ETSI TS 124 229 V8.36.0 (2017-01)

**Digital cellular telecommunications system (Phase 2+) (GSM);
Universal Mobile Telecommunications System (UMTS);
LTE;
IP multimedia call control protocol based on
Session Initiation Protocol (SIP)
and Session Description Protocol (SDP);
Stage 3
(3GPP TS 24.229 version 8.36.0 Release 8)**

Reference
RTS/TSGC-0124229v083600

Keywords
GSM,LTE,UMTS

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:
http://www.etsi.org/standards-search

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status.
Information on the current status of this and other ETSI documents is available at
https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx

If you find errors in the present document, please send your comment to one of the following services:
https://portal.etsi.org/People/CommiteeSupportStaff.aspx

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.
The content of the PDF version shall not be modified without the written authorization of ETSI.
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2017.
All rights reserved.

DECT™, **PLUGTESTS**™, **UMTS**™ and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.
3GPP™ and **LTE**™ are Trade Marks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.
GSM® and the GSM logo are Trade Marks registered and owned by the GSM Association.

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (https://ipr.etsi.org/).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This Technical Specification (TS) has been produced by ETSI 3rd Generation Partnership Project (3GPP).

The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under http://webapp.etsi.org/key/queryform.asp.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Contents

Intellectual Property Rights 2
Foreword 2
Modal verbs terminology 2
Foreword 23
1 Scope 24
2 References 24
3 Definitions and abbreviations 34
3.1 Definitions 34
3.2 Abbreviations 39
3A Interoperability with different IP-CAN 41
4 General 42
4.1 Conformance of IM CN subsystem entities to SIP, SDP and other protocols 42
4.2 URI and address assignments 44
4.2A Transport mechanisms 46
4.2B Security mechanisms 46
4.3 Routeing principles of IM CN subsystem entities 48
4.4 Trust domain 48
4.4.1 General 48
4.4.2 P-Asserted-Identity 49
4.4.3 P-Access-Network-Info 49
4.4.4 History-Info 49
4.4.5 P-Asserted-Service 49
4.4.6 Resource-Priority 49
4.4.7 Reason (in a response) 49
4.4.8 P-Profile-Key 49
4.4.9 P-Served-User 49
4.4.10 P-Private-Network-Indication 49
4.4.11 Void 50
4.4.12 CPC and OLI 50
4.5 Charging correlation principles for IM CN subsystems 50
4.5.1 Overview 50
4.5.2 IM CN subsystem charging identifier (ICID) 50
4.5.3 Access network charging information 51
4.5.3.1 General 51
4.5.3.2 Access network charging information 51
4.5.4 Inter operator identifier (IOI) 51
4.5.5 Charging function addresses 52
4.6 Support of local service numbers 52
4.7 Emergency service 52
4.8 Void 53
4.9 Overlap signalling 53
4.9.1 General 53
4.9.2 Overlap signalling methods 53
4.9.2.1 In-dialog method 53
4.9.2.1.1 General 53
4.9.2.2 Multiple-INVITE method 53
4.9.2.2.1 General 53
4.9.3 Routeing impacts 53
4.9.3.1 General 53
4.9.3.2 Deterministic routeing 54
4.9.3.3 Digit collection 54

5 Application usage of SIP 54
5.1 Procedures at the UE 54
5.1.0 General 54
5.1.1 Registration and authentication 54
5.1.1.1 General 54
5.1.1.1A Parameters contained in the ISIM 55
5.1.1.1B Parameters provisioned to a UE without ISIM or USIM 55
5.1.1.1B.1 Parameters provisioned in the IMC 55
5.1.1.1B.2 Parameters when UE does not contain ISIM, USIM or IMC 56
5.1.1.2 Initial registration 56
5.1.1.2.1 General 56
5.1.1.2.2 Initial registration using IMS AKA 59
5.1.1.2.3 Initial registration using SIP digest without TLS 60
5.1.1.2.4 Initial registration using SIP digest with TLS 60
5.1.1.2.5 Initial registration using NASS-IMS bundled authentication 61
5.1.1.2.6 Initial registration using GPRS-IMS-Bundled authentication 61
5.1.1.3 Subscription to the registration-state event package 62
5.1.1.3A Void 63
5.1.1.4 User-initiated reregistration and registration of an additional public user identity 63
5.1.1.4.1 General 63
5.1.1.4.2 IMS AKA as a security mechanism 65
5.1.1.4.3 SIP digest without TLS as a security mechanism 66
5.1.1.4.4 SIP digest with TLS as a security mechanism 66
5.1.1.4.5 NASS-IMS bundled authentication as a security mechanism 66
5.1.1.4.6 GPRS-IMS-Bundled authentication as a security mechanism 67
5.1.1.5 Authentication 67
5.1.1.5.1 IMS AKA - general 67
5.1.1.5.2 Void 69
5.1.1.5.3 IMS AKA abnormal cases 69
5.1.1.5.4 SIP digest without TLS – general 69
5.1.1.5.5 SIP digest without TLS – abnormal procedures 69
5.1.1.5.6 SIP digest with TLS – general 69
5.1.1.5.7 SIP digest with TLS – abnormal procedures 70
5.1.1.5.8 NASS-IMS bundled authentication – general 70
5.1.1.5.9 NASS-IMS bundled authentication – abnormal procedures 70
5.1.1.5.10 GPRS-IMS-Bundled authentication – general 70
5.1.1.5.11 GPRS-IMS-Bundled authentication – abnormal procedures 70
5.1.1.5.12 Abnormal procedures for all security mechanisms 70
5.1.1.5A Network-initiated re-authentication 70
5.1.1.5B Change of IPv6 address due to privacy 71
5.1.1.6 User-initiated deregistration 72
5.1.1.6.1 General 72
5.1.1.6.2 IMS AKA as a security mechanism 73
5.1.1.6.3 SIP digest without TLS as a security mechanism 74
5.1.1.6.4 SIP digest with TLS as a security mechanism 74
5.1.1.6.5 NASS-IMS bundled authentication as a security mechanism 74
5.1.1.6.6 GPRS-IMS-Bundled authentication as a security mechanism 75
5.1.1.7 Network-initiated deregistration 75
5.1.2 Subscription and notification 76
5.1.2.1 Notification about multiple registered public user identities 76
5.1.2.2 General SUBSCRIBE requirements 77
5.1.2A Generic procedures applicable to all methods excluding the REGISTER method 77
5.1.2A.1 UE-originating case 77
5.1.2A.1.1 General 77
5.1.2A.1.2 Structure of Request-URI 81
5.1.2A.1.3 UE without dial string processing capabilities 81
5.1.2A.1.4 UE with dial string processing capabilities 82
5.1.2A.1.5 Setting the "phone-context" tel URI parameter 82
5.1.2A.1.6 Abnormal cases 82
5.1.2A.2 UE-terminating case 83
5.1.3 Call initiation - UE-originating case 85
5.1.3.1 Initial INVITE request 85

5.1.4 Call initiation - UE-terminating case 87
5.1.4.1 Initial INVITE request 87
5.1.5 Call release 88
5.1.6 Emergency service 88
5.1.6.1 General 88
5.1.6.2 Initial emergency registration 89
5.1.6.2A New initial emergency registration 89
5.1.6.3 Initial subscription to the registration-state event package 89
5.1.6.4 User-initiated emergency reregistration 89
5.1.6.5 Authentication 90
5.1.6.6 User-initiated emergency deregistration 90
5.1.6.7 Network-initiated emergency deregistration 90
5.1.6.8 Emergency session setup 90
5.1.6.8.1 General 90
5.1.6.8.2 Emergency session set-up in case of no registration 90
5.1.6.8.3 Emergency session set-up within an emergency registration 92
5.1.6.8.4 Emergency session setup within a non-emergency registration 94
5.1.6.9 Emergency session release 95
5.1.6.10 Response to non-UE detectable emergency call 95
5.1.7 Void 97
5.1.8 Void 97
5.2 Procedures at the P-CSCF 97
5.2.1 General 97
5.2.2 Registration 99
5.2.2.1 General 99
5.2.2.2 IMS AKA as a security mechanism 102
5.2.2.3 SIP digest without TLS as a security mechanism 106
5.2.2.4 SIP digest with TLS as a security mechanism 106
5.2.2.5 NASS-IMS bundled authentication as a security mechanism 108
5.2.2.6 GPRS-IMS-Bundled authentication as a security mechanism 108
5.2.3 Subscription to the user's registration-state event package 108
5.2.3A Void 109
5.2.4 Registration of multiple public user identities 109
5.2.5 Deregistration 111
5.2.5.1 User-initiated deregistration 111
5.2.5.2 Network-initiated deregistration 111
5.2.6 General treatment for all dialogs and standalone transactions excluding the REGISTER method 112
5.2.6.1 Introduction 112
5.2.6.2 Determination of UE-originated or UE-terminated case 112
5.2.6.3 Requests initiated by the UE 112
5.2.6.3.1 General for all requests 112
5.2.6.3.2 Void 113
5.2.6.3.2A Abnormal cases 113
5.2.6.3.3 Initial request for a dialog 114
5.2.6.3.4 Responses to an initial request for a dialog 115
5.2.6.3.5 Target refresh request for a dialog 116
5.2.6.3.6 Responses to a target refresh request for a dialog 117
5.2.6.3.7 Request for a standalone transaction 117
5.2.6.3.8 Responses to a request for a standalone transaction 118
5.2.6.3.9 Subsequent request other than a target refresh request 118
5.2.6.3.10 Responses to a subsequent request other than a target refresh request 118
5.2.6.3.11 Request for an unknown method that does not relate to an existing dialog 119
5.2.6.3.12 Responses to a request for an unknown method that does not relate to an existing dialog 119
5.2.6.4 Requests terminated by the UE 119
5.2.6.4.1 Void 119
5.2.6.4.2 Void 119
5.2.6.4.3 Initial request for a dialog 119
5.2.6.4.4 Responses to an initial request for a dialog 120
5.2.6.4.5 Target refresh request for a dialog 122
5.2.6.4.6 Responses to a target refresh request for a dialog 122
5.2.6.4.7 Request for a standalone transaction 123
5.2.6.4.8 Responses to a request for a standalone transaction 124

5.2.6.4.9 Subsequent request other than a target refresh request 124
5.2.6.4.10 Responses to a subsequent request other than a target refresh request 125
5.2.6.4.11 Request for an unknown method that does not relate to an existing dialog 125
5.2.6.4.12 Responses to a request for an unknown method that does not relate to an existing dialog 125
5.2.7 Initial INVITE 125
5.2.7.1 Introduction 125
5.2.7.2 UE-originating case 125
5.2.7.3 UE-terminating case 126
5.2.7.4 Access network charging information 126
5.2.8 Call release 126
5.2.8.1 P-CSCF-initiated call release 126
5.2.8.1.1 Cancellation of a session currently being established 126
5.2.8.1.2 Release of an existing session 127
5.2.8.1.3 Abnormal cases 129
5.2.8.1.4 Release of the existing dialogs due to registration expiration and deletion of the security association, IP association or TLS session 129
5.2.8.2 Call release initiated by any other entity 129
5.2.8.3 Session expiration 129
5.2.9 Subsequent requests 129
5.2.9.1 UE-originating case 129
5.2.9.2 UE-terminating case 130
5.2.10 Emergency service 130
5.2.10.1 General 130
5.2.10.2 General treatment for all dialogs and standalone transactions excluding the REGISTER method – requests from an unregistered user 130
5.2.10.2A General treatment for all dialogs and standalone transactions excluding the REGISTER method – requests to an unregistered user 131
5.2.10.3 General treatment for all dialogs and standalone transactions excluding the REGISTER method after emergency registration 132
5.2.10.4 General treatment for all dialogs and standalone transactions excluding the REGISTER method - non-emergency registration 133
5.2.10.5 Abnormal cases 135
5.2.11 Void 136
5.3 Procedures at the I-CSCF 136
5.3.1 Registration procedure 136
5.3.1.1 General 136
5.3.1.2 Normal procedures 136
5.3.1.3 Abnormal cases 137
5.3.2 Initial requests 138
5.3.2.1 Normal procedures 138
5.3.2.1A Originating procedures for requests containing the "orig" parameter 141
5.3.2.2 Abnormal cases 143
5.3.3 Void 144
5.3.3.1 Void 144
5.3.3.2 Void 144
5.3.3.3 Void 144
5.3.4 Void 144
5.4 Procedures at the S-CSCF 144
5.4.0 General 144
5.4.1 Registration and authentication 144
5.4.1.1 Introduction 144
5.4.1.2 Initial registration and user-initiated reregistration 145
5.4.1.2.1 Unprotected REGISTER 145
5.4.1.2.1A Challenge with IMS AKA as security mechanism 147
5.4.1.2.1B Challenge with SIP digest as security mechanism 147
5.4.1.2.1C Challenge with SIP digest with TLS as security mechanism 148
5.4.1.2.1D Initial registration and user-initiated reregistration for NASS-IMS bundled authentication 148
5.4.1.2.1E Initial registration and user-initiated reregistration for GPRS-IMS-Bundled authentication 149
5.4.1.2.2 Protected REGISTER with IMS AKA as a security mechanism 150
5.4.1.2.2A Protected REGISTER with SIP digest as a security mechanism 153
5.4.1.2.2B Protected REGISTER with SIP digest with TLS as a security mechanism 156
5.4.1.2.2C NASS-IMS bundled authentication as a security mechanism 156

5.4.1.2.2D GPRS-IMS-Bundled authentication as a security mechanism....156
5.4.1.2.2E Protected REGISTER – Authentication already performed....156
5.4.1.2.2F Successful registration....158
5.4.1.2.3 Abnormal cases - general....159
5.4.1.2.3A Abnormal cases – IMS AKA as security mechanism....160
5.4.1.2.3B Abnormal cases – SIP digest as security mechanism....161
5.4.1.2.3C Abnormal cases – SIP digest with TLS as security mechanism....161
5.4.1.2.3D Abnormal cases – NASS-IMS bundled authentication as security mechanism....161
5.4.1.2.3E Abnormal cases – GPRS-IMS-Bundled authentication as security mechanism....161
5.4.1.3 Authentication and reauthentication....161
5.4.1.4 User-initiated deregistration....162
5.4.1.4.1 Normal cases....162
5.4.1.4.2 Abnormal cases - IMS AKA as security mechanism....163
5.4.1.4.4 Abnormal cases – SIP digest with TLS as security mechanism....163
5.4.1.4.5 Abnormal cases – NASS-IMS bundled authentication as security mechanism....163
5.4.1.4.6 Abnormal cases – GPRS-IMS-Bundled authentication as security mechanism....164
5.4.1.5 Network-initiated deregistration....164
5.4.1.6 Network-initiated reauthentication....166
5.4.1.7 Notification of Application Servers about registration status....166
5.4.1.7A Including contents in the body of the third-party REGISTER request....168
5.4.1.8 Service profile updates....168
5.4.2 Subscription and notification....169
5.4.2.1 Subscriptions to S-CSCF events....169
5.4.2.1.1 Subscription to the event providing registration state....169
5.4.2.1.2 Notification about registration state....170
5.4.2.1.3 Void....174
5.4.2.1.4 Void....174
5.4.3 General treatment for all dialogs and standalone transactions excluding requests terminated by the S-CSCF....174
5.4.3.1 Determination of UE-originated or UE-terminated case....174
5.4.3.2 Requests initiated by the served user....174
5.4.3.3 Requests terminated at the served user....181
5.4.3.4 Original dialog identifier....188
5.4.3.5 Void....189
5.4.3.6 SIP digest authentication procedures for all SIP request methods initiated by the UE excluding REGISTER....189
5.4.3.6.1 General....189
5.4.3.6.2 Abnormal cases....190
5.4.4 Call initiation....190
5.4.4.1 Initial INVITE....190
5.4.4.2 Subsequent requests....191
5.4.4.2.1 UE-originating case....191
5.4.4.2.2 UE-terminating case....191
5.4.5 Call release....192
5.4.5.1 S-CSCF-initiated session release....192
5.4.5.1.1 Cancellation of a session currently being established....192
5.4.5.1.2 Release of an existing session....192
5.4.5.1.2A Release of the existing dialogs due to registration expiration....194
5.4.5.1.3 Abnormal cases....194
5.4.5.2 Session release initiated by any other entity....194
5.4.5.3 Session expiration....194
5.4.6 Call-related requests....194
5.4.6.1 ReINVITE....194
5.4.6.1.1 Determination of served user....194
5.4.6.1.2 UE-originating case....194
5.4.6.1.3 UE-terminating case....195
5.4.7 Void....195
5.4.7A GRUU management....195
5.4.7A.1 Overview of GRUU operation....195
5.4.7A.2 Representation of public GRUUs....195
5.4.7A.3 Representation of temporary GRUUs....196
5.4.7A.4 GRUU recognition and validity....196

5.4.8 Emergency service 197
5.4.8.1 General 197
5.4.8.2 Initial emergency registration or user-initiated emergency reregistration 197
5.4.8.3 User-initiated emergency deregistration 198
5.4.8.4 Network-initiated emergency deregistration 198
5.4.8.5 Network-initiated emergency reauthentication 198
5.4.8.6 Subscription to the event providing registration state 198
5.4.8.7 Notification of the registration state 198
5.5 Procedures at the MGCF 198
5.5.1 General 198
5.5.2 Subscription and notification 199
5.5.3 Call initiation 199
5.5.3.1 Initial INVITE 199
5.5.3.1.1 Calls originated from circuit-switched networks 199
5.5.3.1.2 Calls terminating in circuit-switched networks 200
5.5.3.2 Subsequent requests 201
5.5.3.2.1 Calls originating in circuit-switched networks 201
5.5.3.2.2 Calls terminating in circuit-switched networks 201
5.5.4 Call release 201
5.5.4.1 Call release initiated by a circuit-switched network 201
5.5.4.2 IM CN subsystem initiated call release 201
5.5.4.3 MGW-initiated call release 201
5.5.5 Call-related requests 201
5.5.5.1 ReINVITE 201
5.5.5.1.1 Calls originating from circuit-switched networks 201
5.5.5.1.2 Calls terminating in circuit-switched networks 202
5.5.6 Further initial requests 202
5.6 Procedures at the BGCF 202
5.6.1 General 202
5.6.2 Common BGCF procedures 202
5.7 Procedures at the Application Server (AS) 204
5.7.1 Common Application Server (AS) procedures 204
5.7.1.1 Notification about registration status 204
5.7.1.2 Extracting charging correlation information 205
5.7.1.3 Access-Network-Info and Visited-Network-ID 205
5.7.1.3A Determination of the served user 205
5.7.1.3A.1 General 205
5.7.1.3A.2 AS serving an originating user 205
5.7.1.3A.3 AS serving a terminating user 205
5.7.1.4 User identify verification at the AS 206
5.7.1.5 Request authorization 208
5.7.1.6 Event notification throttling 208
5.7.1.7 Local numbering 208
5.7.1.7.1 Interpretation of the numbers in a non-international format 208
5.7.1.7.2 Translation of the numbersin a non-international format 209
5.7.1.8 GRUU assignment and usage 209
5.7.1.9 Use of ICSI and IARI values 210
5.7.1.10 Carrier selection 211
5.7.1.11 Void 211
5.7.1.12 Void 211
5.7.1.13 CPC and OLI 211
5.7.2 Application Server (AS) acting as terminating UA, or redirect server 211
5.7.3 Application Server (AS) acting as originating UA 212
5.7.4 Application Server (AS) acting as a SIP proxy 214
5.7.5 Application Server (AS) performing 3rd party call control 214
5.7.5.1 General 214
5.7.5.2 Call initiation 215
5.7.5.2.1 Initial INVITE 215
5.7.5.2.2 Subsequent requests 216
5.7.5.3 Call release 216
5.7.5.4 Call-related requests 216
5.7.5.5 Further initial requests 216

5.7.6 Void 216
5.8 Procedures at the MRFC 216
5.8.1 General 216
5.8.2 Call initiation 217
5.8.2.1 Initial INVITE 217
5.8.2.1.1 MRFC-terminating case 217
5.8.2.1.1.1 Introduction 217
5.8.2.1.2 MRFC-originating case 218
5.8.2.2 Subsequent requests 218
5.8.2.2.1 Tones and announcements 218
5.8.2.2.2 Transcoding 218
5.8.3 Call release 218
5.8.3.1 S-CSCF-initiated call release 218
5.8.3.1.1 Tones and announcements 218
5.8.3.2 MRFC-initiated call release 218
5.8.3.2.1 Tones and announcements 218
5.8.4 Call-related requests 219
5.8.4.1 ReINVITE 219
5.8.4.1.1 MRFC-terminating case 219
5.8.4.1.2 MRFC-originating case 219
5.8.4.2 REFER 219
5.8.4.2.1 MRFC-terminating case 219
5.8.4.2.2 MRFC-originating case 219
5.8.4.2.3 REFER initiating a new session 219
5.8.4.2.4 REFER replacing an existing session 219
5.8.4.3 INFO 219
5.8.5 Further initial requests 219
5.9 Void 220
5.9.1 Void 220
5.10 Procedures at the IBCF 220
5.10.1 General 220
5.10.2 IBCF as an exit point 220
5.10.2.1 Registration 220
5.10.2.1A General 221
5.10.2.2 Initial requests 221
5.10.2.3 Subsequent requests 222
5.10.2.4 IBCF-initiated call release 222
5.10.3 IBCF as an entry point 223
5.10.3.1 Registration 223
5.10.3.1A General 223
5.10.3.2 Initial requests 223
5.10.3.3 Subsequent requests 225
5.10.3.4 IBCF-initiated call release 225
5.10.4 THIG functionality in the IBCF 225
5.10.4.1 General 225
5.10.4.2 Encryption for network topology hiding 226
5.10.4.3 Decryption for network topology hiding 227
5.10.5 IMS-ALG functionality in the IBCF 227
5.10.6 Screening of SIP signalling 228
5.10.6.1 General 228
5.10.6.2 IBCF procedures for SIP header fields 228
5.10.6.3 IBCF procedures for SIP message bodies 229
5.10.7 Media transcoding control 229
5.10.7.1 General 229
5.10.7.2 Media transcoding control procedures 229
5.11 Procedures at the E-CSCF 230
5.11.1 General 230
5.11.2 UE originating case 230

6 Application usage of SDP 232
6.1 Procedures at the UE 232
6.1.1 General 232

6.1.2 Handling of SDP at the originating UE 234
6.1.3 Handling of SDP at the terminating UE 235
6.2 Procedures at the P-CSCF 235
6.3 Procedures at the S-CSCF 236
6.4 Procedures at the MGCF 237
6.4.1 Calls originating from circuit-switched networks 237
6.4.2 Calls terminating in circuit-switched networks 237
6.5 Procedures at the MRFC 237
6.6 Procedures at the AS 238
6.7 Procedures at the IMS-ALG functionality 238

7 Extensions within the present document 238
7.1 SIP methods defined within the present document 238
7.2 SIP header fields defined within the present document 238
7.2.0 General 238
7.2.1 Void 239
7.2.2 Void 239
7.2.3 Void 239
7.2.4 Void 239
7.2.5 Void 239
7.2.6 Void 239
7.2.7 Void 239
7.2.8 Void 239
7.2.9 Void 239
7.2.10 Void 239
7.2A Extensions to SIP header fields defined within the present document 239
7.2A.1 Extension to WWW-Authenticate header field 239
7.2A.1.1 Introduction 239
7.2A.1.2 Syntax 239
7.2A.1.3 Operation 239
7.2A.2 Extension to Authorization header field 240
7.2A.2.1 Introduction 240
7.2A.2.2 Syntax 240
7.2A.2.3 Operation 240
7.2A.3 Tokenized-by header field parameter definition (various header fields) 241
7.2A.3.1 Introduction 241
7.2A.3.2 Syntax 241
7.2A.3.3 Operation 241
7.2A.4 P-Access-Network-Info header field 241
7.2A.4.1 Introduction 241
7.2A.4.2 Syntax 241
7.2A.4.3 Additional coding rules for P-Access-Network-Info header field 242
7.2A.5 P-Charging-Vector header field 244
7.2A.5.1 Introduction 244
7.2A.5.2 Syntax 244
7.2A.5.2.1 General 244
7.2A.5.2.2 GPRS as IP-CAN 245
7.2A.5.2.3 I-WLAN as IP-CAN 245
7.2A.5.2.4 xDSL as IP-CAN 245
7.2A.5.2.5 DOCSIS as IP-CAN 246
7.2A.5.2.6 cdma2000® packet data subsystem as IP-CAN 246
7.2A.5.2.7 EPS as IP-CAN 246
7.2A.5.2.8 Ethernet as IP-CAN 247
7.2A.5.3 Operation 247
7.2A.6 Orig parameter definition 247
7.2A.6.1 Introduction 247
7.2A.6.2 Syntax 247
7.2A.6.3 Operation 247
7.2A.7 Extension to Security-Client, Security-Server and Security-Verify header fields 248
7.2A.7.1 Introduction 248
7.2A.7.2 Syntax 248
7.2A.7.3 Operation 248

7.2A.8 IMS Communication Service Identifier (ICSI) 248
7.2A.8.1 Introduction 248
7.2A.8.2 Coding of the ICSI 248
7.2A.9 IMS Application Reference Identifier (IARI) 248
7.2A.9.1 Introduction 248
7.2A.9.2 Coding of the IARI 249
7.2A.10 "phone-context" tel URI parameter 249
7.2A.10.1 Introduction 249
7.2A.10.2 Syntax 249
7.2A.10.3 Additional coding rules for "phone-context" tel URI parameter 249
7.2A.11 Void 250
7.2A.11.1 Void 250
7.2A.11.2 Void 250
7.2A.11.3 Void 250
7.2A.12 CPC and OLI tel URI parameter definition 250
7.2A.12.1 Introduction 250
7.2A.12.2 Syntax 250
7.2A.12.3 Operation 251
7.2A.13 "sos" SIP URI parameter 251
7.2A.13.1 Introduction 251
7.2A.13.2 Syntax 251
7.2A.13.3 Operation 251
7.3 Option-tags defined within the present document 252
7.4 Status-codes defined within the present document 252
7.5 Session description types defined within the present document 252
7.6 3GPP IM CN subsystem XML body 252
7.6.1 General 252
7.6.2 Document Type Definition 252
7.6.3 XML Schema description 253
7.6.4 MIME type definition 254
7.6.4.1 Introduction 254
7.6.4.2 Syntax 254
7.6.4.3 Operation 254
7.6.5 IANA Registration 255
7.7 SIP timers 256
7.8 IM CN subsystem timers 257
7.9 Media feature tags defined within the current document 257
7.9.1 General 257
7.9.2 Definition of media feature tag g.3gpp.icsi-ref 258
7.9.3 Definition of media feature tag g.3gpp.iari-ref 258
7.10 Reg-event package extensions defined within the current document 259
7.10.1 General 259
7.10.2 Reg-Event package extension to transport wildcarded public user identities 259
7.10.2.1 Structure and data semantics 259
7.10.2.2 XML Schema 259
7.11 Void 260
7.12 Info package definitions and associated MIME type definitions 260
7.12.1 Session-info MIME type 260
7.12.1.1 Legacy INFO usage 260
7.12.1.2 Overlap digit message body 260
7.12.1.2.1 Scope 260
7.12.1.2.2 MIME type 260
7.12.1.2.3 ABNF 260
7.12.1.2.4 IANA registration template 260

8 SIP compression 262
8.1 SIP compression procedures at the UE 262
8.1.1 SIP compression 262
8.1.2 Compression of SIP requests and responses transmitted to the P-CSCF 262
8.1.3 Decompression of SIP requests and responses received from the P-CSCF 263
8.2 SIP compression procedures at the P-CSCF 263
8.2.1 SIP compression 263

8.2.2 Compression of SIP requests and responses transmitted to the UE 263
8.2.3 Decompression of SIP requests and responses received from the UE 263

9 IP-Connectivity Access Network aspects when connected to the IM CN subsystem 264
9.1 Introduction 264
9.2 Procedures at the UE 264
9.2.1 Connecting to the IP-CAN and P-CSCF discovery 264
9.2.2 Handling of the IP-CAN 265
9.2.3 Special requirements applying to forked responses 265

10 Media control 265
10.1 General 265
10.2 Procedures at the AS 265
10.2.1 General 265
10.2.2 Tones and announcements 266
10.2.2.1 General 266
10.2.2.2 Basic network media services with SIP 266
10.2.2.3 SIP interface to VoiceXML media services 266
10.2.2.4 Media control channel framework and packages 266
10.2.3 Ad-hoc conferences 266
10.2.3.1 General 266
10.2.3.2 Basic network media services with SIP 267
10.2.3.3 Media control channel framework and packages 267
10.2.4 Transcoding 267
10.2.4.1 General 267
10.2.4.2 Basic network media services with SIP 267
10.2.4.3 Media control channel framework and packages 267
10.3 Procedures at the MRFC 267
10.3.1 General 267
10.3.2 Tones and announcements 268
10.3.2.1 General 268
10.3.2.2 Basic network media services with SIP 268
10.3.2.3 SIP interface to VoiceXML media services 268
10.3.2.4 Media control channel framework and packages 268
10.3.3 Ad-hoc conferences 268
10.3.3.1 General 268
10.3.3.2 Basic network media services with SIP 269
10.3.3.3 Media control channel framework and packages 269
10.3.4 Transcoding 269
10.3.4.1 General 269
10.3.4.2 Basic network media services with SIP 269
10.3.4.3 Media control channel framework and packages 269

Annex A (normative): Profiles of IETF RFCs for 3GPP usage 270

A.1 Profiles 270
A.1.1 Relationship to other specifications 270
A.1.2 Introduction to methodology within this profile 270
A.1.3 Roles 272

A.2 Profile definition for the Session Initiation Protocol as used in the present document 275
A.2.1 User agent role 275
A.2.1.1 Introduction 275
A.2.1.2 Major capabilities 276
A.2.1.3 PDUs 284
A.2.1.4 PDU parameters 285
A.2.1.4.1 Status-codes 285
A.2.1.4.2 ACK method 288
A.2.1.4.3 BYE method 290
A.2.1.4.4 CANCEL method 297
A.2.1.4.5 COMET method 300
A.2.1.4.6 INFO method 300
A.2.1.4.7 INVITE method 307

A.2.1.4.7A MESSAGE method 318
A.2.1.4.8 NOTIFY method 325
A.2.1.4.9 OPTIONS method 332
A.2.1.4.10 PRACK method 339
A.2.1.4.10A PUBLISH method 345
A.2.1.4.11 REFER method 353
A.2.1.4.12 REGISTER method 360
A.2.1.4.13 SUBSCRIBE method 367
A.2.1.4.14 UPDATE method 375
A.2.2 Proxy role 382
A.2.2.1 Introduction 382
A.2.2.2 Major capabilities 383
A.2.2.3 PDUs 390
A.2.2.4 PDU parameters 391
A.2.2.4.1 Status-codes 391
A.2.2.4.2 ACK method 394
A.2.2.4.3 BYE method 396
A.2.2.4.4 CANCEL method 403
A.2.2.4.5 COMET method 406
A.2.2.4.6 INFO method 406
A.2.2.4.7 INVITE method 413
A.2.2.4.7A MESSAGE method 426
A.2.2.4.8 NOTIFY method 435
A.2.2.4.9 OPTIONS method 443
A.2.2.4.10 PRACK method 451
A.2.2.4.10A PUBLISH method 458
A.2.2.4.11 REFER method 467
A.2.2.4.12 REGISTER method 476
A.2.2.4.13 SUBSCRIBE method 483
A.2.2.4.14 UPDATE method 492

A.3 Profile definition for the Session Description Protocol as used in the present document 499
A.3.1 Introduction 499
A.3.2 User agent role 499
A.3.2.1 Major capabilities 500
A.3.2.2 SDP types 501
A.3.2.3 Void 505
A.3.2.4 Void 505
A.3.3 Proxy role 505
A.3.3.1 Major capabilities 506
A.3.3.2 SDP types 507
A.3.3.3 Void 511
A.3.3.4 Void 511

A.4 Profile definition for other message bodies as used in the present document 511

Annex B (normative): IP-Connectivity Access Network specific concepts when using GPRS to access IM CN subsystem 512

B.1 Scope 512

B.2 GPRS aspects when connected to the IM CN subsystem 512
B.2.1 Introduction 512
B.2.2 Procedures at the UE 512
B.2.2.1 PDP context activation and P-CSCF discovery 512
B.2.2.1A Modification of a PDP context used for SIP signalling 514
B.2.2.1B Re-establishment of the PDP context for SIP signalling 514
B.2.2.2 Session management procedures 515
B.2.2.3 Mobility management procedures 515
B.2.2.4 Cell selection and lack of coverage 515
B.2.2.5 PDP contexts for media 515
B.2.2.5.1 General requirements 515
B.2.2.5.1A Activation or modification of PDP contexts for media by the UE 515

B.2.2.5.1B Activation or modification of PDP contexts for media by the GGSN 517
B.2.2.5.2 Special requirements applying to forked responses 517
B.2.2.5.3 Unsuccessful situations 517
B.2.2.6 Emergency service 517

B.2A Usage of SDP 518
B.2A.1 Impact on SDP offer / answer of activation or modification of PDP contexts for media by the network 518
B.2A.2 Handling of SDP at the terminating UE when originating UE has resources available and IP-CAN performs network-initiated resource reservation for terminating UE 519

B.3 Application usage of SIP 519
B.3.1 Procedures at the UE 519
B.3.1.1 P-Access-Network-Info header field 519
B.3.1.2 Availability for calls 519
B.3.2 Procedures at the P-CSCF 519
B.3.2.1 Determining network to which the originating user is attached 519
B.3.2.2 Location information handling 519
B.3.3 Procedures at the S-CSCF 520
B.3.3.1 Notification of AS about registration status 520

B.4 3GPP specific encoding for SIP header field extensions 520
B.4.1 Void 520

B.5 Use of circuit-switched domain 520

Annex C (normative): UICC and USIM Aspects for access to the IM CN subsystem 521

C.1 Scope 521

C.2 Derivation of IMS parameters from USIM 521

C.3 ISIM Location in 3GPP Systems 521

C.4 Update of IMS parameters on the UICC 521

Annex D (normative): IP-Connectivity Access Network specific concepts when using I-WLAN to access IM CN subsystem 522

D.1 Scope 522

D.2 I-WLAN aspects when connected to the IM CN subsystem 522
D.2.1 Introduction 522
D.2.2 Procedures at the WLAN UE 522
D.2.2.1 I-WLAN tunnel activation and P-CSCF discovery 522
D.2.2.1A Modification of a I-WLAN tunnel used for SIP signalling 523
D.2.2.1B Re-establishment of the I-WLAN tunnel used for SIP signalling 523
D.2.2.2 Void 523
D.2.2.3 Void 523
D.2.2.4 Void 523
D.2.2.5 I-WLAN tunnel procedures for media 523
D.2.2.5.1 General requirements 523
D.2.2.5.1A Activation or modification of I-WLAN tunnel for media by the UE 523
D.2.2.5.1B Activation or modification of I-WLAN tunnel for media by the network 523
D.2.2.5.2 Special requirements applying to forked responses 523
D.2.2.5.3 Unsuccessful situations 524
D.2.2.6 Emergency service 524
D.2A Usage of SDP 524
D.2A.1 Impact on SDP offer / answer of activation or modification of I-WLAN tunnel for media by the network 524
D.2A.2 Handling of SDP at the terminating UE when originating UE has resources available and IP-CAN performs network-initiated resource reservation for terminating UE 524

D.3 Application usage of SIP 524
D.3.1 Procedures at the UE 524
D.3.1.1 P-Access-Network-Info header field 524
D.3.1.2 Availability for calls 524

D.3.2 Procedures at the P-CSCF 524
D.3.2.1 Determining network to which the originating user is attached 524
D.3.2.2 Location information handling 524
D.3.3 Procedures at the S-CSCF 524
D.3.3.1 Notification of AS about registration status 524
D.4 3GPP specific encoding for SIP header field extensions 525
D.5 Use of circuit-switched domain 525
Annex E (normative): IP-Connectivity Access Network specific concepts when using xDSL or Ethernet to access IM CN subsystem 526
E.1 Scope 526
E.2 Fixed broadband aspects when connected to the IM CN subsystem 526
E.2.1 Introduction 526
E.2.2 Procedures at the UE 526
E.2.2.1 Activation and P-CSCF discovery 526
E.2.2.1A Modification of a fixed-broadband connection used for SIP signalling 527
E.2.2.1B Re-establishment of a fixed-broadband connection used for SIP signalling 527
E.2.2.2 Void 527
E.2.2.3 Void 527
E.2.2.4 Void 527
E.2.2.5 Fixed-broadband bearer(s) for media 527
E.2.2.5.1 General requirements 527
E.2.2.5.1A Activation or modification of fixed-broadband bearers for media by the UE 527
E.2.2.5.1B Activation or modification of fixed-broadband bearers for media by the network 527
E.2.2.5.2 Special requirements applying to forked responses 527
E.2.2.5.3 Unsuccessful situations 528
E.2.2.6 Emergency service 528
E.2A Usage of SDP 528
E.2A.1 Impact on SDP offer / answer of activation or modification of xDSL bearer for media by the network 528
E.2A.2 Handling of SDP at the terminating UE when originating UE has resources available and IP-CAN performs network-initiated resource reservation for terminating UE 528
E.3 Application usage of SIP 528
E.3.1 Procedures at the UE 528
E.3.1.1 P-Access-Network-Info header field 528
E.3.1.2 Availability for calls 528
E.3.2 Procedures at the P-CSCF 528
E.3.2.1 Determining network to which the originating user is attached 528
E.3.2.2 Location information handling 529
E.3.3 Procedures at the S-CSCF 529
E.3.3.1 Notification of AS about registration status 529
E.4 3GPP specific encoding for SIP header field extensions 529
E.5 Use of circuit-switched domain 529
Annex F (normative): Additional procedures in support for hosted NAT 530
F.1 Scope 530
F.2 Application usage of SIP 530
F.2.1 UE usage of SIP 530
F.2.1.1 General 530
F.2.1.2 Registration and authentication 530
F.2.1.2.1 General 530
F.2.1.2.1A Parameters contained in the ISIM 530
F.2.1.2.1B Parameters provisioned to a UE without ISIM or USIM 531
F.2.1.2.2 Initial registration 531
F.2.1.2.3 Initial subscription to the registration-state event package 532
F.2.1.2.4 User-initiated re-registration 532

F.2.1.2.5 Authentication 533
F.2.1.2.5.1 IMS AKA - general 533
F.2.1.2.5.2 Void 533
F.2.1.2.5.3 IMS AKA abnormal cases 533
F.2.1.2.5.4 SIP digest – general 533
F.2.1.2.5.5 SIP digest – abnormal procedures 533
F.2.1.2.5.6 SIP digest with TLS – general 533
F.2.1.2.5.7 SIP digest with TLS – abnormal procedures 533
F.2.1.2.5.8 Abnormal procedures for all security mechanisms 534
F.2.1.2.5A Network-initiated re-authentication 534
F.2.1.2.5B Change of IPv6 address due to privacy 534
F.2.1.2.6 User-initiated deregistration 534
F.2.1.2.7 Network-initiated deregistration 534
F.2.1.3 Subscription and notification 534
F.2.1.4 Generic procedures applicable to all methods excluding the REGISTER method 534
F.2.1.4.1 UE originating case 534
F.2.1.4.2 UE terminating case 535
F.2.2 P-CSCF usage of SIP 536
F.2.2.1 Introduction 536
F.2.2.2 Registration 536
F.2.3 S-CSCF usage of SIP 538
F.2.3.1 S-CSCF usage of SIP 538
F.2.3.1.1 Protected REGISTER with IMS AKA as a security mechanism 538

F.3 Application usage of SDP 538
F.3.1 UE usage of SDP 538

F.3.2 P-CSCF usage of SDP 539
F.3.2.1 Introduction 539
F.3.2.2 Receipt of an SDP offer 539
F.3.2.3 Receipt of an SDP answer 539
F.3.2.4 Change of media connection data 539

F.4 P-CSCF usage of SIP in case UDP encapsulated IPsec is not employed 539
F.4.1 Introduction 539
F.4.2 Registration 539
F.4.3 General treatment for all dialogs and standalone transactions excluding the REGISTER method 540
F.4.3.1 Introduction 540
F.4.3.2 Request initiated by the UE 540
F.4.3.3 Request terminated by the UE 541

F.5 NAT traversal for media flows 542

Annex G (normative): Additional procedures in support of NA(P)T and NA(P)T-PT controlled by the P-CSCF 543

G.1 Scope 543

G.2 P-CSCF usage of SDP 543
G.2.1 Introduction 543
G.2.2 Receipt of an SDP offer 543
G.2.3 Receipt of an SDP answer 543
G.2.4 Change of media connection data 543

Annex H (normative): IP-Connectivity Access Network specific concepts when using DOCSIS to access IM CN subsystem 545

H.1 Scope 545

H.2 DOCSIS aspects when connected to the IM CN subsystem 545
H.2.1 Introduction 545
H.2.2 Procedures at the UE 545
H.2.2.1 Activation and P-CSCF discovery 545
H.2.2.1A Modification of IP-CAN used for SIP signalling 545
H.2.2.1B Re-establishment of the IP-CAN used for SIP signalling 545

H.2.2.2 Void 546
H.2.2.3 Void 546
H.2.2.4 Void 546
H.2.2.5 Handling of the IP-CAN for media 546
H.2.2.5.1 General requirements 546
H.2.2.5.1A Activation or modification of IP-CAN for media by the UE 546
H.2.2.5.1B Activation or modification of IP-CAN for media by the network 546
H.2.2.5.2 Special requirements applying to forked responses 546
H.2.2.5.3 Unsuccessful situations 546
H.2.2.6 Emergency service 546
H.2A Usage of SDP 546
H.2A.1 Impact on SDP offer / answer of activation or modification of IP-CAN for media by the network 546
H.2A.2 Handling of SDP at the terminating UE when originating UE has resources available and IP-CAN performs network-initiated resource reservation for terminating UE 546

H.3 Application usage of SIP 547
H.3.1 Procedures at the UE 547
H.3.1.1 P-Access-Network-Info header field 547
H.3.1.2 Availability for calls 547
H.3.2 Procedures at the P-CSCF 547
H.3.2.1 Determining network to which the originating user is attached 547
H.3.2.2 Location information handling 547
H.3.3 Procedures at the S-CSCF 547
H.3.3.1 Notification of AS about registration status 547

H.4 3GPP specific encoding for SIP header field extensions 547

H.5 Use of circuit-switched domain 547

Annex I (normative): Additional routeing capabilities in support of transit traffic in IM CN subsystem 549

I.1 Scope 549

I.2 Procedures 549

Annex J (normative): Void 551

Annex K (normative): Additional procedures in support of UE managed NAT traversal 552

K.1 Scope 552

K.2 Application usage of SIP 552
K.2.1 Procedures at the UE 552
K.2.1.1 General 552
K.2.1.2 Registration and authentication 552
K.2.1.2.1 General 552
K.2.1.2.1A Parameters contained in the ISIM 552
K.2.1.2.1B Parameters provisioned to a UE without ISIM or USIM 552
K.2.1.2.2 Initial registration 553
K.2.1.2.2.1 General 553
K.2.1.2.2.2 Initial registration using IMS AKA 554
K.2.1.2.2.3 Initial registration using SIP digest without TLS 554
K.2.1.2.2.4 Initial registration using SIP digest with TLS 554
K.2.1.2.2.5 Initial registration using NASS-IMS bundled authentication 554
K.2.1.2.3 Initial subscription to the registration-state event package 554
K.2.1.2.4 User-initiated re-registration 555
K.2.1.2.4.1 General 555
K.2.1.2.4.2 IMS AKA as a security mechanism 555
K.2.1.2.4.3 SIP Digest without TLS as a security mechanism 555
K.2.1.2.4.4 SIP Digest with TLS as a security mechanism 555
K.2.1.2.4.5 NASS-IMS bundled authentication as a security mechanism 555
K.2.1.2.5 Authentication 556
K.2.1.2.5.1 IMS AKA – general 556
K.2.1.2.5.2 Void 556

K.2.1.2.5.3 IMS AKA abnormal cases 556
K.2.1.2.5.4 SIP digest without TLS – general 556
K.2.1.2.5.5 SIP digest without TLS – abnormal procedures 556
K.2.1.2.5.6 SIP digest with TLS – general 556
K.2.1.2.5.7 SIP digest with TLS – abnormal procedures 556
K.2.1.2.5.8 NASS-IMS bundled authentication – general 556
K.2.1.2.5.9 NASS-IMS bundled authentication – abnormal procedures 557
K.2.1.2.5.10 Abnormal procedures for all security mechanisms 557
K.2.1.2.5A Network initiated re-authentication 557
K.2.1.2.5B Change of IPv6 address due to privacy 557
K.2.1.2.6 User-initiated deregistration 557
K.2.1.2.6.1 General 557
K.2.1.2.6.2 IMS AKA as a security mechanism 557
K.2.1.2.6.3 SIP digest as a security mechanism 557
K.2.1.2.6.4 SIP digest with TLS as a security mechanism 558
K.2.1.2.6.5 Initial registration using NASS-IMS bundled authentication 558
K.2.1.2.7 Network-initiated deregistration 558
K.2.1.3 Subscription and notification 558
K.2.1.4 Generic procedures applicable to all methods excluding the REGISTER method 558
K.2.1.4.1 UE-originating case 558
K.2.1.4.2 UE-terminating case 559
K.2.1.5 Maintaining flows and detecting flow failures 559
K.2.1.6 Emergency services 559
K.2.1.6.1 General 559
K.2.1.6.2 Initial emergency registration 559
K.2.1.6.2A New initial emergency registration 559
K.2.1.5A.3 Initial subscription to the registration-state event package 560
K.2.1.6.4 User-initiated emergency reregistration 560
K.2.1.6.5 Authentication 560
K.2.1.6.6 User-initiated emergency deregistration 560
K.2.1.6.7 Network-initiated emergency deregistration 560
K.2.1.6.8 Emergency session setup 560
K.2.1.6.8.1 General 560
K.2.1.6.8.2 Emergency session set-up in case of no registration 560
K.2.1.6.8.3 Emergency session set-up with an emergency registration 560
K.2.1.6.8.4 Emergency session set-up within a non-emergency registration 560
K.2.1.6.9 Emergency session release 560
K.2.2 Procedures at the P-CSCF 560
K.2.2.1 Introduction 560
K.2.2.2 Registration 561
K.2.2.2.1 General 561
K.2.2.2.2 IMS AKA as a security mechanism 561
K.2.2.2.3 SIP digest as a security mechanism 563
K.2.2.2.4 SIP digest with TLS as a security mechanism 563
K.2.2.2.5 NASS-IMS bundled authentication as a security mechanism 564
K.2.2.3 General treatment for all dialogs and standalone transactions excluding the REGISTER method 564
K.2.2.3.1 Requests initiated by the UE 564
K.2.2.3.1.1 General for all requests 564
K.2.2.3.1.2 General for all responses 564
K.2.2.3.1.2A Abnormal cases 565
K.2.2.3.1.3 Initial request for a dialog 565
K.2.2.3.1.4 Responses to an initial request for a dialog 565
K.2.2.3.1.5 Target refresh request for a dialog 565
K.2.2.3.1.6 Responses to a target refresh request for a dialog 565
K.2.2.3.1.7 Request for a standalone transaction 565
K.2.2.3.1.8 Responses to a request for a standalone transaction 565
K.2.2.3.1.9 Subsequent request other than a target refresh request 565
K.2.2.3.1.10 Responses to a subsequent request other than a target refresh request 565
K.2.2.3.1.11 Request for an unkown method that does not relate to an existing dialog 565
K.2.2.3.1.12 Responses to a request for an unkown method that does not relate to an existing dialog 565
K.2.2.3.2 Requests terminated by the UE 565
K.2.2.3.2.1 General for all requests 565

K.2.2.3.2.2 General for all responses 565
K.2.2.3.2.3 Initial request for a dialog....566
K.2.2.3.2.4 Responses to an initial request for a dialog 566
K.2.2.3.2.5 Target refresh request for a dialog....566
K.2.2.3.2.6 Responses to a target refresh request for a dialog 566
K.2.2.3.2.7 Request for a standalone transaction 566
K.2.2.3.2.8 Responses to a request for a standalone transaction 566
K.2.2.3.2.9 Subsequent request other than a target refresh request....566
K.2.2.3.2.10 Responses to a subsequent request other than a target refresh request....566
K.2.2.3.2.11 Request for an unknown method that does not relate to an existing dialog....566
K.2.2.3.2.12 Responses to a request for an unknown method that does not relate to an existing dialog 567
K.2.2.4 STUN server support 567
K.2.2.5 Emergency services 567
K.2.2.5.1 General....567
K.2.2.5.2 General treatment for all dialogs and standalone transactions excluding the REGISTER method – from an unregistered user....567
K.2.2.5.3 General treatment for all dialogs and standalone transactions excluding the REGISTER method after emergency registration....568
K.2.2.5.4 General treatment for all dialogs and standalone transactions excluding the REGISTER method – non-emergency registration....568
K.2.2.5.5 Abnormal cases....568
K.2.3 Procedures at the S-CSCF 569
K.2.3.1 Registration and authentication....569
K.2.3.1.1 Introduction....569
K.2.3.2 Initial registration and user-initiated re-registration 569
K.2.3.2.1 Unprotected REGISTER....569
K.2.3.2.2 Protected REGISTER with IMS AKA as a security mechanism 569
K.2.3.2.2A Protected REGISTER with SIP digest as a security mechanism....569
K.2.3.2.2B Protected REGISTER with SIP digest with TLS as a security mechanism....569
K.2.3.2.2C NASS-IMS bundled authentication as a security mechanism....569
K.2.3.2.2D Successful registration 569
K.2.3.3 General treatment for all dialogs and standalone transactions excluding requests terminated by the S-CSCF 570
K.2.3.3.1 Determination of mobile-originated or mobile terminated case....570
K.2.3.3.2 Requests initiated by the served user 570
K.2.3.3.3 Requests terminated by the served user 570
K.2.4 Procedures at the IBCF....570
K.2.4.1 General....570
K.2.4.2 IBCF as an exit point 570
K.2.4.2.1 Registration 570
K.2.4.2.1A General....571
K.2.4.2.2 Initial requests....571
K.2.4.2.3 Subsequent requests 571
K.2.4.2.4 IBCF-initiated call release....571
K.2.4.3 IBCF as an entry point 571
K.2.4.3.1 Registration 571
K.2.4.3.1A General....571
K.2.4.3.2 Initial requests....571
K.2.4.3.3 Subsequent requests 571
K.2.4.3.4 IBCF-initiated call release....571
K.2.4.4 THIG functionality in the IBCF....571
K.2.4.4.1 General....571
K.2.4.4.2 Encryption for network topology hiding....571
K.2.4.4.3 Decryption for network topology hiding....571
K.2.4.5 IMS-ALG functionality in the IBCF....571
K.2.4.6 Screening of SIP signalling....572
K.2.4.6.1 General....572
K.2.4.6.2 IBCF procedures for SIP header fields....572
K.2.4.6.3 IBCF procedures for SIP message bodies....572

K.3 Application usage of SDP 572
K.3.1 UE usage of SDP....572

K.3.2 P-CSCF usage of SDP 572
K.3.2.1 Introduction 572
K.3.2.2 Receipt of an SDP offer 572
K.3.2.3 Receipt of an SDP answer 572
K.3.2.4 Change of media connection data 573
K.4 Void 573
K.5 Application usage of ICE 573
K.5.1 Introduction 573
K.5.2 UE usage of ICE 573
K.5.2.1 General 573
K.5.2.2 Call initiation – UE-origination case 573
K.5.2.3 Call termination – UE-termination case 574
K.5.3 P-CSCF support of ICE 575
K.5.3.1 General 575
K.5.3.2 P-CSCF full ICE procedures for UDP based streams 576
K.5.3.2.1 General 576
K.5.3.2.2 P-CSCF receiving SDP offer 576
K.5.3.2.3 P-CSCF sending SDP offer 576
K.5.3.2.4 P-CSCF receiving SDP answer 576
K.5.3.2.5 P-CSCF sending SDP answer 576
K.5.3.3 P-CSCF ICE lite procedures for UDP based streams 577
K.5.3.4 ICE procedures for TCP based streams 577
K.5.3.4.1 General 577
K.5.3.4.2 P-CSCF receiving SDP offer 577
K.5.3.4.3 P-CSCF sending SDP offer 577
K.5.3.4.4 P-CSCF receiving SDP answer 577
K.5.3.4.5 P-CSCF sending SDP answer 577
K.5.4 ICE functionality in the IBCF 578
K.5.4.1 General 578
K.5.4.2 IBCF full ICE procedures for UDP based streams 578
K.5.4.2.1 General 578
K.5.4.2.2 IBCF receiving SDP offer 578
K.5.4.2.3 IBCF sending SDP offer 578
K.5.4.2.4 IBCF receiving SDP answer 579
K.5.4.2.5 IBCF sending SDP answer 579
K.5.4.3 IBCF ICE lite procedures for UDP based streams 579
K.5.4.4 ICE procedures for TCP based streams 579
K.5.4.4.1 General 579
K.5.4.4.2 IBCF receiving SDP offer 579
K.5.4.4.3 IBCF sending SDP offer 580
K.5.4.4.4 IBCF receiving SDP answer 580
K.5.4.4.5 IBCF sending SDP answer 580

Annex L (normative): IP-Connectivity Access Network specific concepts when using EPS to access IM CN subsystem 581

L.1 Scope 581
L.2 EPS aspects when connected to the IM CN subsystem via E-UTRAN 581
L.2.1 Introduction 581
L.2.2 Procedures at the UE 581
L.2.2.1 EPS bearer context activation and P-CSCF discovery 581
L.2.2.1A Modification of a EPS bearer context used for SIP signalling 583
L.2.2.1B Re-establishment of the EPS bearer context for SIP signalling 583
L.2.2.2 Session management procedures 584
L.2.2.3 Mobility management procedures 584
L.2.2.4 Cell selection and lack of coverage 584
L.2.2.5 EPS bearer contexts for media 584
L.2.2.5.1 General requirements 584
L.2.2.5.1A Activation or modification of EPS bearer contexts for media by the UE 584
L.2.2.5.1B Activation or modification of EPS bearer contexts for media by the network 584

L.2.2.5.2 Special requirements applying to forked responses 585
L.2.2.5.3 Unsuccessful situations 585
L.2.2.6 Emergency service 585

L.2A Usage of SDP 585
L.2A.1 Impact on SDP offer / answer of activation or modification of EPS bearer context for media by the network 585
L.2A.2 Handling of SDP at the terminating UE when originating UE has resources available and IP-CAN performs network-initiated resource reservation for terminating UE 586

L.3 Application usage of SIP 586
L.3.1 Procedures at the UE 586
L.3.1.1 P-Access-Network-Info header field 586
L.3.1.2 Availability for calls 586
L.3.2 Procedures at the P-CSCF 586
L.3.2.1 Determining network to which the originating user is attached 586
L.3.2.2 Location information handling 587
L.3.3 Procedures at the S-CSCF 587
L.3.3.1 Notification of AS about registration status 587

L.4 3GPP specific encoding for SIP header field extensions 587
L.4.1 Void 587

L.5 Use of circuit-switched domain 587

Annex M (normative): IP-Connectivity Access Network specific concepts when using cdma2000® packet data subsystem to access IM CN subsystem 588

M.1 Scope 588

M.2 cdma2000® packet data subsystem aspects when connected to the IM CN subsystem 588
M.2.1 Introduction 588
M.2.2 Procedures at the UE 588
M.2.2.1 Establishment of IP-CAN bearer and P-CSCF discovery 588
M.2.2.1A Modification of IP-CAN used for SIP signalling 589
M.2.2.1B Re-establishment of the IP-CAN used for SIP signalling 589
M.2.2.2 Void 589
M.2.2.3 IP-CAN bearer control point support of DHCP based P-CSCF discovery 589
M.2.2.4 Void 590
M.2.2.5 Handling of the IP-CAN for media 590
M.2.2.5.1 General requirements 590
M.2.2.5.1A Activation or modification of IP-CAN for media by the UE 590
M.2.2.5.1B Activation or modification of IP-CAN for media by the network 590
M.2.2.5.2 Special requirements applying to forked responses 590
M.2.2.5.3 Unsuccessful situations 590
M.2.2.6 Emergency service 590
M.2A Usage of SDP 590
M.2A.1 Impact on SDP offer / answer of activation or modification of IP-CAN for media by the network 590
M.2A.2 Handling of SDP at the terminating UE when originating UE has resources available and IP-CAN performs network-initiated resource reservation for terminating UE 590

M.3 Application usage of SIP 591
M.3.1 Procedures at the UE 591
M.3.1.1 P-Access-Network-Info header field 591
M.3.1.2 Availability for calls 591
M.3.2 Procedures at the P-CSCF 591
M.3.2.1 Detecting requests destined for a PSAP 591
M.3.2.2 Location information handling 591
M.3.3 Procedures at the S-CSCF 591
M.3.3.1 Notification of AS about registration status 591

M.4 3GPP specific encoding for SIP header field extensions 591
M.4.1 Void 591

M.5 Use of circuit switched domain 591

Annex N (Normative): Functions to support overlap signalling 592

N.1 Scope 592

N.2 Digit collection function 592
N.2.1 General 592
N.2.2 Collection of digits 592
N.2.2.1 Initial INVITE request 592
N.2.2.2 Collection of additional digits 593
N.2.2.3 Handling of 404 (Not Found) / 484 (Address Incomplete) responses 593
N.2.3 Forwarding of SIP messages by the digit collection function 594

N.3 En-bloc conversion function 594
N.3.1 General 594
N.3.2 Multiple-INVITE method 595
N.3.3 In-dialog method 595

Annex O (normative): IP-Connectivity Access Network specific concepts when using the EPC via cdma2000® HRPD to access IM CN subsystem 597

O.1 Scope 597

O.2 IP-CAN aspects when connected to the IM CN subsystem 597
O.2.1 Introduction 597
O.2.2 Procedures at the UE 597
O.2.2.1 IP-CAN bearer context activation and P-CSCF discovery 597
O.2.2.1A Modification of an IP-CAN bearer context used for SIP signalling 598
O.2.2.1B Re-establishment of the IP-CAN bearer context for SIP signalling 598
O.2.2.2 Session management procedures 599
O.2.2.3 Mobility management procedures 599
O.2.2.4 Cell selection and lack of coverage 599
O.2.2.5 IP-CAN bearer contexts for media 599
O.2.2.5.1 General requirements 599
O.2.2.5.1A Activation or modification of IP-CAN bearer contexts for media by the UE 599
O.2.2.5.1B Activation or modification of IP-CAN bearer contexts for media by the network 599
O.2.2.5.2 Special requirements applying to forked responses 599
O.2.2.5.3 Unsuccessful situations 600
O.2.2.6 Emergency service 600

O.2A Usage of SDP 600
O.2A.1 Impact on SDP offer / answer of activation or modification of IP-CAN bearer context for media by the network 600
O.2A.2 Handling of SDP at the terminating UE when originating UE has resources available and IP-CAN performs network-initiated resource reservation for terminating UE 600

O.3 Application usage of SIP 601
O.3.1 Procedures at the UE 601
O.3.1.1 P-Access-Network-Info header field 601
O.3.1.2 Availability for calls 601
O.3.2 Procedures at the P-CSCF 601
O.3.2.1 Detecting requests destined for a PSAP 601
O.3.2.2 Location information handling 601
O.3.3 Procedures at the S-CSCF 601

O.4 3GPP specific encoding for SIP header field extensions 601
O.4.1 Void 601

O.5 Use of circuit-switched domain 601

Annex P (informative): Change history 603

History 654

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document defines a call control protocol for use in the IP Multimedia (IM) Core Network (CN) subsystem based on the Session Initiation Protocol (SIP), and the associated Session Description Protocol (SDP).

The present document is applicable to:

- the interface between the User Equipment (UE) and the Call Session Control Function (CSCF);
- the interface between the CSCF and any other CSCF;
- the interface between the CSCF and an Application Server (AS);
- the interface between the CSCF and the Media Gateway Control Function (MGCF);
- the interface between the S-CSCF and the Multimedia Resource Function Controller (MRFC);
- the interface between the Application Server (AS) and the Multimedia Resource Function Controller (MRFC);
- the interface between the CSCF and the Breakout Gateway Control Function (BGCF);
- the interface between the BGCF and the MGCF;
- the interface between the CSCF and an IBCF;
- the interface between the BGCF and any other BGCF; and
- the interface between the CSCF and an external Multimedia IP network.

Where possible the present document specifies the requirements for this protocol by reference to specifications produced by the IETF within the scope of SIP and SDP. Where this is not possible, extensions to SIP and SDP are defined within the present document. The document has therefore been structured in order to allow both forms of specification.

As the IM CN subsystem is designed to interwork with different IP-Connectivity Access Networks (IP-CANs), the IP-CAN independent aspects of the IM CN subsystem are described in the main body and annex A of this specification. Aspects for connecting a UE to the IM CN subsystem through specific types of IP-CANs are documented separately in the annexes or in separate documents.

The document also specifies media-related requirements for the NAT traversal mechanisms defined in this specification.

NOTE: The present document covers only the usage of SIP and SDP to communicate with the enitities of the IM CN subsystem. It is possible, and not precluded, to use the capabilities of IP-CAN to allow a terminal containing a SIP UA to communicate with SIP servers or SIP UAs outside the IM CN subsystem, and therefore utilise the services provided by those SIP servers. The usage of SIP and SDP for communicating with SIP servers or SIP UAs outside the IM CN subsystem is outside the scope of the present document.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[1A] 3GPP TS 22.101: "Service aspects; Service principles".

[1B] 3GPP TS 22.003: "Circuit Teleservices supported by a Public Land Mobile Network (PLMN)".

[2] 3GPP TS 23.002: "Network architecture".

[3] 3GPP TS 23.003: "Numbering, addressing and identification".

[4] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service description; Stage 2".

[4A] 3GPP TS 23.107: "Quality of Service (QoS) concept and architecture".

[4B] 3GPP TS 23.167: "IP Multimedia Subsystem (IMS) emergency sessions".

[4C] 3GPP TS 23.122: "Non-Access-Stratum (NAS) functions related to Mobile Station (MS) in idle mode".

[4D] 3GPP TS 23.140 Release 6: "Multimedia Messaging Service (MMS); Functional description; Stage 2".

[5] 3GPP TS 23.218: "IP Multimedia (IM) Session Handling; IM call model".

[6] 3GPP TS 23.221: "Architectural requirements".

[7] 3GPP TS 23.228: "IP multimedia subsystem; Stage 2".

[7A] 3GPP TS 23.234: "3GPP system to Wireless Local Area Network (WLAN) interworking; System description".

[7B] 3GPP TS 23.401: "GPRS enhancements for E-UTRAN access".

[7C] 3GPP TS 23.292: "IP Multimedia Subsystem (IMS) Centralized Services; Stage 2".

[7D] 3GPP TS 23.380: "IMS Restoration Procedures".

[7E] 3GPP TS 23.402: "Architecture enhancements for non-3GPP accesses".

[8] 3GPP TS 24.008: "Mobile radio interface layer 3 specification; Core Network protocols; Stage 3".

[8A] 3GPP TS 24.141: "Presence service using the IP Multimedia (IM) Core Network (CN) subsystem; Stage 3".

[8B] 3GPP TS 24.147: "Conferencing using the IP Multimedia (IM) Core Network (CN) subsystem; Stage 3".

[8C] 3GPP TS 24.234: "3GPP System to Wireless Local Area Network (WLAN) interworking; User Equipment (UE) to network protocols; Stage 3".

[8D] Void.

[8E] 3GPP TS 24.279: "Combining Circuit Switched (CS) and IP Multimedia Subsystem (IMS) services, stage 3, Release 7".

[8F] 3GPP TS 24.247: "Messaging service using the IP Multimedia (IM) Core Network (CN) subsystem; Stage 3".

[8G] 3GPP TS 24.167: "3GPP IMS Management Object (MO); Stage 3".

[8H] 3GPP TS 24.173: "IMS Multimedia telephony service and supplementary services; Stage 3".

[8I] 3GPP TS 24.606: "Message Waiting Indication (MWI) using IP Multimedia (IM) Core Network (CN) subsystem; Protocol specification".

[8J] 3GPP TS 24.301: "Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3".

[8K] Void.

[8L] 3GPP TS 24.341: "Support of SMS over IP networks; Stage 3".

[8M] 3GPP TS 24.237: "IP Multimedia Subsystem (IMS) Service Continuity; Stage 3".

[8N] 3GPP TS 24.647: "Advice Of Charge (AOC) using IP Multimedia (IM) Core Network (CN) subsystem".

[8O] 3GPP TS 24.292: "IP Multimedia (IM) Core Network (CN) subsystem Centralized Services (ICS); Stage 3".

[8S] 3GPP TS 24.616: "Malicious Communication Identification (MCID) using IP Multimedia (IM) Core Network (CN) subsystem".

[8T] 3GPP TS 24.305: "Selective Disabling of 3GPP User Equipment Capabilities (SDoUE) Management Object (MO)".

[9] 3GPP TS 25.304: "UE Procedures in Idle Mode and Procedures for Cell Reselection in Connected Mode".

[9A] 3GPP TS 25.331: "Radio Resource Control (RRC); Protocol Specification".

[10] Void.

[10A] 3GPP TS 27.060: "Mobile Station (MS) supporting Packet Switched Services".

[11] 3GPP TS 29.061: "Interworking between the Public Land Mobile Network (PLMN) supporting Packet Based Services and Packet Data Networks (PDN)".

[11A] 3GPP TS 29.162: "Interworking between the IM CN subsystem and IP networks".

[11B] 3GPP TS 29.163: "Interworking between the IP Multimedia (IM) Core Network (CN) subsystem and Circuit Switched (CS) networks".

[11C] 3GPP TS 29.161: "Interworking between the Public Land Mobile Network (PLMN) supporting Packet Based Services with Wireless Local Access and Packet Data Networks (PDN)"

[12] 3GPP TS 29.207 Release 6: "Policy control over Go interface".

[13] Void.

[13A] 3GPP TS 29.209 Release 6: "Policy control over Gq interface".

[13B] 3GPP TS 29.212: "Policy and Charging Control over Gx reference point".

[13C] 3GPP TS 29.213: "Policy and charging control signalling flows and Quality of Service (QoS) parameter mapping".

[13D] 3GPP TS 29.214: "Policy and Charging Control over Rx reference point".

[14] 3GPP TS 29.228: "IP Multimedia (IM) Subsystem Cx and Dx Interfaces; Signalling flows and message contents".

[15] 3GPP TS 29.229: "Cx and Dx Interfaces based on the Diameter protocol, Protocol details".

[15A] 3GPP TS 29.311: "Service Level Interworking for Messaging Services".

[15B] 3GPP TS 31.103: "Characteristics of the IP multimedia services identity module (ISIM) application".

[15C] 3GPPTS 31.102: "Characteristics of the Universal Subscriber Identity Module (USIM) application".

[15D] 3GPPTS 31.111: "Universal Subscriber Identity Module (USIM) Application Toolkit (USAT)".

[16] 3GPP TS 32.240: "Telecommunication management; Charging management; Charging architecture and principles".

[17] 3GPP TS 32.260: "Telecommunication management; Charging management; IP Multimedia Subsystem (IMS) charging".

[17A] Void.

[18] 3GPP TS 33.102: "3G Security; Security architecture".

[19] 3GPP TS 33.203: "Access security for IP based services".

[19A] 3GPP TS 33.210: "3G Security; Network Domain Security; IP Network Layer Security".

[19B] 3GPP TS 36.304: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) procedures in idle mode".

[20] 3GPP TS 44.018: "Mobile radio interface layer 3 specification, Radio Resource Control Protocol".

[20A] RFC 2401 (November 1998): "Security Architecture for the Internet Protocol".

[20B] RFC 1594 (March 1994): "FYI on Questions and Answers to Commonly asked "New Internet User" Questions".

[20C] Void.

[20D] Void.

[20E] RFC 2462 (November 1998): "IPv6 Address Autoconfiguration".

[20F] RFC 2132 (March 1997): "DHCP Options and BOOTP Vendor Extensions".

[21] RFC 2617 (June 1999): "HTTP Authentication: Basic and Digest Access Authentication".

[22] RFC 3966 (December 2004): "The tel URI for Telephone Numbers".

[23] RFC 4733 (December 2006): "RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals".

[24] RFC 3761 (April 2004): "The E.164 to Uniform Resource Identifiers (URI) Dynamic Delegation Discovery System (DDDS) Application (ENUM)".

[25] RFC 6086 (January 2011): "Session Initiation Protocol (SIP) INFO Method and Package Framework".

[25A] RFC 3041 (January 2001): "Privacy Extensions for Stateless Address Autoconfiguration in IPv6".

[26] RFC 3261 (June 2002): "SIP: Session Initiation Protocol".

[27] RFC 3262 (June 2002): "Reliability of provisional responses in Session Initiation Protocol (SIP)".

[27A] RFC 3263 (June 2002): "Session Initiation Protocol (SIP): Locating SIP Servers".

[27B] RFC 3264 (June 2002): "An Offer/Answer Model with Session Description Protocol (SDP)".

[28] RFC 3265 (June 2002): "Session Initiation Protocol (SIP) Specific Event Notification".

[28A] Void.

[29] RFC 3311 (September 2002): "The Session Initiation Protocol (SIP) UPDATE method".

[30] RFC 3312 (October 2002): "Integration of resource management and Session Initiation Protocol (SIP)".

[31] RFC 3313 (January 2003): "Private Session Initiation Protocol (SIP) Extensions for Media Authorization".

[32] RFC 3320 (March 2002): "Signaling Compression (SigComp)".

[33] RFC 3323 (November 2002): "A Privacy Mechanism for the Session Initiation Protocol (SIP)".

[34] RFC 3325 (November 2002): "Private Extensions to the Session Initiation Protocol (SIP) for Network Asserted Identity within Trusted Networks".

[34A] RFC 3326 (December 2002): "The Reason Header Field for the Session Initiation Protocol (SIP)".

[35] RFC 3327 (December 2002): "Session Initiation Protocol Extension Header Field for Registering Non-Adjacent Contacts".

[35A] RFC 3361 (August 2002): "Dynamic Host Configuration Protocol (DHCP-for-IPv4) Option for Session Initiation Protocol (SIP) Servers".

[36] RFC 3515 (April 2003): "The Session Initiation Protocol (SIP) REFER method".

[37] RFC 3420 (November 2002): "Internet Media Type message/sipfrag".

[38] RFC 3608 (October 2003): "Session Initiation Protocol (SIP) Extension Header Field for Service Route Discovery During Registration".

[39] RFC 4566 (June 2006): "SDP: Session Description Protocol".

[40] RFC 3315 (July 2003): "Dynamic Host Configuration Protocol for IPv6 (DHCPv6)".

[40A] RFC 2131 (March 1997): "Dynamic host configuration protocol".

[41] RFC 3319 (July 2003): "Dynamic Host Configuration Protocol (DHCPv6) Options for Session Initiation Protocol (SIP) Servers".

[42] RFC 3485 (February 2003): "The Session Initiation Protocol (SIP) and Session Description Protocol (SDP) static dictionary for Signaling Compression (SigComp)".

[43] RFC 3680 (March 2004): "A Session Initiation Protocol (SIP) Event Package for Registrations".

[44] Void.

[45] Void.

[46] Void.

[47] Void.

[48] RFC 3329 (January 2003): "Security Mechanism Agreement for the Session Initiation Protocol (SIP)".

[49] RFC 3310 (September 2002): "Hypertext Transfer Protocol (HTTP) Digest Authentication Using Authentication and Key Agreement (AKA)".

[50] RFC 3428 (December 2002): "Session Initiation Protocol (SIP) Extension for Instant Messaging".

[51] Void.

[52] RFC 3455 (January 2003): "Private Header (P-Header) Extensions to the Session Initiation Protocol (SIP) for the 3rd-Generation Partnership Project (3GPP)".

[53] RFC 3388 (December 2002): "Grouping of Media Lines in Session Description Protocol".

[54] RFC 3524 (April 2003): "Mapping of Media Streams to Resource Reservation Flows".

[55] RFC 3486 (February 2003): "Compressing the Session Initiation Protocol (SIP)".

[55A] RFC 3551 (July 2003): "RTP Profile for Audio and Video Conferences with Minimal Control".

[56] RFC 3556 (July 2003): "Session Description Protocol (SDP) Bandwidth Modifiers for RTP Control Protocol (RTCP) Bandwidth".

[56A] RFC 3581 (August 2003): "An Extension to the Session Initiation Protocol (SIP) for Symmetric Response Routing".

[56B] RFC 3841 (August 2004): "Caller Preferences for the Session Initiation Protocol (SIP)".

[56C] RFC 3646 (December 2003): "DNS Configuration options for Dynamic Host Configuration Protocol for IPv6 (DHCPv6)".

[57] ITU-T Recommendation E.164: "The international public telecommunication numbering plan".

[58] RFC 4028 (April 2005): "Session Timers in the Session Initiation Protocol (SIP)".

[59] RFC 3892 (September 2004): "The Session Initiation Protocol (SIP) Referred-By Mechanism".

[60] RFC 3891 (September 2004): "The Session Inititation Protocol (SIP) "Replaces" Header".

[61] RFC 3911 (October 2004): "The Session Inititation Protocol (SIP) "Join" Header".

[62] RFC 3840 (August 2004): "Indicating User Agent Capabilities in the Session Initiation Protocol (SIP)".

[63] RFC 3861 (August 2004): "Address Resolution for Instant Messaging and Presence".

[63A] RFC 3948 (January 2005): "UDP Encapsulation of IPsec ESP Packets".

[64] RFC 4032 (March 2005): "Update to the Session Initiation Protocol (SIP) Preconditions Framework".

[65] RFC 3842 (August 2004) "A Message Summary and Message Waiting Indication Event Package for the Session Initiation Protocol (SIP)"

[65A] RFC 4077 (May 2005): "A Negative Acknowledgement Mechanism for Signaling Compression".

[66] RFC 4244 (November 2005): "An Extension to the Session Initiation Protocol (SIP) for Request History Information".

[67] RFC 5079 (December 2007): "Rejecting Anonymous Requests in the Session Initiation Protocol (SIP)".

[68] RFC 4458 (January 2006): "Session Initiation Protocol (SIP) URIs for Applications such as Voicemail and Interactive Voice Response (IVR)".

[69] RFC 5031 (January 2008): "A Uniform Resource Name (URN) for Services".

[70] RFC 3903 (October 2004): "An Event State Publication Extension to the Session Initiation Protocol (SIP)".

[71] Void.

[72] RFC 3857 (August 2004): "A Watcher Information Event Template Package for the Session Initiation Protocol (SIP)".

[74] RFC 3856 (August 2004): "A Presence Event Package for the Session Initiation Protocol (SIP)".

[74A] RFC 3603 (October 2003): "Private Session Initiation Protocol (SIP) Proxy-to-Proxy Extensions for Supporting the PacketCable Distributed Call Signaling Architecture".

[74B] RFC 3959 (December 2004): "The Early Session Disposition Type for the Session Initiation Protocol (SIP)".

[75] RFC 4662 (August 2006): "A Session Initiation Protocol (SIP) Event Notification Extension for Resource Lists".

[77] RFC 5875 (May 2010): "An Extensible Markup Language (XML) Configuration Access Protocol (XCAP) Diff Event Package".

[78] RFC 4575 (August 2006): "A Session Initiation Protocol (SIP) Event Package for Conference State".

[79] RFC 5049 (December 2007): "Applying Signaling Compression (SigComp) to the Session Initiation Protocol (SIP)".

[80] RFC 3825 (July 2004): "Dynamic Host Configuration Protocol Option for Coordinate-based Location Configuration Information".

[81] Void.

[82] RFC 4457 (April 2006): "The Session Initiation Protocol (SIP) P-User-Database Private-Header (P-header)".

[83] RFC 4145 (September 2005): "TCP-Based Media Transport in the Session Description Protocol (SDP)".

[84] RFC 4320 (January 2006): "Actions Addressing Identified Issues with the Session Initiation Protocol's (SIP) Non-INVITE Transaction".

[85] 3GPP2 C.S0005-D (March 2004): "Upper Layer (Layer 3) Signaling Standard for cdma2000 Standards for Spread Spectrum Systems".

[86] 3GPP2 C.S0024-A v1.0 (April 2004): "cdma2000 High Rate Packet Data Air Interface Standard".

[86A] 3GPP2 C.S0084-000 (April 2007): "Overview for Ultra Mobile Broadband (UMB) Air Interface Specification".

[86B] 3GPP2 X.S0060-0 v1.0: "HRPD Support for Emergency Services".

[86C] 3GPP2 X.S0057-0 v2.0: "E-UTRAN - eHRPD Connectivity and Interworking: Core Network Aspects".

[86D] 3GPP2 C.S0014-C v1.0: "Enhanced Variable Rate Codec, Speech Service Options 3, 68, and 70 for Wideband Spread Spectrum Digital Systems".

[87] ITU-T Recommendation J.112, "Transmission Systems for Interactive Cable Television Services"

[88] PacketCable Release 2 Technical Report, PacketCable™ Architecture Framework Technical Report, PKT-TR-ARCH-FRM.

[89] RFC 6442 (December 2011): "Location Conveyance for the Session Initiation Protocol".

[90] RFC 4119 (December 2005) "A Presence-based GEOPRIV Location Object Format".

[91] RFC 5012 (January 2008): "Requirements for Emergency Context Resolution with Internet Technologies".

[91A] Void.

[92] RFC 5626 (October 2009): "Managing Client Initiated Connections in the Session Initiation Protocol (SIP)".

[93] RFC 5627 (October 2009): "Obtaining and Using Globally Routable User Agent URIs (GRUUs) in the Session Initiation Protocol (SIP)".

[94] RFC 5628 (October 2009): "Registration Event Package Extension for Session Initiation Protocol (SIP) Globally Routable User Agent URIs (GRUUs)".

[95] Void.

[96] RFC 4168 (October 2005): "The Stream Control Transmission Protocol (SCTP) as a Transport for the Session Initiation Protocol (SIP)".

[97] RFC 5002 (August 2007): "The Session Initiation Protocol (SIP) P-Profile-Key Private Header (P-Header)".

[98] ETSI ES 283 035: "Telecommunications and Internet Converged Services and Protocols for Advanced Networks (TISPAN); Network Attachment Sub-System (NASS); e2 interface based on the DIAMETER protocol".

[99] RFC 5245 (April 2010): "Interactive Connectivity Establishment (ICE): A Protocol for Network Address Translator (NAT) Traversal for Offer/Answer Protocols".

[100] RFC 5389 (October 2008): "Session Traversal Utilities for NAT (STUN)".

[101] RFC 5766 (April 2010): "Traversal Using Relays around NAT (TURN): Relay Extensions to Session Traversal Utilities for NAT (STUN)".

[102] RFC 5768 (April 2010): "Indicating Support for Interactive Connectivity Establishment (ICE) in the Session Initiation Protocol (SIP)".

[103] RFC 4967 (July 2007): "Dial String Parameter for the Session Initiation Protocol Uniform Resource Identifier".

[104] RFC 5365 (October 2008): "Multiple-Recipient MESSAGE Requests in the Session Initiation Protocol (SIP)".

[105] RFC 5368 (October 2008): "Referring to Multiple Resources in the Session Initiation Protocol (SIP)".

[106] RFC 5366 (October 2008): "Conference Establishment Using Request-Contained Lists in the Session Initiation Protocol (SIP)".

[107] RFC 5367 (October 2007): "Subscriptions to Request-Contained Resource Lists in the Session Initiation Protocol (SIP)".

[108] RFC 4583 (November 2006): "Session Description Protocol (SDP) Format for Binary Floor Control Protocol (BFCP) Streams".

[109] RFC 5009 (September 2007): "Private Header (P-Header) Extension to the Session Initiation Protocol (SIP) for Authorization of Early Media".

[110] RFC 4354 (January 2006): "A Session Initiation Protocol (SIP) Event Package and Data Format for Various Settings in Support for the Push-to-Talk over Cellular (PoC) Service".

[111] RFC 4964 (September 2007): "The P-Answer-State Header Extension to the Session Initiation Protocol for the Open Mobile Alliance Push to Talk over Cellular".

[112] RFC 4694 (October 2006): "Number Portability Parameters for the 'tel' URI".

[113] Void.

[114] RFC 4769 (November 2006): "IANA Registration for an Enumservice Containing Public Switched Telephone Network (PSTN) Signaling Information".

[115] RFC 4411 (February 2006): "Extending the Session Initiation Protocol (SIP) Reason Header for Preemption Events".

[116] RFC 4412 (February 2006): "Communications Resource Priority for the Session Initiation Protocol (SIP)".

[117] RFC 5393 (December 2008): "Addressing an Amplification Vulnerability in Session Initiation Protocol (SIP) Forking Proxies".

[118] RFC 4896 (June 2007): "Signaling Compression (SigComp) Corrections and ClarificationsImplementer's Guide for SigComp".

[119] RFC 5112 (January 2008): "The Presence-Specific Static Dictionary for Signaling Compression (Sigcomp)".

[120] RFC 5688 (January 2010): "A Session Initiation Protocol (SIP) Media Feature Tag for MIME Application Subtypes".

[121] RFC 6050 (November 2010): "A Session Initiation Protocol (SIP) Extension for the Identification of Services".

[122] RFC 4346 (April 2006): "The TLS Protocol Version 1.1".

[123] Void.

[124] RFC 3986 (January 2005): "Uniform Resource Identifiers (URI): Generic Syntax".

[125] RFC 5360 (October 2008): "A Framework for Consent-Based Communications in the Session Initiation Protocol (SIP)".

[126] RFC 7433 (January 2015): "A Mechanism for Transporting User-to-User Call Control Information in SIP".

[126A] RFC 7434 (January 2015): "Interworking ISDN Call Control User Information with SIP".

[127] 3GPP2 X.S0011-C: "cdma2000 Wireless IP Network Standard ".

[130] RFC 6432 (November 2011): "Carrying Q.850 Codes in Reason Header Fields in SIP (Session Initiation Protocol) Responses)".

[131] RFC 6544 (March 2012): "TCP Candidates with Interactive Connectivity Establishment (ICE)".

[132] RFC 3023 (January 2001): "XML Media Types".

[133] RFC 5502 (April 2009): "The SIP P-Served-User Private-Header (P-Header) for the 3GPP IP Multimedia (IM) Core Network (CN) Subsystem".

[134] RFC 7316 (July 2014): "The Session Initiation Protocol (SIP) P-Private-Network-Indication Private Header (P-Header)".

[135] RFC 4585 (July 2006): "Extended RTP Profile for Real-time Transport Control Protocol (RTCP)-Based Feedback (RTP/AVPF)".

[136] RFC 5104 (February 2008): "Codec Control Messages in the RTP Audio-Visual Profile with Feedback (AVPF)".

[137] RFC 5939 (September 2010): "Session Description Protocol (SDP) Capability Negotiation".

[138] ETSI ES 282 001: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Functional Architecture Release 1".

[139] Void.

[140] Void.

[141] Void.

[142] RFC 6228 (May 2011): "Response Code for Indication of Terminated Dialog".

[143] RFC 5223 (April 2011): "Indication of support for keep-alive".

[144] RFC 4240 (December 2005): "Basic Network Media Services with SIP".

[145] RFC 5552 (May 2009): "SIP Interface to VoiceXML Media Services".

[146] RFC 6230 (May 2011): "Media Control Channel Framework".

[147] RFC 6231 (May 2011): "An Interactive Voice Response (IVR) Control Package for the Media Control Channel Framework".

[148] RFC 6505 (March 2012): "A Mixer Control Package for the Media Control Channel Framework".

[149] RFC 2046 (November 1996): "Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types".

[150] RFC 5621 (September 2009): "Message Body Handling in the Session Initiation Protocol (SIP)".

[151] RFC 3862 (August 2004): "Common Presence and Instant Messaging (CPIM): Message Format".

[152] RFC 3890 (September 2004): "A Transport Independent Bandwidth Modifier for the Session Description Protocol (SDP)".

[153] RFC 7254 (May 2014): "A Uniform Resource Name Namespace for the Global System for Mobile Communications Association (GSMA) and the International Mobile station Equipment Identity (IMEI)".

[154] RFC 4122 (July 2005): "A Universally Unique IDentifier (UUID) URN Namespace".

[155] RFC 7195 (May 2014): "Session Description Protocol (SDP) Extension for Setting Audio Media Streams over Circuit-Switched Bearers in the Public Switched Telephone Network (PSTN)".

[156] RFC 7006 (September 2013): "Miscellaneous Capabilities Negotiation in the Session Description Protocol (SDP)".

[157] RFC 5438 (January 2009): "Instant Message Disposition Notification (IMDN)".

[158] RFC 5373 (November 2008): "Requesting Answering Modes for the Session Initiation Protocol (SIP)"

[161] RFC 4288 (December 2005): "Media Type Specifications and Registration Procedures".

[163] RFC 6026 (September 2010): "Correct Transaction Handling for 2xx Responses to Session Initiation Protocol (SIP) INVITE Requests".

[165] RFC 5954 (August 2010): "Essential Correction for IPv6 ABNF and URI Comparison in RFC3261".

[172] RFC 6871 (February 2013): "SDP media capabilities Negotiation".

[175] RFC 7462 (March 2015): "URNs for the Alert-Info Header Field of the Session Initiation Protocol (SIP)".

[176] ANSI/J-STD-036-B: "Enhanced Wireless 9-1-1, Phase 2".

[177] Void.

[178] IETF RFC 4975 (September 2007): "The Message Session Relay Protocol (MSRP)".

[184] IETF RFC 4538 (June 2006): "Request Authorization through Dialog Identification in the Session Initiation Protocol (SIP)".

[185] RFC 5547 (May 2009): "A Session Description Protocol (SDP) Offer/Answer Mechanism to Enable File Transfer".

[186] Void.

[187] Void.

[188] Void.

[189] Void.

[190] Void.

[191] Void.

[192] Void.

[193] Void.

[194] Void.

[195] Void.

[196] Void.

[197] Void.

[198] Void.

[199] Void.

[200] Void.

[201] Void.

[202] Void.

[203] Void.

[204] Void.

[205] Void.

[206] Void.

[207] Void.

[208] Void.

[209] Void.

[210] Void.

[211] Void.

[212] RFC 20 (May 2011): "ASCII format for Network Interchange".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply.

Entry point:In the case that "border control concepts", as specified in 3GPP TS 23.228 [7], are to be applied in an IM CN subsystem, then these are to be provided by capabilities within the IBCF, and the IBCF acts as an entry point for this network (instead of the I-CSCF). In this case the IBCF and the I-CSCF can be co-located as a single physical node. If "border control concepts" are not applied, then the I-CSCF is considered as an entry point of a network. If the P-CSCF is in the home network, then the I-CSCF is considered as an entry point for this document.

Exit point: If operator preference requires the application of "border control concepts" as specified in 3GPP TS 23.228 [7], then these are to be provided by capabilities within the IBCF, and requests sent towards another network are routed via a local network exit point (IBCF), which will then forward the request to the other network (discovering the entry point if necessary).

Geo-local number: Either a geo-local service number as specified in 3GPP TS 23.228 [7] or a number in non-international format according to an addressing plan used at the current physical location of the user.

Home-local number: Either a home local service number as specified in 3GPP TS 23.228 [7] or a number in non-international format according to an addressing plan used in the home network of the user.

Newly established set of security associations: Two pairs of IPsec security associations that have been created at the UE and/or the P-CSCF after the 200 (OK) response to a REGISTER request was received.

Old set of security associations: Two pairs of IPsec security associations still in existence after another set of security associations has been established due to a successful authentication procedure.

Temporary set of security associations: Two pairs of IPsec security associations that have been created at the UE and/or the P-CSCF, after an authentication challenge within a 401 (Unauthorized) response to a REGISTER request was received. The SIP level lifetime of such created security associations will be equal to the value of reg-await-auth timer.

Integrity protected: See 3GPP TS 33.203 [19]. Where a requirement exists to send information "integrity-protected" the mechanisms specified in 3GPP TS 33.203 [19] are used for sending the information. Where a requirement exists to

check that information was received "integrity-protected", then the information received is checked for compliance with the procedures as specified in 3GPP TS 33.203 [19].

Instance ID: An URN generated by the device that uniquely identifies a specific device amongst all other devices, and does not contain any information pertaining to the user (e.g., in GPRS instance ID applies to the Mobile Equipment rather than the UICC). The public user identity together with the instance ID uniquely identifies a specific UA instance.

Resource reservation: Mechanism for reserving bearer resources that is required for certain access technologies.

Local preconditions: The indication of segmented status preconditions for the local reservation of resources as specified in RFC 3312 [30].

Alias SIP URI: A URI is an alias of another URI if the treatment of both URIs is identical, i.e. both URIs belong to the same set of implicitly registered public user identities, and are linked to the same service profile, and are considered to have the exact same service configuration for each and every service.

Initial registration: The registration procedure for a public user identity initiated by the UE in the absence of any valid registration.

Registration expiration interval: An indication on how long a registration is valid, indicated using the Expires header field, or the "expires" header field parameter within the Contact header field, according to the procedures specified in RFC 3261 [26].

Re-registration: The registration procedure initiated by the UE to refresh or update an already existing registration for a public user identity.

Registration of an additional public user identity: The registration procedure initiated by the UE to explicitly register an additional public user identity during the life time of the registration of another registered public user identity, where both public user identities have the same contact address and P-CSCF.

Emergency registration: A special registration that relates to binding of a public user identity to a contact address used for emergency service.

Initial emergency registration: An emergency registration that is also an initial registration.

Emergency reregistration: An emergency registration that is also a reregistration.

Back-to-Back User Agent (B2BUA): As given in RFC 3261 [26]. In addition, for the usage in the IM CN subsystem, a SIP element being able to handle a collection of "n" User Agents (behaving each one as UAC and UAS, according to SIP rules), which are linked by some application logic that is fully independent of the SIP rules.

UE private IP address: It is assumed that the NAT device performs network address translation between a private and a public network with the UE located in the private network and the IM CN subsystem in the public network. The UE is assumed to be configured with a private IP address. This address will be denoted as UE private IP address.

UE public IP address: The NAT device is assumed to be configured with one (or perhaps more) public address(es). When the UE sends a request towards the public network, the NAT replaces the source address in the IP header of the packet, which contains the UE private IP address, with a public IP addressed assigned to the NAT. This address will be denoted as UE public IP address.

Encapsulating UDP header: For the purpose of performing UDP encapsulation according to RFC 3948 [63A] each IPsec ESP packet is wrapped into an additional UDP header. This header is denoted as Encapsulating UDP header.

Port_Uenc: In most residential scenarios, when the NAT device performs address translation, it also performs translation of the source port found in the transport layer (TCP/UDP) headers. Following RFC 3948 [63A], the UE will use port 4500 as source port in the encapsulating UDP header when sending a packet. This port is translated by the NAT into an arbitrarily chosen port number which is denoted as port_Uenc.

Multiple registrations: An additional capability of the UE, P-CSCF and S-CSCF, such that the UE (as identified by the private user identity and instance-id), can create multiple simultaneous registration bindings (flows), associated with one or more contact addresses, to any public user identity, Without this capability, a new registration from the UE for a public user identity replaces the existing registration binding, rather than merely creating an additional binding.

IMS flow set: An IMS flow set is a set of flows as defined in RFC 5626 [92]. The flows in an IMS flow set are determined by a combination of transport protocol, IP addresses, and ports. An IMS flow set is established by a successful IMS registration procedure.

NOTE 1: For IPsec, the ports associated with the flow set include protected client ports and protected server ports as defined in 3GPP TS 33.203 [19] and an IMS flow set is made up of the following four flows:

- Flow 1: (IP address UE, port_uc) <--> (IP address P-CSCF, port_ps) over TCP;
- Flow 2: (IP address UE, port_uc) <--> (IP address P-CSCF, port_ps) over UDP;
- Flow 3: (IP address UE, port_us) <--> (IP address P-CSCF, port_pc) over TCP; and
- Flow 4: (IP address UE, port_us) <--> (IP address P-CSCF, port_pc) over UDP.

NOTE 2: For IPsec, according to 3GPP TS 33.203 [19], the P-CSCF can only select among flows 1, 3, or 4 when forwarding requests towards the UE, where flow 1 is only possible in case of TCP connection re-use. According to 3GPP TS 33.203 [19], flow 2 is only used for UE originated requests and corresponding responses. The P-CSCF uses flow 2 to identify the correct IMS flow set.

NOTE 3: An IMS flow set can be considered as a realisation of a logical flow as used in RFC 5626 [92]. But this definition does not depend on any particular definition of a logical flow.

NOTE 4: For TLS, the ports associated with the flow set include a protected client port and a protected server port and an IMS flow set is made up of the following flow:

- (IP address UE, port) <--> (IP address P-CSCF, port) over TCP.

NOTE 5: For SIP digest without TLS, an IMS flow set is as defined in RFC 5626 [92].

IMS flow token: A IMS flow token is uniquely associated with a IMS flow set. When forwarding a request destined towards the UE, the P-CSCF selects the flow from the IMS flow set denoted by the IMS flow token as appropriate according to 3GPP TS 33.203 [19] and RFC 3261 [26].

IP Association: A mapping at the P-CSCF of a UE's packet source IP address, the "sent-by" parameter in the Via header field, and, conditionally, the port with the identities of the UE. This association corresponds to the IP address check table specified in 3GPP TS 33.203 [19].

Authorised Resource-Priority header field: a Resource-Priority header field that is either received from another entity in the trust domain relating to the Resource-Priority header field, or which has been identified as generated by a subscriber known to have such priority privileges for the resource priority namespace and level of priority used within that namespace.

Network-initiated resource reservation: A mechanism of resource reservation where the IP-CAN on the behalf of network initiates the resources to the UE.

Public network traffic: traffic sent to the IM CN subsystem for processing according to normal rules of the NGN. This type of traffic is known as public network traffic.

Private network traffic: traffic sent to the IM CN subsystem for processing according to an agreed set of rules specific to an enterprise. This type of traffic is known as private network traffic. Private network traffic is normally within a single enterprise, but private network traffic can also exist between two different enterprises if not precluded for regulatory reasons.

Priviledged sender: A priviledged sender is allowed to send SIP messages where the identities in P-Asserted-Identity will be passed on in the P-CSCF and are not subject to further processing in the P-CSCF.

Restoration procedures: the procedures for the IM CN to handle a S-CSCF service interruption scenario (see 3GPP TS 23.380 [7D]).

Canonical form of a SIP URI: Canoncial form of a SIP URI takes the form "sip:username@domain" as specified in RFC 3261 [26] subclause 10.3. SIP URI comparisons are performed as defined in RFC 3261 [26] subbclause 19.1.4.

For the purposes of the present document, the following terms and definitions given in RFC 1594 [20B] apply.

Fully-Qualified Domain Name (FQDN)

For the purposes of the present document, the following terms and definitions given in RFC 3261 [26] apply (unless otherwise specified see clause 6).

Client
Dialog
Final response
Header
Header field
Loose routeing
Method
Option-tag (see RFC 3261 [26] subclause 19.2)
Provisional response
Proxy, proxy server
Recursion
Redirect server
Registrar
Request
Response
Server
Session
(SIP) transaction
Stateful proxy
Stateless proxy
Status-code (see RFC 3261 [26] subclause 7.2)
Tag (see RFC 3261 [26] subclause 19.3)
Target Refresh Request
User agent client (UAC)
User agent server (UAS)
User agent (UA)

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.002 [2] subclause 4.1.1.1 and subclause 4a.7 apply:

3GPP AAA proxy
3GPP AAA server
Breakout Gateway Control Function (BGCF)
Call Session Control Function (CSCF)
Home Subscriber Server (HSS)
Media Gateway Control Function (MGCF)
MSC Server enhanced for IMS centralized services
Multimedia Resource Function Controller (MRFC)
Multimedia Resource Function Processor (MRFP)
Packet Data Gateway (PDG)
Subscription Locator Function (SLF)
WLAN UE

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.122 [4C] apply:

Home PLMN (HPLMN)
Visited PLMN (VPLMN)

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.218 [5] subclause 3.1 apply:

Filter criteria
Initial filter criteria
Initial request
Standalone transaction
Subsequent request

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.228 [7] subclauses 3.1, 4.3.3.1, 4.3.6, 4.6, 4.13, 5.2, 5.4.12.1 and 5.10 apply:

Border control concepts
Geo-local service number
Home local service number

Implicit registration set
Interconnection Border Control Function (IBCF)
Interrogating-CSCF (I-CSCF)
IMS Application Level Gateway (IMS-ALG)
IMS application reference
IMS Application Reference Identifier (IARI)
IMS communication service
IMS Communication Service Identifier (ICSI)
Local service number
IP-Connectivity Access Network (IP-CAN)
Policy and Charging Rule Function (PCRF)
Private user identity
Proxy-CSCF (P-CSCF)
Public Service Identity (PSI)
Public user identity
Serving-CSCF (S-CSCF)
Statically pre-configured PSI

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.292 [7C] apply:

ICS UE
SCC AS

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.167 [4B] apply:

Emergency-CSCF (E-CSCF)
Geographical location information
Location identifier
Location information

For the purposes of the present document, the following terms and definitions given in 3GPP TR 33.203 [19] apply:

GPRS-IMS-Bundled Authentication (GIBA)
Port_pc
Port_ps
Port_uc
Port_us
Protected server port
Protected client port

For the purposes of the present document, the following terms and definitions given in 3GPP TR 21.905 [1] apply:

IMS Credentials (IMC)
International Mobile Equipment Identity (IMEI)
IMS SIM (ISIM)
Serial NumbeR (SNR)
Type Approval Code (TAC)
Universal Integrated Circuit Card (UICC)
Universal Subscriber Identity Module (USIM)
User Equipment (UE)

For the purposes of the present document, the following terms and definitions given in RFC 2401 [20A] Appendix A apply:

Security association

A number of different security associations exist within the IM CN subsystem and within the underlying access transport. Within this document this term specifically applies to either:

i) the security association that exists between the UE and the P-CSCF. For this usage of the term, the term "security association" only applies to IPsec. This is the only security association that has direct impact on SIP; or

ii) the security association that exists between the WLAN UE and the PDG. This is the security association that is relevant to the discussion of Interworking WLAN as the underlying IP-CAN.

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.234 [7A] apply.

Interworking WLAN

For the purposes of the present document, the following terms and definitions given in ITU-T E.164 [57] apply:

International public telecommunication number

For the purposes of the present document, the following terms and definitions given in RFC 5012 [91] apply:

Emergency service identifier
Emergency service URN
Public Safety Answering Point (PSAP)
PSAP URI

For the purposes of the present document, the following terms and definitions given in RFC 5627 [93] apply:

Globally Routable User Agent URI (GRUU)

For the purposes of the present document, the following terms and definitions given in RFC 5626 [92] apply:

Flow

For the purposes of the present document, the following terms and definitions given in RFC 4346 [122] appendix B apply:

TLS session

For the purposes of the present document, the following terms and definitions given in 3GPP TS 24.292 [8O] apply:

CS media

For the purposes of the present document, the following terms and definitions given in 3GPP TS 24.301 [8J] apply:

IMS Voice over PS Session (IMSVoPS) indicator

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

1xx	A status-code in the range 101 through 199, and excluding 100
2xx	A status-code in the range 200 through 299
AAA	Authentication, Authorization and Accounting
APN	Access Point Name
AS	Application Server
AUTN	Authentication TokeN
B2BUA	Back-to-Back User Agent
BGCF	Breakout Gateway Control Function
c	conditional
BRAS	Broadband Remote Access Server
CCF	Charging Collection Function
CDF	Charging Data Function
CDR	Charging Data Record
CK	Ciphering Key
CN	Core Network
CPC	Calling Party's Category
CSCF	Call Session Control Function
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
DOCSIS	Data Over Cable Service Interface Specification
DTD	Document Type Definition
EC	Emergency Centre
ECF	Event Charging Function
E-CSCF	Emergency CSCF

EF	Elementary File
EPS	Evolved Packet System
FQDN	Fully Qualified Domain Name
GCID	GPRS Charging Identifier
GGSN	Gateway GPRS Support Node
GPRS	General Packet Radio Service
GRUU	Globally Routable User agent URI
HPLMN	Home PLMN
HSS	Home Subscriber Server
i	irrelevant
IARI	IMS Application Reference Identifier
IBCF	Interconnection Border Control Function
I-CSCF	Interrogating CSCF
ICS	Implementation Conformance Statement
ICID	IM CN subsystem Charging Identifier
ICSI	IMS Communication Service Identifier
IK	Integrity Key
IM	IP Multimedia
IMC	IMS Credentials
IMEI	International Mobile Equipment Identity
IMS	IP Multimedia core network Subsystem
IMS-ALG	IMS Application Level Gateway
IMSI	International Mobile Subscriber Identity
IMSVoPS	IMS Voice over PS Session
IOI	Inter Operator Identifier
IP	Internet Protocol
IP-CAN	IP-Connectivity Access Network
IPsec	IP security
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
ISC	IP Multimedia Subsystem Service Control
ISIM	IM Subscriber Identity Module
I-WLAN	Interworking – WLAN
IWF	Interworking Function
LRF	Location Retrieval Function
m	mandatory
MAC	Message Authentication Code
MCC	Mobile Country Code
MGCF	Media Gateway Control Function
MGW	Media Gateway
MNC	Mobile Network Code
MRFC	Multimedia Resource Function Controller
MRFP	Multimedia Resource Function Processor
n/a	not applicable
NAI	Network Access Identifier
NA(P)T	Network Address (and Port) Translation
NASS	Network Attachment Subsystem
NAT	Network Address Translation
NP	Number Portability
o	optional
OCF	Online Charging Function
OLI	Originating Line Information
PCRF	Policy and Charging Rules Function
P-CSCF	Proxy CSCF
PDG	Packet Data Gateway
PDN	Packet Data Network
PDP	Packet Data Protocol
PDU	Protocol Data Unit
P-GW	PDN Gateway
PICS	Protocol Implementation Conformance Statement
PIDF-LO	Presence Information Data Format Location Object
PLMN	Public Land Mobile Network

PSAP	Public Safety Answering Point
PSI	Public Service Identity
PSTN	Public Switched Telephone Network
QCI	QoS Class Identifier
QoS	Quality of Service
RAND	RANDom challenge
RES	RESponse
RTCP	Real-time Transport Control Protocol
RTP	Real-time Transport Protocol
S-CSCF	Serving CSCF
SCTP	Stream Control Transmission Protocol
SDP	Session Description Protocol
SIP	Session Initiation Protocol
SLF	Subscription Locator Function
SNR	Serial Number
SQN	SeQuence Number
STUN	Session Traversal Utilities for NAT
TAC	Type Approval Code
TURN	Traversal Using Relay NAT
TLS	Transport Layer Security
UA	User Agent
UAC	User Agent Client
UAS	User Agent Server
UDVM	Universal Decompressor Virtual Machine
UE	User Equipment
UICC	Universal Integrated Circuit Card
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
URN	Uniform Resource Name
USAT	Universal Subscriber Identity Module Application Toolkit
USIM	Universal Subscriber Identity Module
VPLMN	Visited PLMN
WLAN	Wireless Local Area Network
x	prohibited
xDSL	Digital Subscriber Line (all types)
XMAC	expected MAC
XML	eXtensible Markup Language

3A Interoperability with different IP-CAN

The IM CN subsystem can be accessed by UEs resident in different types of IP-CAN. The main body of this document, and annex A, are general to UEs and IM CN subsystems that are accessed using any type of IP-CAN. Requirements that are dependent on the type of IP-CAN are covered in annexes B, D, E, H, L, and M.

At any given time, for a given SIP transaction or dialog, the UE sees only one type of IP-CAN, as reported to it by the lower layers. The UE follows the procedures of the IP-CAN specific annex related to the last type of IP-CAN reported, even if it is different to one used previously. In particular, handover at the radio layers between two different access technologies can result in such a change while the dialog or transaction proceeds.

At any given time, for a given SIP transaction or dialog, the P-CSCF sees only one type of IP-CAN, as determined by interface to a particular resource architecture, e.g. policy and charging control, and by the access technology reported to it over that interface, or in the absence of this, by preconfiguration in the system. The P-CSCF follows the procedures of the IP-CAN specific annex related to the last type of IP-CAN determined, even if it is different to one used previously. In particular, handover at the radio layers between two different access technologies can result in such a change while the dialog or transaction proceeds.

It is the responsibility of the IP-CAN to ensure that usage of different bearer resources are synchronised on the handover from one IP-CAN to another, e.g. so that a signalling bearer provided by one IP-CAN is a signalling bearer (if provided by that IP-CAN) after handover, and that the appropriate QoS and resource reservation exists after handover.

There is no SIP signalling associated with handover at the IP-CAN, and therefore no change in SIP state at one entity is signalled to the peer SIP entity when handover occurs.

In particular the following constraints exist that can have an impact on P-CSCF usage:

1) some IP-CANs can explicitly label a bearer as a signalling bearer, while others provide a bearer that has appropriate QoS, but no explicit labelling. Therefore if handover occurs from an IP-CAN with explicit labelling, to an IP-CAN with no explicit labelling, and then back to an IP-CAN with explicit labelling, the signalling will then be on a bearer that is not explicitly labelled; and

2) some IP-CANs support signalling of grouping of media within particular bearers, while others do not. Therefore if handover occurs from an IP-CAN with grouping, to an IP-CAN with no grouping, and then back to an IP-CAN with grouping, the signalled grouping can have been lost.

When a UE supports multiple IP-CANs, but does not support handover between those IP-CANs, the annex specific to that IP-CAN applies unmodified.

Where handover between IP-CANs occurs without a reregistration in the IM CN subsystem, the same identies and security credentials for access to the IM CN subsystem are used before and after the handover.

4 General

4.1 Conformance of IM CN subsystem entities to SIP, SDP and other protocols

SIP defines a number of roles which entities can implement in order to support capabilities. These roles are defined in annex A.

Each IM CN subsystem functional entity using an interface at the Gm reference point, the Ma reference point, the Mg reference point, the Mi reference point, the Mj reference point, the Mk reference point, the Mm reference point, the Mr reference point, the Cr reference point, the Mw reference point, the I2 reference point and the Ici reference point, and also using the IP multimedia Subsystem Service Control (ISC) Interface, shall implement SIP, as defined by the referenced specifications in Annex A, and in accordance with the constraints and provisions specified in annex A, according to the following roles.

The Gm reference point, the Ma reference point, the Mg reference point, the Mi reference point, the Mj reference point, the Mk reference point, the Mm reference point, the Mr reference point, the Cr reference point, the Mw reference point, the I2 reference point and the ISC reference point are defined in 3GPP TS 23.002 [2]. The Ici reference point is defined in 3GPP TS 23.228 [7].

- The User Equipment (UE) shall provide the User Agent (UA) role, with the exceptions and additional capabilities to SIP as described in subclause 5.1, with the exceptions and additional capabilities to SDP as described in subclause 6.1, and with the exceptions and additional capabilities to SigComp as described in subclause 8.1. The UE shall also provide the access technology specific procedures described in the appropriate access technology specific annex (see subclause 3A and subclause 9.2.2). The UE may include one or several interconnected SIP elements registered as a single logical entity when the UE performs the functions of an external attached network (e.g. an enterprise network). This specification does not place any constraint on the SIP role played by each of the elements as long as the compound entity appears to the IM CM subsystem as a SIP UA with the aforementioned exceptions and additional capabilities except for the modifications defined by the UE performing the functions of an external attached network modifying role in annex A.

NOTE 1: When the UE performs the functions of an external attached network (e.g. an enterprise network), the internal structure of this UE is outside the scope of this specification. It is expected that in the most common case, several SIP elements will be connected to an additional element directly attached to the IM CN subsystem.

- The P-CSCF shall provide the proxy role, with the exceptions and additional capabilities to SIP as described in subclause 5.2, with the exceptions and additional capabilities to SDP as described in subclause 6.2, and with the exceptions and additional capabilities to SigComp as described in subclause 8.2. Under certain circumstances as described in subclause 5.2, the P-CSCF shall provide the UA role with the additional capabilities, as follows:

a) when acting as a subscriber to or the recipient of event information; and

b) when performing P-CSCF initiated dialog-release, even when acting as a proxy for the remainder of the dialog.

The P-CSCF shall also provide the access technology specific procedures described in the appropriate access technology specific annex (see subclause 3A and subclause 9.2.2).

- The I-CSCF shall provide the proxy role, with the exceptions and additional capabilities as described in subclause 5.3.

- The S-CSCF shall provide the proxy role, with the exceptions and additional capabilities as described in subclause 5.4, and with the exceptions and additional capabilities to SDP as described in subclause 6.3. Under certain circumstances as described in subclause 5.4, the S-CSCF shall provide the UA role with the additional capabilities, as follows:

  a) the S-CSCF shall also act as a registrar. When acting as a registrar, or for the purposes of executing a third-party registration, the S-CSCF shall provide the UA role;

  b) as the notifier of event information the S-CSCF shall provide the UA role;

  c) when providing a messaging mechanism by sending the MESSAGE method, the S-CSCF shall provide the UA role; and

  d) when performing S-CSCF initiated dialog release the S-CSCF shall provide the UA role, even when acting as a proxy for the remainder of the dialog.

- The MGCF shall provide the UA role, with the exceptions and additional capabilities as described in subclause 5.5, and with the exceptions and additional capabilities to SDP as described in subclause 6.4.

- The BGCF shall provide the proxy role, with the exceptions and additional capabilities as described in subclause 5.6.

- The AS, acting as terminating UA, or redirect server (as defined in 3GPP TS 23.218 [5] subclause 9.1.1.1), shall provide the UA role, with the exceptions and additional capabilities as described in subclause 5.7.2, and with the exceptions and additional capabilities to SDP as described in subclause 6.6.

- The AS, acting as originating UA (as defined in 3GPP TS 23.218 [5] subclause 9.1.1.2), shall provide the UA role, with the exceptions and additional capabilities as described in subclause 5.7.3, and with the exceptions and additional capabilities to SDP as described in subclause 6.6.

- The AS, acting as a SIP proxy (as defined in 3GPP TS 23.218 [5] subclause 9.1.1.3), shall provided the proxy role, with the exceptions and additional capabilities as described in subclause 5.7.4.

- The AS, performing 3rd party call control (as defined in 3GPP TS 23.218 [5] subclause 9.1.1.4), shall provide the UA role, with the exceptions and additional capabilities as described in subclause 5.7.5, and with the exceptions and additional capabilities to SDP as described in subclause 6.6. An AS performing media control of an MRFC shall also support the procedures and methods described in subclause 10.2.

NOTE 2: Subclause 5.7 and its subclauses define only the requirements on the AS that relate to SIP. Other requirements are defined in 3GPP TS 23.218 [5].

- The AS, receiving third-party registration requests, shall provide the UA role, with the exceptions and additional capabilities as described in subclause 5.7.

- The MRFC shall provide the UA role, with the exceptions and additional capabilities as described in subclause 5.8, and with the exceptions and additional capabilities to SDP as described in subclause 6.5. The MRFC shall also support the procedures and methods described in subclause 10.3 for media control.

- The IBCF shall provide the proxy role, with the exceptions and additional capabilities to SIP as described in subclause 5.10. If the IBCF provides an application level gateway functionality (IMS-ALG), then the IBCF shall provide the UA role, with the exceptions and additional capabilities to SIP as described in subclause 5.10, and with the exceptions and additional capabilities to SDP as described in subclause 6.7. If the IBCF provides screening functionality, then the IBCF may provide the UA role, with the exceptions and additional capabilities to SIP as described in subclause 5.10.

- The E-CSCF shall provide the proxy role, with the exceptions and additional capabilities as described in subclause 5.11. Under certain circumstances as described in subclause 5.11, the E-CSCF shall provide the UA role in accordance with RFC 3323 [33], with the additional capabilities, as follows:

  a) when operator policy (e.g. determined by national regulatory requirements applicable to emergency services) allows user requests for suppression of public user identifiers and location information, then the E-CSCF shall provide the UA role, with the exceptions and additional capabilities to SIP as described in subclause 5.11; and

  b) when performing E-CSCF initiated dialog release the E-CSCF shall provide the UA role, even when acting as a proxy for the remainder of the dialog, e.g. for any of the reasons specified in RFC 6442 [89] or RFC 3323 [33].

- The MSC Server enhanced for ICS shall provide the UA role, with the exceptions and additional capabilities as described in 3GPP TS 24.292 [8O].

In addition to the roles specified above, the P-CSCF, the I-CSCF, the IBCF, the S-CSCF, the BGCF and the E-CSCF can act as a UA when providing server functionality to return a final response for any of the reasons specified in RFC 3261 [26].

NOTE 3: Annex A can change the status of requirements in referenced specifications. Particular attention is drawn to table A.4 and table A.162 for capabilities within referenced SIP specifications, and to table A.317 and table A.328 for capabilities within referenced SDP specifications. The remaining tables build on these initial tables.

NOTE 4: The allocated roles defined in this clause are the starting point of the requirements from the IETF SIP specifications, and are then the basis for the description of further requirements. Some of these extra requirements formally change the proxy role into a B2BUA. In all other respects other than those more completely described in subclause 5.2 the P-CSCF implements proxy requirements. Despite being a B2BUA a P-CSCF does not implement UA requirements from the IETF RFCs, except as indicated in this specification, e.g., relating to registration event subscription.

NOTE 5: Except as specified in clause 5 or otherwise permitted in RFC 3261, the functional entities providing the proxy role are intended to be transparent to data within received requests and responses. Therefore these entities do not modify message bodies. If local policy applies to restrict such data being passed on, the functional entity has to assume the UA role and reject a request, or if in a response and where such procedures apply, to pass the response on and then clear the session using the BYE method.

All the above entities are functional entities that could be implemented in a number of different physical platforms coexisting with a number of other functional entities. The implementation shall give priority to transactions at one functional entity, e.g. that of the the E-CSCF, over non-emergency transactions at other entities on the same physical implementation. Such priority is similar to the priority within the functional entities themselves specified elsewhere in this document.

Additional routeing functionality can be provided to support the ability for the IM CN subsystem to provide transit functionality as specified in Annex I. The additional routeing functionality shall assume the proxy role.

4.2 URI and address assignments

In order for SIP and SDP to operate, the following prerequisite conditions apply:

1) I-CSCFs used in registration are allocated SIP URIs. Other IM CN subsystem entities may be allocated SIP URIs. For example sip:pcscf.home1.net and sip:<impl-specific-info>@pcscf.home1.net are valid SIP URIs. If the user part exists, it is an essential part of the address and shall not be omitted when copying or moving the address. How these addresses are assigned to the logical entities is up to the network operator. For example, a single SIP URI may be assigned to all I-CSCFs, and the load shared between various physical boxes by underlying IP capabilities, or separate SIP URIs may be assigned to each I-CSCF, and the load shared between various physical boxes using DNS SRV capabilities.

2) All IM CN subsystem entities are allocated IP addresses. Any IM CN subsystem entities can be allocated IPv4 only, IPv6 only or both IPv4 and IPv6 addresses. For systems providing access to IM CN subsystem using a UMTS/GSM/EPS network this is specified in 3GPP TS 23.221 [6] subclause 5.1. For systems providing access to IM CN subsystem using a cdma2000® network this is specified in subclause M.2.2.1.

3) The subscriber is allocated a private user identity by the home network operator. This private user identity is available to the SIP application within the UE. Depending on the network operator, various arrangements exist within the UE for retaining this information:

   a) where an ISIM is present, within the ISIM, see subclause 5.1.1.1A;

   b) where no ISIM is present but USIM is present, the private user identity is derived (see subclause 5.1.1.1A);

   c) neither ISIM nor USIM is present, but IMC is present, within IMC (see subclause 5.1.1.1B.1);

   d) when neither ISIM nor USIM nor IMC is present, the private user identity is available to the UE via other means (see subclause 5.1.1.1B.2).

NOTE 1: 3GPP TS 33.203 [19] specifies that a UE attached to a 3GPP network has an ISIM or a USIM.

NOTE 2: The SIP URIs can be resolved by using any of public DNSs, private DNSs, or peer-to-peer agreements.

4) The subscriber is allocated one or more public user identities by the home network operator. The public user identity shall take the form of SIP URI as specified in RFC 3261 [26] or tel URI as specified in RFC 3966 [22]. At least one of the public user identities is a SIP URI . All registered public user identities are available to the SIP application within the UE, after registration. Depending on the network operator, various arrangements exist within the UE for retaining this information:

   a) where an ISIM is present, at least one public user identity, which is a SIP URI, within the ISIM, see subclause 5.1.1.1A;

   b) where no ISIM is present but USIM is present, a temporary public user identity is derived (see subclause 5.1.1.1A);

   c) neither ISIM nor USIM is present, but IMC is present, within IMC (see subclause 5.1.1.1B.1);

   d) when neither ISIM nor USIM nor IMC is present, the public user identities are available to the UE via other means (see subclause 5.1.1.1B.2).

NOTE 3: 3GPP TS 33.203 [19] specifies that a UE attached to a 3GPP network has an ISIM or a USIM.

5) If the UE supports GRUU (see table A.4, item A.4/53) or multiple registrations, then it shall have an Instance ID, in conformance with the mandatory requirements for Instance IDs specified in RFC 5627 [93] and RFC 5626 [92].

6) For each tel URI, there is at least one alias SIP URI in the set of implicitly registered public user identities that is used to implicitly register the associated tel URI.

NOTE 4: For each tel URI, there always exists a SIP URI that has identical user part as the tel URI and the "user" SIP URI parameter equals "phone" (see RFC 3261 [26] subclause 19.1.6), that represents the same public user identity. If a tel URI identifies a subscriber served by the IM CN subsystem, then the hostport parameter of the respective SIP URI contains the home domain name of the IM CN subsystem to which the subscriber belongs.

6A) Identification of the UE to a PSAP with point of presence in the CS domain is not possible if a tel URI is not included in the set of implicitly registered public user identities. If the included tel URI is associated either with the first entry in the list of public user identities provisioned in the UE or with the temporary public user identity, then a PSAP can uniquely identify the UE if emergency registration is performed.

NOTE 5: The tel URI uniquely identifies the UE by not sharing any of the implicit registered public user identities in the implicit registration set that contains this tel URI.

NOTE 6: Emergency registration is not always needed or supported.

7) The public user identities may be shared across multiple UEs. A particular public user identity may be simultaneously registered from multiple UEs that use different private user identities and different contact addresses. When reregistering and deregistering a given public user identity and associated contact address, the UE will use the same private user identity that it had used during the initial registration of the respective public user identity and associated contact address. If the tel URI is a shared public user identity, then the associated alias SIP URI is also a shared public user identity. Likewise, if the alias SIP URI is a shared public user identity, then the associated tel URI is also a shared public user identity.

8) For the purpose of access to the IM CN subsystem, UEs can be allocated IPv4 only, IPv6 only or both IPv4 and IPv6 addresses. For systems providing access to IM CN subsystem using a UMTS/GSM network this is specified in 3GPP TS 23.221 [6] subclause 5.1 (see subclause 9.2.1 for the assignment procedures). For systems providing access to IM CN subsystem using a cdma2000® network this is specified in subclause M.2.2.1.

9) For the purpose of indicating an IMS communication service to the network, UEs are assigned ICSI values appropriate to the IMS communication services supported by the UE, coded as URNs as specified in subclause 7.2A.8.2.

NOTE 7: cdma2000® is a registered trademark of the Telecommunications Industry Association (TIA-USA).

4.2A Transport mechanisms

This document makes no requirement on the transport protocol used to transfer signalling information over and above that specified in RFC 3261 [26] clause 18. However, the UE and IM CN subsystem entities shall transport SIP messages longer than 1300 bytes according to the procedures of RFC 3261 [26] subclause 18.1.1, even if a mechanism exists of discovering a maximum transmission unit size longer than 1500 bytes.

NOTE: Support of SCTP as specified in RFC 4168 [96] is optional for IM CN subsystem entities implementing the role of a UA or proxy. SCTP transport between the UE and P-CSCF is not supported in the present document. Support of the SCTP transport is currently not described in 3GPP TS 33.203 [19].

For initial REGISTER requests, the UE and the P-CSCF shall apply port handling according to subclause 5.1.1.2 and subclause 5.2.2.

The UE and the P-CSCF shall send and receive request and responses other than initial REGISTER requests on the protected ports as described in 3GPP TS 33.203 [19].

In case of an emergency session if the UE does not have sufficient credentials to authenticate with the IM CN subsystem and regulations allow, the UE and P-CSCF shall send request and responses other than initial REGISTER requests on non protected ports.

4.2B Security mechanisms

3GPP TS 33.203 [19] defines the security features and mechanisms for secure access to the IM CN subsystem. This document defines a number of access security mechanisms, as summarised in table 4-1.

Table 4-1: Summary of access security mechanisms to the IM CN subsystem

Mechanism	Authentication	Integrity protection	Use of security agreement in accordance with RFC 3329 [48]	Support (as defined in 3GPP TS 33.203 [19])
IMS AKA plus IPsec ESP (see 3GPP TS 33.203 [19] clause 6)	IMS AKA	IPsec ESP	Yes	Mandatory for all UEs containing a UICC, else optional. Mandatory for all P-CSCF, I-CSCF, S-CSCF
SIP digest plus check of IP association (see 3GPP TS 33.203 [19] annex N) (note 2)	SIP digest	None (note 3)	No	Optional for UEs Optional for P-CSCF, I-CSCF, S-CSCF
SIP digest plus Proxy Authentication (see 3GPP TS 33.203 [19] annex N) (note 2)	SIP digest	None (note 3)	No	Optional for UEs Optional for P-CSCF, I-CSCF, S-CSCF
SIP digest with TLS (see 3GPP TS 33.203 [19] annex N and annex O)	SIP digest	TLS session	Yes	Optional for UEs Optional for P-CSCF, I-CSCF, S-CSCF
NASS-IMS bundled authentication (see 3GPP TS 33.203 [19] annex R) (notes 4, 5)	not applicable (note 1)	(note 3)	No	No UE support required Optional for P-CSCF, I-CSCF, S-CSCF
GPRS-IMS-Bundled authentication (see 3GPP TS 33.203 [19] annex S) (note 5)	not applicable (note 1)	None (note 3)	No	Optional for UEs Optional for P-CSCF, I-CSCF, S-CSCF
Authentication already performed by preceding node	not applicable (note 6)	None (note 3)	No	No UE support required Optional for I-CSCF, S-CSCF

NOTE 1: Authentication is not provided as part of the IM CN subsystem signalling.
NOTE 2: The term "SIP digest without TLS" is used in this specification to refer to both "SIP digest plus check of IP association" and "SIP digest plus Proxy Authentication".
NOTE 3: This security mechanism does not allow SIP requests to be protected using an IPsec security association because it does not perform a key agreement procedure.
NOTE 4: A P-Access-Network-Info aware P-CSCF is required in order to provide NASS-IMS bundled authentication.
NOTE 5: The P-CSCF is restricted to the home network when performing this security mechanism.
NOTE 6: Authentication performed by a trusted, preceding node. For example the MSC server enhanced for IMS centralized services has authenticated the UE and as a consequence S-CSCF will skip authentication.

Specification of the mechanisms identified within table 4-1 within this document are provided in clause 5. Subclauses where security procedures are required consist of a general subclause applicable whichever security mechanisms are in use, and a separate subclause for each security mechanism identified by a row within table 4-1.

TLS is optional to implement and is used only in combination with SIP digest authentication. Authentication associated with registration to the IM CN subsystem is applicable to IMS AKA and SIP digest and is covered in subclause 5.1.1 for the UE, subclause 5.2.2 for the P-CSCF and subclause 5.4.1 for the S-CSCF. Additionally, SIP digest allows for authentication to also occur on an initial request for a dialog or a request for a standalone transaction, this additional capability is covered in subclause 5.1.2A and subclause 5.4.3.2.

If a UE that implements SIP digest is configured not to use TLS, then the UE does not establish a TLS session toward the P-CSCF. If a UE supports TLS, then the UE supports TLS as described in 3GPP TS 33.203 [19].

For SIP digest authentication, the P-CSCF can be configured to have TLS required or disabled:

- if TLS is required, the P-CSCF requires the establishment of a TLS session from all SIP digest UEs, in order to access IMS subsequent to registration; or

- if TLS is disabled, the P-CSCF does not allow the establishment of a TLS session from any UE.

NOTE: The mechanism to configure the P-CSCF to have TLS required or disabled is outside the scope of this specification.

SIP digest cannot be used in conjunction with the procedures of Annex F.

For emergency calls, 3GPP TS 33.203 [19] specifies some relaxations, which are further described in the subclauses of this document relating to emergency calls.

3GPP TS 33.210 [19A] defines the security architecture for network domain IP based control planes.
3GPP TS 33.210 [19A] applies for security mechanisms between entities in the IM CN subsystem.

4.3 Routeing principles of IM CN subsystem entities

Each IM CN subsystem functional entity shall apply loose routeing policy as described in RFC 3261 [26], when processing a SIP request. In cases where the I-CSCF, IBCF, S-CSCF and the E-CSCF may interact with strict routers in non IM CN subsystem networks, the I-CSCF, IBCF, S-CSCF and E-CSCF shall use the routeing procedures defined in RFC 3261 [26] to ensure interoperability with strict routers.

4.4 Trust domain

4.4.1 General

RFC 3325 [34] provides for the existence and trust of an asserted identity within a trust domain. For the IM CN subsystem, this trust domain consists of the functional entities that belong to the same operator's network (P-CSCF, the E-CSCF, the I-CSCF, the IBCF, the S-CSCF, the BGCF. the MGCF, the MRFC, and all ASs that are included in the trust domain). Additionally, other nodes within the IM CN subsystem that are not part of the same operator's domain may or may not be part of the trust domain, depending on whether an interconnect agreement exists with the remote network. SIP functional entities that belong to a network for which there is an interconnect agreement are part of the trust domain. ASs outside the operator's network can also belong to the trust domain if they have a trusted relationship with the home network.

NOTE 1: Whether any peer functional entity is regarded as part of the same operator's domain, and therefore part of the same trust domain, is dependent on operator policy which is preconfigured into each functional entity.

NOTE 2: For the purpose of this document, the PSAP is typically regarded as being within the trust domain, except where indicated. National regulator policy applicable to emergency services determines the trust domain applicable to certain header fields. This means that e.g. the handling of the P-Access-Network-Info header field, P-Asserted-Identity header field and the History-Info header field can be as if the PSAP is within the trust domain, and trust domain issues will be resolved accordingly.

Within the IM CN subsystem trust domains will be applied to a number of header fields. These trust domains do not necessarily contain the same functional entities or cover the same operator domains. The procedures in this subclause apply to the functional entities in clause 5 in the case where a trust domain boundary exists at that functional entity.

Where the IM CN subsystem supports business communication, different trust domains can apply to public network traffic, and to private network traffic belonging to each supported corporate network.

NOTE 3: Where an external attached network (e.g. an enterprise network) is in use, the edges of the trust domains need not necessarily lie at the P-CSCF. In this release of the specification, the means by which the P-CSCF learns of such attached devices, and therefore different trust domain requirements to apply, is not provided in the specification and is assumed to be by configuration or by a mechanism outside the scope of this release of the specification.

A trust domain applies for the purpose of the following header fields: P-Asserted-Identity, P-Access-Network-Info, History-Info, Resource-Priority, P-Asserted-Service, Reason (only in a response), P-Profile-Key, and P-Served-User. A trust domain applies for the purpose of the CPC and OLI tel URI parameters. The trust domains of these header fields and parameters need not have the same boundaries. Clause 5 defines additional procedures concerning these header fields.

4.4.2 P-Asserted-Identity

A functional entity at the boundary of the trust domain will need to determine whether to remove the P-Asserted-Identity header field according to RFC 3325 [34] when SIP signalling crosses the boundary of the trust domain. Subclause 5.4 identifies additional cases for the removal of the P-Asserted-Identity header field.

4.4.3 P-Access-Network-Info

A functional entity at the boundary of the trust domain shall remove any P-Access-Network-Info header field.

4.4.4 History-Info

A functional entity at the boundary of the trust domain will need to determine whether to remove the History-Info header field according to RFC 4244 [66] subclause 3.3 when SIP signalling crosses the boundary of the trust domain. Subclause 5.4 identifies additional cases for the removal of the History-Info header field.

4.4.5 P-Asserted-Service

A functional entity at the boundary of the trust domain will need to determine whether to remove the P-Asserted-Service header field according to RFC 6050 [121] when SIP signalling crosses the boundary of the trust domain.

4.4.6 Resource-Priority

A functional entity shall only include a Resource-Priority header field in a request or response forwarded to another entity within the trust domain. If a request or response is forwarded to an entity outside the trust domain, the functional entity shall remove the Resource-Priority header field from the forwarded request or response. If a request or response is received from an untrusted entity (with the exception requests or responses received by the P-CSCF from the UE for which procedures are defined in subclause 5.2) that contains the Resource-Priority header field, the functional entity shall remove the Resource-Priority header field before forwarding the request or response within the trust domain.

4.4.7 Reason (in a response)

A functional entity shall only include a Reason header field in a response forwarded to another entity within the trust domain (as specified in RFC 6432 [130]). If a response is forwarded to an entity outside the trust domain, the functional entity shall remove the Reason header field from the forwarded response.

NOTE: A Reason header field can be received in a response from outside the trust domain and will not be removed.

4.4.8 P-Profile-Key

A functional entity at the boundary of the trust domain will need to determine whether to remove the P-Profile-Key header field as defined in RFC 5002 [97] when SIP signalling crosses the boundary of the trust domain.

4.4.9 P-Served-User

A functional entity at the boundary of the trust domain will need to determine whether to remove the P-Served-User header field according to RFC 5502 [133] when SIP signalling crosses the boundary of the trust domain.

4.4.10 P-Private-Network-Indication

A functional entity shall only include a P-Private-Network-Indication header field in a request forwarded to another entity within the trust domain. If a request is forwarded to an entity outside the trust domain, the functional entity shall remove the P-Private-Network-Indication header field from the forwarded request. If a request is received from an untrusted entity that contains the P-Private-Network-Indication header field, the functional entity shall remove the P-Private-Network-Indication header field before forwarding the request within the trust domain.

NOTE 1: Other entities within the enterprise will frequently be part of this trust domain.

NOTE 2: The presence of the P-Private-Network-Indication header field is an indication that the request constitutes private network traffic. This can modify the trust domain behaviour for other header fields.

NOTE 3: If a trust domain boundary is encountered for this header field without appropriate business communication processing, then this can be an indication that misconfiguration has occurred in the IM CN subsystem. Removal of this header field changes the request from private network traffic to public network traffic.

4.4.11 Void

4.4.12 CPC and OLI

Entities in the IM CN subsystem shall restrict "cpc" and "oli" URI parameters to specific domains that are trusted and support the "cpc" and "oli" URI parameters. Therefore for the purpose of the "cpc" and "oli" URI parameters within this specification, a trust domain also applies.

SIP functional entities within the trust domain shall remove the "cpc" and "oli" URI parameters when the SIP signalling crosses the boundary of the trust domain.

4.5 Charging correlation principles for IM CN subsystems

4.5.1 Overview

This subclause describes charging correlation principles to aid with the readability of charging related procedures in clause 5. See 3GPP TS 32.240 [16] and 3GPP TS 32.260 [17] for further information on charging.

The IM CN subsystem generates and retrieves the following charging correlation information for later use with offline and online charging:

1. IM CN subsystem Charging Identifier (ICID);
2. Access network charging information;
3. Inter Operator Identifier (IOI);
4. Charging function addresses:
    a. Charging Data Function (CDF);
    b. Online Charging Function (OCF).

How to use and where to generate the parameters in IM CN subsystems are described further in the subclauses that follow. The charging correlation information is encoded in the P-Charging-Vector header field as defined in subclause 7.2A.5. The P-Charging-Vector header field contains the following header field parameters: "icid-value", "access-network-charging-info", and "orig-ioi" and "term-ioi".

The offline and online charging function addresses are encoded in the P-Charging-Function-Addresses as defined in RFC 3455 [52]. The P-Charging-Function-Addresses header field contains the following header field parameters: "ccf" for CDF and "ecf" for OCF.

NOTE: P-Charging-Function-Addresses parameters were defined using previous terminology.

4.5.2 IM CN subsystem charging identifier (ICID)

The ICID is the session level data shared among the IM CN subsystem entities including ASs in both the calling and called IM CN subsystems. The ICID is used also for session unrelated messages (e.g. SUBSCRIBE request, NOTIFY request, MESSAGE request) for the correlation with CDRs generated among the IM CN subsystem entities.

The first IM CN subsystem entity involved in a SIP transaction will generate the ICID and include it in the "icid-value" header field parameter of the P-Charging-Vector header field in the SIP request. For a dialog relating to a session, this will be performed only on the INVITE request, for all other transactions, it will occur on each SIP request. See 3GPP

TS 32.260 [17] for requirements on the format of ICID. The P-CSCF will generate an ICID for UE-originated calls. The I-CSCF will generate an ICID for UE-terminated calls if there is no ICID received in the initial request (e.g. the calling party network does not behave as an IM CN subsystem). The AS will generate an ICID when acting as an originating UA. The MGCF will generate an ICID for PSTN/PLMN originated calls. Each entity that processes the SIP request will extract the ICID for possible later use in a CDR. The I-CSCF and S-CSCF are also allowed to generate a new ICID for UE-terminated calls received from another network.

There is also an ICID generated by the P-CSCF with a REGISTER request that is passed in a unique instance of P-Charging-Vector header field. The valid duration of the ICID is specified in 3GPP TS 32.260 [17].

The "icid-value" header field parameter is included in any request that includes the P-Charging-Vector header field. However, the P-Charging-Vector (and ICID) is not passed to the UE.

The ICID is also passed from the P-CSCF to the IP-CAN via PCRF. The interface supporting this operation is outside the scope of this document.

4.5.3 Access network charging information

4.5.3.1 General

The access network charging information are the media flow level data shared among the IM CN subsystem entities for one side of the session (either the calling or called side). GPRS charging information (GGSN identifier and PDP context information) is an example of access network charging information.

4.5.3.2 Access network charging information

The IP-CAN provides the access network charging information to the IM CN subsystem. This information is used to correlate IP-CAN CDRs with IM CN subsystem CDRs, i.e. the access network charging information is used to correlate the bearer level with the session level.

The access network charging information is generated at the first opportunity after the resources are allocated at the IP-CAN. The access network charging information is passed from IP-CAN to P-CSCF via PCRF, over the Rx and Gx interfaces. Access network charging information will be updated with new information during the session as media flows are added or removed. The P-CSCF provides the access network charging information to the S-CSCF. The S-CSCF may also pass the information to an AS, which may be needed for online pre-pay applications. The access network charging information for the originating network is used only within that network, and similarly the access network charging information for the terminating network is used only within that network. Thus the access network charging information are not shared between the calling and called networks. The access network charging information is not passed towards the external ASs from its own network.

The access network charging information is populated in the P-Charging-Vector header field.

4.5.4 Inter operator identifier (IOI)

The Inter Operator Identifier (IOI) is a globally unique identifier to share between sending and receiving networks, service providers or content providers.

The sending network populates the "orig-ioi" header field parameter of the P-Charging-Vector header field in a request and thereby identifies the operator network from which the request originated. The "term-ioi" header field parameter is left out of the P-Charging-Vector header field in this request. The sending network retrieves the "term-ioi" header field parameter from the P-Charging-Vector header field within the message sent in response, which identifies the operator network from which the response was sent.

The receiving network retrieves the "orig-ioi" header field parameter from the P-Charging-Vector header field in the request, which identifies the operator network from which the request originated. The receiving network populates the "term-ioi" header field parameter of the P-Charging-Vector header field in the response to the request, which identifies the operator network from which the response was sent.

There are three types of IOI:

- Type 1 IOI, between the P-CSCF (possibly in the visited network) and the S-CSCF in the home network. This is exchanged in REGISTER requests and responses.

- Type 2 IOI, between the S-CSCF of the home originating network and the S-CSCF of the home terminating network or between the S-CSCF of the home originating network and the MGCF when a call/session is terminated at the PSTN/PLMN or between the MGCF and the S-CSCF of the home terminating network when a call/session is originated from the PSTN/PLMN or with a PSI AS when accessed across I-CSCF. This is exchanged in all session-related and session-unrelated requests and responses. For compatibility issues related to CS charging system behaviour simulation, the S-CSCF in the terminating network shall forward the "orig-ioi" header field parameter from the P-Charging-Vector header field in the initial request, which identifies the operator network from which the request originated.

- Type 3 IOI, between the S-CSCF or I-CSCF of the home operator network and any AS. This is exchanged in all session-related and session-unrelated requests and responses.

Each entity that processes the SIP request will extract the IOI for possible later use in a CDR. The valid duration of the IOI is specified in 3GPP TS 32.240 [16].

4.5.5 Charging function addresses

Charging function addresses are distributed to each of the IM CN subsystem entities in the home network for one side of the session (either the calling or called side) and provide a common location for each entity to send charging information. Charging Data Function (CDF) addresses are used for offline billing. Online Charging Function (OCF) addresses are used for online billing.

There may be multiple addresses for CDF and OCF addresses populated into the P-Charging-Function-Addresses header field of the SIP request or response. The header field parameters are "ccf" and "ecf" for CDF and OCF, respectively. At least one instance of either "ccf" or "ecf" header field paramter is required. If "ccf" header field parameter is included for offline charging, then a secondary "ccf" header field paramter may be included by each network for redundancy purposes, but the first instance of "ccf" header field parameter is the primary address. If ecf address is included for online charging, then a secondary instance may also be included for redundancy.

The CDF and/or OCF addresses are retrieved from an Home Subscriber Server (HSS) via the Cx interface and passed by the S-CSCF to subsequent entities. The charging function addresses are passed from the S-CSCF to the IM CN subsystem entities in its home network, but are not passed to the visited network or the UE. When the P-CSCF is allocated in the visited network, then the charging function addresses are obtained by means outside the scope of this document. The AS receives the charging function addresses from the S-CSCF via the ISC interface. CDF and/or OCF addresses may be allocated as locally preconfigured addresses. The AS can also retrieve the charging function address from the HSS via Sh interface.

4.6 Support of local service numbers

For the IM CN subsystem, the support of local service numbers is provided by an AS in the subscriber's home network as described in subclause 5.7.1.7.

4.7 Emergency service

The need for support of emergency calls in the IM CN subsystem is determined by national regulatory requirements.

If the UE cannot detect the emergency call attempt, the UE initiates the request as per normal procedures as described in subclause 5.1.2A. Depending on network policies, for a non-roaming UE an emergency call attempt can succeed even if the UE did not detect that an emergency session is being requested, otherwise the network rejects the request indicating to the UE that the attempt was for an emergency service.

The UE procedures for UE detectable emergency calls are defined in subclause 5.1.6.

The P CSCF, S-CSCF, and E-CSCF procedures for emergency service are described in subclause 5.2.10, 5.4.8 and 5.11, respectively.

Access dependent aspects of emergency service (e.g. emergency registration support and location provision) are defined in the access technology specific annexes for each access technology.

4.8 Void

4.9 Overlap signalling

4.9.1 General

This subclause explains the overlap signalling impacts on the core entities of the IM CN subsystem.

The support of overlap signalling, and each of the overlap signalling method, within the IM CN subsystem, are optional and is dependent on the network policy.

Only one overlap signalling method shall be used within one IM CN subsystem.

NOTE: Interworking between the overlap signalling methods is not specified in this release.

4.9.2 Overlap signalling methods

4.9.2.1 In-dialog method

4.9.2.1.1 General

The in-dialog method uses INFO requests or INVITE requests in order to transport additional digits. Before an early dialog has been established, upon reception of a 404 (Not Found) or 484 (Address Incomplete) response to an earlier INVITE request, new INVITE requests will be sent to transfer additional digits (as specified in 3GPP TS 29.163 [11B]). Once an entity establishes an early dialog, by sending a provisional response to a INVITE request, INFO requests will be sent to carry additional digits on the early dialog.

The message body, and associated header values, which is used to carry additional digits in INFO requests is defined in 3GPP TS 29.163 [11B].

4.9.2.2 Multiple-INVITE method

4.9.2.2.1 General

The multiple-INVITE method uses INVITE requests with the same Call ID and From header in order to transport digits (as specified in 3GPP TS 29.163 [11B]).

4.9.3 Routeing impacts

4.9.3.1 General

If overlap dialing is supported, the IM CN subsystem needs to be configured in such a manner that erroneous routeing of INVITE requests with incomplete numbers towards others entities than the corresponding INVITE requests with full numbers is avoided, for instance towards a default destination for unknown numbers such as a PSTN. Possibly impacted nodes include the S-CSCF for the UE-originated case, the transit routeing function, the I-CSCF, and application servers.

A misrouteing can be avoided by configuring the entity sending overlap signalling in such a manner that it will send the first INVITE request with a sufficient number of digits to find a suitable entry in the translation database. If ENUM is used, the ENUM database in a typical deployment contains sufficient information about the first digits, as required to identify the destination IP domain. Therefore, ENUM is able to handle incomplete numbers in such deployments. As another alternative, the routeing entity can reject calls with unknown numbers with a 404 (Not Found) response, using entries in the routeing database to identify calls towards the PSTN. The S-CSCF for the UE-originated case could also forward calls with unknown numbers to the BGCF, if the BGCF is configured to reject calls to unknown destinations with a 404 (Not Found) response.

4.9.3.2 Deterministic routeing

If the multiple-INVITE method is used for overlap signalling, if an entity receives a INVITE request outside an existing dialog with the same Call ID and From header field as a previous INVITE request during a certain period of time, the entity shall route the new INVITE request to the same next hop as the previous INVITE request.

NOTE: INVITE requests with the same Call ID and From header fields received in sequence during a certain period of time belong to the same call. The routeing towards the same next hop could be achieved by an appropriately configured database or by the entity comparing the Call ID and From header fields of each INVITE request outside an existing dialog with Call IDs and "tag" From header field parameters of previous INVITE requests. If the entity compares the Call ID and From header field, it stores the information about received Call ID and From header fields at least for a time in the order of call setup times. If paths have been established at registration time, deterministic routeing will be automatic for entities on these paths.

4.9.3.3 Digit collection

Entities performing routeing decicisions may require additional digits for a decision where to route an INVITE request. These entities may interact with a routeing database to reach this decision.

If no suitable entry in a database is found for the digits received in a INVITE request, an entity can reject the INVITE request with a 404 (Not Found) or 484 (Address Incomplete) response. This method of digit collection can be performed by a SIP proxy and is suitable both for the in-dialog and multiple-INVITE overlap signalling methods. Replying with a 404 (Not Found) response avoids the need to keep apart uncomplete and unknown numbers. The 484 (Address Incomplete) response requires the recognition of incomplete numbers.

NOTE: An HSS does not support the recognition of incomplete numbers. A routeing database being queried by ENUM also does not support the recognition of incomplete numbers.

As an alternative for the in-dialogue method, the digit collection function described in annex N.2 may be invoked. It shall be performed by an entity acting as a B2BUA. The digit collection function requires the ability to recognise incomplete number.

5 Application usage of SIP

5.1 Procedures at the UE

5.1.0 General

The UE procedures for UE detectable emergency calls are defined in subclause 5.1.6. Exceptions to procedures for SIP that do not relate to emergency, are documented in subclause 5.1.6 and shall apply.

5.1.1 Registration and authentication

5.1.1.1 General

The UE shall register public user identities (see table A.4/1 and dependencies on that major capability).

NOTE 1: The UE can use multiple Contact header field parameter values simultaneously containing the same IP address and port number.

In case a UE registers several public user identities at different points in time, the procedures to re-register, deregister and subscribe to the registration-state event package for these public user identities can remain uncoordinated in time.

The UE can register any one of its public user identities with any IP address acquired by the UE. The same public user identity can be bound to more than one IP address of the UE. While having valid registrations of previously registered public user identities, the UE can register any additional public user identity with any of its IP addresses. When binding

any one of its public user identities to an additional contact address, the UE shall follow the procedures described in RFC 5626 [92].

If SIP digest without TLS is used, the UE shall not include the header fields defined in RFC 3329 [48] in any SIP messages.

NOTE 2: The UE determines if SIP digest is used with or without TLS based on device configuration. If SIP digest with TLS is used, then the UE includes the header fields defined in RFC 3329 [48] as described in subclause 5.1.1.2.4.

In case a device performing address and/or port number conversions is provided by a NA(P)T or NA(P)T-PT, the UE may need to modify the SIP contents according to the procedures described in either annex F or annex K.

5.1.1.1A Parameters contained in the ISIM

This subclause applies when a UE contains either an ISIM or a USIM.

The ISIM shall always be used for authentication to the IM CN subsystem, if it is present, as described in 3GPP TS 33.203 [19].

The ISIM is preconfigured with all the necessary parameters to initiate the registration to the IM CN subsystem. These parameters include:

- the private user identity;
- one or more public user identities; and
- the home network domain name used to address the SIP REGISTER request

The first public user identity in the list stored in the ISIM is used in emergency registration requests.

In case the UE does not contain an ISIM, the UE shall:

- generate a private user identity;
- generate a temporary public user identity; and
- generate a home network domain name to address the SIP REGISTER request to;

in accordance with the procedures in clause C.2.

The temporary public user identity is only used in REGISTER requests, i.e. initial registration, re-registration, UE-initiated deregistration.

The UE shall not reveal to the user the temporary public user identity if the temporary public user identity is barred. The temporary public user identity is not barred if received by the UE in the P-Associated-URI header field.

If the UE is unable to derive the parameters in this subclause for any reason, then the UE shall not proceed with the request associated with the use of these parameters and will not be able to register to the IM CN subsystem.

5.1.1.1B Parameters provisioned to a UE without ISIM or USIM

5.1.1.1B.1 Parameters provisioned in the IMC

In case the UE contains neither an ISIM nor a USIM, but IMC is present the UE shall use preconfigured parameters in the IMC to initiate the registration to the IM CN subsystem and for authentication.

The following IMS parameters are assumed to be available to the UE:

- a private user identity;
- a public user identity; and
- a home network domain name to address the SIP REGISTER request to.

These parameters may not necessarily reside in a UICC.

The first public user identity in the list stored in the IMC is used in emergency registration requests.

5.1.1.1B.2 Parameters when UE does not contain ISIM, USIM or IMC

If the UE contains neither ISIM, nor USIM nor IMC, the UE shall generate a temporary public user identity, a private user identity and a home network domain name to address the SIP REGISTER request to, according 3GPP TS 23.003 [3].

5.1.1.2 Initial registration

5.1.1.2.1 General

The initial registration procedure consists of the UE sending an unprotected REGISTER request and, if challenged depending on the security mechanism supported for this UE, sending the integrity-protected REGISTER request or other appropriate response to the challenge. The UE can register a public user identity with any of its contact addresses at any time after it has acquired an IP address, discovered a P-CSCF, and established an IP-CAN bearer that can be used for SIP signalling. However, the UE shall only initiate a new registration procedure when it has received a final response from the registrar for the ongoing registration, or the previous REGISTER request has timed out.

When registering any public user identity belonging to the UE, the UE shall either use an already active pair of security associations or a TLS session to protect the REGISTER requests, or register the public user identity via a new initial registration procedure.

When binding any one of its public user identities to an additional contact address via a new initial registration procedure, the UE shall follow the procedures described in RFC 5626 [92]. The set of security associations or a TLS session resulting from this initial registration procedure will have no impact on the existing set of security associations or TLS sessions that have been established as a result of previous initial registration procedures. However, if the UE registers any one of its public user identities with a new contact address via a new initial registration procedure and does not employ the procedures described in RFC 5626 [92], then the new set of security associations or TLS session shall replace any existing set of security association or TLS session.

If the UE detects that the existing security associations or TLS sessions associated with a given contact address are no longer active (e.g., after receiving no response to several protected messages), the UE shall:

- consider all previously registered public user identities bound to this security associations or TLS session that are only associated with this contact address as deregistered; and
- stop processing all associated ongoing dialogs and transactions that were using the security associations or TLS session associated with this contact address, if any (i.e. no further SIP signalling will be sent by the UE on behalf of these transactions or dialogs).

The UE shall send the unprotected REGISTER requests to the port advertised to the UE during the P-CSCF discovery procedure. If the UE does not receive any specific port information during the P-CSCF discovery procedure, or if the UE was pre-configured with the P-CSCF's IP address or domain name and was unable to obtain specific port information, the UE shall send the unprotected REGISTER request to the SIP default port values as specified in RFC 3261 [26].

NOTE 1: The UE will only send further registration and subsequent SIP messages towards the same port of the P-CSCF for security mechanisms that do not require to use negotiated ports for exchanging protected messages.

The UE shall extract or derive a public user identity, the private user identity, and the domain name to be used in the Request-URI in the registration, according to the procedures described in subclause 5.1.1.1A or subclause 5.1.1.1B. A public user identity may be input by the end user.

On sending an unprotected REGISTER request, the UE shall populate the header fields as follows:

a) a From header field set to the SIP URI that contains the public user identity to be registered;

b) a To header field set to the SIP URI that contains the public user identity to be registered;

c) a Contact header field set to include SIP URI(s) containing the IP address or FQDN of the UE in the hostport parameter. If the UE supports GRUU (see table A.4, item A.4/53) or multiple registrations, the UE shall include a "+sip.instance" header field parameter containing the instance ID. If the UE supports multiple registrations it shall include "reg-id" header field parameter as described in RFC 5626 [92]. The UE shall include all supported ICSI values (coded as specified in subclause 7.2A.8.2) in a g.3gpp.icsi-ref media feature tag as defined in subclause 7.9.2 and RFC 3840 [62] for the IMS communication services it intends to use, and IARI values (coded as specified in subclause 7.2A.9.2), for the IMS applications it intends to use in a g.3gpp.iari-ref media feature tag as defined in subclause 7.9.3 and RFC 3840 [62];

d) a Via header field set to include the sent-by field containing the IP address or FQDN of the UE and the port number where the UE expects to receive the response to this request when UDPis used. For TCP, the response is received on the TCP connection on which the request was sent. The UE shall also include a "rport" header field parameter with no value in the Via header field. Unless the UE has been configured to not send keep-alives, and unless the UE is directly connected to an IP-CAN for which usage of NAT is not defined, it shall include a "keep" header field parameter with no value in the Via header field, in order to indicate support of sending keep-alives associated with the registration, as described in RFC 6223 [143];

NOTE 2: When sending the unprotected REGISTER request using UDP, the UE transmit the request from the same IP address and port on which it expects to receive the response to this request.

e) a registration expiration interval value of 600 000 seconds as the value desired for the duration of the registration;

NOTE 3: The registrar (S-CSCF) might decrease the duration of the registration in accordance with network policy. Registration attempts with a registration period of less than a predefined minimum value defined in the registrar will be rejected with a 423 (Interval Too Brief) response.

f) a Request-URI set to the SIP URI of the domain name of the home network used to address the REGISTER request;

g) the Supported header field containing the option-tag "path", and

   1) if GRUU is supported, the option-tag "gruu"; and

   2) if multiple registrations is supported, the option-tag "outbound".

h) if a security association or TLS session exists, and if available to the UE (as defined in the access technology specific annexes for each access technology), a P-Access-Network-Info header field set as specified for the access network technology (see subclause 7.2A.4).

On receiving the 200 (OK) response to the REGISTER request, the UE shall:

a) store the expiration time of the registration for the public user identities found in the To header field value and bind it either to the respective contact address of the UE or to the registration flow and the associated contact address (if the multiple registration mechanism is used);

b) store as the default public user identity the first URI on the list of URIs present in the P-Associated-URI header field and bind it to the respective contact address of the UE and the associated set of security associations or TLS session;

NOTE 4: When using the respective contact address and associated set of security associations or TLS session, the UE can utilize additional URIs contained in the P-Associated-URI header field and bound it to the respective contact address of the UE and the associated set of security associations or TLS session, e.g. for application purposes.

c) treat the identity under registration as a barred public user identity, if it is not included in the P-Associated-URI header field;

d) store the list of service route values contained in the Service-Route header field and bind the list either to the contact address or to the registration flow and the associated contact address (if the multiple registration mechanism is used), and the associated set of security associations or TLS session over which the REGISTER request was sent;

NOTE 5: When multiple registration mechanism is not used, there will be only one list of service route values bound to a contact address. However, when multiple registration mechanism is used, there will be different list of service route values bound to each registration flow and the associated contact address.

NOTE 6: The UE will use the stored list of service route values to build a proper preloaded Route header field for new dialogs and standalone transactions when using either the respective contact address or to the registration flow and the associated contact address (if the multiple registration mechanism is used), and the associated set of security associations or TLS session.

e) find the Contact header field within the response that matches the one included in the REGISTER request. If this contains a "pub-gruu" header field parameter or a "temp-gruu" header field parameter or both, and the UE supports GRUU (see table A.4, item A.4/53), then store the value of those parameters as the GRUUs for the UE in association with the public user identity and the contact address that was registered;

f) if the REGISTER request contained the "reg-id" and "+sip.instance" Contact header field parameter and the "outbound" option tag in a Supported header field, the UE shall check whether the option-tag "outbound" is present in the Require header field:

- if no option-tag "outbound" is present, the UE shall conclude that the S-CSCF does not support the registration procedure as described in RFC 5626 [92], and the S-CSCF has followed the registration procedure as described in RFC 5627 [93] or RFC 3261 [26], i.e., if there is a previously registered contact address, the S-CSCF replaced the old contact address and associated information with the new contact address and associated information (see bullet e) above). Upon detecting that the S-CSCF does not support the registration procedure as defined in RFC 5626 [92], the UE shall refrain from registering any additional IMS flows for the same private identity as described in RFC 5626 [92]; or

NOTE 7: Upon replaces the old contact address with the new contact address, the S-CSCF performs the network initiated deregistration procedure for the previously registered public user identities and the associated old contact address as described in subclause 5.4.1.5. Hence, the UE will receive a NOTIFY request informing the UE about thederegistration of the old contact address.

- if an option-tag "outbound" is present, the UE may establish additional IMS flows for the same private identity, as defined in RFC 5626 [92]; and

g) if the Via header field contains a "keep" header field parameter with a value, unless the UE detects that it is not behind NAT, start to send keep-alives associated with the registration towards the P-CSCF, as described in RFC 6223 [143].

On receiving a 305 (Use Proxy) response to the unprotected REGISTER request, the UE shall:

a) ignore the contents of the Contact header field if it is included in the received message;

NOTE 8: The 305 response is not expected to contain a Contact header field.

b) release all IP-CAN bearers used for the transport of media according to the procedures in subclause 9.2.2;

c) initiate either a new P-CSCF discovery procedure as described in subclause 9.2.1, or select a new P-CSCF, if the UE was pre-configured with more than one P-CSCF's IP addresses or domain names;

s) select a P-CSCF address, which is different from the previously used address, from the address list; and

e) perform the procedures for initial registration as described in subclause 5.1.1.2.

On receiving a 423 (Interval Too Brief) response to the REGISTER request, the UE shall:

- send another REGISTER request populating the registration expiration interval value with an expiration timer of at least the value received in the Min-Expires header field of the 423 (Interval Too Brief) response.

On receiving a 408 (Request Timeout) response or 500 (Server Internal Error) response or 504 (Server Time-Out) or 600 (Busy Everywhere) response for an initial registration, the UE may attempt to perform initial registration again.

When the timer F expires at the UE, the UE may:

a) select a different P-CSCF address from the list of P-CSCF addresses discovered during the procedures described in subclause 9.2.1 or from its pre-configured list of P-CSCF's IP addresses or domain names;

b) if no response has been received when attempting to contact all P-CSCFs known by the UE, the UE may get a new set of P-CSCF-addresses as described in subclause 9.2.1; and

c) perform the procedures for initial registration as described in subclause 5.1.1.2.

NOTE 9: It is an implementation option whether these actions are also triggered by other means than expiration of timer F, e.g. based on ICMP messages.

After a maximum of 5 consecutive unsuccessful initial registration attempts, the UE shall not automatically attempt any further initial registration via the same network and the same P-CSCF, for an implementation dependant time of at least:

a) the amount of time indicated in the Retry-After header field of the 4xx, 5xx, or 6xx response received in response to the most recent registration request, if the Retry-After header field was present; or

b) 30 minutes, if the Retry-After header field was not present and the initial registration was automatically performed as a consequence of a failed reregistration; or

c) 5 minutes, if the Retry-After header field was not present and the initial registration was not performed as a consequence of a failed reregistration.

These limits do not apply if the UE is power cycled.

5.1.1.2.2 Initial registration using IMS AKA

On sending a REGISTER request, as defined in subclause 5.1.1.2.1, the UE shall additionally populate the header fields as follows:

a) an Authorization header field, with:

- the "username" header field parameter, set to the value of the private user identity;
- the "realm" header field parameter, set to the domain name of the home network;
- the "uri" header field parameter, set to the SIP URI of the domain name of the home network;
- the "nonce" header field parameter, set to an empty value; and
- the "response" header field parameter, set to an empty value;

NOTE 1: If the UE specifies its FQDN in the hostport parameter in the Contact header field and in the sent-by field in the Via header field, then it has to ensure that the given FQDN will resolve (e.g., by reverse DNS lookup) to the IP address that is bound to the security association.

NOTE 2: The UE associates two ports, a protected client port and a protected server port, with each pair of security association. For details on the selection of the port values see 3GPP TS 33.203 [19].

b) additionally for the Contact header field, if the REGISTER request is protected by a security association, include the protected server port value in the hostport parameter;

c) additionally for the Via header field, for UDP, if the REGISTER request is protected by a security association, include the protected server port value in the sent-by field; and

d) the Security-Client header field set to specify the security mechanism the UE supports, the IPsec layer algorithms the UE supports and the parameters needed for the security association setup. The UE shall support the setup of two pairs of security associations as defined in 3GPP TS 33.203 [19]. The syntax of the parameters needed for the security association setup is specified in annex H of 3GPP TS 33.203 [19]. The UE shall support the "ipsec-3gpp" security mechanism, as specified in RFC 3329 [48]. The UE shall support the IPsec layer algorithms for integrity and confidentiality protection as defined in 3GPP TS 33.203 [19], and shall announce support for them according to the procedures defined in RFC 3329 [48].

On receiving the 200 (OK) response to the REGISTER request defined in subclause 5.1.1.2.1, the UE shall additionally:

1) If the UE supports multiple registrations and the REGISTER request contained the "+sip.instance" header field parameter and the "reg-id" header field parameter in the Contact header field, and the "outbound" option-tag in the Supported header field, the UE shall check whether the option-tag "outbound" is present in the Require

header field. If the option-tag "outbound" is present, then the UE shall use the bidirectional flow as defined in RFC 5626 [92] as follows:

a) for UDP, the bidirectional flow consists of two unidirectional flows, i.e. the first unidirectional flow is identified with the UE's protected client port, the P-CSCF's protected server port, and the respective IP addresses. The UE uses this flow to send the requests and responses to the P-CSCF. The second unidirectional flow is identified with the P-CSCF's protected client port, the UE's protected server port and the IP addresses. The second unidirectional flow is used by the UE to receive the requests and responses from the P-CSCF; or

b) for TCP, the bidirectional flow is the TCP connection between the UE and the P-CSCF. This TCP connection was established by the UE, i.e. from the UE's protected client port and the UE's IP address to the P-CSCF's protected server port and the P-CSCF's IP address. This TCP connection is used to exchange SIP messages between the UE and the P-CSCF; and

2) set the security association lifetime to the longest of either the previously existing security association lifetime (if available), or the lifetime of the just completed registration plus 30 seconds.

NOTE 3: If the UE receives Authentication-Info, it will proceed as described in RFC 3310 [49].

When a 401 (Unauthorized) response to a REGISTER is received the UE shall behave as described in subclause 5.1.1.5.1.

5.1.1.2.3 Initial registration using SIP digest without TLS

On sending a REGISTER request, as defined in subclause 5.1.1.2.1, the UE shall additionally populate the header fields as follows:

a) an Authorization header field as defined in RFC 2617 [21], with:

- the "username" header field parameter, set to the value of the private user identity;
- the "realm" header field parameter, set to the domain name of the home network;
- the "uri" header field directive, set to the SIP URI of the domain name of the home network;
- the "nonce" header field parameter, set to an empty value; and
- the "response" header field parameter, set to an empty value;

b) the hostport parameter in the Contact header field with the port value of an unprotected port where the UE expects to receive subsequent requests; and

c) the sent-by field in the Via header field with the port value of an unprotected port where the UE expects to receive responses to the request.

The UE shall use the locally available public user identity, the private user identity, and the domain name to be used in the Request-URI in the registration. The method whereby the public user identity and private user identity are made available to the UE is outside the scope of this document (e.g. a public user identity could be input by the end user).

When a 401 (Unauthorized) response to a REGISTER is received the UE shall behave as described in subclause 5.1.1.5.4.

5.1.1.2.4 Initial registration using SIP digest with TLS

On sending a REGISTER request, as defined in subclause 5.1.1.2.1, the UE shall additionally populate the header fields as follows:

a) an Authorization header field set in accordance with subclause 5.1.1.2.3; and

b) the Security-Client header field set to specify the security mechanism the UE supports. The UE shall support the setup of a TLS session as defined in 3GPP TS 33.203 [19]. The UE shall support the "tls" security mechanism, as specified in RFC 3329 [48]. The UE shall support TLS for integrity and confidentiality protection as defined in RFC 3261 [26], and shall announce support for them according to the procedures defined in RFC 3329 [48].

On receiving the 200 (OK) response to the REGISTER request defined in subclause 5.1.1.2.1, the UE shall additionally:

a) set the TLS session lifetime to the longest of either the previously existing TLS session lifetime (if available), or the lifetime of the just completed registration plus 30 seconds.

If a UE supports TLS, then the UE shall support TLS ciphersuites as described in 3GPP TS 33.203 [19]. TLS session lifetime is determined by local configuration of the UE.

For SIP digest with TLS, the UE associates a protected server port with the TLS session port on the UE.

When a 401 (Unauthorized) response to a REGISTER is received the UE shall behave as described in subclause 5.1.1.5.6.

5.1.1.2.5 Initial registration using NASS-IMS bundled authentication

On sending a REGISTER request, as defined in subclause 5.1.1.2.1, the UE shall additionally populate the header fields as follows:

a) optionally, an Authorization header field, with the "username" header field parameter, set to the value of the private user identity;

NOTE 1: In case the Authorization header field is absent, the mechanism only supports that one public user identity is associated with only one private user identity. The private user identity is derived from the public user identity in the To header field by removing SIP URI scheme and the following parts of the SIP URI if present: port number, URI parameters, and To header field parameters.

On receiving the 200 (OK) response to the REGISTER request defined in subclause 5.1.1.2.1, there are no additional requirements for the UE.

NOTE 2: When NASS-IMS bundled authentication is in use, a 401 (Unauthorized) response to the REGISTER request is not expected to be received.

5.1.1.2.6 Initial registration using GPRS-IMS-Bundled authentication

On sending a REGISTER request, as defined in subclause 5.1.1.2.1, the UE shall additionally populate the header fields as follows:

a) an Authorization header field as defined in RFC 2617 [21] shall not be included, in order to indicate support for GPRS-IMS-Bundled authentication.

b) the Security-Client header field as defined in RFC 3329 [48] shall not be included;

c) a From header field set to a temporary public user identity derived from the IMSI, as defined in 3GPP TS 23.003 [3], as the public user identity to be registered;

d) a To header field set to a temporary public user identity derived from the IMSI, as defined in 3GPP TS 23.003 [3], as the public user identity to be registered;

e) the Contact header field with the port value of an unprotected port where the UE expects to receive subsequent mid-dialog requests; and

f) the Via header field with the port value of an unprotected port where the UE expects to receive responses to the request.

NOTE 1: Since the private user identity is not included in the REGISTER requests when GPRS-IMS-Bundled authentication is used for registration, re-registration and de-registration procedures, all REGISTER requests from the UE use the IMSI-derived IMPU as the public user identity even when the implicitly registered IMPUs are available at the UE. The UE does not use the temporary public user identity (IMSI-derived IMPU) in any non-registration SIP requests.

On receiving the 200 (OK) response to the REGISTER request defined in subclause 5.1.1.2.1, there are no additional requirements for the UE.

NOTE 2: When GPRS-IMS-Bundled authentication is in use, a 401 (Unauthorized) response to the REGISTER request is not expected to be received.

5.1.1.3 Subscription to the registration-state event package

Upon receipt of a 2xx response to the initial registration, the UE shall subscribe to the reg event package for the public user identity registered at the user's registrar (S-CSCF) as described in RFC 3680 [43].

The UE shall subscribe to the reg event package upon registering a new contact address via an initial registration procedure. If the UE receives a NOTIFY request via the newly established subscription dialog and via the previously established subscription dialogs (there will be at least one), the UE may terminate the previously established subscription dialogs and keep only the newly established subscription dialog.

The UE shall use the default public user identity for subscription to the registration-state event package, if the public user identity that was used for initial registration is a barred public user identity. The UE may use either the default public user identity or the public user identity used for initial registration for the subscription to the registration-state event package, if the initial public user identity that was used for initial registration is not barred.

On sending a SUBSCRIBE request, the UE shall populate the header fields as follows:

a) a Request-URI set to the resource to which the UE wants to be subscribed to, i.e. to a SIP URI that contains the public user identity used for subscription;

b) a From header field set to a SIP URI that contains the public user identity used for subscription;

c) a To header field set to a SIP URI that contains the public user identity used for subscription;

d) an Event header field set to the "reg" event package;

e) an Expires header field set to 600 000 seconds as the value desired for the duration of the subscription;

f) if available to the UE (as defined in the access technology specific annexes for each access technology), a P-Access-Network-Info header field set as specified for the access network technology (see subclause 7.2A.4); and

g) a Contact header field set to contain:

- the same IP address or FQDN, and if multiple registrations is supported, its instance ID ("+sip.instance" header field parameter) and an "ob" SIP URI parameter as described in RFC 5626 [92];

- if IMS AKA or SIP digest with TLS is being used as a security mechanism, the protected server port value as in the initial registration; and

- if SIP digest without TLS, NASS-IMS bundled authentication or GPRS-IMS-Bundled authentication is being used as a security mechanism, the port value of an unprotected port where the UE expects to receive subsequent mid-dialog requests. The UE shall set the unprotected port value to the port value used in the initial REGISTER request.

Upon receipt of a 2xx response to the SUBSCRIBE request, the UE shall store the information for the established dialog and the expiration time as indicated in the Expires header field of the received response.

If continued subscription is required, the UE shall automatically refresh the subscription by the reg event package, for a previously registered public user identity, either 600 seconds before the expiration time if the initial subscription was for greater than 1200 seconds, or when half of the time has expired if the initial subscription was for 1200 seconds or less. If a SUBSCRIBE request to refresh a subscription fails with a non-481 response, the UE shall still consider the original subscription valid for the duration of the most recently known "Expires" value according to RFC 3265 [28]. Otherwise, the UE shall consider the subscription invalid and start a new initial subscription according to RFC 3265 [28].

5.1.1.3A Void

5.1.1.4 User-initiated reregistration and registration of an additional public user identity

5.1.1.4.1 General

The UE can perform the reregistration of a previously registered public user identity bound to any one of with its contact addresses and the associated set of security associations or TLS sessions at any time after the initial registration has been completed.

The UE can perform the reregistration of a previously registered public user identity over any existing set of security associations or TLS session that is associated with the related contact address.

The UE can perform the reregistration of a previously registered public user identity via an initial registration as specified in subclause 5.1.1.2, when binding the previously registered public user identity either to new contact address or to the registration flow and the associated contact address (if the multiple registration mechanism is used).

The UE can perform registration of additional public user identities at any time after the initial registration has been completed. The UE shall perform the registration of additional public user identities either:

- over the existing set of security associations or TLS sessions, if appropriate to the security mechanism in use, that is associated with the related contact address; or

- via an initial registration as specified in subclause 5.1.1.2.

Unless either the user or the application within the UE has determined that a continued registration is not required the UE shall reregister an already registered public user identity either 600 seconds before the expiration time if the previous registration was for greater than 1200 seconds, or when half of the time has expired if the previous registration was for 1200 seconds or less, or when the UE intends to update its capabilities according to RFC 3840 [62] or when the UE needs to modify the ICSI values that the UE intends to use in a g.3gpp.icsi-ref media feature tag or IARI values that the UE intends to use in the g.3gpp.iari-ref media feature tag.

When sending a protected REGISTER request, the UE shall use a security association or TLS session associated either with the contact address or to the registration flow and the associated contact address used to send the request, see 3GPP TS 33.203 [19], established as a result of an earlier initial registration.

The UE shall extract or derive a public user identity, the private user identity, and the domain name to be used in the Request-URI in the registration, according to the procedures described in subclause 5.1.1.1A or subclause 5.1.1.1B.

On sending a REGISTER request that does not contain a challenge response, the UE shall populate the header fields as follows:

a) a From header field set to the SIP URI that contains the public user identity to be registered;

b) a To header field set to the SIP URI that contains the public user identity to be registered;

c) a Contact header field set to include SIP URI(s) that contain(s) in the hostport parameter the IP address or FQDN of the UE, and containing the instance ID of the UE in the "+sip.instance" header field parameter, if the UE supports GRUU (see table A.4, item A.4/53) or multiple registrations. If the UE support multiple registrations, it shall include "reg-id" header field as described in RFC 5626 [92]. The UE shall include all supported ICSI values (coded as specified in subclause 7.2A.8.2) in a g.3gpp.icsi-ref media feature tag as defined in subclause 7.9.2 and RFC 3840 [62] for the IMS communication it intends to use, and IARI values (coded as specified in subclause 7.2A.9.2), for the IMS applications it intends to use in a g.3gpp.iari-ref media feature tag as defined in subclause 7.9.3 and RFC 3840 [62];

d) a Via header field set to include the IP address or FQDN of the UE in the sent-by field. For the TCP, the response is received on the TCP connection on which the request was sent. If the UE previously has previously negotiated sending of keep-alives associated with the registration, it shall include a "keep" header field parameter with no value in the Via header field, in order to indicate continuous support to send keep-alives, as described in RFC 6223 [143];

e) a registration expiration interval value, set to 600 000 seconds as the value desired for the duration of the registration;

NOTE 1: The registrar (S-CSCF) might decrease the duration of the registration in accordance with network policy. Registration attempts with a registration period of less than a predefined minimum value defined in the registrar will be rejected with a 423 (Interval Too Brief) response.

f) a Request-URI set to the SIP URI of the domain name of the home network used to address the REGISTER request;

g) the Supported header field containing the option-tag "path", and if GRUU is supported, the option-tag "gruu"; and

h) if available to the UE (as defined in the access technology specific annexes for each access technology), a P-Access-Network-Info header field set as specified for the access network technology (see subclause 7.2A.4).

On receiving the 200 (OK) response to the REGISTER request, the UE shall:

a) bind the new expiration time of the registration for this public user identity found in the To header field value either to the contact address or to the registration flow and the associated contact address used in this registration;

b) store the list of service route values contained in the Service-Route header field and bind the list either to the contact address or to the registration flow and the associated contact address (if the multiple registration mechanism is used);

NOTE 2: The stored list of service route values will be used build a proper preloaded Route header field for new dialogs and standalone transactions when using either the respective contact address or to the registration flow and the associated contact address (if the multiple registration mechanism is used).

NOTE 3: If the list of Service-Route headers saved from a previous registration and bound either to this contact address or to the registration flow and the associated contact address (if the multiple registration mechanism is used), and the associated set of security associations or TLS session already exist, then the received list of Service-Route headers replaces the old list.

NOTE 4: The UE can utilize additional URIs contained in the P-Associated-URI header field, e.g. for application purposes.

c) find the Contact header field within the response that matches the one included in the REGISTER request. If this contains a "pub-gruu" header field parameter or a "temp-gruu" header field parameter or both, and the UE supports GRUU (see table A.4, item A.4/53), then store the value of those parameters as the GRUUs for the UE in association with the public user identity and the contact address that was registered; and

d) if the Via header field contains a "keep" header field parameter with a value, continue to send keep-alives as described in RFC 6223 [143], towards the P-CSCF.

When a 401 (Unauthorized) response to a REGISTER is received the UE shall behave as described in subclause 5.1.1.5.1.

On receiving a 423 (Interval Too Brief) response to the REGISTER request, the UE shall:

- send another REGISTER request populating the registration expiration interval value with an expiration timer of at least the value received in the Min-Expires header field of the 423 (Interval Too Brief) response.

On receiving a 408 (Request Timeout) response or 500 (Server Internal Error) response or 504 (Server Time-Out) response for a reregistration, the UE shall perform the procedures for initial registration as described in subclause 5.1.1.2.

On receiving a 305 (Use Proxy) response to the REGISTER request, the UE shall:

a) ignore the contents of the Contact header field if it is included in the received message;

NOTE 4: The 305 response is not expected to contain a Contact header field.

b) release all IP-CAN bearers used for the transport of media according to the procedures in subclause 9.2.2;

c) initiate either a new P-CSCF discovery procedure as described in subclause 9.2.1, or select a new P-CSCF, if the UE was pre-configured with more than one P-CSCF's IP addresses or domain names;

d) select a P-CSCF address, which is different from the previously used address, from the address list; and

e) perform the procedures for initial registration as described in subclause 5.1.1.2.

When the timer F expires at the UE:

1) the UE shall stop processing of all ongoing dialogs and transactions associated with that flow, if any (i.e. no further SIP signalling will be sent by the UE on behalf of these transactions or dialogs); and

2) after releasing all IP-CAN bearers used for the transport of media according to the procedures in subclause 9.2.2:

   a) the UE may select a different P-CSCF address from the list of P-CSCF addresses discovered during the procedures described in subclause 9.2.1 or from its pre-configured list of P-CSCF's IP addresses or domain names;

   b) if no response has been received when attempting to contact all P-CSCFs known by the UE, the UE may get a new set of P-CSCF-addresses as described in subclause 9.2.1;

   c) the UE may perform the procedures for initial registration as described in subclause 5.1.1.2; and

   d) the UE shall perform the procedures in RFC 5626 [92] to form a new flow to replace the failed one if it supports multiple registrations. If failed registration attempts occur in the process of creating a new flow, the flow recovery procedures defined in RFC 5626 [92] shall apply.

NOTE 5: It is an implementation option whether these actions are also triggered by other means than expiration of timer F, e.g. based on ICMP messages.

5.1.1.4.2 IMS AKA as a security mechanism

On sending a REGISTER request, as defined in subclause 5.1.1.4.1, the UE shall additionally populate the header fields as follows:

a) an Authorization header field, with:

   - the "username" header field parameter set to the value of the private user identity;

   - the "realm" header field parameter directive, set to the value as received in the "realm" WWW-Authenticate header field parameter;

   - the "uri" header field parameter, set to the SIP URI of the domain name of the home network;

   - the "nonce" header field parameter, set to last received nonce value; and

   - the "response" header field parameter, set to the last calculated response value;

NOTE 1: If the UE specifies its FQDN in the hostport parameter in the Contact header field and in the sent-by field in the Via header field, then it has to ensure that the given FQDN will resolve (e.g., by reverse DNS lookup) to the IP address that is bound to the security association.

NOTE 2: The UE associates two ports, a protected client port and a protected server port, with each pair of security associations. For details on the selection of the protected port value see 3GPP TS 33.203 [19].

NOTE 3: If the UE is setting up an additional registration using procedures specified in RFC 5626 [92] and the UE accesses the network through 3GPP or 3GPP2 systems without any NAT, the flow is considered to be "logical flow".

b) additionally for the Contact header field, include the protected server port value in the hostport parameter;

c) additionally for the Via header field, for UDP, if the REGISTER request is protected by a security association, include the protected server port value in the sent-by field;

d) a Security-Client header field, set to specify the security mechanism it supports, the IPsec layer algorithms for security and confidentiality protection it supports and the new parameter values needed for the setup of two new pairs of security associations. For further details see 3GPP TS 33.203 [19] and RFC 3329 [48]; and

e) a Security-Verify header field that contains the content of the Security-Server header field received in the 401 (Unauthorized) response of the last successful authentication.

On receiving the 200 (OK) response to the REGISTER request, the UE shall additionally:

a) set the security association lifetime associated with either this contact address or to the registration flow and the associated contact address (if the multiple registration mechanism is used), and the associated set of security associations to the longest of either the previously existing security association lifetime, or the lifetime of the just completed registration plus 30 seconds.

NOTE 4: If the UE receives Authentication-Info, it will proceed as described in RFC 3310 [49].

5.1.1.4.3 SIP digest without TLS as a security mechanism

On sending a REGISTER request that does not contain a challenge response, the UE shall additionally populate the header fields as follows:

a) an Authorization header field as defined in RFC 2617 [21], including:

- the "username" header field parameter, set to the value of the private user identity;
- the "realm" header field parameter, set to the domain name of the home network;
- the "uri" header field parameter, set to the SIP URI of the domain name of the home network;
- the "nonce" header field parameter, set to an empty value; and
- the "response" header field parameter, set to an empty value;

b) the Contact header field with the port value of an unprotected port where the UE expects to receive subsequent requests; and

c) the Via header field with the port value of an unprotected port where the UE expects to receive responses to the request.

5.1.1.4.4 SIP digest with TLS as a security mechanism

On sending a REGISTER request, as defined in subclause 5.1.1.4.1, the UE shall additionally populate the header fields as follows:

a) an Authorization header field set in accordance with subclause 5.1.1.2.3;

b) the Security-Client header field set to specify the security mechanism the UE supports. The UE shall support the setup of a TLS session as defined in 3GPP TS 33.203 [19]. The UE shall support the "tls" security mechanism, as specified in RFC 3329 [48]. The UE shall support TLS for integrity and confidentiality protection as defined in RFC 3261 [26], and shall announce support for them according to the procedures defined in RFC 3329 [48]; and

c) a Security-Verify header field that contains the content of the Security-Server header field received in the 401 (Unauthorized) response of the last successful authentication.

On receiving the 200 (OK) response to the REGISTER request defined in subclause 5.1.1.2.1, the UE shall additionally:

a) set the lifetime of the respective TLS session to the value configured.

5.1.1.4.5 NASS-IMS bundled authentication as a security mechanism

On sending a REGISTER request, as defined in subclause 5.1.1.4.1, the UE shall additionally populate the header fields as follows:

a) optionally, an Authorization header field, with the "username" header field parameter, set to the value of the private user identity;

NOTE 1: In case the Authorization header field is absent, the mechanism only supports that one public user identity is associated with only one private user identity.

On receiving the 200 (OK) response to the REGISTER request defined in subclause 5.1.1.2.1, there are no additional requirements for the UE.

NOTE 2: When NASS-IMS bundled authentication is in use, a 401 (Unauthorized) response to the REGISTER request is not expected to be received.

5.1.1.4.6 GPRS-IMS-Bundled authentication as a security mechanism

On sending a REGISTER request, as defined in subclause 5.1.1.4.1, the UE shall additionally populate the header fields as follows:

a) an Authorization header field as defined in RFC 2617 [21] shall not be included, in order to indicate support GPRS-IMS-Bundled authentication.

b) security agreement header field values as required by RFC 3329 [48] shall not be included;

c) a From header field set to a temporary public user identity derived from the IMSI, as defined in 3GPP TS 23.003 [3], as the public user identity to be registered;

d) a To header field set to a temporary public user identity derived from the IMSI, as defined in 3GPP TS 23.003 [3], as the public user identity to be registered;

e) the Contact header field with the port value of an unprotected port where the UE expects to receive subsequent mid-dialog requests; and

f) the Via header field with the port value of an unprotected port where the UE expects to receive responses to the request.

NOTE 1: Since the private user identity is not included in the REGISTER requests when GPRS-IMS-Bundled authentication is used for registration, re-registration and de-registration procedures, all REGISTER requests from the UE use the IMSI-derived IMPU as the public user identity even when the implicitly registered IMPUs are available at the UE. The UE does not use the temporary public user identity (IMSI-derived IMPU) in any non-registration SIP requests.

On receiving the 200 (OK) response to the REGISTER request defined in subclause 5.1.1.4.1, there are no additional requirements for the UE.

NOTE 2: When GPRS-IMS-Bundled authentication is in use, a 401 (Unauthorized) response to the REGISTER request is not expected to be received.

5.1.1.5 Authentication

5.1.1.5.1 IMS AKA - general

Authentication is performed during initial registration. A UE can be re-authenticated during subsequent reregistrations, deregistrations or registrations of additional public user identities. When the network requires authentication or re-authentication of the UE, the UE will receive a 401 (Unauthorized) response to the REGISTER request.

On receiving a 401 (Unauthorized) response to the REGISTER request, the UE shall:

1) extract the RAND and AUTN parameters;

2) check the validity of a received authentication challenge, as described in 3GPP TS 33.203 [19] i.e. the locally calculated XMAC must match the MAC parameter derived from the AUTN part of the challenge; and the SQN parameter derived from the AUTN part of the challenge must be within the correct range; and

3) check the existence of the Security-Server header field as described in RFC 3329 [48]. If the Security-Server header field is not present or it does not contain the parameters required for the setup of the set of security associations (see annex H of 3GPP TS 33.203 [19]), the UE shall abandon the authentication procedure and send a new REGISTER request with a new Call-ID.

In the case that the 401 (Unauthorized) response to the REGISTER request is deemed to be valid the UE shall:

1) calculate the RES parameter and derive the keys CK and IK from RAND as described in 3GPP TS 33.203 [19];

2) set up a temporary set of security associations for this registration based on the static list and parameters the UE received in the 401 (Unauthorized) response and its capabilities sent in the Security-Client header field in the REGISTER request. The UE sets up the temporary set of security associations using the most preferred mechanism and algorithm returned by the P-CSCF and supported by the UE and using IK and CK (only if encryption enabled) as the shared key. The UE shall use the parameters received in the Security-Server header field to setup the temporary set of security associations. The UE shall set a temporary SIP level lifetime for the temporary set of security associations to the value of reg-await-auth timer; and

3) send another REGISTER request towards the protected server port indicated in the response using the temporary set of security associations to protect the message. The header fields are populated as defined for the initial REGISTER request that was challenged with the received 401 (Unauthorized) response, with the addition that the UE shall include an Authorization header field containing:

   - the "realm" header field parameter set to the value as received in the "realm" WWW-Authenticate header field parameter;

   - the "username" header field parameter, set to the value of the private user identity;

   - the "response" header field parameter that contains the RES parameter, as described in RFC 3310 [49];

   - the "uri" header field parameter, set to the SIP URI of the domain name of the home network;

   - the "algorithm" header field parameter, set to the value received in the 401 (Unauthorized) response; and

   - the "nonce" header field parameter, set to the value received in the 401 (Unauthorized) response.

   The UE shall also insert the Security-Client header field that is identical to the Security-Client header field that was included in the previous REGISTER request (i.e. the REGISTER request that was challenged with the received 401 (Unauthorized) response). The UE shall also insert the Security-Verify header field into the request, by mirroring in it the content of the Security-Server header field received in the 401 (Unauthorized) response. The UE shall set the Call-ID of the security association protected REGISTER request which carries the authentication challenge response to the same value as the Call-ID of the 401 (Unauthorized) response which carried the challenge.

On receiving the 200 (OK) response for the security association protected REGISTER request registering a public user identity with the associated contact address, the UE shall:

- change the temporary set of security associations to a newly established set of security associations, i.e. set its SIP level lifetime to the longest of either the previously existing set of security associations SIP level lifetime, or the lifetime of the just completed registration plus 30 seconds; and

- if this is the only set of security associations available toward the P-CSCF, use the newly established set of security associations for further messages sent towards the P-CSCF. If there are additional sets of security associations (e.g. due to registration of multiple contact addresses), the UE can either use them or use the newly established set of security associations for further messages sent towards the P-CSCF as appropriate.

NOTE 1: If the UE has registered multiple contact addresses, the UE can either send requests towards the P-CSCF over the newly established set of security associations, or use different UE's contact address and associated set of security associations when sending the requests towards the P-CSCF. Responses towards the P-CSCF that are sent via UDP will be sent over the same set of security associations that the related request was received on. Responses towards the P-CSCF that are sent via TCP will be sent over the same set of security associations that the related request was received on.

When the first request or response protected with the newly established set of security associations is received from the P-CSCF or when the lifetime of the old set of security associations expires, the UE shall delete the old set of security associations and related keys it may have with the P-CSCF after all SIP transactions that use the old set of security associations are completed.

NOTE 2: If the UE has registered multiple contact addresses, the S-CSCF may use different contact address when sending the requests desined for the UE. In this case the UE will not receive the subsequent requests over the newly established set of security associations.

Whenever the 200 (OK) response is not received before the temporary SIP level lifetime of the temporary set of security associations expires or a 403 (Forbidden) response is received, the UE shall consider the registration to have failed. The UE shall delete the temporary set of security associations it was trying to establish, and use the old set of security

associations. The UE should send an unprotected REGISTER request according to the procedure specified in subclause 5.1.1.2 if the UE considers the old set of security associations to be no longer active at the P-CSCF.

In the case that the 401 (Unauthorized) response is deemed to be invalid then the UE shall behave as defined in subclause 5.1.1.5.3.

5.1.1.5.2 Void

5.1.1.5.3 IMS AKA abnormal cases

If, in a 401 (Unauthorized) response, either the MAC or SQN is incorrect the UE shall respond with a further REGISTER indicating to the S-CSCF that the challenge has been deemed invalid as follows:

- in the case where the UE deems the MAC parameter to be invalid the subsequent REGISTER request shall contain no "auts" Authorization header field parameter and an empty "response" Authorization header field parameter, i.e. no authentication challenge response;

- in the case where the UE deems the SQN to be out of range, the subsequent REGISTER request shall contain the "auts" Authorization header field parameter (see 3GPP TS 33.102 [18]).

NOTE: In the case of the SQN being out of range, a "response" Authorization header field parameter can be included by the UE, based on the procedures described in RFC 3310 [49].

Whenever the UE detects any of the above cases, the UE shall:

- send the REGISTER request using an existing set of security associations, if available (see 3GPP TS 33.203 [19]);

- populate a new Security-Client header field within the REGISTER request and associated contact address, set to specify the security mechanism it supports, the IPsec layer algorithms for integrity and confidentiality protection it supports and the parameters needed for the new security association setup; and

- not create a temporary set of security associations.

On receiving a 420 (Bad Extension) in which the Unsupported header field contains the value "sec-agree" and if the UE supports GPRS-IMS-Bundled authentication, the UE shall initiate a new authentication attempt with the GPRS-IMS-Bundled authentication procedures as specified in subclause 5.1.1.2.6.

5.1.1.5.4 SIP digest without TLS – general

On receiving a 401 (Unauthorized) response to the REGISTER request, and where the "algorithm" Authorization header field parameter is "MD5", the UE shall extract the digest-challenge parameters as indicated in RFC 2617 [21] from the WWW-Authenticate header field. The UE shall calculate digest-response parameters as indicated in RFC 2617 [21]. The UE shall send another REGISTER request containing an Authorization header field. The header fields are populated as defined in subclause 5.1.1.2.3, with the addition that the UE shall include an Authorization header field containing a challenge response, i.e. "cnonce", "qop", and "nonce-count" header field parameters as indicated in RFC 2617 [21]. The UE shall set the Call-ID of the REGISTER request which carries the authentication challenge response to the same value as the Call-ID of the 401 (Unauthorized) response which carried the challenge. If SIP digest without TLS is used, the UE shall not include RFC 3329 [48] header fields with this REGISTER.

On receiving the 200 (OK) response for the REGISTER request, if the "algorithm" Authentication-Info header field parameter is "MD5", the UE shall authenticate the S-CSCF using the "rspauth" Authentication-Info header field parameter as described in RFC 2617 [21].

5.1.1.5.5 SIP digest without TLS – abnormal procedures

On receiving a 403 (Forbidden) response, the UE shall consider the registration to have failed.

5.1.1.5.6 SIP digest with TLS – general

On receiving a 401 (Unauthorized) response to the REGISTER request, the procedures in subclause 5.1.1.5.4 apply with the following differences:

- The UE shall check the existence of the Security-Server header field as described in RFC 3329 [48]. If the Security-Server header field is not present or the list of supported security mechanisms does not include "tls", the UE shall abandon the authentication procedure and send a new REGISTER request.

In the case that the 401 (Unauthorized) response to the REGISTER is deemed to be valid the UE shall send another REGISTER request using the TLS session to protect the message. The header fields are populated as defined for the initial request, with the addition that the UE shall include an Authorization header field containing a challenge response, "cnonce", "qop", and "nonce-count" header field parameters as indicated in RFC 2617 [21]. The UE shall also insert the Security-Client header field that is identical to the Security-Client header field that was included in the previous REGISTER request (i.e. the REGISTER request that was challenged with the received 401 (Unauthorized) response). The UE shall also insert the Security-Verify header field into the request, by mirroring in it the content of the Security-Server header field received in the 401 (Unauthorized) response. The UE shall set the Call-ID to the same value as the Call-ID of the 401 (Unauthorized) response which carried the challenge.

When SIP digest with TLS is used, and for the case where the 401 (Unauthorized) response to the REGISTER request is deemed to be valid, the UE shall establish the TLS session as described in 3GPP TS 33.203 [19]. The UE shall use this TLS session to send all further messages towards the P-CSCF towards the protected server port.

5.1.1.5.7 SIP digest with TLS – abnormal procedures

On receiving a 403 (Forbidden) response, the UE shall consider the registration to have failed. If performing SIP digest with TLS, the UE should send an initial REGISTER according to the procedure specified in subclause 5.1.1.2 if the UE considers the TLS session to be no longer active at the P-CSCF.

5.1.1.5.8 NASS-IMS bundled authentication – general

NASS-IMS bundled authentication is only applicable to UEs that contain neither USIM nor ISIM. Authentication is achieved via the registration and re-registration procedures as defined in subclause 5.1.1.2 and subclause 5.1.1.4. NASS-bundled authentication is granted by the network upon receipt by the UE of a 200 (OK) response to the initial REGISTER request.

There is no separate authentication procedure.

5.1.1.5.9 NASS-IMS bundled authentication – abnormal procedures

There is no separate authentication procedure, and therefore no abnormal procedures.

5.1.1.5.10 GPRS-IMS-Bundled authentication – general

Authentication is achieved via the registration and re-registration procedures as defined in subclause 5.1.1.2 and subclause 5.1.1.4. GPRS-IMS-Bundled authentication is granted by the network upon receipt by the UE of a 200 (OK) response to the initial REGISTER request.

5.1.1.5.11 GPRS-IMS-Bundled authentication – abnormal procedures

There is no separate authentication procedure and therefore no abnormal procedures.

5.1.1.5.12 Abnormal procedures for all security mechanisms

A UE shall only respond to two consecutive invalid challenges and shall not automatically attempt authentication after two consecutive failed attempts to authenticate. The UE may attempt to register with the network again after an implementation specific time.

5.1.1.5A Network-initiated re-authentication

At any time, the UE can receive a NOTIFY request carrying information related to the reg event package (as described in subclause 5.1.1.3). If:

- the state attribute in any of the <registration> elements is set to "active";

- the value of the <uri> sub-element inside the <contact> sub-element is set to the Contact address that the UE registered; and

- the event attribute of that <contact> sub-element(s) is set to "shortened";

the UE shall:

1) use the expiry attribute within the <contact> sub-element that the UE registered to adjust the expiration time for that public user identity; and

2) start the re-authentication procedures at the appropriate time (as a result of the S-CSCF procedure described in subclause 5.4.1.6) by initiating a reregistration as described in subclause 5.1.1.4, if required.

NOTE: When authenticating a given private user identity, the S-CSCF will only shorten the expiry time within the <contact> sub-element that the UE registered using its private user identity. The <contact> elements for the same public user identity, if registered by another UE using different private user identities remain unchanged. The UE will not initiate a reregistration procedure, if none of its <contact> sub-elements was modified.

5.1.1.5B Change of IPv6 address due to privacy

Stateless address autoconfiguration as described in RFC 2462 [20E] defines how an IPv6 prefix and an interface identifier is used by the UE to construct a complete IPv6 address.

If the UE receives an IPv6 prefix, the UE may change the interface identity of the IPv6 address as described in RFC 3041 [25A] due to privacy but this can result in service discontinuity for services provided by the IM CN subsystem.

NOTE: When the UE constructs new IPv6 address by changing the interface identity, the UE can either transfer all established dialogs to new IPv6 address as specified in 3GPP TS 24.237 [8M] and subsequently relinquish the old IPv6 address, or terminate all established dialogs and transactions. While transferring the established dialogs to new IPv6 address, the UE will have double registration, i.e. one registration for the old IPv6 address and another for the new IPv6 address.

The procedure described below assumes that the UE will terminate all established dialogs and transactions and temporarily disconnect the UE from the IM CN subsystem until the new registration is performed. If the UE decides to change the IPv6 address due to privacy and terminate all established dialogs and transaction, associated with old IPv6 address, the UE shall:

1) terminate all ongoing dialogs (e.g., sessions) and transactions (e.g., subscription to the reg event) that were using the old IPv6 address;

2) deregister all registered public user identities that were using the old IPv6 address as described in subsclause 5.1.1.4;

3) construct a new IPv6 address according to the procedures specified in RFC 3041 [25A];

4) register the public user identities that were deregistered in step 2 above with a new IPv6 address, as follows:

   a) by performing an initial registration as described in subsclause 5.1.1.2; and

   b) by performing a subscription to the reg event package as described in subsclause 5.1.1.3; and

5) subscribe to other event packages it was subscribed to before the change of IPv6 address procedure started.

To ensure a maximum degree of continuous service to the end user, the UE should transfer all established dialogs to the new IPv6 address as specified in 3GPP TS 24.237 [8M] rather then terminate all established dialogs and transactions and temporarily disconnect the UE from the IM CN subsystem as described above.

5.1.1.6 User-initiated deregistration

5.1.1.6.1 General

For any public user identity that the UE has previously registered, the UE can deregister via a single registration procedure:

- all contact addresses bound to the indicated public user identity;
- some contact addresses bound to the indicated public user identity;
- a particular contact address bound to the indicated public user identity; or
- when the UE supports multiple registrations (i.e. the "outbound" option tag is included in the Supported header field) one or more flows bound to the indicated public user identity.

The UE can deregister a public user identity that it has previously registered with its contact address at any time. The UE shall protect the REGISTER request using a security association or TLS session that is associated with contact address, see 3GPP TS 33.203 [19], established as a result of an earlier registration, if one is available.

The UE shall extract or derive a public user identity, the private user identity, and the domain name to be used in the Request-URI in the registration, according to the procedures described in subclause 5.1.1.1A or subclause 5.1.1.1B.

Prior to sending a REGISTER request for deregistration, the UE shall release all dialogs that were using the contact addresses or the flow that is going to be deregistered and related to the public user identity that is going to be deregistered or to one of the implicitly registered public user identities. However:

- if the dialog that was established by the UE subscribing to the reg event package used the public user identity that is going to be deregistered; and
- this dialog is the only remaining dialog used for subscription to reg event package of the user, i.e. there are no other contact addresses registered with associated subscription to the reg event package of the user;

then the UE shall not release this dialog.

On sending a REGISTER request that will remove the binding between the public user identity and one of its contact addresses or one of its flows, the UE shall populate the header fields as follows:

a) a From header field set to the SIP URI that contains the public user identity to be deregistered;

b) a To header field set to the SIP URI that contains the public user identity to be deregistered;

c) a Contact header field set to the SIP URI(s) that contain(s) in the hostport parameter the IP address of the UE or FQDN, and;

   1) if the UE is removing the binding between the public user identity indicated in the To header field, (together with the associated implicitly registered public user identities), and the contact address indicated in the Contact header field; and

      - if the UE supports GRUU or multiple registrations (i.e. the "outbound" option tag is included in the Supported header field), the Contact header field also contains the "+sip.instance" header field parameter;
      - if the UE supports multiple registrations (i.e. the "outbound" option tag is included in the Supported header field), the Contact header field does not contain the "reg-id" header field parameter;
      - if the UE does not supports GRUU or multiple registrations (i.e. the "outbound" option tag is included in the Supported header field), the Contact header field does not contain either the "+sip.instance" header field parameter or the "reg-id" header field parameter;

   NOTE 1: Since the contact address is deregistered, if there are any flows that were previously registered with the respective contact address, all flows terminating at the respective contact address are removed.

   2) if the UE is removing the binding between the public user identity indicated in the To header field, (together with the associated implicitly registered public user identities) and one of its flows, the Contact header field contains the "+sip.instance" header field parameter and the "reg-id" header field parameter that identifies the flow;

d) a Via header field set to include the IP address or FQDN of the UE in the sent-by field;

e) a registration expiration interval value set to the value of zero, appropriate to the deregistration requirements of the user;

f) a Request-URI set to the SIP URI of the domain name of the home network used to address the REGISTER request; and

g) if available to the UE (as defined in the access technology specific annexes for each access technology), a P-Access-Network-Info header field set as specified for the access network technology (see subclause 7.2A.4).

For a public user identity that the UE has registerd with multiple contact addresses or multiple flows (e.g. via different P-CSCFs), the UE shall also be able to deregister multiple contact addresses or multiple flows, bound to its public user identity, via single deregistration proceduere as specified in the RFC 3261 [26]. The UE shall send a single REGISTER request, using one of its contact addresses and the associated set of security associations or TLS session, containing a list of Contact headers. Each Contact header field is populated as specifed above in bullets a) through g)..

The UE can deregister all contact addresses bound to its public user identity and associated with its private user identity. The UE shall send a single REGISTER request, using one of its contact addresses and the associated set of security associations or TLS session, containing a public user identity that is being deregistered in the To header field, and a single Contact header field with value of "*" and the Expires header field with a value of "0". The UE shall not include the "instance-id" feature tag and the "reg-id" header field parameter in the Contact header field in the REGISTER request.

NOTE 2: All entities subscribed to the reg event package of the user will be inform via NOTIFY request which contact addresses bound to the public user identity have been deregistered.

When a 401 (Unauthorized) response to a REGISTER request is received the UE shall behave as described in subclause 5.1.1.5.1.

On receiving the 200 (OK) response to the REGISTER request, the UE shall remove all registration details relating to this public user identity and the associated contact address.

If there are no more public user identities registered with this contact address, the UE shall delete any security associations or TLS sessions and related keys it may have towards the IM CN subsystem.

If all public user identities are deregistered and all security association or TLS session is removed, then the UE shall consider subscription to the reg event package cancelled (i.e. as if the UE had sent a SUBSCRIBE request with an Expires header field containing a value of zero).

5.1.1.6.2 IMS AKA as a security mechanism

On sending a REGISTER request, as defined in subclause 5.1.1.6.1, the UE shall additionally populate the header fields as follows:

a) an Authorization header field, with:

- the "username" header field parameter, set to the value of the private user identity;
- the "realm" header field parameter, set to the value as received in the "realm" WWW-Authenticate header field parameter;
- the "uri" header field parameter, set to the SIP URI of the domain name of the home network;
- the "nonce" header field parameter, set to last received nonce value; and
- the response directive, set to the last calculated response value;

b) additionally for each Contact header field and associated contact address, include the associated protected server port value in the hostport parameter;

c) additionally for the Via header field, include the protected server port value bound to the security association in the sent-by field;

NOTE 1: If the UE specifies its FQDN in the hostport parameter in the Contact header field and in the sent-by field in the Via header field, then it has to ensure that the given FQDN will resolve (e.g., by reverse DNS lookup) to the IP address that is bound to the security association.

d) a Security-Client header field, set to specify the security mechanism it supports, the IPsec layer algorithms for integrity and confidentiality protection it supports and the new parameter values needed for the setup of two new pairs of security associations. For further details see 3GPP TS 33.203 [19] and RFC 3329 [48]; and

e) a Security-Verify header field that contains the content of the Security-Server header field received in the 401 (Unauthorized) response of the last successful authentication.

NOTE 2: When the UE has received the 200 (OK) response for the REGISTER request of the only public user identity currently registered with this contact address and its associated set of implicitly registered public user identities (i.e. no other public user identity is registered), the UE removes the security association (between the P-CSCF and the UE) that were using this contact address. Therefore further SIP signalling using this security association (e.g. the NOTIFY request containing the deregistration event) will not reach the UE.

5.1.1.6.3 SIP digest without TLS as a security mechanism

On sending a REGISTER request, as defined in subclause 5.1.1.6.1, the UE shall additionally populate the header fields as follows:

a) an Authorization header field as defined in RFC 2617 [21], including:

- the "username" header field parameter, set to the value of the private user identity;
- the "realm" header field parameter, set to the domain name of the home network;
- the "uri" header field parameter, set to the SIP URI of the domain name of the home network;
- the "nonce" header field parameter, set to an empty value; and
- the "response" header field parameter, set to an empty value;

b) for each Contact header field and associated contact address include the associated unprotected port value (where the UE was expecting to receive mid-dialog requests); and

c) the Via header field with the port value of an unprotected port where the UE expects to receive responses to the request.

5.1.1.6.4 SIP digest with TLS as a security mechanism

On sending a REGISTER request, as defined in subclause 5.1.1.6.1, the UE shall additionally populate the header fields as follows:

a) an Authorization header field set in accordance with subclause 5.1.1.6.3; and

b) a Security-Client header field, set to specify the security mechanism it supports. For further details see 3GPP TS 33.203 [19] and RFC 3329 [48]; and

c) a Security-Verify header field that contains the content of the Security-Server header field received in the 401 (Unauthorized) response of the last successful authentication.

5.1.1.6.5 NASS-IMS bundled authentication as a security mechanism

On sending a REGISTER request, as defined in subclause 5.1.1.6.1, the UE shall additionally populate the header fields as follows:

a) optionally, an Authorization header field, with the "username" header field parameter, set to the value of the private user identity;

NOTE 1: In case the Authorization header field is absent, the mechanism only supports that one public user identity is associated with only one private user identity.

On receiving the 200 (OK) response to the REGISTER request defined in subclause 5.1.1.6.1, there are no additional requirements for the UE.

NOTE 2: When NASS-IMS bundled authentication is in use, a 401 (Unauthorized) response to the REGISTER request is not expected to be received.

5.1.1.6.6 GPRS-IMS-Bundled authentication as a security mechanism

On sending a REGISTER request, as defined in subclause 5.1.1.6.1, the UE shall additionally populate the header fields as follows:

a) an Authorization header field as defined in RFC 2617 [21] shall not be included, in order to indicate support GPRS-IMS-Bundled authentication.

b) the Security-Verify header field and the Security-Client header field values as defined by RFC 3329 [48] shall not be included;

c) a From header field set to a temporary public user identity derived from the IMSI, as defined in 3GPP TS 23.003 [3], as the public user identity to be deregistered;

d) a To header field set to a temporary public user identity derived from the IMSI, as defined in 3GPP TS 23.003 [3], as the public user identity to be deregistered;

e) for each Contact header field and associated contact address include the associated unprotected port value (where the UE was expecting to receive mid-dialog requests); and

f) the Via header field with the port value of an unprotected port where the UE expects to receive responses to the request.

NOTE 1: Since the private user identity is not included in the REGISTER requests when GPRS-IMS-Bundled authentication is used for registration, re-registration and de-registration procedures, all REGISTER requests from the UE use the IMSI-derived IMPU as the public user identity even when the implicitly registered IMPUs are available at the UE. The UE does not use the temporary public user identity (IMSI-derived IMPU) in any non-registration SIP requests.

On receiving the 200 (OK) response to the REGISTER request defined in subclause 5.1.1.6.1, there are no additional requirements for the UE.

NOTE 2: When GPRS-IMS-Bundled authentication is in use, a 401 (Unauthorized) response to the REGISTER request is not expected to be received.

5.1.1.7 Network-initiated deregistration

Upon receipt of a NOTIFY request, on any dialog which was generated during the subscription to the reg event package as described in subclause 5.1.1.3, including one or more <registration> element(s) which were registered by this UE, with:

1) the state attribute within the <registration> element set to "terminated", and within each <contact> element belonging to this UE, the state attribute set to "terminated" and the event attribute set either to "unregistered", or "rejected", or "deactivated", the UE shall remove all registration details relating to the respective public user identity (i.e. consider the public user identity indicated in the aor attribute of the <registration> element as deregistered); or

2) the state attribute within the <registration> element set to "active", and within a given <contact> element belonging to this UE, the state attribute set to "terminated", and the associated event attribute set either to "unregistered", or "rejected", or "deactivated", the UE shall consider the binding between the public user identity and either the contact address or the registration flow and the associated contact address (if the multiple registration mechanism is used) indicated in the respective <contact> element as removed. The UE shall consider its public user identity as deregistered when all bindings between the respective public user identity and all contact addresses and all registration flow and the associated contact address (if the multiple registration mechanism is used) belonging to this UE are removed.

NOTE 1: When multiple registration mechanism is used to register a public user identity and bind it to a registration flow and the associated contact address, there will be one <contact> element for each registration flow and the associated contact address.

NOTE 2: If the state attribute within the <registration> element is set to "active" and the <contact> element belonging to this UE is set to "active", the UE will consider that the binding between the public user identity and either the respective contact address or the registration flow and the associated contact address as left unchanged.

In case of a "deactivated" event attribute, the UE shall start the initial registration procedure as described in subclause 5.1.1.2. In case of a "rejected" event attribute, the UE shall release all dialogs related to those public user identities.

Upon receipt of a NOTIFY request, the UE shall delete all security associations or TLS sessions towards the P-CSCF either:

- if all <registration> element(s) have their state attribute set to "terminated" (i.e. all public user identities are deregistered) and the Subscription-State header field contains the value of "terminated"; or

- if each <registration> element that was registered by this UE has either the state attribute set to "terminated", or the state attribute set to "active" and the state attribute within the <contact> element belonging to this UE set to "terminated".

When all UE's public user identities are registered via a single P-CSCF and the subscription dialog to the reg event package of the UE is set via the respective P-CSCF, the UE shall delete these security associations or TLS sessions towards the respective P-CSCF when all public user identities have been deregistered and after the server transaction (as defined in RFC 3261 [26]) pertaining to the received NOTIFY request terminates.

NOTE 3: Deleting a security association or TLS session is an internal procedure of the UE and does not involve any SIP procedures.

NOTE 4: If all the public user identities (i.e. <contact> elements) registered by this UE are deregistered and the security associations or TLS sessions have been removed, the UE considers the subscription to the reg event package terminated since the NOTIFY request was received with Subscription-State header field containing the value of "terminated".

5.1.2 Subscription and notification

5.1.2.1 Notification about multiple registered public user identities

Upon receipt of a 2xx response to the SUBSCRIBE request the UE shall maintain the generated dialog (identified by the values of the Call-ID header field, and the values of tags in To and From header fields).

Upon receipt of a NOTIFY request on the dialog which was generated during subscription to the reg event package the UE shall perform the following actions:

- if a state attribute "active", i.e. registered is received for one or more public user identities, the UE shall store the indicated public user identities as registered;

- if a state attribute "active" is received, and the UE supports GRUU (see table A.4, item A.4/53), then for each public user identity indicated in the notification that contains a <pub-gruu> element or a <temp-gruu> element or both (as defined in RFC 5628 [94]) then the UE shall store the value of those elements in association with the public user identity;

- if a state attribute "terminated", i.e. deregistered is received for one or more public user identities, the UE shall store the indicated public user identities as deregistered and shall remove any associated GRUUs.

NOTE 1: There may be public user identities which are automatically registered within the registrar (S-CSCF) of the user upon registration of one public user identity or when S-CSCF receives a Push-Profile-Request (PPR) from the HSS (as described in 3GPP TS 29.228 [14]) changing the status of a public user identity associated with a registered implicit set from barred to non-barred. Usually these automatically or implicitly registered public user identities belong to the same service profile of the user and they might not be available within the UE. The implicitly registered public user identities may also belong to different service profiles. The here-described procedures provide a different mechanism (to the 200 (OK) response to the REGISTER request) to inform the UE about these automatically registered public user identities.

NOTE 2: RFC 5628 [94] provides guidance on the management of temporary GRUUs, utilizing information provided in the reg event notification.

5.1.2.2 General SUBSCRIBE requirements

If the UE receives a 503 (Service Unavailable) response to an initial SUBSCRIBE request containing a Retry-After header field, then the UE shall not automatically reattempt the request until after the period indicated by the Retry-After header field contents.

5.1.2A Generic procedures applicable to all methods excluding the REGISTER method

5.1.2A.1 UE-originating case

5.1.2A.1.1 General

The procedures of this subclause are general to all requests and responses, except those for the REGISTER method.

When the UE sends any request using either a given contact address or to the registration flow and the associated contact address, the UE shall:

- if IMS AKA is in use as a security mechanism:

  a) if the UE has not obtained a GRUU, populate the Contact header field of the request with the protected server port and the respective contact address; and

  b) include the protected server port and the respective contact address in the Via header field entry relating to the UE;

- if SIP digest without TLS is in use as a security mechanism:

  a) if the UE has not obtained a GRUU, populate the Contact header field of the request with the port value of an unprotected port and the contact address where the UE expects to receive subsequent mid-dialog requests; and

  b) populate the Via header field of the request with the port value of an unprotected port and the respective contact address where the UE expects to receive responses to the request;

- if SIP digest with TLS is in use as a security mechanism:

  a) if the UE has not obtained a GRUU, populate the Contact header field of the request with the protected server port; and

  b) include the protected server port in the Via header field entry relating to the UE;

- if NASS-IMS bundled authentication is in use as a security mechanism, and therefore no port is provided for subsequent SIP messages by the P-CSCF during registration, the UE shall send any request to the same port used for the initial registration as described in subclause 5.1.1.2;

- if GPRS-IMS-Bundled authentication is in use as a security mechanism, and therefore no port is provided for subsequent SIP messages by the P-CSCF during registration, the UE shall send any request to the same port used for the initial registration as described in subclause 5.1.1.2.

If SIP digest without TLS is used, the UE shall not include RFC 3329 [48] header field s in any SIP messages.

When SIP digest is in use, upon receiving a 407 (Proxy Authentication Required) response to an initial request, the originating UE shall:

- extract the digest-challenge parameters as indicated in RFC 2617 [21] from the Proxy-Authenticate header field;
- calculate the response as described in RFC 2617 [21]; and
- send a new request containing a Proxy-Authorization header field in which the header field parameters are populated as defined in RFC 2617 [21] using the calculated response.

Where a security association or TLS session exists, the UE shall discard any SIP response that is not protected by the security association or TLS session and is received from the P-CSCF outside of the registration and authentication procedures. The requirements on the UE within the registration and authentication procedures are defined in subclause 5.1.1.

In accordance with RFC 3325 [34] the UE may insert a P-Preferred-Identity header field in any initial request for a dialog or request for a standalone transaction as a hint for creation of an asserted identity (contained in the P-Asserted-Identity header field) within the IM CN subsystem.

NOTE 1: Since the S-CSCF uses the P-Asserted-Identity header field when checking whether the UE originating request matches the initial filter criteria, the P-Preferred-Identity header field inserted by the UE determines which services and applications are invoked.

When sending any initial request for a dialog or request for a standalone transaction using either a given contact address or to the registration flow and the associated contact address, the UE may include any of the following in the P-Preferred-Identity header field:

- a public user identity which has been registered by the user with the respective contact address;
- an implicitly registered public user identity returned in a registration-state event package of a NOTIFY request whose <uri> sub-element inside the <contact> sub-element of the <registration> element is the same as the contact address being used for this request and was not subsequently deregistered or that has not expired; or
- any other public user identity which the user has assumed by mechanisms outside the scope of this specification to have a current registration.

NOTE 2: The temporary public user identity specified in subclause 5.1.1.1 is not a public user identity suitable for use in the P-Preferred-Identity header field.

NOTE 3: Procedures in the network require international public telecommunication numbers when telephone numbers are used in P-Preferred-Identity header field.

NOTE 4: A number of header fields can reveal information about the identity of the user. Where privacy is required, implementers should also give consideration to other header fields that can reveal identity information. RFC 3323 [33] subclause 4.1 gives considerations relating to a number of header fields.

Where privacy is required, in any initial request for a dialog or request for a standalone transaction, the UE shall set the From header field to "Anonymous" as specified in RFC 3261 [26].

NOTE 5: The contents of the From header field are not necessarily modified by the network based on any privacy specified by the user either within the UE indication of privacy or by network subscription or network policy. Therefore the user should include the value "Anonymous" whenever privacy is explicitly required. As the user may well have privacy requirements, terminal manufacturers should not automatically derive and include values in this header field from the public user identity or other values stored in or derived from the UICC. Where the user has not expressed a preference in the configuration of the terminal implementation, the implementation should assume that privacy is required. Users that require to identify themselves, and are making calls to SIP destinations beyond the IM CN subsystem, where the destination does not implement RFC 3325 [34], will need to include a value in the From header field other than Anonymous.

The UE shall determine the public user identity to be used for this request as follows:

1) if a P-Preferred-Identity was included, then use that as the public user identity for this request; or

2) if no P-Preferred-Identity was included, then use the default public user identity for the security association or TLS session and the associated contact address as the public user identity for this request;

The UE shall not include its "+sip.instance" header field parameter in the Contact header field in its non-register requests and responses except when the request or response is guaranteed to be sent to a trusted intermediary that will remove the "+sip.instance" header field parameter prior to forwarding the request or response to the destination.

NOTE 6: Such trusted intermediaries include an AS that all such requests as part of an application or service traverse. In order to ensure that all requests or responses containing the "+sip.instance" header field parameter are forwarded via the trusted intermediary the UE needs to have first verified that the trusted intermediary is present (e.g. first contacted via a registration or configuration procedure). Including the "+sip.instance" header field parameter containing an IMEI URN does not violate RFC 7254 [153] even when the UE requests privacy using RFC 3323 [33].

If this is a request for a new dialog, the Contact header field is populated as follows:

1) a contact header value which is one of:

- if a public GRUU value ("pub-gruu" header field parameter) has been saved associated with the public user identity to be used for this request, and the UE does not indicate privacy of the P-Asserted-Identity, then the UE should insert the public GRUU ("pub-gruu" header field parameter) value as specified in RFC 5627 [93]; or

- if a temporary GRUU value ("temp-gruu" header field parameter) has been saved associated with the public user identity to be used for this request, and the UE does indicate privacy of the P-Asserted-Identity, then the UE should insert the temporary GRUU ("temp-gruu" header field parameter) value as specified in RFC 5627 [93]; or

- otherwise, a SIP URI containing the contact address of the UE;

NOTE 7: The above items are mutually exclusive.

2) include an "ob" SIP URI parameter, if the UE supports multiple registrations, and the UE wants all subsequent requests in the dialog to arrive over the same flow identified by the flow token as described in RFC 5626 [92];

3) if the request is related to an IMS communication service that requires the use of an ICSI then the UE shall include in a g.3gpp.icsi-ref media feature tag, as defined in subclause 7.9.2 and RFC 3841 [56B], the ICSI value (coded as specified in subclause 7.2A.8.2) for the IMS communication service. The UE may also include other ICSI values that the UE is prepared to use for all dialogs with the terminating UE(s); and

4) if the request is related to an IMS application that is supported by the UE, then the UE may include in a g.3gpp.iari-ref media feature tag, as defined in subclause 7.9.3 and RFC 3841 [56B], the IARI value (coded as specified in subclause 7.2A.9.2) that is related to the IMS application and that applies for the dialog.

If this is a request within an existing dialog, and the request includes a Contact header field, then the UE should insert the previously used Contact header field.

If the UE support multiple registrations as specified in RFC 5626 [92], the UE should include option-tag "outbound" in the Supported header field.

If this is a request for a new dialog or standalone transaction and the request is related to an IMS communication service that requires the use of an ICSI then the UE:

1) shall include the ICSI value (coded as specified in subclause 7.2A.8.2), for the IMS communication service that is related to the request in a P-Preferred-Service header field according to RFC 6050 [121]. If a list of network supported ICSI values was received as specified in 3GPP TS 24.167 [8G], the UE shall only include an ICSI value that is in the received list;

NOTE 8: The UE only receives those ICSI values corresponding to the IMS communication services that the network provides to the user.

2) may include an Accept-Contact header field containing an ICSI value (coded as specified in subclause 7.2A.8.2) that is related to the request in a g.3gpp.icsi-ref media feature tag as defined in subclause 7.9.2 if the ICSI for the IMS communication service is known.

NOTE 9: If the UE includes the same ICSI values into the Accept-Contact header field and the P-Preferred-Service header field, there is a possibility that one of the involved S-CSCFs or an AS changes the ICSI value in the P-Asserted-Service header field, which results in the message including two different ICSI values (one in the P-Asserted-Service header field, changed in the network and one in the Accept-Contact header field).

If an IMS application indicates that an IARI is to be included in a request for a new dialog or standalone transaction, the UE shall include an Accept-Contact header field containing an IARI value (coded as specified in subclause 7.2A.9.2) that is related to the request in a g.3gpp.iari-ref media feature tag as defined in subclause 7.9.3 and RFC 3841 [56B].

NOTE 10: RFC 3841 [56B] allows multiple Accept-Contact header fields along with multiple Reject-Contact header fields in a SIP request, and within those header fields, expressions that include one or more logical operations based on combinations of media feature tags. Which registered UE will be contacted depends on the Accept-Contact header field and Reject-Contact header field combinations included that evaluate to a logical expression and the relative qvalues of the registered contacts for the targeted registered public user identity. There is therefore no guarantee that when multiple Accept-Contact header fields or additional Reject-Contact header field(s) along with the Accept-Contact header field containing the ICSI value or IARI value are included in a request that the request will be routed to a contact that registered the same ICSI value or IARI value. Charging and accounting is based upon the contents of the P-Asserted-Service header field and the actual media related contents of the SIP request and not the Accept-Contact header field contents or the contact reached.

NOTE 11: The UE only includes the header field parameters "require" and "explicit" in the Accept-Contact header field containing the ICSI value or IARI value if the IMS communication service absolutely requires that the terminating UE understand the IMS communication service in order to be able to accept the session. Including the header field parameters "require" and "explicit" in Accept-Contact header fields in requests which don"t absolutely require that the terminating UE understand the IMS communication service in order to accept the session creates an interoperability problem for sessions which otherwise would interoperate and violates the interoperability requirements for the ICSI in 3GPP TS 23.228 [7].

After the dialog is established the UE may change the dialog capabilities (e.g. add a media or request a supplementary service) if defined for the IMS communication service as identified by the ICSI value using the same dialog. Otherwise, the UE shall initiate a new initial request to the other user.

The UE can indicate privacy of the P-Asserted-Identity that will be generated by the P-CSCF in accordance with RFC 3323 [33], and the additional requirements contained within RFC 3325 [34].

If resource priority in accordance with RFC 4412 [116] is required for a dialog, then the UE shall include the Resource-Priority header field in all requests associated with that dialog.

NOTE 12: The case where the UE is unaware of the requirement for resource priority because the user requested the capability as part of the dialstring falls outside the scope of this requirement. Such cases can exist and will need to be dealt with by an appropriate AS to process the dialstring.

If available to the UE (as defined in the access technology specific annexes for each access technology), the UE shall insert a P-Access-Network-Info header field into any request for a dialog, any subsequent request (except ACK requests and CANCEL requests) or response (except CANCEL responses) within a dialog or any request for a standalone method (see subclause 7.2A.4).

NOTE 13: During the dialog, the points of attachment to the IP-CAN of the UE may change (e.g. UE connects to different cells). The UE will populate the P-Access-Network-Info header field in any request or response within a dialog with the current point of attachment to the IP-CAN (e.g. the current cell information).

The UE shall build a proper preloaded Route header field value for all new dialogs and standalone transactions. The UE shall build a list of Route header field values made out of the following, in this order:

a) the P-CSCF URI containing the IP address or the FQDN learnt through the P-CSCF discovery procedures; and

b) the P-CSCF port based on the security mechanism in use:

- if IMS AKA or SIP digest with TLS is in use as a security mechanism, the protected server port learnt during the registration procedure;

- if SIP digest without TLS, NASS-IMS bundled authentication or GPRS-IMS-Bundled authentication is in use as a security mechanism, the unprotected server port used during the registration procedure;

c) and the values received in the Service-Route header field saved from the 200 (OK) response to the last registration or re-registration of the public user identity with associated contact address.

NOTE 14: When the UE registers multiple contact addresses, there will be a list of Service-Route headers for each contact address. When sending a request using a given contact address and the associated security associations or TLS session, the UE will use the corresponding list of Service-Route headers to construct a list of Route headers.

The UE may indicate that proxies should not fork the request by including a "no-fork" directive within the Request-Disposition header field in the request as described in RFC 3841 [56B].

If the UE receives a 1xx or 200 (OK) response to an initial request for a dialog, the response containing a P-Asserted-Identity header field set to an emergency number as specified in 3GPP TS 22.101 [1A], the UE procedures in subclause 5.1.6.10 apply.

5.1.2A.1.2 Structure of Request-URI

The UE may use non-international formats of E.164 addresses, including geo-local numbers and home-local numbers and other local numbers (e.g. private number), in the Request-URI.

Local numbering information is sent in the Request-URI in initials requests or stand alone transaction, using one of the following formats:

1) a tel-URI, complying with RFC 3966 [22], with a local number followed by a "phone-context" tel URI parameter value.

2) a SIP URI, complying with RFC 3261 [26], with the "user" SIP URI parameter set to "phone"

3) a SIP URI, complying with RFC 3261 [26] and RFC 4967 [103], with the "user" SIP URI parameter set to "dialstring"

The actual value of the URI depends on whether user equipment performs an analysis of the dial string input by the end user or not.

5.1.2A.1.3 UE without dial string processing capabilities

In this case the UE does not perform any analysis of the dial string. This requires that the dialling plan is designed so it enables the network to differentiate local numbers from other numbers.

The dial string is sent to the network, in the Request-URI of a initial request or a stand alone transaction, using one of the following formats:

1) a tel-URI, syntactically complying with RFC 3966 [22], with the dial string encoded as a local number followed by a "phone-context" tel URI parameter value;

EXAMPLE: tel:<input dial string>;phone-context=operator.com

2) a SIP URI, syntactically complying with RFC 3261 [26], with the user =phone parameter, embedding a tel-URI with a "phone-context" tel URI parameter value;

EXAMPLE: sip:<input dial string>;
phone-context=operator.com@operator.com;user=phone

3) a SIP URI, complying with RFC 3261 [26] and RFC 4967 [103], with the user=dialstring parameter and a with a "phone-context" tel-URI parameter value in the user part; or

EXAMPLE: sip:<input dial string>;
phone-context=operator.com@operator.com;user=dialstring

4) a SIP URI syntactically complying with RFC 3261 [26], where the user part contains the dial string and the domain name is specific enough to enable to network to understand that the user part contains a dial string.

EXAMPLE: sip:<input dial string>@dialstrings.entreprise.com

For cases 1), 2), and 3) the UE shall set the "phone-context" tel URI parameter in accordance with subclause 5.1.2A.1.5.

5.1.2A.1.4 UE with dial string processing capabilities

In this case the UE performs sufficient dial string analysis (or receives an explicit indication from the user) to identify the type of numbering that is used and processes the dial string accordingly before building the Request-URI

If the UE detects that a local dialling plan is being used, where the terminal is able to identify a global telephone number, the normal procedures apply after removing all dial string elements used for local numbering detection purposes (e.g. escape codes).

If the UE detects that a local (private or public) dialling plan is being used, it may decide to send the dial string unchanged to the network as described in subclause 5.1.2A.1.3 or the UE may decide to alter it to comply with the local numbering plan (e.g. remove all dial string elements used for local numbering detection).

In the latter case the local numbering information is sent using one of the following formats:

1) a tel-URI, complying with RFC 3966 [22], with a local number followed by a "phone-context" tel-URI parameter value;

2) a SIP URI, complying with RFC 3261 [26], with the "user" SIP URI parameter set to "phone"; and

3) if the UE intends to send information related to supplementary services, a SIP URI, complying with RFC 3261 [26] and RFC 4967 [103], with the "user" SIP URI parameter set to "dialstring" and a with a "phone-context" tel URI parameter value in the user part.

NOTE: The way how the UE process the dial-string and handles special characters (e.g. pause) in order to produce a conformant SIP URI or tel-URI according to RFC 3966 [22] is implementation specific.

As a general rule, recognition of special service numbers shall take priority over other dialling plan issues. If the dial string equates to a pre-configured service URN as specified in RFC 5031 [69]) then the service-urn should be sent.

5.1.2A.1.5 Setting the "phone-context" tel URI parameter

When the UE uses home-local number, the UE shall include in the "phone-context" tel URI parameter the home domain name in accordance with RFC 3966 [22].

When the UE uses geo-local number, the UE shall:

- if access technology information available to the UE (i.e., the UE can insert P-Access-Network-Info header field into the request), include the access technology information in the "phone-context" tel URI parameter according to RFC 3966 [22] as defined in subclause 7.2A.10; and

- if access technology information is not available to the UE (i.e., the UE cannot insert P-Access-Network-Info header field into the request), include in the "phone-context" tel URI parameter the home domain name prefixed by the "geo-local." string according to RFC 3966 [22] as defined in subclause 7.2A.10.

When the UE uses other local numbers, than geo-local number or home local numbers , e.g. private numbers that are different from home-local number, the UE shall include a "phone-context" tel URI parameter set according to RFC 3966 [22], e.g. if private numbers are used a domain name to which the private addressing plan is associated.

NOTE 1: The "phone-context" tel URI parameter value can be entered or selected by the subscriber, or can be a "pre-configured" value inserted by the UE, based on implementation.

NOTE 2: The way how the UE determines whether numbers in a non-international format are geo-local, home-local or relating to another network, is implementation specific.

NOTE 3: Home operator's local policy can define a prefix string(s) to enable subscribers to differentiate dialling a geo-local number and/or a home-local number.

5.1.2A.1.6 Abnormal cases

In the event the UE receives a 504 (Server Time-out) response containing:

1) a P-Asserted-Identity header field set to a value equal to a URI:

   a) from the Service-Route header field value received during registration; or

b) from the Path header field value received during registration; and

2) a Content-Type header field set according to subclause 7.6 (i.e. "application/3gpp-ims+xml"), independent of the value or presence of the Content-Disposition header field, independent of the value or presence of Content-Disposition parameters, then the following treatment is applied:

a) if the 504 (Server Time-out) response includes an IM CN subsystem XML body as described in subclause 7.6 with the <ims-3gpp> element, including a version attribute, with the <alternative-service> child element:

A) with the <type> child element set to "restoration" (see table 7.7AA); and

B) with the <action> child element set to "initial-registration" (see table 7.7AB);

then the UE:

- shall initiate restoration procedures by performing an initial registration as specified in subclause 5.1.1.2; and

- may provide an indication to the user based on the text string contained in the <reason> child element of the <alternative-service> child element of the <ims-3gpp> element.

When sending a request from a contact address (or via a registration flow if the multiple registration mechanism is used) which is bound to a public user identity by registration which used a P-CSCF address, and:

- if timer F expires in the "Trying" state of non-INVITE client transaction as described in IETF RFC 3261 [26];

- if a fatal transport error is reported by the transport layer in the "Trying" state of non-INVITE client transaction as described in IETF RFC 3261 [26];

- if timer B expires in the "Calling" state of INVITE client transaction as described in IETF RFC 6026 [163]; or

- if a fatal transport error is reported by the transport layer in "Calling" state of INVITE client transaction as described in IETF RFC 6026 [163];

then the UE shall:

1) if the multiple registration mechanism is not used, consider the contact address as not bound to any public user identity and remove the P-CSCF address from the list of P-CSCF addresses discovered during the procedures described in subclause 9.2.1; and

2) if the multiple registration mechanism is used, declare the registration flow dead as defined in RFC 5626 [92] and remove the P-CSCF address from the list of P-CSCF addresses discovered during the procedures described in subclause 9.2.1.

NOTE: When a fatal transport error occurs, further steps might be necessary to restore the transport layer, possibly including re-establishment of an IP-CAN bearer.

5.1.2A.2 UE-terminating case

The procedures of this subclause are general to all requests and responses, except those for the REGISTER method.

Where a security association or TLS session exists, the UE shall discard any SIP request that is not protected by the security association or TLS session and is received from the P-CSCF outside of the registration and authentication procedures. The requirements on the UE within the registration and authentication procedures are defined in subclause 5.1.1.

If an initial request contains an Accept-Contact header field containing the g.3gpp.icsi-ref media feature tag with an ICSI value, the UE should invoke the IMS application that is the best match for the ICSI value.

If an initial request contains an Accept-Contact header field containing the g.3gpp.iari-ref media feature tag with an IARI value the UE should invoke the IMS application that is the best match for the IARI value.

The UE can receive multiple ICSI values, IARI values or both in an Accept-Contact header field. In this case it is up to the implementation which of the multiple ICSI values or IARI values the UE takes action on.

NOTE 1: The application verifies that the contents of the request (e.g. SDP media capabilities, Content-Type header field) are consistent with the the ICSI value in the g.3gpp.icsi-ref media feature tag and IARI value contained in the g.3gpp.iari-ref media feature tag.

If an initial request does not contain an Accept-Contact header field containing a g.3gpp.icsi-ref media feature tag or a g.3gpp.iari-ref media feature tag the UE shall invoke the application that is the best match based on the contents of the request (e.g. SDP media capabilities, Content-Type header field, media feature tag).

The UE can indicate privacy of the P-Asserted-Identity that will be generated by the P-CSCF in accordance with RFC 3323 [33], and the additional requirements contained within RFC 3325 [34].

NOTE 2: In the UE-terminating case, this version of the document makes no provision for the UE to provide a P-Preferred-Identity in the form of a hint.

NOTE 3: A number of header fields can reveal information about the identity of the user. Where, privacy is required, implementers should also give consideration to other header fields that can reveal identity information. RFC 3323 [33] subclause 4.1 gives considerations relating to a number of header fields.

The UE shall not include its "+sip.instance" header field parameter in the Contact header field in its non-register requests and responses except when the request or response is guaranteed to be sent to a trusted intermediary that will remove the "+sip.instance" header field parameter prior to forwarding the request or response to the destination.

NOTE 4: Such trusted intermediaries include an AS that all such requests as part of an application or service traverse. In order to ensure that all requests or responses containing the "+sip.instance" header field parameter are forwarded via the trusted intermediary the UE needs to have first verified that the trusted intermediary is present (e.g first contacted via a registration or configuration procedure). Including the "+sip.instance" header field parameter containing an IMEI URN does not violate RFC 7254 [153] even when the UE requests privacy using RFC 3323 [33].

If the response includes a Contact header field, and the response is sent within an existing dialog, and the Contact address previously used in the dialog was a GRUU, then the UE should insert the previously used GRUU value in the Contact header field as specified in RFC 5627 [93].

If the response includes a Contact header field, and the response is not sent within an existing dialog, the Contact header field is populated as follows:

1) if a public GRUU value ("pub-gruu" header field parameter) has been saved associated with the public user identity from the P-Called-Party-ID header field, and the UE does not indicate privacy of the contents of the P-Asserted-Identity header field, then the UE should insert the public GRUU ("pub-gruu" header field parameter) value as specified in RFC 5627 [93];

2) if a temporary GRUU value ("temp-gruu" header field parameter) has been saved associated with the public user identity from the P-Called-Party-ID header field, and the UE does indicate privacy of the P-Asserted-Identity, then should insert the temporary GRUU ("temp-gruu" header field parameter) value in the Contact header field as specified in RFC 5627 [93];

NOTE 5: The above items 1 and 2 are mutually exclusive.

3) if the request is related to an IMS communication service that requires the use of an ICSI then the UE shall include in a g.3gpp.icsi-ref media feature tag as defined in subclause 7.9.2 and RFC 3841 [56B] the ICSI value (coded as specified in subclause 7.2A.8.2), for the IMS communication service and then the UE may include the IARI value for any IMS application that applies for the dialog, (coded as specified in subclause 7.2A.9.2), that is related to the request in a g.3gpp.iari-ref media feature tag as defined in subclause 7.9.3 and RFC 3841 [56B]. The UE may also include other ICSI values that the UE is prepared to use for all dialogs with the originating UE(s) and other IARI values for the IMS application that is related to the IMS communication service; and

4) if the request is related to an IMS application that is supported by the UE when the use of an ICSI is not needed, then the UE may include the IARI value (coded as specified in subclause 7.2A.9.2), that is related to any IMS application and that applies for the dialog, in a g.3gpp.iari-ref media feature tag as defined in subclause 7.9.3 and RFC 3841 [56B].

After the dialog is established the UE may change the dialog capabilities (e.g. add a media or request a supplementary service) if defined for the IMS communication service as identified by the ICSI value using the same dialog. Otherwise, the UE shall initiate a new initial request to the other user.

If the UE did not insert a GRUU in the Contact header field then the UE shall include a port in the address in the Contact header field as follows:

- if IMS AKA or SIP digest with TLS is being used as a security mechanism, the protected server port value as in the initial registration; or

- if SIP digest without TLS is being used as a security mechanism, the port value of an unprotected port where the UE expects to receive subsequent mid-dialog requests. The UE shall set the unprotected port value to the port value used in the initial registration.

If resource priority in accordance with RFC 4412 [116] is required for a dialog, then the UE shall include the Resource-Priority header field in all requests associated with that dialog.

If available to the UE (as defined in the access technology specific annexes for each access technology), the UE shall insert a P-Access-Network-Info header field into any response to a request for a dialog, any subsequent request (except CANCEL requests) or response (except CANCEL responses) within a dialog or any response to a standalone method (see subclause 7.2A.4).

5.1.3 Call initiation - UE-originating case

5.1.3.1 Initial INVITE request

Upon generating an initial INVITE request, the UE shall include the Accept header field with "application/sdp", the MIME type associated with the 3GPP IM CN subsystem XML body (see subclause 7.6.1) and any other MIME type the UE is willing and capable to accept.

The "integration of resource management and SIP" extension is hereafter in this subclause referred to as "the precondition mechanism" and is defined in RFC 3312 [30] as updated by RFC 4032 [64].

The preconditions mechanism should be supported by the originating UE.

The UE may initiate a session without the precondition mechanism if the originating UE does not require local resource reservation.

NOTE 1: The originating UE can decide if local resource reservation is required based on e.g. application requirements, current access network capabilities, local configuration, etc.

In order to allow the peer entity to reserve its required resources, an originating UE supporting the precondition mechanism should make use of the precondition mechanism, even if it does not require local resource reservation.

Upon generating an initial INVITE request using the precondition mechanism, the UE shall:

- indicate the support for reliable provisional responses and specify it using the Supported header field mechanism;and

- indicate the support for the preconditions mechanism and specify it using the Supported header field mechanism.

Upon generating an initial INVITE request using the precondition mechanism, the UE shall not indicate the requirement for the precondition mechanism by using the Require header field mechanism.

NOTE 2: Table A.4 specifies that UE support of forking is required in accordance with RFC 3261 [26]. The UE can accept or reject any of the forked responses, for example, if the UE is capable of supporting a limited number of simultaneous transactions or early dialogs.

Upon successful reservation of local resources the UE shall confirm the successful resource reservation (see subclause 6.1.2) within the next SIP request.

NOTE 3: In case of the precondition mechanism being used on both sides, this confirmation will be sent in either a PRACK request or an UPDATE request. In case of the precondition mechanism not being supported on one or both sides, alternatively a reINVITE request can be used for this confirmation after a 200 (OK) response has been received for the initial INVITE request, in case the terminating UE does not support the PRACK request (as described in RFC 3262 [27]) and does not support the UPDATE request (as described in RFC 3311 [29]).

NOTE 4: If the UE supports the P-Early-Media header field, upon receiving a 18x provisional response with a P-Early-Media header field indicating authorized early media, as described in RFC 5009 [109], if the preconditions are met, the UE should, based on local configuration, present received early media to the user.

NOTE 5: If the UE supports the P-Early-Media header field, upon receiving a 180 (Ringing) provisional response with a P-Early-Media header field indicating authorized early media, as described in RFC 5009 [109], if the preconditions are met, and the UE presents the received early media to the user based on local configuration, the UE will not provide an indication that the invited user is being alerted.

NOTE 6: If the UE supports the P-Early-Media header field and if the most recently received P-Early-Media header field within the dialog includes a parameter applicable to media stream with value "inactive", then based on local configuration, the UE will provide an indication that the invited user is being alerted and stop presenting received early media to the user if requested by any previous receipt of P-Early-Media header field within the dialog.

If the UE wishes to receive early media authorization indications, as described in RFC 5009 [109], the UE shall add the P-Early-Media header field with the "supported" parameter to the INVITE request.

When a final answer is received for one of the early dialogues, the UE proceeds to set up the SIP session. The UE shall not progress any remaining early dialogues to established dialogs. Therefore, upon the reception of a subsequent final 200 (OK) response for an INVITE request (e.g., due to forking), the UE shall:

1) acknowledge the response with an ACK request; and

2) send a BYE request to this dialog in order to terminate it.

Upon receiving a 488 (Not Acceptable Here) response to an initial INVITE request, the originating UE should send a new INVITE request containing SDP according to the procedures defined in subclause 6.1.

NOTE 7: An example of where a new request would not be sent is where knowledge exists within the UE, or interaction occurs with the user, such that it is known that the resulting SDP would describe a session that did not meet the user requirements.

Upon receiving a 421 (Extension Required) response to an initial INVITE request in which the precondition mechanism was not used, including the "precondition" option-tag in the Require header field, the originating UE shall:

- send a new INVITE request using the precondition mechanism, if the originating UE supports the precondition mechanism; and

- send an UPDATE request as soon as the necessary resources are available and a 200 (OK) response for the first PRACK request has been received.

Upon receiving a 503 (Service Unavailable) response to an initial INVITE request containing a Retry-After header field, then the originating UE shall not automatically reattempt the request until after the period indicated by the Retry-After header field contents.

The UE may include a "cic" tel-URI parameter in a tel-URI, or in the userinfo part of a SIP URI with user=phone, in the Request-URI of an initial INVITE request if the UE wants to identify a user-dialed carrier, as described in RFC 4694 [112].

NOTE 8: The method whereby the UE determines when to include a "cic" tel-URI parameter and what value it should contain is outside the scope of this document (e.g. the UE could use a locally configured digit map to look for special prefix digits that indicate the user has dialled a carrier).

NOTE 9: The value of the "cic" tel-URI parameter reported by the UE is not dependent on UE location (e.g. the reported value is not affected by roaming scenarios).

In the event the UE receives a 380 (Alternative Service) response to an INVITE request the response containing a P-Asserted-Identity header field with a value equal to the value of the last entry on the Path header field value received during registration and the the response containing a 3GPP IM CN subsystem XML body that includes an <ims-3gpp> element, including a version attribute, with an <alternative-service> child element with the <type> child element set to "emergency" (see table 7.7AA), the UE shall attempt an emergency call as described in subclause 5.1.6.

NOTE 10: The last entry on the Path header field value received during registration is the value of the SIP URI of the P-CSCF.

Upon receiving a 199 (Early Dialog Terminated) provisional response to an established early dialog the UE shall release resources specifically related to that early dialog.

5.1.4 Call initiation - UE-terminating case

5.1.4.1 Initial INVITE request

The preconditions mechanism should be supported by the terminating UE.

The handling of incoming initial INVITE requests at the terminating UE is mainly dependent on the following conditions:

- the specific service requirements for "integration of resource management and SIP" extension (hereafter in this subclause known as the precondition mechanism and defined in RFC 3312 [30] as updated by RFC 4032 [64], and with the request for such a mechanism known as a precondition); and

- the UEs configuration for the case when the specific service does not require the precondition mechanism.

If an initial INVITE request is received the terminating UE shall check whether the terminating UE requires local resource reservation.

NOTE 1: The terminating UE can decide if local resource reservation is required based on e.g. application requirements, current access network capabilities, local configuration, etc.

If local resource reservation is required at the terminating UE and the terminating UE supports the precondition mechanism, and:

a) the received INVITE request includes the "precondition" option-tag in the Supported header field or Require header field, the terminating UE shall make use of the precondition mechanism and shall indicate a Require header field with the "precondition" option-tag in any response or subsequent request it sends towards to the originating UE; or

b) the received INVITE request does not include the "precondition" option-tag in the Supported header field or Require header field, the terminating UE shall not make use of the precondition mechanism.

If local resource reservation is not required by the terminating UE and the terminating UE supports the precondition mechanism and:

a) the received INVITE request includes the "precondition" option-tag in the Supported header field and:

   - the required resources at the originating UE are not reserved, the terminating UE shall use the precondition mechanism; or

   - the required local resources at the originating UE and the terminating UE are available, the terminating UE may use the precondition mechanism;

b) the received INVITE request does not include the "precondition" option-tag in the Supported header field or Require header field, the terminating UE shall not make use of the precondition mechanism; or

c) the received INVITE request includes the "precondition" option-tag in the Require header field, the terminating UE shall use the precondition mechanism.

NOTE 2: Table A.4 specifies that UE support of forking is required in accordance with RFC 3261 [26].

NOTE 3: If the terminating UE does not support the precondition mechanism it will apply regular SIP session initiation procedures.

If the terminating UE requires a reliable alerting indication at the originating side, the UE shall send the 180 (Ringing) response reliably. If the received INVITE request indicated support for reliable provisionable responses, but did not require their use, the terminating UE shall send provisional responses reliably only if the provisional response carries SDP or for other application related purposes that requires its reliable transport.

NOTE 4: Certain applications, services and operator policies might mandate the terminating UE to send a 199 (Early Dialog Terminated) provisional response (see RFC 6228 [142]) prior to sending a non-2xx final response to the INVITE request.

If the terminating UE uses the precondition mechanism, upon successful reservation of local resources:

a) if the originating side requested confirmation for the result of the resource reservation (as defined in RFC 3312 [30]) at the terminating UE, the terminating UE shall confirm the successful resource reservation (see subclause 6.1.3) within an UPDATE request; and

NOTE 5: Originating side requests confirmation for the result of the resource reservation at the terminating UE e.g. when an application server performs 3rd party call control. The request for confirmation for the result of the resource reservation at the terminating UE can be included e.g. in the SDP answer in the PRACK request.

b) if the originating side did not request confirmation for the result of the resource reservation (as defined in RFC 3312 [30]) at the terminating UE, the terminating UE shall not confirm the successful resource reservation (see subclause 6.1.3) within an UPDATE request.

NOTE 6: The terminating UE can send an UPDATE request for reasons other than confirmation of the successful resource reservation.

5.1.5 Call release

Void.

5.1.6 Emergency service

5.1.6.1 General

A CS and IM CN subsystem capable UE shall follow the conventions and rules specified in 3GPP TS 22.101 [1A] and 3GPP TS 23.167 [4B] to select the domain for the emergency call attempt. If the CS domain is selected, the UE shall attempt an emergency call setup using appropriate access technology specific procedures.

The UE shall determine, whether it is currently attached to its home operator's network (e.g. HPLMN) or to a different network than its home operator's network (e.g. VPLMN) by applying access technology specific procedures described in the access technology specific annexes.

If the IM CN subsystem is selected and the UE is currently attached to its home operator's network (e.g. HPLMN) and the UE is currently registered, the UE shall attempt an emergency call as described in subclause 5.1.6.8.4.

If the IM CN subsystem is selected and the UE is currently attached to its home operator's network (e.g. HPLMN) and the UE is not currently registered, the UE shall:

1) perform an initial emergency registration, as described in subclause 5.1.6.2; and

2) attempt an emergency call as described in subclause 5.1.6.8.3.

If the IM CN subsystem is selected and the UE is attached to a different network than its home operator's network (e.g. VPLMN), the UE shall:

1) perform an initial emergency registration, as described in subclause 5.1.6.2; and

2) attempt an emergency call as described in subclause 5.1.6.8.3.

If the IM CN subsystem is selected and the UE has no credentials the UE can make an emergency call without being registered. The UE shall attempt an emergency call as described in subclause 5.1.6.8.2.

The IP-CAN can, dependent on the IP-CAN capabilities, provide local emergency numbers (including information about emergency service categories) to the UE which has that capability, in order for the UE to recognize these numbers as emergency call.

5.1.6.2 Initial emergency registration

When the user initiates an emergency call, if emergency registration is needed, the UE shall perform an emergency registration prior to sending the SIP request related to the emergency call.

The UE shall have only one valid emergency registration at any given time. If the UE initiates a new emergency registration using different contact address, and the previous emergency registration has not expired, the UE shall consider the previous emergency registration as expired.

IP-CAN procedures for emergency registration are defined in 3GPP TS 23.167 [4B] and in each access technology specific annex.

When a UE performs an initial emergency registration the UE shall perform the actions as specified in subclause 5.1.1.2 with the following additions and modifications:

a) the UE shall include a "sos" SIP URI parameter in the Contact header field as described in subclause 7.2A.13, indicating that indicates that this is an emergency registration and that the associated contact address is allowed only for emergency service; and

b) the UE shall populate the From and To header fields of the REGISTER request with:

   - the first entry in the list of public user identities provisioned in the UE;

   - the default public user identity obtained during the normal registration, if the UE is not provisioned with a list of public user identites, but the UE is currently registered to the IM CN subsystem; and

   - the derived temporary public user identity, in all other cases.

When the UE performs an initial emergency registration and whilst this emergency registration is active, the UE shall:

- handle the emergency registration independently from any other ongoing registration to the IM CN subsystem;

- handle any signalling or media related IP-CAN for the purpose of emergency calls independently from any other established IP-CAN for IM CN subsystem related signalling or media; and

- handle all SIP signalling and all media related to the emergency call independently from any other ongoing IM CN subsystem signalling and media.

5.1.6.2A New initial emergency registration

The UE shall perform a new initial emergency registration, as specified in subclause 5.1.6.2, if the UE determines that:

- it has previously performed an emergency registration which has not yet expired; and

- it has obtained an IP address from the serving IP-CAN, as specified in subclause 9.2.1, different than the IP address used for the emergency registration.

5.1.6.3 Initial subscription to the registration-state event package

Upon receiving the 200 (OK) to the REGISTER request that completes the emergency registration, the UE shall not subscribe to the reg event package of the public user identity specified in the REGISTER request.

5.1.6.4 User-initiated emergency reregistration

The UE shall perform user-initiated emergency reregistration as specified in subclause 5.1.1.4 if half of the time for the emergency registration has expired and:

- the UE has emergency related ongoing dialog; or

- standalone transactions exist; or

- the user initiates an emergency call.

The UE shall not perform user-initiated emergency reregistration in any other cases.

5.1.6.5 Authentication

When a UE performs authentication a UE shall perform the procedures as specified in subclause 5.1.1.5.

5.1.6.6 User-initiated emergency deregistration

Once the UE registers a public user identity and an associated contact address via emergency registration, the UE shall not perform user-initiated deregistration of the respective public user identity and the associated contact address.

NOTE: The UE will be deregistered when the emergency registration expires.

5.1.6.7 Network-initiated emergency deregistration

An emergency registration will not be deregistered by the network (see subclause 5.4.8.4).

5.1.6.8 Emergency session setup

5.1.6.8.1 General

The UE shall translate any user indicated emergency number as specified in 3GPP TS 22.101 [1A] to an emergency service URN, i.e. a service URN with a top-level service type of "sos" as specified in RFC 5031 [69]. A Request-URI of an initial request for a dialog or a standalone transaction, or an unknown method transmitted as part of UE detected emergency call procedures as defined in subclause 5.1.6 shall include one of the following service URNs; "urn:service:sos", "urn:service:sos.ambulance", "urn:service:sos.police", "urn:service:sos.fire", "urn:service:sos.marine", "urn:service:sos.mountain". If the UE can determine the type of emergency service the UE shall include a sub-service type.

NOTE 1: A service URN with a top-level service type of "sos" is used only when the user intends to establish an emergency call.

In the event the UE receives a 380 (Alternative Service) response to an INVITE request the response including a 3GPP IM CN subsystem XML body as described in subclause 7.6 that includes an <ims-3gpp> element, including a version attribute, with an <alternative-service> child element with the <type> child element set to "emergency" (see table 7.7AA), the UE shall automatically send an ACK request to the P-CSCF as per normal SIP procedures and terminate the session. In addition, if the 380 (Alternative Service) response includes a P-Asserted-Identity header field with a value equal to the value of the last entry on the Path header field value received during registration:

- the UE may also provide an indication to the user based on the text string contained in the <reason> child element of the <alternative-service> child element of the <ims-3gpp> element; and
- one of subclause 5.1.6.8.3 or subclause 5.1.6.8.4 applies.

NOTE 2: Emergency numbers which the UE does not detect, will be treated as a normal call.

NOTE 3: The last entry on the Path header field value received during registration is the value of the SIP URI of the P-CSCF.

5.1.6.8.2 Emergency session set-up in case of no registration

When establishing an emergency session for an unregistered user, the UE is allowed to receive responses to emergency requests and requests inside an established emergency session on the unprotected ports. The UE shall reject or silently discard all other messages not arriving on a protected port. Additionally, the UE shall transmit signalling packets pertaining to the emergency session from the same IP address and unprotected port on which it expects to receive signalling packets containing the responses to emergency requests and the requests inside the established emergency session.

Prior to establishing an emergency session for an unregistered user, the UE shall acquire a local IP address, discover a P-CSCF, and establish an IP-CAN bearer that can be used for SIP signalling. The UE shall send only the initial INVITE requests to the port advertised to the UE during the P-CSCF discovery procedure. If the UE does not receive any specific port information during the P-CSCF discovery procedure, the UE shall send the initial INVITE request to the SIP default port values as specified in RFC 3261 [26].

The UE shall apply the procedures as specified in subclause 5.1.2A.1 and subclause 5.1.3 with the following additions:

1) the UE shall set the From header field of the INVITE request to "Anonymous" as specified in RFC 3261 [26];

2) the UE shall include a service URN in the Request-URI of the initial INVITE request in accordance with subclause 5.1.6.8.1;

NOTE 1: Other specifications make provision for emergency service identifiers, that are not specifically the emergency service URN, to be recognised in the UE. Emergency service identifiers which the UE does not detect will be treated as a normal call by the UE.

3) the UE shall insert in the INVITE request, a To header field with:

   - the same emergency service URN as in the Request-URI; or

   - if the UE cannot perform local dialstring interpretation for the dialled digits, a dialstring URI representing the dialled digits in accordance with RFC 4967 [103] or a tel URL representing the dialled digits;

NOTE 2: This version of this document does not provide any specified handling of a URI with the dialled digits in accordance with RFC 4967 [103] at an entity within the IM CN susbsystem. Behaviour when this is used is therefore not defined.

4) if available to the UE (as defined in the access technology specific annexes for each access technology), the UE shall include in the P-Access-Network-Info header field in any request for a dialog, any subsequent request (except ACK requests and CANCEL requests) or response (except CANCEL responses) within a dialog or any request. The UE shall populate the P-Access-Network-Info header field with the current point of attachment to the IP-CAN as specified for the access network technology (see subclause 7.2A.4). The P-Access-Network-Info header field contains the location identifier such as the cell id, the line id or the identity of the I-WLAN access node, which is relevant for routeing the emergency call;

5) the UE shall populate the P-Preferred-Identity header field in the INVITE request with an equipment identifier as a SIP URI. The special details of the equipment identifier to use depends on the IP-CAN;

6) a Contact header field set to include SIP URI that contains in the hostport parameter the IP address of the UE and an unprotected port where the UE will receive incoming requests belonging to this dialog. The UE shall not include either the public or temporary GRUU in the Contact header field;

7) a Via header field set to include the IP address of the UE in the sent-by field and for the UDP the unprotected server port value where the UE will receive response to the emergency request, while for the TCP, the response is received on the TCP connection on which the emergency request was sent. The UE shall also include "rport" header field parameter with no value in the top Via header field. Unless the UE has been configured to not send keep-alives, and unless the UE is directly connected to an IP-CAN for which usage of NAT is not defined, it shall include a "keep" header field parameter with no value in the Via header field, in order to indicate support of sending keep-alives associated with, and during the lifetime of, the emergency session, as described in RFC 6223 [143];

NOTE 3: The UE inserts the same IP address and port number into the Contact header field and the Via header field, and sends all IP packets to the P-CSCF from this IP address and port number.

8) if the UE has its location information available, or a URI that points to the location information, the UE shall include a Geolocation header fieldin the INVITE request in the following way:

   - if the UE is aware of the URI that points to where the UE's location is stored, include the URI as the Geolocation header field value, as described in RFC 6442 [89]; or

   - if the UE is aware of its location information, include the location information in a PIDF location object, in accordance with RFC 4119 [90], include the location object in a message body with the content type application/pidf+xml, and include a Content ID URL, referring to the message body, as the Geolocation header field value, as described RFC 6442 [89];

9) if the UE includes a Geolocation header field, the UE shall also include a Geolocation-Routing header field with a "yes" header field value, which indicates that the location of the UE can be used by other entities to make routing decisions, as described in RFC 6442 [89]; and

10) if the UE has neither geographical location information available, nor a URI that points to the location information, the UE shall not insert a Geolocation header field in the INVITE request.

NOTE 4: It is suggested that UE's only use the option of providing a URI when the domain part belongs to the current P-CSCF or S-CSCF provider. This is an issue on which the network operator needs to provide guidance to the end user. A URI that is only resolvable to the UE which is making the emergency call is not desirable.

NOTE 5: During the dialog, the points of attachment to the IP-CAN of the UE can change (e.g. UE connects to different cells). The UE will populate the P-Access-Network-Info header field in any request or response within a dialog with the current point of attachment to the IP-CAN (e.g. the current cell information).

The UE shall build a proper preloaded Route header field value for all new dialogs. The UE shall build a Route header field value containing only the P-CSCF URI (containing the unprotected port number and the IP address or the FQDN learnt through the P-CSCF discovery procedures).

When a SIP transaction times out, i.e. timer B, timer F or timer H expires at the UE, the UE may behave as if timer F expired, as described in subclause 5.1.1.4.

NOTE 6: It is an implementation option whether these actions are also triggered by other means.

NOTE 7: A number of header fields can reveal information about the identity of the user. Where privacy is required, implementers should also give consideration to other header fields that can reveal identity information. RFC 3323 [33] subclause 4.1 gives considerations relating to a number of header fields.

NOTE 8: RFC 3261 [26] provides for the use of the Priority header field with a suggested value of "emergency". It is not precluded that emergency sessions contain this value, but such usage will have no impact on the processing within the IM CN subsystem.

If the response for the initial INVITE request indicates that the UE is behind NAT, and the INVITE request was sent overt TCP connection, the UE shall keep the TCP connection during the entire duration of the emergency session. In this case the UE will receive all responses to the emergency requests and the requests inside the established emergency session over this TCP connection.

If the Via header field of any provisional response, or of the final 200 (OK) response, for the initial INVITE request contains a "keep" header field parameter with a value, unless the UE detects that it is not behind a NAT, the UE shall start to send keep-alives associated with the session towards the P-CSCF, as described in RFC 6223 [143].

5.1.6.8.3 Emergency session set-up within an emergency registration

After a successful initial emergency registration, the UE shall apply the procedures as specified in subclause 5.1.2A, 5.1.3 and 5.1.4 with the following additions:

1) the UE shall insert in the INVITE request, a From header field that includes the public user identity registered via emergency registration or the tel URI associated with the public user identity registered via emergency registration, as described in subclause 4.2;

2) the UE shall include a service URN in the Request-URI of the initial INVITE request in accordance with subclause 5.1.6.8.1;

3) the UE shall insert in the INVITE request, a To header field with:

   - the same emergency service URN as in the Request-URI; or

   - if the UE cannot perform local dialstring interpretation for the dialled digits, a dialstring URI representing the dialled digits in accordance with RFC 4967 [103] or a tel URL representing the dialled digits;

NOTE 1: This version of this document does not provide any specified handling of a URI with the dialled digits in accordance with RFC 4967 [103] at an entity within the IM CN subsystem. Behaviour when this is used is therefore not defined.

4) if available to the UE, and if defined for the access type as specified in subclause 7.2A.4, the P-Access-Network-Info header field shall contain a location identifier such as the cell id, line id or the identity of the I-WLAN access node, which is relevant for routeing the IMS emergency call;

NOTE 2: The IMS emergency specification in 3GPP TS 23.167 [4B] describes several methods how the UE can get its location information from the access network or from a server. Such methods are not in the scope of this specification.

5) the UE shall insert in the INVITE request, one or two P-Preferred-Identity header field(s) that include the public user identity registered via emergency registration or the tel URI associated with the public user identity registered via emergency registration as described in subclause 4.2;

NOTE 3: Providing two P-Preferred-Identity header fields is usually supported by UE acting as enterprise network.

6) void;

7) if the UE has its location information available, or a URI that points to the location information, then the UE shall include a Geolocation header field in the INVITE request in the following way:

   - if the UE is aware of the URI that points to where the UE's location is stored, include the URI as the Geolocation header field value, as described in RFC 6442 [89]; or

   - if the UE is aware of its location information, include the location information in a PIDF location object, in accordance with RFC 4119 [90], include the location object in a message body with the content type application/pidf+xml, and include a Content ID URL, referring to the message body, as the Geolocation header field value, as described RFC 6442 [89];

8) if the UE includes a Geolocation header field, the UE shall also include a Geolocation-Routing header field with a "yes" header field value, which indicates that the location of the UE can be used by other entities to make routing decisions, as described in RFC 6442 [89]; and

NOTE 4: It is suggested that UE's only use the option of providing a URI when the domain part belongs to the current P-CSCF or S-CSCF provider. This is an issue on which the network operator needs to provide guidance to the end user. A URI that is only resolvable to the UE which is making the emergency call is not desirable.

9) if the UE has neither geographical location information available, nor a URI that points to the location information, the UE shall not insert a Geolocation header field in the INVITE request.

NOTE 5: RFC 3261 [26] provides for the use of the Priority header field with a suggested value of "emergency". It is not precluded that emergency sessions contain this value, but such usage will have no impact on the processing within the IM CN subsystem.

In the event the UE receives a 380 (Alternative Service) response with a P-Asserted-Identity header field with a value equal to the value of the last entry on the Path header field value received during registration, and the Content-Type header field set according to subclause 7.6 (i.e. "application/3gpp-ims+xml"), independent of the value or presence of the Content-Disposition header field, independent of the value or presence of Content-Disposition parameters, then following treatment is applied:

1) if the 380 (Alternative Service) response includes a 3GPP IM CN subsystem XML body as described in subclause 7.6 with the <ims-3gpp> element, including a version attribute, with the <alternative-service> child element with the <type> child element set to "emergency" (see table 7.7AA), then the UE:

   a) if the CS domain is available to the UE, and no prior attempt using the CS domain for the current emergency call attempt has been made, attempt the emergency call via CS domain using appropriate access technology specific procedures; and

   b) if the CS domain is not available to the UE or the emergency call has already been attempted using the CS domain, then perform one of the following actions:

      - if the <action> child element of the <alternative-service> child element of the <ims-3gpp> element in the IM CN subsystem XML body as described in subclause 7.6 is set to "emergency-registration" (see table 7.7AB), perform an initial emergency registration using a different VPLMN if available, as described in subclause 5.1.6.2 and if the new emergency registration succeeded, attempt an emergency call as described in this subclause; or

      - perform implementation specific actions to establish the emergency call; and

2) if the 380 (Alternative Service) response includes a 3GPP IM CN subsystem XML body as described in subclause 7.6 with the <ims-3gpp> element, including a version attribute, with the <alternative-service> child element with:

   a) the <type> child element set to "emergency" (see table 7.7AA); and

   b) the <action> child element set to "emergency-registration" (see table 7.7AB);

   then the UE may also provide an indication to the user based on the text string contained in the <reason> child element of the <alternative-service> child element of the <ims-3gpp> element.

NOTE 6: The last entry on the Path header field value received during registration is the value of the SIP URI of the P-CSCF.

5.1.6.8.4 Emergency session setup within a non-emergency registration

The UE shall apply the procedures as specified in subclauses 5.1.2A, 5.1.3 and 5.1.4 with the following additions:

1) the UE shall include a service URN in the Request-URI of the initial INVITE request in accordance with subclause 5.1.6.8.1;

2) the UE shall insert in the INVITE request, a To header field with:

   - the same emergency service URN as in the Request-URI; or

   - if the UE cannot perform local dialstring interpretation for the dialled digits, a dialstring URI representing the dialled digits in accordance with RFC 4967 [103] or a tel URL representing the dialled digits;

NOTE 1: This version of this document does not provide any specified handling of a URI with the dialled digits in accordance with RFC 4967 [103] at an entity within the IM CN subsystem. Behaviour when this is used is therefore not defined.

3) the UE shall insert in the INVITE request, a From header field that includes the public user identity or the tel URI associated with the public user identity, as described in subclause 4.2;

4) if available to the UE, and if defined for the access type as specified in subclause 7.2A.4, the UE shall insert in the P-Access-Network-Info header field a location identifier such as the cell id, line id or the identity of the I-WLAN access node, which is relevant for routeing the IMS emergency call;

NOTE 2: 3GPP TS 23.167 [4B] describes several methods how the UE can get its location information from the access network or from a server. Such methods are not in the scope of this specification.

5) the UE shall insert in the INVITE request one or two P-Preferred-Identity header field(s) that include the public user identity or the tel URI associated with the public user identity as described in subclause 4.2;

NOTE 3: Providing two P-Preferred-Identity header fields is usually supported by UE acting as enterprise network.

6) if the UE has its location information available, or a URI that points to the location information, then the UE shall include a Geolocation header field in the INVITE request in the following way:

   - if the UE is aware of the URI that points to where the UE's location is stored, include the URI as the Geolocation header field value, as described in RFC 6442 [89]; or

   - if the UE is aware of its location information, include the location information in a PIDF location object, in accordance with RFC 4119 [90], include the location object in a message body with the content type application/pidf+xml, and include a Content ID URL, referring to the message body, as the Geolocation header field value, as described RFC 6442 [89];

7) if the UE includes a Geolocation header field, the UE shall also include a Geolocation-Routing header field with a "yes" header field value, which indicates that the location of the UE can be used by other entities to make routing decisions, as described in RFC 6442 [89];

8) if the UE has neither geographical location information available, nor a URI that points to the location information, the UE shall not insert a Geolocation header field in the INVITE request; and

NOTE 4: It is suggested that UE's only use the option of providing a URI when the domain part belongs to the current P-CSCF or S-CSCF provider. This is an issue on which the network operator needs to provide guidance to the end user. A URI that is only resolvable to the UE which is making the emergency call is not desirable.

9) if a public GRUU value ("pub-gruu" header field parameter) has been saved associated with the public user identity to be used for this request, then insert the public GRUU ("pub-gruu" header field parameter) value in the Contact header field as specified in RFC 5627 [93]. Otherwise the UE shall include the address in the Contact header field set to contain the IP address or FQDN of the UE, and the UE shall also include:

   - if IMS AKA or SIP digest with TLS is being used as a security mechanism, the protected server port value as in the initial registration; or

   - if SIP digest without TLS, NASS-IMS bundled authentication or GPRS-IMS-Bundled Authentication is being used as a security mechanism, the port value of an unprotected port where the UE expects to receive subsequent mid-dialog requests. The UE shall set the unprotected port value to the port value used in the initial registration.

In the event the UE receives a 380 (Alternative Service) response with a P-Asserted-Identity header field with a value equal to the value of the SIP URI of the P-CSCF received in the Path header field during registration, and the Content-Type header field set according to subclause 7.6 (i.e. "application/3gpp-ims+xml"), independent of the value or presence of the Content-Disposition header field, independent of the value or presence of Content-Disposition parameters, then the following treatment is applied:

a) if the 380 (Alternative Service) response includes a 3GPP IM CN subsystem XML body as described in subclause 7.6 with an <ims-3gpp> element, including a version attribute, with an <alternative-service> child element with the <type> child element set to "emergency" (see table 7.7AA), then the UE shall:

   - if the <action> child element of the <alternative-service> child element of the <ims-3gpp> element in the IM CN subsystem XML body as described in subclause 7.6 is set to "emergency-registration" (see table 7.7AB), perform an initial emergency registration, as described in subclause 5.1.6.2 and attempt an emergency call as described in subclause 5.1.6.8.3;

   - attempt emergency call via CS domain using appropriate access technology specific procedures, if available and not already tried; or

   - perform implementation specific actions to establish the emergency call; and

b) if the 380 (Alternative Service) response includes a 3GPP IM CN subsystem XML body as described in subclause 7.6 with an <ims-3gpp> element, including a version attribute, with an <alternative-service> child element:

   i) with the <type> child element set to "emergency" (see table 7.7AA); and

   ii) with the <action> child element set to "emergency-registration" (see table 7.7AB);

   then the UE may also provide an indication to the user based on the text string contained in the <reason> child element of the <alternative-service> child element of the <ims-3gpp> element.

NOTE 5: RFC 3261 [26] provides for the use of the Priority header field with a suggested value of "emergency". It is not precluded that emergency sessions contain this value, but such usage will have no impact on the processing within the IM CN subsystem.

NOTE 6: The last entry on the Path header field value received during registration is the value of the SIP URI of the P-CSCF.

5.1.6.9 Emergency session release

Normal call release procedure shall apply, as specified in the subclause 5.1.5.

5.1.6.10 Response to non-UE detectable emergency call

If the UE receives a 1xx or 200 (OK) response to an initial request for a dialog, the response containing a P-Asserted-Identity header field set to an emergency number as specified in 3GPP TS 22.101 [1A], and:

- if a public GRUU value (pub-gruu) has been saved associated with the public user identity, the public GRUU value has not been included in the Contact header field of the initial request for a dialog as specified in RFC 5627 [93];

- if a public GRUU value (pub-gruu) has not been saved and a protected server port was not included in the address in the Contact header field of the the initial request for a dialog; or

- if the UE has its geographical location information available and the geographical location information has not been included in the initial request for a dialog; then the UE shall send an UPDATE request according to RFC 3311 [29]; and

  1) if available to the UE, and if defined for the access type as specified in subclause 7.2A.4, the UE shall include in the UPDATE request a P-Access-Network-Info header field and it shall contain a location identifier such as the cell id or the identity of the I-WLAN access node;

  2) if the UE has its geographical location information available, or a URI that points to the location information, then the UE shall include it in the UPDATE request in the following way:

     I) if the UE is aware of the URI that points to where the UE's location is stored, include the URI as the Geolocation header field value, as described in RFC 6442 [89]; or

     II) if the UE is aware of its location information, include the location information in a PIDF location object , in accordance with RFC 4119 [90], include the location object in a message body with the content type application/pidf+xml, and include a Content ID URL, referring to the message body, as the Geolocation header field value, as described RFC 6442 [89];

  3) if the UE includes a Geolocation header field, the UE shall also include a Geolocation-Routing header field with a "yes" header field value, which indicates that the location of the UE can be used by other entities to make routing decisions, as described in RFC 6442 [89];

  4) if the UE has neither geographical location information available, nor a URI that points to the location information, the UE shall not insert a Geolocation header field in the INVITE request; and

  4) if a public GRUU value ("pub-gruu" header field parameter) has been saved associated with the public user identity, then the UE shall insert the public GRUU ("pub-gruu" header field parameter) value in the Contact header field of the UPDATE request as specified in RFC 5627 [93]; otherwise the UE shall include the Contact header field set in accordance with subclause 5.1.6.8.4, item 8.

NOTE 1: The IMS emergency specification in 3GPP TS 23.167 [4B] describes several methods how the UE can get its location information from the access network or from a server. Such methods are not in the scope of this specification.

NOTE 2: It is suggested that UEs only use the option of providing a URI when the domain part belongs to the current P-CSCF or S-CSCF provider. This is an issue on which the network operator needs to provide guidance to the end user. A URI that is only resolvable to the UE which is making the emergency call is not desirable.

NOTE 3: During the dialog, the points of attachment to the IP-CAN of the UE can change (e.g. UE connects to different cells). The UE will populate the P-Access-Network-Info header field in any request (except ACK requests and CANCEL requests) or response (except CANCEL responses) within a dialog with the current point of attachment to the IP-CAN (e.g. the current cell information).

NOTE 4: In this version of the specification, only requests creating a dialog can request emergency services.

If the UE receives a 1xx or 200 (OK) response to an initial request for a dialog the response containing a P-Asserted-Identity header field set to an emergency number as specified in 3GPP TS 22.101 [1A], then the UE may indicate the nature of the session to the user.

5.1.7 Void

5.1.8 Void

5.2 Procedures at the P-CSCF

5.2.1 General

Where the P CSCF provides emergency call support, the procedures of subclause 5.2.10 shall be applied first.

Subclause 5.2.2 through subclause 5.2.9 define P-CSCF procedures for SIP that do not relate to emergency. All SIP requests are first screened according to the procedures of subclause 5.2.10 to see if they do relate to an emergency.

For all SIP transactions identified:

- as relating to an emergency; or
- if priority is supported, as containing an authorised Resource-Priority header field, or, if such an option is supported, relating to a dialog which previously contained an authorised Resource-Priority header field;

the P-CSCF shall give priority over other transactions or dialogs. This allows special treatment of such transactions or dialogs. If the P-CSCF recognises the need for priority processing to a request or if the P-CSCF recognises the need to provide different priority processing than the one indicated by the originating UE, based on the information stored during registration, the P-CSCF may insert or modify Resource-Priority header in accordance with RFC 4412 [116].

NOTE 1: The special treatment can include filtering, higher priority processing, routeing, call gapping. The exact meaning of priority is not defined further in this document, but is left to national regulation and network configuration.

The P-CSCF shall support the Path and Service-Route header fields.

NOTE 2: The Path header field is only applicable to the REGISTER request and its 200 (OK) response. The Service-Route header field is only applicable to the 200 (OK) response of REGISTER request.

NOTE 3: In subsequent procedures, the P-CSCF can address the needs of individual users (e.g. in support of attached enterprise networks or in support of priority mechanisms, from information saved during registration. In this release of the specification, no information is specified in the registration procedures to perform this, and therefore this information has to either be associated with the user at time of registration from configured information, or by a mechanism outside the scope of this release of the specification.

When the P-CSCF sends any request or response to the UE, before sending the message the P-CSCF shall:

- remove the P-Charging-Function-Addresses and P-Charging-Vector header fields, if present.

When the P-CSCF receives any request or response from the UE, the P-CSCF:

1) shall remove the P-Charging-Function-Addresses and P-Charging-Vector header fields, if present. Also, the P-CSCF shall ignore any data received in the P-Charging-Function-Addresses and P-Charging-Vector header fields; and

2) may insert previously saved values into the P-Charging-Function-Addresses and P-Charging-Vector header fields before forwarding the message;

NOTE 4: When the P-CSCF is located in the visited network, then it will not receive the P-Charging-Function-Addresses header field from the S-CSCF, IBCF, or I-CSCF. Instead, the P-CSCF discovers charging function addresses by other means not specified in this document.

3) shall remove the P-Access-Network-Info header field, if the request or the response include a P-Access-Network-Info header field with a "network-provided" parameter;

4) may insert a P-Access-Network-Info header field where, if the request or the response are sent using:

- xDSL as an IP-CAN, the access-type field is set to one of "ADSL", "ADSL2", "ADSL2+", "RADSL", "SDSL", "HDSL", "HDSL2", "G.SHDSL", "VDSL", or "IDSL", the "network-provided" parameter is added and the "dsl-location" parameter is set with the value received in the Location-Information header field in the User-Data Answer command as specified in ETSI ES 283 035 [98];

- Ethernet as an IP-CAN, the access-type field is set to one of "IEEE-802.3", "IEEE-802.3a", "IEEE-802.3e", "IEEE-802.3i", "IEEE-802.3j", "IEEE-802.3u" ,"IEEE-802.3ab"or "IEEE-802.3ae", "IEEE-802.3ak", "IEEE-802.3aq", "IEEE-802.3an", "IEEE-802.3y", or "IEEE-802.3z" and if NASS subsystem is used, the "network-provided" parameter is added and the "eth-location" parameter is set with the value received in the Location-Information header field in the User-Data Answer command as specified in ETSI ES 283 035 [98];

NOTE 5: The way the P-CSCF deduces that the request comes using xDSL or Ethernet access is implementation dependent.

- DOCSIS as an IP-CAN, the access-type field is set to "DOCSIS" and the "network-provided" parameter is added.

NOTE 6: The way the P-CSCF deduces that the request comes using DOCSIS access is implementation dependent.

- 3GPP as an IP-CAN, the access-class field is set to the value has been obtained from the PCRF using the procedures specified in 3GPP TS 29.214 [13D] and the "network-provided" parameter is added.

NOTE 7: The way the IM CN subsystem functionalities (e.g. S-CSCF, AS) deduce the request comes using a 3GPP Rel-8 P-CSCF is implementation dependent.

When the P-CSCF receives any request or response containing the P-Media-Authorization header field, the P-CSCF shall remove the header field.

NOTE 8: Depending on the security mechanism in use, the P-CSCF can integrity protect all SIP messages sent to the UE outside of the registration and authentication procedures by using a security association or TLS session. The P-CSCF will discard any SIP message that is not protected by using a security association or TLS session and is received outside of the registration and authentication procedures. The integrity and confidentiality protection and checking requirements on the P-CSCF within the registration and authentication procedures are defined in subclause 5.2.2.

With the exception of 305 (Use Proxy) responses, the P-CSCF shall not recurse on 3xx responses.

NOTE 9: If the P-CSCF is connected to a PDF the requirements for this interconnection is specified in the Release 6 version of this specification.

The P-CSCF may add, remove, or modify, the P-Early-Media header field within forwarded SIP requests and responses according to procedures in RFC 5009 [109].

NOTE 10: The P-CSCF can use the P-Early-Media header field for the gate control procedures, as described in 3GPP TS 29.214 [13D]. In the presence of early media for multiple dialogs due to forking, if the P-CSCF is able to identify the media associated with a dialog, (i.e., if symmetric RTP is used by the UE and and the P-CSCF can use the remote SDP information to determine the source of the media) the P-CSCF can selectively open the gate corresponding to an authorized early media flow for the selected media.

When SIP digest without TLS is used, the P-CSCF shall discard any SIP messages received outside of the registration and authentication procedures that do not map to an existing IP association as defined in subclause 5.2.3.

In case a device performing address and/or port number conversions is provided by a NA(P)T or NA(P)T-PT controlled by the P-CSCF, the P-CSCF may need to modify the SIP contents according to the procedures described in annex F. In case a device performing address and/or port number conversions is provided by a NA(P)T or NA(P)T-PT not controlled by the P-CSCF, the P-CSCF may need to modify the SIP contents according to the procedures described in annex K if both a "reg-id" and "+sip.instance" header field parameters are present in the received Contact header field as described in RFC 5626 [92].

5.2.2 Registration

5.2.2.1 General

The P-CSCF shall be prepared to receive the unprotected REGISTER requests on the SIP default port values as specified in RFC 3261 [26]. The P-CSCF shall also be prepared to receive the unprotected REGISTER requests on the port advertised to the UE during the P-CSCF discovery procedure.

NOTE 1: The P-CSCF will only accept further registration and subsequent SIP messages on the same ports for security mechanisms that do not require to use negotiated ports for exchanging protected messages.

The P-CSCF shall distinguish between security mechanisms through the use of the Security-Client header field and Authorization header field as follows:

1) if a REGISTER request from the UE contains a Security-Client header field then for an initial registration, the P-CSCF shall select the sec-mechanism and mode (as described in Annex H of 3GPP TS 33.203 [19]) from the corresponding parameters offered in the Security-Client header field according to its priorities, as follows:

   - if the P-CSCF selects the sec-mechanism "ipsec- 3gpp" then follow the procedures as described in subclause 5.2.2.2, in addition to the procedures described in this subclause;

   - if the P-CSCF selects the sec-mechanism "tls" then follow the procedures as described in subclause 5.2.2.4, in addition to the procedures described in this subclause.

2) if a REGISTER request from the UE does not contain a Security-Client header field, or the P-CSCF does not select any sec-mechanism from the Security-Client header field, then the P-CSCF shall behave as follows, in addition to the procedures described in the remainder of this subclause:

   - if the REGISTER request does not contain an Authorization header field and was received over an access network defined in 3GPP specifications then follow the GPRS-IMS-Bundled authentication procedures as described in subclause 5.2.2.6; or

   - if the REGISTER request does not contain an Authorization header field and was received over a TISPAN NASS then follow the NASS-IMS bundled authentication procedures described in subclause 5.2.2.5. If the NASS-IMS bundled authentcation related query from the P-CSCF to the TISPAN NASS fails, then the P-CSCF shall not continue and shall return an error message to the UE; or

   - if the REGISTER request contains an Authorization header field and was not received over a TISPAN NASS then follow the SIP digest without TLS procedures as described in subclause 5.2.2.3; or

   - if the REGISTER request contains an Authorization header field and was received over a TISPAN NASS, and the P-CSCF supports both SIP digest and NASS-IMS bundled authentication, then the P-CSCF shall perform the steps required for NASS-IMS bundled authentication, in subclause 5.2.2.5, as well as the steps required for SIP digest without TLS, in subclause 5.2.2.3, unless it is configured to behave differently. If the NASS-IMS bundled authentication related query from the P-CSCF to the TISPAN NASS fails, then the P-CSCF shall only continue with the SIP digest related steps.

For subsequent registrations, the P-CSCF shall continue to use the selected mechanism.

NOTE 2: The steps required for SIP digest and for NASS-IMS bundled authentcation are not in contradiction. Rather, for NASS-IMS bundled authentication the P-CSCF needs to perform additional steps, namely an exchange with the TISPAN NASS and an inclusion of NASS location information in the REGISTER request, on top of the steps required for SIP digest.

NOTE 3: How the P-CSCF knows the access network type of a specific network interface is implementation-dependent (e.g. it can know the access network type from different UE IP address ranges or by using different network interfaces for different access network types).

When the P-CSCF receives a REGISTER request from the UE, the P-CSCF shall:

1) insert a Path header field in the request including an entry containing:

   - the SIP URI identifying the P-CSCF;

- an indication that requests routed in this direction of the path (i.e. from the S-CSCF towards the P-CSCF) are expected to be treated as for the UE-terminating case. This indication may e.g. be in a parameter in the URI, a character string in the user part of the URI, or be a port number in the URI;

- an IMS flow token in the user portion of the SIP URI that the P-CSCF inserts into the Path header field, and the "ob" SIP URI parameter according to RFC 5626 [92]. The same SIP URI (user portion, hostport parameter and SIP URI parameters) shall be used for the initial registration, re-registrations, binding fetchings, and de-registration of the respective registration;

- the P-CSCF shall use a different IMS flow token for each registration. If the multiple registration mechanism is used, the P-CSCF shall also use a different IMS flow token for each registration flow associated with the registration;

NOTE 4: The form of the IMS flow token is of local significance to the P-CSCF only and can thus be chosen freely by a P-CSCF implementation.

NOTE 5: By inserting the "ob" SIP URI parameter in its SIP URI, the P-CSCF indicates that it supports multiple registrations as specified in RFC 5626 [92]. The presence of the "ob" SIP URI parameter is not an indication that the P-CSCF supports the keep-alive mechanism defined in RFC 5626 [92].

2) insert a Require header field containing the option-tag "path";

3) insert a P-Charging-Vector header field with the "icid-value" header field parameter populated as specified in 3GPP TS 32.260 [17] and a type 1 "orig-ioi" header field parameter. The P-CSCF shall set the type 1 "orig-ioi" header field parameter to a value that identifies the sending network of the request. The P-CSCF shall not include the type 1 "term-ioi" header field parameter;

4) insert a P-Visited-Network-ID header field, with the value of a pre-provisioned string that identifies the visited network at the home network;

4A) void;

4B) if the REGISTER request contains an Authorization header field, remove the "integrity-protected" header field parameter, if present;

5) if the P-CSCF is located in the visited network, and local policy requires the application of IBCF capabilities in the visited network towards the home network, forward the request to an IBCF in the visited network.

If the selected exit point:

- does not respond to the REGISTER request and its retransmissions by the P-CSCF; or

- sends back a 3xx response or 480 (Temporarily Unavailable) response to a REGISTER request;

the P-CSCF shall select a new exit point and forward the original REGISTER request.

NOTE 6: The list of the exit points can be either obtained as specified in RFC 3263 [27A] or provisioned in the P-CSCF.

If the P-CSCF fails to forward the REGISTER request to any exit point, the P-CSCF shall send back a 504 (Server Time-Out) response to the user, in accordance with the procedures in RFC 3261 [26] unless local policy allows omitting the exit point;

NOTE 7: If the P-CSCF forwards the request to an IBCF in the visited network, the IBCF can determine the entry point of the home network, using the same mechanisms as described in NOTE 1 above.

6) if the P-CSCF is located in the visited network and local policy does not require the application of IBCF capabilities in the visited network towards the home network, determine the entry point of the home network and forward the request to that entry point.

If the selected entry point:

- does not respond to the REGISTER request and its retransmissions by the P-CSCF; or

- sends back a 3xx response or 480 (Temporarily Unavailable) response to a REGISTER request;

the P-CSCF shall select a new entry point and forward the original REGISTER request.

NOTE 8: The list of the entry points can be either obtained as specified in RFC 3263 [27A] or provisioned in the P-CSCF.

If the P-CSCF fails to forward the REGISTER request to any entry point, the P-CSCF shall send back a 504 (Server Time-Out) response to the user, in accordance with the procedures in RFC 3261 [26];

7) if the P-CSCF is located in the home network, determine the I-CSCF of the home network and forward the request to that I-CSCF.

If the selected I-CSCF:

- does not respond to the REGISTER request and its retransmissions by the P-CSCF; or
- sends back a 3xx response or 480 (Temporarily Unavailable) response to a REGISTER request;

the P-CSCF shall select a new I-CSCF and forward the original REGISTER request; and

NOTE 9: The list of the I-CSCFs can be either obtained as specified in RFC 3263 [27A] or provisioned in the P-CSCF.

If the P-CSCF fails to forward the REGISTER request to any I-CSCF, the P-CSCF shall send back a 504 (Server Time-Out) response to the user, in accordance with the procedures in RFC 3261 [26].

When the P-CSCF receives a 200 (OK) response to a REGISTER request, the P-CSCF shall check the value of the registration expiration interval value. When the registration expiration interval value is different than zero, then the P-CSCF shall:

1) save the list of service route values in the Service-Route header fields preserving the order, and bind the list either to the contact address or to the registration flow and the associated contact address (if the multiple registration mechanism is used) and the associated security association or TLS session over which the REGISTER request was received. The P-CSCF shall store this list during the entire registration period of the respective public user identity and bind it either to the associated contact address or to the registration flow and the associated contact address (if the multiple registration mechanism is used). The P-CSCF shall use this list to validate the routeing information in the requests originated by the UE using either the respective contact address or to the registration flow and the associated contact address, and received over the respective security association or a TLS session. If the list of Service-Route header fields already exists either for this contact address or to the registration flow and the associated contact address (if the multiple registration mechanism is used), then the P-CSCF shall replace the already existing list of service route values with the list of Service-Route header fields received in the 200 (OK) response;

NOTE 10: When the UE registers multiple registration flows and the associated contact addresses, then the UE and the P-CSCF will have a list of Service-Route header fields for each registration flow and the associated contact address and the associated security association or TLS session. When sending a request using a given registration flow and the associated contact address and the associated security association or TLS session, the UE will use the corresponding list of Service-Route header fields, when building a list of Route header fields.

2) associate the list of service route values with the registered public user identity and either the associated contact address or to the registration flow and the associated contact address (if the multiple registration mechanism is used) and the associated security association or TLS session;

3) store the public user identities found in the P-Associated-URI header field value, including any associated display names, and any parameters associated with either the user or the identities of the user, and associate them to the registered public user identity, i.e. the registered public user identity and its associated set of implicitly registered public user identities are bound to the contact address and security association or TLS session over which the REGISTER request was received;

4) store the default public user identity, including its associated display name, if provided, for use with procedures for the P-Asserted-Identity header field for requests received from the UE over the respective security association or TLS session. The default public user identity is the first on the list of URIs present in the P-Associated-URI header field;

NOTE 11: There can be more than one default public user identity stored in the P-CSCF, as the result of the multiple registrations of public user identities.

NOTE 12: For each contact address and the associated security association or TLS session the P-CSCF will maintain a list of registered public user identities and the associated default public user identities, that it will use when populating the P-Asserted Identity header.

5) store the values received in the P-Charging-Function-Addresses header field;

6) if a "term-ioi" header field parameter is received in the P-Charging-Vector header field, store the value of the received "term-ioi" header field parameter;

NOTE 13: Any received "term-ioi" header field parameter will contain a type 1 IOI. The type 1 IOI identifies the home network of the registered user.

7) if the P-CSCF included an IMS flow token and the "ob" SIP URI parameter in the Path header field of the REGISTER request, check for presence of the option-tag "outbound" in the Require header field of the a 200 (OK) response:

   - if the option-tag "outbound" is present, it indicates that the UE has successfully registered its public user identity with a new bidirectional flow as defined in RFC 5626 [92]. In this case the P-CSCF shall route the subsequent requests and responses destined for the UE as specified in RFC 5626 [92]; or

   - if the option-tag "outbound" is not present, it indicates that the public user identity has not been registered as specified in RFC 5626 [92]. In this case the P-CSCF shall route the subsequent requests and responses destined for the UE as specified in RFC 3261 [26]; and

8) if the P-CSCF detects that the UE is behind a NAT, and the UE's Via header field contains a "keep" header field parameter, the P-CSCF shall add a value to the parameter, to indicate that it is willing to receive keep-alives associated with the registration from the UE, as defined in RFC 6223 [143].

If the P-CSCF detects that the UE is behind a NAT, and the request was received over a TCP connection, the P-CSCF shall not close the TCP connection during the duration of the registration.

NOTE 14: The P-CSCF can conclude whether the UE is behind a NAT or not by comparing the values in the "received" header field parameter and "rport" header field parameter with the corresponding values in the sent-by parameter in the topmost Via header field. If the values do not match, the P-CSCF can conclude that the UE is not behind a NAT.

5.2.2.2 IMS AKA as a security mechanism

When the P-CSCF receives a REGISTER request from the UE, as defined in subclause 5.2.2.1, the P-CSCF shall additionally:

1) insert the "integrity-protected" header field parameter (described in subclause 7.2A.2) with a value "yes" into the Authorization header field in case the REGISTER request was either received protected with the security association created during an ongoing authentication procedure and includes an authentication challenge response (i.e. RES parameter), or it was received on the security association created during the last successful authentication procedure, otherwise insert the parameter with the value "no";

1A) if the "reg-id" header field parameter was included in the Contact header field of the REGISTER request, insert in the Path header an IMS flow token and the "ob" URI parameter according to RFC 5626 [92]. The IMS flow token shall identify the flow from the P-CSCF toward the UE, as follows:

   a) for UDP, the IMS flow token identifies the unidirectional flow from the P-CSCF's protected client port and the P-CSCF's IP address to the UE's protected server port and the UE's IP address. This flow is used by the P-CSCF to send requests and responses to the UE. The P-CSCF shall receive the requests and responses from the UE on its protected server port; or

   b) for TCP, the IMS flow token identifies the excising TCP connection between the UE and the P-CSCF. This TCP connection was established by the UE, i.e. from the UE's protected server port and the UE's IP address to the P-CSCF's protected client port and the P-CSCF's IP address. This TCP connection is used to exchange SIP messages between the UE and the P-CSCF;

2) in case the REGISTER request was received without protection, on the default port or port advertised to UE for P-CSCF discovery:

   a) check the existence of the Security-Client header field. If the Security-Client header field is present, then remove and store it. If the Security-Client header field is not present, then the P-CSCF shall return a suitable 4xx response;

   b) set the value of the "rport" header field parameter in the Via header field to the source port of the received REGISTER request;

   c) insert the "received" header field parameter in the Via header field containing the source IP address that the request came from, as defined in the RFC 3581 [56A]; and

NOTE 1: As defined in RFC 3581 [56A], the P-CSCF will insert a "received" header field parameter containing the source IP address that the request came from, even if it is identical to the value of the "sent-by" component.

NOTE 2: Upon receiving the unprotected REGISTER request the P-CSCF detects if the UE is behind a NAT.

3) in case the REGISTER request was received protected towards the port that was notified to the UE in the previous response, then:

   a) check the security association which protected the request. If the security association is a temporary one, then the request is expected to contain a Security-Verify header field in addition to a Security-Client header field. If there are no such header fields, then the P-CSCF shall return a suitable 4xx response. If there are such header fields, then the P-CSCF shall compare the content of the Security-Verify header field with the content of the Security-Server header field sent earlier and the content of the Security-Client header field with the content of the Security-Client header field received in the challenged REGISTER request. If those do not match, then there is a potential man-in-the-middle attack. The request should be rejected by sending a suitable 4xx response. If the contents match, the P-CSCF shall remove the Security-Verify and the Security-Client header field;

   b) if the security association the REGISTER request was received on, is an already established one, then:

      - the P-CSCF shall remove the Security-Verify header field if it is present;

      - a Security-Client header field containing new parameter values is expected. If the Security-Client header field or any required parameter is missing, then the P-CSCF shall return a suitable 4xx response; and

      - the P-CSCF shall remove and store the Security-Client header field before forwarding the request to the S-CSCF;

   c) check if the private user identity conveyed in the Authorization header field of the protected REGISTER request is the same as the private user identity which was previously challenged or authenticated. If the private user identities are different, the P-CSCF shall reject the REGISTER request by returning a 403 (Forbidden) response; and

   d) ignore the "rport" Via header field parameter, if included.

NOTE 3: Once the IPsec security associations between the UE and the P-CSCF have been created, in case of UDP the P-CSCF sends the responses to a different UE's port then the one from which the request was received from the UE. For the TCP, the responses are sent on the TCP connection on which the request was received. Hence, the P-CSCF will ignore the "rport" Via header field parameter in all protected requests and responses, if received.

When the P-CSCF receives a 401 (Unauthorized) response to a REGISTER request, the P-CSCF shall:

1) delete any temporary set of security associations established towards the UE;

2) remove the "ck" and "ik" WWW-Authenticate header field parameters contained in the 401 (Unauthorized) response and bind the values to the proper private user identity and to the temporary set of security associations which will be setup as a result of this challenge. The P-CSCF shall forward the 401 (Unauthorized) response to the UE if and only if the "ck" and "ik" header field parameters have been removed;

3) insert a Security-Server header field in the response, containing the P-CSCF static security list and the parameters needed for this security association setup, as specified in Annex H of 3GPP TS 33.203 [19]. The P-

CSCF shall support the "ipsec-3gpp" security mechanism, as specified in RFC 3329 [48]. The P-CSCF shall support the IPsec layer algorithms for integrity and confidentiality protection as defined in 3GPP TS 33.203 [19] and shall announce support for them according to the procedures defined in RFC 3329 [48];

4) set up the temporary set of security associations for this registration with a temporary SIP level lifetime between the UE and the P-CSCF for the user identified with the private user identity. For further details see 3GPP TS 33.203 [19] and RFC 3329 [48]. The P-CSCF shall set the temporary SIP level lifetime for the temporary set of security associations to the value of reg-await-auth timer; and

5) send the 401 (Unauthorized) response to the UE using the security association with which the associated REGISTER request was protected, or unprotected in case the REGISTER request was received unprotected. If the 401 (Unauthorized) response to the unprotected REGISTER request is sent using UDP, the P-CSCF shall send the response to the IP address listed in the "received" Via header field parameter and the port in the "rport" Via header field parameter. In case of TCP, the P-CSCF shall send the response over the same TCP connection over which the request was received from the UE.

NOTE 4: The challenge in the 401 (Unauthorized) response sent back by the S-CSCF to the UE as a response to the REGISTER request is piggybacked by the P-CSCF to insert the Security-Server header field in it. The S-CSCF authenticates the UE, while the P-CSCF negotiates and sets up two pairs of security associations with the UE during the same registration procedure. For further details see 3GPP TS 33.203 [19].

When the P-CSCF receives a 200 (OK) response to a REGISTER request as defined in subclause 5.2.2.1, the P-CSCF shall additionally:

1) if an existing set of security association is available, set the SIP level lifetime of the security association to the longest of either the previously existing security association lifetime, or the lifetime of the just completed registration plus 30 seconds;

2) if a temporary set of security associations exists, change the temporary set of security associations to a newly established set of security associations, i.e. set its SIP level lifetime to the longest of either the previously existing set of security associations SIP level lifetime, or the lifetime of the just completed registration plus 30 seconds; and

3) protect the 200 (OK) response to the REGISTER request within the same security association to that in which the REGISTER request was protected.

If the P-CSCF receives a SIP message (including REGISTER requests) from the UE over the newly established set of security associations that have not yet been taken into use, the P-CSCF shall:

1) reduce the SIP level lifetime of the old set of security associations towards the same UE to 64*T1 (if currently longer than 64*T1); and

2) use the newly established set of security associations for further messages sent towards the UE as appropriate (i.e. take the newly established set of security associations into use).

NOTE 5: If the UE has registered other contact addresses and established security associations for these contact addresses, it may use them when sending subsequent SIP messages rather then using the newly established set of security associations. In this case the P-CSCF will not receive any SIP message over the newly established set of security associations.

NOTE 6: In this case, the P-CSCF will send requests (that specify the associated contact address in the Request-URI) towards the UE over the newly established set of security associations. Responses towards the UE that are sent via UDP will be sent over the newly established set of security associations. Responses towards the UE that are sent via TCP will be sent over the same set of security associations that the related request was received on.

NOTE 7: When receiving a SIP message (including REGISTER requests) from the UE over a set of security associations that is different from the newly established set of security associations, the P-CSCF will not take any action on any set of security associations.

When the SIP level lifetime of an old set of security associations is about to expire, i.e. their SIP level lifetime is shorter than 64*T1 and a newly established set of security associations has not been taken into use, the P-CSCF shall use the newly established set of security associations for further messages towards the UE as appropriate (see NOTE 2).

When sending the 200 (OK) response for a REGISTER request that concludes a re-authentication, the P-CSCF shall:

1) keep the set of security associations that was used for the REGISTER request that initiated the re-authentication;

2) keep the newly established set of security associations created during this authentication; and

3) go on using for further requests sent towards the UE the set of security associations and associated contact address that was used to protect the REGISTER request that initiated the re-authentication as appropriate (see NOTE 6).

When sending the 200 (OK) respone for a REGISTER request that concludes an initial authentication of the user registering its public user identity with a given contact address the associated security association, i.e. the REGISTER request that initiated the authentication was received unprotected, the P-CSCF shall:

1) keep the newly established set of security associations created during this authentication; and

2) use the kept newly established set of security associations and associated contact address for further messages sent towards the UE as appropriate (see NOTE 6).

NOTE 8: For each contact address or for each registration flow and the associated contact address bound to a set of security associations, the P-CSCF will maintain two Route header field lists. The first Route header field list (constructed from the Service-Route header fields received during the last registration procedure of either the respective contact address or a registration flow) is used only to validate the routeing information in the initial requests for a dialog and stand alone transactions originating from the UE using either the respective contact address or a registration flow and the associated contact address and the respective security association. This list is valid as long as there is at least one public user identity registered either with the associated contact address or a registration flow and the associated contact address. The second list is the list of Route –header fields (constructed from the Record Route header fields in the initial INVITE request and associated response) and it is used during the duration of the call. Once the call is terminated, this list of Route header fields is discarded.

The P-CSCF shall delete any security association from the IPsec database when their SIP level lifetime expires.

The handling of the security associations at the P-CSCF is summarized in table 5.2.2-1.

Table 5.2.2-1: Handling of security associations at the P-CSCF

	Temporary set of security associations	**Newly established set of security associations**	**Old set of security associations**
SIP message received over newly established set of security associations that have not yet been taken into use	No action	Take into use	Reduce SIP level lifetime to 64*T1, if lifetime is larger than 64*T1
SIP message received over old set of security associations	No action	No action	No action
Old set of security associations currently in use will expire in 64*T1	No action	Take into use	No action
Sending an authorization challenge within a 401 (Unauthorized) response for a REGISTER request	Create Remove any previously existing temporary set of security associations	No action	No action
Sending 200 (OK) response for REGISTER request that concludes re-authentication	Change to a newly established set of security associations	Convert to and treat as old set of security associations (see next column)	Continue using the old set of security associations over which the REGISTER request, that initiated the re-authentication was received. Delete all other old sets of security associations immediately
Sending 200 (OK) response for REGISTER request that concludes initial authentication	Change to a newly established set of security associations and take into use immediately	Convert to old set of security associations, i.e. delete	Delete

5.2.2.3 SIP digest without TLS as a security mechanism

When the P-CSCF receives a REGISTER request from the UE, as defined in subclause 5.2.2.1, the P-CSCF shall additionally:

- if the REGISTER request does not map to an existing IP association, and does not contain a challenge response, not include the "integrity-protected" header field parameter; or
- if the REGISTER request does not map to an existing IP association, and does contain a challenge response, include an "integrity-protected" header field parameter with the value set to "ip-assoc-pending"; or
- if the REGISTER request does map to an existing IP association, include an "integrity-protected" header field parameter with the value set to "ip-assoc-yes".

NOTE 1: The value of "ip-assoc-pending" for the "integrity-protected" header field parameter or the absence of an "integrity-protected" header field parameter in the Authorization header field is an indication to the I-CSCF and S-CSCF that this is an initial REGISTER request.

If the P-CSCF receives a 500 (Server Internal Error) or 504 (Server Time-Out) response to a REGISTER request, and if the REGISTER request is mapped to an existing IP association, then the P-CSCF shall delete the IP association.

NOTE 2: The P-CSCF deletes the IP association on receipt of 500 (Server Internal Error) or 504 (Server Time-Out) so that the next REGISTER request received from the UE will look like an initial REGISTER request.

When the P-CSCF receives a 200 (OK) response to a REGISTER request as defined in subclause 5.2.2.1, and the registration expiration interval value is different than zero, the P-CSCF shall additionally:

a) create an IP association by storing and associating the UE's packet source IP address along with the "sent-by" parameter of the Via header field, cf. RFC 3261 [26], of the REGISTER request with the private user identity and all the successfully registered public user identities related to that private user identity. If required by the use case, e.g. RFC 5626 [92] is used, then the P-CSCF shall also include the UE's packet source port of the REGISTER request as part of the IP association;

b) if the port has been stored as part of the IP associaton, overwrite any existing IP association which has the same pair of IP address and port, but a different private user identity. If the port has not been stored as part of the IP association then overwrite any existing IP association which has the same IP address, but a different private user identy; and

c) send the 200 (OK) response to the UE unprotected as defined in clause 4 of RFC 3581 [56A].

5.2.2.4 SIP digest with TLS as a security mechanism

TLS is optional to implement and is used only in combination with SIP digest authentication. If the P-CSCF supports TLS, then the P-CSCF shall support TLS as described in 3GPP TS 33.203 [19]. If the P-CSCF supports TLS, the P-CSCF shall support TLS ciphersuites as described in 3GPP TS 33.203 [19].

When the P-CSCF receives a REGISTER request from the UE, as defined in subclause 5.2.2.1, the P-CSCF shall additionally:

1) in case the REGISTER request was received without protection on the default port or port advertised to UE for P-CSCF discovery and with the Security-Client header field indicating "tls", then:

   a) remove and store the Security-Client header field;

   b) do not include the "integrity-protected" header field parameter in the Authorization header; or

   c) set the value of the "rport" header field parameter in the Via header to the source port of the received REGISTER request; and

   d) insert the "received" header field parameter in the Via header containing the source IP address that the request came from, as defined in the RFC 3581 [56A];

NOTE 1: The absence of an "integrity-protected" header field parameter in the Authorization header is an indication to the I-CSCF and S-CSCF that this is an initial REGISTER request.

NOTE 2: As defined in RFC 3581 [56A], the P-CSCF will insert a "received" header field parameter containing the source IP address that the request came from, even if it is identical to the value of the "sent-by" component.

NOTE 3: Upon receiving the unprotected REGISTER request the P-CSCF detects if the UE is behind a NAT.

2) if the REGISTER request was received protected with a TLS session, on the protected server port, created during an ongoing authentication procedure, where the Session ID for the TLS session is not yet bound to a private user identity, and includes an authentication challenge response (i.e. response parameter), then:

   a) check if the private user identity conveyed in the Authorization header of the protected REGISTER request is the same as the private user identity which was previously challenged. If the private user identities are different, the P-CSCF shall reject the REGISTER request by returning a 403 (Forbidden) response;

   b) check the existence of the Security-Verify header field and the Security-Client header field. If there are no such headers, then the P CSCF shall return a suitable 4xx response. If there are such headers, then the P-CSCF shall compare the content of the Security-Verify header field with the content of the Security-Server header field sent earlier and the content of the Security-Client header field with the content of the Security-Client header field received in the challenged REGISTER request. If those do not match, then there is a potential man-in-the-middle attack. The P-CSCF should reject the request by sending a suitable 4xx response. If the contents match, the P-CSCF shall remove the Security-Verify and the Security-Client header fields; and

   c) include an "integrity-protected" header field parameter with the value set to "tls-pending"; or

3) if the REGISTER request was received on an existing TLS session created during a previous authentication procedure and the private user identity contained in the REGISTER request matches the private user identity previously associated with the Session ID for this TLS session, then:

   a) check if the private user identity conveyed in the Authorization header of the protected REGISTER request is the same as the private user identity which was previously authenticated. If the private user identities are different, the P-CSCF shall reject the REGISTER request by returning a 403 (Forbidden) response;

   b) check the existence of the Security-Verify header field and Security-Client header field. If there are no such header fields, then the P-CSCF shall return a suitable 4xx response. If there are such headers, then the P-CSCF shall compare the content of the Security-Verify header field with the content of the Security-Server header field sent earlier and the content of the Security-Client header field with the content of the Security-Client header field received in the challenged REGISTER request. If those do not match, then there is a potential man-in-the-middle attack. The P-CSCF should reject the request by sending a suitable 4xx response;

   c) the P-CSCF shall remove and store the Security-Client header field and remove the Security-Verify header field before forwarding the request to the S-CSCF; and

   d) include an "integrity-protected" header field parameter with the value set to "tls-yes".

If the P-CSCF require security agreement, and the Security-Client header field is not present, then the P-CSCF shall return a suitable 4xx response.

When the P-CSCF receives a 401 (Unauthorized) response to a REGISTER request, the P-CSCF shall:

1) insert a Security-Server header field in the response, containing the P-CSCF selected mechanism name, as specified in Annex H of 3GPP TS 33.203 [19]. The P-CSCF shall support and indicate the "tls" security mechanism, as specified in RFC 3329 [48]. The P-CSCF shall support the TLS ciphersuites as described in 3GPP TS 33.203 [19] and shall announce support for them according to the procedures defined in RFC 3329 [48]; and

2) send the 401 (Unauthorized) response to the UE using the TLS session with which the associated REGISTER request was protected, or unprotected in case the REGISTER request was received unprotected. If the 401 (Unauthorized) response to the unprotected REGISTER request is sent using UDP, the P-CSCF shall send the response to the IP address listed in the "received" header field parameter and the port in the "rport" header field parameter. In case of TCP, the P-CSCF shall send the response over the same TCP connection over which the request was received from the UE.

NOTE 4: The challenge in the 401 (Unauthorized) response sent back by the S-CSCF to the UE as a response to the REGISTER request is piggybacked by the P-CSCF to insert the Security-Server header field in it.

When the P-CSCF receives a 200 (OK) response to a REGISTER request as defined in subclause 5.2.2.1, and the registration expiration interval value is different than zero, the P-CSCF shall additionally:

- create an association by storing and associating the UEs IP address and port of the TLS connection with the TLS Session ID, the private user identity and all the successfully registered public user identities related to that private user identity; and

- protect the 200 (OK) response to the REGISTER request within the same TLS session to that in which the request was protected.

5.2.2.5 NASS-IMS bundled authentication as a security mechanism

When the P-CSCF receives a REGISTER request from the UE, as defined in subclause 5.2.2.1, the P-CSCF shall additionally:

1) perform the NASS-IMS bundled authentication related query from the P-CSCF to the TISPAN NASS; and

2) if the query in step 1) is successful, insert a P-Access-Network-Info header field as described in subclause 5.2.1 step 4).

When the P-CSCF receives a 200 (OK) response to a REGISTER request from the UE, as defined in subclause 5.2.2.1, the P-CSCF shall additionally:

1) store an association between the IP source address and port of the initial REGISTER request and the public user identities found in the P-Associated-URI header field value and associate them to the public user identity under registration; and

2) store an association between the IP source address and port of the initial REGISTER request the default public user identity for use with procedures for the P-Asserted-Identity header field. The default public user identity is the first on the list of URIs present in the P-Associated-URI header field.

5.2.2.6 GPRS-IMS-Bundled authentication as a security mechanism

When the P-CSCF receives a SIP request from a GPRS-IMS-Bundled UE, the P-CSCF checks the IP address in the "sent-by" parameter of the Via header field provided by the UE as specified in RFC 3261 [6]. If the "sent-by" parameter contains a domain name, or if it contains an IP address that differs from the packet source IP address, the P-CSCF adds a "received" header field parameter to that Via header field value. This parameter contains the source IP address from which the packet was received.

When the P-CSCF receives a 200 (OK) response to a REGISTER request from the UE, as defined in subclause 5.2.2.1, the P-CSCF shall additionally:

1) store an association between the IP source address and port of the initial REGISTER request and the public user identities found in the P-Associated-URI header field value and associate them to the public user identity under registration; and

2) store an association between the IP source address and port of the initial REGISTER request the default public user identity for use with procedures for the P-Asserted-Identity header field. The default public user identity is the first on the list of URIs present in the P-Associated-URI header field.

5.2.3 Subscription to the user's registration-state event package

Upon receipt of a 200 (OK) response to the first initial REGISTER request (i.e. this was the first initial REGISTER request that the P-CSCF received from the user identified with its private user identity), the P-CSCF shall:

1) generate a SUBSCRIBE request in accordance with RFC 3680 [43], with the following elements:

   - a Request-URI set to the resource to which the P-CSCF wants to be subscribed to, i.e. to a SIP URI that contains the default public user identity of the user;

   - a From header field set to the P-CSCF's SIP URI;

- a To header field, set to a SIP URI that contains the default public user identity of the user;
- an Event header field set to the "reg" event package;
- an Expires header field set to a value higher then the registration expiration interval value indicated in the 200 (OK) response to the REGISTER request;
- a P-Asserted-Identity header field set to the SIP URI of the P-CSCF,which was inserted into the Path header field during the registration of the user to whose registration state the P-CSCF subscribes to; and
- a P-Charging-Vector header field with the "icid-value" header field parameter populated as specified in 3GPP TS 32.260 [17];

2) if the P-CSCF is located in the visited network, and local policy requires the application of IBCF capabilities in the visited network towards the home network, then the P-CSCF shall forward the request to an IBCF in the visited network;

3) if the P-CSCF is located in the home network, or if the P-CSCF is located in the visited network and local policy does not require the application of IBCF capabilities in the visited network towards the home network, determine the entry point of the home network (e.g., by using DNS services) and send the SUBSCRIBE request to that entry point, according to the procedures of RFC 3261 [26]; and

4) if the P-CSCF is located in the home network, then the P-CSCF shall forward the request to an I-CSCF in the home network.

NOTE: The subscription to reg event package is done once per private user identity.

Upon receipt of a 2xx response to the SUBSCRIBE request, the P-CSCF shall store the information for the so established dialog and the expiration time as indicated in the Expires header field of the received response.

If continued subscription is required the P-CSCF shall automatically refresh the subscription by the reg event package 600 seconds before the expiration time for a previously registered public user identity, either 600 seconds before the expiration time if the initial subscription was for greater than 1200 seconds, or when half of the time has expired if the initial subscription was for 1200 seconds or less. If a SUBSCRIBE request to refresh a subscription fails with a non-481 response, the P-CSCF shall still consider the original subscription valid for the duration of the most recently known "Expires" value according to RFC 3265 [28]. Otherwise, the P-CSCF shall consider the subscription invalid and start a new initial subscription according to RFC 3265 [28].

5.2.3A Void

5.2.4 Registration of multiple public user identities

Upon receipt of a 2xx response to the SUBSCRIBE request the P-CSCF shall maintain the generated dialog (identified by the values of the Call-ID header field, and the values of tags in To and From header fields).

Upon receipt of a NOTIFY request on the dialog which was generated during subscription to the reg event package of the user, the P-CSCF shall identify the public user identity as follows:

1) if no <wildcardedIDentity> subelement is included in the <registration> element, the public user identity is taken from the 'aor' attribute of the registration element; or

2) if a <wildcardedIdentity> sub element is included in the <registration> element, the wildcarded public user identity is taken from the <wildcardedIdentity> sub element. The wildcardcarded public user identity is treated as a public user identity in the procedures of this subclause.

Upon receipt of a NOTIFY request on the dialog which was generated during subscription to the reg event package of the user, the P-CSCF shall perform the following actions:

1) for each public user identity whose state attribute in the <registration> element is set to "active", i.e. registered; and
   - the state attribute within the <contact> sub-element is set to "active"; and

- the value of the <uri> sub-element inside the <contact> sub-element is set to the contact address of the user's UE; and

- the event attribute of that <contact> sub-element(s) is set to "registered" or "created";

the P-CSCF shall:

- bind the indicated public user identity as registered to the contact address of the respective user, including any associated display names, and any parameters associated with either the user or the identities of the user; and

- add the public user identity to the list of the public user identities that are registered for the user saved against the contact address;

2) for each public user identity whose state attribute in the <registration> element is set to "active", i.e. registered: and

- the state attribute within the <contact> sub-element is set to "terminated";

- the value of the <uri> sub-element inside the <contact> sub-element is set to the contact address of the user's UE; and

- the event attribute of that <contact> sub-element(s) is set to "deactivated", "expired", "probation", "unregistered", or "rejected";

the P-CSCF shall consider the binding between the indicated public user identity and the contact address and its related information as deregistered for this user, and shall release all stored information associated with the deregistered contact address and related information associated with this contact address; and

3) for each public user identity whose state attribute in the <registration> element is set to "terminated", i.e. deregistered; and for each <contact> sub-element, if

- the value of the <uri> sub-element inside each <contact> sub-element is set to the respective contact address of the user's UE; and

- the event attribute of each <contact> sub-element(s) is set to "deactivated", "expired", "probation", "unregistered", or "rejected";

the P-CSCF shall consider the indicated public user identity and all its contact addresses as deregistered for this UE, and shall release all stored information for these public user identity bound to the respective user and remove the public user identity from the list of the public user identities that are registered for the user.

If the P-CSCF is informed that all contact addresses that are registered with this P-CSCF and belonging to the user using its private user identity have been deregistered, i.e. the state attribute within each <contact> sub-element is set to "terminated", the P-CSCF shall either unsubscribe to the reg event package or let the subscription expire.

NOTE 1: Since there may be other active registrations of the user via other P-CSCFs, the S-CSCF will not terminate the by sending a NOTIFY request that includes the Subscription-State header set to "terminated".

If all public user identities, that were registered by the user using its private user identity, have been deregistered, the P-CSCF, will receive from the S-CSCF a NOTIFY request that may include the Subscription-State header field set to "terminated", as described in subclause 5.4.2.1.2. If the Subscription-State header field was not set to "terminated", the P-CSCF may either unsubscribe to the reg event package of the user or let the subscription expire.

NOTE 2: Upon receipt of a NOTIFY request with the Subscription-State header field set to "terminated", the P-CSCF considers the subscription to the reg event package terminated (i.e. as if the P-CSCF had sent a SUBSCRIBE request with an Expires header field containing a value of zero).

NOTE 3: There may be public user identities which are implicitly registered within the registrar (S-CSCF) of the user upon registration of one public user identity. The procedures in this subclause provide a mechanism to inform the P-CSCF about these implicitly registered public user identities.

5.2.5 Deregistration

5.2.5.1 User-initiated deregistration

When the P-CSCF receives a 200 (OK) response to a REGISTER request (sent according to subclause 5.2.2) sent by this UE, then the P-CSCF shall check each Contact header field included in the response. If there is a Contact header field that contains the contact address registered via this P-CSCF via the respective security associations or TLS sessions, and the value of the registration expiration interval value equals zero, then the P-CSCF shall:

1) if the "reg-id" header field parameter is not included in the Contact header field, remove the binding between the public user identity found in the To header field (together with the implicitly registered public user identities) and the contact address indicated in the Contact header field, from the registered public user identities list belonging to this UE and all related stored information;

1A) the "reg-id" header field parameter is included in the Contact header field, remove the binding between the public user identity found in the To header field (together with the implicitly registered public user identities) and the flow identified by the "reg-id" header field parameter and all its related stored information belonging to this UE;

2) if the "reg-id" header field parameter is not included in the Contact header field, check if the UE has left any other registered public user identity. When all of the public user identities that were registered by this UE are deregistered, the P-CSCF shall delete any security associations, TLS sessions or IP associations towards the UE, after the server transaction (as defined in RFC 3261 [26]) pertaining to this deregistration terminates; and

2A) if multiple registrations is used, check if the UE has left any other registered public user identity that is bound to this flow. When all of the public user identities that were registered and are bound to this flow are deregistered, the P-CSCF shall delete any security associations or TLS sessions associated with this flow, after the server transaction (as defined in RFC 3261 [26]) pertaining to this deregistration terminates.

NOTE 1: Upon receipt of a NOTIFY request with all <registration> element(s) having their state attribute set to "terminated" (i.e. all public user identities are deregistered) and the Subscription-State header field set to "terminated", the P-CSCF considers the subscription to the reg event package terminated (i.e. as if the P-CSCF had sent a SUBSCRIBE request with an Expires header field containing a value of zero).

NOTE 2: There is no requirement to distinguish a REGISTER request relating to a registration from that relating to a deregistration. For administration reasons the P-CSCF may distinguish such requests, however this has no impact on the SIP procedures.

NOTE 3: When the P-CSCF has sent the 200 (OK) response for the REGISTER request of the only public user identity currently registered with its associated set of implicitly registered public user identities using the respective security association or TLS session (i.e. no other public user identity belonging to the user is registered with this contact address the associated security association or TLS session), the P-CSCF removes the security association or TLS session established between the P-CSCF and the UE. Therefore further SIP signalling sent over this security association or TLS session (e.g. the NOTIFY request containing the deregistration event) will not reach the UE.

5.2.5.2 Network-initiated deregistration

Upon receipt of a NOTIFY request on the dialog which was generated during subscription to the reg event package of the UE, as described in subclause 5.2.3, including one or more <registration> element(s) which were registered by the UE with either:

- the state attribute within the <registration> element set to "terminated"; or

- the state attribute within the <registration> element set to "active" and the state attribute within each <contact> sub-element belonging to this UE and registered via this P-CSCF set to "terminated", and the event attribute within the <contact> sub-element belonging to this UE set either to "unregistered", or "rejected" or "deactivated";

the P-CSCF shall remove all stored information for these public user identities for this UE, and remove these public user identities from the list of the public user identities that are registered for the user.

NOTE 1: If all public user identities have been removed from the list of the public user identities registered via this P-CSCF, and the NOTIFY request indicates that the UE is still registered (e.g. via another P-CSCF), the P-CSCF can unsubscribe from the reg event package of the UE.

Upon receipt of a NOTIFY request with all <registration> element(s) having their state attribute set to "terminated" (i.e. all public user identities are deregistered) and the Subscription-State header field set to "terminated" or when all public user identities of the UE have been deregistered, the P-CSCF shall shorten any security associations or TLS sessions towards the UE.

NOTE 2: The security association between the P-CSCF and the UE is shortened to a value that will allow the NOTIFY request containing the deregistration event to reach the UE.

NOTE 3: When the P-CSCF receives the NOTIFY request with Subscription-State header field containing the value of "terminated", the P-CSCF considers the subscription to the reg event package terminated (i.e. as if the P-CSCF had sent a SUBSCRIBE request to the S-CSCF with an Expires header field containing a value of zero).

5.2.6 General treatment for all dialogs and standalone transactions excluding the REGISTER method

5.2.6.1 Introduction

The procedures of subclause 5.2.6 and its subclauses are general to all requests and responses, except those for the REGISTER method.

5.2.6.2 Determination of UE-originated or UE-terminated case

Upon receipt of an initial request or a target refresh request or a stand-alone transaction, the P-CSCF shall:

- perform the procedures for the UE-terminating case as described in subclause 5.2.6.4 if the request makes use of the information for UE-terminating calls, which was added to the Path header field entry of the P-CSCF during registration (see subclause 5.2.2), e.g. the message is received at a certain port or the topmost Route header field contains a specific user part or parameter;

- perform the procedures for the UE-originating case as described in subclause 5.2.6.3 if this information is not used by the request.

5.2.6.3 Requests initiated by the UE

5.2.6.3.1 General for all requests

When the P-CSCF receives an initial request for a dialog or a request for a standalone transaction from a UE that is not considered as priviledged sender, and:

- the request does not include any P-Preferred-Identity header field or none of the P-Preferred-Identity header fields included in the request matches any of the registered public user identities or any of the registered wildcarded public user identities, then the P-CSCF shall identify the originator and the served user of the request by the default public user identity;

- the request includes one or two P-Preferred-Identity header field(s) each of which matches a registered public user identity or a registered wildcarded public user identity, the P-CSCF shall identify the originator and the served user of the request by the public user identity from the first such P-Preferred-Identity header field; and

- the request includes two P-Preferred-Identity header fields, each of which matches a registered public user identity or a registered wildcarded public user identity, the P-CSCF shall identify the alternative identity of the originator of the request by the public user identity from the second such P-Preferred-Identity header field.

NOTE: When two identities are provided in the P-Preferred-Identity header fields, it is assumed that one is an alias of the other but P-CSCF does not have the information to verify this.

When the P-CSCF receives an initial request for a dialog or a request for a standalone transaction from a UE that is considered as priviledged sender, and the request:

a) does not include any P-Preferred-Identity header field, then the P-CSCF shall identify the served user of the request by the default public user identity;

b) includes a P-Preferred-Identity header field that does not match one of the registered public user identities or wildcarded public user identities, then the P-CSCF shall identify the served user of the request by the default public user identity; or

c) includes a P-Preferred-Identity header field that matches one of the registered public user identities or wildcarded public user identities, then the P-CSCF shall identify the served user of the request by the public user identity from the P-Preferred-Identity header field.

In addition, if the request from a UE that is considered as priviledged sender:

1) includes one or two P-Asserted-Identity header field(s) then the P-CSCF shall identify the originator of that request by the public user identity from the first P-Asserted-Identity header field; or

2) does not include a P-Asserted-Identity header field then the P-CSCF shall identify the originator of that request by the same identity that has been determined for the served user according to steps a), b), and c) above.

NOTE 1: If no security association was set-up during registration, the P-CSCF identifies the originator and served user of the request by using the IP association information stored during the registration for which it holds the list of registered public user identities.

NOTE 2: The contents of the From header field do not form any part of this decision process.

NOTE 3: The display-name portion of the P-Preferred-Identity header field and the registered public user identities is not included in the comparison to determine a match.

NOTE 4: The P-CSCF can determine if the UE is considered as priviledged sender based on parameters stored during registration (see subclause 5.2.2.1), if available. Otherwise the P-CSCF can make the determination based on local configuration.

5.2.6.3.2 Void

5.2.6.3.2A Abnormal cases

When the P-CSCF is unable to forward the request to the next hop by the Route header fields, as determined by one of the following:

- there is no response to the service request and its retransmissions by the P-CSCF; or

- by unspecified means available to the P-CSCF;

and:

- the P-CSCF supports restoration procedures;

then the P-CSCF:

1) shall reject the request by returning a 504 (Server Time-out) response to the UE;

2) shall assume that the UE supports version 1 of the XML Schema for the 3GPP IM CN subsystem XML body if support for the 3GPP IM CN subsystem XML body as described in subclause 7.6 in the Accept header field is not indicated; and

3) shall include in the 504 (Server Time-out) response:

   - a Content-Type header field with the value set to associated MIME type of the 3GPP IM CN subsystem XML body as described in subclause 7.6.1;

- a P-Asserted-Identity header field set to the value of the SIP URI of the P-CSCF included in the Path header field during the registration of the user whose UE sent the request causing this response (see subclause 5.2.2.1); and

- a 3GPP IM CN subsystem XML body containing:

  a) an <ims-3gpp> element with the "version" attribute set to "1" and with an <alternative-service> child element, set to the parameters of the alternative service;

     i) a <type> child element, set to "restoration" (see table 7.7AA) to indicate that restoration procedures are supported;

     ii) a <reason> child element, set to an operator configurable reason; and

     iii) an <action> child element, set to "initial-registration" (see table 7.7AB).

NOTE: These procedures do not prevent the usage of unspecified reliability or recovery techniques above and beyond those specified in this subclause.

5.2.6.3.3 Initial request for a dialog

When the P-CSCF receives from the UE an initial request for a dialog, and a service route value list exists for the served user of the request, the P-CSCF shall:

1) remove its own SIP URI from the top of the list of Route header fields;

2) verify that the resulting list of Route header fields matches the list of URIs received in the Service-Route header field (during the last successful registration or re-registration). This verification is done on a per URI basis, not as a whole string. If the verification fails, then the P-CSCFshall either:

   a) return a 400 (Bad Request) response; the P-CSCF shall not forward the request, and shall not continue with the execution of steps 2 onwards; or

   b) replace the preloaded Route header field value in the request with the value of the Service-Route header field received during the last 200 (OK) response for the last successful registration or reregistration;

3) if the P-CSCF is located in the visited network, and local policy requires the application of IBCF capabilities in the visited network towards the home network, select an IBCF in the visited network and add the URI of the selected IBCF to the topmost Route header field;

NOTE 1: It is implementation dependent as to how the P-CSCF obtains the address of the IBCF exit point.

4) add its own address to the Via header field. The P-CSCF Via header field entry is built in a format that contains the port number of the P-CSCF in accordance with the procedures of RFC 3261 [26], and either:

   a) the P-CSCF FQDN that resolves to the IP address, or

   b) the P-CSCF IP address;

5) when adding its own SIP URI to the Record-Route header field, build the P-CSCF SIP URI in a format that contains the port number of the P-CSCF where it awaits subsequent requests from the called party, and either:

   a) the P-CSCF FQDN that resolves to the IP address; or

   b) the P-CSCF IP address.

   If the Contact header field in the request contains an "ob" SIP URI parameter, the P-CSCF shall add a flow token and the "ob" SIP URI parameter to its SIP URI;

NOTE 2: The inclusion of these values in the Record-Route header field will ensure that all subsequent mid dialog requests destined for the UE are sent over the same IMS flow over which the initial dialog-forming request was received.

5A) if a P-Private-Network-Indication header field is included in the request, check whether the information saved during registration or from configuration allows the receipt of private network traffic from this source. If private network traffic is allowed, the P-CSCF shall check whether the received domain name in any included P-

Private-Network-Indication header field in the request is the same as the domain name associated with that saved information. If private network traffic is not allowed, or the received domain name does not match, then the P-CSCF shall remove the P-Private-Network-Indication header field;

5B) if the served user of the request is understood from information saved during registration or from configuration to always send and receive private network traffic from this source, insert a P-Private-Network-Indication header field containing the domain name associated with that saved information;

5C) if the request is originated from a UE which the P-CSCF considers as priviledged sender, keep the P-Asserted-Identity header field unchnanged if one was received, or include the originator of the request in the P-Asserted-Identity header field if no P-Asserted-Identity header field was received. In addition remove any P-Preferred-Identity header field, include the served user of the request in the P-Served-User header field as specified in RFC 5502 [133] and skip step 6) below;

NOTE 3: The P-CSCF can determine if the UE is considered as priviledged senderbased on parameters stored during registration (see subclause 5.2.2.1), if available. Otherwise the P-CSCF can make the determination based on local configuration.

6) remove any P-Preferred-Identity header field or P-Asserted-Identity header field, if present, and insert a P-Asserted-Identity header field with the value identifying the originator of the request and the value of the alternative identity of the originator of the request, if identified (see subclause 5.2.6.3.1), including the display name if previously stored during registration representing the served user of the request;

6A) if the identity of the served user of the request was taken from P-Preferred-Identity header field by it matching a registered wildcarded public user identity and the P-CSCF supports the SIP P-Profile-Key private header extension, include the wildcarded public user identity value in the P-Profile-Key header field as defined in RFC 5002 [97];

7) add a P-Charging-Vector header field with the "icid-value" header field parameter populated as specified in 3GPP TS 32.260 [17]; and

8) if the request is an INVITE request, save the Contact, CSeq and Record-Route header field values received in the request such that the P-CSCF is able to release the session if needed. If the Contact header field in the INVITE request contains a GRUU but itdoes not include an "ob" SIP URI parameter as defined in RFC 5626 [92], the P-CSCF shall save the GRUU received in the Contact header field of the request and associate that GRUU with the UE IP address and the UE port such that the P-CSCF is able to release the session if needed. The UE port used for the association is determined as follows:

- if IMS AKA or SIP digest with TLS is being used as a security mechanism, the UE protected server port for the security association on which the request was received; or

- if SIP digest without TLS, NASS-IMS bundled authentication or GPRS-IMS-Bundled Authentication is being used as a security mechanism, the UE unprotected port on which the request was received;

before forwarding the request, based on the topmost Route header field, in accordance with the procedures of RFC 3261 [26].

NOTE 4: According to RFC 5626 [92], an approach such as having the Edge Proxy adds a Record-Route header field with a flow token is one way to ensure that mid-dialog requests are routed over the correct flow.

5.2.6.3.4 Responses to an initial request for a dialog

When the P-CSCF receives any 1xx or 2xx response to the above request, the P-CSCF shall:

1) store the values received in the P-Charging-Function-Addresses header field;

2) store the list of Record-Route header fields from the received response;

3) store the dialog ID and associate it with the private user identity and public user identity involved in the session;

4) if a security association or TLS session exists, in the response rewrite its own Record Route entry to its own SIP URI that contains the protected server port number of the security association or TLS session established from the UE to the P-CSCF and either:

a) the P-CSCF FQDN that resolves to the IP address of the security association or TLS session established from the UE to the P-CSCF; or

b) the P-CSCF IP address of the security association or TLS session established from the UE to the P-CSCF;

NOTE: The P-CSCF associates two ports, a protected client port and a protected server port, with each pair of security associations. For details on the selection of the protected port values see 3GPP TS 33.203 [19].

5) if SIP digest without TLS, NASS-IMS bundled authentication or GPRS-IMS-Bundled authentication is used, in the response rewrite its own Record-Route entry to its own SIP URI that contains an unprotected server port number where the P-CSCF expects subsequent requests from the UE; and

6) if the response corresponds to an INVITE request, save the Contact, From, To and Record-Route header field values received in the response such that the P-CSCF is able to release the session if needed;

before forwarding the response to the UE in accordance with the procedures of RFC 3261 [26].

5.2.6.3.5 Target refresh request for a dialog

When the P-CSCF receives from the UE a target refresh request for a dialog, the P-CSCF shall:

1) verify if the request relates to a dialog in which the originator of the request is involved:

a) if the request does not relates to an existing dialog in which the originator is involved, then the P-CSCF shall answer the request by sending a 403 (Forbidden) response back to the originator. The P-CSCF will not forward the request. No other actions are required; or

b) if the request relates to an existing dialog in which the originator is involved, then the P-CSCF shall continue with the following steps;

1A) remove its own SIP URI from the top of the list of Route header fields;

2) verify that the resulting list of Route header fields matches the list of Record-Route header fields constructed by inverting the order of the stored list of Record-Route header fields and removing its Record-Route header field value from the list. This verification is done on a per URI basis, not as a whole string. If the verification fails, then the P-CSCF shall either:

a) return a 400 (Bad Request) response; the P-CSCF shall not forward the request, and shall not continue with the execution of steps 3 onwards; or

b) replace the Route header field value in the request with the list of Record-Route header fields constructed by inverting the order of the stored list of Record-Route header fields and removing its Record-Route header value from the list;

3) add its own address to the Via header field. The P-CSCF Via header field entry is built in a format that contains the port number of the P-CSCF where it awaits the responses to come, and either:

a) the P-CSCF FQDN that resolves to the IP address, or

b) the P-CSCF IP address; and

4) void

5) for INVITE dialogs (i.e. dialogs initiated by an INVITE request), replace the saved Contact and Cseq header field values received in the request such that the P-CSCF is able to release the session if needed. If the Contact header field in the INVITE request contains a GRUU but the Contact header field does not include an "ob" SIP URI parameter as defined in RFC 5626 [92], the P-CSCF shall save the GRUU received in the Contact header field of the request and associate that GRUU with the UE IP address and the UE port such that the P-CSCF is able to release the session if needed. The UE port used for the association is determined as follows:

- if IMS AKA or SIP digest with TLS is being used as a security mechanism, the UE protected server port for the security association on which the request was received; or

- if SIP digest without TLS, NASS-IMS bundled authentication or GPRS-IMS-Bundled Authentication is being used as a security mechanism, the UE unprotected port on which the request was received;

NOTE: The replaced Contact header field value is valid only if a 1xx or 2xx response will be received for the request. In other cases the old value is still valid.

before forwarding the request, based on the topmost Route header field, in accordance with the procedures of RFC 3261 [26].

5.2.6.3.6 Responses to a target refresh request for a dialog

When the P-CSCF receives a 1xx or 2xx response to the above request, the P-CSCF shall:

1) if a security association or TLS session exists, rewrite the the address and port number of its own Record Route entry to the same value as for the response to the initial request for the dialog; and

2) replace the saved Contact header field value received in the response such that the P-CSCF is able to release the session if needed;

before forwarding the response to the UE in accordance with the procedures of RFC 3261 [26].

5.2.6.3.7 Request for a standalone transaction

When the P-CSCF receives from the UE the request for a standalone transaction, and a service route value list exists for the served user of the request, the P-CSCF shall:

1) remove its own SIP URI from the top of the list of Route header fields;

2) verify that the resulting list of Route header fields matches the list of URIs received in the Service-Route header field (during the last successful registration or re-registration). This verification is done on a per URI basis, not as a whole string. If the verification fails, then the P-CSCF shall either:

   a) return a 400 (Bad Request) response; the P-CSCF shall not forward the request, and shall not continue with the execution of steps 3 onwards; or

   b) replace the preloaded Route header field value in the request with the one received during the last registration in the Service-Route header field of the 200 (OK) response;

3) if the P-CSCF is located in the visited network, and local policy requires the application of IBCF capabilities in the visited network towards the home network, select an IBCF in the visited network and add the URI of the selected IBCF to the topmost Route header field;

NOTE 1: It is implementation dependent as to how the P-CSCF obtains the address of the IBCF exit point.

3A) if the request is originated from a UE which the P-CSCF considers as priviledged sender, keep the P-Asserted-Identity header field unchnanged if one was received, or include the originator of the request in the P-Asserted-Identity header field if no P-Asserted-Identity header field was received. In addition remove any P-Preferred-Identity header field, include the served user of the request in the P-Served-User header field as specified in RFC 5502 [133] and skip step 4) below;

NOTE 2: The P-CSCF can determine if the UE is considered as priviledged sender based on parameters stored during registration (see subclause 5.2.2.1), if available. Otherwise the P-CSCF can make the determination based on local configuration.

4) remove any P-Preferred-Identity header field or P-Asserted-Identity header field, if present, and insert P-Asserted-Identity header fields with the value identifying the originator of the request and the value of the alternative identity of the originator of the request, if identified (see subclause 5.2.6.3.1), including the display name if previously stored during registration, representing the served user of the request;

4A) if the identity of the served user of the request was taken from P-Preferred-Identity header field by it matching a registered wildcarded public user identity and the P-CSCF supports the SIP P-Profile-Key private header extension, include the wildcarded public user identity value in the P-Profile-Key header field as defined in RFC 5002 [97];

4B) if a P-Private-Network-Indication header field is included in the request, check whether the information saved during registration or from configuration allows the receipt of private network traffic from this source. If private network traffic is allowed, the P-CSCF shall check whether the received domain name in any included P-Private-Network-Indication header field in the request is the same as the domain name associated with that saved

information. If private network traffic is not allowed, or the received domain name does not match, then the P-CSCF shall remove the P-Private-Network-Indication header field;

4C) if the served user of the request is understood from information saved during registration or from configuration to always send and receive private network traffic from this source, insert a P-Private-Network-Indication header field containing the domain name associated with that saved information;

5) add a P-Charging-Vector header field with the "icid-value" header field parameter populated as specified in 3GPP TS 32.260 [17];

before forwarding the request, based on the topmost Route header field, in accordance with the procedures of RFC 3261 [26].

5.2.6.3.8 Responses to a request for a standalone transaction

When the P-CSCF receives any response to the above request, the P-CSCF shall:

1) store the values received in the P-Charging-Function-Addresses header field;

before forwarding the response to the UE in accordance with the procedures of RFC 3261 [26].

5.2.6.3.9 Subsequent request other than a target refresh request

When the P-CSCF receives from the UE subsequent requests other than a target refresh request (including requests relating to an existing dialog where the method is unknown), the P-CSCF shall:

1) verify if the request relates to a dialog in which the originator of the request is involved:

   a) if the request does not relates to an existing dialog in which the originator is involved, then the P-CSCF shall answer the request by sending a 403 (Forbidden) response back to the originator. The P-CSCF will not forward the request. No other actions are required; or

   b) if the request relates to an existing dialog in which the originator is involved, then the P-CSCF shall continue with the following steps;

1A) remove its own SIP URI from the top of the list of Route header fields;

2) verify that the resulting list of Route header fields matches the list of Record-Route header fields constructed by inverting the order of the stored list of Record-Route header fields and removing its Record-Route header field from the list. This verification is done on a per URI basis, not as a whole string. If the verification fails, then the P-CSCF shall either:

   a) return a 400 (Bad Request) response; the P-CSCF shall not forward the request, and shall not continue with the execution of steps 3 onwards; or

   b) replace the Route header field value in the request with the list of Record-Route header fields constructed by inverting the order of the stored list of Record-Route header fields and removing its Record-Route header field from the list;

3) for dialogs that are not INVITE dialogs, add a P-Charging-Vector header field with the "icid-value" header field parameter populated as specified in 3GPP TS 32.260 [17]; and

4) for INVITE dialogs, replace the saved Cseq header field value received in the request such that the P-CSCF is able to release the session if needed;

before forwarding the request (based on the topmost Route header field), in accordance with the procedures of RFC 3261 [26].

5.2.6.3.10 Responses to a subsequent request other than a target refresh request

Void

5.2.6.3.11 Request for an unknown method that does not relate to an existing dialog

When the P-CSCF receives from the UE the request for an unknown method (that does not relate to an existing dialog), and a service route value list exists for the served user of the request, the P-CSCF shall:

1) verify that the list of URIs received in the Service-Route header field (during the last successful registration or re-registration) is included, preserving the same order, as a subset of the preloaded Route header fields in the received request. This verification is done on a per URI basis, not as a whole string. If the verification fails, then the P-CSCF shall either:

   a) return a 400 (Bad Request) response; the P-CSCF shall not forward the request, and shall not continue with the execution of steps 2 onwards; or

   b) replace the Route header field value in the request with the one received during the last registration in the Service-Route header field of the 200 (OK) response;

2) if the P-CSCF is located in the visited network, and local policy requires the application of IBCF capabilities in the visited network towards the home network, then the P-CSCF shall select an IBCF in the visited network and add the URI of the selected IBCF to the topmost Route header field;

NOTE 1: It is implementation dependent as to how the P-CSCF obtains the address of the IBCF exit point.

2A) if the request is originated from a UE which the P-CSCF considers as priviledged sender, keep the P-Asserted-Identity header field unchnanged if one was received, or include the originator of the request in the P-Asserted-Identity header field if no P-Asserted-Identity header field was received. In addition remove any P-Preferred-Identity header field, include the served user of the request in the P-Served-User header field as specified in RFC 5502 [133] and skip step 3) below;

NOTE 2: The P-CSCF can determine if the UE is considered priviledged sender based on parameters stored during registration (see subclause 5.2.2.1), if available. Otherwise the P-CSCF can make the determination based on local configuration.

3) remove any P-Preferred-Identity header field or P-Asserted-Identity header field, if present, and insert a P-Asserted-Identity header fields with the value identifying the originator of the request and the value of the alternative identity of the originator of the request, if identified (see subclause 5.2.6.3.1), including the display name if previously stored during registration, representing the served user of the request; and

3A) if the identity of the served user of the request was taken from P-Preferred-Identity header field by it matching a registered wildcarded public user identity and the P-CSCF supports the SIP P-Profile-Key private header extension, include the wildcarded public user identity value in the P-Profile-Key header field as defined in RFC 5002 [97];

before forwarding the request, based on the topmost Route header field, in accordance with the procedures of RFC 3261 [26].

5.2.6.3.12 Responses to a request for an unknown method that does not relate to an existing dialog

Void.

5.2.6.4 Requests terminated by the UE

5.2.6.4.1 Void

5.2.6.4.2 Void

5.2.6.4.3 Initial request for a dialog

When the P-CSCF receives, destined for the UE, an initial request for a dialog, prior to forwarding the request, the P-CSCF shall:

1) if an indication has been received from the PCRF that the signalling bearer to the UE is lost, and has not recovered, reject the request by sending 503 (Service Unavailable) response);

NOTE 1: The signalling bearer can be considered as recovered by the P-CSCF when the registration timer expires in P-CSCF and the user is de-registered from the IM CN subsystem, a new REGISTER request from the UE is received providing an indication to the P-CSCF that the signalling bearer to that user has become available or a P-CSCF implementation dependent function which discovers that the signalling bearer is available to the UE.

NOTE 2: The Retry-After header field value is set based on operator policy.

2) convert the list of Record-Route header field values into a list of Route header field values and save this list of Route header fields;

3) if the request is an INVITE request, save a copy of the Contact, CSeq and Record-Route header field values received in the request such that the P-CSCF is able to release the session if needed;

4) if a security association or TLS session exists, when adding its own SIP URI to the top of the list of Record-Route header fields and save the list, build the P-CSCF SIP URI in a format that contains the protected server port number of the security association or TLS session established from the UE to the P-CSCF and either:

   a) the P-CSCF FQDN that resolves to the IP address of the security association or TLS session established from the UE to the P-CSCF; or

   b) the P-CSCF IP address of the security association or TLS session established from the UE to the P-CSCF;

5) if SIP digest without TLS, NASS-IMS bundled authentication or GPRS-IMS-Bundled authentication is used, when adding its own SIP URI to the top of the list of Record-Route header fields and saving the list, build the P-CSCF URI in a format that contains an unprotected server port number where the P-CSCF expects subsequent requests from the UE;

6) if a security association or TLS session exists, when adding its own address to the top of the received list of Via header fields and save the list, build the P-CSCF Via header field entry in a format that contains the protected server port number of the security association or TLS session established from the UE to the P-CSCF and either:

   a) the P-CSCF FQDN that resolves to the IP address of the security association or TLS session established from the UE to the P-CSCF; or

   b) the P-CSCF IP address of the security association or TLS session established from the UE to the P-CSCF;

NOTE 3: The P-CSCF associates two ports, a protected client port and a protected server port, with each pair of security associations or TLS session. For details of the usage of the two ports see 3GPP TS 33.203 [19].

7) if SIP digest without TLS, NASS-IMS bundled authentication or GPRS-IMS-Bundled athentication is used, when adding its own address to the top of the received list of Via header fields and saving the list, build the P-CSCF Via header field entry in a format that contains an unprotected server port number where the P-CSCF expects responses to the current request from the UE;

7A) if the recipient of the request is understood from information saved during registration or from configuration to always send and receive private network traffic from this source, remove the P-Private-Network-Indication header field containing the domain name associated with that saved information;

8) store the values received in the P-Charging-Function-Addresses header field;

9) store the "icid-value" header field parameter received in the P-Charging-Vector header field; and

10) save a copy of the P-Called-Party-ID header field;

before forwarding the request to the UE either in accordance with the procedures of RFC 3261 [26] or as specified in RFC 5626 [92].

5.2.6.4.4 Responses to an initial request for a dialog

When the P-CSCF receives any 1xx or 2xx response to the above request, the P-CSCF shall:

0A) if the response is originated from a UE which the P-CSCF considers as priviledged sender, remove any P-Preferred-Identity header field, and skip step 1) below;

NOTE: The P-CSCF can determine if the UE is considered priviledged sender based on parameters stored during registration (see subclause 5.2.2.1), if available. Otherwise the P-CSCF can make the determination based on local configuration.

1) remove any P-Preferred-Identity header field or P-Asserted-Identity header field, if present, and insert a P-Asserted-Identity header field with the saved public user identity from the P-Called-Party-ID header field that was received in the request, plus the display name if previously stored during registration, representing the originator of the response;

2) verify that the list of Via header fields matches the saved list of Via header fields received in the request corresponding to the same dialog, including the P-CSCF Via header field value. This verification is done on a per Via header field value basis, not as a whole string. If the verification fails, then the P-CSCF shall either:

   a) discard the response; or

   b) replace the Via header field values with those received in the request;

3) verify that the list of URIs received in the Record-Route header field of the request corresponding to the same dialog is included, preserving the same order, as a subset of the Record-Route header field list of this response. This verification is done on a per URI basis, not as a whole string.

   If the verification fails, then the P-CSCF shall either:

   a) discard the response; or

   b) replace the Record-Route header field values with those received in the request, and if a security association or TLS session exists, add its own Record-Route entry with its own SIP URI with the port number where it awaits subsequent requests from the calling party. The P-CSCF shall include in the Record-Route header field either:

      - the P-CSCF FQDN that resolves to its IP address; or

      - the P-CSCF IP address.

      The P-CSCF shall remove the "comp" SIP URI parameter from the Record-Route header field.

   If the verification is successful, the P-CSCF shall rewrite its own Record-Route entry to its SIP URI in a format that contains the port number where it awaits subsequent requests from the calling party. The P-CSCF shall include in the Record-Route header field either:

   a) the P-CSCF FQDN that resolves to its IP address; or

   b) the P-CSCF IP address.

   The P-CSCF shall remove the "comp" SIP URI parameter from the Record-Route header field;

   When adding its SIP URI to the Record-Route header field, the P-CSCF shall also copy the flow token and the "ob" SIP URI parameter from the Route header field of the initial dialog-forming request destined for the UE to its SIP URI, if the Route header field contained these values;

4) store the dialog ID and associate it with the private user identity and public user identity involved in the session; and

5) if the response corresponds to an INVITE request, save the Contact, To, From and Record-Route header field value received in the response such that the P-CSCF is able to release the session if needed. If the Contact header field in the response to the INVITE request contains a GRUU and the INVITE request was not sent over a bidirectional flow as defined in RFC 5626 [92], the P-CSCF shall save the GRUU received in the Contact header field of the response and associate that GRUU with the UE IP address and the UE port, for the security association on which the INVITE request was sent such that the P-CSCF is able to release the session if needed. The UE port used for the association is determined as follows:

   - if IMS AKA or SIP digest with TLS is being used as a security mechanism, the UE protected server port for the security association on which the request was received; or

- if SIP digest without TLS, NASS-IMS bundled authentication or GPRS-IMS-Bundled Authentication is being used as a security mechanism, the UE unprotected port on which the request was received;

before forwarding the response in accordance with the procedures of RFC 3261 [26].

When the P-CSCF receives any other response to the above request, the P-CSCF shall:

1) verify that the list of Via header fields matches the saved list of Via header fields received in the request corresponding to the same dialog, including the P-CSCF Via header field value. This verification is done on a per Via header field value basis, not as a whole string. If these lists do not match, then the P-CSCF shall either:

   a) discard the response; or

   b) replace the Via header field values with those received in the request;

before forwarding the response in accordance with the procedures of RFC 3261 [26].

5.2.6.4.5 Target refresh request for a dialog

When the P-CSCF receives, destined for the UE, a target refresh request for a dialog, prior to forwarding the request, the P-CSCF shall:

1) if a security association or TLS session exists, add its own address to the top of the received list of Via header fields and save the list. The P-CSCF Via header field entry is built in a format that contains the protected server port number of the security association or TLS session established from the UE to the P-CSCF and either:

   a) the P-CSCF FQDN that resolves to the IP address of the security association or TLS session established from the UE to the P-CSCF; or

   b) the P-CSCF IP address of the security association or TLS session established from the UE to the P-CSCF;

NOTE 1: The P-CSCF associates two ports, a protected client port and a protected server port, with each pair of security associations or TLS session. For details of the usage of the two ports see 3GPP TS 33.203 [19].

2) if SIP digest without TLS, NASS-IMS bundled authentication or GPRS-IMS-Bundled authentication is used, when adding its own address to the top of the received list of Via header fields and saving the list, build the P-CSCF Via header field entry in a format that contains an unprotected server port number where the P-CSCF expects responses to the current request from the UE;

3) if a security association or TLS session exists, when adding its own SIP URI to the top of the list of Record-Route header fields and save the list, build the P-CSCF SIP URI in a format that contains the protected server port number of the security association or TLS session established from the UE to the P-CSCF and either:

   a) the P-CSCF FQDN that resolves to the IP address of the security association or TLS session established from the UE to the P-CSCF; or

   b) the P-CSCF IP address of the security association or TLS session established from the UE to the P-CSCF;

4) if SIP digest without TLS, NASS-IMS bundled authentication or GPRS-IMS-Bundled authentication is used, when adding its own SIP URI to the top of the list of Record-Route header fields and saving the list, build the P-CSCF URI in a format that contains an unprotected server port number where the P-CSCF expects subsequent requests from the UE; and

5) for INVITE dialogs, replace the saved Contact and Cseq header field values received in the request such that the P-CSCF is able to release the session if needed;

NOTE 2: The replaced Contact header field value is valid only if a 1xx or 2xx response will be received for the request. In other cases the old value is still valid.

before forwarding the request to the UE in accordance with the procedures of either RFC 3261 [26] or RFC 5626 [92].

5.2.6.4.6 Responses to a target refresh request for a dialog

When the P-CSCF receives a 1xx or 2xx response to the above request, the P-CSCF shall:

1) verify that the list of Via header fields matches the saved list of Via header fields received in the request corresponding to the same dialog, including the P-CSCF Via header field value. This verification is done on a per Via header field value basis, not as a whole string. If the verification fails, then the P-CSCF shall either:

   a) discard the response; or

   b) replace the Via header field values with those received in the request;

2) if a security association or TLS session exists, rewrite its own Record-Route entry to the same value as for the response to the initial request for the dialog and remove the "comp" SIP URI parameter; and

3) replace the saved Contact header field value received in the response such that the P-CSCF is able to release the session if needed. If the Contact header field in the response to the target refresh request for a dialog contains a GRUU and target refresh request for a dialog was not sent over a bidirectional flow, the P-CSCF shall save the GRUU received in the Contact header field of the response and associate That GRUU with the UE IP address and the UE port, for the security association on which the target refresh request for a dialog was sent such that the P-CSCF is able to release the session if needed. The UE port used for the association is determined as follows:

   - if IMS AKA or SIP digest with TLS is being used as a security mechanism, the UE protected server port for the security association on which the request was received; or

   - if SIP digest without TLS, NASS-IMS bundled authentication or GPRS-IMS-Bundled Authentication is being used as a security mechanism, the UE unprotected port on which the request was received;

before forwarding the response in accordance with the procedures of RFC 3261 [26].

When the P-CSCF receives any other response to the above request, the P-CSCF shall:

1) verify that the list of Via header fields matches the saved list of Via header fields received in the request corresponding to the same dialog, including the P-CSCF Via header field value. This verification is done on a per Via header field value basis, not as a whole string. If the verification fails, then the P-CSCF shall either:

   a) discard the response; or

   b) replace the Via header field values with those received in the request; and

2) if a security association or TLS session exists, rewrite the IP address and the port number of its own Record-Route entry to the IP address and the port number where it awaits subsequent requests from the calling party and remove the "comp" SIP URI parameter;

before forwarding the response in accordance with the procedures of RFC 3261 [26].

5.2.6.4.7 Request for a standalone transaction

When the P-CSCF receives, destined for the UE, a request for a standalone transaction, or a request for an unknown method (that does not relate to an existing dialog), prior to forwarding the request, the P-CSCF shall:

1) if an indication has been received from the PCRF that the signalling bearer to the UE is lost, and has not recovered, reject the request by sending 503 (Service Unavailable) response);

NOTE 1: The signalling bearer can be considered as recovered by the P-CSCF when the registration timer expires in P-CSCF and the user is de-registered from the IM CN subsystem, a new REGISTER request from the UE is received providing an indication to the P-CSCF that the signalling bearer to that user has become available or a P-CSCF implementation dependent function which discovers that the signalling bearer is available to the UE.

NOTE 2: The Retry-After header field value is set based on operator policy.

2) if a security association or TLS session exists, add its own address to the top of the received list of Via header fields and save the list. The P-CSCF Via header field entry is built in a format that contains the protected server port number of the security association or TLS session established from the UE to the P-CSCF and either:

   a) the P-CSCF FQDN that resolves to the IP address of the security association or TLS session established from the UE to the P-CSCF; or

b) the P-CSCF IP address of the security association or TLS session established from the UE to the P-CSCF;

NOTE 3: The P-CSCF associates two ports, a protected client port and a protected server port, with each pair of security associations or TLS session. For details of the usage of the two ports see 3GPP TS 33.203 [19].

3) if SIP digest without TLS, NASS-IMS bundled authentication or GPRS-IMS-Bundled authentication is used, when adding its own address to the top of the received list of Via header fields and saving the list, build the P-CSCF Via header field entry in a format that contains an unprotected server port number where the P-CSCF expects responses to the current request from the UE;

3A) if the recipient of the request is understood from information saved during registration or from configuration to always send and receive private network traffic from this source, remove the P-Private-Network-Indication header field containing the domain name associated with that saved information;

4) store the values received in the P-Charging-Function-Addresses header field;

5) store the "icid-value" header field parameter received in the P-Charging-Vector header field; and

6) save a copy of the P-Called-Party-ID header field;

before forwarding the request to the UE either in accordance with the procedures of RFC 3261 [26] or as specified in RFC 5626 [92].

5.2.6.4.8 Responses to a request for a standalone transaction

When the P-CSCF receives any response to the above request, the P-CSCF shall:

1) verify that the list of Via header fields matches the saved list of Via header fields received in the request corresponding to the same dialog, including the P-CSCF Via header field value. This verification is done on a per Via header field value basis, not as a whole string. If these lists do not match, then the P-CSCF shall either:

   a) discard the response; or

   b) replace the Via header field values with those received in the request;

1A) if the response is originated from a UE which the P-CSCF considers as priviledged sender, remove any P-Preferred-Identity header field, and skip step 2) below; and

NOTE: The P-CSCF can determine if the UE is considered priviledged sender based on parameters stored during registration (see subclause 5.2.2.1), if available. Otherwise the P-CSCF can make the determination based on local configuration.

2) remove any P-Preferred-Identity header field or P-Asserted-Identity header field, if present, and insert an P-Asserted-Identity header field with the saved public user identity from the P-Called-Party-ID header field of the request, plus the display name if previously stored during registration, representing the originator of the response;

before forwarding the response in accordance with the procedures of RFC 3261 [26].

5.2.6.4.9 Subsequent request other than a target refresh request

When the P-CSCF receives, destined for the UE, a subsequent request for a dialog that is not a target refresh request (including requests relating to an existing dialog where the method is unknown), prior to forwarding the request, the P-CSCF shall:

1) if a security association or TLS session exists, add its own address to the top of the received list of Via header fields and save the list The P-CSCF Via header field entry is built in a format that contains the protected server port number of the security association or TLS session established from the UE to the P-CSCF and either:

   a) the P-CSCF FQDN that resolves to the IP address of the security association or TLS session established from the UE to the P-CSCF; or

   b) the P-CSCF IP address of the security association or TLS session established from the UE to the P-CSCF;

NOTE: The P-CSCF associates two ports, a protected client port and a protected server port, with each pair of security associations or TLS session. For details of the usage of the two ports see 3GPP TS 33.203 [19].

2) if SIP digest without TLS, NASS-IMS bundled authentication or GPRS-IMS-Bundled authentication is used, when adding its own address to the top of the received list of Via header fields and saving the list, build the P-CSCF Via header field entry in a format that contains an unprotected server port number where the P-CSCF expects responses to the current request from the UE;

3) store the "icid-value" header field parameter from P-Charging-Vector header field; and

4) for INVITE dialogs, replace the saved Cseq header field value received in the request such that the P-CSCF is able to release the session if needed;

before forwarding the request to the UE either in accordance with the procedures of RFC 3261 [26] or as specified in RFC 5626 [92].

5.2.6.4.10 Responses to a subsequent request other than a target refresh request

When the P-CSCF receives any response to the above request, the P-CSCF shall:

1) verify that the list of Via header fields matches the saved list of Via header fields received in the request corresponding to the same dialog, including the P-CSCF Via header field value. This verification is done on a per Via header field value basis, not as a whole string. If these lists do not match, then the P-CSCF shall either:

   a) discard the response; or

   b) replace the Via header field values with those received in the request;

before forwarding the response in accordance with the procedures of RFC 3261 [26].

5.2.6.4.11 Request for an unknown method that does not relate to an existing dialog

Void.

5.2.6.4.12 Responses to a request for an unknown method that does not relate to an existing dialog

Void.

5.2.7 Initial INVITE

5.2.7.1 Introduction

In addition to following the procedures for initial requests defined in subclause 5.2.6, initial INVITE requests also follow the procedures of this subclause.

5.2.7.2 UE-originating case

When the P-CSCF receives from the UE an INVITE request for which resource authorization procedure is required, if it receives from the IP-CAN (e.g. via PCRF) an indication that the requested resources for the multimedia session being established cannot be granted and this indication does not provide an acceptable bandwidth information, the P-CSCF shall return a 503 (Service Unavailable) response to the received INVITE request. Depending on local operator policy, this 503 (Service Unavailable) response may include a Retry-After header indicating how long the UE shall wait before it can reattempt the request.

When the P-CSCF receives from the UE an INVITE request, the P-CSCF may require the periodic refreshment of the session to avoid hung states in the P-CSCF. If the P-CSCF requires the session to be refreshed, then the P-CSCF shall apply the procedures described in RFC 4028 [58] clause 8.

NOTE 1: Requesting the session to be refreshed requires support by at least one of the UEs. This functionality cannot automatically be granted, i.e. at least one of the involved UEs needs to support it.

The P-CSCF shall respond to all INVITE requests with a 100 (Trying) provisional response.

If received from the IP-CAN, the P-CSCF shall also include the access-network-charging-info parameter (e.g. received via the PCRF, over the Rx or Gx interfaces) in the P-Charging-Vector header field in the first request originated by the UE that traverses the P-CSCF, as soon as the charging information is available in the P-CSCF, e.g., after the local resource reservation is complete. Typically, this first request is an UPDATE request if the remote UA supports the "integration of resource management in SIP" extension or a re-INVITE request if the remote UA does not support the "integration of resource management in SIP" extension. See subclause 5.2.7.4 for further information on the access network charging information.

The P-CSCF (IMS-ALG) shall transparently forward a received Contact header field towards the UE when the Contact header field contains a GRUU or a media feature tag indicating a capability for which the URI can be used.

NOTE 2: One examples of such a media feature tag is the isfocus media feature tag where the URI in the Contact header field is used by conference services to transport the temporary conference identity that can be used when rejoining an ongoing conference.

5.2.7.3 UE-terminating case

When the P-CSCF receives an INVITE request destined for the UE the P-CSCF may require the periodic refreshment of the session to avoid hung states in the P-CSCF. If the P-CSCF requires the session to be refreshed, then the P-CSCF shall apply the procedures described in RFC 4028 [58] clause 8.

NOTE 1: Requesting the session to be refreshed requires support by at least one of the UEs. This functionality cannot automatically be granted, i.e. at least one of the involved UEs needs to support it in order to make it work.

When the P-CSCF receives an initial INVITE request destined for the UE, it will have a list of Record-Route header fields. Prior to forwarding the initial INVITE request, the P-CSCF shall respond to all INVITE requests with a 100 (Trying) provisional response.

If received from the IP-CAN, the P-CSCF shall also include the access-network-charging-info parameter (e.g. received via the PCRF, over the Rx or Gx interfaces) in the P-Charging-Vector header field in the first request or reliable response originated by the UE that traverses the P-CSCF, as soon as the charging information is available in the P-CSCF e.g., after the local resource reservation is complete. See subclause 5.2.7.4 for further information on the access network charging information.

The P-CSCF (IMS-ALG) shall transparently forward a received Contact header field towards the UE when the Contact header field contains a GRUU or a media feature tag indicating a capability for which the URI can be used.

NOTE 2: One example of such a media feature tag is the isfocus media feature tag where the URI in the Contact header field is used by conference services to transport the temporary conference identity that can be used when rejoining an ongoing conference.

5.2.7.4 Access network charging information

The P-CSCF shall include the "access-network-charging-info" header field parameter within the P-Charging-Vector header field as described in subclause 7.2A.5.

5.2.8 Call release

5.2.8.1 P-CSCF-initiated call release

5.2.8.1.1 Cancellation of a session currently being established

Upon receipt of an indication that radio/bearer resources is no longer available for a multimedia session currently being established (e.g. abort session request from PCRF), the P-CSCF shall cancel that dialog by applying the following steps:

1) if the P-CSCF serves the calling user of the session, send out a CANCEL request to cancel the INVITE request towards the terminating UE that includes a Reason header field containing a 503 (Service Unavailable) status code according to the procedures described in RFC 3261 [26] and RFC 3326 [34A]; and

2) if the P-CSCF serves the called user of the session, send out a 503 (Service Unavailable) response to the received INVITE request.

Upon receipt of an indication that QoS or bearer resources are no longer available for a multimedia session currently being established (e.g. abort session request from PCRF), the P-CSCF shall cancel that dialog by responding to the original INVITE request with a 503 (Servi ce Unavailable) response, and by sending out a CANCEL request to the INVITE request towards the terminating UE that includes a Reason header field containing a 503 (Service Unavailable) status code according to the procedures described in RFC 3261 [26] and RFC 3326 [34A].

5.2.8.1.2 Release of an existing session

Upon receipt of an indication that the radio/bearer resources are no longer available or the signalling bearer is lost to the UE for a session (e.g. abort session request from PCRF) or upon detecting that the SDP offer conveyed in a SIP response contained parameters which are not allowed according to the local policy (as specified in the subclause 6.2), the P-CSCF shall release the respective dialog by applying the following steps:

1) if the P-CSCF serves the calling user of the session, then the P-CSCF shall generate a BYE request destined for the called user based on the information saved for the related dialog, including:

   - a Request-URI, set to the stored Contact header field provided by the called user;
   - a To header field, set to the To header field value as received in the 200 (OK) response for the initial INVITE request;
   - a From header field, set to the From header field value as received in the initial INVITE request;
   - a Call-ID header field, set to the Call-Id header field value as received in the initial INVITE request;
   - a CSeq header field, set to the current CSeq value stored for the direction from the calling to the called user, incremented by one;
   - a Route header field, set to the routeing information towards the called user as stored for the dialog;
   - a Reason header field that contains:
     - a 503 (Service Unavailable) response code, if radio/bearer interface resources are no longer available; or
     - a 503 (Service Unavailable) response code, if the signalling bearer is lost to the UE; or
     - a 488 (Not Acceptable Here) response code, if a SDP offer conveyed in a SIP response contained parameters which are not allowed according to the local policy;
   - further header fields, based on local policy; and
   - send the generated BYE requests towards the called user;

2) if the P-CSCF serves the calling user of the session and upon detecting that the SDP offer conveyed in a SIP response contained parameters which are not allowed according to the local policy (as specified in the subclause 6.2), then the P-CSCF shall generate an additional BYE request destined for the calling user based on the information saved for the related dialog, including:

   - a Request-URI, set to a contact address obtained from the stored Contact header field if provided by the calling user. If the stored Contact header field contains either a public or a temporary GRUU, the P-CSCF shall set the Request-URI either to:
     a) the stored UE IP address and the UE port associated with the respective GRUU, if the stored Contact header field contains either a public or a temporary GRUU and the bidirectional flow as defined in RFC 5626 [92] is not used for this session; or
     b) the UE IP address and UE port associated with the bidirectional flow that the P-CSCF uses to send the in-dialog requests toward the UE as defined in RFC 5626 [92];
   - a To header field, set to the From header field value as received in the initial INVITE request;
   - a From header field, set to the To header field value as received in the 200 (OK) response for the initial INVITE request;

- a Call-ID header field, set to the Call-Id header field value as received in the initial INVITE request;
- a CSeq header field, set to the current CSeq value stored for the direction from the called to the calling user, incremented by one;
- a Route header field, set to the routeing information towards the calling user as stored for the dialog;
- a Reason header field that contains a 488 (Not Acceptable Here) response code;
- further header fields, based on local policy; and
- send the BYE request either:

  a) to the contact address indicated in the Request-URI, if the dialog being released did not use the bidirectional flow to send the requests to the UE as defined in RFC 5626 [92]; or

  b) over the same flow that the P-CSCF uses to send the in-dialog requests toward the UE as defined in RFC 5626 [92];

3) If the P-CSCF serves the called user of the session, then the P-CSCF shall generate a BYE request destined for the calling user based on the information saved for the related dialog, including:

- a Request-URI, set to the stored Contact header field provided by the calling user;
- a To header field, set to the From header field value as received in the initial INVITE request;
- a From header field, set to the To header field value as received in the 200 (OK) response for the initial INVITE request;
- a Call-ID header field, set to the Call-Id header field value as received in the initial INVITE request;
- a CSeq header field, set to the current CSeq value stored for the direction from the called to the calling user, incremented by one;
- a Route header field, set to the routeing information towards the calling user as stored for the dialog;
- a Reason header field that contains:
  - a 503 (Service Unavailable) response code, if radio/bearer interface resources are no longer available; or
  - a 488 (Not Acceptable Here) response code, if SDP payload contained parameters which are not allowed according to the local policy;
- further header fields, based on local policy; and
- send the generated BYE requests towards the calling user;

4) if the P-CSCF serves the called user of the session and upon detecting that the SDP offer conveyed in a SIP response contained parameters which are not allowed according to the local policy (as specified in the subclause 6.2), then the P-CSCF shall generate an additional BYE request destined for the called user based on the information saved for the related dialog, including:

- a Request-URI, set to a contact address obtained from the stored Contact header field if provided by the called user. If the stored Contact header field contains either a public or a temporary GRUU, the P-CSCF shall set the Request-URI either to:

  a) the stored UE IP address and the UE port associated with the respective GRUU, if the stored Contact header field contains either a public or a temporary GRUU and the bidirectional flow as defined in RFC 5626 [92] is not used for this session; or

  b) the UE IP address and the UE port associated with the bidirectional flow that the P-CSCF uses to send the in-dialog requests toward the UE as defined in RFC 5626 [92];

- a To header field, set to the To header field value as received in the 200 (OK) response for the initial INVITE request;
- a From header field, set to the From header field value as received in the initial INVITE request;

- a Call-ID header field, set to the Call-Id header field value as received in the initial INVITE request;
- a CSeq header field, set to the current CSeq value stored for the direction from the calling to the called user, incremented by one;
- a Route header field, set to the routeing information towards the called user as stored for the dialog;
- a Reason header field that contains a 488 (Not Acceptable Here) response code;
- further header fields, based on local policy; and
- send the BYE request either:

  a) to the contact address indicated in the Request-URI, if the dialog being released did not use t the bidirectional flow to send the requests to the UE as defined in RFC 5626 [92]; or

  b) over the same flow that the P-CSCF uses to send the in-dialog requests toward the UE as defined in RFC 5626 [92].

Upon receipt of the 2xx responses for the BYE requests, the P-CSCF shall delete all information related to the dialog and the related multimedia session.

5.2.8.1.3 Abnormal cases

Upon receipt of a request on a dialog for which the P-CSCF initiated session release, the P-CSCF shall terminate this received request and answer it with a 481 (Call/Transaction Does Not Exist) response.

5.2.8.1.4 Release of the existing dialogs due to registration expiration and deletion of the security association, IP association or TLS session

If there are still active dialogs associated with the user after the security associations, IP association or TLS sessions were deleted, the P-CSCF shall discard all information pertaining to these dialogs without performing any further SIP transactions with the peer entities of the P-CSCF.

NOTE: If the interface between the P-CSCF and the IP-CAN is supported, the P-CSCF will also indicate (e.g. via the Rx or Gx interface) that the session has been terminated.

5.2.8.2 Call release initiated by any other entity

When the P-CSCF receives a 2xx response for a BYE request matching an existing dialog, then the P-CSCF shall delete all the stored information related to the dialog.

5.2.8.3 Session expiration

If the P-CSCF requested the session to be refreshed periodically, and the P-CSCF got the indication that the session will be refreshed, when the session timer expires, the P-CSCF shall delete all the stored information related to the dialog.

NOTE: If the interface between the P-CSCF and the IP-CAN is supported, the P-CSCF will also indicate to the IP-CAN (e.g. via the Rx or Gx interface), that the session has terminated.

5.2.9 Subsequent requests

5.2.9.1 UE-originating case

The P-CSCF shall respond to all reINVITE requests with a 100 (Trying) provisional response.

For a reINVITE request or UPDATE request from the UE within the same dialog, the P-CSCF shall include the updated access-network-charging-info parameter from P-Charging-Vector header field when sending the SIP request to the S-CSCF. See subclause 5.2.7.4 for further information on the access network charging information.

5.2.9.2 UE-terminating case

The P-CSCF shall respond to all reINVITE requests with a 100 (Trying) provisional response.

For a reINVITE request or UPDATE request destined towards the UE within the same dialog, when the P-CSCF sends 200 (OK) response (to the INVITE request or UPDATE request) towards the S-CSCF, the P-CSCF shall include the updated access-network-charging-info parameter in the P-Charging-Vector header field. See subclause 5.2.7.4 for further information on the access network charging information.

5.2.10 Emergency service

5.2.10.1 General

If the P-CSCF belongs to a network where the registration is not required to obtain emergency service, the P-CSCF shall accept any unprotected request on the IP address and port advertised to the UE during the P-CSCF discovery procedure. The P-CSCF shall also accept any unprotected request on the same IP address and the default port as specified in RFC 3261 [26].

The P-CSCF can handle emergency session and other requests from both a registered user as well as an unregistered user. Certain networks only allow emergency session from registered users.

NOTE 1: If only emergency setup from registered users is allowed, a request from an unregistered user is ignored since it is received outside of the security association, TLS session or IP association.

The P-CSCF can handle emergency session establishment within a non-emergency registration, i.e. one that did not contain the "sos" SIP URI parameter in the Contact header field of the 200 (OK) response.

Upon receiving the 200 (OK) response to the REGISTER request that completes the emergency registration, as identified by the presence of the "sos" SIP URI parameter in the Contact header field of the 200 (OK) response, the P-CSCF shall not subscribe to the registration event package for any emergency public user identity specified in the REGISTER request.

The P-CSCF shall store a configurable list of local emergency service identifiers, i.e. emergency numbers and the emergency service URNs, which can be resolved in the network to which the P-CSCF belongs. In addition to that, the P-CSCF shall store a configurable list of roaming partners' emergency service identifiers.

NOTE 2: The emergency service URN is common to all networks, although subtypes may either not necessarily be in use, or a different set of subtypes is in use in different networks.

NOTE 3: Depending on local operator policy, the P-CSCF has the capability to reject requests relating to specific methods in accordance with RFC 3261 [26], as an alternative to the functionality described above.

5.2.10.2 General treatment for all dialogs and standalone transactions excluding the REGISTER method – requests from an unregistered user

If the P-CSCF receives an initial request for a dialog or standalone transaction, or an unknown method from an unregistered user on the IP address and the unprotected port advertised to the UE during the P-CSCF discovery or the SIP default port, the P-CSCF shall inspect the Request-URI independent of values of possible entries in the received Route header fields for known emergency service identifiers. The P-CSCF shall consider the Request URI of the initial request as a emergency service identifier, if it is an emergency number or an emergency service URN in the list of local emergency service identifiers or in the list of roaming partners' emergency service identifiers..

If the P-CSCF detects that the Request-URI of the initial request for a dialog or a standalone transaction, or an unknown method matches one of the emergency service identifiers, the P-CSCF shall:

1) include in the Request-URI an emergency service URN, i.e. a service URN with a top-level service type of "sos" in accordance with RFC 5031 [69]. If information on the type of emergency service is known include a sub-service type. The entry in the Request-URI that the P-CSCF includes shall be:

- as received in the Request-URI from the UE in accordance with RFC 5031 [69]; or

- as deduced from the Request-URI received from the UE;

2) select an E-CSCF and add the URI of the selected E-CSCF to the topmost Route header field;

NOTE: How the list of E-CSCF is obtained by the P-CSCF is implementation dependent.

3) execute the procedure described in subclause 5.2.6.3.3, subclause 5.2.6.3.7, subclause 5.2.6.3.11 and subclause 5.2.7.2, as appropriate except for:

   - verifying the preloaded route against the received Service-Route header field;
   - routing to IBCF;
   - removing the P-Preferred-Identity header field; and
   - inserting a P-Asserted-Identity header field; and

4) if the P-CSCF detects that the UE is behind a NAT, and the UE's Via header field contains a "keep" header field parameter, the P-CSCF shall add a value to the parameter, to indicate that it is willing to receive keep-alives associated with the dialog from the UE, as defined in RFC 6223 [143].

When the P-CSCF receives any 1xx or 2xx response to the above requests, the P-CSCF shall execute the appropriate procedure for the type of request described in subclause 5.2.6.3.4, subclause 5.2.6.3.8, and subclause 5.2.6.3.12, except that the P-CSCF may rewrite the port number of its own Record-Route entry to an unprotected port where the P-CSCF wants to receive the subsequent incoming requests from the UE belonging to this dialog.

If the P-CSCF does not receive any response to the initial request for a dialog or standalone transaction or unknown method (including its retransmissions); or receives a 3xx response or 480 (Temporarily Unavailable) response to an initial request for a dialog or standalone transaction or an unknown method, the P-CSCF shall select a new E-CSCF and forward the request.

When the P-CSCF receives a target refresh request from the UE for a dialog, the P-CSCF shall execute the procedure described in subclause 5.2.6.3.5.

When the P-CSCF receives from the UE subsequent requests other than a target refresh request (including requests relating to an existing dialog where the method is unknown), the P-CSCF shall execute the procedure described in subclause 5.2.6.3.9.

When the P-CSCF receives any 1xx or 2xx response to the above requests, the P-CSCF shall execute the appropriate procedure for the type of request described in subclause 5.2.6.3.5 or subclause 5.2.6.3.9.

5.2.10.2A General treatment for all dialogs and standalone transactions excluding the REGISTER method – requests to an unregistered user

When the P-CSCF receives, destined for the UE, a target refresh request for a dialog, prior to forwarding the request, the P-CSCF shall execute the procedure described in step 5, the paragraph of subclause 5.2.6.4.5.

When the P-CSCF receives a 1xx or 2xx response to the above request the P-CSCF shall execute the procedure described in subclause 5.2.6.4.6.

When the P-CSCF receives any other response to the above request the P-CSCF shall execute the procedure described in step 1) to 2) in the paragraph of subclause 5.2.6.4.6 describing when the P-CSCF receives any other response to a target request.

When the P-CSCF receives, destined for the UE, a subsequent request for a dialog that is not a target refresh request (including requests relating to an existing dialog where the method is unknown), prior to forwarding the request, the P-CSCF shall execute the procedure described in steps 3 and 4 of subclause 5.2.6.4.9 describing when a P-CSCF receives a subsequent request.

When the P-CSCF receives any other response to the above request the P-CSCF shall execute the procedure described in step 1 in the paragraph of subclause 5.2.6.4.10 describing when the P-CSCF receives any other response to a subsequent request.

5.2.10.3 General treatment for all dialogs and standalone transactions excluding the REGISTER method after emergency registration

If the P-CSCF receives an initial request for a dialog, or a standalone transaction, or an unknown method, for a registered user over the security association, TLS session, or IP association that was created during the emergency registration, as identified by the presence of the "sos" SIP URI parameter in the Contact header field of the 200 (OK) response, the P-CSCF shall inspect the Request-URI independent of values of possible entries in the received Route header fields for known emergency service identifiers. The P-CSCF shall consider the Request URI of the initial request as a emergency service identifier, if it is an emergency number or an emergency service URN from the configurable lists that are associated with:

- the country of the operator to which the P-CSCF belongs to; and
- for inbound roamers, the country from which the UE is roaming from. The P-CSCF determines the country to which the UE is belonging to based on the content of the P-Assserted-Identity header field which contains the home network domain name in a SIP URI belonging to the user.

If the P-CSCF detects that the Request-URI of the initial request for a dialog, or a standalone transaction, or an unknown method does not match any one of the emergency service identifiers in the associated lists, the P-CSCF shall reject the request by returning a 403 (Forbidden) response to the UE.

If the P-CSCF detects that the Request-URI of the initial request for a dialog, or a standalone transaction, or an unknown method matches one of the emergency service identifiers in the associated lists, the P-CSCF shall:

1) include in the Request-URI an emergency service URN, i.e. a service URN with a top-level service type of "sos" as specified in RFC 5031 [69], if necessary. If information on the type of emergency service is known include a sub-service type. The entry in the Request-URI that the P-CSCF includes shall be:
   - as received from the UE in the Request-URI in accordance with RFC 5031 [69]; or
   - as deduced from the Request-URI received from the UE.

1A) execute the procedure described in subclause 5.2.6.3.3, subclause 5.2.6.3.7, subclause 5.2.6.3.11 and subclause 5.2.7.2, as appropriate except for:

   a) verifying the preloaded route against the received Service-Route header field; and

   b) routing to IBCF.

When executing the referenced procedures, P-CSCF shall additionally:

   a) select an E-CSCF and add the URI of the selected E-CSCF to the topmost Route header field; and

NOTE: It is implementation dependant as to how the P-CSCF obtains the list of E-CSCFs.

   b) if the request is from a UE that is not considered as priviledged sender and if the alternative identity of the originator of the request was not identified (see subclause 5.2.6.3.1):

      i) if the P-Asserted-Identity header field in the request to be sent contains a SIP URI and if a tel URI belongs to the set of implicitly registered public user identities that contains the SIP URI, add a second P-Asserted-Identity header field that contains the first tel URI of the implicitly registered public user identities; and

      ii) if the P-Asserted-Identity header field in the request to be sent contains a tel URI, add a second P-Asserted-Identity header field that contains the first SIP URI of the implicitly registered public user identities that contains the tel URI; and

2) if the request contains a Contact header field containing a GRUU the P-CSCF shall save the GRUU received in the Contact header field of the request and associate it with the UE IP address and UE port such that the P-CSCF is able to route target refresh request containing that GRUU in the Request-URI. The UE port used for the association is determined as follows:
   - if IMS AKA or SIP digest with TLS is being used as a security mechanism, the UE protected server port for the security association on which the request was received; or

- if SIP digest without TLS, NASS-IMS bundled authentication or GPRS-IMS-Bundled Authentication is being used as a security mechanism, the UE unprotected port on which the request was received.

If the P-CSCF does not receive any response to the initial request for a dialog or standalone transaction (including its retransmissions); or receives a 3xx response or 480 (Temporarily Unavailable) response to an initial request for a dialog or standalone transaction or an unknown method, the P-CSCF shall select a new E-CSCF and forward the request.

When the P-CSCF receives a target refresh request for a dialog with the Request-URI containing a GRUU the P-CSCF shall:

- obtain the UE IP address and UE port associated to the GRUU contained in the Request-URI and rewrite the Request-URI with that UE IP address and UE port; and

- perform the steps in subclause 5.2.6.4.5 for when the P-CSCF receives, destined for the UE, a target refresh request for a dialog.

5.2.10.4 General treatment for all dialogs and standalone transactions excluding the REGISTER method - non-emergency registration

If the P-CSCF receives an initial request for a dialog, or a standalone transaction, or an unknown method, for a registered user, and the request is not understood from saved or included information to relate to private network traffic (see subclause 5.2.6.3), the P-CSCF shall inspect the Request-URI independent of values of possible entries in the received Route header fields for known emergency service identifiers. The P-CSCF shall consider the Request URI of the initial request as a emergency service identifier, if it is an emergency number or an emergency service URN URN from the configurable lists that are associated with:

- the country of the operator to which the P-CSCF belongs to;

- for inbound roamers , the country from which the UE is roaming from. The P-CSCF determines the country to which the UE is belonging to based on the content of the P-Assserted-Identity header field which contains the home network domain name in a SIP URI belonging to the user; and

- the country of roaming partners, if the request originates from a different country then the country of the network to which the P-CSCF belongs to. Access technology specific procedures are described in each access technology specific annex to determine from which country and roaming partner the request was originated. If the country from which the request originates can not be determined all lists are associated.

If the P-CSCF detects that the Request-URI of the initial request for a dialog, or a standalone transaction, or an unknown method matches one of the emergency service identifiers in the associated lists, the P-CSCF shall:

0A) determine the geographical location of the UE. Access technology specific procedures are described in each access technology specific annex:

I) shall reject the request by returning a 380 (Alternative Service) response to the UE;

II) if:

- support for the 3GPP IM CN subsystem XML body as described in subclause 7.6 in the Accept header field is not indicated, the P-CSCF shall assume that the UE supports version 1 of the XML Schema for the 3GPP IM CN subsystem XML; or

- if both the "sv" and "schemaversion" parameters are present, then the P-CSCF shall ignore the value of the "schemaversion" parameter;

III) shall include in the 380 (Alternative Service) response:

- a Content-Type header field with the value set to associated MIME type of the 3GPP IM CN subsystem XML body as described in subclause 7.6.1; and

- a P-Asserted-Identity header field set to the value of the SIP URI of the P-CSCF included in the Path header field during the registration of the user whose UE sent the request causing this response (see subclause 5.2.2.1); and

IV) shall include an IM CN subsystem XML body with the following elements:

a) an <ims-3gpp> element with the "version" attribute set to "1" and with an <alternative-service> child element, set to the parameters of the alternative service:

i) a <type> child element, set to "emergency" (see table 7.7AA) to indicate that it was an emergency call;

ii) a <reason> child element, set to an operator configurable reason; and

iii) an <action> child element, set to "emergency-registration" (see table 7.7AB) if the P-CSCF is accordingly configured by the operator; and

b) if the UE is roaming and the P-CSCF is in the same network where the UE is roaming, or the UE is not roaming, then the P-CSCF, depending on operator policies, shall either:

I) apply items of bullet a) of bullet 0A); or

II) continue with the next steps; and

NOTE 1: Roaming is when a UE is in a geographic area that is outside the serving geographic area of the home IM CN subsystem.

NOTE 2: Emergency service URN in the request-URI indicates for the network that the emergency call attempt is recognized by the UE.

1) include in the Request-URI an emergency service URN, i.e. a service URN with a top-level service type of "sos" as specified in RFC 5031 [69], if necessary. If information on the type of emergency service is known include a sub-service type. The entry in the Request-URI that the P-CSCF includes shall be:

- as received from the UE in the Request-URI in accordance with RFC 5031 [69]; or

- as deduced from the Request-URI received from the UE; and

1A) execute the procedure described in subclause 5.2.6.3.3, subclause 5.2.6.3.7, subclause 5.2.6.3.11 and subclause 5.2.7.2, as appropriate except for:

a) verifying the preloaded route against the received Service-Route header field; and

b) routing to IBCF.

When executing the referenced procedures, P-CSCF shall additionally:

a) remove all Route header fields;

b) select an E-CSCF and add a Route header field with the URI of the selected E-CSCF; and

NOTE 3: It is implementation dependant as to how the P-CSCF obtains the list of E-CSCFs.

c) if the request is from a UE that is not considered as priviledged sender and if the alternative identity of the originator of the request was not identified (see subclause 5.2.6.3.1):

i) if the P-Asserted-Identity header field in the request to be sent contains a SIP URI and if a tel URI belongs to the set of implicitly registered public user identities that contains the SIP URI, add a second P-Asserted-Identity header field that contains the first tel URI of the implicitly registered public user identities; and

ii) if the P-Asserted-Identity header field in the request to be sent contains a tel URI, add a second P-Asserted-Identity header field that contains the first SIP URI of the implicitly registered public user identities that contains the tel URI; and

2) if the request contains a Contact header field containing a GRUU the P-CSCF shall save the GRUU received in the Contact header field of the request and associate it with the UE IP address and UE port such that the P-CSCF is able to route target refresh request containing that GRUU in the Request-URI. The UE port used for the association is determined as follows:

- if IMS AKA or SIP digest with TLS is being used as a security mechanism, the UE protected server port for the security association on which the request was received; or

- if SIP digest without TLS is being used as a security mechanism, the UE unprotected port on which the request was received.

If the P-CSCF:

- does not receive any response to the initial request for a dialog or standalone transaction (including its retransmissions); or receives a 3xx response or 480 (Temporarily Unavailable) response to an initial request for a dialog or standalone transaction, the P-CSCF shall select a different E-CSCF that has not been tried before for this initial request for the dialog or standalone transaction (including its retransmissions), and forward the request. If all E-CSCFs have been tried before for this initial request for the dialog or standalone transaction (including its retransmissions) and if the entry in the Request-URI as received from the UE is not in accordance with RFC 5031 [69], the P-CSCF shall reject this request by returning a 380 (Alternative Service) response to the UE as described in items I), II), III) and IV) within bullet 0A);

- receives:

  1) any 4xx response other than a 480 (Temporarily Unavailable) response;

  2) any 5xx response;

  3) any 6xx response,

  and the entry in the Request-URI as received from the UE is not in accordance with RFC 5031 [69], then the P-CSCF shall reject this request by returning a 380 (Alternative Service) response to the UE as described in items I), II), III) and IV) within bullet 0A).

If the P-CSCF receives from the IP-CAN (e.g. via PCRF) an indication that the requested resources for the multimedia session being established cannot be granted and the entry in the Request-URI as received from the UE is not in accordance with RFC 5031 [69], then the P-CSCF shall:

- send a CANCEL request to cancel the request forwarded to the selected E-CSCF; and

- reject this request by returning a 380 (Alternative Service) response to the UE as described in items I), II), III) and IV) within bullet 0A).

When the P-CSCF receives a target refresh request for a dialog with the Request-URI containing a GRUU the P-CSCF shall:

- obtain the UE IP address and UE port associated to the GRUU contained in the Request-URI and rewrite the Request-URI with that UE IP address and UE port; and

- perform the steps in subclause 5.2.6.4 for when the P-CSCF receives, destined for the UE, a target refresh request for a dialog.

5.2.10.5 Abnormal cases

If the IM CN subsystem to where the P-CSCF belongs to is not capable to handle emergency sessions or due to local policy does not handle emergency sessions or only handles certain type of emergency session request or does not support emergency sessions for either the geographical location of the UE is located or the IP-CAN to which the UE is attached, or the SDP of the request describes CS media (see 3GPP TS 24.292 [8O]), the P-CSCF shall not forward the initial request for a dialog or standalone transaction. The P-CSCF:

I) shall respond to the initial request for a dialog or standalone transaction with a 380 (Alternative Service) response;

II) if:

  - support for the 3GPP IM CN subsystem XML body as described in subclause 7.6 in the Accept header field is not indicated, the P-CSCF shall assume that the UE supports version 1 of the 3GPP XML Schema for the IM CN subsystem XML body if support for the 3GPP IM CN subsystem XML; or

  - if both the "sv" and "schemaversion" parameters are present, then the P-CSCF shall ignore the value of the "schemaversion" parameter;

III) shall include in the 380 (Alternative Service) response:

- a Content-Type header field with the value set to associated MIME type of the 3GPP IM CN subsystem XML body as described in subclause 7.6.1; and

- a P-Asserted-Identity header field set to the value of the SIP URI of the P-CSCF included in the Path header field during the registration of the user whose UE sent the request causing this response (see subclause 5.2.2.1); and

IV)shall include an IM CN subsystem XML body with the following elements:

a) an <ims-3gpp> element with the "version" attribute set to "1" and with an <alternative-service> child element, set to the parameters of the alternative service:

i) a <type> child element, set to "emergency" (see table 7.7AA) to indicate that it was an emergency call;

ii) a <reason> child element, set to an operator configurable reason; and

iii) an <action> child element, set to "emergency-registration" (see table 7.7AB) if the P-CSCF is accordingly configured by the operator.

NOTE 1: Emergency service URN in the request-URI indicates for the network that the emergency call attempt is recognized by the UE.

NOTE 2: Some networks only allow session requests with a Request-URI containing an emergency service URN, i.e. a service URN with a top-level service type of "sos" as specified in RFC 5031 [69].

5.2.11 Void

5.3 Procedures at the I-CSCF

5.3.1 Registration procedure

5.3.1.1 General

During the registration procedure the I-CSCF shall behave as a stateful proxy.

5.3.1.2 Normal procedures

When the I-CSCF receives a REGISTER request, the I-CSCF shall verify whether or not it has arrived from a trusted domain. If the request has not arrived from a trusted domain, the I-CSCF shall complete the processing of the request by responding with 403 (Forbidden) response. Otherwise, the I-CSCF starts the user registration status query procedure to the HSS as specified in 3GPP TS 29.228 [14].

NOTE 1: The I-CSCF can find out whether the request arrived from a trusted domain or not, from the procedures described in 3GPP TS 33.210 [19A].

NOTE 2: Different UEs, each with its own private user identity, can register the same shared public user identity. Registrations of all public user identities belonging to these UEs are directed to the same S-CSCF as described in 3GPP TS 29.228 [14].

If the REGISTER request does not include an Authorization header field and private user identity, the I-CSCF shall derive the private user identity from the public user identity being registered, contained in the To header field, by removing URI scheme and the following parts of the URI if present: port number, URI parameters, and To header field parameters.

Prior to performing the user registration query procedure to the HSS, the I-CSCF decides which HSS to query, possibly as a result of a query to the Subscription Locator Functional (SLF) entity as specified in 3GPP TS 29.228 [14]. As a result of the query the I-CSCF gets the Redirect-Host AVP.

If the user registration status query response from the HSS includes a valid SIP URI, the I-CSCF shall:

1) replace the Request-URI of the received REGISTER request with the SIP URI received from the HSS in the Server-Name AVP;

2) optionally include the received Redirect-Host AVP value in the P-User-Database header field as defined in RFC 4457 [82]; and

3) forward the REGISTER request to the indicated S-CSCF.

NOTE 3: The P-User-Database header field can be included only if the I-CSCF can assume (e.g. based on local configuration) that the receiving S-CSCF will be able to process the header field.

If the user registration status query response from the HSS includes a list of capabilities, the I-CSCF shall:

1) select a S-CSCF that fulfils the indicated mandatory capabilities – if more than one S-CSCFs fulfils the indicated mandatory capabilities the S-CSCF which fulfils most of the possibly additionally indicated optional capabilities;

2) replace the Request-URI of the received REGISTER request with the URI of the S-CSCF;

3) optionally, include the received Redirect-Host AVP value in the P-User-Database header field as defined in RFC 4457 [82]; and

4) forward the REGISTER request to the selected S-CSCF.

NOTE 4: The P-User-Database header field can be included only if the I-CSCF can assume (e.g. based on local configuration) that the receiving S-CSCF will be able to process the header field.

NOTE 5: It is important that the I-CSCF does not alter the Via header field for requests and responses sent in the direction from the UE to the S-CSCF in the case of GPRS-IMS-Bundled authentication

When the I-CSCF receives a 2xx response to a REGISTER request, the I-CSCF shall proxy the 2xx response to the P-CSCF.

5.3.1.3 Abnormal cases

In the case of SLF query, if the SLF does not send HSS address to the I-CSCF, the I-CSCF shall send back a 403 (Forbidden) response to the UE.

If the HSS sends a negative response to the user registration status query request, the I-CSCF shall send back a 403 (Forbidden) response.

If the user registration status query procedure cannot be completed, e.g. due to time-out or incorrect information from the HSS, the I-CSCF shall send back a 480 (Temporarily Unavailable) response to the UE.

If a selected S-CSCF:

- does not respond to the REGISTER request and its retransmissions by the I-CSCF; or

- sends back a 3xx response or 480 (Temporarily Unavailable) response to a REGISTER request;

and:

- the REGISTER request did not include an "integrity-protected" header field parameter in the Authorization header field;

- the REGISTER request did include an "integrity-protected" header field parameter in the Authorization header field with a value set to "no" in the Authorization header field;

- the REGISTER request did include an "integrity-protected" header field parameter in the Authorization header field with a value set to other than "no" and the I-CSCF supports restoration procedures; or

- the REGISTER request did not include an Authorization header field and the I-CSCF supports restoration procedures;

then:

- if the I-CSCF has received the list of capabilities from the HSS, the I-CSCF shall select a new S-CSCF as described in subclause 5.3.1.2, based on the capabilities indicated from the HSS. The newly selected S-CSCF shall not be one of any S-CSCFs selected previously during this same registration procedure; or

- if the I-CSCF has received a valid SIP URI from the HSS because the S-CSCF is already assigned to other UEs sharing the same public user identity, it will request the list of capabilities from the HSS and, on receiving these capabilities, the I-CSCF shall select a new S-CSCF as described in subclause 5.3.1.2, based on the capabilities indicated from the HSS. The newly selected S-CSCF shall not be one of any S-CSCFs selected previously during this same registration procedure.

NOTE 1: Checking for the inclusion of the Authorization header field is necessary to prevent S-CSCF reselection in the case of GPRS-IMS-Bundled authentication or NASS-IMS bundled authentication when no Authorization header field is present in case I-CSCF does not support restoration procedures.

NOTE 2: In case the S-CSCF does not respond, the I-CSCF can apply a pre-configured timer based on local policy before re-selecting a new S-CSCF.

If a selected S-CSCF does not respond to a REGISTER request and its retransmissions by the I-CSCF and none of the conditions specified above in this case are fulfilled, the I-CSCF shall send back a or 504 (Server Time-Out) response to the user, in accordance with the procedures in RFC 3261 [26].

If the I-CSCF cannot select a S-CSCF which fulfils the mandatory capabilities indicated by the HSS, the I-CSCF shall send back a 600 (Busy Everywhere) response to the user.

5.3.2 Initial requests

5.3.2.1 Normal procedures

The I-CSCF may behave as a stateful proxy for initial requests.

Upon receipt of a request, the I-CSCF shall perform the originating procedures as described in subclause 5.3.2.1A if the topmost Route header field of the request contains the "orig" parameter. Otherwise, the I-CSCF shall continue with the rest of the procedures of this subclause.

When the I-CSCF receives a request, the I-CSCF shall verify whether it has arrived from a trusted domain or not. If the request has arrived from a non trusted domain, then the I-CSCF shall remove all P-Charging-Vector header fields and all P-Charging-Function-Addresses header fields the request may contain.

NOTE 1: The I-CSCF can find out whether the request arrived from a trusted domain or not, from the procedures described in 3GPP TS 33.210 [19A].

For all SIP transactions identified:

- if priority is supported, as containing an authorised Resource-Priority header field, or, if such an option is supported, relating to a dialog which previously contained an authorised Resource-Priority header field;

the I-CSCF shall give priority over other transactions or dialogs. This allows special treatment of such transactions or dialogs.

NOTE 2: The special treatment can included filtering, higher priority processing, routeing, call gapping. The exact meaning of priority is not defined further in this document, but is left to national regulation and network configuration.

The I-CSCF shall discard the P-Profile-Key header field, if the I-CSCF receives the P-Profile-Key header field in a SIP request or response.

When the I-CSCF receives, destined for a served user or a PSI, an initial request for a dialog or standalone transaction the I-CSCF shall:

1) if the Request-URI includes:

   a) a pres: or an im: URI, then translate the pres: or im: URI to a public user identity and replace the Request-URI of the incoming request with that public user identity; or

   b) a SIP-URI that is not a GRUU and with the user part starting with a + and the "user" SIP URI parameter equals "phone" then replace the Request-URI with a tel-URI with the user part of the SIP-URI in the telephone-subscriber element in the tel-URI, and carry forward the tel-URI parameters that may be present in the Request-URI; or

c) a SIP URI that is a GRUU, then obtain the public user identity from the Request-URI and use it for location query procedure to the HSS. When forwarding the request, the I-CSCF shall not modify the Request-URI of the incoming request;

NOTE 3: SRV records have to be advertised in DNS pointing to the I-CSCF for pres: and im: queries.

2) remove its own SIP URI from the topmost Route header field, if present; and

3) check if the domain name of the Request-URI matches with one of the PSI subdomains configured in the I-CSCF. If the match is successful, the I-CSCF resolves the Request-URI by an internal DNS mechanism into the IP address of the AS hosting the PSI and does not start the user location query procedure. Otherwise, the I-CSCF will start the user location query procedure to the HSS as specified in 3GPP TS 29.228 [14] for the called PSI or user, indicated in or derived from the Request-URI. Prior to performing the user location query procedure to the HSS, the I-CSCF decides which HSS to query, possibly as a result of a query to the Subscription Locator Functional (SLF) entity as specified in 3GPP TS 29.228 [14].

When the I-CSCF receives any response to such a request, the I-CSCF shall store the value of the "term-ioi" header field parameter received in the P-Charging-Vector header field, if present.

NOTE 4: Any received "term-ioi" header field parameter will be a type 3 IOI. The type 3 IOI identifies the service provider from which the response was sent.

When the I-CSCF receives an INVITE request, the I-CSCF may require the periodic refreshment of the session to avoid hung states in the I-CSCF. If the I-CSCF requires the session to be refreshed, then the I-CSCF shall apply the procedures described in RFC 4028 [58] clause 8.

NOTE 5: Requesting the session to be refreshed requires support by at least one of the UEs. This functionality cannot automatically be granted, i.e. at least one of the involved UEs needs to support it.

In case the I-CSCF is able to resolve the Request-URI into the IP address of the AS hosting the PSI, then the I-CSCF shall:

1) store the value of the "icid-value" header field parameter received in the P-Charging-Vector header field and retain the "icid-value" header field parameter in the P-Charging-Vector header field. If no "icid-value" header field parameter was found, then create a new, globally unique value for the "icid-value" header field parameter and insert it into the P-Charging-Vector header field. The I-CSCF shall insert a type 3 "orig-ioi" header field parameter in place of any received "orig-ioi" header field parameter. The I-CSCF shall set the type 3 "orig-ioi" header field parameter to a value that identifies the sending network of the request. The I-CSCF shall not include the type 3 "term-ioi" header field parameter; and

2) forward the request directly to the AS hosting the PSI.

Upon successful user location query, when the response contains the URI of the assigned S-CSCF, or the URI of an AS hosting the PSI, the I-CSCF shall:

1) insert the URI received from the HSS as the topmost Route header field;

2) store the value of the "icid-value" header field parameter received in the P-Charging-Vector header field and retain the "icid-value" header field parameter in the P-Charging-Vector header field. If no "icid-value" header field parameter was found, then create a new, globally unique value for the "icid-value" header field parameter and insert it into the P-Charging-Vector header field;

3) optionally, include the received Redirect-Host AVP value in the P-User-Database header field as defined in RFC 4457 [82];

3A) if the Wildcarded Identity value is received from the HSS in the Wildcarded-Identity AVP, and the I-CSCF supports the SIP P-Profile-Key private header extension, include the wildcarded identity value in the P-Profile-Key header field as defined in RFC 5002 [97]; and

4) forward the request based on the topmost Route header field.

NOTE 6: The P-User-Database header field can be included only if the I-CSCF can assume (e.g. based on local configuration) that the receiving S-CSCF will be able to process the header field.

Upon successful user location query, when the response contains information about the required S-CSCF capabilities, the I-CSCF shall:

1) if overlap signalling using the multiple-INVITEs method is supported as a network option, and if the I-CSCF receives an INVITE request outside an existing dialog with the same Call ID and From header as a previous INVITE request during a certain period of time, route the new INVITE to the same next hop as the previous INVITE request; otherwise

2) select a S-CSCF according to the method described in 3GPP TS 29.228 [14];

3) insert the URI of the selected S-CSCF as the topmost Route header field value;

4) execute the procedure described in step 2 and 3 in the above paragraph (upon successful user location query, when the response contains the URI of the assigned S-CSCF);

5) optionally, include the received Redirect-Host AVP value in the P-User-Database header field as defined in RFC 4457 [82];

6) if the Wildcarded Identity value is received from the HSS in the Wildcarded-Identity AVP and the I-CSCF supports the the SIP P-Profile-Key private header extension, include the wildcarded identity value in the P-Profile-Key header field as defined in RFC 5002 [97]; and

NOTE 7: A Wildcarded Identity can be either a PSI or a public user identity.

7) forward the request to the selected S-CSCF.

NOTE 8: The P-User-Database header field can be included only if the I-CSCF can assume (e.g. based on local configuration) that the receiving S-CSCF will be able to process the header field.

Upon an unsuccessful user location query when the response from the HSS indicates that the user does not exist, and if the Request-URI is a tel URI containing a public telecommunications number as specified in RFC 3966 [22], the I-CSCF may support a local configuration option that indicates whether or not request routeing is to be attempted. If the local configuration option indicates that request routeing is to be attempted, then the I-CSCF shall perform one of the following procedures based on local operator policy:

1) forward the request to the transit functionality for subsequent routeing; or

2) invoke the portion of the transit functionality that translates the public telecommunications number contained in the Request-URI to a routeable SIP URI, and process the request based on the result, as follows:

   a) if the translation fails, the request may be forwarded to a BGCF or any other appropriate entity (e.g. a MRFC to play an announcement) in the home network, or the I-CSCF may send an appropriate SIP response to the originator, such as 404 (Not Found) or 604 (Does not exist anywhere). When forwarding the request to a BGCF or any other appropriate entity, the I-CSCF shall leave the original Request-URI containing the tel URI unmodified:

      i) if overlap signalling using the multiple-INVITEs method is supported as a network option, and if the I-CSCF receives an INVITE request outside an existing dialog with the same Call ID and From header as a previous INVITE request during a certain period of time, the I-CSCF shall route the new INVITE to the same next hop as the previous INVITE request; and

      ii) additional procedures apply if the I-CSCF supports NP capabilities and these capabilities are enabled by local policy, and the database used for translation from an international public telecommunications number to a SIP URI also provides NP data (for example, based on the PSTN Enumservice as defined by RFC 4769 [114] or other appropriate data bases). If the above translation from an international public telecommunications number to a SIP URI failed, but NP data was obtained from the database, then the I-CSCF shall update the tel-URI in the Request-URI with the obtained NP data, prior to forwarding the request to the BGCF or other appropriate entity. The URI is updated by the I-CSCF by adding the NP parameters defined by RFC 4694 [112] to the tel-URI in the Request-URI: an "npdi" tel-URI parameter is added to indicate that NP data retrieval has been performed, and if the number is ported, an "rn" tel-URI parameter is added to identify the ported-to routeing number. The I-CSCF shall perform these procedures if the tel-URI in the received Request-URI does not contain an "npdi" tel-URI parameter. In addition, the I-CSCF may, based on local policy, perform these procedures when the tel-URI in the received Request-URI contains an "npdi" tel-URI parameter indicating that the NP data has been previously obtained; or

NOTE 9: The I-CSCF might need to update NP data added by a previous network if the previous network's NP database did not contain the local ported data for the called number.

b) if this translation succeeds, then replace the Request-URI with the routeable SIP URI and process the request as follows:

- determine the destination address (e.g. DNS access) using the URI placed in the topmost Route header field if present, otherwise based on the Request-URI. If the destination requires interconnect functionalities (e.g. the destination address is of an IP address type other than the IP address type used in the IM CN subsystem), the I-CSCF shall forward the request to the destination address via an IBCF in the same network;

- if network hiding is needed due to local policy, put the address of the IBCF to the topmost Route header field;

- route the request based on SIP routeing procedures; and

- if overlap signalling using the multiple-INVITE method is supported as a network option, and if the I-CSCF receives an INVITE request outside an existing dialog with the same Call ID and From header as a previous INVITE request during a certain period of time, route the new INVITE to the same next hop as the previous INVITE request.

Upon an unsuccessful user location query when the response from the HSS indicates that the user does not exist, and if local operator policy does not indicate that request routeing is to be attempted, then, the I-CSCF shall return an appropriate unsuccessful SIP response. This response may be a 404 (Not found) or 604 (Does not exist anywhere) in the case the user is not a user of the home network.

Upon an unsuccessful user location query when the response from the HSS indicates that the user is not registered and no services are provided for such a user, the I-CSCF shall return an appropriate unsuccessful SIP response. This response may be a 480 (Temporarily unavailable) response if the user is recognized as a valid user, but is not registered at the moment and it does not have services for unregistered users.

When the I-CSCF receives an initial request for a dialog or standalone transaction, that contains a single Route header field pointing to itself, the I-CSCF shall determine from the entry in the Route header field whether it needs to do HSS query. In case HSS query is not needed, then the I-CSCF shall:

1) remove its own SIP URI from the topmost Route header field; and

2) route the request based on the Request-URI.

When the I-CSCF receives an initial request for a dialog or standalone transaction containing more than one Route header field, the I-CSCF shall:

1) remove its own SIP URI from the topmost Route header field; and

2) forward the request based on the topmost Route header field.

NOTE 10: In accordance with SIP the I-CSCF can add its own routeable SIP URI to the top of the Record-Route header field to any request, independently of whether it is an initial request. The P-CSCF will ignore any Record-Route header field that is not in the initial request of a dialog.

When the I-CSCF receives a response to an initial request (e.g. 183 (Session Progress) response or 2xx response), the I-CSCF shall store the values from the P-Charging-Function-Addresses header field, if present. If the next hop is outside of the current network, then the I-CSCF shall remove the P-Charging-Function-Addresses header field prior to forwarding the message.

When the I-CSCF, upon sending an initial INVITE request to the S-CSCF, receives a 305 (Use Proxy) response from the S-CSCF, the I-CSCF shall forward the initial INVITE request to the SIP URI indicated in the Contact field of the 305 (Use Proxy) response, as specified in RFC 3261 [26].

5.3.2.1A Originating procedures for requests containing the "orig" parameter

The procedures of this subclause apply for requests received at the I-CSCF when the topmost Route header field of the request contains the "orig" parameter.

The I-CSCF shall verify for all requests whether they arrived from a trusted domain or not. If the request arrived from a non trusted domain, then the I-CSCF shall respond with 403 (Forbidden) response.

If the request arrived from a trusted domain, the I-CSCF shall perform the procedures below.

NOTE 1: The I-CSCF can find out whether the request arrived from a trusted domain or not, from the procedures described in 3GPP TS 33.210 [19A].

For all SIP transactions identified:

- if priority is supported, as containing an authorised Resource-Priority header field, or, if such an option is supported, relating to a dialog which previously contained an authorised Resource-Priority header field;

the I-CSCF shall give priority over other transactions or dialogs. This allows special treatment of such transactions or dialogs.

NOTE 2 The special treatment can include filtering, higher priority processing, routeing, call gapping. The exact meaning of priority is not defined further in this document, but is left to national regulation and network configuration.

If the I-CSCF receives the P-Profile-Key header field in a SIP request or response the I-CSCF shall discard the P-Profile-Key header field.

When the I-CSCF receives an initial request for a dialog or standalone transaction the I-CSCF will start the user location query procedure to the HSS as specified in 3GPP TS 29.228 [14] for the calling user, indicated in either:

1) the P-Served-User header field, if included in the request; or

2) the P-Asserted-Identity header field, if the P-Served-User header field is not included in the request.

Prior to performing the user location query procedure to the HSS, the I-CSCF decides which HSS to query, possibly as a result of a query to the Subscription Locator Functional (SLF) entity as specified in 3GPP TS 29.228 [14].

When the I-CSCF receives an INVITE request, the I-CSCF may require the periodic refreshment of the session to avoid hung states in the I-CSCF. If the I-CSCF requires the session to be refreshed, the I-CSCF shall apply the procedures described in RFC 4028 [58] clause 8.

NOTE 3: Requesting the session to be refreshed requires support by at least one of the UEs. This functionality cannot automatically be granted, i.e. at least one of the involved UEs needs to support it.

When the response for user location query contains information about the required S-CSCF capabilities, the I-CSCF shall select an S-CSCF according to the method described in 3GPP TS 29.228 [14].

If the user location query was successful, the I-CSCF shall:

1) insert the URI of an AS hosting the PSI, or the URI of the S-CSCF - either received from the HSS, or selected by the I-CSCF based on capabilities - as the topmost Route header field appending the "orig" parameter to the URI of the S-CSCF;

2) store the value of the "icid-value" header field parameter received in the P-Charging-Vector header field and retain the "icid-value" header field parameter in the P-Charging-Vector header field. If no "icid-value" header field parameter was found, then create a new, globally unique value for the "icid-value" header field parameter and insert it into the P-Charging-Vector header field;

3) optionally, include the received Redirect-Host AVP value in the P-User-Database header field as defined in draft-camarillo-sipping-user-database [82];

4) if a wildcarded public user identity value is received from the HSS in the Wildcarded-IMPU AVP and the I-CSCF supports the SIP P-Profile-Key private header extension, include the wildcarded public user identity value in the P-Profile-Key header field as defined in RFC 5002 [97]; and

5) forward the request based on the topmost Route header field.

NOTE 4: The P-User-Database header field can be included only if the I-CSCF can assume (e.g. based on local configuration) that the receiving S-CSCF will be able to process the header field.

Upon an unsuccessful user location query, the I-CSCF shall return an appropriate unsuccessful SIP response. This response may be a 404 (Not found) response or 604 (Does not exist anywhere) response in the case the user is not a user of the home network.

When the I-CSCF receives any response to the above request, and forwards it to AS, the I-CSCF shall:

- store the values from the P-Charging-Function-Addresses header field, if present. If the next hop is outside of the current network, then the I-CSCF shall remove the P-Charging-Function-Addresses header field prior to forwarding the message; and

- insert a P-Charging-Vector header field containing the type 3 "orig-ioi" header field parameter, if received in the request, and a type 3 "term-ioi" header field parameter in the response. The I-CSCF shall set the type 3 "term-ioi" header field parameter to a value that identifies the sending network of the response and the type 3 "orig-ioi" header field parameter is set to the previously received value of type 3 "orig-ioi" header field parameter.

5.3.2.2 Abnormal cases

In the case of SLF query, if the SLF does not send HSS address to the I-CSCF, the I-CSCF shall send back a 404 (Not Found) response to the UE.

Upon successful user location query, when the response contains the URI of the assigned S-CSCF, if the I-CSCF is unable to contact the assigned S-CSCF, as determined by one of the following:

- the S-CSCF does not respond to the service request and its retransmissions by the I-CSCF; or

- by unspecified means available to the I-CSCF;

and:

- the I-CSCF supports restoration procedures;

then:

- the I-CSCF shall explicitly request the list of capabilities from the HSS and, on receiving these capabilities, the I-CSCF shall select a new S-CSCF, based on the capabilities indicated from the HSS. The newly selected S-CSCF shall not be one of any S-CSCFs selected previously during this same terminating procedure. Re-selection shall be performed until SIP transaction timer expires as specified in RFC 3261 [26].

NOTE 1: These procedures do not prevent the usage of unspecified reliability or recovery techniques above and beyond those specified in this subclause.

Upon successful user location query, when the response contains information about the required S-CSCF capabilities, if the I-CSCF is unable to contact a selected S-CSCF, as determined by one of the following:

- the S-CSCF does not respond to the service request and its retransmissions by the I-CSCF; or

- by unspecified means available to the I-CSCF;

then:

- the I-CSCF shall select a new S-CSCF, based on the capabilities indicated from the HSS. The newly selected S-CSCF shall not be one of any S-CSCFs selected previously during this same terminating procedure. Re-selection shall be performed until SIP transaction timer expires as specified in RFC 3261 [26].

NOTE 2: These procedures do not prevent the usage of unspecified reliability or recovery techniques above and beyond those specified in this subclause.

If the I-CSCF receives a negative response to the user location query, the I-CSCF shall send back a 404 (Not Found) response.

If the I-CSCF receives a CANCEL request and if the I-CSCF finds an internal state indicating a pending Cx transaction with the HSS, the I-CSCF:

- shall answer the CANCEL request with a 200 (OK) response; and

- shall answer the original request with a 487 (Request Terminated) response.

NOTE 3: The I-CSCF will discard any later arriving (pending) Cx answer message from the HSS.

With the exception of 305 (Use Proxy) response, the I-CSCF may recurse on a 3xx response only when the domain part of the URI contained in the 3xx response is in the same domain as the I-CSCF. For the same cases, if the URI is an IP address, the I-CSCF shall only recurse if the IP address is known locally to be a address that represents the same domain as the I-CSCF.

5.3.3 Void

5.3.3.1 Void

5.3.3.2 Void

5.3.3.3 Void

5.3.4 Void

5.4 Procedures at the S-CSCF

5.4.0 General

Where the S CSCF provides emergency call support, the procedures of subclause 5.4.8 shall be applied first.

5.4.1 Registration and authentication

5.4.1.1 Introduction

The S-CSCF shall determine which authentication mechanism applies based on the contents of the REGISTER request and the authentication mechanism assigned in the HSS:

- if the REGISTER request contains an Authorization header field with the "integrity-protected" header field parameter set to "no", the S-CSCF shall perform the initial registration procedures with IMS-AKA authentication described in subclauses 5.4.1.2.1 and 5.4.1.2.1A;

- if the REGISTER request contains an Authorization header field with the "integrity-protected" header field parameter set to "yes", the S-CSCF shall perform the protected registration procedures with IMS-AKA as a security mechanism as described in subclause 5.4.1.2.2;

- if the REGISTER request does not contain an Authorization header field and the access type field in the P-Access-Network-Info header field indicated xDSL or Ethernet access and containing the "network provided" header field parameter, then S-CSCF shall perform the initial registration procedures with NASS-IMS bundled authentication as a security mechanism as described in subclause 5.4.1.2.1D;

- if the REGISTER request does not contain an Authorization header field and the P-Access-Network-Info header field indicates it is received from a 3GPP access and containing the "network provided" header field parameter, the S-CSCF shall perform the initial registration procedures with GPRS-IMS-Bundled authentication described in subclause 5.4.1.2.1E;

- if the REGISTER request contains an Authorization header field without an "integrity-protected" header field parameter, the S-CSCF shall send an authentication request for the user to the HSS indicating that the authentication scheme is unknown as described in 3GPP TS 29.228 [14]:

    - if the HSS responds with an authentication scheme of NASS-IMS bundled authentication and the request was received from a P-CSCF is in the home network and the P-CSCF is "TISPAN-enabled", then the S-CSCF shall perform the initial registration procedures with NASS-IMS bundled authentication as a security mechanism as described in subclause 5.4.1.2.1D; or

    - if the HSS responds with an authentication scheme of SIP digest, then the S-CSCF shall perform the initial registration procedures with SIPdigest as a security mechanism as described in subclauses 5.4.1.2.1 and 5.4.1.2.1B;

- if the REGISTER request contains an Authorization header field with the "integrity-protected" header field parameter set to "tls-pending", "tls-yes", "ip-assoc-pending" or "ip-assoc-yes", the S-CSCF shall perform the protected registration procedures for SIP digest described in subclause 5.4.1.2.2A; and

- if the REGISTER request contains an Authorization header field with the "integrity-protected" header field parameter set to "auth-done", the S-CSCF shall perform the protected registration procedures described in subclause 5.4.1.2.2E.

NOTE 1: The S-CSCF needs to be configured to know which P-CSCFs are "TISPAN-enabled" and uses the Via header field to determine which P-CSCF forwarded the registration request.

The S-CSCF shall act as the SIP registrar for all UAs belonging to the IM CN subsystem and with public user identities.

Subclause 5.4.1.2 through subclause 5.4.1.7 define S-CSCF procedures for SIP registration that do not relate to emergency. All registration requests are first screened according to the procedures of subclause 5.4.8.2 to see if they do relate to an emergency registration.

For all SIP registrations identified:

- as relating to an emergency; or

- if priority is supported, as containing an authorised Resource-Priority header field;

the S-CSCF shall give priority over other registrations. This allows special treatment of such registrations.

NOTE 2: The special treatment can include filtering, higher priority processing, routeing, call gapping. The exact meaning of priority is not defined further in this document, but is left to national regulation and network configuration.

The S-CSCF shall support the use of the Path and Service-Route header field. The S-CSCF shall also support the Require and Supported header fields. The Path header field is only applicable to the REGISTER request and its 200 (OK) response. The Service-Route header field is only applicable to the 200 (OK) response of REGISTER. The S-CSCF shall not act as a redirect server for REGISTER requests.

The network operator defines minimum and maximum times for each registration. These values are provided within the S-CSCF.

The procedures for notification concerning automatically registered public user identities of a user are described in subclause 5.4.2.1.2.

In case a device performing address and/or port number conversions is provided by a NA(P)T or NA(P)T-PT, the S-CSCF may need to modify the SIP signalling according to the procedures described in annex K if both a "reg-id" and "+sip.instance" header field parameter are present in the received Contact header field as described in RFC 5626 [92].

5.4.1.2 Initial registration and user-initiated reregistration

5.4.1.2.1 Unprotected REGISTER

Any REGISTER request sent unprotected by the UE with an Authorization header field and with the "integrity-protected" header field parameter in the Authorization header field set to "no", or without an "integrity-protected" header field parameter is considered to be an initial registration. If such an initial registration contains a private user identity specifically reserved for IM CN subsystem registrations from an MSC Server enhanced for ICS as defined in 3GPP TS 23.003 [3], the S-CSCF shall respond with a 403 (Forbidden) response. The S-CSCF shall consider this registration attempt as failed.

NOTE 1: For NASS-IMS bundled authentication and GPRS-IMS-Bundled Authentication there is no distinction between a protected and an unprotected REGISTER. There is only an unprotected REGISTER to consider.

NOTE 2: If IMS AKA or SIP digest with TLS are used as a security mechanism, a 200 (OK) final response to an initial registration will only be sent back after the S-CSCF receives a correct authentication challenge response in a REGISTER request that is sent integrity protected.

NOTE 3: A REGISTER with the registration expiration interval value equal to zero will always be received protected. However, it is possible that in error conditions a REGISTER with the registration expiration interval value equal to zero can be received unprotected. In that instance the procedures below will be applied.

Upon receipt of a REGISTER request that is part of an initial registration as outlined above, for a user identity linked to a private user identity and instance ID/reg-id if available, that has previously registered one or more public user identities, the S-CSCF shall:

1) perform the procedure below in this subclause for receipt of a REGISTER request for a public user identity which is not already registered, for the received public user identity;

2) if the multiple registrations is not used and if the authentication that in step 1) has been successful, and there are public user identities (including the public user identity being registered, if previously registered) that belong to this user that have been previously registered with the same private user identity, and with an old contact address different from the one received in the REGISTER request, and the previous registrations have not expired, the S-CSCF shall perform the network initiated deregistration procedure (as described in subclause 5.4.1.5) for the previously registered public user identities belonging to this user including the public user identity being registered, if previously registered; and

3) if the multiple registrations is used (i.e., the "reg-id" header field parameter is included in the REGISTER request) and if the authentication that concludes the initial registration has been successful, and if the are public user identity being registered has been previously registered with the same private user identity and the same "+sip.instance" and "reg-id" header field parameter values, and the previous reigistration has not expired, then the S-CSCF shall:

   a) identify the registration flow being replaced;

   b) terminate any dialog, as specified in subclause 5.4.5.1.2, associated with the registration flow being replaced; and

   c) send a NOTIFY request to the subscribers to the registration event package for the public user identity indicated in the REGISTER request, as described in subclause 5.4.2.1.2.

NOTE 4: The way the S-CSCF identifies the dialogs associated with the registration flow being replaced is implementation specific.

NOTE 5: The S-CSCF will inform the HSS that the previously registered public user identities, excluding the public user identity being registered, have been deregistered.

NOTE 6: Contact related to emergency registration is not affected. S-CSCF is not able deregister contact related to emergency registration and will not delete that.

When S-CSCF receives a REGISTER request with the "integrity-protected" header field parameter in the Authorization header field set to "no" and a non-empty "response" Authorization header field parameter, the S-CSCF shall ignore the value of the "response" header field parameter.

Upon receipt of a REGISTER request that is part of an initial registration as outlined above, for a public user identity which is not already registered linked to the same private user identity and the "+sip.instance" and "reg-id" header field parameters, if available, the S-CSCF shall:

1) identify the user by the public user identity as received in the To header field and the private user identity as received in the "username" Authorization header field parameter of the REGISTER request;

2) check if the P-Visited-Network-ID header field is included in the REGISTER request, and if it is included identify the visited network by the value of this header field;

3) select an authentication vector for the user. If no authentication vector for this user is available, after the S-CSCF has performed the Authentication procedure with the HSS, as described in 3GPP TS 29.228 [14], the S-CSCF shall select an authentication vector as described in 3GPP TS 33.203 [19].

   Prior to performing Authentication procedure with the HSS, the S-CSCF decides which HSS to query, possibly as a result of a query to the Subscription Locator Functional (SLF) entity as specified in 3GPP TS 29.228 [14] or use the value as received in the P-User-Database header field in the REGISTER request as defined in RFC 4457 [82];

NOTE 7: The HSS address received in the response to SLF query or as a value of P-User-Database header field can be used to address the HSS of the public user identity in further queries.

NOTE 8: At this point the S-CSCF informs the HSS, that the user currently registering will be served by the S-CSCF by passing its SIP URI to the HSS. This will be used by the HSS to direct all subsequent incoming initial requests for a dialog or standalone transactions destined for this user to this S-CSCF.

NOTE 9: When passing its SIP URI to the HSS, the S-CSCF may include in its SIP URI the transport protocol and the port number where it wants to be contacted.

4) store the "icid-value" header field parameter received in the P-Charging-Vector header field;

5) challenge the user by generating a 401 (Unauthorized) response for the received REGISTER request appropriate to the security mechanism in use;

6) send the so generated 401 (Unauthorized) response towards the UE, and if the URI in the first Path header field has an "ob" SIP URI parameter, include a Require header field with the option-tag "outbound" as described in RFC 5626 [92]; and,

7) start timer reg-await-auth which guards the receipt of the next REGISTER request.

If the received REGISTER request indicates that the challenge sent previously by the S-CSCF to the UE was deemed to be invalid by the UE, the S-CSCF shall stop the timer reg-await-auth and proceed as described in the subclause 5.4.1.2.3.

5.4.1.2.1A Challenge with IMS AKA as security mechanism

On sending a 401 (Unauthorized) response to an unprotected REGISTER request, the S-CSCF shall populate the header fields as follows:

1) a WWW-Authenticate header field which transports:

   - a globally unique name of the S-CSCF in the "realm" header field parameter;

   - the RAND and AUTN parameters and optional server specific data for the UE in the "nonce" header field parameter;

   - the security mechanism, which is "AKAv1-MD5", in the "algorithm" header field parameter;

   - the IK (Integrity Key) parameter for the P-CSCF in the "ik" header field parameter (see subclause 7.2A.1); and

   - the CK (Cipher Key) parameter for the P-CSCF in the "ck" header field parameter (see subclause 7.2A.1).

The S-CSCF shall store the RAND parameter used in the 401 (Unathorized) response for future use in case of a resynchronisation. If a stored RAND already exists in the S-CSCF, the S-CSCF shall overwrite the stored RAND with the RAND used in the most recent 401 (Unauthorized) response.

5.4.1.2.1B Challenge with SIP digest as security mechanism

On sending a 401 (Unauthorized) response to an unprotected REGISTER request, the S-CSCF shall populate the header fields as follows:

1) a WWW-Authenticate header field as defined in RFC 2617 [21], which transports:

   - a protection domain in the "realm" header field parameter;

   - a "nonce" header field parameter (generated by the S-CSCF);

   - an "algorithm" header field parameter; if the algorithm value is not provided in the authentication vector, it shall have the value "MD5"; and

   - a "qop" header field parameter; if the qop value is not provided in the authentication vector, it shall contain the value "auth".

5.4.1.2.1C Challenge with SIP digest with TLS as security mechanism

The procedures for subclause 5.4.1.2.1B apply.

NOTE: The S-CSCF is not able to distinguish between SIP Digest with TLS and SIP Digest without TLS for the case of an unprotected REGISTER request, therefore the procedures are the same for both.

5.4.1.2.1D Initial registration and user-initiated reregistration for NASS-IMS bundled authentication

Upon receipt of a REGISTER request that is determined to be NASS-IMS bundled authentication, for a user identity linked to a private user identity that has a registered public user identity but with a new contact address, the S-CSCF shall:

1) perform the procedure for receipt of a REGISTER request without the "integrity-protected" header field parameter in the Authorization header field or without the Authorization header field, for the received public user identity; and

2) if the Contact header field of the REGISTER request does not contain a "reg-id" header field parameter (i.e., the multiple registrations mechanism is not used), and the authentication has been successful, and there are public user identities (including the public user identity being registered, if previously registered) belonging to this user that have been previously registered with the same private user identity and with an old contact address different from the one received in the REGISTER request and if the previous registration have not expired:

   a) terminate all dialogs, if any, associated with the previously registered public user identities (including the public user identity being registered, if previously registered), as specified in subclause 5.4.5.1.2;

   b) send a NOTIFY request, to the subscribers to the registration event package of the previously registered public user identities, that indicates that all previously registered public user identities (excluding the public user identity being registered) belonging to this user identified with its private user identity, have been deregistered, as described in subclause 5.4.2.1.2. For the public user identity being registered, the NOTIFY request contains the new contact information; and

NOTE 1: The last dialog to be terminated will be the dialog established by the UE subscribing to the reg event package. When sending the NOTIFY request to the UE over this dialog, the S-CSCF will terminate this dialog by setting in the NOTIFY request the Subscription-State header field to the value of "terminated".

   c) delete all information associated with the previously registered public user identities.

NOTE 2: Contact related to emergency registration is not affected. The S-CSCF is not able to deregister contact related to emergency registration and will not delete it.

Upon receipt of a REGISTER request without the "integrity-protected" header field parameter in the Authorization header field or without an Authorization header field, which is not for an already registered public user identity linked to the same private user identity, the S-CSCF shall:

1) identify the user by the public user identity as received in the To header field of the REGISTER request and if the Authorization header field is present, the private user identity as received in the Authorization header field of the REGISTER request. If the Authorization header field is not present, the S-CSCF shall derive the private user identity from the public user identity being registered by removing SIP URI scheme and the following parts of the URI if present: port number, SIP URI parameters, and To header field parameters;

2) check whether one or more Line-Identifiers previously received over the Cx interface, and stored as a result of a Authentication procedure with the HSS, are available for the user. If not, the S-CSCF performs the Authentication procedure with the HSS, as described in 3GPP TS 29.228 [14], in order to obtain these Line-Identifiers.

3) In the particular case where the S-CSCF received via the Cx interface one or more Line-Identifiers, compare each of the "dsl-location" parameter of the P-Access-Network-Info header field (if present and if it includes the "network-provided" parameter),

- if one of these match, the user is considered authenticated and the S-CSCF behave as described in step 5) to 11) of subclause 5.4.1.2.2,

- otherwise i.e. if these do not match the S-CSCF shall return a 403 (Forbidden) response to the REGISTER request; and

4) if no Line-Identifier is received over the Cx interface, send a 500 (Server Internal Error) response to the REGISTER request.

Upon receipt of a REGISTER request without the "integrity-protected" header field parameter in the Authorization header field or without an Authorization header field, for an already registered public user identity linked to the same private user identity, and for existing contact information, the S-CSCF shall behave as described in subclause 5.4.1.2.2F.

5.4.1.2.1E Initial registration and user-initiated reregistration for GPRS-IMS-Bundled authentication

Upon receipt of a REGISTER request without an Authorization header field, the S-CSCF shall:

1) identify the user by the public user identity as received in the To header field of the REGISTER request. The S-CSCF shall derive the private user identity from the public user identity being registered by removing URI scheme and the following parts of the URI if present: port number, URI parameters, and To header field parameters.

2) check if the P-Visited-Network-ID header field is included in the REGISTER request, and if it is included identify the visited network by the value of this header field.

3) check whether an IP address is stored for this UE. If no IP address (or prefix) is stored for the UE, query the HSS as described in 3GPP TS 29.228 [14] with the derived private user identity and the public user identity as input and store the received IP address (or prefix) of the UE; if the S-CSCF receives a prefix from the HSS, it will only check against prefixes otherwise it will check against the full IP address.

NOTE 1: At this point the S-CSCF informs the HSS, that the user currently registering will be served by the S-CSCF by passing its SIP URI to the HSS. This will be indicated by the HSS for all further incoming requests to this user, in order to direct all these requests directly to this S-CSCF.

4) check whether a "received" header field parameter exists in the Via header field provided by the UE. If a "received" header field parameter exists, the S-CSCF shall compare the IP address recorded in the "received" header field parameter against the UE's IP address stored during registration. In case of IPv6 stateless autoconfiguration, the S-CSCF shall compare the prefix of the IP address recorded in the "received" header field parameter against the UE's IP address prefix stored during registration. If no "received" header field parameter exists in the Via header field provided by the UE, then the S-CSCF shall compare IP address recorded in the "sent-by" parameter against the stored UE IP address. In case of IPv6 stateless autoconfiguration, S-CSCF shall compare the prefix of the IP address recorded in the "sent-by" parameter against the UE's IP address prefix stored during registration. In any case, if the stored IP address (or prefix) and the (prefix of the) IP address recorded in the Via header field provided by the UE do not match, the S-CSCF shall query the HSS as described in 3GPP TS 29.228 [14] with the derived private user identity and the public user identity as input and store the received IP address (or prefix) of the UE. If the stored IP address (or prefix) and the (prefix of the) IP address recorded in the Via header field provided by the UE still do not match the S-CSCF shall reject the registration with a 403 (Forbidden) response and skip the following steps.

5) after performing the S-CSCF Registration/deregistration notification procedure with the HSS, as described in 3GPP TS 29.228 [14], store the following information in the local data:

   a) the list of public user identities, including the registered own public user identity and its associated set of implicitly registered public user identities and wildcarded public user identities due to the received REGISTER request. Each public user identity is identified as either barred or non-barred;

   b) all the service profile(s) corresponding to the public user identities being registered (explicitly or implicitly), including initial Filter Criteria (the initial Filter Criteria for the Registered and common parts is stored and the unregistered part is retained for possible use later - in the case the S-CSCF is retained if the user becomes unregistered); and

   c) if restoration procedures are supported, the restoration information if received as specified in 3GPP TS 29.228 [14];

NOTE 2: There might be more than one set of initial Filter Criteria received because some implicitly registered public user identities that are part of the same implicit registration set belong to different service profiles.

6) update registration bindings as follows:

   a) bind to each non-barred registered public user identity all registered contact information including all header field parameters contained in the Contact header field and all associated URI parameters with the exception of the "pub-gruu" and "temp-gruu" header field parameters as specified in RFC 5627 [93], and store information for future use; and

   b) for each binding that contains a "+sip.instance" Contact header field parameter, assign a new temporary GRUU, as specified in subclause 5.4.7A.3;

NOTE 3: There might be more than one contact information available for one public user identity.

NOTE 4: The barred public user identities are not bound to the contact information.

7) check whether a Path header field was included in the REGISTER request and bind it either to the respective contact address of the UE or to the registration flow and the associated contact address (if the multiple registration mechanism is used) and construct a list of preloaded Route header fields from the list of entries in the received Path header field. The S-CSCF shall preserve the order of the preloaded Route header fields and bind them either to the contact address of the UE or to the registration flow and the associated contact address (if the multiple registration mechanism is used) and the contact information that was received in the REGISTER request;

NOTE 5: If this registration is a reregistration or an initial registration (i.e., there are previously registered public user identities belonging to the user that have not been deregistered or expired), then a list of pre-loaded Route header fields will already exist. If multiple registration mechanism was not used, then the existing list of pre-loaded Route header fields is bound to a respective contact address of the UE. However, if multiple registration mechanism was used, then the existing list of pre-loaded Route header fields is bound to a registration flow and the associated contact address that was used to send the REGISTER request. In either case, the new list replaces the old list.

8) determine the duration of the registration by checking the registration expiration interval value in the received REGISTER request and bind it either to the respective contact address of the UE or to the registration flow and the associated contact address (if the multiple registration mechanism is used). The S-CSCF may reduce the duration of the registration due to local policy or send back a 423 (Interval Too Brief) response specifying the minimum allowed time for registration;

9) store the "icid-value" header field parameter received in the P-Charging-Vector header field;

10) create and send a 200 (OK) response for the REGISTER request as specified in subclause 5.4.1.2.2F.

When a user de-registers, or is de-registered by the HSS, the S-CSCF shall delete the IP address stored for the UE.

5.4.1.2.2 Protected REGISTER with IMS AKA as a security mechanism

Upon receipt of a REGISTER request with the "integrity-protected" header field parameter in the Authorization header field set to "yes", the S-CSCF shall identify the user by the public user identity as received in the To header field and the private user identity as received in the Authorization header field of the REGISTER request, and:

In the case that there is no authentication currently ongoing for this user (i.e. no timer reg-await-auth is running):

1) check if the user needs to be reauthenticated.

   The S-CSCF may require authentication of the user for any REGISTER request, and shall always require authentication for REGISTER requests received without the "integrity-protected" header field parameter in the Authorization header field set to "yes".

   If the user needs to be reauthenticated, the S-CSCF shall proceed with the procedures as described for the unprotected REGISTER in subclause 5.4.1.2.1, beginning with step 3). If the user does not need to be reauthenticated, the S-CSCF shall proceed with the following steps in this paragraph;

2) check whether a registration expiration interval value is included in the REGISTER request and its value. If the registration expiration interval value indicates a zero value, the S-CSCF shall perform the deregistration

procedures as described in subclause 5.4.1.4. If the registration expiration interval value does not indicate zero, the S-CSCF shall:

- if the REGISTER request does not contain a "reg-id" header field parameter and the contact address indicated in the Contact header field was not previously registered, send a 403 (Forbidden) response to the UE; and

NOTE 1: New contact address is always registered via an initial registration.

3) check whether the public user identity received in the To header field is already registered. If it is not registered, the S-CSCF shall proceed beginning with step 4B below. Otherwise, the S-CSCF shall either:

- send a 439 (First Hop Lacks Outbound Support) response to the UE, if the REGISTER request contains the "reg-id" Contact header field parameter and the "outbound" option tag in a Supported header field, but the first URI in the Path header field does not have an "ob" URI parameter; or

- otherwise proceed beginning with step 6 below.

In the case that a timer reg-await-auth is running for this user the S-CSCF shall:

1) check if the Call-ID of the request matches with the Call-ID of the 401 (Unauthorized) response which carried the last challenge. The S-CSCF shall only proceed further if the Call-IDs match.

2) stop timer reg-await-auth;

3) check whether an Authorization header field is included, containing:

a) the private user identity of the user in the "username" header field parameter;

b) the algorithm which is "AKAv1-MD5" in the "algorithm" header field parameter; and

c) the authentication challenge response needed for the authentication procedure in the "response" header field parameter.

The S-CSCF shall only proceed with the following steps in this paragraph if the authentication challenge response was included;

4) check whether the received authentication challenge response and the expected authentication challenge response (calculated by the S-CSCF using XRES and other parameters as described in RFC 3310 [49]) match. The XRES parameter was received from the HSS as part of the Authentication Vector. The S-CSCF shall only proceed with the following steps if the challenge response received from the UE and the expected response calculated by the S-CSCF match;

4A) if the Contact header field of the REGISTER request does not contain a "reg-id" header field parameter (i.e., the multiple registrations mechanism is not used), and there are public user identities (including the public user identity being registered, if previously registered) that belong to this user that have been previously registered with the same private user identity, and with an old contact address different from the one received in the REGISTER request and if the previous registrations have not expired:

a) terminate all dialogs, associated with the previously registered public user identities (including the public user identity being registered, if previously registered), as specified in subclause 5.4.5.1.2;

b) send a NOTIFY request, to the subscribers to the registration event package of the previously registered public user identities, that indicates that all previously registered public user identities (excluding the public user identity being registered) belonging to this user identified with its private user identity, have been deregistered, as described in subclause 5.4.2.1.2. For the public user identity being registered, the NOTIFY request contains the new contact information; and

NOTE 2: The last dialog to be terminated will be the dialog established by the UE subscribing to the reg event package. When sending the NOTIFY request to the UE over this dialog, the S-CSCF will terminate this dialog by setting in the NOTIFY request the Subscription-State header field to the value of "terminated".

c) delete all information associated with the previously registered public user identities;

NOTE 3: Contact related to emergency registration is not affected. The S-CSCF is not able to deregister contact related to emergency registration and will not delete it.

4B) if the REGISTER request contains the "reg-id" Contact header field parameter and the "outbound" option tag in a Supported header field, but the first URI in the Path header field does not have an "ob" URI parameter, send a 439 (First Hop Lacks Outbound Support) response to the UE;

5) after performing the S-CSCF Registration/deregistration notification procedure with the HSS, as described in 3GPP TS 29.228 [14], store the following information in the local data:

   a) the list of public user identities, including the registered own public user identity and its associated set of implicitly registered public user identities and wildcarded public user identities due to the received REGISTER request. Each public user identity is identified as either barred or non-barred;

   b) all the service profile(s) corresponding to the public user identities being registered (explicitly or implicitly), including initial Filter Criteria(the initial Filter Criteria for the Registered and common parts is stored and the unregistered part is retained for possible use later - in the case of the S-CSCF is retained if the user becomes unregistered); and

   c) if restoration procedures are supported, the restoration information if received as specified in 3GPP TS 29.228 [14];

NOTE 4: There might be more than one set of initial Filter Criteria received because some implicitly registered public user identities that are part of the same implicit registration set belong to different service profiles.

6) update registration bindings:

   a) bind to each non-barred registered public user identity all registered contact information including all header field parameters contained in the Contact header field and all associated SIP URI parameters, with the exception of the "pub-gruu" and "temp-gruu" header field parameters as specified in RFC 5627 [93], and store information for future use;

   b) for each binding that contains a "+sip.instance" Contact header field parameter, assign a new temporary GRUU, as specified in subclause 5.4.7A.3;

   c) if the Contact header field of the REGISTER request contained a "+sip.instance" and a "reg-id" header field parameter, and the SIP URI in the Path header field inserted by the P-CSCF contained an "ob" SIP URI parameter header field, and:

      - if the public user identity has not previously been registered with the same "+sip.instance" and "reg-id" header field parameter has not been previously registered with the same "reg-id" header field parameter values, then the registration flow being created shall be in addition to any existing registration flow; or

      - if the public user identity has previously been registered with the same "+sip.instance" and "reg-id" header field values, then the S-CSCF shall determine whether the request refreshes or replaces an existing registration flow. If the request:

         i) refreshes an existing registration flow, then the S-CSCF shall leave the flow intact; or

         ii) replaces the existing registration flow with a new flow, then the S-CSCF shall:

            a) terminate any dialog, as specified in subclause 5.4.5.1.2, associated with the registration flow being replaced; and

            b) send a NOTIFY request to the subscribers to the registration event package for the public user identity indicated in the REGISTER request, as described in subclause 5.4.2.1.2;

NOTE 5: The S-CSCF determines whether this REGISTER request replaces or refreshes an existing registration flow by examining the SIP URI in the Path header field inserted into the request by the P-CSCF (see subclause 5.2.2.1).

NOTE 6: The way the S-CSCF identifies the dialogs associated with the registration flow being replaced is implementation specific.this registration shall replace the previous registration, and the S-CSCF shall perform the network initiated deregistration procedure for the previously registered public user identity with its associated "+sip.instance" Contact header field parameter and "reg-id" header field parameter value (as described in subclause 5.4.1.5);

NOTE 7: There might be more then one contact information available for one public user identity.

NOTE 8: The barred public user identities are not bound to the contact information.

NOTE 9: Contact related to emergency registration is not affected. S-CSCF is not able deregister contact related to emergency registration and will not delete that.

7) check whether a Path header field was included in the REGISTER request and construct a list of preloaded Route header fields from the list of entries in the received Path header field. The S-CSCF shall preserve the order of the preloaded Route header fields and bind them either to the contact address of the UE or to the registration flow and the associated contact address (if the multiple registration mechanism is used) and the contact information that was received in the REGISTER request;

NOTE 10: If this registration is a reregistration or an initial registration (i.e., there are previously registered public user identities belonging to the user that have not been deregistered or expired), then a list of pre-loaded Route header fields will already exist. If multiple registration mechanism was not used, then the existing list of pre-loaded Route header fields is bound to a respective contact address of the UE. However, if multiple registration mechanism was used, then the existing list of pre-loaded Route header fields is bound to a registration flow and the associated contact address that was used to send the REGISTER request. In either case, the new list replaces the old list.

8) determine the duration of the registration by checking the value of the registration expiration interval value in the received REGISTER request and bind it either to the respective contact address of the UE or to the registration flow and the associated contact address (if the multiple registration mechanism is used). The S-CSCF may reduce the duration of the registration due to local policy or send back a 423 (Interval Too Brief) response specifying the minimum allowed time for registration;

9) store the "icid-value" header field parameter received in the P-Charging-Vector header field;

10) if an "orig-ioi" header field parameter is received in the P-Charging-Vector header field, store the value of the received "orig-ioi" header field parameter; and

NOTE 11: Any received "orig-ioi" header field parameter will be a type 1 IOI. The type 1 IOI identifies the network from which the request was sent.

11) create and send a 200 (OK) response for the REGISTER request as specified in subclause 5.4.1.2.2F.

5.4.1.2.2A Protected REGISTER with SIP digest as a security mechanism

Upon receipt of a REGISTER request with the "integrity-protected" header field parameter in the Authorization header field set to "tls-pending", "tls-yes", "ip-assoc-pending", or "ip-assoc-yes", the S-CSCF shall identify the user by the public user identity as received in the To header field and the private user identity as received in the Authorization header field of the REGISTER request, and:

NOTE: Although the REGISTER request with the "integrity-protected" header field parameter set to "ip-assoc-pending" or "ip-assoc-yes" is handled as protected REGISTER request, the integrity of the request is actually not protected by SIP digest.

In the case that there is no authentication currently ongoing for this user (i.e. no timer reg-await-auth is running):

1) check if the user needs to be reauthenticated. The S-CSCF may require authentication of the user for any REGISTER request, and shall always require authentication for REGISTER requests received without the "integrity-protected" header field parameter in the Authorization header field set to "tls-yes".

   If the user needs to be reauthenticated and the REGISTER did not include an Authorization header field with a digest response, the S-CSCF shall proceed with the authentication procedures as described for the initial REGISTER in subclause 5.4.1.2.1 and subclause 5.4.1.2.1B.

   If the user needs to be reauthenticated and the REGISTER included an Authorization header field with a digest response, the S-CSCF shall proceed with the authentication procedures as described for the initial REGISTER in subclause 5.4.1.2.1 and subclause 5.4.1.2.1B and include the "stale" header field parameter with value "true" in the WWW-Authenticate header field.

In the case that a timer reg-await-auth is running for this user the S-CSCF shall:

1) check if the Call-ID of the request matches with the Call-ID of the 401 (Unauthorized) response which carried the last challenge. The S-CSCF shall only proceed further if the Call-IDs match.

2) stop timer reg-await-auth;

3) in the case the algorithm is "MD5", check the following additional fields:

   - a "realm" header field parameter matching the "realm" header field parameter in the authentication challenge;

   - an "algorithm" header field parameter which matches the "algorithm" header field parameter sent in the authentication challenge;

   - "nonce" header field parameter matching the "nonce" header field parameter in the authentication challenge;

   - a "cnonce" header field parameter; and

   - a nonce-count field.

   The S-CSCF shall only proceed with the following steps in this paragraph if the authentication challenge response was included;

4) check whether the received authentication challenge response and the expected authentication challenge response match. The expected response is calculated by the S-CSCF as described in RFC 2617 [21] using the H(A1) value provided by the HSS. If the received authentication challenge response and the expected authentication challenge response match, then the UE is considered authenticated. If the UE is considered authenticated, and if the "integrity-protected" header field parameter in the Authorization header field is set to the value "tls-pending" or "tls-yes", then the S-CSCF shall associate the registration with the local state of "tls-protected";

NOTE 1: The S-CSCF can have a local security policy to treat messages other than initial REGISTER requests, messages relating to emergency services, and error messages, differently depending on whether the registration is associated with the state "tls-protected".

4A) if the REGISTER request contains the "reg-id" Contact header field parameter and the "outbound" option tag in a Supported header field, but the first URI in the Path header does not have an "ob" URI parameter, send a 439 (First Hop Lacks Outbound Support) response to the UE;

5) after performing the S-CSCF Registration/deregistration notification procedure with the HSS, as described in 3GPP TS 29.228 [14], store the following information in the local data:

   a) the list of public user identities, including the registered own public user identity and its associated set of implicitly registered public user identities and wildcarded public user identities due to the received REGISTER request. Each public user identity is identified as either barred or non-barred;

   b) all the service profile(s) corresponding to the public user identities being registered (explicitly or implicitly), including initial Filter Criteria(the initial Filter Criteria for the Registered and common parts is stored and the unregisterd part is retained for possible use later - in the case of the S-CSCF is retained if the user becomes unregistered); and

   c) if restoration procedures are supported, the restoration information, if received, as specified in 3GPP TS 29.228 [14];

NOTE 2: There might be more than one set of initial Filter Criteria received because some implicitly registered public user identities that are part of the same implicit registration set belong to different service profiles.

6) update registration bindings:

   a) bind to each non-barred registered public user identity all registered contact information including all header field parameters contained in the Contact header field and all associated URI parameters, with the exception of the "pub-gruu" and "temp-gruu" header field parameters as specified in RFC 5627 [93], and store information for future use;

   b) for each binding that contains a "+sip.instance" Contact header field parameter, assign a new temporary GRUU, as specified in subclause 5.4.7A.3;

   c) if the Contact header field of the REGISTER request does not contain a "reg-id" header field parameter (i.e., the multiple registrations mechanism is not used), and there are public user identities (including the public user identity being registered, if previously registered) that belong to this user that have been previously

registered with the same private user identity, and with an old contact address different from the one received in the REGISTER request and if the previous registrations have not expired:

- terminate all dialogs, associated with the previously registered public user identities (including the public user identity being registered, if previously registered), as specified in subclause 5.4.5.1.2;

- send a NOTIFY request, to the subscribers to the registration event package of the previously registered public user identities, that indicates that all previously registered public user identities (excluding the public user identity being registered) belonging to this user identified with its private user identity, have been deregistered, as described in subclause 5.4.2.1.2. For the public user identity being registered, the NOTIFY request contains the new contact information; and

NOTE 3: The last dialog to be terminated will be the dialog established by the UE subscribing to the reg event package. When sending the NOTIFY request to the UE over this dialog, the S-CSCF will terminate this dialog by setting in the NOTIFY request the Subscription-State header field to the value of "terminated".

- delete all information associated with the previously registered public user identities; and

NOTE 4: Contact related to emergency registration is not affected. The S-CSCF is not able to deregister contact related to emergency registration and will not delete it.

d) if the Contact header field of the REGISTER request contained a "+sip.instance" and a "reg-id" header field parameter, and the SIP URI in the Path header field inserted by the P-CSCF contained an "ob" SIP URI parameter header field, and:

- if the public user identity has not previously been registered with the same "+sip.instance" and "reg-id" header field parameter values, then the registration flow being created shall be in addition to any existing registration flow; or

- if the public user identity has previously been registered with the same "+sip.instance" and "reg-id" header field parameter values, then the S-CSCF shall determine whether the request refreshes or replaces an existing registration flow. If the request:

  i) refreshes an existing registration flow, then the S-CSCF shall leave the flow intact; or

  ii) replaces the existing registration flow with a new flow, then the S-CSCF shall:

    a) terminate any dialog, as specified in subclause 5.4.5.1.2, associated with the registration flow being replaced; and

    b) send a NOTIFY request to the subscribers to the registration event package for the public user identity indicated in the REGISTER request, as described in subclause 5.4.2.1.2;

NOTE 5: The S-CSCF determines whether this REGISTER request replaces or refreshes an existing registration flow by examining the SIP URI in the Path header field inserted into the request by the P-CSCF (see subclause 5.2.2.1).

NOTE 6: The way the S-CSCF identifies the dialogs associated with the registration flow being replaced is implementation specific.

NOTE 7: There might be more then one contact information available for one public user identity.

NOTE 8: The barred public user identities are not bound to the contact information.

NOTE 9: Contact related to emergency registration is not affected. S-CSCF is not able deregister contact related to emergency registration and will not delete that.

7) check whether a Path header field was included in the REGISTER request and construct a list of preloaded Route header fields from the list of entries in the received Path header field. The S-CSCF shall preserve the order of the preloaded Route header fields and bind them either to the contact address of the UE or to the registration flow and the associated contact address (if the multiple registration mechanism is used) and the contact information that was received in the REGISTER request;

NOTE 10: If this registration is a reregistration or an initial registration (i.e., there are previously registered public user identities belonging to the user that have not been deregistered or expired), then a list of pre-loaded Route header fields will already exist. If multiple registration mechanism was not used, then the existing list of pre-loaded Route header fields is bound to a respective contact address of the UE. However, if multiple registration mechanism was used, then the existing list of pre-loaded Route header fields is bound to a registration flow and the associated contact address that was used to send the REGISTER request. In either case, the new list replaces the old list.

8) determine the duration of the registration by checking the value of the registration expiration interval value in the received REGISTER request and bind it either to the respective contact address of the UE or to the registration flow and the associated contact address (if the multiple registration mechanism is used). The S-CSCF may reduce the duration of the registration due to local policy or send back a 423 (Interval Too Brief) response specifying the minimum allowed time for registration;

9) store the "icid-value" header field parameter received in the P-Charging-Vector header field;

10) if an "orig-ioi" header field parameter is received in the P-Charging-Vector header field, store the value of the received "orig-ioi" header field parameter; and

NOTE 11: Any received "orig-ioi" header field parameter will be a type 1 IOI. The type 1 IOI identifies the network from which the request was sent.

11) create and send a 200 (OK) response for the REGISTER request as specified in subclause 5.4.1.2.2F. The S-CSCF shall also store the nonce-count value in the received REGISTER request and include an Authentication-Info header field containing the fields described in RFC 2617 [21] as follows:

- a "nextnonce" header field parameter if the S-CSCF requires a new nonce for subsequent authentication responses from the UE;
- a "qop" header field parameter matching the "qop" Authorization header field parameter sent by the UE;
- a "rspauth" header field parameter with a response-digest calculated as described in RFC 2617 [21];
- a "cnonce" header field parameter value matching the cnonce in the Authorization header field sent by the UE; and
- a "nonce-count" header field parameter matching the "nonce-count" Authorization header field parameter sent by the UE.

5.4.1.2.2B Protected REGISTER with SIP digest with TLS as a security mechanism

The procedures for subclause 5.4.1.2.2A apply.

5.4.1.2.2C NASS-IMS bundled authentication as a security mechanism

There is no protected REGISTER when NASS-IMS bundled authentication is used as a security mechanism. The procedures of subclause 5.4.1.2.1D apply to all REGISTER requests.

5.4.1.2.2D GPRS-IMS-Bundled authentication as a security mechanism

There is no protected REGISTER when GPRS-IMS-Bundled authentication is used as a security mechanism. The procedures of subclause 5.4.1.2.1E apply to all REGISTER requests.

5.4.1.2.2E Protected REGISTER – Authentication already performed

The S-CSCF shall not perform authentication of the user for any REGISTER request with the "integrity-protected" header field parameter in the Authorization header set to "auth-done".

In this release of this document, when the registration procedure as specified in this subclause is performed, i.e., the REGISTER request contains the "integrity-protected" header field parameter in the Authorization header set to "auth-done", the S-CSCF shall not employ outbound registration as described in RFC 5626 [92].Upon receipt of a REGISTER request with the "integrity-protected" header field parameter in the Authorization header set to "auth-done", the S-CSCF

shall identify the user by the public user identity as received in the To header field and the private user identity as received in the Authorization header field of the REGISTER request.

In addition the S-CSCF shall check whether a registration expiration interval value is included in the REGISTER request and its value. If the registration expiration interval value indicates a zero value, the S-CSCF shall perform the deregistration procedures as described in subclause 5.4.1.4. If the registration expiration interval value does not indicate zero, the S-CSCF shall:

1) if the REGISTER request contains the "reg-id" header field parameter in the Contact header field, respond with a 403 (Forbidden) response to the REGISTER request; and

2) if there are public user identities (including the public user identity being registered, if previously registered) that belong to this user that have been previously registered with the same private user identity, and with an old contact address different from the one received in the REGISTER request and if the previous registrations have not expired:

   a) terminate all dialogs, associated with the previously registered public user identities (including the public user identity being registered, if previously registered), as specified in subclause 5.4.5.1.2;

   b) send a NOTIFY request, to the subscribers to the registration event package of the previously registered public user identities, that indicates that all previously registered public user identities (excluding the public user identity being registered) belonging to this user identified with its private user identity, have been deregistered, as described in subclause 5.4.2.1.2. For the public user identity being registered, the NOTIFY request contains the new contact information; and

NOTE 1: The last dialog to be terminated will be the dialog established by the user (identified with its private user identity) subscribing to its own reg event package using the old contact address. When sending the NOTIFY request over this dialog, the S-CSCF will terminate this dialog by setting in the NOTIFY request the Subscription-State header field to the value of "terminated".

   c) delete all information associated with the previously registered public user identities;

Subsequently, the S-CSCF shall check whether the public user identity received in the To header field is already registered. If it is not registered, the S-CSCF shall proceed beginning with step 1 below. Otherwise, the S-CSCF shall proceed beginning with step 2 below.

1) after performing the S-CSCF Registration/deregistration notification procedure with the HSS, as described in 3GPP TS 29.228 [14], store the following information in the local data:

   a) the list of public user identities, including the registered own public user identity and its associated set of implicitly registered public user identities and wildcarded public user identities due to the received REGISTER request. Each public user identity is identified as either barred or non-barred; and,

   b) all the service profile(s) corresponding to the public user identities being registered (explicitly or implicitly), including initial Filter Criteria(the initial Filter Criteria for the Registered and common parts is stored and the unregisterd part is retained for possible use later - in the case of the S-CSCF is retained if the user becomes unregistered);

NOTE 2: There might be more than one set of initial Filter Criteria received because some implicitly registered public user identities that are part of the same implicit registration set belong to different service profiles.

2) update registration bindings:

   a) bind to each non-barred registered public user identity all registered contact information including all header parameters contained in the Contact header and all associated URI parameters, with the exception of the URI "pub-gruu" and "temp-gruu" parameters as specified in RFC 5627 [93], and store information for future use;

   b) for each binding that contains a "+sip.instance" header field parameter, assign a new temporary GRUU, as specified in subclause 5.4.7A.3.

NOTE 3: There might be more then one contact information available for one public user identity.

NOTE 4: The barred public user identities are not bound to the contact information.

3) check whether a Path header was included in the REGISTER request and construct a list of preloaded Route headers from the list of entries in the received Path header field. The S-CSCF shall preserve the order of the

preloaded Route header fields and bind them to the contact information that was received in the REGISTER request;

NOTE 5: If this registration is a reregistration or an initial registration (i.e., there are previously registered public user identities belonging to the user that have not been deregistered or expired), then a list of pre-loaded Route headers will already exist. The new list replaces the old list.

4) determine the duration of the registration by checking the value of the registration expiration interval value in the received REGISTER request. The S-CSCF may reduce the duration of the registration due to local policy or send back a 423 (Interval Too Brief) response specifying the minimum allowed time for registration;

5) store the "icid-value" header field parameter received in the P-Charging-Vector header;

6) if an "orig-ioi" header field parameter is received in the P-Charging-Vector header, store the value of the received "orig-ioi" header field parameter; and

NOTE 6: Any received "orig-ioi" header field parameter will be a type 1 IOI. The type 1 IOI identifies the network from which the request was sent.

7) create and send a 200 (OK) response for the REGISTER request as specified in subclause 5.4.1.2.2F.

5.4.1.2.2F Successful registration

If a 200 (OK) response is to be sent for a REGISTER request, the S-CSCF shall, in addition to any contents identified elsewhere in subclause 5.4.1.2, include:

a) the list of received Path header fields;

b) a P-Associated-URI header field containing the list of the registered public user identity and its associated set of implicitly registered public user identities. The first URI in the list of public user identities supplied by the HSS to the S-CSCF will indicate the default public user identity to be used by the S-CSCF. The public user identity indicated as the default public user identity must be a registered public user identity. The S-CSCF shall place the default public user identity as the first entry in the list of URIs present in the P-Associated-URI header field. The default public user identity will be used by the P-CSCF in conjunction with the procedures for the P-Asserted-Identity header field, as described in subclause 5.2.6.3. If the S-CSCF received a display name from the HSS for a public user identity, then the S-CSCF shall populate the P-Associated-URI header field entry for that public identity with the associated display name. The S-CSCF shall not add a barred public user identity to the list of URIs in the P-Associated-URI header field;

NOTE 1: The P-Associated-URI header field lists only the public user identity and its associated set of implicitly registered public user identities that have been registered, rather than the list of user's URIs that may be either registered or unregistered as specified in the RFC 3455 [52]. If the registered public user identity which is not barred does not have any other associated public user identities or wildcarded public user identities, the P-Associated-URI header field lists only the registered public user identity itself, rather than an empty P-Associated-URI header field as specified in RFC 3455 [52]. The P-Associated-URI header field does not list wildcarded public user identities.

c) a Service-Route header field containing:

- the SIP URI identifying the S-CSCF containing an indication that subsequent requests routed via this service route (i.e. from the P-CSCF to the S-CSCF) was sent by the UE using either the contact address of the UE or the registration flow and the associated contact address (if the multiple registration mechanism is used) that has been registered and are treated as for the UE-originating case. This indication may e.g. be in a URI parameter, a character string in the user part of the URI or be a port number in the URI. The S-CSCF shall use a different SIP-URI for each registration. If the multiple registration mechanism is used, the S-CSCF shall also use a different SIP-URI for each registration flow associated with the registration; and

- if network topology hiding is required a SIP URI identifying an IBCF as the topmost entry;

NOTE 2: In accordance with the procedures described in RFC 3608 [38], an IBCF does not insert its own routable SIP URI to the Service-Route header field.

d) a P-Charging-Function-Addresses header field containing the values received from the HSS if the P-CSCF is in the same network as the S-CSCF. It can be determined if the P-CSCF is in the same network as the S-CSCF by the contents of the P-Visited-Network-ID header field included in the REGISTER request;

e) a P-Charging-Vector header field containing the "orig-ioi" header field parameter, if received in the REGISTER request and a type 1 "term-ioi" header field parameter. The S-CSCF shall set the type 1 "term-ioi" header field parameter to a value that identifies the sending network of the response and the "orig-ioi" header field parameter is set to the previously received value of "orig-ioi" header field parameter;

f) a Contact header field listing all contact addresses for this public user identity, including all saved header field parameters and URI parameters (including all ICSI values and IARI values) received in the Contact header field of the REGISTER request;

g) GRUUs in the Contact header field. If the REGISTER request contained a Required or Supported header field containing the value "gruu" then for each contact address in the Contact header field that has a "+sip.instance" header field parameter, add "pub-gruu" and "temp-gruu" header field parameters. The values of these parameters shall contain, respectively, the public GRUU and the most recently assigned temporary GRUU representing (as specified in subclause 5.4.7A) the association between the public user identity from the To header field in the REGISTER request and the instance ID contained in the "+sip.instance" header field parameter; and

NOTE 3: There might be other contact addresses available, that this UE or other UEs have registered for the same public user identity.

h) if the received REGISTER request contained both a "reg-id" and "+sip.instance" header field parameters in the Contact header field, and the first URI within the Path header field contains the "ob" SIP URI parameter a Require header field with the "outbound" option-tag as described in RFC 5626 [92];

and send the so created 200 (OK) response to the UE.

For all service profiles in the implicit registration set, the S-CSCF shall send a third-party REGISTER request, as described in subclause 5.4.1.7, to each AS that matches the Filter Criteria of the service profile from the HSS for the REGISTER event.

NOTE 4: If this registration is a reregistration, the Filter Criteria already exists in the local data.

NOTE 5: If the same AS matches the Filter Criteria of several service profiles for the event of REGISTER request, then the AS will receive several third-party REGISTER requests. Each of these requests will include a public user identity from the corresponding service profile.

The S-CSCF shall consider the public user identity being registered to be bound either to the contact address of the UE or to the registration flow and the associated contact address (if the multiple registration mechanism is used), as specified in the Contact header field, for the duration indicated in the registration expiration interval value.

5.4.1.2.3 Abnormal cases - general

In the case that the expiration timer from the UE is too short to be accepted by the S-CSCF, the S-CSCF shall:

- reject the REGISTER request with a 423 (Interval Too Brief) response, containing a Min-Expires header field with the minimum registration time the S-CSCF will accept.

On receiving a failure response to one of the third-party REGISTER requests, based on the information in the Filter Criteria the S-CSCF may:

- abort sending third-party REGISTER requests; and

- initiate network-initiated deregistration procedure.

If the Filter Criteria does not contain instruction to the S-CSCF regarding the failure of the contact to the AS, the S-CSCF shall not initiate network-initiated deregistration procedure.

In the case that the REGISTER request from the UE contains multiple SIP URIs which are different addresses as Contact header field entries, the S-CSCF shall store:

- the entry in the Contact header field with the highest value of the "q" header field parameter; or

- an entry decided by the S-CSCF based on local policy;

and include the stored entry in the 200 (OK) response.

In the case that the REGISTER request from the UE contains multiple SIP URIs which are the same addresses with the same value of the "q" Contact header field parameter, the S-CSCF shall not store multiple entries with the same "q" value but store one of the entries with the same "q" value based on local policy along with any entries that have different "q" values and include only the stored entries in the 200 (OK) response.

NOTE 1: The UE can register multiple SIP URIs in the Contact header field simultanously, provided they all contain the same IP address and port number. In this case the S-CSCF behaviour is as defined RFC 3261 [26] (i.e multiple Contact header field entries are bound to the public user identity in the To header field and are returned in the 200 (OK) response).

NOTE 2: If the timer reg-await-auth expires, the S-CSCF will consider the authentication to have failed. If the public user identity was already registered, the S-CSCF will leave it registered, as described in 3GPP TS 33.203 [19].

For any error response, the S-CSCF shall insert a P-Charging-Vector header field containing the "orig-ioi" header field parameter, if received in the REGISTER request and a type 1 "term-ioi" header field parameter. The S-CSCF shall set the type 1 "term-ioi" header field parameter to a value that identifies the sending network of the response and the "orig-ioi" header field parameter is set to the previously received value of "orig-ioi" header field.

NOTE 3: Any previously received "orig-ioi" header field parameter will be a type 1 IOI. The type 1 IOI identifies the visited network of the registered user.

5.4.1.2.3A Abnormal cases – IMS AKA as security mechanism

In the case that the REGISTER request, that contains the authentication challenge response from the UE does not match with the expected REGISTER request (e.g. wrong Call-Id or authentication challenge response) and the request has the "integrity-protected" header field parameter in the Authorization header field set to "yes", the S-CSCF shall:

- send a 403 (Forbidden) response to the UE. The S-CSCF shall consider this authentication attempt as failed. The S-CSCF shall not update the registration state of the subscriber.

NOTE 1: If the UE was registered before, it stays registered until the registration expiration time expires.

In the case that the REGISTER request, which was supposed to carry the response to the challenge, contains and empty "response" Authorization header field parameter (i.e. no authentication challenge response) and no "auts" Authorization header field parameters indicating that the MAC parameter was invalid in the challenge, the S-CSCF shall:

- respond with a 403 (Forbidden) response to the UE. The S-CSCF shall not update the registration state of the subscriber.

NOTE 2: If the UE was registered before, it stays registered until the registration expiration time expires.

In the case that the REGISTER request from the UE containing an "auts" Authorization header field parameter, indicating that the SQN was deemed to be out of range by the UE), the S-CSCF will fetch new authentication vectors from the HSS. In order to indicate a resynchronisation, the S-CSCF shall include the value of the "auts" header field parameter received from the UE and the stored RAND, when fetching the new authentication vectors. On receipt of the new authentication vectors from the HSS, the S-CSCF shall either:

- send a 401 (Unauthorized) response to initiate a further authentication attempt, using these new vectors; or

- respond with a 403 (Forbidden) response if the authentication attempt is to be abandoned. The S-CSCF shall not update the registration state of the subscriber.

NOTE 3: If the UE was registered before, it stays registered until the registration expiration time expires.

NOTE 4: Since the UE responds only to two consecutive invalid challenges, the S-CSCF will send a 401 (Unauthorized) response that contains a new challenge only twice.

NOTE 5: In the case of an "auts" Authorization header field parameter being present in the REGISTER request, the "response" Authorization header field parameter in the same REGISTER request will not be taken into account by the S-CSCF.

In the case that the S-CSCF receives a REGISTER request with the "integrity-protected" header field parameter in the Authorization header field set to "yes", for which the public user identity received in the To header field and the private user identity received in the "username" Authorization header field parameter of the REGISTER request do not match to any registered user at this S-CSCF, if the S-CSCF supports restoration procedures, the S-CSCF shall behave as described in subclause 5.4.1.2.2, otherwise the S-CSCF shall:

- respond with a 500 (Server Internal Error) response to the UE.

NOTE 6: This error is not raised if there is a match on the private user identity, but no match on the public user identity.

5.4.1.2.3B Abnormal cases – SIP digest as security mechanism

In the case that the REGISTER request, that contains the authentication challenge response from the UE does not match with the expected REGISTER request (e.g. wrong Call-Id or authentication challenge response) and the request has the "integrity-protected" header field parameter in the Authorization header field set to either "tls-pending", "tls-yes", "ip-assoc-pending", or "ip-assoc-yes", the S-CSCF shall do one of the following:

- send a 403 (Forbidden) response to the UE. The S CSCF shall consider this authentication attempt as failed. The S-CSCF shall not update the registration state of the subscriber; or

- rechallenge the user by issuing a 401 (Unauthorized) response including a challenge as per the authentication procedures described in subclause 5.4.1.2.1B.

NOTE 1: If the UE was registered before, it stays registered until the registration expiration time expires.

In the case that the REGISTER request from the UE contains an invalid "nonce" Authorization header field parameter with a valid challenge response for that nonce (indicating that the client knows the correct username/password), or when the nonce-count value sent by the UE is not the expected value, the S-CSCF shall:

- send a 401 (Unauthorized) response to initiate a further authentication attempt with a fresh nonce and the "stale" header field parameter set to "true" in the WWW-Authenticate header field.

In the case that the S-CSCF receives a REGISTER request with the "integrity-protected" header field parameter in the Authorization header field set to "tls-pending", "tls-yes", "ip-assoc-pending", or "ip-assoc-yes", for which the public user identity received in the To header field and the private user identity received in the Authorization header field of the REGISTER request do not match to any registered or initial registration pending user at this S-CSCF, if the S-CSCF supports restoration procedures, the S-CSCF shall behave as described in subclause 5.4.1.2.2A, otherwise the S-CSCF shall:

- respond with a 500 (Server Internal Error) response to the UE.

NOTE 2: This error is not raised if there is a match on the private user identity, but no match on the public user identity.

5.4.1.2.3C Abnormal cases – SIP digest with TLS as security mechanism

The procedures for subclause 5.4.1.2.3B apply.

5.4.1.2.3D Abnormal cases – NASS-IMS bundled authentication as security mechanism

There are no abnormal cases for NASS-IMS bundled authentication.

5.4.1.2.3E Abnormal cases – GPRS-IMS-Bundled authentication as security mechanism

There are no abnormal cases for GPRS-IMS-Bundled authentication.

5.4.1.3 Authentication and reauthentication

Authentication and reauthentication is performed by the registration procedures as described in subclause 5.4.1.2.

5.4.1.4 User-initiated deregistration

5.4.1.4.1 Normal cases

When S-CSCF receives a REGISTER request with the registration expiration interval value containing the value zero, the S-CSCF shall:

1) verify that the REGISTER request is associated with an existing registered contact or an existing flow or, if the restoration procedures are supported by this S-CSCF, attempt to restore a contact or flow from HSS associated with the REGISTER request. If no associated contact or flow exists then the S-CSCF shall send a 481 (Call Leg/Transaction Does Not Exist) response to the UE and skip the remaining procedures in this subclause;

2) if IMS AKA is in use as the security mechanism, check whether the "integrity-protected" header field parameter in the Authorization header field set to "yes", indicating that the REGISTER request was received integrity protected. The S-CSCF shall only proceed with the following steps if the "integrity-protected" header field parameter is set to "yes";

3) if SIP digest without TLS or SIP digest with TLS is in use as a security mechanism, check whether the "integrity-protected" header field parameter in the Authorization header field set to "tls-yes" or "ip-assoc-yes", indicating that the REGISTER request was received from a previously registered user. If the "integrity-protected" header field parameter is set to "tls-pending", "ip-assoc-pending" or is not present the S-CSCF shall ensure authentication is performed as described in subclause 5.4.1.2.1 (and consequently subclause 5.4.1.2.1B or 5.4.1.2.1C) if local policy requires. The S-CSCF shall only proceed with the following steps if the "integrity-protected" header field parameter is set to "tls-yes", "ip-assoc-yes", or the required authentication is successfully performed if required by local policy;

4) if NASS-IMS bundled authentication is in use as a security mechanism, the S-CSCF shall only proceed with the following steps if the "integrity-protected" header field parameter in the Authorization header field does not exist or without an Authorization header field, and one or more Line-Identifiers previously received over the Cx interface, stored as a result of an Authentication procedure with the HSS, as described in 3GPP TS 29.228 [14], are available for the user;

4A) if the security mechanism as described in subclause 5.4.1.2.2E is in use, check whether the "integrity-protected" header field parameter in the Authorization header field set to "auth-done". The S-CSCF shall only proceed with the following steps if the "integrity-protected" header field parameter is set to "auth-done";

5) release all dialogs that include this user's contact addresses or the flows that are being deregistered, and where these dialogs were initiated by or terminated towards these contact addresses and the same public user identity found that was To header field that was received REGISTER request or with one of the implicitly registered public user identities by applying the steps listed in subclause 5.4.5.1.2. However:

   a) if the dialog that was established by the UE subscribing to the reg event package used the public user identity that is going to be deregistered; and

   b) this dialog is the only remaining dialog used for subscription to reg event package;

   then the S-CSCF shall not release this dialog;

6) examine the Contact header field in the REGISTER request, and:

   a) if the value "*" is not included in the Contact header field and:

      i) if the "reg-id" header field parameter is not included in the Contact header field,then:

         - remove the binding (i.e. deregister) between the public user identity found in the To header field together with the implicitly registered public user identities and the contact addresses specified in the REGISTER request. The S-CSCF shall only remove the contact addresses that were registered by this UE;

      ii) if the "reg-id" header field parameter and "+sip.instance" header field parameter are included in the Contact header field, and the UE supports multiple registrations (i.e. the "outbound" option tag is included in the Supported header field), then:

- remove the binding (i.e. deregister) between the public user identity indicated in the To header field (together with the associated implicitly registered public user identities) and the flow identified by the "reg-id" header field parameter;

7) if the S-CSCF receives a REGISTER request with the value "*" in the Contact header field and the value zero in the Expires header field, the S-CSCF shall remove all contact addresses that were bound to the public user identity found in the To header field and have been registered by this UE identified with its private user identity;

8) for all service profiles in the implicit registration set send a third-party REGISTER request, as described in subclause 5.4.1.7, to each AS that matches the Filter Criteria of the service profile from the HSS for the REGISTER event;

9) if this is a deregistration request for the only public user identity currently registered with its associated set of implicitly registered public user identities (i.e. no other is registered) and there are still active multimedia sessions that includes this user's registered contact address, where the session was initiated by or terminated towards the contact with the registered contact address for that public user identity which is currently registered or with one of the implicitly registered public user identities, release only each of these multimedia sessions associated with the registered contact address by applying the steps listed in subclause 5.4.5.1.2. The S-CSCF shall only release dialogs associated to the multimedia sessions originated or terminated towards the registered user's contact address; and

10) send a 200 (OK) response to a REGISTER request that contains a list of Contact header fields enumerating all contacts and flows that are currently registered, and all contacts that have been deregistered. For each contact address and the flow that has been deregistered, the Contact header field shall contain the contact address and the "reg-id" header field parameter that identifies the flow, if a flow was deregistered, and the associated information, and the registration expiration interval value shall be set to zero.

If all public user identities of the UE are deregistered, then the S-CSCF may consider the UE and P-CSCF subscriptions to the reg event package cancelled (i.e. as if the UE had sent a SUBSCRIBE request with an Expires header field containing a value of zero).

If the Authorization header field of the REGISTER request contained an "integrity-protected" header field parameter set to the value "no", the S-CSCF shall apply the procedures described in subclause 5.4.1.2.1.

On completion of the above procedures in this subclause and of the S-CSCF Registration/deregistration notification procedure with the HSS, as described in 3GPP TS 29.228 [14], for one or more public user identities, the S-CSCF shall update or remove those public user identities, their registration state and the associated service profiles from the local data (based on operators' policy the S-CSCF can request of the HSS to either be kept or cleared as the S-CSCF allocated to this subscriber).

5.4.1.4.2 Abnormal cases - IMS AKA as security mechanism

If case that the S-CSCF receives a REGISTER request with the "integrity-protected" header field parameter in the Authorization header set to "yes", for which the public user identity received in the To header and the private user identity received in the Authorization header of the REGISTER request do not match to any registered user at this S-CSCF, if the S-CSCF supports restoration procedures as specified in 3GPP TS 23.380 [7D], the S-CSCF shall behave as described in subclause 5.4.1.4.1, otherwise the S-CSCF shall:

- respond with a 500 (Server Internal Error) response to the UE.

NOTE: This error is not raised if there is a match on the private user identity, but no match on the public user identity.

5.4.1.4.4 Abnormal cases – SIP digest with TLS as security mechanism

The procedures for subclause 5.4.1.4.2 apply.

5.4.1.4.5 Abnormal cases – NASS-IMS bundled authentication as security mechanism

There are no abnormal cases for NASS-IMS bundled authentication.

5.4.1.4.6 Abnormal cases – GPRS-IMS-Bundled authentication as security mechanism

There are no abnormal cases for GPRS-IMS-Bundled authentication.

5.4.1.5 Network-initiated deregistration

NOTE 1: A network-initiated deregistration event that occurs at the S-CSCF may be received from the HSS or may be an internal event in the S-CSCF.

For any registered public user identity, the S-CSCF can deregister:

- all contact addresses bound to the indicated public user identity (i.e. deregister the respective public user identity);
- some contact addresses bound to the indicated public user identity;
- a particular contact address bound to the indicated public user identity; or
- one or more registration flows and the associated contact address bound to the indicated public user identity, when the UE supports multiple registration procedure;

by sending a single NOTIFY request.

Prior to initiating the network-initiated deregistration for the only currently registered public user identity and its associated set of implicitly registered public user identities and wildcarded public user identities that have been registered either with the same contact address of the UE or the same registration flow and the associated contact address (if the multiple registration mechanism is used), i.e. there are no other public user identities registered either with this contact address or with this registration flow and the associated contact address (if the multiple registration mechanism is used), and there are still active multimedia sessions belonging either to this contact address or to this registration flow and the associated contact address (if the multiple registration mechanism is used), the S-CSCF shall release only multimedia sessions belonging to this contact address or to this registration flow and the associated contact address (if the multiple registration mechanism is used) as described in the following paragraph. The multimedia sessions for the same public user identity, if registered either with another contact address or another registration flow and the associated contact address (if the multiple registration mechanism is used) remain unchanged.

Prior to initiating the network-initiated deregistration while there are still active multimedia sessions that are associated with this user and contact, the S-CSCF shall release none, some or all of these multimedia sessions by applying the steps listed in subclause 5.4.5.1.2 under the following conditions:

- when the S-CSCF does not expect the UE to reregister a given public user identity and its associated set of implicitly registered public user identities that have been registered with respective contact address (i.e. S-CSCF will set the event attribute within the respective <contact> element to "rejected" for the NOTIFY request, as described below), the S-CSCF shall release all sessions that are associated with the registered contact address for the public user identities using the contact address that is being deregistered, which includes the implicitly registered public user identities.
- when the S-CSCF expects the UE to reregister a given public user identity and its associated set of implicitly registered public user identities that have been registered with respective contact address (i.e. S-CSCF will set the event attribute within the respective <contact> element to "deactivated" for the NOTIFY request, as described below), the S-CSCF shall only release sessions that currently include the user's contact address, where the session was initiated by or terminated towards the user with the contact address registered to one of the public user identities using the contact address that is being deregistered, which includes the implicitly registered public user identities.

When a network-initiated deregistration event occurs for one or more public user identities that are bound either to one or more contact addresses or registration flows and the associated contact addresses (if the multiple registration mechanism is used), the S-CSCF shall send a NOTIFY request to all subscribers that have subscribed to the respective reg event package. For each NOTIFY request, the S-CSCF shall:

1) set the Request-URI and Route header field to the saved route information during subscription;
2) set the Event header field to the "reg" value;
3) in the body of the NOTIFY request, include as many <registration> elements as many public user identities the S-CSCF is aware of the user owns;

4) set the aor attribute within each <registration> element to one public user identity:

   a) set the <uri> sub-element inside each <contact> sub-element of each <registration> element to the respective contact address provided by the UE;

   b) if the public user identity:

      i) has been deregistered (i.e. all contact addresses and all registration flows and associated contact addresses bound to the indicated public user identity are removed) then:

         - set the state attribute within the <registration> element to "terminated";

         - set the state attribute within each <contact> element belonging to this UE to "terminated"; and

         - set the event attribute within each <contact> element belonging to this UE to either "unregistered", or "deactivated" if the S-CSCF expects the UE to reregister or "rejected" if the S-CSCF does not expect the UE to reregister; or

NOTE 2: If the multiple registration mechanism is used, then the reg-id header field parameter will be included as an <unknown-param> element within each respective <contact> element.

NOTE 3: The UE will consider its public user identity as deregistered when the binding between the respective public user identity and all contact addresses and all registration flows and associated contact addresses (if the multiple registration mechanism is used) belonging to the UE have been removed.

      ii) has been kept registered then:

         I) set the state attribute within the <registration> element to "active";

         II) set the state attribute within each <contact> element to:

            - for the binding between the public user identity and either the contact address or a registration flow and associated contact addresses (if the multiple registration mechanism is used) to be removed set the state attribute within the <contact> element to "terminated", and event attribute element to either "unregistered", or "deactivated" if the S-CSCF expects the UE to reregister or "rejected" if the S-CSCF does not expect the UE to reregister; or

            - for the binding between the public user identity and either the contact address or the registration flow and associated contact addresses (if the multiple registration mechanism is used) which remain unchanged, if any, leave the <contact> element unmodified, and if the contact has been assigned GRUUs set the <pub-gruu> and <temp-gruu> sub-elements of the <contact> element as specified in RFC 5628 [94] and include the <unknown-param> sub-element within each <contact> to any additional header field parameters contained in the Contact header field of the REGISTER request according to RFC 3680 [43]; and

NOTE 4: There might be more than one contact information available for one public user identity. When deregistering this UE, the S-CSCF will only modify the <contact> elements that were originally registered by this UE using its private user identity. The <contact> elements of the same public user identity, if registered by another UE using different private user identities remain unchanged.

5) add a P-Charging-Vector header field with the "icid-value" header field parameter populated as specified in 3GPP TS 32.260 [17].

The S-CSCF shall only include the non-barred public user identities in the NOTIFY request.

When sending a final NOTIFY request with all <registration> element(s) having their state attribute set to "terminated" (i.e. all public user identities have been deregistered or expired), the S-CSCF shall also terminate the subscription to the registration event package by setting the Subscription-State header field to the value of "terminated".

Also, for all service profiles in the implicit registration set the S-CSCF shall send a third-party REGISTER request, as described in subclause 5.4.1.7, to each AS that matches the Filter Criteria of the service profile from the HSS as if a equivalent REGISTER request had been received from the user deregistering that public user identity, or combination of public user identities.

On completion of the above procedures for one or more public user identities linked to the same private user identity, the S-CSCF shall consider those public user identities and the associated implicitly registered public user identities

which have no contact address or a registration flow and associated contact addresses (if the multiple registration mechanism is used) bound to them as deregistered. On completion of the S-CSCF Registration/deregistration notification procedure with the HSS, as described in 3GPP TS 29.228 [14], the S-CSCF shall update or remove those public user identities linked to the same private user identity, their registration state and the associated service profiles from the local data (based on operators' policy the S-CSCF can request of the HSS to either be kept or cleared as the S-CSCF allocated to this subscriber). On the completion of the Network initiated de-registration by the HSS procedure, as described in 3GPP TS 29.228 [14], the S-CSCF shall remove those public user identities, their registration state and the associated service profiles from the local data.

5.4.1.6 Network-initiated reauthentication

The S-CSCF may request a subscriber to reauthenticate at any time, based on a number of possible operator settable triggers as described in subclause 5.4.1.2.

If the S-CSCF is informed that a private user identity needs to be re-authenticated, the S-CSCF shall generate a NOTIFY request on all dialogs which have been established due to subscription to the reg event package of that user. For each NOTIFY request the S-CSCF shall:

1) set the Request-URI and Route header field to the saved route information during subscription;

2) set the Event header field to the "reg" value;

3) in the body of the NOTIFY request, include as many <registration> elements as many public user identities the S-CSCF is aware of the user owns:

   a) set the <uri> sub-element inside the <contact> sub-element of each <registration> element to the contact address provided by the UE;

   b) set the aor attribute within each <registration> element to one public user identity;

   c) set the state attribute within each <registration> element to "active";

   d) set the state attribute within each <contact> element to "active";

   e) set the event attribute within each <contact> element that was registered by this UE to "shortened";

   f) set the expiry attribute within each <contact> element that was registered by this UE to an operator defined value; and

   g) set the <pub-gruu> and <temp-gruu> sub-elements within each <contact> element as specified in subclause 5.4.2.1.2; and

NOTE 1: There might be more than one contact information available for one public user identity. The S-CSCF will only modify the <contact> elements that were originally registered by this UE using its private user identity. The S-CSCF will not modify the <contact> elements for the same public user identitity, if registered by another UE using different private user identity.

4) set a P-Charging-Vector header field with the "icid-value" header field parameter populated as specified in 3GPP TS 32.260 [17].

Afterwards the S-CSCF shall wait for the user to reauthenticate (see subclause 5.4.1.2).

NOTE 2: Network initiated re-authentication may occur due to internal processing within the S-CSCF.

The S-CSCF shall only include the non-barred public user identities in the NOTIFY request.

When generating the NOTIFY request, the S-CSCF shall shorten the validity of all registration lifetimes associated with this private user identity to an operator defined value that will allow the user to be re-authenticated.

5.4.1.7 Notification of Application Servers about registration status

During registration, the S-CSCF shall include the P-Access-Network-Info header fields (as received in the REGISTER request from the UE and the P-CSCF) and a P-Visited-Network-ID header field (as received in the REGISTER request from the UE) in the 3rd-party REGISTER request sent towards the ASs, if the AS is part of the trust domain. If the AS is not part of the trust domain, the S-CSCF shall not include any P-Access-Network-Info header field or P-Visited-

Network-ID header field. The S-CSCF shall not include a P-Access-Network-Info header field in any responses to the REGISTER request.

If the registration procedure described in subclauses 5.4.1.2, 5.4.1.4 or 5.4.1.5 (as appropriate) was successful, the S-CSCF shall send a third-party REGISTER request to each AS with the following information:

a) the Request-URI, which shall contain the AS's SIP URI;

b) the From header field, which shall contain the S-CSCF's SIP URI;

c) the To header field, which shall contain a non-barred public user identity belonging to the service profile of the processed Filter Criteria. It may be either a public user identity as contained in the REGISTER request received from the UE or one of the implicitly registered public user identities in the service profile, as configured by the operator;

NOTE 1: For the whole implicit registration set only one public user identity per service profile appears in the third-party REGISTER requests. Thus, based on third-party REGISTER requests only, the ASs will not have complete information on the registration state of each public user identity in the implicit registration set. The only way to have a complete and continuously updated information (even upon administrative change in subscriber's profile) is to subscribe to the reg event package.

d) the Contact header field, which shall contain the S-CSCF's SIP URI;

e) for initial registration and user-initiated reregistration (subclause 5.4.1.2), the registration expiration interval value, which shall contain the same value that the S-CSCF returned in the 200 (OK) response for the REGISTER request received from the UE;

f) for user-initiated deregistration (subclause 5.4.1.4) and network-initiated deregistration (subclause 5.4.1.5), the registration expiration interval value, which shall contain the value zero;

g) for initial registration and user-initiated reregistration (subclause 5.4.1.2), a message body, if there is Filter Criteria indicating the need to include HSS provided data for the REGISTER event (e.g. HSS may provide AS specific data to be included in the third-party REGISTER) or if there is Filter Criteria indicating the need to include the contents of the incoming REGISTER request or the contents of the 200 (OK) response to the incoming REGISTER request in the body of the third-party REGISTER. The S-CSCF shall format the MIME body and set the value of the Content-Type header field to include the MIME type specified in subclause 5.4.1.7A;

NOTE 2: When the AS is outside the trust domain for any header field that is permitted in the REGISTER request received from the UE or final response to the REGISTER request received from the UE, including an Include Register Request or Include Register Response indication in the initial Filter Criteria would cause the incoming REGISTER request or 200 (OK) response to the incoming REGISTER request contents to be delivered to the AS revealing information that AS is not trusted to obtain. Include Register Request and Include Register Response indication is therefore not included in the initial Filter Criteria for an AS that exists outside the trust domain for any such header field.

h) for initial registration and user-initiated reregistration, the P-Charging-Vector header field, which shall contain the same "icid-value header field parameter that the S-CSCF received in the original REGISTER request from the UE and which shall contain a a type 3 "orig-ioi" header field parameter. The S-CSCF shall insert the type 3 orig ioi parameter in place of the received "orig-ioi" header field parameter and shall set the type 3 "orig-ioi" header field parameter to a value that identifies the sending network of the request. The S-CSCF shall not include the type 3 "term-ioi" header field parameter;

i) for initial registration and user-initiated reregistration, a P-Charging-Function-Addresses header field, which shall contain the values received from the HSS if the message is forwarded within the S-CSCF home network; and

j) in case the original received REGISTER request contained a P-User-Database header field and the AS belongs to the same operator as the S-CSCF, optionally a P-User-Database header field which shall contain the received value.

When the S-CSCF receives any response to a third-party REGISTER request, the S-CSCF shall store the value of the "term-ioi" header field parameter received in the P-Charging-Vector header field, if present.

NOTE 3: Any received "term-ioi" header field parameter will be a type 3 IOI. The type 3 IOI identifies the service provider from which the response was sent.

If the S-CSCF fails to receive a SIP response or receives a 408 (Request Timeout) response or a 5xx response to a third-party REGISTER, the S-CSCF shall:

- if the default handling defined in the filter criteria indicates the value "SESSION_CONTINUED" as specified in 3GPP TS 29.228 [14] or no default handling is indicated, no further action is needed; and

- if the default handling defined in the filter criteria indicates the value "SESSION_TERMINATED" as specified in 3GPP TS 29.228 [14], the S-CSCF shall, for a currently registered public user identity, initiate the network-initiated deregistration as described in subclause 5.4.1.5.

5.4.1.7A Including contents in the body of the third-party REGISTER request

If there is a service information XML element provided in the HSS Filter Criteria for an AS (see 3GPP TS 29.228 [14]), then in the third-party REGISTER request the S-CSCF shall:

- include in the message body the service information within the <service-info> XML element which is a child XML element of an <ims-3gpp> element with the "version" attribute set to "1" as described in subclause 7.6; and

- set the value of the content type to the MIME type specified in subclause 7.6.

If there is an Include Register Request XML element provided in the HSS Filter Criteria for an AS (see 3GPP TS 29.228 [14]), then in the third-party REGISTER request the S-CSCF shall:

- include in the message body the incoming SIP REGISTER request within a "message/sip" MIME body as defined in RFC 3261 [26]; and

- set the value of the content type to "message/sip".

If there is an Include Register Response XML element provided in the HSS Filter Criteria for an AS (see 3GPP TS 29.228 [14]), then in the third-party REGISTER request, the S-CSCF shall:

- include in the message body the 200 (OK) response to the incoming SIP REGISTER request within a "message/sip" MIME body as defined in RFC 3261 [26]; and

- set the value of the content type to "message/sip".

If there is more than one message body to be included in the third-party REGISTER request then in the third-party REGISTER request the S-CSCF shall:

- include a multipart message body and set the value of the Content-Type header field to "multipart/mixed" as specified in RFC 2046 [149] and RFC 5621 [150]; and

- set the Content-Type of the elements of the MIME body to the content type specified for the body.

If there is only one message body to be included in the third-party REGISTER request then the S-CSCF sets the Content-Type header field to the content type specified for the body.

5.4.1.8 Service profile updates

NOTE 1: The S-CSCF can receive an update of subscriber data notification on the Cx interface, from the HSS, which can affect the stored information about served public user identities. According to 3GPP TS 29.228 [14], the changes are guaranteed not to affect the default public user identity within the registration implicit set.

When receiving a Push-Profile-Request (PPR) from the HSS (as described in 3GPP TS 29.228 [14]), modifying the service profile of served public user identities, the S-CSCF shall

1) if the modification consists in the addition of a new non-barred public user identity to an implicit set, or in the change of status from barred to non-barred for a public user identity already in the implicit set, add the public user identity to the list of registered, non-barred public user identities;

2) if the modification consists in the deletion of a public user identity while there are no active multimedia session belonging to this public user identity, or in the change of status from non-barred to barred of a public user identity in an implicit set, remove the public user identity from the list of registered, non-barred public user identities;

NOTE 2: As the S-CSCF checks the barring status of the public user identity on receipt of a initial request for a dialog, or a standalone transaction, the above procedures have no impact on transactions or dialogs already in progress and are effective only for new transactions and dialogs.

3) if the modification consists of deletion of a public user identity from an implicit registration set while there are active multimedia session belonging to this public user identity and contact, release these multimedia sessions as described in subclause 5.4.5.1.2 and after all multimedia sessions are released, remove the public user identity from the list of registered, non-barred public user identities; and

4) synchronize with the UE and IM CN entities, by either:

   - performing the procedures for notification of the reg-event subscribers about registration state, as described in subclause 5.4.2.1.2; or

   - triggering the UE to re-register, by shortening the life time of the current registration, as described in subclause 5.4.1.6, e.g. when a new trigger point of Register method is added in the iFCs.

5.4.2 Subscription and notification

5.4.2.1 Subscriptions to S-CSCF events

5.4.2.1.1 Subscription to the event providing registration state

When an incoming SUBSCRIBE request addressed to S-CSCF arrives containing the Event header field with the reg event package, the S-CSCF shall:

1) check if, based on the local policy, the request was generated by a subscriber who is authorised to subscribe to the registration state of this particular user. The authorized subscribers include:

   - all public user identities this particular user owns, that the S-CSCF is aware of, and which are not-barred;

   - all the entities identified by the Path header field (i.e. the P-CSCF to which this user is attached to); and

   - all the ASs listed in the initial filter criteria that are part of the trust domain; and

NOTE 1: The S-CSCF finds the identity for authentication of the subscription in the P-Asserted-Identity header field received in the SUBSCRIBE request.

2) store the value of the "orig-ioi" header field parameter received in the P-Charging-Vector header field if present; and

NOTE 2: Any received "orig-ioi" header field parameter will be a type 3 IOI. The type 3 IOI identifies the service provider from which the request was sent.

3) generate a 2xx response acknowledging the SUBSCRIBE request and indicating that the authorised subscription was successful as described in RFC 3680 [43]. The S-CSCF shall populate the header fields as follows:

   - an Expires header field, set to either the same or a decreased value as the Expires header field in SUBSCRIBE request; and

   - if the request originated from an ASs listed in the initial filter criteria, a P-Charging-Vector header field containing the "orig-ioi" header field parameter, if received in the SUBSCRIBE request, and a type 3 "term-ioi" header field parameter. The S-CSCF shall set the type 3 "term-ioi" header field parameter to a value that identifies the sending network of the response and the "orig-ioi" header field parameter is set to the previously received value of "orig-ioi" header field parameter.

   The S-CSCF may set the Contact header field to an identifier uniquely associated to the SUBSCRIBE request and generated within the S-CSCF, that may help the S-CSCF to correlate refreshes for the SUBSCRIBE.

NOTE 3: The S-CSCF could use such unique identifiers to distinguish between UEs, when two or more users, holding a shared subscription, register under the same public user identity.

Afterwards the S-CSCF shall perform the procedures for notification about registration state as described in subclause 5.4.2.1.2.

If the SUBSCRIBE request originated from an AS listed in the initial filter criteria, for any final response that is not a 2xx response, the S-CSCF shall insert a P-Charging-Vector header field containing the "orig-ioi" header field parameter, if received in the SUBSCRIBE request and a type 3 "term-ioi" header field parameter. The S-CSCF shall set the type 3 "term-ioi" header field parameter to a value that identifies the sending network of the response and the "orig-ioi" header field parameter is set to the previously received value of "orig-ioi" header field parameter.

When the S-CSCF receives a subscription refresh request for a dialog that was established by the UE subscribing to the reg event package, the S-CSCF shall accept the request irrespective if the user's public user identity specified in the SUBSCRIBE request is either registered or has been deregistered.

5.4.2.1.2 Notification about registration state

The UE can bind any one of its public user identities either to its contact address or to a registration flow and the associated contact address (if the multiple registration mechanism is used) via a single registration procedure. When multiple registrations mechanism is used to register a public user identity and bind it to a registration flow and the associated contact address, the S-CSCF shall generate a NOTIFY request that includes one <contact> element for each binding between a public user identity and a registration flow and the associated contact address.

NOTE 1: If the UE binds a given public user identity to the same contact address but several registration flows and the associated contact address (via several registrations), then the NOTIFY request will contain one <contact> element for each registration flow and the associated contact address. Each respective <contact> elements will contain the same contact address in the "uri" sub-element, but different value in the "id" sub-element and different "reg-id" value included in the respective <unknown-param> element.

For every successful registration that creates a new binding between a public user identity and either its contact address or the registration flow and the associated contact address (if the multiple registration mechanism is used, the NOTIFY request shall always include a new <contact> element containing new value in the "id" sub-element, the state attribute set to "active", and event attribute set to either "registered" or "created".

Any successful registration (that creates a new binding between a public user identity and either its contact address or a registration flow and associated contact address) may additionally replace or remove one or more existing bindings. In the NOTIFY request, for each replaced or removed binding, the <contact> element shall have the state attribute set to "terminated" and the event attribute set to "unregistered", "deactivated", or "rejected".

NOTE 2: When multiple registrations mechanism is not used, if the UE registers new contact address then all registrations, if any, using an old contact address are deregistered, i.e. the new registration replaces the old registrations. Hence, for each deregistered public user identity, the NOTIFY request will have the state attribute within the <registration> element set to "terminated" and the state attribute in the <contact> element set to "terminated" and the event attribute set to "unregistered", "deactivated", or "rejected".

NOTE 3: If the UE uses a multiple registrations mechanism to bind a public user identity to a new registration flow the registration flow and the associated contact address, and if the new registration flow replaces an existing registration flow, then for the registration flow and the associated contact address being replaced, the respective <contact> element in the NOTIFY request will have the state attribute set to "terminated" and the event attribute set to "unregistered", "deactivated", or "rejected".

The S-CSCF shall send a NOTIFY request:

- when an event pertaining to the user occurs. In this case the NOTIFY request is sent on all dialogs which have been established due to subscription to the reg event package of that user; and

- as specified in RFC 3265 [28].

When sending a NOTIFY request, the S-CSCF shall not use the default filtering policy as specified in RFC 3680 [43], i.e. the S-CSCF shall always include in every NOTIFY request the state information of all registered public user identities of the user (i.e. the full state information).

NOTE 4: Contact information related to emergency registration is not included.

When generating NOTIFY requests, the S-CSCF shall not preclude any valid reg event package parameters in accordance with RFC 3680 [43].

For each NOTIFY request triggered by an event and on all dialogs which have been established due to subscription to the reg event package of that user, the S-CSCF shall:

1) set the Request-URI and Route header field to the saved route information during subscription;

2) set the Event header field to the "reg" value;

3) in the body of the NOTIFY request, include one <registration> elements for each public user identity that the S-CSCF is aware the user owns.

   If the user shares one or more public user identities with other users, the S-CSCF shall include any contact addresses registered by other users of the shared public user identity in the NOTIFY request;

4) for each <registration> element:

   a) set the aor attribute to one public user identity or if the public user identity of this <registration> element is a wildcarded public user identiy, then choose arbitrarily a public user identity that matches the wildcarded public user identity and the service profile of the wildcarded public user identity and set the aor attribute to this public user identity;

NOTE 5: The value of the aor attribute will not be used by the receiver of the NOTIFY in this release of the specification.

   b) set the <uri> sub-element inside each <contact> sub-element of the <registration> element to the contact address provided by the respective UE as follows:

      I) if the aor attribute of the <registration> element contains a SIP URI, then for each contact address that contains a "+sip.instance" Contact header field parameter, include <pub-gruu> and <temp-gruu> sub-elements within the corresponding <contact> element. The S-CSCF shall set the contents of these elements as specified in RFC 5628 [94]; or

      II) if the aor attribute of the <registration> element contains a tel-URI, determine its alias SIP URI and then include a copy of the <pub-gruu> and <temp-gruu> sub-elements from that equivalent element;

   c) if the respective UE has provided a display-name in a Contact header field, set the <display-name> sub-element inside the respective <contact> sub-element of the <registration> element to the value provided by the UE according to RFC3680 [43];

   d) if the user owns a wildcarded public user identity then include a <wildcardedIdentity> sub-element as described in subclause 7.10.2; and

   e) if the public user identity set in step a):

      I) has been deregistered either by the UE or the S-CSCF (i.e. upon the deregistration, there are no binding left between this public user identity and either a contact address or a registaration flows and associated contact addresses that belong to this user) then:

         - set the state attribute within the <registration> element to "terminated";

         - set the state attribute within each <contact> element belonging to this user to "terminated"; and

         - set the event attribute within each <contact> element to "deactivated", "expired", "unregistered", "rejected" or "probation" according to RFC 3680 [43].

         If the public user identity has been deregistered for this user and this deregistration has already been indicated in the NOTIFY request, and no new registration for this user has occurred, its <registration> element shall not be included in the subsequent NOTIFY requests; or

      II) has been registered by the UE (i.e. the public user identity has not been previously bound either to a contact address or to a registration flow and the associated contact address (if the multiple registration mechanism is used)) then:

- set the <unknown-param> element to any additional header field parameters contained in the Contact header field of the REGISTER request according to RFC 3680 [43];

NOTE 6: If the multiple registration mechanism is used, then the reg-id header field parameter will be included as an <unknown-param> element.

- set the state attribute within the <registration> element to "active"; and:

- set the state attribute within the <contact> element belonging to this user to "active", include new value in the "id" sub-element, and set the event attribute within this <contact> element to "registered"; or

NOTE 7: If this registration, that created new binding, additionally replaces or removes one or more existing registrations, then for the replaced or removed registrations the respective <registration> elements and <contact> elements will be modified accordingly.

III) has been re-registered (i.e. it has been previously registered) then:

- set the state attribute within the <registration> element to "active";

- set the <unknown-param> element to any additional header field parameters contained in the Contact header field of the REGISTER request according to RFC 3680 [43];

- for contact addresses to be registered: set the state attribute within the <contact> element to "active"; and set the event attribute within the <contact> element to "registered"; or

- for contact addresses to be re-registered, set the state attribute within the <contact> element to "active"; and set the event attribute within the <contact> element to "refreshed" or "shortened" according to RFC 3680 [43]; or

- for contact addresses that remain unchanged, if any, leave the <contact> element unmodified (i.e. the event attribute within the <contact> element includes the last event that caused the transition to the respective state); or

IV) has been automatically registered or registered by the S-CSCF, and has not been previously automatically registered:

- set the <unknown-param> element to any additional header field parameters contained in the Contact header field of the original REGISTER request according to RFC 3680 [43];

- set the state attribute within the <registration> element to "active";

- set the state attribute within the <contact> element to "active"; and

- set the event attribute within the <contact> element to "created"; and

V) is hosted (unregistered case) at the S-CSCF:

- set the state attribute within the <registration> element to "terminated";

- set the state attribute within each <contact> element to "terminated"; and

- set the event attribute within each <contact> element to "unregistered".

The S-CSCF shall also terminate the subscription to the registration event package by setting the Subscription-State header field to the value of "terminated"; and

NOTE 8: The value of "init" for the state attribute within the <registration> element is not used.

5) set the P-Charging-Vector header field with the "icid-value" header field parameter populated as specified in 3GPP TS 32.260 [17], and if the NOTIFY request is sent towards an AS listed in the initial filter criteria a type 3 "orig-ioi" header field parameter. The S-CSCF shall set the type 3 "orig-ioi" header field parameter to a value that identifies the sending network of the request. The S-CSCF shall not include the type 3 "term-ioi" header field parameter.

NOTE 9: When sending a NOTIFY request to a subscriber subscribing or unsubscribing to the reg event package, or when the S-CSCF terminates the subscription, the event attribute within the <contact> element includes the last event that caused the transition to the respective state.

The S-CSCF shall only include the non-barred public user identities in the NOTIFY request.

EXAMPLE 1: If sip:user1_public1@home1.net is registered, the public user identity sip:user1_public2@home1.net can automatically be registered. Therefore the entries in the body of the NOTIFY request look like:

```
<?xml version="1.0"?>
<reginfo xmlns="urn:ietf:params:xml:ns:reginfo"
             version="0" state="full">
  <registration aor="sip:user1_public1@home1.net" id="as9"
                state="active">
    <contact id="76" state="active" event="registered">
           <uri>sip:[5555::aaa:bbb:ccc:ddd]</uri>
           <unknown-param name="audio"/>
    </contact>
  </registration>
  <registration aor="sip:user1_public2@home1.net" id="as10"
                state="active">
    <contact id="86" state="active" event="created">
           <uri>sip:[5555::aaa:bbb:ccc:ddd]</uri>
           <unknown-param name="audio"/>
    </contact>
  </registration>
</reginfo>
```

EXAMPLE 2: If sip:user1_public1@home1.net is registered, the public user identity sip:ep_user1@home1.net can automatically be registered. sip:ep_user1@home1.net is a dedicated identity out of the related range indicated in the <wildcardedIdentity> element. Therefore the entries in the body of the NOTIFY request look like:

```
<?xml version="1.0"?>
<reginfo xmlns="urn:ietf:params:xmlns:reginfo"
             xmlns:ere="urn:3gpp:ns:extRegExp:1.0"
             version="0" state="full">
  <registration aor="sip:user1_public1@home1.net" id="as10"
                state="active">
    <contact id="86" state="active" event="created">
           <uri>sip:[5555::aaa:bbb:ccc:ddd]</uri>
    </contact>
   </registration>
   <registration aor="sip:ep_user1@home1.net" id="as11"
                 state="active">
    <contact id="86" state="active" event="created">
           <uri>sip:[5555::aaa:bbb:ccc:ddd]</uri>
    </contact>
    <ere:wildcardedIdentity>sip:ep_user!.*!@home1.net
    </ere:wildcardedIdentity>
   </registration>
</reginfo>
```

When sending a final NOTIFY request with all <registration> element(s) having their state attribute set to "terminated" (i.e. all public user identities have been deregistered, expired or are hosted (unregistered case) at the S-CSCF), the S-CSCF shall also terminate the subscription to the registration event package by setting the Subscription-State header field to the value of "terminated".

When all of a UE's contact addresses have been deregistered (i.e.there is no <contact> element set to "active" for this UE), the S-CSCF shall consider subscription to the reg event package belonging to the UE cancelled (i.e. as if the UE had sent a SUBSCRIBE request with an Expires header field containing a value of zero).

The S-CSCF shall only include the non-barred public user identities in the NOTIFY request.

When the S-CSCF receives any response to the NOTIFY request, the S-CSCF shall store the value of the "term-ioi" header field parameter received in the P-Charging-Vector header field, if present.

NOTE 10: Any received "term-ioi" header field parameter will be a type 3 IOI. The type 3 IOI identifies the service provider from which the response was sent.

5.4.2.1.3 Void

5.4.2.1.4 Void

5.4.3 General treatment for all dialogs and standalone transactions excluding requests terminated by the S-CSCF

5.4.3.1 Determination of UE-originated or UE-terminated case

Upon receipt of an initial request or a target refresh request or a stand-alone transaction, the S-CSCF shall:

- perform the procedures for the UE-originating case as described in subclause 5.4.3.2 if the request makes use of the information for UE-originating calls, which was added to the Service-Route header field entry of the S-CSCF during registration (see subclause 5.4.1.2), e.g. the message is received at a certain port or the topmost Route header field contains a specific user part or parameter; or,

- perform the procedures for the UE-originating case as described in subclause 5.4.3.2 if the topmost Route header field of the request contains the "orig" parameter. The S-CSCF shall remove the "orig" parameter from the topmost Route header field; or,

- perform the procedures for the UE-terminating case as described in subclause 5.4.3.3 if this information is not used by the request.

5.4.3.2 Requests initiated by the served user

For all SIP transactions identified:

- if priority is supported, as containing an authorised Resource-Priority header field, or, if such an option is supported, relating to a dialog which previously contained an authorised Resource-Priority header field;

the S-CSCF shall give priority over other transactions or dialogs. This allows special treatment of such transactions or dialogs.

NOTE 1 The special treatment can include filtering, higher priority processing, routeing, call gapping. The exact meaning of priority is not defined further in this document, but is left to national regulation and network configuration.

When the S-CSCF receives from the UE an initial request for a dialog, which contains a GRUU and an "ob" SIP URI parameter in the Contact header field, and multiple contact addresses have been registered for the specific GRUU, then for all subsequent in-dialog requests sent toward the UE's, the S-CSCF shall populate the Request-URI with the registered contact address from which the UE sent the initial request for the dialog.

NOTE 2: When a given contact address is registered, the S-CSCF can use a dedicated value in its Service-Route header field entry to identify the given contact address. When the S-CSCF receives an initial request for a dialog, the S-CSCF can find out from which contact the address was sent by looking at the preloaded Route header field (constructed from the Service-Route header field returned in the response for the REGISTER request) which contains the entry of the S-CSCF.

When performing SIP digest without TLS, when the S-CSCF receives from the served user an initial request for a dialog or a request for a standalone transaction, the S-CSCF may perform the steps in subclause 5.4.3.6 to challenge the request based on local policy.

NOTE 3: If the user registration is associated with the state "tls-protected", then the execution of Proxy-Authorization as described in subclause 5.4.3.6 is still possible, although it is unlikely this would add additional security provided the P-CSCF is trusted. Thus, in most cases the state "tls-protected" will be reason for the S-CSCF to not desire Proxy-Authentication for this user.

NOTE 4: The option for the S-CSCF to challenge the request does not apply to a request from an AS acting as an originating UA.

When performing GPRS-IMS-Bundled authentication, when the S-CSCF receives from the served user an initial request for a dialog or a request for a standalone transaction, the S-CSCF shall check whether a "received" header field

parameter exists in the Via header field provided by the UE. If a "received" header field parameter exists, S-CSCF shall compare the (prefix of the) IP address received in the "received" header field parameter against the UE's IP address (or prefix) stored during registration. If no "received" header field parameter exists in the Via header field provided by the UE, then S-CSCF shall compare the (prefix of the) IP address received in the "sent-by" parameter against the IP address (or prefix) stored during registration. If the stored IP address (or prefix) and the (prefix of the) IP address in the "received" Via header field parameter provided by the UE do not match, the S-CSCF shall reject the request with a 403 (Forbidden) response. In case the stored IP address (or prefix) and the (prefix of the) IP address in the "received" Via header field parameter provided by the UE do match, the S-CSCF shall proceed as described in the remainder of this subclause.

When the S-CSCF receives from the served user or from a PSI an initial request for a dialog or a request for a standalone transaction, and the request is received either from a functional entity within the same trust domain or contains a valid original dialog identifier (see step 3) or the dialog identifier (From, To and Call-ID header fields) relates to an existing request processed by the S-CSCF, then prior to forwarding the request, the S-CSCF shall:

0) if the request is received from a P-CSCF that does not support the trust domain handling of the P-Served-User header field then remove any P-Served-User header fields;

1) determine the served user as follows:

   a) if the request contains a P-Served-User header field then

      i) determine the served user by taking the identity contained in a P-Served-User header field as defined in RFC 5502 [133]. Then check whether the determined served user is a barred public user identity. In case the said header field contains the served user identity is a barred public user identity for the user, then the S-CSCF shall reject the request by generating a 403 (Forbidden) response. Otherwise, the S-CSCF shall save the public user identity of the served user and continue with the rest of the steps;

   b) if the request does not contain a P-Served-User header field then:

      i) determine the served user by taking the identity contained in one of the URI(s) of the P-Asserted-Identity header field. In case the determined served user is a barred public user identity, then the S-CSCF shall reject the request by generating a 403 (Forbidden) response. Otherwise, the S-CSCF shall save the public user identity of the served user and continue with the rest of the steps; and

      ii) if the P-Asserted-Identity header field contains two URIs and the URI other than the determined served user is not an alias of the determined served user or is barred then act based on local policy, e.g. reject the request by generating a 403 (Forbidden) response or remove the URI not identifying the determined served user from the P-Asserted-Identity header field;

NOTE 5: If the P-Asserted-Identity header field contains a barred public user identity, then the message has been received, either directly or indirectly, from a non-compliant entity which should have had generated the content with a non-barred public user identity.

1A) if the Contact is a GRUU, but is not valid as defined in subclause 5.4.7A.4, then return a 4xx response as specified in RFC 5627 [93];

2) store the value of the "orig-ioi" header field parameter received in the P-Charging-Vector header field if present, and remove it from any forwarded request;

NOTE 6: Any received "orig-ioi" header field parameter will be a type 3 IOI. The type 3 IOI identifies the service provider from which the request was sent (AS initiating a session on behalf of a user or a PSI);

3) check if an original dialog identifier that the S-CSCF previously placed in a Route header field is present in the topmost Route header field of the incoming request.

   - If not present, the S-CSCF shall build an ordered list of initial filter criteria based on the public user identity of the served user (as determined in step 1) of the received request as described in 3GPP TS 23.218 [5].

   - If present, the request has been sent from an AS in response to a previously sent request, an ordered list of initial filter criteria already exists and the S-CSCF shall not change the ordered list of initial filter criteria even if the AS has changed the P-Served-User header field or the or the P-Asserted-Identity header field;

NOTE 7: An original dialog identifier is sent to each AS invoked due to iFC evaluation such that the S-CSCF can associate requests as part of the same sequence that trigger iFC evaluation in priority order (and not rely on SIP dialog information that may change due to B2BUA AS). If the same original dialog identifier is included in more than one request from a particular AS (based on service logic in the AS), then the S-CSCF will continue the iFC evaluation sequence rather than build a new ordered list of iFC;

4) remove its own SIP URI from the topmost Route header field;

4A) if there was an original dialog identifier present in the topmost Route header field of the incoming request and the request is received from a functional entity within the same trust domain and contains a P-Asserted-Service header field, continue the procedure with step 5;

4B) if the request contains a P-Preferred-Service header field, check whether the ICSI value contained in the P-Preferred-Service header field is part of the set of the subscribed services for the served user and determine whether the contents of the request (e.g. SDP media capabilities, Content-Type header field) match the ICSI for the subscribed service:

a) if not, as an operator option, the S-CSCF may reject the request by generating a 403 (Forbidden) response. Otherwise remove the P-Preferred-Service header field and continue with the rest of the steps; and

b) if so, then include a P-Asserted-Service header field in the request containing the ICSI value contained in the P-Preferred-Service header field, remove the P-Preferred-Service header field, and continue the procedure with step 5;

4C) if the request does not contain a P-Preferred-Service header field, check whether the contents of the request match a subscribed service for each and any of the subscribed services for the served user:

a) if not, as an operator option, the S-CSCF may reject the request by generating a 403 (Forbidden) response; and

b) if so, and if the request is related to an IMS communication service and the IMS communication service requires the use of an ICSI value then select an ICSI value for the related IMS communication service and include a P-Asserted-Service header field in the request containing the selected ICSI value; and

c) if so, and if the request is related to an IMS communication service and the IMS communication service does not require the use of an ICSI value then continue without including an ICSI value; and

d) if so, and if the request does not relate to an IMS communication service (or if the S-CSCF is unable to unambiguously determine the service being requested but decides to allow the session to continue) then continue without inclding an ICSI value;

5) check whether the initial request matches any unexecuted initial filter criteria. If there is a match, then the S-CSCF shall select the first matching unexecuted initial filter criteria from the ordered list of initial filter criteria and the S-CSCF shall:

a) insert the AS URI to be contacted into the Route header field as the topmost entry followed by its own URI populated as specified in the subclause 5.4.3.4;

b) if the S-CSCF supports the P-Served-User extension as specified in RFC 5502 [133] insert P-Served-User header field populated with the served user identity as determined in step 1;

c) if the AS is located outside the trust domain then the S-CSCF shall remove the access-network-charging-info parameter in the P-Charging-Vector header field from the request that is forwarded to the AS; if the AS is located within the trust domain, then the S-CSCF shall retain the access-network-charging-info parameter in the P-Charging-Vector header field in the request that is forwarded to the AS; and

d) insert a type 3 "orig-ioi" header field parameter in place of any received "orig-ioi" header field parameters in the P-Charging-Vector header field. The S-CSCF shall set the type 3 "orig-ioi" header field parameter to a value that identifies the sending network of the request. The S-CSCF shall not include the type 3 "term-ioi" header field parameter;

NOTE 8: Depending on the result of processing the filter criteria the S-CSCF might contact one or more AS(s) before processing the outgoing Request-URI.

NOTE 9: An AS can activate or deactivate its own filter criteria via the Sh interface. As the S-CSCF checks initial filter criteria only on receipt of an initial request for a dialog, or a standalone transaction, a modified service profile will have no impact on transactions or dialogs already in progress and the modified profile will be effective only for new transactions and dialogs. If the S-CSCF receives a modification of the iFC during their execution, then it should not update the stored initial Filter Criteria until the iFC related to the initial request have been completely executed.

6) if there was no original dialog identifier present in the topmost Route header field of the incoming request store the value of the "icid-value" header field parameter received in the P-Charging-Vector header field and retain the "icid-value" header field parameter in the P-Charging-Vector header field. Optionally, the S-CSCF may generate a new, globally unique ICID and insert the new value in the "icid-value" header field parameter of the P-Charging-Vector header field when forwarding the message. If the S-CSCF creates a new ICID, then it is responsible for maintaining the two ICID values in the subsequent messaging;

7) in step 5, if the initial request did not match any unexecuted initial filter criteria (i.e. the request is not forwarded to an AS), insert an "orig-ioi" header field parameter into the P-Charging-Vector header field. The S-CSCF shall set the type 2 "orig-ioi" header field parameter to a value that identifies the sending network. The S-CSCF shall not include the type 2 "term-ioi" header field parameter;

8) insert a P-Charging-Function-Addresses header field populated with values received from the HSS if the request does not contain a Charging-Function-Addresses header field and the message is forwarded within the S-CSCF home network, including towards AS;

9) if there was no original dialog identifier present in the topmost Route header field of the incoming request and if the served user is not considered a priviledged sender then:

   a) if the P-Asserted-Identity header field contains only a SIP URI and if the S-CSCF has knowledge that the SIP URI contained in the received P-Asserted-Identity header field is an alias SIP URI for a tel URI, add a second P-Asserted-Identity header field containing this tel URI, including the display name associated with the tel URI, if available; and

   b) if the P-Asserted-Identity header field contains only a tel URI, the S-CSCF shall add a second P-Asserted-Identity header field containing a SIP URI. The added SIP URI shall contain in the user part a "+" followed by the international public telecommunication number contained in tel URI, and user's home domain name in the hostport part. The added SIP URI shall contain the same value in the display name as contained in the tel URI. The S-CSCF shall also add a "user" SIP URI parameter equals "phone" to the SIP URI;

NOTE 10: The S-CSCF recognizes that a given SIP URI is an alias SIP URI of a tel URI, since this grouping is sent from the HSS (see 3GPP TS 29.228 [14]). If tel URI is shared URI so is the alias SIP URI.

10) if the request is not forwarded to an AS and if the outgoing Request-URI is:

- a SIP URI with the user part starting with a + and the "user" SIP URI parameter equals "phone", and if configured per local operator policy, the S-CSCF shall perform the procedure described here. Local policy can dictate whether this procedure is performed for all domains of the SIP URI, only if the domain belongs to the home network, or not at all. If local policy indicates that the procedure is to be performed, then the S-CSCF shall translate the international public telecommunications number contained in the user part of the SIP URI (see RFC 3966 [22]) to a globally routeable SIP URI using either an ENUM/DNS translation mechanism with the format specified in RFC 3761 [24], or any other available database. Database aspects of ENUM are outside the scope of the present document. An S-CSCF that implements the additional routeing functionality described in annex I may forward the request without attempting translation. If a translation is in fact performed and it succeeds, the S-CSCF shall update the Request-URI with the globally routeable SIP URI either returned by ENUM/DNS or obtained from any other available database. If this translation fails, the request may be forwarded to a BGCF or any other appropriate entity (e.g. a MRFC to play an announcement) in the originator's home network or the S-CSCF may send an appropriate SIP response to the originator. When forwarding the request to a BGCF or any other appropriate entity, the S-CSCF shall leave the original Request-URI containing the SIP URI with "user" SIP URI parameter equals phone unmodified. If the request is forwarded, the S-CSCF shall remove the access-network-charging-info parameter from the P-Charging-Vector header field prior to forwarding the message;

- a SIP URI with a "user" SIP URI parameter equals "dialstring" and the domain name of the SIP URI belongs to the home network (i.e. the local number analysis and handling is either failed in the appropriate AS or the request has not been forwarded to AS for local number analysis and handling at all), either forward the

request to any appropriate entity (e.g a MRFC to play an announcement) in the originator's home network or send an appropriate SIP response to the originator;

- a SIP URI with a local number (see RFC 3966 [22]) in the user part and a "user" SIP URI parameter equals "phone" and the domain name of the SIP URI belongs to the home network (i.e. the local number analysis and handling is either failed in the appropriate AS or the request has not been forwarded to AS for local number analysis and handling at all), either forward the request to to a BGCFor any appropriate entity (e.g a MRFC to play an announcement) in the originator's home network or send an appropriate SIP response to the originator;

- a tel URI containing a global number (see RFC 3966 [22]) in the international format, the S-CSCF shall translate the E.164 address) to a globally routeable SIP URI using either an ENUM/DNS translation mechanism with the format specified in RFC 3761 [24], or any other available database. Database aspects of ENUM are outside the scope of the present document. An S-CSCF that implements the additional routeing functionality described in Annex I may forward the request without attempting translation. If this translation is in fact performed and it succeeds, the S-CSCF shall update the Request-URI with the globally routeable SIP URI returned by ENUM/DNS. If this translation fails, the request may be forwarded to a BGCF or any other appropriate entity (e.g a MRFC to play an announcement) in the originator's home network or the S-CSCF may send an appropriate SIP response to the originator. When forwarding the request to a BGCF or any other appropriate entity, the S-CSCF shall leave the original Request-URI containing the tel URI unmodified. If the request is forwarded, the S-CSCF shall remove the access-network-charging-info parameter from the P-Charging-Vector header field prior to forwarding the message;

- a tel URI in non-international format (i.e. the local service number analysis and handling is either failed in the appropriate AS or the request has not been forwarded to AS for local service number analysis and handling at all), either forward the request to a BGCF or any other appropriate entity (e.g. a MRFC to play an announcement) in the originator's home network or send an appropriate SIP response to the originator; and

- a pres URI or an im URI, the S-CSCF shall forward the request as specified in RFC 3861 [63]. In this case, the S-CSCF shall not modify the received Request-URI.

NOTE 11: If there is no SIP-based transport found after applying the procedure specified in RFC 3861 [63], the S-CSCF can forward the request to a translating gateway.

Additional procedures apply if the S-CSCF supports NP capabilities and these capabilities are enabled by local policy, and the database used for translation from an international public telecommunications number to a SIP URI also provides NP data (for example, based on the PSTN Enumservice as defined by RFC 4769 [114] or other appropriate data bases) . If the above translation from an international public telecommunications number to a SIP URI failed, but NP data was obtained from the database and there is no "npdi" parameter in the received request, then the S-CSCF shall, based on operator policy, update the URI in the Request-URI with the obtained NP data, prior to forwarding the request to the BGCF or other appropriate entity. If the received request already contains a tel-URI "npdi" parameter, then the S-CSCF may update the URI with the obtained NP data. The URI is updated by the S-CSCF by adding NP parameters defined by RFC 4694 [112]. If the Request-URI is a tel-URI, then an "npdi" tel-URI parameter is added to indicate that NP data retrieval has been performed, and if the number is ported, an "rn" tel-URI parameter is added to identify the ported-to routeing number. If the Request-URI is in the form of a SIP URI user=phone, the "npdi" and "rn" tel-URI parameters are added as described above to the userinfo part of the SIP URI;

11) determine the destination address (e.g. DNS access) using the URI placed in the topmost Route header field if present, otherwise based on the Request-URI. If the destination requires interconnect functionalities (e.g. the destination address is of an IP address type other than the IP address type used in the IM CN subsystem), the S-CSCF shall forward the request to the destination address via an IBCF in the same network;

12) if network hiding is needed due to local policy, put the address of the IBCF to the topmost Route header field;

13) in case of an initial request for a dialog:

a) determine the need for GRUU processing. GRUU processing is required if:

- an original dialog identifier that the S-CSCF previously placed in a Route header field is not present in the topmost Route header field of the incoming request (this means the request is not returning after having been sent to an AS), and

- the contact address contains a GRUU that was assigned by the S-CSCF that is valid as specified in subclause 5.4.7A.4.

b) if GRUU processing is not required and the initial request originated from a served user, then determine the need to record-route for other reasons:

- if the request is routed to an AS which is part of the trust domain, the S-CSCF can decide whether to record-route or not. The decision is configured in the S-CSCF using any information in the received request that may otherwise be used for the initial filter criteria. If the request is record-routed the S-CSCF shall create a Record-Route header field containing its own SIP URI; or

- if the request is routed elsewhere, create a Record-Route header field containing its own SIP URI;

NOTE 12: For requests originated from a PSI the S-CSCF can decide whether to record-route or not based on operator policy.

c) if GRUU processing is required, the S-CSCF shall create a Record-Route header field containing its own SIP URI;

d) if GRUU processing is required, the S-CSCF shall save an indication that GRUU-routeing is to be performed for in-dialog requests that reach the S-CSCF because of the Record-route header field added in step c);

NOTE 13: The manner of representing the GRUU-routeing indication is a private matter for the S-CSCF. The indication is used during termination processing of in-dialog requests to cause the S-CSCF to replace a Request-URI containing a GRUU with the corresponding registered contact address. It can be saved using values in the Record-Route header field, or in dialog state.

14) based on the destination user (Request-URI), remove any P-Access-Network-Info header field and the access-network-charging-info parameter in the P-Charging-Vector header field prior to forwarding the message;

14A) if the request is not routed to an AS, remove the P-Served-User header field prior to forwarding the request;

15) route the request based on SIP routeing procedures; and

16) if the request is an INVITE request, save the Contact, Cseq and Record-Route header field values received in the request such that the S-CSCF is able to release the session if needed.

When the S-CSCF receives, an initial request for a dialog or a request for a standalone transaction, from an AS acting on behalf of an unregistered user, the S-CSCF shall:

1) execute the procedures described in the steps 1, 2, 3, 4, 4A, 4B, 4C, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 and 16 in the above paragraph (when the S-CSCF receives, from a registered served user, an initial request for a dialog or a request for a standalone transaction).

NOTE 14: When the S-CSCF does not have the user profile, before executing the actions as listed above, it initiates the S-CSCF Registration/deregistration notification procedure, as described in 3GPP TS 29.228 [14]; with the purpose of downloading the relevant user profile (i.e. for unregistered user) and informs the HSS that the user is unregistered. The S-CSCF will assess triggering of services for the unregistered user, as described in 3GPP TS 29.228 [14].

When the S-CSCF receives a request initiated by the served user for which the S-CSCF does not have the user profile or does not trust the data that it has (e.g. due to restart), the S-CSCF shall attempt to retrieve the user profile from the HSS. If the S-CSCF fails to retrieve the user profile and the S-CSCF supports restoration procedures, then the S-CSCF shall:

1) reject the request by returning a 504 (Server Time-out) response to the UE;

2) assume that the UE supports version 1 of the XML Schema for the 3GPP IM CN subsystem XML body if support for the 3GPP IM CN subsystem XML body as described in subclause 7.6 in the Accept header field is not indicated; and

3) include in the 504 (Server Time-out) response:

- a Content-Type header field with the value set to associated MIME type of the 3GPP IM CN subsystem XML body as described in subclause 7.6.1;

- a P-Asserted-Identity header field set to the value of the SIP URI of the S-CSCF included in the Service-Route header field (see subclause 5.4.1.2.2F) during the registration of the user whose UE sent the request causing this response; and

- a 3GPP IM CN subsystem XML body:

  a) an <ims-3gpp> element with the "version" attribute set to "1" and with an <alternative-service> child element, set to the parameters of the alternative service:

     i) a <type> child element, set to "restoration" (see table 7.7AA) to indicate that restoration procedures are supported;

     ii) a <reason> child element, set to an operator configurable reason; and

     iii) an <action> child element, set to "initial-registration" (see table 7.7AB).

NOTE 15: These procedures do not prevent the usage of unspecified reliability or recovery techniques above and beyond those specified in this subclause.

If the S-CSCF fails to receive a SIP response or receives a 408 (Request Timeout) response or a 5xx response from the AS, the S-CSCF shall:

- if the default handling defined in the filter criteria indicates the value "SESSION_CONTINUED" as specified in 3GPP TS 29.228 [14] or no default handling is indicated, execute the procedure from step 5; and

- if the default handling defined in the filter criteria indicates the value "SESSION_TERMINATED" as specified in 3GPP TS 29.228 [14], either forward the received response or, if the request is an initial INVITE request, send a 408 (Request Timeout) response or a 5xx response towards the served UE as appropriate (without verifying the matching of filter criteria of lower priority and without proceeding for further steps).

If the S-CSCF receives any final response from the AS, the S-CSCF shall forward the response towards the served UE (without verifying the matching of filter criteria of lower priority and without proceeding for further steps).

When the S-CSCF receives any response to the above request, the S-CSCF may:

1) apply any privacy required by RFC 3323 [33] and RFC 3325 [34] to the P-Asserted-Identity header field.

NOTE 16: The P-Asserted-Identity header field would normally only be expected in 1xx or 2xx responses.

NOTE 17: The optional procedure above is in addition to any procedure for the application of privacy at the edge of the trust domain specified by RFC 3325 [34].

When the S-CSCF receives any response to the above request containing a "term-ioi" header field parameter, the S-CSCF shall store the value of the received "term-ioi" header field parameter received in the P-Charging-Vector header field, if present, and remove all received "orig-ioi" and "term-ioi" header field parameters from the forwarded response if next hop is not an AS.

NOTE 18: Any received "term-ioi" header field parameter will be a type 2 IOI or type 3 IOI. The IOI identifies the sending network of the response message.

When the S-CSCF receives any response to the above request, and forwards it to AS, the S-CSCF shall insert a P-Charging-Vector header field containing the "orig-ioi" header field parameter, if received in the request, and a type 3 "term-ioi" header field parameter in the response. The S-CSCF shall set the type 3 "term-ioi" header field parameter to a value that identifies the sending network of the response and the type 3 "orig-ioi" header field parameter is set to the previously received value of type 3 "orig-ioi" header field parameter.

When the S-CSCF receives any 1xx or 2xx response to the initial request for a dialog, if the response corresponds to an INVITE request, the S-CSCF shall save the Contact and Record-Route header field values in the response in order to be able to release the session if needed.

When the S-CSCF receives any 1xx or 2xx response to an initial request for a dialog or a request for a standalone transaction, if the response is forwarded within the S-CSCF home network and not to an AS, the S-CSCF shall insert a P-Charging-Function-Addresses header field populated with values received from the HSS.

When the S-CSCF, upon sending an initial INVITE request that includes an IP address in the SDP offer (in "c=" parameter), receives an error response indicating that the the IP address type is not supported, (e.g., the S-CSCF

receives the 488 (Not Acceptable Here) with 301 Warning header field indicating "incompatible network address format"), the S-CSCF shall either:

- fork the initial INVITE request to the IBCF; or

- process the error response and forward it using the Via header field.

NOTE 19: If the S-CSCF knows that the originating UE supports both IPv6 and IPv4 addresses simultaneously, the S-CSCF will forward the error response to the UE using the Via header field.

When the S-CSCF receives from the served user a target refresh request for a dialog, prior to forwarding the request the S-CSCF shall:

0A) if the dialog is related to an IMS communication service determine whether the contents of the request (e.g. SDP media capabilities, Content-Type header field) match the IMS communication service as received as the ICSI value in the P-Asserted-Service header field in the initial request. As an operator option, if the contents of the request do not match the IMS communication service the S-CSCF may reject the request by generating a status code reflecting which added contents are not matching. Otherwise, continue with the rest of the steps;

1) remove its own URI from the topmost Route header field;

2) create a Record-Route header field containing its own SIP URI;

3) for INVITE dialogs (i.e. dialogs initiated by an INVITE request), save the Contact and Cseq header field values received in the request such that the S-CSCF is able to release the session if needed;

4) in case the request is routed towards the destination user (Request-URI) or in case the request is routed to an AS located outside the trust domain, remove the access-network-charging-info parameter in the P-Charging-Vector header field; and

5) route the request based on the topmost Route header field.

When the S-CSCF receives any 1xx or 2xx response to the target refresh request for an INVITE dialog, the S-CSCF shall replace the saved Contact header field values in the response such that the S-CSCF is able to release the session if needed.

When the S-CSCF receives from the served user a subsequent request other than a target refresh request for a dialog, prior to forwarding the request the S-CSCF shall:

1) remove its own URI from the topmost Route header field;

2) in case the request is routed towards the destination user (Request-URI) or in case the request is routed to an AS located outside the trust domain, remove the access-network-charging-info parameter in the P-Charging-Vector header field; and

3) route the request based on the topmost Route header field;

With the exception of 305 (Use Proxy) responses, the S-CSCF shall not recurse on 3xx responses.

5.4.3.3 Requests terminated at the served user

For all SIP transactions identified:

- if priority is supported, as containing an authorised Resource-Priority header field, or, if such an option is supported, relating to a dialog which previously contained an authorised Resource-Priority header field;

the S-CSCF shall give priority over other transactions or dialogs. This allows special treatment such trasactions or dialogs.

NOTE 1: The special treatment can include filtering, higher priority processing, routeing, call gapping. The exact meaning of priority is not defined further in this document, but is left to national regulation and network configuration.

When the S-CSCF receives, destined for a statically pre-configured PSI or a registered served user, an initial request for a dialog or a request for a standalone transaction, and the request is received either from a functional entity within the

same trust domain or contains a valid original dialog identifier or the dialog identifier (From, To and Call-ID header fields) relates to an existing request processed by the S-CSCF, then prior to forwarding the request, the S-CSCF shall:

1) check if an original dialog identifier that the S-CSCF previously placed in a Route header field is present in the topmost Route header field of the incoming request.

   - If present, the request has been sent from an AS in response to a previously sent request.

   - If not present, it indicates that the request is visiting the S-CSCF for the first time and in this case the S-CSCF shall determine the served user by taking the identity contained in the Request-URI. If the Request-URI is a temporary GRUU assigned by the S-CSCF as defined in subclause 5.4.7A.3, then take the public user identity that is associated with the temporary GRUU to be the served user identity. Then check whether the determined served user identity is a barred public user identity. In case the served user identity is a barred public user identity for the user, then the S-CSCF shall reject the request by generating a 404 (Not Found) response. Otherwise, the S-CSCF shall save the Request-URI from the request, the served user identity and the public user identity of the served user and continue with the rest of the steps;

NOTE 2: An original dialog identifier is sent to each AS invoked due to iFC evaluation such that the S-CSCF can associate requests as part of the same sequence that trigger iFC evaluation in priority order (and not rely on SIP dialog information that may change due to B2BUA AS). If the same original dialog identifier is included in more than one request from a particular AS (based on service logic in the AS), then the S-CSCF will continue the iFC evaluation sequence rather than build a new ordered list of iFC;

2) remove its own URI from the topmost Route header field;

2A) if there was no original dialog identifier present in the topmost Route header field of the incoming request build an ordered list of initial filter criteria based on the public user identity in the Request-URI of the received request as described in 3GPP TS 23.218 [5].

NOTE 3: When the S-CSCF does not have the user profile, before executing the actions as listed above, it initiates the S-CSCF Registration/deregistration notification procedure, as described in 3GPP TS 29.228 [14]; with the purpose of downloading the relevant user profile (i.e. for unregistered user) and informs the HSS that the user is unregistered. The S-CSCF will assess triggering of services for the unregistered user, as described in 3GPP TS 29.228 [14].

3) if there was an original dialog identifier present in the topmost Route header field of the incoming request then check whether the Request-URI matches the saved Request-URI. The Request-URI and saved Request-URI are considered a match:

   a) if the canonical forms of the two Request-URI are equal to the saved value of the Request-URI;

   b) if the Request-URI is a GRUU (public or temporary) and the saved value of the Request-URI is a GRUU (public or temporary) and both GRUUs represent the same public user identity; or

   c) if the Request-URI is an alias SIP URI of the saved value of the Request-URI.

NOTE 4: The canonical form of the Request-URI is obtained by removing all URI parameters (including the user-param), and by converting any escaped characters into unescaped form. The alias SIP URI is defined in subclause 3.1.

If there is no match, then the S-CSCF shall decide whether to trigger the originating services to be executed after retargeting. The decision is configured in the S-CSCF and may use any information in the received request that is used for the initial filter criteria or an operator policy. The S-CSCF shall decide either to:

NOTE 5: The S-CSCF will assess triggering of services for the originating services after retargeting, as described in 3GPP TS 29.228 [14] "Assess triggering of services for the originating services after retargeting" means setting the SessionCase parameter (defined in 3GPP TS 29.228 [14]) to a value belonging to the "originating services after retargeting" case.

   a) stop evaluating current iFC. In that case, if the request is an INVITE request, save the Contact, CSeq and Record-Route header field values received in the request such that the S-CSCF is able to release the session if needed, forward the request based on the topmost Route header field or if not available forward the request based on the Request-URI (routeing based on Request-URI is specified in steps 7 and 10 through 14a from subclause 5.4.3.2) and skip the following steps; or

b) stop evaluating current iFC and build an ordered list of iFC with the originating services to be executed after retargeting as described in 3GPP TS 23.218 [5] criteria based on the public user identity of the served user and start the evaluation of that iFC as described in subclause 5.4.3.2 starting at step 4A of subclause 5.4.3.2;

NOTE 6: The identity of the served user can be obtained from the History-Info header field (see RFC 4244 [66]) or the P-Served User header field as specified in RFC 5502 [133]. The served user can be a public user identity, a public GRUU, or a temporary GRUU. It needs to be ensure, that all ASs in the iFC can determine the served user correctly.

NOTE 7: The S-CSCF determines whether to apply a) or b) based on information in the initial Filter Criteria.

3A) if the Request-URI is a GRUU, but is not valid as defined in subclause 5.4.7A.4, then return a 4xx response as specified in RFC 5627 [93];

3B) if the Request-URI contains a public GRUU and the saved value of the Request-URI is a temporary GRUU, then replace the Request-URI with the saved value of the Request-URI;

3C) if the request contains a P-Asserted-Service header field check whether the IMS communication service identified by the ICSI value contained in the P-Asserted-Service header field is allowed by the subscribed services for the served user:

a) if so, continue from step 4; and

b) if not, as an operator option, the S-CSCF may reject the request by generating a 403 (Forbidden) response. Otherwise, remove the P-Asserted-Service header field and continue with the rest of the steps;

3D) if the request does not contain a P-Asserted-Service header field check if the contents of the request matches a subscribed service (e.g. SDP media capabilities, Content-Type header field) for each and any of the subscribed services for the served user:

a) if not, as an operator option, the S-CSCF may reject the request by generating a 403 (Forbidden) response. Otherwise, continue with the rest of the steps; and

b) if so, and if the request is related to an IMS communication service and the IMS communication service requires the use of an ICSI value then include a P-Asserted-Service header field in the request containing the ICSI value for the related IMS communication service, and use it as a header field in the initial request when matching initial filter criteria in step 4; and

c) if so, and if the request is related to an IMS communication service and the IMS communication service does not require the use of an ICSI value then continue without including an ICSI value; and

d) if so, and if the request does not relate to an IMS communication service (or if the S-CSCF is unable to unambiguously determine the service being requested but decides to allow the session to continue) then continue without inclding an ICSI value;

4) check whether the initial request matches any unexecuted initial filter criteria based on the public user identity of the served user in the priority order and apply the filter criteria on the SIP method as described in 3GPP TS 23.218 [5] subclause 6.5. If there is a match, then the S-CSCF shall select the first matching unexecuted initial filter criteria and:

- if the Request-URI is a temporary GRUU as defined in section 5.4.7A.3, then replace the Request-URI with the public GRUU that is associated with the temporary GRUU (i.e. the public GRUU representing the same public user identity and instance ID as the temporary GRUU);

- insert the AS URI to be contacted into the Route header field as the topmost entry followed by its own URI populated as specified in the subclause 5.4.3.4;

- if the S-CSCF supports the P-Served-User extension as specified in RFC 5502 [133], insert the P-Served-User header field populated with the served user identity as determined in step 1; and

- insert a type 3 "orig-ioi" header field parameter replacing any received "orig-ioi" header field parameter in the P-Charging-Vector header field. The type 3 "orig-ioi" header field parameter identifies the sending network of the request message before the received "orig-ioi" header field parameter. The S-CSCF shall not include the type 3 "term-ioi" header field parameter;

NOTE 8: Depending on the result of the previous process, the S-CSCF can contact one or more AS(s) before processing the outgoing Request-URI.

NOTE 9: If the Request-URI of the received terminating request contains a temporary GRUU, then step 4 replaces the Request-URI with the associated public GRUU before invoking the AS, and step 3B restores the original temporary GRUU when the request is returned from the AS.

NOTE 10: An AS can activate or deactivate its own filter criteria via the Sh interface. As the S-CSCF checks initial filter criteria only on receipt of an initial request for a dialog, or a standalone transaction, a modified service profile will have no impact on transactions or dialogs already in progress and the modified profile will be effective only for new transactions and dialogs. If the S-CSCF receives a modification of the iFC during their execution, then it should not update the stored initial Filter Criteria until the iFC related to the initial request have been completely executed.

5) if there was no original dialog identifier present in the topmost Route header field of the incoming request insert a P-Charging-Function-Addresses header field, if not present, populated with values received from the HSS if the message is forwarded within the S-CSCF home network, including towards AS;

6) if there was no original dialog identifier present in the topmost Route header field of the incoming request store the value of the "icid-value" header field parameter received in the P-Charging-Vector header field and retain the "icid-value" header field parameter in the P-Charging-Vector header field;

7) if there was no original dialog identifier present in the topmost Route header field of the incoming request store the value of the "orig-ioi" header field parameter received in the P-Charging-Vector header field, if present, and remove received "orig-ioi" and "term-ioi" header field parameters from the forwarded request if next hop is not an AS;

NOTE 11: Any received "orig-ioi" header field parameter will be a type 2 IOI. or type 3 IOI. The type 2 IOI identifies the sending network of the request message.

8) in the case:

   i) there are no Route header fields in the request; and

   ii) there are bindings saved during registration or re-registration as described in subclause 5.4.1.2 which are not marked as created by an emergency registration as described in subclause 5.4.8.2;

   then, create a target set of potential routes from the the list of preloaded routes associated with the bindings in item 8) ii), as follows:

   a) if the Request-URI contains a valid GRUU assigned by the S-CSCF as defined in subclause 5.4.7A.4, then the target set is determined by following the procedures for Request Targeting specified in RFC 5627 [93], using the public user identity and instance ID derived from the GRUU using the procedures of subclause 5.4.7A;

   b) if the Request-URI contains a public user identity or a GRUU not assigned by the S-CSCF, then the target set is all the registered contacts saved for the destination public user identity;

NOTE 12: In this release of the specification, use of preloaded routes saved during registration or re-registration which created or refreshed bindings marked as created by an emergency registration is out of scope.

9) if necessary perform the caller preferences to callee capabilities matching according to RFC 3841 [56B] to the target set;

NOTE 13: This might eliminate entries and reorder the target set.

10) in case there are no Route header fields in the request:

   a) if there is more than one route in the target set determined in steps 8) and 9) above:

      - if the fork directive in the Request Disposition header field was set to "no-fork", use the contact with the highest qvalue parameter to build the target URI. In case no qvalue parameters were provided, the S-CSCF shall decide locally what contact address to be used to build the target URI; otherwise

      - fork the request or perform sequential search based on the relative preference indicated by the qvalue parameter of the Contact header field in the original REGISTER request, as described in RFC 3261 [26].

In case no qvalue parameters were provided, then the S-CSCF determine the contact address to be used to build the target URI as directed by the Request Disposition header field as described in RFC 3841 [56B]. If the Request-Disposition header field is not present, the S-CSCF shall decide locally whether to fork or perform sequential search among the contact addresses;

- in case that no route is chosen, return a 480 (Temporarily unavailable) response or another appropriate unsuccessful SIP response and terminate these procedures.

b) If no "loose route" indication has been received, in the service profile of the served public user identity, from the HSS during registration, build the Request-URI with the contents of the target URI determined in the previous step, otherwise the Request-URI is retained as received;

c) insert a P-Called-Party-ID SIP header field containing the contents of the Request-URI received in the request unless the Request-URI contains a temporary GRUU in which case insert the public GRUU in the P-Called-Party-ID;

d) build the Route header field with the Path values from the chosen route and if "loose route" indication has been received, in the service profile of the served user identity, from the HSS during registration and the selected contact address was not registered as described in RFC 5626 [92], add the content of the target URI determined in step a), as last URI of the route. If the selected contact address was registered as described in RFC 5626 [92], the target URI determined in step a) is not added to the Route header field; and

e) save the Request-URI and the total number of Record-Route header fields as part of the dialog request state.

NOTE 14: For each initial dialog request terminated at a served user two pieces of state are maintained to assist in processing GRUUs: the chosen contact address to which the request is routed; and the position of an entry for the S-CSCF in the Record-Route header field that will be responsible for GRUU translation, if needed (the position is the number of entries in the list before the entry was added). The entry will be added in step 5) of the below procedures for handling S-CSCF receipt any 1xx or 2xx response to the initial request for a dialog. The S-CSCF can record-route multiple times, but only one of those (the last) will be responsible for gruu translation at the terminating end.

11) if the request is an INVITE request, save the Contact, CSeq and Record-Route header field values received in the request such that the S-CSCF is able to release the session if needed;

12) optionally, apply any privacy required by RFC 3323 [33] and RFC 3325 [34] to the P-Asserted-Identity header field and privacy required by RFC 4244 [66];

NOTE 15: The optional procedure above is in addition to any procedure for the application of privacy at the edge of the trust domain specified by RFC 3325 [34].

13) in case of an initial request for a dialog, either:

- if the request is routed to an AS which is part of the trust domain, the S-CSCF can decide whether to record-route or not. The decision is configured in the S-CSCF using any information in the received request that may otherwise be used for the initial filter criteria. If the request is record-routed the S-CSCF shall create a Record-Route header field containing its own SIP URI; or

- if the request is routed elsewhere, create a Record-Route header field containing its own SIP URI;

13A) if the request is routed to the P-CSCF remove the P-User-Database header field and P-Served-User header field if present; and

14) forward the request based on the topmost Route header field.

If the S-CSCF fails to receive a SIP response or receives a 408 (Request Timeout) response or a 5xx response from the AS, the S-CSCF shall:

- if the default handling defined in the filter criteria indicates the value "SESSION_CONTINUED" as specified in 3GPP TS 29.228 [14] or no default handling is indicated, execute the procedure from step 4; and

- if the default handling defined in the filter criteria indicates the value "SESSION_TERMINATED" as specified in 3GPP TS 29.228 [14], either forward the received response or, if the request is an initial INVITE request, send a 408 (Request Timeout) response or a 5xx response towards the originating UE as appropriate (without verifying the matching of filter criteria of lower priority and without proceeding for further steps).

If the S-CSCF receives any final response from the AS, the S-CSCF shall forward the response towards the originating UE (without verifying the matching of filter criteria of lower priority and without proceeding for further steps).

When the S-CSCF receives any response to the above request and forwards it to AS, the S-CSCF shall insert a P-Charging-Vector header field containing the "orig-ioi" header field parameter, if received in the request, and a type 3 "term-ioi" header field parameter in the response. The S-CSCF shall set the type 3 "term-ioi" header field parameter to a value that identifies the sending network of the response and the "orig-ioi" header field parameter is set to the previously received value of "orig-ioi" header field parameter.

NOTE 16: Any received "term-ioi" header field parameter will be a type 3 IOI. The type 3 IOI identifies the service provider from which the response was sent.

When the S-CSCF receives, destined for an unregistered user, an initial request for a dialog or a request for a standalone transaction, the S-CSCF shall:

1) Void.

2) execute the procedures described in 1, 2, 3, 3C, 3D, 4, 5, 6, 7, 11, 13, 13B, 13C and 14 in the above paragraph (when the S-CSCF receives, destined for the registered served user, an initial request for a dialog or a request for a standalone transaction).

3) In case that no more AS needs to be contacted, then S-CSCF shall return an appropriate unsuccessful SIP response. This response may be a 480 (Temporarily unavailable) and terminate these procedures.

NOTE 17: When the S-CSCF does not have the user profile, before executing the actions as listed above, it initiates the S-CSCF Registration/deregistration notification procedure, as described in 3GPP TS 29.228 [14]; with the purpose of downloading the relevant user profile (i.e. for unregistered user) and informs the HSS that the user is unregistered. The S-CSCF will assess triggering of services for the unregistered user, as described in 3GPP TS 29.228 [14]. When requesting the user profile the S-CSCF can include the information in the P-Profile-Key header field in S-CSCF Registration/deregistration notification.

Prior to performing S-CSCF Registration/Deregistration procedure with the HSS, the S-CSCF decides which HSS to query, possibly as a result of a query to the Subscription Locator Functional (SLF) entity as specified in 3GPP TS 29.228 [14] or use the value as received in the P-User-Database header field in the initial request for a dialog or a request for a standalone transaction as defined in RFC 4457 [82]. The HSS address received in the response to SLF query can be used to address the HSS of the public user identity with further queries.

If the HSS indicates to the S-CSCF that there is already another S-CSCF assigned for the user, the S-CSCF shall return a 305 (Use Proxy) response containing the SIP URI of the assigned S-CSCF received from the HSS in the Contact header field.

When the S-CSCF receives any 1xx or 2xx response to the initial request for a dialog (whether the user is registered or not), the S-CSCF shall:

1) if the response corresponds to an INVITE request, save the Contact and Record-Route header field values in the response such that the S-CSCF is able to release the session if needed;

2) if the response is not forwarded to an AS (i.e. the response is related to a request that was matched to the first executed initial filter criteria), insert a type 2 "term-ioi" header field parameter in the P-Charging-Vector header field of the outgoing response. The type 2 "term-ioi" header field is set to a value that identifies the sending network of the response and the "orig-ioi" header field parameter is set to the previously received value of "orig-ioi" header field parameter. Values of "orig-ioi" and "term-ioi" header field parameters in the received response are removed;

3) in case the served user is not considered a priviledged sender then:

   a) if the P-Asserted-Identity header field contains only a SIP URI and in the case where the S-CSCF has knowledge that the SIP URI contained in the received P-Asserted-Identity header field is an alias SIP URI for a tel URI, the S-CSCF shall add a second P-Asserted-Identity header field containing this tel URI, including the display name associated with the tel URI, if available; and

   b) if the P-Asserted-Identity header field contains only a tel URI, the S-CSCF shall add a second P-Asserted-Identity header field containing a SIP URI. The added SIP URI shall contain in the user part a "+" followed by the international public telecommunication number contained in tel URI, and user's home domain name in

the hostport part. The added SIP URI shall contain the same value in the display name as contained in the tel URI. The S-CSCF shall also add a "user" SIP URI parameter equals "phone" to the SIP URI;

4) in case the response is sent towards the originating user, the S-CSCF may retain the P-Access-Network-Info header field based on local policy rules and the destination user (Request-URI);

5) save an indication that GRUU routeing is to be performed for subsequent requests sent within this same dialog if:

   a) there is a record-route position saved as part of the initial dialog request state; and

   b) the contact address in the response is a valid GRUU assigned by the S-CSCF as specified in subclause 5.4.7A.4; and

NOTE 18: There could be several responses returned for a single request, and the decision to insert or modify the Record-Route needs to be applied to each. But a response might also return to the S-CSCF multiple times as it is routed back through AS. The S-CSCF will take this into account when carrying out step 5) to ensure that the information is stored only once.

6) if the response is forwarded within the S-CSCF home network and not to an AS, insert a P-Charging-Function-Addresses header field populated with values received from the HSS.

When the S-CSCF receives a response to a request for a standalone transaction (whether the user is registered or not), then:

1) in case the served user is not considered a priviledged sender then

   a) if the P-Asserted-Identity header field contains only a SIP URI and in the case where the S-CSCF has knowledge that the SIP URI contained in the received P-Asserted-Identity header field is an alias SIP URI for a tel URI, the S-CSCF shall add a second P-Asserted-Identity header field containing this tel URI, including the display name associated with the tel URI, if available; and

   b) if the P-Asserted-Identity header field contains only a tel URI, the S-CSCF shall add a second P-Asserted-Identity header field containing a SIP URI. The added SIP URI shall contain in the user part a "+" followed by the international public telecommunication number contained in tel URI, and user's home domain name in the hostport part. The added SIP URI shall contain the same value in the display name as contained in the tel URI. The S-CSCF shall also add a "user" SIP URI parameter equals "phone" to the SIP URI; and

2) in case the response is forwarded to an AS that is located within the trust domain, the S-CSCF shall retain the access-network-charging-info parameter in the P-Charging-Vector header field; otherwise, the S-CSCF shall remove the access-network-charging-info parameter in the P-Charging-Vector header field.

When the S-CSCF receives the 200 (OK) response for a standalone transaction request, the S-CSCF shall:

1) insert a P-Charging-Function-Addresses header field populated with values received from the HSS if the message is forwarded within the S-CSCF home network, including towards an AS; and

2) if the response is not forwarded to an AS (i.e. the response is related to a request that was matched to the first executed initial filter criteria), insert a type 2 "term-ioi" header field parameter in the P-Charging-Vector header field of the outgoing response. The type 2 "term-ioi" header field parameter is set to a value that identifies the sending network of the response and the type 2 "orig-ioi" header field parameter is set to the previously received value of "orig-ioi" header field parameter.

NOTE 19: If the S-CSCF forked the request of a stand alone transaction to multiple UEs and receives multiple 200 (OK) responses, the S-CSCF will select and return only one 200 (OK) response. The criteria that the S-CSCF employs when selecting the 200 (OK) response is based on the operator's policy (e.g. return the first 200 (OK) response that was received).

When the S-CSCF receives, destined for a served user, a target refresh request for a dialog, prior to forwarding the request, the S-CSCF shall:

0) if the dialog is related to an IMS communication service determine whether the contents of the request (e.g. SDP media capabilities, Content-Type header field) match the IMS communication service as received as the ICSI value in the P-Asserted-Service header field in the initial request. As an operator option, if the contents of the

request do not match the IMS communication service the S-CSCF may reject the request by generating a status code reflecting which added contents are not matching. Otherwise, continue with the rest of the steps;

1) if the incoming request is received on a dialog for which GRUU routeing is to be performed and the Request-URI is not the GRUU for this dialog, then return a response of 400 (Bad Request).

2) if the incoming request is received on a dialog for which GRUU routeing is to be performed and the Request-URI contains the GRUU for this dialog then the S-CSCF shall:

   - perform the procedures for Request Targeting specified in RFC 5627 [93], using the public user identity and instance ID derived from the Request-URI, as specified in subclause 5.4.7A;

   - if no contact can be selected, return a response of 480 (Temporarily Unavailable).

3) remove its own URI from the topmost Route header field;

4) for INVITE dialogs (i.e. dialogs initiated by an INVITE request), save the Contact and Cseq header field values received in the request such that the S-CSCF is able to release the session if needed;

5) create a Record-Route header field containing its own SIP URI; and

6) forward the request based on the topmost Route header field.

When the S-CSCF receives any 1xx or 2xx response to the target refresh request for a dialog (whether the user is registered or not), the S-CSCF shall:

1) for INVITE dialogs, replace the saved Contact header field values in the response such that the S-CSCF is able to release the session if needed; and

2) in case the response is forwarded to an AS that is located within the trust domain, the S-CSCF shall retain the access-network-charging-info parameter in the P-Charging-Vector header field; otherwise, the S-CSCF shall remove the access-network-charging-info parameter in the P-Charging-Vector header field.

When the S-CSCF receives, destined for the served user, a subsequent request other than target refresh request for a dialog, prior to forwarding the request, the S-CSCF shall:

1) if the incoming request is received on a dialog for which GRUU routeing is to be performed and the Request-URI is not the GRUU for this dialog, then return a response of 400 (Bad Request).

2) if the incoming request is received on a dialog for which GRUU routeing is to be performed and the Request-URI contains the GRUU for this dialog then the S-CSCF shall:

   - perform the procedures for Request Targeting specified in RFC 5627 [93], using the public user identity and instance ID derived from the Request-URI, as specified in subclause 5.4.7A;

   - if no contact can be selected, return a response of 480 (Temporarily Unavailable).

3) remove its own URI from the topmost Route header field; and

4) forward the request based on the topmost Route header field.

When the S-CSCF receives a response to a a subsequent request other than target refresh request for a dialog, in case the response is forwarded to an AS that is located within the trust domain, the S-CSCF shall retain the access-network-charging-info parameter from the P-Charging-Vector header field; otherwise, the S-CSCF shall remove the access-network-charging-info parameter from the P-Charging-Vector header field.

With the exception of 305 (Use Proxy) responses, the S-CSCF shall not recurse on 3xx responses.

5.4.3.4 Original dialog identifier

The original dialog identifier is an implementation specific token that the S-CSCF encodes into the own S-CSCF URI in a Route header field, prior to forwarding the request to an AS. This is possible because the S-CSCF is the only entity that creates and consumes the value.

The token may identify the original dialog of the request, so in case an AS acting as a B2BUA changes the dialog, the S-CSCF is able to identify the original dialog when the request returns to the S-CSCF. In a case of a standalone

transaction, the token indicates that the request has been sent to the S-CSCF from an AS in response to a previously sent request. The token can be encoded in different ways, such as e.g., a character string in the user-part of the S-CSCF URI, a parameter in the S-CSCF URI or port number in the S-CSCF URI.

The S-CSCF shall ensure that the value chosen is unique so that the S-CSCF may recognize the value when received in a subsequent message of one or more dialogs and make the proper association between related dialogs that pass through an AS.

An original dialog identifier is sent to each AS invoked due to iFC evaluation such that the S-CSCF can associate requests as part of the same sequence that trigger iFC evaluation in priority order (and not rely on SIP dialog information that may change due to B2BUA AS).

NOTE: If the same original dialog identifier is included in more than one request from a particular AS (based on service logic in the AS), then the S-CSCF will continue the iFC evaluation sequence. If the AS wants iFC evaluation to start from the beginning for a request, then AS should not include an original dialog identifier;

5.4.3.5 Void

5.4.3.6 SIP digest authentication procedures for all SIP request methods initiated by the UE excluding REGISTER

5.4.3.6.1 General

When the S-CSCF receives from the UE a request (excluding REGISTER), and SIP digest without TLS or SIP digest with TLS is supported and in use for this UE, the S-CSCF may perform the following steps if authentication of SIP request methods initiated by the UE excluding REGISTER is desired:

1) The S-CSCF shall identify the user by the public user identity as received in the P-Asserted-Identity header field;

2) If the public user identity does not match one of the registered public user identities, and the public user identity does not match one of the registered wildcarded public user identities, the S-CSCF may reject the request with a 400 (Bad Request) response or silently discard the request;

3) If the request does not contain a Proxy-Authorization header field or the Proxy-Authorization header field does not contain a digest response, the S-CSCF shall:

   a) challenge the user by generating a 407 (Proxy Authentication Required) response for the received request, including a Proxy-Authenticate header field as defined in RFC 2617 [21], which includes:

      - a "realm" header field parameter;

      - a "nonce" header field parameter, with a newly generated value by the S-CSCF;

      - an "algorithm" header field parameter; if the algorithm value is not provided in the authentication vector, it shall have the value "MD5"; and

      - a "qop" header field parameter; if the qop value is not provided in the authentication vector, it shall have the value "auth".

      The challenge parameters, with the exception of the "nonce" header field parameter, shall be the same as the ones used for the last successfull registration.

NOTE: The usage of the same parameters for authentication of non-registration SIP requests requires the storage of these parameters during authentication of REGISTER requests, as retrieval of authentication vectors is only specified for REGISTER requests.

   b) send the so generated 407 (Proxy Authentication Required) response towards the UE; and,

   c) retain the nonce and initialize the corresponding nonce count to a value of 1.

4) If the request contains a Proxy-Authorization header field, the S-CSCF shall:

   a) check whether the Proxy-Authorization header field contains:

- the private user identity of the user in the "username" header field parameter;
- an "algorithm" header field parameter value which matches the "algorithm" header field parameter in the authentication challenge (i.e. "MD5");
- a "response" header field parameter with the authentication challenge response;
- a "realm" header field parameter matching the "realm" header field parameter in the authentication challenge;
- "nonce" header field parameter matching the expected nonce from either a recent authentication challenge or a more recent "nextnonce" header field parameter sent in a Proxy-Authentication-Info header field;
- a "uri" header field parameter matching the SIP Request-URI;
- a "cnonce" header field parameter; and
- a "nonce-count" header field parameter with a value that equals the nonce-count expected by the S-CSCF. The S-CSCF may choose to accept a nonce-count which is greater than the expected nonce-count. If the S-CSCF uses this nonce-count and authentication is successful and the S-CSCF increments it for any subsequent authentication responses.

If any of the above checks do not succeed, the S-CSCF shall proceed as described in subclause 5.4.3.6.2, and skip the remainder of this procedure.

b) check whether the received authentication challenge response and the expected authentication challenge response match. The S-CSCF shall compute the expected digest response as described in RFC 2617 [21] using the H(A1) value contained within the authentication vector, and other digest parameters (i.e. nonce, cnonce, nonce-count, qop).

In the case where the digest response does not match the expected digest response calculated by the S-CSCF, the S-CSCF shall consider the authentication attempt as failed and do one of the following:

1) rechallenge the user by issuing a 407 (Proxy Authentication Required) response including a challenge as per procedures described in this subclause; or
2) reject the request by issuing a 403 (Forbidden) response; or
3) reject the request without sending a response.

In the case where the digest response matches the expected digest response calculated by the S-CSCF, the S-CSCF shall consider the identity of the user verified and the request authenticated and continue with the procedures as described in subclause 5.4.3.

5.4.3.6.2 Abnormal cases

In the case that SIP digest is used and the request from the UE contains an invalid "nonce" Authorization header field parameter with a valid challenge response for that nonce (indicating that the client knows the correct username/password), or when the "nonce-count" Authorization header field parameter value sent by the UE is not the expected value, or when the Proxy-Authorization header field does not include the correct parameters, the S-CSCF shall:

- send a 407 (Proxy Authentication Required) response to initiate a further authentication attempt with a fresh nonce and the "stale" header field parameter set to "true" in the Proxy-Authenticate header field.

5.4.4 Call initiation

5.4.4.1 Initial INVITE

When the S-CSCF receives an INVITE request, either from the served user or destined to the served user, the S-CSCF may require the periodic refreshment of the session to avoid hung states in the S-CSCF. If the S-CSCF requires the session to be refreshed, the S-CSCF shall apply the procedures described in RFC 4028 [58] clause 8.

NOTE 1: Requesting the session to be refreshed requires support by at least one of the UEs. This functionality cannot automatically be granted, i.e. at least one of the involved UEs needs to support it.

When the S-CSCF receives an initial INVITE request destined for the served user, the S-CSCF shall either:

a) examine the SDP offer (the "c=" parameter) to detect if it contains an IP address type that is not supported by the IM CN subsystem; or

b) process the initial INVITE request without examining the SDP.

NOTE 2: If the S-CSCF knows that the terminating UE supports both IPv6 and IPv4 addressing simultaneously, the S-CSCF will forward the initial INVITE request to the UE without examining the SDP.

NOTE 3: If the SDP offer contained an IP address type that is not supported by the IM CN subsystem, the S-CSCF will receive the 488 (Not Acceptable Here) response with 301 Warning header field indicating "incompatible network address format".

Subsequently, when the S-CSCF detects that the SDP offer contained an IP address type that is not supported by the IM CN subsystem (i.e., either case a) or b)), the S-CSCF shall either:

- return a 305 (Use Proxy) response to the I-CSCF with the Contact field containing the SIP URI of the IBCF, or

- forward the initial INVITE request to the IBCF. When forwarding the initial INVITE request, the S-CSCF shall not insert its SIP URI into the Record-Route header field.

If overlap signalling using the multiple-INVITE method is supported as a network option, several INVITE requests with the same Call ID and the same From header field (including "tag" header field parameter) can be received outside of an existing dialog. Such INVITE requests relate to the same call. If the S-CSCF receives an INVITE request from the served user outside an existing dialog with the same Call ID and From header field as a previous INVITE request during a certain period of time, it shall route the new INVITE request to the same next hop as the previous INVITE request.

5.4.4.2 Subsequent requests

5.4.4.2.1 UE-originating case

When the S-CSCF receives the request containing the access-network-charging-info parameter in the P-Charging-Vector, the S-CSCF shall store the access-network-charging-info parameter from the P-Charging-Vector header field. The S-CSCF shall retain access-network-charging-info parameter in the P-Charging-Vector header field when the request is forwarded to an AS. However, the S-CSCF shall not include the access-network-charging-info parameter in the P-Charging-Vector header field when the request is forwarded outside the home network of the S-CSCF.

When the S-CSCF receives any request or response (excluding ACK requests and CANCEL requests and responses) related to a UE-originated dialog or standalone transaction, the S-CSCF may insert previously saved values into P-Charging-Vector and P-Charging-Function-Addresses header fields before forwarding the message within the S-CSCF home network, including towards AS.

5.4.4.2.2 UE-terminating case

When the S-CSCF receives 180 (Ringing) or 200 (OK) (to INVITE) responses containing the access-network-charging-info parameter in the P-Charging-Vector, the S-CSCF shall store the access-network-charging-info parameter from the P-Charging-Vector header field. The S-CSCF shall retain the access-network-charging-info parameter in the P-Charging-Vector header field when the response is forwarded to an AS. However, the S-CSCF shall not include the access-network-charging-info parameter in the P-Charging-Vector header field when the response is forwarded outside the home network of the S-CSCF.

When the S-CSCF receives any request or response (excluding ACK requests and CANCEL requests and responses) related to a UE-terminated dialog or standalone transaction, the S-CSCF may insert previously saved values into P-Charging-Vector and P-Charging-Function-Addresses header fields before forwarding the message within the S-CSCF home network, including towards AS.

When the S-CSCF receives an error response (to INVITE) for an existing early dialog, and if the S-CSCF does not forward the response immediately (if the S-CSCF forked the INVITE request it may wait for additional final responses),

the S-CSCF does not have knowledge of having received an 199 (Early Dialog Terminated) provisional response on the same early dialog, and the associated INVITE request included the "199" option-tag in the Supported header field, and the INVITE request did not include the "100rel" option tag in the Require header field, the S-CSCF shall trigger and send an unreliable 199 (Early Dialog Terminated) provisional response, using the same "tag" To header field parameter value as the error response, as specified in in RFC 6228 [142].

5.4.5 Call release

5.4.5.1 S-CSCF-initiated session release

5.4.5.1.1 Cancellation of a session currently being established

Upon receipt of an network internal indication to release a session which is currently being established, the S-CSCF shall cancel the related dialogs by sending the CANCEL request according to the procedures described in RFC 3261 [26].

5.4.5.1.2 Release of an existing session

Upon receipt of a network internal indication to release an existing multimedia session, the S-CSCF shall:

1) if the S-CSCF serves the calling user of the session, generate a BYE request destined for the called user based on the information saved for the related dialog, including:

   - a Request-URI, set to the stored Contact header field provided by the called user;
   - a To header field, set to the To header field value as received in the 200 (OK) response for the initial INVITE request;
   - a From header field, set to the From header field value as received in the initial INVITE request;
   - a Call-ID header field, set to the Call-Id header field value as received in the initial INVITE request;
   - a CSeq header field, set to the CSeq value that was stored for the direction from the calling to the called user, incremented by one;
   - a Route header field, set to the routeing information towards the called user as stored for the dialog;
   - a Reason header field that contains proper SIP response code;
   - further header fields, based on local policy;
   - treat the BYE request as if received directly from the calling user, i.e. the S-CSCF shall send the BYE request to the internal service control and based on the outcome further on towards the called user; and

2) if the S-CSCF serves the calling user of the session, generate an additional BYE request destined for the calling user based on the information saved for the related dialog, including:

   - a Request-URI, set to a contact address obtained from the stored Contact header field if provided by the calling user. If the stored Contact header field contained either a public or a temporary GRUU, the S-CSCF shall set the Request-URI either to:

     a) the contact address bound to the respective GRUU, if the stored Contact header field did not include an "ob" SIP URI parameter; or

     b) the contact address that the UE used to send the initial INVITE request, if the stored Contact header field included an "ob" SIP URI parameter;

NOTE 1: Since the same public GRUU may be bound to multiple contact addresses of the UE that were registered as specified in RFC 5626 [92], the S-CSCF selects the contact address that the UE used to send the initial INVITE request.

   - a To header field, set to the From header field value as received in the initial INVITE request;

- a From header field, set to the To header field value as received in the 200 (OK) response for the initial INVITE request;
- a Call-ID header field, set to the Call-Id header field value as received in the initial INVITE request;
- a CSeq header field, set to the CSeq value that was stored for the direction from the called to the calling user, incremented by one – if no CSeq value was stored for that session the S-CSCF shall generate and apply a random number within the valid range for CSeqs;
- a Route header field, set to the routeing information towards the calling user as stored for the dialog;
- a Reason header field that contains proper SIP response code;
- further header fields, based on local policy;
- send the BYE request directly to the calling user.

3) if the S-CSCF serves the called user of the session, generate a BYE request destined for the called user based on the information saved for the related dialog, including:
   - a Request-URI, set to a contact address that the S-CSCF uses to send the in-dialog requests towards the called UE as defined in RFC 5626 [92] and RFC 5627 [93];
   - a To header, set to the To header value as received in the 200 (OK) response for the initial INVITE request;
   - a From header, set to the From header value as received in the initial INVITE request;
   - a Call-ID header, set to the Call-Id header value as received in the initial INVITE request;
   - a CSeq header, set to the CSeq value that was stored for the direction from the calling to the called user, incremented by one;
   - a Route header, set to the routeing information towards the called user as stored for the dialog;
   - a Reason header that contains proper SIP response code;
   - further headers, based on local policy;
   - send the BYE request directly to the called user; and
4) if the S-CSCF serves the called user of the session, generate an additional BYE request destined for the calling user based on the information saved for the related dialog, including:
   - a Request-URI, set to the stored Contact header field provided by the calling user;
   - a To header, set to the From header field value as received in the initial INVITE request;
   - a From header, set to the To header field value as received in the 200 (OK) response for the initial INVITE request;
   - a Call-ID header, set to the Call-Id header field value as received in the initial INVITE request;
   - a CSeq header, set to the CSeq value that was stored for the direction from the called to the calling user, incremented by one – if no CSeq value was stored for that session the BYE shall generate and apply a random number within the valid range for CSeqs;
   - a Route header field, set to the routeing information towards the calling user as stored for the dialog;
   - a Reason header field that contains proper SIP response code;
   - further headers, based on local policy;
   - treat the BYE request as if received directly from the called user, i.e. the S-CSCF shall send the BYE request to the internal service control and based on the outcome further on towards the calling user..

Upon receipt of the 2xx responses for both BYE requests, the S-CSCF shall release all information related to the dialog and the related multimedia session.

5.4.5.1.2A Release of the existing dialogs due to registration expiration

When:

1) the registration lifetime of the only public user identity currently registered with its associated set of implicitly registered public user identities (i.e. no other is registered) and bound either to the contact address of the UE or to the registration flow and the associated contact address (if the multiple registration mechanism is used) expires;

2) there are still active multimedia sessions that includes either this user's contact address or the registration flow and the associated contact address (if the multiple registration mechanism is used); and

3) the session was initiated by or terminated towards the user using the public user identity currently registered or with one of the implicitly registered public used identities bound either to the contact address of the UE or to the registration flow and the associated contact address (if the multiple registration mechanism is used);

then the S-CSCF shall:

- release each of these multimedia sessions by applying the steps listed in the subclause 5.4.5.1.2. The S-CSCF shall only release dialogs associated with the multi media sessions originated or terminated towards the registered user's contact address or the registration flow and the associated contact address (if the multiple registration mechanism is used).

5.4.5.1.3 Abnormal cases

Upon receipt of a request on a dialog for which the S-CSCF initiated session release, the S-CSCF shall terminate the received request and answer it with a 481 (Call/Transaction Does Not Exist) response.

5.4.5.2 Session release initiated by any other entity

Upon receipt of a 2xx response for a BYE request matching an existing dialog, the S-CSCF shall delete all the stored information related to the dialog.

5.4.5.3 Session expiration

If the S-CSCF requested the session to be refreshed periodically, and the S-CSCF got the indication that the session will be refreshed, when the session timer expires, the S-CSCF shall delete all the stored information related to the dialog.

5.4.6 Call-related requests

5.4.6.1 ReINVITE

5.4.6.1.1 Determination of served user

Void.

5.4.6.1.2 UE-originating case

For a reINVITE request or UPDATE request from the UE within the same dialog, the S-CSCF shall store the updated access-network-charging-info parameter from P-Charging-Vector header field in the received SIP request. The S-CSCF shall retain the access-network-charging-info parameter in the P-Charging-Vector header field when the request is forwarded to an AS. However, the S-CSCF shall not include the access-network-charging-info parameter in the P-Charging-Vector header field when the request is forwarded outside the home network of the S-CSCF.

For a reINVITE request from the UE, if the request is to be forwarded to an AS that is located within the trust domain, the S-CSCF shall retain the access-network-charging-info parameter from the P-Charging-Vector header field; otherwise, the S-CSCF shall remove the access-network-charging-info parameter from the P-Charging-Vector header field.

5.4.6.1.3 UE-terminating case

For a reINVITE request or UPDATE request destined towards the UE within the same dialog, when the S-CSCF receives the 200 (OK) response (to the INVITE request or UPDATE request), the S-CSCF shall store the updated access-network-charging-info parameter from the P-Charging-Vector header field. The S-CSCF shall retain the access-network-charging-info parameter in the P-Charging-Vector header field when the response is forwarded to the AS. However, the S-CSCF shall not include the access-network-charging-info parameter in the P-Charging-Vector header field when the 200 (OK) response is forwarded outside the home network of the S-CSCF.

For any SIP response to an INVITE request, if the response is to be forwarded to an AS that is located within the trust domain, the S-CSCF shall retain the access-network-charging-info parameter from the P-Charging-Vector header field; otherwise, the S-CSCF shall remove the access-network-charging-info parameter from the P-Charging-Vector header field.

5.4.7 Void

5.4.7A GRUU management

5.4.7A.1 Overview of GRUU operation

The S-CSCF provides a service of assigning and translating GRUUs for use by registered UEs. This is conducted as specified in RFC 5627 [93] and RFC 5628 [94]. Two kinds of GRUUs are assigned: public GRUUs and temporary GRUUs.

NOTE: If the UE performs the functions of an external attached network (e.g an enterprise network) the UE could have self allocated its own GRUUs. In this version of the specification only UE self allocated public GRUUs are supported. Routing to a specific UE self-allocated public GRUUs requires that "loose route" is provisioned in the service profile of the served public user identity. Use of UE self-allocated temporary GRUUs is not supported in this version of the specification and requests addressed to UE self allocated temporary GRUUs will fail to be routed to the UE.

Each assigned GRUU represents an association between a public user identity and an instance ID provided by a registering UE. It is used to address a particular UE that possesses the instance ID and registers with the public user identity. The GRUU also denotes a contact address registered with a public user identity when the contact address has a "+sip.instance" header field parameter containing the the GRUU instance ID.

The S-CSCF issues GRUUs as part of the registration process, and also reports GRUUs as part of notifications for subscriptions to the "reg" event package. The S-CSCF always issues GRUUs in pairs – a public GRUU and a temporary GRUU. In case of implicit registration the S-CSCF assigns a unique public GRUU and a unique temporary GRUU for each public user identity.

5.4.7A.2 Representation of public GRUUs

Each public GRUU shall conform to all requirements specified in RFC 5627 [93].

The S-CSCF constructs a public GRUU by adding a "gr" SIP URI parameter to the canonical form of the SIP URI which contains a public user identity. The "gr" SIP URI parameter serves as an indicator that the URI is in fact a GRUU and carries a value that encodes the instance ID that is defined in 3GPP TS 23.003 [3].

By default, the value of the "gr" SIP URI parameter is a copy of the value of the "+sip.instance" header field parameter from a Contact address registered with the S-CSCF, with escaping of special characters as specified in RFC3261 [26].

The public GRUU that is returned in the "pub-gruu" parameter in the 200 (OK) response to the REGISTER request is constructed using the canonical form of the SIP URI of the public user identity from the To header field of the REGISTER request provided that public user identity is not barred. If the public user identity from the To header field of the REGISTER request is barred then the public GRUU that is returned in the "pub-gruu" parameter in the 200 (OK) response to the REGISTER request is constructed using the canonical form of the SIP URI of the default public user identity.

NOTE 1: The default public user identity is always provisioned as a SIP URI.

If the "+sip.instance" header field parameter from the Contact address contains an IMEI URN, as specified in RFC 7254 [153], then the value of the "gr" SIP URI parameter is generated by the S-CSCF using the name-based UUID algorithm defined in RFC 4122 [154]. The following applies to the algorithm:

- the "name space ID" shall be a UUID generated for use across the administrative domain and shall use the algorithm for creating a UUID from truly random numbers specified in RFC 4122 [154];

NOTE 2: If the generated UUID is changed, then newly created GRUUs will not match those that were created with the previous UUID. Therefore, the UUID needs to remain the same in order to create consistent GRUUs. This means that the namespace UUID needs to be the same for all S-CSCFs within the domain for which the public GRUU is hosted (it cannot be generated at run time by the S-CSCF as that would produce different values).

- SHA-1 shall be used as the hash algorithm; and

- the "name" is made up of a concatenation of the ASCII representation (see RFC 20 [212]) of the TAC and SNR portions of the IMEI from the "+sip.instance" header field parameter.

The S-CSCF shall store the "gr" parameter used in a public GRUU and the associated value received in a "+sip.instance" header field parameter.

The public GRUU for a particular association of public user identity and instance ID is persistent. The same public GRUU will be returned each time a registration is performed with a particular pair of public user identity and instance ID.

5.4.7A.3 Representation of temporary GRUUs

Each temporary GRUU shall conform to all requirements specified in RFC 5627 [93].

Because of the limited lifetime of an temporary GRUU, only the S-CSCF that created a temporary GRUU is required to understand how to translate that GRUU to the corresponsing public user identity and instance ID.

The temporary GRUU that is returned in the "temp-gruu" parameter in the 200 (OK) response to the REGISTER request is mapped to the public user identity from the To header field of the REGISTER request provided that public user identity is not barred. If the public user identity from the To header field of the REGISTER request is barred then the temporary GRUU that is returned in the "temp-gruu" parameter in the 200 (OK) response to the REGISTER request is mapped to the default public user identity.

NOTE 1: The default public user identity is always provisioned as a SIP URI.

The specific representation of a temporary GRUU may be decided by each S-CSCF implementation. Temporary GRUUs must route to the assigning S-CSCF without requiring each assigned GRUU to be stored in the HSS.

The S-CSCF may choose a representation of temporary GRUUs that requires no extra state to be retained, such as that specified in RFC 5627 [93]. Alternatively, the S-CSCF may choose a stateful representation. This is an implementation choice.

NOTE 2: One possible implementation is for the S-CSCF to have a statically configured wildcard PSI that routes to it, with each temporary GRUU being encoded so that it matches the wildcard.

5.4.7A.4 GRUU recognition and validity

The S-CSCF shall recognize those GRUUs it has assigned, verify their validity, and extract the associated public user identity and instance ID. This is true for both public GRUUs and temporary GRUUs.

NOTE: The S-CSCF only validates and extracts the associated public user identity and instance ID for GRUUs that it assigned.

GRUUs are distinguished from other URIs by the presence of a "gr" SIP URI parameter. Public GRUUs are distinguished from temporary GRUUs by the presence of a value for the "gr" SIP URI parameter.

The instance ID is obtained from a public GRUU by using the "gr" parameter to retrieve the stored associated instance ID. The public user identity is extracted from a public GRUU by removing the "gr" SIP URI parameter.

The S-CSCF can recognize a public GRUU as valid if the "gr" parameter contains a value that was stored in the S-CSCF during generation of the public GRUU, and the derived public user identity compares equal, according to the comparison rules of RFC3261 [26], to a public user identity active within the S-CSCF.

The public user identity and instance ID are derived from a temporary GRUU via implementation specific means consistent with the way temporary GRUUs are constructed. The S-CSCF shall determine the validity of a temporary GRUU in conformance with RFC 5627 [93], and using implementation specific means.

5.4.8 Emergency service

5.4.8.1 General

S-CSCF shall handle the emergency registration as per the needs of the normal registration.

5.4.8.2 Initial emergency registration or user-initiated emergency reregistration

When the S-CSCF receives a REGISTER request; and the Contact header field includes a "sos" SIP URI parameter that indicates that this is an emergency registration, the S-CSCF shall perform the actions as specified in subclause 5.4.1.1 with the following additions:

1) when handling unprotected REGISTER request or protected REGISTER request, the S-CSCF:

   a) shall deregister only contacts that were registered as part of emergency registration; and

   b) shall not deregister contacts that were registered as part of non-emergency registration.

NOTE 1: other conditions triggering contact deregistration are described in subclause 5.4.1.

2) for the protected REGISTER request, when the S-CSCF receives a REGISTER request with the "integrity-protected" header field parameter in the Authorization header field set to "yes", "tls-yes" or "ip-assoc-yes", i.e. for the protected REGISTER request, and the Contact header field includes a "sos" SIP URI parameter that indicates that this is an emergency registration, the S-CSCF shall identify the user by the public user identity as received in the To header field and the private user identity as received in the Authorization header field of the REGISTER request;

3) the S-CSCF shall not include a Service-Route in the 200 (OK) response to the REGISTER request;

4) the S-CSCF shall not include a temporary GRUU in the 200 (OK) response to the REGISTER request;

5) the S-CSCF shall include the "sos" URI parameter in the URI that was successfully emergency registered and included in the Contact header field of the 200 (OK) response to the REGISTER request;

NOTE 2: In the case where the S-CSCF returns a GRUU in the Contact header field of the 200 (OK) response to the REGISTER request, the "sos" URI parameter is appended to the URI and not included as a Contact header field parameter. The public GRUU that is returned in the 200 (OK) response includes the "sos" URI parameter as a parameter of the URI included in the "pub-gruu" Contact header field parameter.

6) store the Path header field and the contact information including all header field parameters contained in the Contact header field;

NOTE 3: The Path header field and contact information used for the emergency dialogs destined for the UE and obtained during the emergency registration can be different than the Path header field used for the non-emergency communication and obtained during the non-emergency registration.

NOTE 4: If the previous emergency registration with different contact information or emergency Path header field has not expired, the S-CSCF will not perform the network initiated deregistration procedure for the previous emergency registration, but will let it expire.

7) the S-CSCF shall not send any third-party REGISTER requests to any AS;

8) determine the duration of the registration by checking the value of the registration expiration interval value in the received REGISTER request and based on local policy; and

NOTE 5: The value of the emergency registration time is subject to national regulation and can be subject to roaming agreements.

9) for any bindings created by the emergency registration, mark those bindings as created by an emergency registration.

5.4.8.3 User-initiated emergency deregistration

When S-CSCF receives a REGISTER request with the registration expiration interval value containing zero and the Contact header field contains a contact address that has been registered for emergency service (i.e. the "sos" SIP URI parameter that indicates that this is an emergency registration is included in the Contact header field), the S-CSCF shall reject the REGISTER request by sending a 501 (Not Implemented) response.

NOTE: The UE cannot deregister its emergency public user identity.

5.4.8.4 Network-initiated emergency deregistration

The S-CSCF shall not perform a network-initiated emergency deregistration.

5.4.8.5 Network-initiated emergency reauthentication

If a given public user identity and the associated contact address have been registered via emergency registration, the S-CSCF shall not reauthenticate this public user identity.

5.4.8.6 Subscription to the event providing registration state

If a S-CSCF receives a SUBSCRIBE request addressed to S-CSCF containing the Event header field with the reg event package with the Contact header field that contains a contact address that has been registered for emergency service, the S-CSCF shall reject the SUBSCRIBE request for the reg-event package by sending a 489 (Bad Event) response.

5.4.8.7 Notification of the registration state

When the user performs an emergency registration or when the emergency registration expires, the S-CSCF shall not send a NOTIFY request to the subscribers to the reg event package of the respective user.

The contact address that has been registered for emergency serviceshall not be included in the NOTIFY requests sent to the subscribers to the reg event package of the user.

5.5 Procedures at the MGCF

5.5.1 General

The MGCF, although acting as a UA, does not initiate any registration of its associated addresses. These are assumed to be known by peer-to-peer arrangements within the IM CN subsystem. Therefore table A.4/1 and dependencies on that major capability shall not apply.

The use of the Path and Service-Route header fields shall not be supported by the MGCF.

For all SIP transactions identified:

- if priority is supported, as containing an authorised Resource-Priority header field, or, if such an option is supported, relating to a dialog which previously contained an authorised Resource-Priority header field;

the MGCF shall give priority over other transactions or dialogs. This allows special treatment of such transactions or dialogs.

NOTE: The special treatment can include filtering, higher priority processing, routeing, call gapping. The exact meaning of priority is not defined further in this document, but is left to national regulation and network configuration.

When the MGCF sends any request or response related to a dialog, the MGCF may insert previously saved values into P-Charging-Vector and P-Charging-Function-Addresses header fields before sending the message.

The MGCF shall use a GRUU referring to itself (as specified in RFC 5627 [93]) when inserting a contact address in a dialog establishing or target refreshing SIP message. This specification does not define how GRUUs are created by the MGCF; they can be provisioned by the operator or obtained by any other mechanism. A GRUU used by the MGCF when establishing a dialog shall remain valid for the lifetime of the dialog. The GRUU used by the MGCF shall not reveal calling party related information.

The MGCF shall handle requests addressed to its currently valid GRUUs when received outside of the dialog in which the GRUU was provided.

EXAMPLE: Upon receipt of an INVITE request addressed to a GRUU assigned to a dialog it has active, and containing a Replaces header field referencing that dialog, the MGCF will be able to establish the new call replacing the old one.

The MGCF may support retrieval of NP data, subject to local policy. The interface used at the MGCF to retrieve the NP data is out of scope of this specification. Retrieval of NP data is relevant only if the Request-URI contains an international public telecommunications number. For requests from the IM CN subsystem network, if the Request-URI contains a tel-URI with an "npdi" tel-URI parameter, as defined in RFC 4694 [112], NP data has been obtained previously and NP data retrieval is not needed, but still may still be performed if required by local policy. If NP data is retrieved by the MGCF, and the request is routed to the IM CN subsystem, the MGCF shall add the tel-URI NP parameters to the Request-URI as defined in RFC 4694 [112]: an "npdi" tel-URI parameter is added to indicate that NP data retrieval has been performed, and if the number is ported, an "rn" tel-URI parameter is added to identify the ported-to routeing number.

The MGCF NP procedures also apply when the request contains a Request-URI in the form of a SIP URI user=phone, where the "npdi" and "rn" tel-URI parameters are contained in the userinfo part of the SIP URI.

The MGCF supports as a network option the inclusion of the XML MIME schema for PSTN. In cases where the XML MIME for PSTN is included the the Content-Type header field is set to "application/vnd.etsi.pstn+xml" and the Content-Disposition to "signal" with the "handling" parameter set to "optional".

5.5.2 Subscription and notification

Void.

5.5.3 Call initiation

5.5.3.1 Initial INVITE

5.5.3.1.1 Calls originated from circuit-switched networks

When the MGCF receives an indication of an incoming call from a circuit-switched network, the MGCF shall:

1) generate an INVITE request:

   - set the Request-URI to the "tel" format using an E.164 address or to the "sip" format using an E164 address in the user portion and set user=phone;

NOTE 1: Details how to set the host portion are out of scope of the document. However, when a SIP URI is used the host portion needs to be part of the domain name space owned by the I-CSCF

   - include the "100rel" option tag in the Supported header field (as defined in RFC 3262 [27]);

   - include the "precondition" option tag in the Supported header field (as defined in RFC 3312 [30] as updated by RFC 4032 [64]) if the MGCF supports the SIP preconditions mechanism;

   - not indicate the requirement for the precondition mechanism by using the Require header field;

   - include an P-Asserted-Identity header field, including the display name if available, depending on corresponding information in the circuit-switched network;

- create a new, globally unique value for the "icid-value" header field parameter and insert it into the P-Charging-Vector header field; and

- insert a type 2 "orig-ioi" header field parameter into the P-Charging-Vector header field. The MGCF shall set the type 2 "orig-ioi" header field parameter to a value that identifies the sending network in which the MGCF resides and the type 2 "term-ioi" header field parameter shall not be included.

When the MGCF receives a 1xx or 2xx response to an initial request for a dialog, the MGCF shall store the value of the received "term-ioi" header field parameter received in the P-Charging-Vector header field, if present.

NOTE 2: Any received "term-ioi" header field parameter will be a type 2 IOI. The type 2 IOI identifies the sending network of the response message.

Upon receiving a 199 (Early Dialog Terminated) provisional response to an established early dialog the MGCF shall release resources specifically related to that early dialog.

Based upon local policy, the MGCF may support preferred circuit carrier access (RFC 4694 [112]). If such routeing is applicable for the call, the MGCF shall perform the interworking of the carrier identification code from the circuit switched signalling protocol as described in 3GPP TS 29.163 [11B]. The "cic" tel-URI parameter is added in the tel-URI or in the userinfo part of the SIP URI with user=phone Request-URI in accordance with the RFC 4694 [112].

If resource priority in accordance with RFC 4412 [116] is required for a dialog, then the MGCF shall include the Resource-Priority header field in all requests associated with that dialog.

If overlap signalling using the multiple-INVITE method is supported as a network option, several INVITE requests with the same Call ID and the same From header field (including "tag" header field parameter) that relate to the same call can be sent by the MGCF. The MGCF shall route those INVITE requests to the same next hop.

5.5.3.1.2 Calls terminating in circuit-switched networks

When the MGCF receives an initial INVITE request with Supported header field indicating "100rel", the MGCF shall:

1) store the value of the "orig-ioi" header field parameter received in the P-Charging-Vector header field, if present;

NOTE: Any received "orig-ioi" header field parameter will be a type 2 IOI. The type 2 IOI identifies the sending network of the request message.

2) send a 100 (Trying) response;

3) after a matching codec is found or no codec is required at the MGW, send 183 "Session Progress" response:

   - set the Require header field to the value of "100rel";

   - store the values received in the P-Charging-Function-Addresses header field;

   - store the value of the "icid-value" header field parameter received in the P-Charging-Vector header field; and

   - insert a P-Charging-Vector header field containing the "orig-ioi" header field parameter, if received in the initial INVITE request and a type 2 "term-ioi" header field parameter. The MGCF shall set the type 2 "term-ioi" header field parameter to a value that identifies the network in which the MGCF resides and the "orig-ioi" header field parameter is set to the previously received value of "orig-ioi" header field parameter.

If a codec is required and the MGCF does not find an available matching codec at the MGW for the received initial INVITE request, the MGCF shall:

- send 503 (Service Unavailable) response if the type of codec was acceptable but none were available; or

- send 488 (Not Acceptable Here) response if the type of codec was not supported, and may include SDP in the message body to indicate the codecs supported by the MGCF/MGW.

Based upon local policy, the MGCF may support preferred ciruit carrier access (RFC 4694 [112]), if such routeing is applicable for the call.

NOTE: Interworking of the "cic" tel-URI parameter, if present in a tel-URI or in the userinfo part of a SIP URI with user=phone Request-URI, to the circuit switched signalling protocol is described in 3GPP TS 29.163 [11B].

The MGCF may support resource priority in accordance with RFC 4412 [116] if required for a dialog. The MGCF shall use compatible namespace and priority levels to the capabilities supported in the CS network.

5.5.3.2 Subsequent requests

5.5.3.2.1 Calls originating in circuit-switched networks

When the MGCF receives 183 (Session Progress) response to an INVITE request, the MGCF shall:

- store the values received in the P-Charging-Function-Addresses header field.

The MGCF shall send an UPDATE request when the following conditions are fulfilled:

- conditions as specified in 3GPP TS 29.163 [11B]; and
- the MGCF receives 200 (OK) response to a PRACK request

5.5.3.2.2 Calls terminating in circuit-switched networks

When the MGCF receives an indication of a ringing for the called party of outgoing call to a circuit-switched network, the MGCF shall:

- send 180 (Ringing) response to the UE.

When the MGCF receives an indication of answer for the called party of outgoing call to a circuit-switched network, the MGCF shall:

- send 200 (OK) response to the UE. The 200 (OK) response shall include an P-Asserted-Identity header field if corresponding information is received from the circuit-switched network.

5.5.4 Call release

5.5.4.1 Call release initiated by a circuit-switched network

When the MGCF receives an indication of call release from a circuit-switched network, the MGCF shall:

- send a BYE request to the UE.

5.5.4.2 IM CN subsystem initiated call release

NOTE: The release of a call towards the circuit-switched network additionally requires signalling procedures other than SIP in the MGCF that are outside the scope of this document.

5.5.4.3 MGW-initiated call release

When the MGCF receives an indication from the MGW that the bearer was lost, the MGCF shall:

- send a BYE request towards the UE; and
- may include Error-Info header field with a pointer to additional information indicating that bearer was lost.

5.5.5 Call-related requests

5.5.5.1 ReINVITE

5.5.5.1.1 Calls originating from circuit-switched networks

Void.

5.5.5.1.2 Calls terminating in circuit-switched networks

When the MGCF receives a reINVITE request for hold/resume operation, the MGCF shall:

- send 100 (Trying) response;
- after performing interaction with MGW to hold/resume the media flow, send 200 (OK) response.

5.5.6 Further initial requests

When the MGCF responds to an OPTIONS request with a 200 (OK) response, the MGCF may include a message body with an indication of the DTMF capabilities and supported codecs of the MGCF/MGW.

NOTE: The detailed interface for requesting MGCF/MGW capabilities is not specified in this version of the document. Other solutions can be used in the interim.

5.6 Procedures at the BGCF

5.6.1 General

The use of the Path and Service-Route header fields shall not be supported by the BGCF.

For all SIP transactions identified:

- if priority is supported, as containing an authorised Resource-Priority header field, or, if such an option is supported, relating to a dialog which previously contained an authorised Resource-Priority header field;

the BGCF shall give priority over other transactions or dialogs. This allows special treatment of such transactions or dialogs.

NOTE: The special treatment can include filtering, higher priority processing, routeing, call gapping. The exact meaning of priority is not defined further in this document, but is left to national regulation and network configuration.

When the BGCF receives any request or response (excluding ACK requests and CANCEL requests and responses) related to a dialog or standalone transaction, the BGCF may insert previously saved values into P-Charging-Vector and P-Charging-Function-Addresses header fields before forwarding the message.

With the exception of 305 (Use Proxy) responses, the BGCF may recurse on a 3xx response only when the domain part of the URI contained in the 3xx response is in the same domain as the BGCF. For the same cases, if the URI is an IP address, the BGCF shall only recurse if the IP address is known locally to be a address that represents the same domain as the BGCF.

5.6.2 Common BGCF procedures

When determining where to route the received request, the originating BGCF may use the information obtained from other protocols or any other available databases.

The BGCF may support retrieval of NP data as part of the procedures to determine where to route the request. Retrieval of NP data by the BGCF is subject to local policy. Retrieval of NP data is relevant only if the Request-URI contains an international public telecommunications number. The interface used at the BGCF to retrieve the NP data is out of scope of this specification. If the Request-URI contains a tel-URI with an "npdi" tel-URI parameter, as defined in RFC 4694 [112], NP data has been obtained previously and NP data retrieval is only performed if required by local policy. If NP data is retrieved by the BGCF, the BGCF shall add the tel-URI NP parameters to the Request-URI as defined in RFC 4694 [112]: an "npdi" tel-URI parameter is added to indicate that NP data retrieval has been performed, and if the number is ported, an "rn" tel-URI parameter is added to identify the ported-to routeing number. The "rn" tel-URI parameter may be used by the BGCF for routeing the request.

The BGCF NP procedures also apply when the request contains a Request-URI in the form of a SIP URI user=phone, where the "npdi" and "rn" tel-URI parameters are contained in the userinfo part of the SIP URI.

When the BGCF receives a request, the BGCF shall forward the request:

- to an MGCF within its own network; or
- to another network containing a BGCF, or I-CSCF; or
- where the request is for another network, to an IBCF in its own network, if local policy requires IBCF capabilities towards another network; or
- where the Ici interface is used to interconnect two networks and the destination network is beyond such interface, to an IBCF in its own network..

When forwarding the request to the next hop, the BGCF may leave the received Request-URI unmodified.

When the BGCF receives a request and the Request-URI contains a tel URI in local number format, the BGCF shall not forward the request to an entity in another network (e.g. BGCF, I-CSCF) unless the local policy (e.g. routeing of service numbers) requires forwarding the request outside the network.

The BGCF need not Record-Route the INVITE request. While the next entity may be a MGCF acting as a UA, the BGCF shall not apply the procedures of RFC 3323 [33] relating to privacy. The BGCF shall store the values received in the P-Charging-Function-Addresses header field. The BGCF shall store the value of the "icid-value" header field parameter received in the P-Charging-Vector header field and retain the "icid-value" header field parameter in the P-Charging-Vector header field.

NOTE 1: The means by which the decision is made to forward to an MGCF or to another network is outside the scope of the present document, but may be by means of a lookup to an external database, or may be by data held internally to the BGCF.

If the BGCF supports carrier routeing, then the BGCF shall support the following procedures, based on local policy:

a) if the BGCF is configured to populate an operator configured preassigned carrier into a tel-URI contained in the Request-URI, and a preassigned carrier is required for this call, then the BGCF shall include the "cic" tel-URI parameter in the Request-URI identifying the preassigned carrier (as described in RFC 4694 [112]); or

b) if the BGCF is configured to populate the freephone carrier ID, and a freephone carrier is required for this call, then the BGCF shall include the "cic" tel-URI parameter in the Request-URI identifying the freephone carrier (as described in RFC 4694 [112]).

The BGCF carrier routeing procedures also apply when the Request-URI is in the form of a SIP URI user=phone, where the "cic" tel-URI parameter is contained in the userinfo part of the SIP URI.

The BGCF shall not add the "cic" tel-URI parameter in the Request-URI if the parameter already exists in the tel-URI.

NOTE 2: Local policy should be able to control the interaction and precedence between routeing on "cic" parameter versus routeing based on "rn" parameter.

NOTE 3: The means to configure the BGCF with the pre-assigned carrier is outside the scope of this document.

When the BGCF receives an INVITE request, if the BGCF inserts its own Record-Route header field, the BGCF may require the periodic refreshment of the session to avoid hung states in the BGCF. If the BGCF requires the session to be refreshed, the BGCF shall apply the procedures described in RFC 4028 [58] clause 8.

NOTE 4: Requesting the session to be refreshed requires support by at least one of the UEs. This functionality cannot automatically be granted, i.e. at least one of the involved UEs needs to support it.

If overlap signalling using the multiple-INVITE method is supported as a network option, several INVITE requests with the same Call ID and the same From header field (including "tag" header field parameter) can be received outside of an existing dialog . Such INVITE requests relate to the same call and the BGCF shall route such INVITE request received during a certain period of time to the same next hop.

5.7 Procedures at the Application Server (AS)

5.7.1 Common Application Server (AS) procedures

5.7.1.1 Notification about registration status

The AS may support the REGISTER method in order to discover the registration status of the user. If a REGISTER request arrives and the AS supports the REGISTER method, the AS shall store the registration expiration interval value from the request and generate a 200 (OK) response or an appropriate failure response. For the success case, the 200 (OK) response shall contain a registration expiration interval value equal to the value received in the REGISTER request. The AS shall store the values received in P-Charging-Function-Addresses header field. Also, the AS shall store the values of the "icid-value" header field parameter and "orig-ioi" header field parameter if present in the P-Charging-Vector header field from the REGISTER request. The AS shall insert a P-Charging-Vector header field containing the "orig-ioi" header field parameter, if received in the REGISTER request and a type 3 "term-ioi" header field parameter in the response to REGISTER. The AS shall set the type 3 "term-ioi" header field parameter to a value that identifies the service provider from which the response is sent and the "orig-ioi" header field parameter is set to the previously received value of "orig-ioi" header field parameter.

Upon receipt of a third-party REGISTER request, with the Content-Type header field or with a MIME body part's Content-Type header field set according to subclause 7.6 (i.e. "application/3gpp-ims+xml"), independent of the value or presence of the Content-Disposition header field or a MIME body part's Content-Type header field, independent of the value or presence of Content-Disposition parameters or MIME body part's Content-Disposition parameters, thenthe following treatment is applied:

- if the third-party REGISTER request includes an IM CN subsystem XML body with an <ims-3gpp> element, including a version attribute, with the <service-info> child element or a MIME body part containing an <ims-3gpp> element with a <service-info> XML child element as described in subclause 7.6, then the AS may retrieve the service information within the <service-info> XML child element of the <ims-3gpp> element.

Upon receipt of a third-party REGISTER request, with the Content-Type header field or with a body part's Content-Type header field set to "message/sip" and including a "message/sip" MIME body of the incoming REGISTER request, or the 200 (OK) response to the incoming REGISTER request then the AS may retrieve information from the "message/sip" MIME body or body part.

Upon receipt of a third-party REGISTER request, the AS may subscribe to the reg event package for the public user identity registered at the user's registrar (S-CSCF) as described in RFC 3680 [43].

On sending a SUBSCRIBE request, the AS shall populate the header fields as follows:

a) a Request-URI set to the resource to which the AS wants to be subscribed to, i.e. to a SIP URI that contains the public user identity of the user that was received in the To header field of the third-party REGISTER request;

b) a From header field set to the AS's SIP URI;

c) a To header field, set to a SIP URI that contains the public user identity of the user that was received in the To header field of the third-party REGISTER request;

d) an Event header field set to the "reg" event package;

e) a P-Asserted-Identity header field set to the SIP URI of the AS; and

NOTE 1: The S-CSCF expects the SIP URI used in the P-Asserted-Identity header field to correspond to the SIP URI, which identified this AS in the initial filter criteria of the user to whose registration state the AS subscribes to.

f) a P-Charging-Vector header field with the "icid-value" header field parameter populated as specified in 3GPP TS 32.260 [17] and a type 3 "orig-ioi" header field parameter. The type 3 "orig-ioi" header field parameter identifies the service provider from which the request is sent. The AS shall not include the type 3 "term-ioi" header field parameter.

Upon receipt of a 2xx response to the SUBSCRIBE request, the AS shall store the information for the so established dialog and the expiration time as indicated in the Expires header field of the received response.

Upon receipt of any response, the AS shall store the value of the "term-ioi" header field parameter received in the P-Charging-Vector header field if present.

NOTE 2: Any received term-ioi parameter will be a type 3 term-ioi. The type 3 term-ioi identifies the network operator from which the response was sent.

NOTE 3: Upon receipt of a NOTIFY request with all <registration> element(s) having their state attribute set to "terminated" (i.e. all public user identities are deregistered) and the Subscription-State header field set to "terminated", the AS considers the subscription to the reg event package terminated, i.e. as if the AS had sent a SUBSCRIBE request with an Expires header field containing a value of zero.

Upon receipt of a NOTIFY request, the AS shall store the value of the "orig-ioi" header field parameters if present in the P-Charging-Vector header field. The AS shall insert a P-Charging-Vector header field in the response to the NOTIFY rquest containing the "orig-ioi" header field parameter, if received in the NOTIFY request and a type 3 "term-ioi" header field. The AS shall set the type 3 "term-ioi" header field parameter to a value that identifies the service provider from which the response is sent and the "orig-ioi" header field parameter is set to the previously received value of "orig-ioi" header field parameter.

5.7.1.2 Extracting charging correlation information

When an AS receives an initial request for a dialog or a request (excluding ACK requests and CANCEL requests and responses) for a standalone transaction, the AS shall store the values received in the P-Charging-Vector header field, e.g. "orig-ioi" header field parameter, if present, and "icid-value" header field parameter, and retain the P-Charging-Vector header field in the message. The AS shall store the values received in the P-Charging-Function-Addresses header field and retain the P-Charging-Function-Addresses header field in the message.

When an AS sends any request or response related to a dialog or standalone transaction, the AS may insert previously saved values into the P-Charging-Vector and P-Charging-Function-Addresses header fields before sending the message.

5.7.1.3 Access-Network-Info and Visited-Network-ID

The AS may receive in any request or response (excluding ACK requests and CANCEL requests and responses) information about the served user access network. The AS may receive information about the served user core network in REGISTER requests from S-CSCF. This information can be obtained either from the P-Access-Network-Info header field and P-Visited-Network-ID header field in the REGISTER request or can be obtained from those header fields in the body of the REGISTER request. The AS can use the header fields to provide an appropriate service to the user.

5.7.1.3A Determination of the served user

5.7.1.3A.1 General

The determination of the served user is different per session:

- for an originating session, the procedure is described in subclause 5.7.1.3A.2; and
- for a terminating session the procedure is described in subclause 5.7.1.3A.3.

5.7.1.3A.2 AS serving an originating user

If an AS receives a request on behalf of an originating user:

- and the AS supports the P-Served-User header field as defined in RFC 5502 [133], the AS shall determine the served user by taking the identity contained in the P-Served-User header field; or if that is not available by taking the identity contained in P-Asserted-Identity header field; and
- otherwise, if the AS supports the History-Info header field as defined in RFC 4244 [66] the AS shall determine the served user from the content of the History-Info header field or the P-Asserted-Identity header field.

5.7.1.3A.3 AS serving a terminating user

If an AS receives a request on behalf of a terminating user:

- and the AS supports the P-Served-User header field as defined in RFC 5502 [133], the AS shall determine the served user by taking the identity contained in the P-Served-User header field; or if that is not available by taking the identity contained in the Request-URI; and

- otherwise, if the AS supports the History-Info header field as defined in RFC 4244 [66] the AS shall determine the served user from the content of the History-Info header field or the Request-URI.

5.7.1.4 User identify verification at the AS

The procedures at the AS to accomplish user identity verification are described with the help of figure 5-1.

NOTE: Different means can be used to represent or transport the credentials. Such mechanisms are subject to operator policy and can e.g. include the P-Asserted-Identity header field, the Authorization header field or other mechanisms not specified by 3GPP TS 24.229.

When the AS receives a SIP initial or standalone request, excluding REGISTER request, that does not contain credentials, the AS shall:

a) if a Privacy header field is present in the initial or standalone request and the Privacy header field value is set to "id" or "user", then the user and the request are considered as anonymous, and no further actions are required. The AS shall consider the request as authenticated;

b) if there is no Privacy header field present in the initial or standalone request, or if the Privacy header field contains a value other than "id" or "user", then the AS shall check for the presence of a P-Asserted-Identity header field in the initial or standalone request. Two cases exist:

   i) the initial or standalone request contains a P-Asserted-Identity header field. This is typically the case when the user is located inside a trusted domain as defined by subclause 4.4. In this case, the AS is aware of the identity of the user and no extra actions are needed. The AS shall consider the request as authenticated.

   ii) the initial or standalone request does not contain a P-Asserted-Identity header field. This is typically the case when the user is located outside a trusted domain as defined by subclause 4.4. In this case, the AS does not have a verified identity of the user. The AS shall check the From header field of the initial or standalone request. If the From header field value in the initial or standalone request is set to "Anonymous" as specified in RFC 3261 [26], then the user and the request are considered as anonymous and no further actions are required. If the From header field value does not indicate anonymity, then the AS shall challenge the user by issuing a 401 (Unauthorized) response including a challenge as per procedures described in RFC 3261 [26].

When the AS receives a SIP initial or standalone request that contains credentials but it does not contain a P-Asserted-Identity header field the AS shall check the correctness of the credentials as follows:

a) If the credentials are correct, then the AS shall consider the identity of the user verified, and the AS shall consider the request as authenticated;

b) If the credentials are not correct, the AS may either rechallenge the user by issuing a 401 (Unauthorized) response including a challenge as per procedures described in RFC 3261 [26] (up to a predetermined maximum number of times predefined in the AS configuration data), or consider the user as anonymous. If the user is considered anonymous, the AS shall consider the request as authenticated.

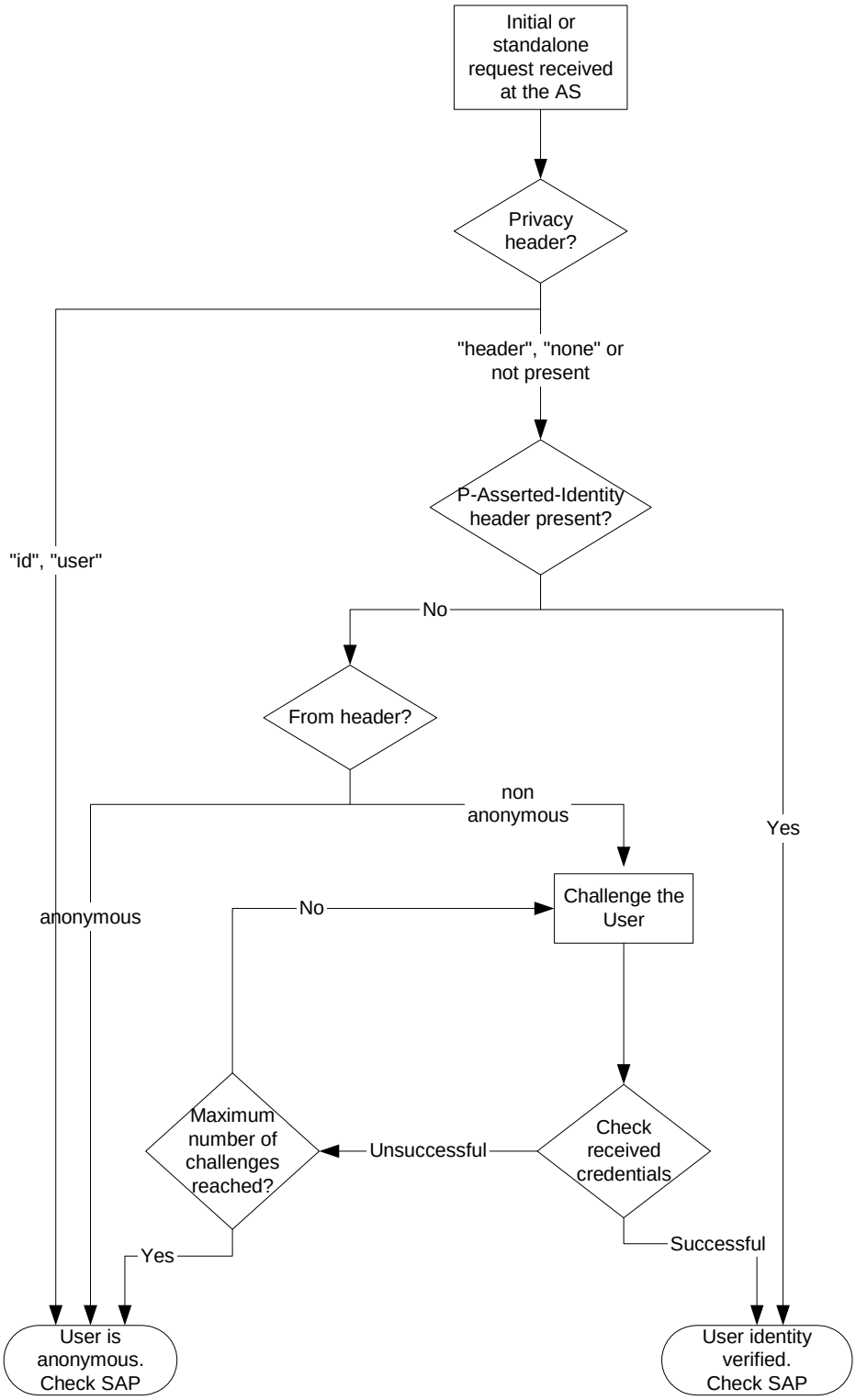

Figure 5-1: User identity verification flow at the AS

5.7.1.5 Request authorization

Once the AS have tried to verify the identity of the user, the AS either has a verified identity of the user or it considers the user as anonymous.

If the user is considered anonymous, the AS shall check whether the authorization policy defined for this request allows anonymous requests. If anonymous requests are allowed, then the AS can proceed with the requested functionality, otherwise, the AS shall not proceed with the requested functionality.

If the user is identified by an identity, the AS shall apply the authorization policy related to the requested functionality to detect whether the particular user is allowed to request the functionality. The authorization policy may require a verified identity of a user.

If the request is authorized then the AS shall continue with the procedures as defined for that request.

If the request is not authorized, the AS shall either:

- reject the request according to the procedures defined for that request e.g., by issuing a 403 (Forbidden) response; or
- send a 2xx final response if the authorization policy requires to deny the requested functionality, whilst appearing to the user as if the request has been granted.

5.7.1.6 Event notification throttling

If the AS has a local configuration information limiting the rate at which notification generation is allowed, then the AS shall take that information into account. Such local configuration information could be e.g. the shortest time period between issuing consecutive NOTIFY requests.

5.7.1.7 Local numbering

5.7.1.7.1 Interpretation of the numbers in a non-international format

If home operator's local policy defines a prefix string(s) to enable subscribers to differentiate dialling a geo-local number and/or a home-local number and if the phone number in a non-international format in the Request-URI includes such a prefix, the AS shall interpret the received number in a non-international format as a geo-local number or as a home-local number according to the prefix.

If the phone number in a non-international format in the Request-URI includes a "phone-context" tel URI parameter, the AS shall:

1) if the "phone-context" tel URI parameter contains access technology information or the home domain name prefixed by the "geo-local." string, interpret it as a geo-local number;
2) if the "phone-context" tel URI parameter contains the home domain name, interpret it as a home-local number; or
3) if the "phone-context" tel URI parameter contains any other value, apply general procedures for translation.

NOTE 1: If business communication services are provided to the calling user, and the "phone-context" tel URI parameter contains a value associated with a private numbers, it is expected that any needed translation of the number information is handled by the corresponding business communication AS.

If the phone number in a non-international format in the Request-URI includes both operator defined prefix and a "phone-context" tel URI parameter and those information are contradictory, the AS shall ignore either the prefix or the "phone-context" tel URI parameter according to operator policy.

If the phone number in a non-international format in the Request-URI does not include either a "phone-context" tel URI parameter or an operator defined prefix, the AS shall interpret the phone number in a non-international format either as a geo-local number or as a home-local number according to operator policy.

NOTE 2: Operator must ensure that service setting dialling strings do not reach local numbering AS by setting appropriately the precedences of the initial filter criteria.

5.7.1.7.2 Translation of the numbersin a non-international format

When an AS receives a request having a geo-local number in a non-international format in the Request-URI, the AS shall use the "phone-context" tel URI parameter to determine the visited access network, if "phone-context" tel URI parameter in the Request-URI is available. If "phone-context" tel URI parameter in the Request-URI is not available, the AS may determine the visited access network based on the available P-Access-Network-Info header fields containing the access-type field, if it is available in the received request, or by means outside the scope of this document.

If the visited access network is determined the AS shall attempt to determine whether the geo-local number is used to access a service in the visited network or the local addressing plan of the visited network and translate the received geo-local number to a globally routeable SIP URI or an international tel URI:

NOTE 1: During the translation the AS can contact an entity in the visited access network for getting the needed information. The protocol and procedures for this is outside the scope of this specification.

When an AS receives a request having a home-local number in a non-international format in the Request-URI, the AS shall determine whether the home-local number is used to access a service or the local addressing plan and translate the received home-local number to a globally routeable SIP URI or an international tel URI:

When an AS receives a request having any other number in a non-international format in the Request-URI, the AS shall attempt to determine whether it is used to access a service in the third network or the local addressing plan of the third network and translate the received number in a non-international format to a globally routeable SIP URI or an international tel URI:

NOTE 2: The AS can translate the tel URI to a SIP URI by including the 'telephone-subscriber' part of the received tel URI to the user part of the SIP URI and setting the domain name of the SIP URI to indicate the domain name of the network of the phone number based on the received "phone-context" tel URI parameter;

NOTE 3: If business communication services are provided to the calling user, and the "phone-context" tel URI parameter contains a value associated with a private numbers, it is expected that any needed translation of the number information is handled by the corresponding business communication AS.

If the translation at the AS fails, the AS shall either send an appropriate SIP response or route the request based on the topmost Route header field, based on local policy.

5.7.1.8 GRUU assignment and usage

It is possible for an AS to use a GRUU referring to itself when inserting a contact address in a dialog establishing or target refreshing SIP message. When using a GRUU, the AS shall do so in conformance with RFC 5627 [93].

This specification does not define how GRUUs are created by the AS; they can be provisioned by the operator or obtained by any other mechanism. The GRUU shall remain valid for the time period in which features addressed to it remain meaningful.

The AS shall handle requests addressed to its currently valid GRUUs when received outside of the dialog in which the GRUU was provided.

EXAMPLE: Upon receipt of an INVITE request addressed to a GRUU assigned to a dialog it has active, and containing a Replaces header field referencing that dialog, the AS will be able to establish the new call replacing the old one, if that is appropriate for the features being provided by the AS.

When an AS is acting as a routeing B2BUA (as defined in subclause 5.7.5) it may provide a contact address that is not a GRUU when the contact address in the incoming message that is being replaced is not a GRUU. In all other cases the AS shall use a GRUU.

When an AS acts as UA or Initiating B2BUA it may provide a contact address that is not a GRUU in cases where it can ascertain that valid requests that could result from the use of that contact and follow the usage rules of RFC 5627 [93] will reach the element. In all other cases the AS shall use a GRUU.

An AS acting as a UA or an initiating or routeing B2BUA on behalf of a public user identity can provide a GRUU in the contact address referring to itself as described above. When the AS provides a GRUU on behalf of a user, subsequent dialog-initiating requests sent to that GRUU will be routed directly to the AS, thus bypassing terminating

services assigned to the user. If the AS wishes to have terminating services applied for the user, the AS may generate a new terminating request addressed to a public GRUU associated with the public user identity of the user.

NOTE 1: If the AS wishes to have terminating services applied when the public user identity on whose behalf the AS is acting is unregistered, then the options available to the AS depend on whether or not the subscriber has ever previously registered with the IM CN subsystem. In the case where the public user identity had previously registered with the IM CN subsystem, then the AS can use the most recently allocated public GRUU if available. In the case where the user has never registered with the IM CN subsystem, then the AS can use the public user identity itself.

NOTE 2: Once terminating services have been applied, it is assumed that the terminating S-CSCF will route the request back to this AS via the initial filter criteria. In order for this to work, the initial filter criteria of the target user need to be configured so that the AS is invoked at the appropriate time relative to other terminating ASs (say, after the required terminating services have been applied). The mechanism to ensure that the AS is invoked by the initial filter criteria at the appropriate time is outside the scope of this specification (e.g. the user"s filter criteria could be statically configured to invoke the AS at the correct time, or the AS could use the Dynamic Service Activation Information mechanism to activate the appropriate filter criteria).

When an AS acts as a UA or an initiating or routeing B2BUA, and is originating or terminating a request on behalf of a public user identity, and privacy is required, the AS shall ensure that any GRUU provided in the contact address in the request does not reveal the public user identity of the user.

5.7.1.9 Use of ICSI and IARI values

Based on service logic, an AS can validate an ICSI value received in an Accept-Contact header field or received in a P-Asserted-Service header field and reject the request if necessary.

A trusted AS may insert a P-Asserted-Service header field in a request for a new dialog or standalone transaction. An untrusted AS may insert a P-Preferred-Service header field in a request for a new dialog or standalone transaction. If the request is related to an IMS communication service that requires the use of an ICSI then the AS:

- shall include the ICSI value (coded as specified in subclause 7.2A.8.2), for the IMS communication service that is related to the request in either a P-Asserted-Service header field or a P-Preferred-Service header field depending whether the AS is trusted or not according to RFC 6050 [121].

When an AS that is acting as a UA or initiating B2BUA or routeing B2BUA sends an initial request for a dialog or a request for a standalone transaction, the AS may include an Accept-Contact header field containing:

- an ICSI value (coded as specified in subclause 7.2A.8.2) in a g.3gpp.icsi-ref media feature tag as defined in subclause 7.9.2 and RFC 3841 [56B]; and

- one or more IARI values (coded as specified in subclause 7.2A.9.2) that are related to the request in a g.3gpp.iari-ref media feature tag as defined in subclause 7.9.3 and RFC 3841 [56B];

if the ICSI or IARIs for the IMS communication service and IMS application are known.

The AS may:

- include the received ICSI and IARI values;

- replace or remove received ICSI and IARI values; or

- include new ICSI and IARI values.

When the AS acting as a UA or initiating B2BUA or routeing B2BUA sends a SIP request or a SIP response related to an IMS communication service, the AS may include in the Contact header field:

- in a g.3gpp.icsi-ref media feature tag as defined in subclause 7.9.2 one or more ICSI values (coded as specified in subclause 7.2A.8.2); and

- one or more IARI values (coded as specified in subclause 7.2A.9.2) in a g.3gpp.iari-ref media feature tag, for the IMS applications, that are related to the request as defined in subclause 7.9.2 and RFC 3840 [62];

if the ICSI or IARIs for the IMS communication service and IMS application are known. The AS may:

- include the received ICSI and IARI values;
- replace or remove received ICSI values; or
- include new ICSI and IARI values.

5.7.1.10 Carrier selection

An AS may play a role in support of carrier selection as defined in RFC 4694 [112].

NOTE 1: In general, ASs do not need to support carrier selection, Rather a specific AS or a few ASs in a network will be used for carrier selection,

When an AS that supports carrier selection receives an initial request with a Request-URI in the form of a tel-URI that contains a "cic" tel-URI parameter inserted by the UE, and if configured per operator policy, the AS may validate the value of the "cic" parameter. If an AS that supports carrier selection determines the "cic" parameter received in the initial request to be valid, as configured per operator policy, the AS shall process the request accordingly. If an AS supports carrier selecton and determines the "cic" parameter received in the initial request to be invalid, then the AS shall remove the "cic" parameter and process the request as if no "cic" had been received from the UE.

When an AS that support carrier selection receives an initial request with a Request-URI in the form of a tel-URI, the AS may, based on operator policy, insert an appropriate value for the "cic" tel-URI parameters as defined in RFC 4694 [112].

NOTE 2: For example, the AS that supports preferred carrier could insert a "cic" tel-URI parameter that identifies the originating user's preassigned carrier, or the carrier assigned to a called freephone number.

When an AS that support carrier selection receives an initial request with a Request-URI in the form of a SIP URI user=dialstring (see RFC 4967 [103]), the AS may translate the SIP URI to a valid tel-URI or a valid SIP URI user=phone comprising a userinfo part containing the tel-URI and a domain matching the domain of the original SIP URI user=dialstring. If the received SIP URI user=dialstring is successfully converted, then the AS shall replace the Request-URI with the newly created tel-URI or SIP URI user=phone. The AS shall then process the request as if it had arrived from the UE containing this tel-URI or SIP URI user=phone in the Request-URI.

NOTE 3: This specification does not make any assumptions regarding how these procedures are mapped to ASs; whether all procedures are supported by a single AS or spread across multiple ASs. However, this specification does assume that the responsibility for ensuring that the UE complies with the carrier selection procedures defined in RFC 4694 [112] will be performed by a single AS (e.g. validate "cic"), and the filter criteria will be configured so that this AS is invoked before other ASs that have carrier selection responsibilities.

The AS carrier selection procedures also apply when the request contains a Request-URI in the form of a SIP URI user=phone, where the "cic" tel-URI parameter is contained in the userinfo part of the SIP URI.

5.7.1.11 Void

5.7.1.12 Void

5.7.1.13 CPC and OLI

The AS may populate the "cpc" and "oli" URI parameters in each initial request for a dialog or a request for a standalone transaction in the tel URI or SIP URI representation of telephone numbers in the P-Asserted-Identity header field based on their origin source.

5.7.2 Application Server (AS) acting as terminating UA, or redirect server

When acting as a terminating UA the AS shall behave as defined for a UE in subclause 5.1.4, with the exceptions identified in this subclause.

The AS, although acting as a UA, does not initiate any registration of its associated addresses. These are assumed to be known by peer-to-peer arrangements within the IM CN subsystem.

If the AS requires knowledge of the served user it shall determine the served user according to the applicable procedure in subclause 5.7.1.3A.

An AS acting as redirect server shall propagate any received IM CN subsystem XML message body in the redirected message.

When an AS acting as a terminating UA generates a subsequent request that does not relate to an INVITE dialog, the AS shall insert a P-Charging-Vector header field with the "icid-value" header field parameter populated as specified in 3GPP TS 32.260 [17].

When the AS acting as terminating UA receives an initial request for a dialog or a request for a standalone transaction, the AS shall store the value of the "orig-ioi" header field parameters received in the P-Charging-Vector header field if present.

NOTE: Any received orig-ioi parameter will be any type of orig-ioi. The orig-ioi identifies the network operator from which the request was sent.

When the AS acting as terminating UA generates a response to an initial request for a dialog or a request for a standalone transaction, the AS shall insert a P-Charging-Vector header field containing the "orig-ioi" header field parameter, if received in the request and a type 3 "term-ioi" header field parameter. The AS shall set the type 3 "term-ioi" header field parameter to a value that identifies the service provider from which the response is sent and the "orig-ioi" header field parameter is set to the previously received value of "orig-ioi" header field parameter.

If resource priority in accordance with RFC 4412 [116] is required for a dialog, then the AS shall include the Resource-Priority header field in all requests associated with that dialog.

5.7.3 Application Server (AS) acting as originating UA

In order to support an AS acting as an originating UA, the AS has to be within the same trust domain as the S-CSCF to which requests will be sent.

When acting as an originating UA the AS shall behave as defined for a UE in subclause 5.1.3, with the exceptions identified in this subclause.

The AS, although acting as a UA, does not initiate any registration of its associated addresses and does not participate in any authentication procedures defined for a UE. These are assumed to be known by peer-to-peer arrangements within the IM CN subsystem.

When an AS acting as an originating UA generates an initial request for a dialog or a request for a standalone transaction, the AS shall insert a P-Charging-Vector header field with the "icid-value" header field parameter populated as specified in 3GPP TS 32.260 [17] and a type 3 "orig-ioi" header field parameter. The AS shall set the type 3 "orig-ioi" header field parameter to a value that identifies the service provider from which the request is sent. The AS shall not include the type 3 "term-ioi" header field parameter.

NOTE 1: The AS can retrieve CDF and/or ODF addresses from HSS on Sh interface.

When the AS acting as an originating UA receives any response to an initial request for a dialog or a request for a standalone transaction, the AS shall store the value of the "term-ioi" header field parameter received in the P-Charging-Vector header field if present.

NOTE 2: Any received "term-ioi" header field parameter will be a type 3 IOI. The type 3 IOI identifies the network operator from which the response was sent.

When an AS acting as an originating UA generates a subsequent request that does not relate to an INVITE dialog, the AS shall insert a P-Charging-Vector header field with the "icid-value" header field parameter populated as specified in 3GPP TS 32.260 [17].

The AS shall extract charging function addresses from any P-Charging-Function-Addresses header field that is received in any 1xx or 2xx responses to the requests.

The AS may also indicate that the proxies should not fork the request by including a "no-fork" directive within the Request-Disposition header field in the request as described in RFC 3841 [56B].

When sending any initial request, an identity is needed that will correlate with the service profile to be used at the S-CSCF. If the identity for that service profile corresponds to the value to be used to identify the caller to the destination

user, include the identity in the P-Asserted-Identity header field. If the identity for that service profile does not correspond to the value to be used to identify the caller to the destination user, and the P-Served-User header field is supported by the S-CSCF, include the identity in the P-Served-User header field. This leaves the P-Asserted-Identity header field for the identity to be used to identify the caller to the destination user.

When sending an initial request on behalf of a PSI that is hosted by the AS, the AS shall:

- insert a Request-URI as determined by the service logic;

- insert a P-Asserted-Identity header field and possibly a P-Served-User header field containing the PSI as indicated earlier in this subclause;

- if the AS is not able to resolve the next hop address by itself or the operator policy does not allow it, insert a Route header field pointing either to the S-CSCF where the PSI is hosted, or to the entry point of the home network of the PSI or to the transit function. The AS shall append the "orig" parameter to the URI in the topmost Route header field; and

NOTE 3: The address of the S-CSCF hosting the PSI can be obtained by querying the HSS on the Sh interface.

NOTE 4: AS can only send the initial request to the entry point of the home network of the PSI only if the AS can assume (e.g. based on local configuration) that the receiving entry point will be able to process the request as an originating request.

- if the AS is able to resolve the next hop address by itself and the operator policy allows it, forward the originating request directly to the destination without involving any S-CSCF in the originating IM CN subsystem.

When sending an initial request on behalf of a public user identity, the AS shall:

- insert a Request-URI as determined by the service logic;

- insert a P-Asserted-Identity header field and possibly a P-Served-User header field containing the public user identity as indicated earlier in this subclause;

- if the AS intends to send the originating request to the home network of the public user identity or the operator policy requires it, insert a Route header field pointing to the S-CSCF where the public user identity on whose behalf the request is generated is registered or hosted (unregistered case) or to the entry point of the public user identity's network. The AS shall append the "orig" parameter to the URI in the topmost Route header field; and

NOTE 5: The address of the S-CSCF can be obtained either by querying the HSS on the Sh interface or during third-party registration.

NOTE 6: AS can send the initial request to the entry point of the public user identity's network or to the entry point of the home network of the PSI only if the AS can assume (e.g. based on local configuration) that the receiving entry point will be able to process the request as an originating request.

- if the AS intends to send the originating request directly to the terminating network and the operator policy allows it, forward the originating request directly to the destination without involving any S-CSCF in the originating IM CN subsystem.

When sending an initial request to a served public user identity, the AS shall insert:

- a Request-URI containing the served public user identity;

- a P-Asserted-Identity as determined by the service logic (e.g. the URI of the AS or the URI of the entity that triggered the SIP request, if the sending of the initial request is triggered by a non-SIP request); and

- a Route header field pointing to the S-CSCF where the public user identity to whom the request is generated is registered or hosted (unregistered case) or to the entry point of the public user identity's network. The AS shall not append the "orig" parameter to the URI in the topmost Route header field.

NOTE 7: The address of the S-CSCF can be obtained either by querying the HSS on the Sh interface or during third-party registration.

The AS can indicate privacy of the P-Asserted-Identity in accordance with RFC 3323 [33], and the additional requirements contained within RFC 3325 [34].

Where privacy is required, in any initial request for a dialog or request for a standalone transaction, the AS shall set the From header field to "Anonymous" as specified in RFC 3261 [26].

NOTE 8: The contents of the From header field cannot be relied upon to be modified by the network based on any privacy specified by the user either within the AS indication of privacy or by network subscription or network policy. Therefore the AS includes the value "Anonymous" whenever privacy is explicitly required.

If resource priority in accordance with RFC 4412 [116] is required for a dialog, then the AS shall include the Resource-Priority header field in all requests associated with that dialog.

5.7.4 Application Server (AS) acting as a SIP proxy

When the AS acting as a SIP proxy receives a request from the S-CSCF, prior to forwarding the request, the AS shall:

- remove its own URI from the topmost Route header field; and
- after executing the required services, route the request based on the topmost Route header field.

The AS may modify the SIP requests based on service logic, prior to forwarding the request back to the S-CSCF.

The AS shall not fork the request if the fork-directive in the Request-Disposition header field is set to "no-fork" as described in RFC 3841 [56B].

If the AS requires knowledge of the served user it shall determine the served user according to the applicable procedure in subclause 5.7.1.3A.

An AS acting as a SIP proxy shall propagate any received IM CN subsystem XML message body in the forwarded message.

When the AS acting as a SIP proxy receives an initial request for a dialog or a request for a standalone transaction, the AS shall store the value of the "orig-ioi" header field parameter received in the P-Charging-Vector header field if present. The AS shall remove the "orig-ioi" header field parameter from the forwarded request and insert a type 3 "orig-ioi" header field parameter. The AS shall set the type 3 "orig-ioi" header field parameter to a value that identifies the service provider from which the request is sent. The AS shall not include the type 3 "term-ioi" header field parameter.

NOTE: A received orig-ioi parameter will be a type 3 IOI. The orig-ioi identifies the network operator from which the request was sent.

When the AS acting as a SIP proxy forwards a response to an initial request for a dialog or a request for a standalone transaction, the AS shall remove any received "orig-ioi" and "term-ioi" header field parameters, and insert a P-Charging-Vector header field containing the previously stored "orig-ioi" header field parameter, if received in the request and a type 3 "term-ioi" header field parameter. The AS shall set the type 3 "term-ioi" header field parameter to a value that identifies the service provider from which the response is sent and the "orig-ioi" header field parameter is set to the previously received value of "orig-ioi" header field parameter. Any values of "orig-ioi" or "term-ioi" header field parameters received in any response that is being forwarded are not used.

5.7.5 Application Server (AS) performing 3rd party call control

5.7.5.1 General

The AS performing 3rd party call control acts as a B2BUA. There are two kinds of 3rd party call control:

- Routeing B2BUA: an AS receives a request, terminates it and generates a new request, which is based on the received request.
- Initiating B2BUA: an AS initiates two requests, which are logically connected together at the AS, or an AS receives a request and initiates a new request that is logically connected but unrelated to the incoming request from the originating user (e.g. the P-Asserted-Identity of the incoming request is changed by the AS). AS can initiate additional requests and associate them with a related incoming request.

If the AS requires knowledge of the served user the AS shall determine the served user according to the applicable procedure in subclause 5.7.1.3A.

When the AS receives a terminated call and generates a new call, and dependent on whether the service allows the AS to change the P-Asserted-Identity for outgoing requests compared with the incoming request, the AS will select appropriate kind of 3rd party call control.

The B2BUA AS will internally map the message header fields between the two dialogs that it manages. It is responsible for correlating the dialog identifiers and will decide when to simply translate a message from one dialog to the other, or when to perform other functions. These decisions are specific to each AS and are outside the scope of the present document.

The AS, although acting as a UA, does not initiate any registration of its associated addresses. These are assumed to be known by peer-to-peer arrangements within the IM CN subsystem.

For standalone transactions, when the AS is acting as a Routeing B2BUA, the AS shall copy the remaining Route header field(s) unchanged from the received request for a standalone transation to the new request for a standalone transaction.

When the AS receives a Replaces header field within an initial request for a dialog, the AS should check, whether the AS acts as a routeing B2BUA for the dialog identified in the Replaces header field. The AS should:

- if the AS acts as routeing B2BUA for the dialog indicated in the Replaces header field, include in the forwarded request a Replaces header field, indicating the the dialog on the outgoing side that corresponds to the dialog identified in the received Replaces header field; or

- if the AS does not act as a routeing B2BUA for the dialog indicated in the Replaces header field, include in the forwarded request the Replaces header field as received in the incoming request.

When the AS acting as a routeing B2BUA receives an initial request for a dialog or a request for a standalone transaction, the AS shall:

- store the value of the "orig-ioi" header field parameter received in the P-Charging-Vector header field if present; and

- remove the "orig-ioi" header field parameter from the forwarded request.

NOTE: Any received orig-ioi parameter will be any type of orig-ioi. The orig-ioi identifies the network operator from which the request was sent.

When the AS acting as a routeing B2BUA generates a response to an initial request for a dialog or a request for a standalone transaction, the AS shall insert a P-Charging-Vector header field containing the "orig-ioi" header field parameter, if received in the request and a type 3 "term-ioi" header field parameter. The AS shall set the type 3 "term-ioi" header field parameter to a value that identifies the service provider from which the response is sent and the "orig-ioi" header field parameter is set to the previously received value of "orig-ioi" header field parameter. Any values of "orig-ioi" or "term-ioi" header field parameter received in any response that is being forwarded are not used.

The AS shall transparently pass supported and unsupported signalling elements (e.g. SIP headers, SIP messages bodies), except signalling elements that are modified or deleted as part of the hosted service logic, or based on service provider policy.

If resource priority in accordance with RFC 4412 [116] is required for a dialog, then the AS shall include the Resource-Priority header field in all requests associated with that dialog.

5.7.5.2 Call initiation

5.7.5.2.1 Initial INVITE

When the AS acting as a Routeing B2BUA receives an initial INVITE request, the AS shall:

1) remove its own SIP URI from the topmost Route header field of the received INVITE request;

2) perform the AS specific functions. See 3GPP TS 23.218 [5];

3) if successful, generate and send a new INVITE request to establish a new dialog;

4) copy the remaining Route header field(s) unchanged from the received INVITE request to the new INVITE request;

5) copy the P-Asserted-Identity to the outgoing request;

6) if a Route header field is present, route the new INVITE request based on the topmost Route header field; and

NOTE 1: The topmost Route header field of the received INVITE request will contain the AS's SIP URI. The following Route header field will contain the SIP URI of the S-CSCF.

7) if no Route header field is present (e.g. the AS may be acting on behalf of a PSI):

   a) insert a Route header field pointing either to the S-CSCF where the PSI is hosted or to the entry point of the home network of the PSI or to the transit function, if the AS is not able to resolve the next hop address by itself or the operator policy requires it; or

   b) forward the originating request directly to the destination without involving any S-CSCF in the originating IM CN subsystem, if the AS is able to resolve the next hop address by itself, and the operator policy allows it.

NOTE 2: The address of the S-CSCF hosting the PSI can be obtained by querying the HSS on the Sh interface.

When the AS is acting as an Initiating B2BUA, the AS shall apply the procedures described in subclause 5.7.3 for any outgoing requests. The AS shall either set the "icid-value" header field parameter in the P-Charging-Vector header field to be the same as received or different. The AS can include original dialog identifier in the Route header field for the S-CSCF that it learned from an incoming request, per service logic needs.

NOTE 3: The AS can retrieve CDF and/or ODF adresses from HSS on Sh interface.

5.7.5.2.2 Subsequent requests

Void.

5.7.5.3 Call release

5.7.5.4 Call-related requests

An AS may initiate a call release. See 3GPP TS 23.218 [5] for possible reasons. The AS shall simultaneously send the BYE request for both dialogs managed by the B2BUA.

5.7.5.5 Further initial requests

When the AS is acting as an Initiating B2BUA the AS shall apply the procedures described in subclause 5.7.3 for the requests. The AS shall either set the "icid-value" header field parameter in the P-Charging-Vector header field to be the same as received or different. The AS may initiate any number of requests, per service logic needs.

5.7.6 Void

5.8 Procedures at the MRFC

5.8.1 General

Although the MRFC is acting as a UA, it is outside the scope of this specification how the MRFC associated addresses are made known to other entities.

For all SIP transactions identified:

- if priority is supported, as containing an authorised Resource-Priority header field, or, if such an option is supported, relating to a dialog which previously contained an authorised Resource-Priority header field;

the MRFC shall give priority over other transactions or dialogs. This allows special treatment of such transactions or dialogs.

NOTE: This special treatment can include filtering, higher priority processing, routeing, call gapping. The exact meaning of priority is not defined further in this document, but is left to national regulation and network configuration.

When the MRFC sends any request or response (excluding ACK requests and CANCEL requests and responses) related to a dialog or standalone transaction, the MRFC may insert previously saved values into P-Charging-Vector and P-Charging-Function-Addresses header fields before sending the message.

The MRFC shall use a GRUU referring to itself (as specified in RFC 5627 [93]) when inserting a contact address in a dialog establishing or target refreshing SIP message. This specification does not define how GRUUs are created by the MRFC; they can be provisioned by the operator or obtained by any other mechanism. A GRUU used by the MRFC when establishing a dialog shall remain valid for the lifetime of the dialog.

The MRFC shall handle requests addressed to its currently valid GRUUs when received outside of the dialog in which the GRUU was provided.

EXAMPLE: Upon receipt of an INVITE request addressed to a GRUU assigned to a dialog it has active, and containing a Replaces header field referencing that dialog, the MRFC will be able to establish the new call replacing the old one.

5.8.2 Call initiation

5.8.2.1 Initial INVITE

5.8.2.1.1 MRFC-terminating case

5.8.2.1.1.1 Introduction

The MRFC shall provide a P-Asserted-Identity header field in a response to the initial request for a dialog, or any response for a standalone transaction. It is a matter of network policy whether the MRFC expresses privacy according to RFC 3323 [33] with such responses.

When the MRFC receives an initial INVITE request, the MRFC shall store the values received in the P-Charging-Vector header field, e.g. "icid-value" header field parameter. The MRFC shall store the values received in the P-Charging-Function-Addresses header field.

5.8.2.1.1.2 Tones and announcements

The MRFC can receive INVITE requests to set up a session to play tones and announcements. The MRFC acts as terminating UA in this case.

When the MRFC receives an INVITE request for a tone or announcement, the MRFC shall:

- send 100 (Trying) response.

5.8.2.1.1.3 Ad-hoc conferences

The MRFC can receive INVITE requests to set up an ad-hoc conferencing session (for example a multiparty call) or to add parties to the conference. The MRFC acts as terminating UA in this case.

When the MRFC receives an INVITE request for ad hoc conferencing, the MRFC shall:

- send 100 (Trying) response; and
- after the MRFP indicates that the conference resources are available, send 200 (OK) response. The MRFC may choose to send a 183 (Session Progress) response prior to the 200 (OK) response.

When the MRFC receives an INVITE request to add a party to an existing ad hoc conference (i.e. MRFC conference identifier), the MRFC shall:

- send 100 (Trying) response; and

- after the MRFP indicates that the conferencing request is granted, send 200 OK response. The MRFC may choose to send a 183 Session Progress response prior to the 200 (OK) response.

5.8.2.1.1.4 Transcoding

The MRFC may receive INVITE requests to set up transcoding between endpoints with incompatible codecs. The MRFC acts as terminating UA in this case.

When the MRFC receives an INVITE request for transcoding and a codec is supplied in SDP, the MRFC shall:

- send 100 (Trying) response; and
- after the MRFP indicates that the transcoding request is granted, send 200 (OK) response.

When the MRFC receives an INVITE request with an indicator for transcoding but no SDP, the MRFC shall:

- send 183 (Session Progress) response with list of codecs supported by the MRFC/MRFP.

5.8.2.1.2 MRFC-originating case

The MRFC shall provide a P-Asserted-Identity header field in an initial request for a dialog, or any request for a standalone transaction. It is a matter of network policy whether the MRFC expresses privacy according to RFC 3323 [33] with such requests.

When an MRFC generates an initial request for a dialog or a request for a standalone transaction, the MRFC shall insert a P-Charging-Vector header field with the "icid-value" header field parameter populated as specified in 3GPP TS 32.260 [17].

5.8.2.2 Subsequent requests

5.8.2.2.1 Tones and announcements

When the MRFC receives an ACK request for a session, this may be considered as an event to direct the MRFP to start the playing of a tone or announcement.

5.8.2.2.2 Transcoding

When the MRFC receives a PRACK request (in response to the 183 (Session Progress) response with an indicator for transcoding and codec supplied in SDP, the MRFC shall:

- after the MRFP indicates that the transcoding request is granted, send 200 (OK) response.

5.8.3 Call release

5.8.3.1 S-CSCF-initiated call release

5.8.3.1.1 Tones and announcements

When the MRFC receives a BYE request for a session, the MRFC directs the MRFP to stop the playing of a tone or announcement.

5.8.3.2 MRFC-initiated call release

5.8.3.2.1 Tones and announcements

When the MRFC has a timed session to play tones and announcements and the time expires, the MRFC shall:

- send a BYE request towards the UE.

When the MRFC is informed by the MRFP that tone or announcement resource has been released, the MRFC shall:

- send a BYE request towards the UE.

5.8.4 Call-related requests

5.8.4.1 ReINVITE

5.8.4.1.1 MRFC-terminating case

5.8.4.1.1.1 Ad-hoc conferences

The MRFC can receive reINVITE requests to modify an ad-hoc conferencing session (for example a multiparty call) for purposes of floor control and for parties to leave and rejoin the conference.

When the MRFC receives a reINVITE request, the MRFC shall:

- send 100 (Trying) response; and
- after the MRFP indicates that the conferencing request is granted, send 200 (OK) response. The MRFC may choose to send a 183 (Session Progress) response prior to the 200 (OK) response.

5.8.4.1.2 MRFC-originating case

Void.

5.8.4.2 REFER

5.8.4.2.1 MRFC-terminating case

Void.

5.8.4.2.2 MRFC-originating case

Void.

5.8.4.2.3 REFER initiating a new session

Void.

5.8.4.2.4 REFER replacing an existing session

Void.

5.8.4.3 INFO

Void.

5.8.5 Further initial requests

When the MRFC responds to an OPTIONS request with a 200 (OK) response, the MRFC may include a message body with an indication of the supported tones/announcement packages, DTMF capabilities, supported codecs and conferencing options of the MRFC/MRFP.

NOTE: As specified in RFC 6230 [146] an MRFC supporting the use of the control channel framework shall support the SYNC command to indicate the media control packages supported. Additionally each media control package should define an audit command for discovery of package capabilities (for example supported codecs and options).

5.9 Void

5.9.1 Void

5.10 Procedures at the IBCF

5.10.1 General

As specified in 3GPP TS 23.228 [7] border control functions may be applied between two IM CN subsystems or between an IM CN subsystem and other SIP-based multimedia networks based on operator preference. The IBCF may act both as an entry point and as an exit point for a network. If it processes a SIP request received from other network it functions as an entry point (see subclause 5.10.3) and it acts as an exit point whenever it processes a SIP request sent to other network (see subclause 5.10.2).

The functionalities of the IBCF include:

- network configuration hiding (see subclause 5.10.4);
- application level gateway (see subclause 5.10.5);
- transport plane control, i.e. QoS control (see subclause 5.10.5);
- screening of SIP signalling (see subclause 5.10.6);
- inclusion of an IWF if appropriate; and
- media transcoding control (see suclause 5.10.7).

NOTE 1: The functionalities performed by the IBCF are configured by the operator, and it is network specific.

The IBCF, acting as B2BUA, which is located between visited network and home network shall preserve the dialog identifier, i.e. shall not change the Call-Id header field value, the "tag" header field parameter value of the From header field in any SIP INVITE request and any SIP response to the SIP INVITE request, and shall preserve the "tag" header field parameter value of the To header field, in any SIP response to the SIP INVITE request.

NOTE 2: The IBCF can identify whether it is located between visited network and home network based on local configuration.

5.10.2 IBCF as an exit point

5.10.2.1 Registration

When IBCF receives a REGISTER request, the IBCF shall:

1) void;

2) if network topology hiding is required or IBCF is configured to perform application level gateway and/or transport plane control functionalities, then the IBCF shall add its own routeable SIP URI to the top of the Path header field; and

NOTE 1: The IBCF can include in the inserted SIP URI an indicator that identifies the direction of subsequent requests received by the IBCF i.e., from the S-CSCF towards the P-CSCF, to identify the UE-terminating case. The IBCF can encode this indicator in different ways, such as, e.g., a unique parameter in the URI, a character string in the username part of the URI, or a dedicated port number in the URI.

NOTE 2: Any subsequent request that includes the direction indicator (in the Route header field) or arrives at the dedicated port number, indicates that the request was sent by the S-CSCF towards the P-CSCF.

3) select an entry point of the home network and forward the request to that entry point.

   If the selected entry point:

- does not respond to the REGISTER request and its retransmissions by the IBCF; or
- sends back a 3xx response or 480 (Temporarily Unavailable) response to a REGISTER request;

the IBCF shall select a new entry point and forward the original REGISTER request.

NOTE 3: The list of the entry points can be either obtained as specified in RFC 3263 [27A] or provisioned in the IBCF. The entry point can be an IBCF or an I-CSCF.

If the IBCF fails to forward the REGISTER request to any entry point, the IBCF shall send back a 504 (Server Time-Out) response to the P-CSCF, in accordance with the procedures in RFC 3261 [26].

5.10.2.1A General

For all SIP transactions identified:

- if priority is supported, as containing an authorised Resource-Priority header field, or, if such an option is supported, relating to a dialog which previously contained an authorised Resource-Priority header field;

the IBCF shall give priority over other transactions or dialogs. This allows special treatment of such transactions or dialogs.

NOTE: The special treatment can include filtering, higher priority processing, routeing, call gapping. The exact meaning of priority is not defined further in this document, but is left to national regulation and network configuration.

5.10.2.2 Initial requests

Upon receipt of:

- an initial request for a dialog;
- a request for a standalone transaction, except the REGISTER method; or
- a request for an unknown method that does not relate to an existing dialog;

the IBCF shall:

1) if the request is an INVITE request, respond with a 100 (Trying) provisional response;

2) if the request is an INVITE request and the IBCF is configured to perform application level gateway and/or transport plane control functionalities, save the Contact, CSeq and Record-Route header field values received in the request such that the IBCF is able to release the session if needed;

2A) if the request is an initial request for a dialog and local policy requires the application of IBCF capabilities in subsequent requests, perform record route procedures as specified in RFC 3261 [26];

3) if network topology hiding is required, apply the procedures as described in subclause 5.10.4;

4) if screening of SIP signalling is required, apply the procedures as described in subclause 5.10.6;

5) void;

5A) if the recipient of the request is understood from configured information to always send and receive private network traffic from this source, remove the P-Private-Network-Indication header field containing the domain name associated with that saved information;

6) store the values from the P-Charging-Function-Addresses header field, if present;

7) remove some of the parameters from the P-Charging-Vector header field or the header field itself, depending on operator policy, if present; and

8) remove the P-Charging-Function-Addresses header fields, if present, prior to forwarding the message.

and forwards the request according to RFC 3261 [26].

NOTE 1: If IBCF processes a request without a pre-defined route (e.g. the subscription to reg event package originated by the P-CSCF), the next-hop address can be either obtained as specified in RFC 3263 [27A] or be provisioned in the IBCF.

When the IBCF receives an INVITE request, the IBCF may require the periodic refreshment of the session to avoid hung states in the IBCF. If the IBCF requires the session to be refreshed, the IBCF shall apply the procedures described in RFC 4028 [58] clause 8.

NOTE 2: Requesting the session to be refreshed requires support by at least one of the UEs. This functionality cannot automatically be granted, i.e. at least one of the involved UEs needs to support it.

When the IBCF receives a response to the initial request and network topology hiding is required, then the IBCF shall apply the procedures as described in subclause 5.10.4.

When the IBCF receives a response to the initial request and screening of SIP signalling is applied, then the IBCF shall apply the procedures as described in subclause 5.10.6.

5.10.2.3 Subsequent requests

Upon receipt a subsequent request, the IBCF shall:

1) if the request is an INVITE request, respond with a 100 (Trying) provisional response;

2) if the request is a target refresh request and the IBCF is configured to perform application level gateway and/or transport plane control functionalities, save the Contact and CSeq header field values received in the request such that the IBCF is able to release the session if needed;

3) if the subsequent request is other than a target refresh request (including requests relating to an existing dialog where the method is unknown) and the IBCF is configured to perform application level gateway and/or transport plane control functionalities, save the Contact and CSeq header field values received in the request such that the IBCF is able to release the session if needed;

4) if network topology hiding is required, apply the procedures as described in subclause 5.10.4; and

5) if screening of SIP signalling is required, apply the procedures as described in subclause 5.10.6.

and forwards the request, based on the topmost Route header field, in accordance with the procedures of RFC 3261 [26].

When the IBCF receives a response to the subsequent request and network topology hiding is required, then the IBCF shall apply the procedures as described in subclause 5.10.4.

When the IBCF receives a response to the subsequent request and screening of SIP signalling is required, then the IBCF shall apply the procedures as described in subclause 5.10.6.

5.10.2.4 IBCF-initiated call release

If the IBCF provides transport plane control functionality and receives an indication of a transport plane related error the IBCF may:

1) generate a BYE request for the terminating side based on information saved for the related dialog; and

2) generate a BYE request for the originating side based on the information saved for the related dialog.

NOTE: Transport plane related errors can be indicated from e.g. TrGW, or PCRF. The protocol for indicating transport plane related errors to the IBCF is out of scope of this specification.

Upon receipt of the 2xx responses for both BYE requests, the IBCF shall release all information related to the dialog and the related multimedia session.

5.10.3 IBCF as an entry point

5.10.3.1 Registration

When IBCF receives a REGISTER request, the IBCF shall:

1) verify if it arrived from a trusted domain or not. If the request arrived from an untrusted domain, respond with 403 (Forbidden) response;

NOTE 1: The IBCF can find out whether the request arrived from a trusted domain or not, from the procedures described in 3GPP TS 33.210 [19A].

2) if network topology hiding, or screening of SIP signalling, is required or IBCF is configured to perform application level gateway and/or transport plane control functionalities, add its own routeable SIP URI to the top of the Path header field; and

NOTE 2: The IBCF can include in the inserted SIP URI an indicator that identifies the direction of subsequent requests received by the IBCF i.e., from the S-CSCF towards the P-CSCF, to identify the UE-terminating case. The IBCF can encode this indicator in different ways, such as, e.g., a unique parameter in the URI, a character string in the username part of the URI, or a dedicated port number in the URI.

NOTE 3: Any subsequent request that includes the direction indicator (in the Route header field) or arrives at the dedicated port number, indicates that the request was sent by the S-CSCF towards the P-CSCF.

3) If IBCF is colocated with an I-CSCF, or it has a preconfigured I-CSCF to be contacted, forward the request to that I-CSCF. Otherwise select an I-CSCF and forward the request to that I-CSCF.

NOTE 4: The selection of an I-CSCF can lead to additional delays.

If the selected I-CSCF:

- does not respond to the REGISTER request and its retransmissions by the IBCF; or

- sends back a 3xx response or 480 (Temporarily Unavailable) response to a REGISTER request;

the IBCF shall select a new I-CSCF and forward the original REGISTER request.

NOTE 5: The list of the I-CSCFs can be either obtained as specified in RFC 3263 [27A] or provisioned in the IBCF.

If the IBCF fails to forward the REGISTER request to any I-CSCF, the IBCF shall send back a 504 (Server Time-Out) response towards the P-CSCF, in accordance with the procedures in RFC 3261 [26].

5.10.3.1A General

For all SIP transactions identified:

- if priority is supported, as containing an authorised Resource-Priority header field, or, if such an option is supported, relating to a dialog which previously contained an authorised Resource-Priority header field;

the IBCF shall give priority over other transactions or dialogs. This allows special treatment of such transactions or dialogs.

NOTE: The special treatment can include filtering, higher priority processing, routeing, call gapping. The exact meaning of priority is not defined further in this document, but is left to national regulation and network configuration.

5.10.3.2 Initial requests

Upon receipt of:

- an initial request for a dialog;

- a request for a standalone transaction, except the REGISTER request; or

- a request for an unknown method that does not relate to an existing dialog;

the IBCF shall verify whether the request is arrived from a trusted domain or not. If the request arrived from an untrusted domain, then the IBCF shall:

- if the topmost Route header field of the request contains the "orig" parameter, respond with 403 (Forbidden) response. Otherwise,

- remove all P-Charging-Vector header fields and all P-Charging-Function-Addresses header fields the request may contain.

Upon receipt of:

- an initial request for a dialog;

- a request for a standalone transaction, except the REGISTER request; or

- a request for an unknown method that does not relate to an existing dialog;

the IBCF shall:

1) if the request is an INVITE request, then respond with a 100 (Trying) provisional response;

1A) if a P-Private-Network-Indication header field is included in the request, check whether the configured information allows the receipt of private network traffic from this source. If private network traffic is allowed, the IBCF shall check whether the received domain name in any included P-Private-Network-Indication header field in the request is the same as the domain name associated with that configured information. If private network traffic is not allowed, or the received domain name does not match, then the IBCF shall remove the P-Private-Network-Indication header field;

1B) if the initiator of the request is understood from configured information to always send and receive private network traffic from this source, insert a P-Private-Network-Indication header field containing the domain name associated with that configured information;

2) if the request is an INVITE request and the IBCF is configured to perform application level gateway and/or transport plane control functionalities, then the IBCF shall save the Contact, CSeq and Record-Route header field values received in the request such that the IBCF is able to release the session if needed;

2A) if the request is an initial request for a dialog and local policy requires the application of IBCF capabilities in subsequent requests, perform record route procedures as specified in the RFC 3261 [26];

3) if network topology hiding is required, then apply the procedures as described in subclause 5.10.4; and

4) If IBCF receives an initial request for a dialog or standalone transaction, that contains a single Route header field pointing to itself, and it is co-located with an I-CSCF, or it has a preconfigured I-CSCF to be contacted, then forward the request to that I-CSCF. Otherwise select an I-CSCF and forward the request to that I-CSCF. If the single Route header field of the request contains the "orig" parameter, the IBCF shall insert the "orig" parameter to the URI of the I-CSCF.

NOTE 1: The selection of an I-CSCF can lead to additional delays.

When the IBCF receives an INVITE request, the IBCF may require the periodic refreshment of the session to avoid hung states in the IBCF. If the IBCF requires the session to be refreshed, the IBCF shall apply the procedures described in RFC 4028 [58] clause 8.

NOTE: Requesting the session to be refreshed requires support by at least one of the UEs. This functionality cannot automatically be granted, i.e. at least one of the involved UEs needs to support it.

When the IBCF receives a response to an initial request (e.g. 183 or 2xx), the IBCF shall:

1) store the values from the P-Charging-Function-Addresses header field, if present;

2) remove the P-Charging-Function-Addresses header field prior to forwarding the message; and

3) if network topology hiding is required, then the IBCF shall apply the procedures as described in subclause 5.10.4.

5.10.3.3 Subsequent requests

Upon receipt of a subsequent request, the IBCF shall:

1) if the request is an INVITE request, then respond with a 100 (Trying) provisional response;

2) if the request is a target refresh request and the IBCF is configured to perform application level gateway and/or transport plane control functionalities, then the IBCF shall save the Contact and CSeq header field values received in the request such that the IBCF is able to release the session if needed;

3) if the subsequent request is other than a target refresh request (including requests relating to an existing dialog where the method is unknown) and the IBCF is configured to perform application level gateway and/or transport plane control functionalities, then the IBCF shall save the Contact and CSeq header field values received in the request such that the IBCF is able to release the session if needed; and

4) if network topology hiding is required, then apply the procedures as described in subclause 5.10.4;

and forwards the request, based on the topmost Route header field, in accordance with the procedures of RFC 3261 [26].

When the IBCF receives a response to the subsequent request and network topology hiding is required, then the IBCF shall apply the procedures as described in subclause 5.10.4.

5.10.3.4 IBCF-initiated call release

If the IBCF provides transport plane control functionality and receives an indication of a transport plane related error the IBCF may:

1) generate a BYE request for the terminating side based on information saved for the related dialog; and

2) generate a BYE request for the originating side based on the information saved for the related dialog.

NOTE: Transport plane related errors can be indicated from e.g. TrGW or PCRF. The protocol for indicating transport plane related errors to the IBCF is out of scope of this specification.

Upon receipt of the 2xx responses for both BYE requests, the IBCF shall release all information related to the dialog and the related multimedia session.

5.10.4 THIG functionality in the IBCF

5.10.4.1 General

NOTE 1: THIG functionality is performed in I-CSCF in Release-5 and Release-6 and is compatible with the procedures specified in this subclause.

The following procedures shall only be applied if network topology hiding is required by the network. The network requiring network topology hiding is called the hiding network.

NOTE 2: Requests and responses are handled independently therefore no state information is needed for that purpose within an IBCF.

The IBCF shall apply network topology hiding to all header fields which reveal topology information, such as Via, Route, and Record-Route.

NOTE 3: If the P-CSCF is located in the visited network and in order to allow the subscription initiated by the P-CSCF to the user's registration-state event package, the IBCF cannot apply network topology hiding on the Path header field contained in the REGISTER request.

NOTE 4: In order to allow the roaming UE to perform restoration procedures when the S-CSCF rejects the served user initiated request, the IBCF cannot apply network topology hiding on the Service-Route header field contained in a 200 (OK) response for the REGISTER request.

Upon receiving an incoming REGISTER request for which network topology hiding has to be applied and which includes a Path header field, the IBCF shall add the routeable SIP URI of the IBCF to the top of the Path header field.

The IBCF may include in the inserted SIP URI an indicator that identifies the direction of subsequent requests received by the IBCF i.e., from the S-CSCF towards the P-CSCF, to identify the UE-terminating case. The IBCF may encode this indicator in different ways, such as, e.g., a unique parameter in the URI, a character string in the username part of the URI, or a dedicated port number in the URI.

NOTE 5: Any subsequent request that includes the direction indicator (in the Route header field) or arrives at the dedicated port number, indicates that the request was sent by the S-CSCF towards the P-CSCF.

Upon receiving an incoming initial request for which network topology hiding has to be applied and which includes a Record-Route header field, the IBCF shall add its own routeable SIP URI to the top of the Record-Route header field.

5.10.4.2 Encryption for network topology hiding

Upon receiving an outgoing request/response from the hiding network the IBCF shall perform the encryption for network topology hiding purposes, i.e. the IBCF shall:

1) use the whole header field values which were added by one or more specific entity of the hiding network as input to encryption, besides the UE entry;

2) not change the order of the header fields subject to encryption when performing encryption;

3) use for one encrypted string all received consecutive header field entries subject to encryption, regardless if they appear in separate consecutive header fields or if they are consecutive entries in a comma separated list in one header field;

4) construct a hostname that is the encrypted string;

5) append a "tokenized-by" header field parameter and set it to the value of the encrypting network's name, after the constructed hostname;

6) form one valid entry for the specific header field out of the resulting NAI, e.g. prepend "SIP/2.0/UDP" for Via header fields or "sip:" for Route and Record-Route header fields;

7) if the IBCF encrypted an entry in the Route header field, then it also inserts its own URI before the topmost encrypted entry; and

8) if the IBCF encrypted an entry in the Via header field, then it also inserts its own URI before the topmost encrypted entry.

NOTE 1: Even if consecutive entries of the same network in a specific header field are encrypted, they will result in only one encrypted header field entry. For example:

```
Via: SIP/2.0/UDP ibcf1.home1.net;lr,
     SIP/2.0/UDP Token( SIP/2.0/UDP scscf1.home1.net;lr,
                        SIP/2.0/UDP pcscf1.home1.net;lr);
                                    tokenized-by=home1.net,
     SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
```

NOTE 2: If multiple entries of the same network are within the same type of header fields, but they are not consecutive, then these entries will be tokenized to different strings. For example:

```
Record-Route:   sip:ibcf1.home1.net;lr,
        sip:Token(sip:scscf1.home1.net;lr);tokenized-by=home1.net,
        sip:as1.foreign.net;lr,
        sip:Token(sip:scscf1.home1.net;lr,
                  sip:pcscf1.home1.net;lr);tokenized-by=home1.net
```

NOTE 3: If request will return to the hiding network (e.g. after visiting an AS), then the URI of IBCF is inserted. For example:

```
Route: sip:as1.foreign.net;lr,
        sip:ibcf1.home1.net;lr,
        sip:Token(sip:scscf1.home1.net;lr);tokenized-by=home1.net
```

5.10.4.3 Decryption for network topology hiding

Upon receiving and incoming requests/response to the hiding network the IBCF shall perform the decryption for network topology hiding purposes, i.e. the IBCF shall:

1) identify hostnames encrypted by the network this IBCF belongs to within all header fields of the incoming message;

2) use those hostnames that carry the identification of the hiding network within the value of the "tokenized-by" header field parameter as input to decryption;

3) use as encrypted string the hostname which follows the sent-protocol (for Via header fields, e.g. "SIP/2.0/UDP") or the URI scheme (for Route and Record-Route header fields, e.g. "sip:");

4) replace all content of the received header field which carries encrypted information with the entries resulting from decryption.

EXAMPLE: An encrypted entry to a Via header field that looks like:

```
Via:    SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net;lr,
        SIP/2.0/UDP pcscf1.home1.net;lr);tokenized-by=home1.net
```

will be replaced with the following entries:

```
Via: SIP/2.0/UDP scscf1.home1.net;lr, SIP/2.0/UDP pcscf1.home1.net;lr
```

NOTE: Motivations for these decryption procedures are e.g. to allow the correct routeing of a response through the hiding network, to enable loop avoidance within the hiding network, or to allow the entities of the hiding network to change their entries within e.g. the Record-Route header field.

5.10.5 IMS-ALG functionality in the IBCF

The IBCF shall only apply the following procedures if application level gateway functionality is required by the network.

The IBCF acts as a B2BUA when it performs IMS-ALG functionality. As an IMS-ALG, the IBCF will internally map the message header fields between the two dialogs that it manages. It is responsible for correlating the dialog identifiers and will decide when to simply translate a message from one dialog to the other, or when to perform other functions. The IBCF, although acting as a UA, does not initiate any registration of its associated addresses. These are assumed to be known by peer-to-peer arrangements within the IM CN subsystem.

When the IBCF receives an initial INVITE request from another SIP network, i.e. the IBCF acts as an entry point, the IBCF shall generate a new initial INVITE request and forward it to the I-CSCF. In case the initial INVITE request is received from own network, i.e. the IBCF acts as an exit point, the IBCF shall generate a new initial INVITE request and forward it to the entry point of the other network.

An IBCF may replace a contact address with a URI of its own when the contact address in the incoming message is not a GRUU (e.g when the contact address is an IP address).

The IBCF shall transparently forward a received Contact header field when the Contact header field contains a GRUU or a media feature tag is included indicating a capability for which the Contact URI can be used by the remote party. When transparently forwarding a received Contact header field of a dialog-forming request, the IBCF shall include its own URI in a Record-Route header field in order to ensure that it is included on the route of subsequent requests.

NOTE: One example of such a media feature tag is the isfocus media feature tag used by conference services to transport the temporary conference identity that can be used when rejoining an ongoing conference.

The internal function of the IBCF as an IMS-ALG is defined in 3GPP TS 29.162 [11A].

5.10.6 Screening of SIP signalling

5.10.6.1 General

The IBCF may act as a B2BUA when it performs screening of SIP signalling functionality. In this case the B2BUA behaviour of the IBCF shall comply with the description given in subclause 5.10.5 for the IMS-ALG functionality.

NOTE: Many header fields are intended for end-to-end operation; removal of such header fields will impact the intended end-to-end operation between the end users. Additionally the IM CN subsystem does not preclude security mechanisms covering SIP header fields; any such removal can prevent validation of all header fields covered by the security mechanism.

5.10.6.2 IBCF procedures for SIP header fields

If specified by local policy rules, the IBCF may omit or modify any received SIP header fields prior to forwarding SIP messages, with the following exceptions.

As a result of any screening policy adopted, the IBCF should not modify at least the following header fields which would cause misoperation of the IM CN subsystem:

- Authorization; and
- WWW-Authenticate.

Where the IBCF appears in the path between the UE and the S-CSCF, some header fields are involved in the registration and authentication of the user. As a result of any screening policy adopted as part of normal operation, e.g. where the request or response is forwarded on, the IBCF should not modify as part of the registration procedure at least the following header fields:

- Path; and
- Service-Route.

NOTE 1: If the IBCF modifies SIP information elements (SIP header fields, SIP message bodies) other than as specified by SIP procedures (e.g., RFC 3261 [26]) caution needs to be taken that SIP functionality (e.g., routeing using Route, Record-Route and Via) is not impacted in a way that could create interoperability problems with networks that assume that this information is not modified.

NOTE 2: Where operator requirements can be achieved by configuration hiding, then these procedures can be used in preference to screening.

The IBCF may add, remove, or modify, the P-Early-Media header field within forwarded SIP requests and responses according to procedures in RFC 5009 [109].

NOTE 3: The IBCF can use the P-Early-Media header field for the gate control procedures, as described in 3GPP TS 29.214 [13D]. In the presence of early media for multiple dialogs due to forking, if the IBCF is able to identify the media associated with a dialog, (i.e., if symmetric RTP is used by the UE and and the IBCF can use the remote SDP information to determine the source of the media) the IBCF can selectively open the gate corresponding to an authorized early media flow for the selected media.

The IBCF may add, or omit any P-Asserted-Identity header fields prior to forwarding SIP messages according to local policy.

NOTE 4: The IBCF can use the P-Asserted-Identy header field to trigger identity specific procedures in subsequent entities, e.g. for malicious call identification. As an example, a P-Asserted-Identity header field will be deleted and a new P-Asserted-Identity header field with operator specific content will be added to the outgoing request, if the request was received from a network which cannot support the deletion of INFO request which is needed for the support of the malicious call identification service.

When the IBCF, located in the home network, receives a SIP request from another entity within the same trust domain, the IBCF may police the ICSI value contained in the P-Asserted-Service header field.

5.10.6.3 IBCF procedures for SIP message bodies

If IP address translation (NA(P)T or IP version interworking) occurs on the user plane, the IBCF shall modify SDP according to the annex F and G as appropriate;

Additionally, the IBCF may take the followings action upon SIP message bodies:

1) examine the length of a SIP message body and if required by local policy, take an appropriate action (e.g. forward the message body transparently, reject the request, remove the body);

2) examine the characteristics of the SIP message body MIMEs (i.e. check the values of any Content-Type, Content-Disposition, and Content-Language header fields), take an appropriate action defined by local policy (e.g. forward the body unchanged, remove the SIP message body MIME, reject the call); and

3) examine the content of SIP message body MIMEs, and take appropriate action defined by local policy (e.g. forward the body unchanged, remove the SIP message body MIME, reject the call).

When the intended action of an IBCF, based on local policy, is to remove a message body MIME from a SIP message body, and a Content-Disposition header field with a "handling" parameter set to "required" is associated with the MIME, the IBCF shall reject the SIP request with the 415 (Unsupported Media Type) response code as specified in RFC 5621 [150].

5.10.7 Media transcoding control

5.10.7.1 General

The IBCF may perform the media transcoding control in order to allow establishing communication between IM CN subsystems using different media codecs based on the interworking agreement and session information. When performing media transcoding control the IBCF acts as a special case of an IMS-ALG compliant with the description given in subclause 5.10.5.

5.10.7.2 Media transcoding control procedures

Upon receipt of any request containing an SDP offer, based on local policy and signalling inspection (e.g ICSI values, SDP), the IBCF may perform media transcoding control. Based on the local configuration determines the media which requires transcoding in the SDP offer.

Before forwarding the request to the answerer, the IBCF may add to the selected media one or more codecs at the end of the codec list contained in the SDP in order to give priority to the codecs inserted by the offerer over the codecs inserted by the IBCF. The codecs added to the offer are based on local policy.

NOTE 1: There is no mechanism to indicate to the terminating UE which codecs have been inserted by the network. However, RFC 4566 [39] recommends to list codecs in priority order, so by adding network inserted codecs to the end of the codec list will give higher priority to previous codecs that might have been inserted by the originating UE.

Upon receipt of any response containing an SDP answer, the IBCF shall inspect the list of the returned codecs and proceed as follows:

- if the list contains at least one of the codecs belonging to the original offer, the IBCF shall not invoke the transcoding function; and

- if the list contains none of the codecs belonging to the original offer, the IBCF shall select one of the returned codecs introduced in the answer and invoke the transcoding function. In order to perform the transcoding the IBCF shall select one of the codecs originally offered and set to a non-zero port value the related media stream in the answer sent to the offerer.

NOTE 2: The protocol used between IBCF and TrGW to allow the transport plane media trascoding control is out of scope of this specification. The codec selected by the answerer and the one selected by the IBCF and sent to the offerer can be used to instruct the TrGW for the transcoding purposes.

The IBCF shall remove from the SDP the codecs added to the original offer before forwarding the response to the offerer.

NOTE 3: In accordance with normal SDP procedure the transcoding IBCF informs the answerer of the properties of the chosen codecs (IP-address and ports).

5.11 Procedures at the E-CSCF

5.11.1 General

The PSAP may either be directly connected to the IM CN subsystem or via the PSTN.

The E-CSCF retrieves a PSAP URI, based on the location of the UE and the requested type of emergency service. The PSAP URI can be retrieved from LRF or from local configuration. The PSAP address will either point to a PSAP connected to the IM CN subsystem or to a PSAP connected to the PSTN.

If the E-CSCF fails to select a PSAP based on the received location information contained in an INVITE request, the E-CSCF can interrogate an LRF or an external server in order to retrieve location information.

NOTE 1: The protocol used between an E-CSCF and an LRF and between an E-CSCF and an external server is not specified in this version of the specification.

When the E-CSCF receives an emergency request for a dialog requesting privacy or a standalone emergency transaction requesting privacy or any request or response related to a UE-originated emergency dialog requesting privacy, and if operator policy (e.g. determined by national regulatory requirements applicable to emergency services) allows requests for suppression of public user identifiers and location information per 3GPP TS 22.101 [1A], the E-CSCF:

- shall provide the privacy service role according to RFC 3323 [33] and RFC 3325 [34];

NOTE 2: The procedure above is in addition to any procedure for the application of privacy at the edge of the trust domain specified by RFC 3325 [34].

- shall remove any location object from the message"s body with Content-Type header field containing the content type application/pidf+xml. If only one message body remains in the message"s body then the E-CSCF sets the Content-Type header field to the content type specified for the body; and

- shall remove the Geolocation header field (if present) and the Geolocation-Routing header field (if present).

5.11.2 UE originating case

The E-CSCF may either forward the call to a PSAP in the IP network or forward the call to a PSAP in the PSTN. In the latter case the call will pass a BGCF and a MGCF before entering the PSTN.

Upon receipt of an initial request for a dialog, or a standalone transaction, or an unknown method including a Request-URI with an emergency service URN, i.e. a service URN with a top-level service type of "sos" as specified in RFC 5031 [69], or an emergency number the E-CSCF shall:

1) remove its own SIP URI from the topmost Route header field;

2) if the PSAP is the next hop, store the value of the "icid-value" header field parameter received in the P-Charging-Vector header field and remove the received information in the P-Charging-Vector header field, else keep the P-Charging-Vector if the next hop is an exit IBCF or a BGCF;

3) if the PSAP is the next hop remove the P-Charging-Function-Addresses header fields, if present, else keep the P-Charging-Function-Addresses header fields if the next hop is an exit IBCFor an BGCF;

4) if an IBCF or BGCF is the next hop insert a type 2 "orig-ioi" header field parameter into the P-Charging-Vector header field. The E-CSCF shall set the type 2 "orig-ioi" header field parameter to a value that identifies the sending network. The E-CSCF shall not include the "term-ioi" header field parameter;

5) get location information as

   - geographical location information received in a PIDF location object [90], with the content type application/pidf+xml, as described RFC 6442 [89]; and

   - location identifier as derived from the P-Access-Network-Info header field, if available.

NOTE 1: The E-CSCF can request location information from an LRF. The protocol used to retrieve the location information from the LRF is not specified in this version of the specification.

NOTE 2: As an alternative to retrieve location information from the LRF the E-CSCF can also request location information from an external server. The address to the external server can be received in the Geolocation header field as specified in RFC 6442 [89]. The protocol used to retrieve the location information from the external server is not specified in this version of the specification.

5A) if the location is retrieved using information from the Geolocation header field, and if:

- the Geolocation-Routing header field is present, and includes a value not allowing routing of the request based on user location information;
- the Geolocation-Routing header field is present, and includes a value unknown to the E-CSCF; or
- the Geolocation-Routing header field is not present.

not use the location retrieved from the Geolocation header field when deciding where to forward the request.

6) select, based on location information and optionally type of emergency service:

- a PSAP connected to the IM CN subsystem network and add the PSAP URI to the topmost Route header field; or

NOTE 3: If the user did not request privacy or if national regulator policy applicable to emergency services does not require the user be allowed to request privacy, the E-CSCF conveys the P-Access-Network-Info header field containing the location identifier, if defined for the access type as specified in subclause 7.2A.4, to the PSAP.

- a PSAP in the PSTN, add the BGCF URI to the topmost Route header field, add a PSAP URI in tel URI format to the Request-URI with an entry used in the PSTN/CS domain to address the PSAP and set the handling header field parameter value of the Content-Disposition header field associated with the application/pidf+xml message body (if present) to "optional";

NOTE 4: If the user did not request privacy or if national regulator policy applicable to emergency services does not require the user be allowed to request privacy, the E-CSCF conveys the P-Access-Network-Info header field containing the location identifier, if defined for the access type as specified in subclause 7.2A.4, towards the MGCF. The MGCF can translate the location information if included in INVITE (i.e. both the geographical location information in PIDF-LO and the location identifier in the P-Access-Network-Info header field) into ISUP signalling, see 3GPP TS 29.163 [11B].

NOTE 5: The E-CSCF can request location information and routeing information from the LRF. The E-CSCF can for example send the location identifier to LRF and LRF maps the location identifier into the corresponding geographical location information that LRF sends to E-CSCF. The LRF can invoke an RDF to convert the location information into a proper PSAP/EC URI. Both the location information and the PSAP URI are returned to the E-CSCF.

NOTE 6: The way the E-CSCF determines the next hop address when the PSAP address is a tel URI is implementation dependent.

7) if the user did not request privacy or if national regulator policy applicable to emergency services does not require the user be allowed user to request privacy, and if the E-CSCF receives a reference number from the LRF the E-CSCF shall include the reference number in the P-Asserted-Identity header field;

NOTE 7: The reference number is used in the communication between the PSAP and LRF.

8) if due to local policy or if the PSAP requires interconnect functionalities (e.g. PSAP address is of an IP address type other than the IP address type used in the IM CN subsystem), put the address of the IBCF to the topmost Route header field, in order to forward the request to the PSAP via an IBCF in the same network;

9) create a Record-Route header field containing its own SIP URI;

10) if the request is an INVITE request, save the Contact, Cseq and Record-Route header field values received in the request such that the E-CSCF is able to release the session if needed;

11) if no P-Asserted-Identity header field is present and if required by operator policy governing the indication to PSAPs that a UE does not have sufficient credentials (e.g. determined by national regulatory requirements applicable to emergency services), insert a P-Asserted-Identity header field set to a non-dialable callback number (see ANSI/J-STD-036-B [176]);

12) if required by national regulatory requirements applicable to emergency services, include:

- a CPC with value "emergency"; and optionally
- an OLI set to a value corresponding to the characteristics of the access used when the emergency request was initiated by the UE, i.e., an OLI that corresponds to a wireless access; and

13) route the request based on SIP routeing procedures.

NOTE 8: Depending on local operator policy, the E-CSCF has the capability to reject requests relating to specific methods in accordance with RFC 3261 [26], as an alternative to the functionality described above.

Upon receipt of an initial request for a dialog, a standalone transaction, or an unknown method, that does not include a Request-URI with an emergency service URN or an emergency number, the E-CSCF shall reject the call by sending a 403 (Forbidden) response.

When the E-CSCF receives the request containing the access-network-charging-info parameter in the P-Charging-Vector, the E-CSCF shall store the access-network-charging-info parameter from the P-Charging-Vector header field. The E-CSCF shall retain access-network-charging-info parameter in the P-Charging-Vector header field.

When the E-CSCF receives any request or response (excluding ACK requests and CANCEL requests and responses) related to a UE-originated dialog or standalone transaction, the E-CSCF may insert previously saved values into P-Charging-Vector and P-Charging-Function-Addresses header fields before forwarding the message.

When the E-CSCF receives any 1xx or 2xx response related to a UE-originated dialog or standalone transaction, the E-CSCF shall remove any P-Preferred-Identity header field, and insert a P-Asserted-Identity header field with the digits that can be recognized as a valid emergency number if dialled as a tel URI representing the number, before forwarding the message.

NOTE 9: Numbers that can be recognized as valid emergency numbers if dialled by the user are specified in 3GPP TS 22.101 [1A]. The emergency numbers 112 and 911 are stored on the ME, in accordance with 3GPP TS 22.101 [1A].

When the E-CSCF receives an INVITE request from the UE, the E-CSCF may require the periodic refreshment of the session to avoid hung states in the E-CSCF. If the E-CSCF requires the session to be refreshed, the E-CSCF shall apply the procedures described in RFC 4028 [58] clause 8.

NOTE 10: Requesting the session to be refreshed requires support by at least the UE or the PSAP or MGCF. This functionality cannot automatically be granted, i.e. at least one of the involved UAs needs to support it in order to make it work.

6 Application usage of SDP

6.1 Procedures at the UE

6.1.1 General

The "integration of resource management and SIP" extension is hereafter in this subclause referred to as "the precondition mechanism" and is defined in RFC 3312 [30] as updated by RFC 4032 [64].

In order to authorize the media streams, the P-CSCF and S-CSCF have to be able to inspect the SDP payloads. Hence, the UE shall not encrypt the SDP payloads.

During session establishment procedure, and during session modification procedures, SIP messages shall only contain SDP payload if that is intended to modify the session description, or when the SDP payload is included in the message because of SIP rules described in RFC 3261 [26].

NOTE 1: A codec can have multiple payload type numbers associated with it.

In order to support accurate bandwidth calculations, the UE may include the "a=ptime" attribute for all "audio" media lines as described in RFC 4566 [39]. If a UE receives an "audio" media line with "a=ptime" specified, the UE should transmit at the specified packetization rate. If a UE receives an "audio" media line which does not have "a=ptime" specified or the UE does not support the "a=ptime" attribute, the UE should transmit at the default codec packetization rate as defined in RFC 3551 [55A]. The UE will transmit consistent with the resources available from the network.

For "video" and "audio" media types that utilize the RTP/RTCP, the UE shall specify the proposed bandwidth for each media stream utilizing the "b=" media descriptor and the "AS" bandwidth modifier in the SDP.

For "video" and "audio" media types that utilize the RTP/RTCP, in addition to the "b=AS" parameter, the UE may specify the "b=TIAS", and "a=maxprate" parameters in accordance with RFC 3890 [152]. The value of the parameter shall be determined as described in RFC 3890 [152]. The value or absence of the "b=" parameter(s) may affect the assigned QoS which is defined in 3GPP TS 29.213 [13C].

If a UE receives a media line which contains both a=ptime and a=maxprate, the UE should use the a=maxprate value, if this attribute is supported.

If multiple codecs are specified on the media line, "a=maxprate" (or "a=ptime" if "a=maxprate" is not available or not supported) should be used to derive the packetization time used for all codecs specified on the media line. Given that not all codecs support identical ranges of packetization, the UE should ensure that the packetization derived by "a=maxprate" (or "a=ptime" if "a=maxprate" is not available or not supported) is a valid packetization time for each codec specified in the list.

If the media line in the SDP indicates the usage of RTP/RTCP, and if the UE is configured to request an RTCP bandwidth level for the session is different than the default RTCP bandwidth as specified in RFC 3556 [56], then in addition to the "AS" bandwidth modifier in the media-level "b=" line, the UE shall include two media-level "b=" lines, one with the "RS" bandwidth modifier and the other with the "RR" bandwidth modifier as described in RFC 3556 [56] to specify the required bandwidth allocation for RTCP. The bandwidth-value in the b=RS: and b=RR: lines may include transport overhead as described in subclause 6.1 of RFC 3890 [152].

For other media streams the "b=" media descriptor may be included. The value or absence of the "b=" parameter will affect the assigned QoS which is defined in or 3GPP 29.213 [13C].

NOTE 2: In a two-party session where both participants are active, the RTCP receiver reports are not sent, therefore, the RR bandwidth modifier will typically get the value of zero.

If an in-band DTMF codec is supported by the application associated with an audio media stream, then the UE shall include, in addition to the payload types associated with the audio codecs for the media stream, for each clock rate associated with the audio codecs for the media stream, the MIME subtype "telephone-event" in the SDP "m=" media descriptor associated with the media stream, to indicate support of in-band DTMF as described in RFC 4733 [23].

The UE shall inspect the SDP contained in any SIP request or response, looking for possible indications of grouping of media streams according to RFC 3524 [54] and perform the appropriate actions for IP-CAN bearer establishment for media according to IP-CAN specific procedures (see subclause B.2.2.5 for IP-CAN implemented using GPRS).

In case of UE initiated resource reservation and if the UE determines resource reservation is needed, the UE shall start reserving its local resources whenever it has sufficient information about the media streams, media authorization and used codecs available.

NOTE 3: Based on this resource reservation can, in certain cases, be initiated immediately after the sending or receiving of the initial SDP offer.

In order to fulfil the QoS requirements of one or more media streams, the UE may re-use previously reserved resources. In this case the UE shall indicate as met the local preconditions related to the media stream, for which resources are re-used.

If an IP-CAN bearer is rejected or modified, the UE shall, if the SDP is affected, update the remote SIP entity according to RFC 3261 [26] and RFC 3311 [29].

NOTE 4: The UE can use one IP address for signalling (and specify it in the Contact header field) and different IP address(es) for media (and specify it in the "c=" parameter of the SDP).

If the UE wants to transport media streams with TCP and there are no specific alternative negotiation mechanisms defined for that particular application, then the UE shall support the procedures and the SDP rules specified in RFC 4145 [83].

6.1.2 Handling of SDP at the originating UE

An INVITE request generated by a UE shall contain a SDP offer and at least one media description. The SDP offer shall reflect the calling user's terminal capabilities and user preferences for the session.

If the desired QoS resources for one or more media streams have not been reserved at the UE when constructing the SDP offer, the UE:

- shall indicate the related local preconditions for QoS as not met, using the segmented status type, as defined in RFC 3312 [30] and RFC 4032 [64], as well as the strength-tag value "mandatory" for the local segment and the strength-tag value "optional" for the remote segment, if the UE supports the precondition mechanism (see subclause 5.1.3.1);

- shall set the related media streams to inactive, by including an "a=inactive" line, according to the procedures described in RFC 4566 [39], unless the UE knows that the precondition mechanism is supported by the remote UE; and

NOTE 1: When setting the media streams to the inactive mode, the UE can include in the first SDP offer the proper values for the RS and RR modifiers and associate bandwidths to prevent the receiving of the RTCP packets, and not send any RTCP packets.

- if the UE supports the precondition mechanism (see subclause 5.1.3.1), shall not request confirmation for the result of the resource reservation (as defined in RFC 3312 [30]) at the terminating UE.

If the UE supports the precondition mechanism (see subclause 5.1.3.1), and the desired QoS resources for one or more media streams are available at the UE when the SDP offer is sent, the UE shall indicate the related local preconditions as met, using the segmented status type, as defined in RFC 3312 [30] and RFC 4032 [64], as well as the strength-tag value "mandatory" for the local segment and the strength-tag value "optional" for the remote segment and shall not request confirmation for the result of the resource reservation (as defined in RFC 3312 [30]) at the terminating UE.

NOTE 2: If the originating UE does not support the precondition mechanism it will not include any precondition information in SDP.

Upon generating the SDP offer for an INVITE request generated after receiving a 488 (Not Acceptable Here) response, as described in subclause 5.1.3.1, the UE shall include SDP payload containing a subset of the allowed media types, codecs and other parameters from the SDP payload of all 488 (Not Acceptable Here) responses related to the same session establishment attempt (i.e. a set of INVITE requests used for the same session establishment). For each media line, the UE shall order the codecs in the SDP payload according to the order of the codecs in the SDP payload of the 488 (Not Acceptable Here) responses.

NOTE 3: The UE can attempt a session establishment through multiple networks with different policies and potentially can need to send multiple INVITE requests and receive multiple 488 (Not Acceptable Here) responses from different CSCF nodes. The UE therefore takes into account the SDP contents of all the 488 (Not Acceptable Here) responses received related to the same session establishment when building a new INVITE request.

Upon confirming successful local resource reservation, the UE shall create an SDP offer in which:

- the related local preconditions are set to met, using the segmented status type, as defined in RFC 3312 [30] and RFC 4032 [64]; and

- the media streams previously set to inactive mode are set to active (sendrecv, sendonly or recvonly) mode.

Upon receiving an SDP answer, which includes more than one codec per media stream, excluding the in-band DTMF codec, as described in subclause 6.1.1, the UE shall send an SDP offer at the first possible time, selecting only one codec per media stream.

If the UE sends an initial INVITE request that includes only an IPv6 address in the SDP offer, and receives an error response (e.g., 488 (Not Acceptable Here) with 301 Warning header field) indicating "incompatible network address format", the UE shall send an ACK as per standard SIP procedures. Subsequently, the UE may acquire an IPv4 address

or use an existing IPv4 address, and send a new initial INVITE request to the same destination containing only the IPv4 address in the SDP offer.

If the first SDP offer sent by the UE not supporting RFC 5939 [137] includes a video media component transported using protocol other than RTP/AVP as specified in RFC 3551 [55A] then upon receiving an SDP answer, with port of video media component set to zero, to the first SDP offer, the UE should send another SDP offer at the first possible time, offering video media component transported using RTP/AVP as specified in RFC 3551 [55A].

NOTE 4: If the first SDP offer sent by the UE was constructed using RFC 5939 [137], then upon receiving an SDP answer indicating that RFC 5939 [137] is not supported, the UE can send, after the call is established, another SDP offer using transport and attributes offered in the first SDP offer in tcap and acap attributes.

6.1.3 Handling of SDP at the terminating UE

Upon receipt of an initial SDP offer in which no precondition information is available, the terminating UE shall in the SDP answer:

- if, prior to sending the SDP answer the desired QoS resources have been reserved at the terminating UE, set the related media streams the in the SDP answer to:
  - active mode, if the offered media streams were not listed as inactive; or
  - inactive mode, if the offered media streams were listed as inactive.

If the terminating UE had previously set one or more media streams to inactive mode and the QoS resources for those media streams are now ready, the UE shall set the media streams to active mode by applying the procedures described in RFC 4566 [39] with respect to setting the direction of media streams.

Upon sending a SDP answer to an SDP offer (which included one or more media lines which was offered with several codecs) the terminating UE shall select exactly one codec per media line and indicate only the selected codec for the related media stream. In addition, the UE may indicate support of the in-band DTMF codec, as described in subclause 6.1.1.

Upon sending a SDP answer to an SDP offer, with the SDP answer including one or more media streams for which the originating side did indicate its local preconditions as not met, if the precondition mechanism is supported by the terminating UE, the terminating UE shall indicate its local preconditions and request the confirmation for the result of the resource reservation at the originating end point.

NOTE 1: If the terminating UE does not support the precondition mechanism it will ignore any precondition information received from the originating UE.

Upon receiving an initial INVITE request, that includes the SDP offer containing an IP address type (in the "c=" parameter) that is not supported by the UE, the UE shall respond with the 488 (Not Acceptable Here) response with 301 Warning header field indicating "incompatible network address format".

NOTE 2: Upon receiving an initial INVITE request that does not include an SDP offer, the UE can accept the request and include an SDP offer in the first reliable response. The SDP offer will reflect the called user's terminal capabilities and user preferences for the session.

If the UE receives an SDP offer that specifies different IP address type for media (i.e. specify it in the "c=" parameter of the SDP offer) that the UE is using for signalling, and if the UE supports both IPv4 and IPv6 addresses simultaneously, the UE shall accept the received SDP offer. Subsequently, the UE shall either acquire an IP address type or use an existing IP address type as specified in the SDP offer, and include it in the "c=" parameter in the SDP answer.

NOTE 3: Upon receiving an initial INVITE request, that includes an SDP offer containing connection addresses (in the "c=" parameter) equal to zero, the UE will select the media streams that is willing to accept for the session, reserve the QoS resources for accepted media streams, and include its valid connection address in the SDP answer.

6.2 Procedures at the P-CSCF

When the P-CSCF receives any SIP request containing an SDP offer, the P-CSCF shall examine the media parameters in the received SDP. If the P-CSCF finds any media parameters which are not allowed on the network by local policy or

if available by bandwidth authorisation limitation information coming from the IP-CAN (e.g. via PCRF), the P-CSCF shall return a 488 (Not Acceptable Here) response containing SDP payload. This SDP payload contains either all the media types, codecs and other SDP parameters which are allowed according to the local policy, or, based on configuration by the operator of the P-CSCF, a subset of these allowed parameters. This subset may depend on the content of the received SIP request. The P-CSCF shall build the SDP payload in the 488 (Not Acceptable Here) response in the same manner as a UAS builds the SDP in a 488 (Not Acceptable Here) response as specifed in RFC 3261 [26]. For each media line, the P-CSCF shall order the codecs with the most preferred codec listed first. If the SDP offer is encrypted, the P-CSCF may reject the request.

When the P-CSCF receives a SIP response different from 200 (OK) response containing SDP offer, the P-CSCF shall not examine the media parameters in the received SDP offer, but the P-CSCF shall rather check the succeeding request containing the SDP answer for this offer, and if necessary (i.e. the SDP answer reduced by the UE still breaches local policy, or if available by bandwidth authorisation limitation information coming from the IP-CAN, e.g. via PCRF), the P-CSCF shall return a 488 (Not Acceptable Here) response containing the local policy allowed SDP payload. If the SDP answer is encrypted, the P-CSCF may reject the succeeding request.

When the P-CSCF receives a 200 (OK) response containing SDP offer, the P-CSCF shall examine the media parameters in the received SDP. If the P-CSCF finds any media parameters which are not allowed on the network by local policy or if available by bandwidth authorisation limitation information coming from the IP-CAN (e.g. via PCRF), the P-CSCF shall forward the SDP offer and on the receipt of the ACK request containing the SDP answer, the P-CSCF shall immediately terminate the session as described in subclause 5.2.8.1.2. If the SDP offer is encrypted, the P-CSCF shall forward the SDP offer and on the receipt of the ACK request containing the SDP answer, it may immediately terminate the session as described in subclause 5.2.8.1.2.

In case a device performing address and/or port number conversions is provided by a NA(P)T or NA(P)T-PT controlled by the P-CSCF, or by a hosted NAT, the P-CSCF may need to modify the media connection data in SDP bodies according to the procedures described in annex F and/or annex G.

The P-CSCF shall apply and maintain the same policy within the SDP from the initial request or response containing SDP and throughout the complete SIP session.

The P-CSCF may inspect, if present, the "b=RS" and "b=RR" lines in order to find out the bandwidth allocation requirements for RTCP.

6.3 Procedures at the S-CSCF

When the S-CSCF receives any SIP request containing an SDP offer, the S-CSCF shall examine the media parameters in the received SDP. If the S-CSCF finds any media parameters which are not allowed based on local policy or subscription (i.e. the information in the instances of the Core Network Service Authorization class in the service profile, described in 3GPP TS 29.228 [14]), the S-CSCF shall return a 488 (Not Acceptable Here) response containing SDP payload. This SDP payload contains either all the media types, codecs and other SDP parameters which are allowed according to the local policy and users subscription or, based on configuration by the operator of the S-CSCF, a subset of these allowed parameters. This subset may depend on the content of the received SIP request. The S-CSCF shall build the SDP payload in the 488 (Not Acceptable Here) response in the same manner as a UAS builds the SDP in a 488 (Not Acceptable Here) response as specified in RFC 3261 [26]. If the SDP offer is encrypted, the S-CSCF may reject the request.

When the S-CSCF receives a SIP response different from 200 (OK) response containing SDP offer, the S-CSCF shall not examine the media parameters in the received SDP offer, but the S-CSCFshall rather check the succeeding request containing the SDP answer for this offer, and if necessary (i.e. the SDP answer reduced by the UE still breaches local policy), the S-CSCF shall return a 488 (Not Acceptable Here) response containing the local policy allowed SDP payload. If the SDP answer is encrypted, the S-CSCF may reject the succeeding request.

When the S-CSCF receives a 200 (OK) response containing SDP offer, the S-CSCF shall examine the media parameters in the received SDP. If the S-CSCF finds any media parameters which are not allowed based on local policy or subscription (i.e. the information in the instances of the Core Network Service Authorization class in the service profile, described in 3GPP TS 29.228 [14]), the S-CSCF shall forward the SDP offer and on the receipt of the ACK request containing the SDP answer, the S-CSCF shall immediately terminate the session as described in subclause 5.4.5.1.2. If the SDP offer is encrypted, the S-CSCF shall forward the SDP offer and on the receipt of the ACK request containing the SDP answer, it may immediately terminate the session as described in subclause 5.4.5.1.2.

6.4 Procedures at the MGCF

6.4.1 Calls originating from circuit-switched networks

The usage of SDP by the MGCF is the same as its usage by the UE, as defined in the subclause 6.1 and A.3.2, with the following exceptions:

- in an initial SDP offer the MGCF shall not use the "inactive" attribute when the local preconditions are met;
- if local preconditions are not met at the MGCF and local configuration indicates that the MGCF is serving users not supporting SIP preconditions, then the MGCF shall set the inactive mode (by including an attribute "a=inactive") in an initial SDP offer, (otherwise all served users support the SIP precondtions and the inactive indication is not needed); and
- in initial an INVITE request generated by a MGCF, the MGCF shall indicate the current status of the local precondition.

When sending an SDP, the MGCF shall not include the "i=", "u=", "e=", "p=", "r=", and "z=" descriptors in the SDP, and the MGCF shall ignore them when received in the SDP.

When the MGCF generates and sends an INVITE request for a call originating in a circuit-switched network, the MGCF shall:

- populate the SDP with the codecs supported by the associated MGW; and
- in order to support DTMF, populate the SDP with MIME subtype "telephone-event" as described in RFC 4733 [23].

When the MGCF receives 183 (Session Progress) response to an INVITE request, the MGCF shall:

- check that a supported codec has been indicated in the SDP.

6.4.2 Calls terminating in circuit-switched networks

The usage of SDP by the MGCF is the same as its usage by the UE, as defined in the subclause 6.1 and A.3.2, with the following exceptions:

a) when the MGCF sends a 183 (Session Progress) response with SDP payload, the MGCF shall only request confirmation for the result of the resource reservation (as defined in RFC 3312 [30]) at the originating end point if all of the following conditions are true:
   - there are any remaining unfulfilled preconditions at the originating end point;
   - the received initial INVITE request indicates support of SIP preconditions; and
   - local configuration indicates support of SIP preconditions.

When sending an SDP, the MGCF shall not include the "i=", "u=", "e=", "p=", "r=", and "z=" descriptors in the SDP, and the MGCF shall ignore them when received in the SDP.

When the MGCF receives an initial INVITE request, the MGCF shall:

- check for a codec that matches the requested SDP, which may include the MIME subtype "telephone-event" as described in RFC 4733 [23].

When the MGCF generates and sends a 183 (Session Progress) response to an initial INVITE request, the MGCF shall:

- set SDP indicating the selected codec, which may include the MIME subtype "telephone-event" as described in RFC 4733 [23].

6.5 Procedures at the MRFC

Void.

6.6 Procedures at the AS

Since an AS may provide a wide range of different services, procedures for the SDP usage for an AS acting as originating UA, terminating UA or third-party call control role are dependent on the service provided to the UA and on the capabilities on the remote UA. There is no special requirements regarding the usage of the SDP, except the requirements for the SDP capabilities described in the following paragraphs and clause A.3:

1) Providing that an INVITE request generated by an AS contains SDP payload, the AS has the capability of reflecting the originating AS's capabilities, desired QoS and precondition requirements for the session in the SDP payload.

2) When the AS sends a 183 (Session Progress) response with SDP payload including one or more "m=" media types, it has the capability of requesting confirmation for the result of the resource reservation at the originating endpoint.

6.7 Procedures at the IMS-ALG functionality

When the IBCF acts as an IMS-ALG, it makes procedures as for an originating UA and terminating UA. The IMS-ALG acts as a B2BUA. The treatment of the SDP information between originating UA and terminating UA is described in 3GPP TS 29.162 [11A].

7 Extensions within the present document

7.1 SIP methods defined within the present document

There are no SIP methods defined within the present document over and above those defined in the referenced IETF specifications.

7.2 SIP header fields defined within the present document

7.2.0 General

There are no SIP header fields defined within the present document over and above those defined in the referenced IETF specifications.

7.2.1 Void

7.2.2 Void

7.2.3 Void

7.2.4 Void

7.2.5 Void

7.2.6 Void

7.2.7 Void

7.2.8 Void

7.2.9 Void

7.2.10 Void

7.2A Extensions to SIP header fields defined within the present document

7.2A.1 Extension to WWW-Authenticate header field

7.2A.1.1 Introduction

This extension defines a new authentication parameter (auth-param) for the WWW-Authenticate header field used in a 401 (Unauthorized) response to the REGISTER request. For more information, see RFC 2617 [21] subclause 3.2.1.

7.2A.1.2 Syntax

The syntax for for auth-param is specified in table 7.4.

Table 7.4: Syntax of auth-param

```
auth-param      = 1#( integrity-key / cipher-key )
integrity-key   = "ik" EQUAL ik-value
cipher-key      = "ck" EQUAL ck-value
ik-value        = LDQUOT *(HEXDIG) RDQUOT
ck-value        = LDQUOT *(HEXDIG) RDQUOT
```

7.2A.1.3 Operation

This authentication parameter will be used in a 401 (Unauthorized) response in the WWW-Authenticate header field during UE authentication procedure as specified in subclause 5.4.1.

The S-CSCF appends the integrity-key parameter (directive) to the WWW.-Authenticate header field in a 401 (Unauthorized) response. The P-CSCF stores the integrity-key value and removes the integrity-key parameter from the header field prior to forwarding the response to the UE.

The S-CSCF appends the cipher-key parameter (directive) to the WWW-Authenticate header field in a 401 (Unauthorized) response. The P-CSCF removes the cipher-key parameter from the header field prior to forwarding the response to the UE. In the case ciphering is used, the P-CSCF stores the cipher-key value.

7.2A.2 Extension to Authorization header field

7.2A.2.1 Introduction

This extension defines a new auth-param for the Authorization header field used in REGISTER requests. For more information, see RFC 2617 [21] subclause 3.2.2.

7.2A.2.2 Syntax

The syntax of auth-param for the Authorization header field is specified in table 7.5.

Table 7.5: Syntax of auth-param for Authorization header field

```
auth-param = "integrity-protected" EQUAL ("yes" / "no" / "tls-pending" / "tls-yes" / "ip-assoc-
pending" / "ip-assoc-yes") / "auth-done"
```

7.2A.2.3 Operation

This authentication parameter is inserted in the Authorization header field of all the REGISTER requests. The value of the "integrity-protected" header field parameter in the auth-param parameter is set as specified in subclause 5.2.2. This information is used by S-CSCF to decide whether to challenge the REGISTER request or not, as specified in subclause 5.4.1.

The values in the "integrity-protected" header field field are defined as follows:

"yes": indicates that a REGISTER request received in the P-CSCF is protected using an IPsec security association and IMS AKA is used as authentication scheme.

"no": indicates that a REGISTER request received in the P-CSCF is not protected using an IPsec security association and IMS AKA is used as authentication scheme, i.e. this is an initial REGISTER request with the Authorization header field not containing a challenge response.

"tls-yes": indicates that a REGISTER request is received in the P-CSCF protected over a TLS connection and the Session ID, IP address and port for the TLS connection are already bound to a private user identity. The S-CSCF will decide whether or not to challenge such a REGISTER request based on its policy. This is used in case of SIP digest with TLS.

"tls-pending": indicates that a REGISTER request is received in the P-CSCF protected over a TLS connection and the Session ID, IP address and port for the TLS connection are not yet bound to a private user identity. The S-CSCF shall challenge such a REGISTER request if it does not contain an Authorization header field with a challenge response or if the verification of the challenge response fails. This is used in case of SIP digest with TLS.

"ip-assoc-yes": indicates that a REGISTER request received in the P-CSCF does map to an existing IP association in case SIP digest without TLS is used.

"ip-assoc-pending": indicates that a REGISTER request received in the P-CSCF does not map to an existing IP association, and does contain a challenge response in case SIP digest without TLS is used.

"auth-done": indicates that a REGISTER request is sent from an entity that is trusted and has authenticated the identities used in the REGISTER request. An example for such an entity is the MSC server enhanced for IMS centralized services. The S-CSCF shall skip authentication.

NOTE 1: In case of SIP digest with TLS is used, but the REGISTER request was not received over TLS, the P-CSCF does not include an "integrity-protected" header field parameter in the auth-param to indicate that an initial REGISTER request was not received over an existing TLS session. The S-CSCF will always challenge such a REGISTER request.

NOTE 2: In case of SIP digest without TLS is used, but the REGISTER request was not received over TLS, the P-CSCF does not include an "integrity-protected" header field parameter in the auth-param to indicate that the REGISTER request does not map to an existing IP association, and does not contain a challenge response. The S-CSCF will always challenge such a REGISTER request.

NOTE 3: The value "yes" is also used when an initial REGISTER request contains an Authorization header field with a challenge response as in this case the IPsec association is already in use, and its use by the UE implicitly authenticates the UE. This is a difference to TLS case where the use of TLS alone does not yet implicitly authenticates the UE. Hence in the TLS case, for an initial REGISTER request containing an Authorization header field with a challenge response the value "tls-pending" and not "tls-yes" is used.

7.2A.3 Tokenized-by header field parameter definition (various header fields)

7.2A.3.1 Introduction

The "tokenized-by" header field parameter is an extension parameter appended to encrypted entries in various SIP header fields as defined in subclause 5.10.4.

7.2A.3.2 Syntax

The syntax for the "tokenized-by" header field parameter is specified in table 7.6:

Table 7.6: Syntax of tokenized-by-param

```
rr-param =  tokenized-by-param / generic-param
via-params =  via-ttl / via-maddr
             / via-received / via-branch
             / tokenized-by-param / via-extension
tokenized-by-param = "tokenized-by" EQUAL hostname
```

The BNF for rr-param and via-params is taken from IETF RFC 3261 [26] and modified accordingly.

7.2A.3.3 Operation

The "tokenized-by" header field parameter is appended by IBCF (THIG) after all encrypted strings within SIP header fields when network configuration hiding is active. The value of the header field parameter is the domain name of the network which encrypts the information.

7.2A.4 P-Access-Network-Info header field

7.2A.4.1 Introduction

The P-Access-Network-Info header field is extended to include specific information relating to particular access technologies.

7.2A.4.2 Syntax

The syntax of the P-Access-Network-Info header field is described in RFC 3455 [52]. There are additional coding rules for this header field depending on the type of IP-CAN, according to access technology specific descriptions.

Table 7.6A describes the 3GPP-specific extended syntax of the P-Access-Network-Info header field defined in RFC 3455 [52].

Table 7.6A: Syntax of extended P-Access-Network-Info header field

```
   P-Access-Network-Info  = 'P-Access-Network-Info' HCOLON
                            access-net-spec *(COMMA access-net-spec)
   access-net-spec        = (access-type / access-class) *(SEMI access-info)
   access-type            = "IEEE-802.11" / "IEEE-802.11a" / "IEEE-802.11b" / "IEEE-802.11g" /
                            "IEEE-802.11n" / "3GPP-GERAN" / "3GPP-UTRAN-FDD" / "3GPP-UTRAN-TDD" /
                            "3GPP-E-UTRAN-FDD" / "3GPP-E-UTRAN-TDD" / "ADSL" / "ADSL2" / "ADSL2+" /
                            "RADSL" / "SDSL" / "HDSL" / "HDSL2" / "G.SHDSL" / "VDSL" / "IDSL" /
                            "3GPP2-1X" / "3GPP2-1X-HRPD" / "3GPP2-UMB" / "DOCSIS" / "IEEE-802.3" /
                            "IEEE-802.3a" / "IEEE-802.3e" / "IEEE-802.3i" / "IEEE-802.3j" / "IEEE-
                            802.3u" / "IEEE-802.3ab" / "IEEE-802.3ae" / "IEEE-802.3ak" / "IEEE-
                            802.3aq" / "IEEE-802.3an" / "IEEE-802.3y" / "IEEE-802.3z"/ token
...access-class           = "3GPP-GERAN" / "3GPP-UTRAN" / "3GPP-E-UTRAN" / "3GPP-WLAN" / "3GPP-GAN"
                            / "3GPP-HSPA" / token
   np                     = "network-provided"
   access-info            = cgi-3gpp / utran-cell-id-3gpp / dsl-location / i-wlan-node-id / ci-3gpp2
                            / eth-location / np/ extension-access-info
   extension-access-info  = generic-param
   cgi-3gpp               = "cgi-3gpp" EQUAL (token / quoted-string)
   utran-cell-id-3gpp     = "utran-cell-id-3gpp" EQUAL (token / quoted-string)
   i-wlan-node-id         = "i-wlan-node-id" EQUAL (token / quoted-string)
   dsl-location           = "dsl-location" EQUAL (token / quoted-string)
   eth-location           = "eth-location" EQUAL (token / quoted-string)
   ci-3gpp2               = "ci-3gpp2" EQUAL (token / quoted-string)
```

The presence of the "np" parameter indicates a P-Access-Network-Info header field is provided by the P-CSCF. The content can differ from a P-Access-Network-Info header field without this parameter which is provided by the UE.

The "np" parameter can be used with both "access-type" and "access-class" constructs. The "access-type" construct is provided for use where the value is not known to be specific to a particular "access-class" value, e.g. in the case of some values delivered from the PCRF.

7.2A.4.3 Additional coding rules for P-Access-Network-Info header field

The P-Access-Network-Info header field is populated with the following contents:

1) the access-type field set to one of "3GPP-GERAN","3GPP-UTRAN-FDD", "3GPP-UTRAN-TDD", "3GPP-E-UTRAN-FDD", "3GPP-E-UTRAN-TDD", "3GPP2-1X", "3GPP2-1X-HRPD", "3GPP2-UMB", "IEEE-802.11", "IEEE-802.11a", "IEEE-802.11b", "IEEE-802.11g", "IEEE-802.11n", "ADSL", "ADSL2", "ADSL2+", "RADSL", "SDSL", "HDSL", "HDSL2", "G.SHDSL", "VDSL", "IDSL", or "DOCSIS", "IEEE-802.3", "IEEE-802.3a", "IEEE-802.3e", "IEEE-802.3i", "IEEE-802.3j", "IEEE-802.3u", or "IEEE-802.3ab", "IEEE-802.3ae", IEEE-802.3ak", "IEEE-802.3aq", IEEE-802.3an", "IEEE-802.3y" or "IEEE-802.3z" as appropriate to the access technology in use.

2) if the access type field is set to "3GPP-GERAN", a cgi-3gpp parameter set to the Cell Global Identity obtained from lower layers of the UE. The Cell Global Identity is a concatenation of MCC, MNC, LAC and CI (as described in 3GPP TS 23.003 [3]). The value of "cgi-3gpp" parameter is therefore coded as a text string as follows:

   Starting with the most significant bit, MCC (3 digits), MNC (2 or 3 digits depending on MCC value), LAC (fixed length code of 16 bits using full hexadecimal representation) and CI (fixed length code of 16 bits using a full hexadecimal representation);

3) if the access type field is equal to "3GPP-UTRAN-FDD", or "3GPP-UTRAN-TDD", a "utran-cell-id-3gpp" parameter set to a concatenation of the MCC, MNC, LAC (as described in 3GPP TS 23.003 [3]) and the UMTS Cell Identity (as described in 3GPP TS 25.331 [9A]), obtained from lower layers of the UE, and is coded as a text string as follows:

   Starting with the most significant bit, MCC (3 digits), MNC (2 or 3 digits depending on MCC value), LAC (fixed length code of 16 bits using full hexadecimal representation) and UMTS Cell Identity (fixed length code of 28 bits using a full hexadecimal representation);

4) if the access-class field is set, the "np" access-info parameter is the only access-info parameter inserted. This release of this specification does not define values for use in this parameter. The access-class field can be set only by the P-CSCF;

5) if the access type field is set to "3GPP2-1X", a ci-3gpp2 parameter set to the ASCII representation of the hexadecimal value of the string obtained by the concatenation of SID (16 bits), NID (16 bits), PZID (8 bits) and BASE_ID (16 bits) (see 3GPP2 C.S0005-D [85]) in the specified order. The length of the ci-3gpp2 parameter shall be 14 hexadecimal characters. The hexadecimal characters (A through F) shall be coded using the uppercase ASCII characters. If the MS does not know the values for any of the above parameters, the MS shall use the value of 0 for that parameter. For example, if the SID is unknown, the MS shall represent the SID as 0x0000;

NOTE 1: The SID value is represented using 16 bits as supposed to 15 bits as specified in 3GPP2 C.S0005-D [85].

EXAMPLE: If SID = 0x1234, NID = 0x5678, PZID = 0x12, BASE_ID = 0xFFFF, the ci-3gpp2 value is set to the string "1234567812FFFF".

6) if the access type field is set to "3GPP2-1X-HRPD", a ci-3gpp2 parameter set to the ASCII representation of the hexadecimal value of the string obtained by the concatenation of Sector ID (128 bits) and Subnet length (8 bits) (see 3GPP2 C.S0024-A [86]) and Carrier-ID, if available, (see 3GPP2 X.S0060 [86B])in the specified order. The length of the ci-3gpp2 parameter shall be 34 or 40 hexadecimal characters depending on whether the Carrier-ID is included. The hexadecimal characters (A through F) shall be coded using the uppercase ASCII characters;

EXAMPLE: If the Sector ID = 0x12341234123412341234123412341234, Subnet length = 0x11, and the Carrier-ID=0x555444, the ci-3gpp2 value is set to the string "12341234123412341234123412341234123411555444".

7) if the access type field is set to "3GPP2-UMB" 3GPP2 C.S0084-000 [86A], a ci-3gpp2 parameter is set to the ASCII representation of the hexadecimal value of the Sector ID (128 bits) defined in 3GPP2 C.S0084-000 [86A]. The length of the ci-3gpp2 parameter shall be 32 hexadecimal characters. The hexadecimal characters (A through F) shall be coded using the uppercase ASCII characters;

EXAMPLE: If the Sector ID = 0x12341234123412341234123412341234, the ci-3gpp2 value is set to the string "12341234123412341234123412341234".

8) if the access-type field set to one of "IEEE-802.11", "IEEE-802.11a", "IEEE-802.11b" or "IEEE-802.11g", or "IEEE-802.11n", an "i-wlan-node-id" parameter is set to the ASCII representation of the hexadecimal value of the AP's MAC address without any delimiting characters;

EXAMPLE: If the AP's MAC address = 00-0C-F1-12-60-28, then i-wlan-node-id is set to the string "000cf1126028".

9) if the access-type field is set to one of "ADSL", "ADSL2", "ADSL2+", "RADSL", "SDSL", "HDSL", "HDSL2", "G.SHDSL", "VDSL", "IDSL", the access-info field shall contain a dsl-location parameter obtained from the CLF (see NASS functional architecture);

10) if the access-type field set to "DOCSIS", the access info parameter is not inserted. This release of this specification does not define values for use in this parameter;

11) if the access type field is equal to "3GPP-E-UTRAN-FDD" or "3GPP-E-UTRAN-TDD", a "utran-cell-id-3gpp" parameter set to a concatenation of the MCC, MNC, TAC (as described in 3GPP TS 23.003 [3]) and the Cell Identity (as described in 3GPP TS 23.401 [7B]), obtained from lower layers of the UE, and is coded as a text string as follows:

   Starting with the most significant bit, MCC (3 digits), MNC (2 or 3 digits depending on MCC value), TAC (fixed length code of 16 bits using full hexadecimal representation) and Cell Identity (fixed length code of 28 bits using a full hexadecimal representation); and

12) if the access-type field is set to one of "IEEE-802.3", "IEEE-802.3a", "IEEE-802.3e", "IEEE-802.3i", "IEEE-802.3j", "IEEE-802.3u", "IEEE-802.3ab", "IEEE-802.3ae", IEEE-802.3ak", IEEE-802.3aq", "IEEE-802.3an", "IEEE-802.3y" or "IEEE-802.3z" and NASS subsystem is used, the access-info field shall contain an eth-location parameter obtained from the CLF (see NASS functional architecture).

NOTE 2: The "cgi-3gpp", the "utran-cell-id-3gpp", the "ci-3gpp2", the "i-wlan-node-id", eth-location, and the "dsl-location" parameters described above among other usage also constitute the location identifiers that are used for emergency services.

7.2A.5 P-Charging-Vector header field

7.2A.5.1 Introduction

The P-Charging-Vector header field is extended to include specific charging correlation information needed for IM CN subsystem functional entities.

7.2A.5.2 Syntax

7.2A.5.2.1 General

The syntax of the P-Charging-Vector header field is described in RFC 3455 [52]. There may be additional coding rules for this header field depending on the type of IP-CAN, according to access technology specific descriptions.

Table 7.6B describes 3GPP-specific extensions to the P-Charging-Vector header field defined in RFC 3455 [52].

Table 7.6B: Syntax of extensions to P-Charging-Vector header field

```
access-network-charging-info = (gprs-charging-info / i-wlan-charging-info / xdsl-charging-info /
     packetcable-charging-info / icn-charging-info / eps-charging-info / eth-charging-info/
     generic-param)
gprs-charging-info = ggsn SEMI auth-token [SEMI pdp-info-hierarchy] *(SEMI extension-param)
ggsn = "ggsn" EQUAL gen-value
pdp-info-hierarchy = "pdp-info" EQUAL LDQUOT pdp-info *(COMMA pdp-info) RDQUOT
pdp-info = pdp-item SEMI pdp-sig SEMI gcid [SEMI flow-id]
pdp-item = "pdp-item" EQUAL DIGIT
pdp-sig = "pdp-sig" EQUAL ("yes" / "no")
gcid = "gcid" EQUAL 1*HEXDIG
auth-token = "auth-token" EQUAL 1*HEXDIG
flow-id = "flow-id" EQUAL "(" "{" 1*DIGIT COMMA 1*DIGIT "}" *(COMMA "{" 1*DIGIT COMMA 1*DIGIT
     "}")")"
extension-param = token [EQUAL token]
i-wlan-charging-info = "pdg"
xdsl-charging-info = bras SEMI auth-token [SEMI xDSL-bearer-info] *(SEMI extension-param)
bras = "bras" EQUAL gen-value
xDSL-bearer-info = "dsl-bearer-info" EQUAL LDQUOT dsl-bearer-info *(COMMA dsl-bearer-info) RDQUOT
dsl-bearer-info = dsl-bearer-item SEMI dsl-bearer-sig SEMI dslcid [SEMI flow-id]
dsl-bearer-item = "dsl-bearer-item" EQUAL DIGIT
dsl-bearer-sig = "dsl-bearer-sig" EQUAL ("yes" / "no")
dslcid = "dslcid" EQUAL 1*HEXDIG
packetcable-charging-info = packetcable [SEMI bcid]
packetcable = "packetcable-multimedia"
bcid = "bcid" EQUAL 1*48(HEXDIG)
icn-charging-info = icn-bcp *(SEMI itid) [SEMI extension-param]
icn-bcp = "icn-bcp" EQUAL gen-value
itid = itc-sig SEMI itc-id SEMI *(flow-id)
itc-sig = "itc-sig" EQUAL ("yes" / "no")
itc-id = "itc-id" EQUAL gen-value
flow-id = "flow-id" EQUAL gen-value
extension-param = token [EQUAL (token | quoted-string)]
eps-charging-info = pdngw [SEMI eps-bearer-hierarchy] *(SEMI extension-param)
pdngw = "pdngw" EQUAL gen-value
eps-bearer-hierarchy = "eps-info" EQUAL LDQUOT eps-info *(COMMA eps-info) RDQUOT
eps-info = eps-item SEMI eps-sig SEMI ecid [SEMI flow-id]
eps-item = "eps-item" EQUAL DIGIT
eps-sig = "eps-sig" EQUAL ("yes" / "no")
ecid = "ecid" EQUAL 1*HEXDIG
eth-charging-info = ip-edge *(SEMI extension-param)
ip-edge = "ip-edge" EQUAL gen-value
extension-param = token [EQUAL (token | quoted-string)]
```

NOTE: The syntax above is not aligned with the rules for defining new P-Charging-Vector header field parameters as defined in RFC 3455 [52]. Entities that perform syntax check (even if they are not interested in specific header field parameter values) of the header field need to follow the explicit syntax above, as using the rules in RFC 3455 [52] would trigger a parser error.

The access-network-charging-info parameter is an instance of generic-param from the current charge-params component of P-Charging-Vector header field.

The access-network-charging-info parameter includes alternative definitions for different types access networks. The description of these parameters are given in the subsequent subclauses.

The "access-network-charging-info" header field parameter is not included in the P-Charging-Vector for SIP signalling that is not associated with a session.

When the "access-network-charging-info" is included in the P-Charging-Vector and necessary information isnot available from the IP-CAN (e.g. via Gx/Rx interface) reference points then null or zero values are included.

For type 1 and type 3 IOIs, the generating SIP entity shall express the "orig-ioi" and "term-ioi" header field parameters in the format of a quoted string as specified in RFC 3455 [52] with a specific string prefix being "Type 1" and "Type 3" respectively to indicate the type of IOI. For the type 2 IOI, no string prefix is used. The receiving SIP entity does not perform syntactic checking of the contents of the IOI parameter (the IOI parameter is passed unmodified to charging entities).

7.2A.5.2.2 GPRS as IP-CAN

GPRS is the initially supported access network (gprs-charging-info parameter). For GPRS there are the following components to track: GGSN address (ggsn parameter), media authorization token (auth token parameter), and a pdp-info parameter that contains the information for one or more PDP contexts. In this release the media authorization token is set to zero. The pdp-info contains one or more pdp-item values followed by a collection of parameters (pdp-sig, gcid, and flow-id). The value of the pdp-item is a unique number that identifies each of the PDP-related charging information within the P-Charging-Vector header field. Each PDP context has an indicator if it is an IM CN subsystem signalling PDP context (pdp-sig parameter), an associated GPRS Charging Identifier (gcid parameter), and a identifier (flow-id parameter). The flow-id parameter contains a sequence of curly bracket delimited flow identifier tuples that identify associated m-lines and relative order of port numbers in an m-line within the SDP from the SIP signalling to which the PDP context charging information applies. For a complete description of the semantics of the flow-id parameter see 3GPP TS 29.214 [13D] Annex B. The gcid, ggsn address and flow-id parameters are transferred from the GGSN to the P-CSCF via the PCRF over the Rx interface (see 3GPP TS 29.214 [13D] and Gx interface (see 3GPP TS 29.212 [13B]).

The gcid value is received in binary format at the P-CSCF (see 3GPP TS 29.214 [13D]). The P-CSCF shall encode it in hexadecimal format before include it into the gcid parameter. On receipt of this header field, a node receiving a gcid shall decode from hexadecimal into binary format.

The "access-network-charging-info" is not included in the P-Charging-Vector for SIP signalling that is not associated with a multimedia session. The access network charging information may be unavailable for sessions that use a general purpose PDP context (for both SIP signalling and media) or that do not require media authorisation.

7.2A.5.2.3 I-WLAN as IP-CAN

The access-network-charging-info parameter is an instance of generic-param from the current charge-params component of P-Charging-Vector header field.

This version of the specification defines the use of "pdg" for inclusion in the P-Charging-Vector header field. No other extensions are defined for use in I-WLAN in this version of the specification.

7.2A.5.2.4 xDSL as IP-CAN

The access-network-charging-info parameter is an instance of generic-param from the current charge-params component of P-Charging-Vector header field. The access-network-charging-info parameter includes alternative definitions for different types of access networks. This subclause defines the components of the xDSL instance of the access-network-charging-info.

For xDSL, there are the following components to track: BRAS address (bras parameter), media authorization token (auth-token parameter), and a set of dsl-bearer-info parameters that contains the information for one or more xDSL bearers.

The dsl-bearer-info contains one or more dsl-bearer-item values followed by a collection of parameters (dsl-bearer-sig, dslcid, and flow-id). The value of the dsl-bearer-item is a unique number that identifies each of the dsl-bearer-related charging information within the P-Charging-Vector header field. Each dsl-bearer-info has an indicator if it is an IM CN

subsystem signalling dsl-bearer (dsl-bearer-sig parameter), an associated DSL Charging Identifier (dslcid parameter), and a identifier (flow-id parameter). The flow-id parameter contains a sequence of curly bracket delimited flow identifier tuples that identify associated m-lines and relative order of port numbers in an m-line within the SDP from the SIP signalling to which the dsl-bearer charging information applies. For a complete description of the semantics of the flow-id parameter see 3GPP TS 29.214 [13D].

The format of the dslcid parameter is identical to that of ggsn parameter. On receipt of this header field, a node receiving a dslcid shall decode from hexadecimal into binary format.

For a dedicated dsl-bearer for SIP signalling, i.e. no media stream requested for a session, then there is no authorisation activity or information exchange over the Rx and Gx interfaces. Since there are no dslcid, media authorization token or flow identifiers in this case, the dslcid and media authorization token are set to zero and no flow identifier parameters are constructed by the PCRF.

7.2A.5.2.5 DOCSIS as IP-CAN

The access-network-charging-info parameter is an instance of generic-param from the current charge-params component of P-Charging-Vector header field. The access-network-charging-info parameter includes alternative definitions for different types of access networks. This subclause defines the components of the cable instance of the access-network-charging-info. Cable access is based upon the architecture defined by Data Over Cable Service Interface Specification (DOCSIS).

The billing correlation identifier (bcid) uniquely identifies the PacketCable DOCSIS bearer resources associated with the session within the cable operator's network for the purposes of billing correlation. To facilitate the correlation of session and bearer accounting events, a correlation ID that uniquely identifies the resources associated with a session is needed. This is accomplished through the use of the bcid as generated by the PacketCable Multimedia network. This bcid is returned to the P-CSCF within the response to a successful resource request.

The bcid is specified in RFC 3603 [74A]. This identifier is chosen to be globally unique within the system for a window of several months. Consistent with RFC 3603 [74A], the BCID must be encoded as a hexadecimal string of up to 48 characters. Leading zeroes may be suppressed.

If the bcid value is received in binary format by the P-CSCF from the IP-CAN, the P-CSCF shall encode it in hexadecimal format before including it into the bcid parameter. On receipt of this header field, a node using a bcid will normally decode from hexadecimal into binary format.

7.2A.5.2.6 cdma2000® packet data subsystem as IP-CAN

The specific extensions to the P-Charging-Vector header field defined in RFC 3455 [52] when the access network is cdma2000® packet data subsystem are: the icn-charging-info parameter contains one icn-bcp child parameter and one or more child itid parameters. The icn-bcp parameter, identifies the point of attachment where UE has attached itself to the the cdma2000® packet data subsystem. The icn-bcp parameter is conveyed to the P-CSCF by the cdma2000® packet data subsystem. Each itid child parameter within icn-charging-info corresponds to one IP-CAN bearer that was established by the cdma2000® packet data subsystem for the UE. Each itid parameter contains an indicator if it is an IP-CAN subsystem signalling IP-CAN bearer (itc-sig parameter), an associated IP-CAN charging identifier (itc-id parameter), and one or more flow identifiers (flow-id parameter) that identify associated m-lines within the SDP from the SIP signalling. These parameters are transferred from the cdma2000® packet data subsystem to the P-CSCF over the respective interface.

For an IP-CAN bearer that is only used for SIP signalling, i.e. no media stream requested for a session, then there is no authorisation activity or information exchange with the P-CSCF over the respective cdma2000® interfaces. Since there is no itc-id, or flow identifiers in this case, the itc-id is set to zero and no flow identifier parameters are constructed by the P-CSCF.

7.2A.5.2.7 EPS as IP-CAN

For EPS there are the following components to track: P-GW address (pdngw parameter), and a eps-info parameter that contains the information for one or more EPS bearers. The eps-info contains one or more eps-item values followed by a collection of parameters (eps-sig, ecid, and flow-id). The value of the eps-item is a unique number that identifies each of the EPS-bearer-related charging information within the P-Charging-Vector header field. Each EPS bearer context has an associated QCI indicating if it is an IM CN subsystem signalling EPs bearer context (eps-sig parameter), an associated EPS Charging Identifier (ecid parameter), and a identifier (flow-id parameter). The flow-id parameter

contains a sequence of curly bracket delimited flow identifier tuples that identify associated m-lines and relative order of port numbers in an m-line within the SDP from the SIP signalling to which the EPS bearer charging information applies. For a complete description of the semantics of the flow-id parameter see 3GPP TS 29.214 [13D] Annex B. The ecid, pdngw address and flow-id parameters are transferred from the P-GW to the P-CSCF via the PCRF over the Rx interface (see 3GPP TS 29.214 [13D] and Gx interface (see 3GPP TS 29.212 [13B]).

The ecid value is received in binary format at the P-CSCF (see 3GPP TS 29.214 [13D]). The P-CSCF shall encode it in hexadecimal format before include it into the ecid parameter. On receipt of this header field, a node receiving a gcid shall decode from hexadecimal into binary format.

The "access-network-charging-info" header field parameter is not included in the P-Charging-Vector for SIP signalling that is not associated with a multimedia session. The access network charging information may be unavailable for sessions that use a general purpose EPS bearer context (for both SIP signalling and media).

7.2A.5.2.8 Ethernet as IP-CAN

The access-network-charging-info parameter is an instance of generic-param from the current charge-params component of P-Charging-Vector header field. For Ethernet accesses, the IP Edge Node address (ip-edge parameter) is tracked. The IP Edge Node is defined in ETSI ES 282 001 [138].

7.2A.5.3 Operation

The operation of this header field is described in subclauses 5.2, 5.3, 5.4, 5.5, 5.6, 5.7 and 5.8.

7.2A.6 Orig parameter definition

7.2A.6.1 Introduction

The "orig" parameter is a uri-parameter intended to:

- tell the S-CSCF that it has to perform the originating services instead of terminating services;
- tell the I-CSCF that it has to perform originating procedures.

7.2A.6.2 Syntax

The syntax for the orig parameter is specified in table 7.7:

Table 7.7: Syntax of orig parameter

```
uri-parameter = transport-param / user-param / method-param / ttl-param / maddr-param / lr-param /
    orig / other-param
orig = "orig"
```

The BNF for uri-parameter is taken from IETF RFC 3261 [26] and modified accordingly.

7.2A.6.3 Operation

The orig parameter is appended to the address of the S-CSCF, I-CSCF or IBCF by the ASs, when those initiate requests on behalf of the user. The S-CSCF will run originating services whenever the orig parameter is present next to its address. The I-CSCF will run originating procedures whenever the orig parameter is present next to its address. The IBCF will preserve the "orig" parameter in the topmost Route header field.

7.2A.7 Extension to Security-Client, Security-Server and Security-Verify header fields

7.2A.7.1 Introduction

This extension defines new paramerts for the Security-Client, Security-Server and Security-Verify header fields.

7.2A.7.2 Syntax

The syntax for the Security-Client, Security-Server and Security-Verify header fields is defined in IETF RFC 3329. The additional syntax is defined in Annex H of 3GPP TS 33.203 [19].

7.2A.7.3 Operation

The operation of the additional parameters for the Security-Client, Security-Server and Security-Verify header fields is defined in Annex H of 3GPP TS 33.203 [19].

7.2A.8 IMS Communication Service Identifier (ICSI)

7.2A.8.1 Introduction

The ICSI is defined to fulfil the requirements as stated in 3GPP TS 23.228 [7].

7.2A.8.2 Coding of the ICSI

This parameter is coded as a URN. The ICSI URN may be included as:

- a tag-value within the g.3gpp.icsi-ref media feature tag as defined in subclause 7.9.2 and RFC 3840 [62], in which case those characters of the URN that are not part of the tag-value definition in RFC 3840 [62] shall be represented in the percent encoding as defined in RFC 3986 [124]; or

- as a value of the P-Preferred-Service or P-Asserted-Service header fields as defined RFC 6050 [121].

A list of the URNs containing ICSI values registered by 3GPP can be found at http://www.3gpp.com/Uniform-Resource-Name-URN-list.html

An example of an ICSI for a 3GPP defined IMS communication service is:

```
urn:urn-7:3gpp-service.ims.icsi.mmtel
```

An example of a g.3gpp.icsi-ref media feature tag containing an ICSI for a 3GPP defined IMS communication service is:

```
g.3gpp.icsi-ref="urn%3Aurn-7%3A3gpp-service.ims.icsi.mmtel"
```

An example of an ICSI for a 3GPP defined IMS communication service in a P-Preferred-Service header field is

```
P-Preferred-Service: urn:urn-7:3gpp-service.ims.icsi.mmtel
```

An example of an ICSI for a 3GPP defined IMS communication service in a P-Asserted-Service header field is

```
P-Asserted-Service: urn:urn-7:3gpp-service.ims.icsi.mmtel
```

7.2A.9 IMS Application Reference Identifier (IARI)

7.2A.9.1 Introduction

The IARI is defined to fulfil the requirements as stated in 3GPP TS 23.228 [7].

7.2A.9.2 Coding of the IARI

This parameter is coded as a URN. The IARI URN may be included as a tag-value within the g.3gpp.iari-ref media feature tag as defined in subclause 7.9.3 and RFC 3840 [62], in which case those characters of the URN that are not part of the tag-value definition in RFC 3840 [62] shall be represented in the percent encoding as defined in RFC 3986 [124].

A list of the URNs containing IARI values registered by 3GPP can be found at http://www.3gpp.com/Uniform-Resource-Name-URN-list.html

An example of a g.3gpp.iari-ref media feature tag containing an IARI is:

```
g.3gpp.iari-ref="urn%3Aurn-7%3A3gpp-application.ims.iari.game-v1"
```

7.2A.10 "phone-context" tel URI parameter

7.2A.10.1 Introduction

The "phone-context" tel URI parameter indicates that the UE uses local service number or that the UE has included information according to a local dialling plan in the Request-URI.

In the former case, the "phone-context" tel URI parameter is included in a Tel-URI or a corresponding SIP URI with a "user" SIP URI parameter set to "phone".

In the latter case, the "phone-context" tel URI parameter is included in the user part of a SIP URI with the "user" SIP URI parameter set to "dialstring" (see RFC 4967 [103]).

7.2A.10.2 Syntax

The syntax of the "phone-context" tel URI parameter is described in RFC 3966 [22]. There are additional coding rules for this parameter depending on the type of IP-CAN, according to access technology specific descriptions.

7.2A.10.3 Additional coding rules for "phone-context" tel URI parameter

In case the current IP-CAN is indicated in the "phone-context" tel URI parameter, the entities inserting the "phone-context" tel URI parameter shall populate the "phone-context" tel URI parameter with the following contents:

1) if the IP-CAN is GPRS, then the "phone-context" tel URI parameter is a domain name. It is constructed from the MCC, the MNC and the home network domain name by concatenating the MCC, MNC, and the string "gprs" as domain labels before the home network domain name;

EXAMPLE: If MCC = 216, MNC = 01, then the "phone-context" tel URI parameter is set to '216.01.gprs.home1.net'.

2) if the IP-CAN is I-WLAN, then the "phone-context" tel URI parameter is a domain name. It is constructed from the SSID, AP's MAC address, and the home network domain name by concatenating the SSID, AP's MAC address, and the string "i-wlan" as domain labels before the home network domain name;

EXAMPLE: If SSID = BU-Airport, AP's MAC = 00-0C-F1-12-60-28, and home network domain name is "home1.net", then the "phone-context" tel URI parameter is set to the string "bu-airport.000cf1126028.i-wlan.home1.net".

3) if the IP-CAN is xDSL, then the "phone-context" tel URI parameter is a domain name. It is constructed from the dsl-location (see subclause 7.2A.4) and the home network domain name by concatenating the dsl-location and the string "xdsl" as domain labels before the home network domain name;

4) if the IP-CAN is DOCSIS, then the "phone-context" tel URI parameter is based on data configured locally in the UE;

5) if the IP-CAN is EPS, then the "phone-context" tel URI parameter is a domain name. It is constructed from the MCC, the MNC and the home network domain name by concatenating the MCC, MNC, and the string "eps" as domain labels before the home network domain name;

6) if the IP-CAN is Ethernet, then the "phone-context" parameter is a domain name. It is constructed from the eth-location (see subclause 7.2A.4) and the home network domain name by concatenating the eth-location and the string "ethernet" as domain labels before the home network domain name;

7) if the IP-CAN is cdma2000®, then the "phone-context" parameter is a domain name. It is constructed from the subnet id and the home network domain name by concatenating the subnet id as the domain label before the home network domain name; and

8) if the access network information is not available in the UE, then the "phone-context" tel URI parameter is set to the home network domain name preceded by the string "geo-local.".

In case the home domain is indicated in the "phone-context" tel URI parameter, the "phone-context" tel URI parameter is set to the home network domain name (as it is used to address the SIP REGISTER request, see subclause 5.1.1.1A or subclause 5.1.1.1B).

In case the "phone-context" tel URI parameter indicates a network other than the home network or the visited access network, the "phone-context" tel URI parameter is set according to RFC 3966 [22].

7.2A.11 Void

7.2A.11.1 Void

7.2A.11.2 Void

7.2A.11.3 Void

7.2A.12 CPC and OLI tel URI parameter definition

7.2A.12.1 Introduction

The use of the "cpc" and "oli" URI parameters for use in the P-Asserted-Identity in SIP requests is defined.

7.2A.12.2 Syntax

The Calling Party's Category and Originating Line Information are represented as URI parameters for the tel URI scheme and SIP URI representation of telephone numbers. The ABNF syntax is as follows and extends the formal syntax for the tel URI as specified in RFC 3966 [22]:

```
par =/ cpc / oli
cpc = cpc-tag "=" cpc-value
oli = oli-tag "=" oli-value
cpc-tag = "cpc"
oli-tag = "oli"
cpc-value
= "ordinary" / "test" / "operator" /
"payphone" / "unknown" / "mobile-hplmn" / "mobile-vplmn" / "emergency" /
genvalue
oli-value = 2DIGIT
genvalue = 1*(alphanum / "-" / "." )
```

The Accept-Language header field shall be used to express the language of the operator.

The semantics of these Calling Party's Category values are described below:

ordinary: The caller has been identified, and has no special features.

test: This is a test call that has been originated as part of a maintenance procedure.

operator: The call was generated by an operator position.

payphone: The calling station is a payphone.

unknown: The CPC could not be ascertained.

mobile-hplmn: The call was generated by a mobile device in its home PLMN.

mobile-vplmn: The call was generated by a mobile device in a vistited PLMN.

emergency: The call is an emergency service call.

NOTE 1: The choice of CPC and OLI values and their use are up to the Service Provider. CPC and OLI values can be exchanged across networks if specified in a bilateral agreement between the service providers.

NOTE 2: Additional national/regional CPC values can exist.

The two digit OLI values are decimal codes assigned and administered by North American Numbering Plan Administration.

7.2A.12.3 Operation

The "cpc" and "oli" URI parameters may be supported by IM CN subsystem entities that provide the UA role and by IM CN subsystem entities that provide the proxy role.

The "cpc" and "oli" URI parameters shall not be populated at the originating UE.

Unless otherwise specified in this document, "cpc" and "oli" URI parameters are only passed on by IM CN subsystem entities (subject to trust domain considerations as specified in subclause 4.4.12).

7.2A.13 "sos" SIP URI parameter

7.2A.13.1 Introduction

The "sos" SIP URI parameter is intended to:

- indicate to the S-CSCF that a REGISTER request that includes the "sos" SIP URI parameter is for emergency registration purposes;
- tell the S-CSCF to not apply barring of the public user identity being registered; and
- tell the S-CSCF to not apply initial filter criteria to requests destined for an emergency registered contact.

7.2A.13.2 Syntax

The syntax for the "sos" SIP URI parameter is specified in table 7.8.

Table 7.8: Syntax of sos SIP URI parameter

```
uri-parameter =/ sos-param
sos-param = "sos"
```

The BNF for uri-parameter is taken from IETF RFC 3261 [26] and modified accordingly.

7.2A.13.3 Operation

When a UE includes the "sos" SIP URI parameter in the URI included in the Contact header field of REGISTER request, the REGISTER request is intended for emergency registration.

When a S-CSCF receives a REGISTER request for emergency registration that includes the "sos" SIP URI parameter, the S-CSCF is required to preserve the previously registered contact address. This differs to the registrar operation as defined in RFC 3261 [26] in that the rules for URI comparison for the Contact header field shall not apply and thus, if the URI in the Contact header field matches a previously received URI, then the old contact address shall not be overwritten.

7.3 Option-tags defined within the present document

There are no option-tags defined within the present document over and above those defined in the referenced IETF specifications.

7.4 Status-codes defined within the present document

There are no status-codes defined within the present document over and above those defined in the referenced IETF specifications.

7.5 Session description types defined within the present document

There are no session description types defined within the present document over and above those defined in the referenced IETF specifications.

7.6 3GPP IM CN subsystem XML body

7.6.1 General

This subclause contains the 3GPP IM CN Subsystem XML body in XML format. The 3GPP IM CN Subsystem XML shall be valid against the 3GPP IM CN Subsystem XML schema defined in table 7.7A.

Any SIP User Agent or proxy may insert or remove the 3GPP IM CN subsystem XML body or parts of it, as required, in any SIP message. The 3GPP IM CN subsystem XML body shall not be forwarded outside a 3GPP network.

See subclause 7.6.4 and subclause 7.6.5 for the associated MIME type definition.

7.6.2 Document Type Definition

The XML Schema, is defined in table 7.7A.

Table 7.7A: IM CN subsystem XML body, XML Schema

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified"
           attributeFormDefault="unqualified" version="1">
   <xs:complexType name="tIMS3GPP">
      <xs:sequence>
         <xs:choice>
            <xs:element name="alternative-service" type="tAlternativeService"/>
            <xs:element name="service-info" type="xs:string"/>
         </xs:choice>
         <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
      <xs:attribute name="version" type="xs:decimal" use="required"/>
      <xs:anyAttribute/>
   </xs:complexType>
   <xs:complexType name="tAlternativeService">
      <xs:sequence>
         <xs:element ref="type"/>
         <xs:element name="reason" type="xs:string"/>
         <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
      <xs:anyAttribute/>
   </xs:complexType>

   <!-- root element -->
   <xs:element name="ims-3gpp" type="tIMS3GPP"/>

   <xs:element name="type" type="xs:string"/>

   <!-- action element for //ims-3gpp//alternative-service -->
   <xs:element name="action" type="xs:string"/>

</xs:schema>
```

7.6.3 XML Schema description

This subclause describes the elements of the IM CN subsystem XML Schema as defined in table 7.7A.

<ims-3gpp>: The <ims-3gpp> element is the root element of the IM CN subsystem XML body. It is always present. XML instance documents of future versions of the XML Schema in table 7.7A is valid against the XML Schema in table 7.7A in this document. XML instance documents of the XML Schema in table 7.7A in the present document have a version attribute value, part of the <ims-3gpp> element, that is equal to the value of the XML Schema version described in the present document.

<service-info>: the transparent element received from the HSS for a particular trigger point are placed within this optional element.

<alternative-service>: in the present document, the alternative service is used as a response for an attempt to establish an emergency session within the IM CN subsystem or as a response to initiate restoration procedures. The element describes an alternative service where the call should success. The alternative service is described by the type of service information. A possible reason cause why an alternative service is suggested may be included.

In the present document, the <alternative-service> element contains a <type> element, a <reason> element, and an optional <action> element.

The <type> element indicates the type of alternative service. The <type> element contains only the values specified in table 7.7AA in the present document.

Table 7.7AA: ABNF syntax of values of the <type> element

```
emergency-value = %x65.6D.65.72.67.65.6E.63.79 ; "emergency"
restoration-value = %x72.65.73.74.6F.72.61.74.69.6F.6E ; "restoration"
```

The <action> element contains only the values specified in table 7.7AB in the present document.

Table 7.7AB: ABNF syntax of values of the <action> element

```
emergency-registration-value = %x65.6D.65.72.67.65.6E.63.79.2D.72.65.67.69.73.74.72.61.74.69.6F.6E ;
    "emergency-registration"
initial-registration-value = %x69.6E.69.74.69.61.6C.2D.72.65.67.69.73.74.72.61.74.69.6F.6E  ;
    "initial-registration"
```

The <reason> element contains an explanatory text with the reason why the session setup has been redirected. A UE may use this information to give an indication to the user.

If included in the IM CN subsystem XML body:

1. the <type> element with the value "emergency" is included as the first child element of the <alternative-service> element;

2. the <type> element with the value "restoration" is included as one of the following:

   a) the first child element of the <alternative-service> element; or

   b) the third or later child element of the <alternative-service> element;

3. the <action> element with the value "emergency-registration" is included as the third child element of the <alternative-service> element; and

4. the <action> element with the value "initial-registration" is included as the third or later child element of the <alternative-service> element.

NOTE: When included, the <action> and the second occurence of the <type> elements are validated by the <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/> particle of their parent elements.

7.6.4 MIME type definition

7.6.4.1 Introduction

This subclause defines the MIME type for "application/3gpp-ims+xml". A 3GPP IM CN subsystem XML Document can be identified with this media type.

7.6.4.2 Syntax

The following optional parameters are defined:

- "charset": the parameter has identical semantics to the charset parameter of the "application/xml" media type as specified in RFC 3023 [132].
- "sv" or "schemaversion": the syntax for the "sv" or "schemaversion" parameter is specified in table 7.7B:

Table 7.7B: Syntax of the "sv" or "schemaversion" parameter

```
m-parameter    =/ ("sv" / "schemaversion") EQUAL LDQUOT [ sv-value-list ] RDQUOT
sv-value-list  =  sv-value-range *( "," sv-value )
sv-value-range =  sv-value [ "-" sv-value ]
sv-value       =  number / token
number         =  1*DIGIT [ "." 1*DIGIT ]
```

The BNF for m-parameter is taken from IETF RFC 3261 [26] and modified accordingly.

7.6.4.3 Operation

The encoding considerations for "application/3gpp-ims+xml" are identical to those of "application/xml" as described in RFC 3023 [132].

The "sv" or "schemaversion" parameter"s value is used to indicate:

- the versions of the 3GPP IM CN Subsystem XML schema that can be used to validate the 3GPP IM CN subsystem XML body (if the MIME type and parameter are present in the Content-Type header field); or

- the accepted versions of the 3GPP IM CN Subsystem XML body (if the MIME type and parameter are present in the Accept header field).

If the "sv"and "schemaversion" parameter are absent, it shall be assumed that version 1 of the XML Schema for the IM CN subsystem XML body is supported.

7.6.5 IANA Registration

NOTE: RFC 4288 [161], section 9, states the process that applies in case of changes to the registry of media types. Any future changes to the format or to subclause 7.6.5 would invoke this procedure.

MIME media type name:

application

MIME subtype name:

3gpp-ims+xml

Required parameters:

None

Optional parameters:

"charset" the parameter has identical semantics to the charset parameter of the "application/xml" media type as specified in RFC 3023 [132].

"sv" or "schemaversion" the parameter"'s value is used to indicate:

- the versions of the 3GPP IP multimedia (IM) Core Network (CN) subsystem XML schema that can be used to validate the 3GPP IM CN subsystem XML body (if the MIME type and parameter are present in the Content-Type header field) or

- the accepted versions of the 3GPP IM CN Subsystem XML body (if the MIME type and parameter are present in the Accept header field).

If the "sv" and "schemaversion" parameter are absent, it shall be assumed that version 1 of the XML Schema for the IM CN subsystem XML body is supported.

Encoding considerations:

Same as encoding considerations of application/xml as specified in RFC 3023 [132]

Security considerations:

Same as general security considerations for application/xml as specified in section 10 of RFC 3023 [132].

In addition, this content type provides a format for exchanging information in SIP, so the security considerations from RFC 3261 [26] apply.

Interoperability considerations:

Same as Interoperability considerations as specified in section 3.1 of RFC 3023 [132].

If both "sv" and "schemaversion" are specified, then the value of "schemaversion" is ignored

Published specification:

3GPP TS 24.229: "IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP), stage 3", as published in subclause 7.6.5, version 8.9.0.

Available via <http://www.3gpp.org/specs/numbering.htm>.

Applications which use this media:

Applications that use the 3GPP IM CN Subsystem as defined by 3GPP.

Intended usage:

COMMON

Additional information:

1. Magic number(s): none
2. File extension(s): none
3. Macintosh file type code: none
4. Object Identifiers: none

7.7 SIP timers

The timers defined in RFC 3261 [26] need modification in some cases to accommodate the delays introduced by the air interface processing and transmission delays. Table 7.8 shows recommended values for IM CN subsystem.

Table 7.8 lists in the first column, titled "SIP Timer" the timer names as defined in RFC 3261 [26].

The second column, titled "value to be applied between IM CN subsystem elements" lists the values recommended for network elements e.g. P-CSCF, S-CSCF, MGCF, when communicating with each other i.e. when no air interface leg is included. These values are identical to those recommended by RFC 3261 [26].

The third column, titled "value to be applied at the UE" lists the values recommended for the UE, when in normal operation the UE generates requests or responses containing a P-Access-Network-Info header field which included a value of "3GPP-GERAN","3GPP-UTRAN-FDD", "3GPP-UTRAN-TDD", "3GPP-E-UTRAN-FDD", "3GPP-E-UTRAN-TDD", "3GPP2-1X", "3GPP2-1X-HRPD", "3GPP2-UMB", "IEEE-802.11", "IEEE-802.11a", "IEEE-802.11b", or "IEEE-802.11g", or "IEEE-802.11n". These are modified when compared to RFC 3261 [26] to accommodate the air interface delays. In all other cases, the UE should use the values specified in RFC 3261 [26] as indicated in the second column of table 7.8.

The fourth column, titled "value to be applied at the P-CSCF toward a UE" lists the values recommended for the P-CSCF when an air interface leg is traversed, and which are used on all SIP transactions on a specific security association where the security association was established using a REGISTER request containing a P-Access-Network-Info header field provided by the UE which included a value of "3GPP-GERAN","3GPP-UTRAN-FDD", "3GPP-UTRAN-TDD", "3GPP-E-UTRAN-FDD", "3GPP-E-UTRAN-TDD", "3GPP2-1X", "3GPP2-1X-HRPD", "3GPP2-UMB", "IEEE-802.11", "IEEE-802.11a" or "IEEE-802.11b", or "IEEE-802.11g", or "IEEE-802.11n". These are modified when compared to RFC 3261 [26]. In all other cases, the P-CSCF should use the values specified in RFC 3261 [26] as indicated in the second column of table 7.8.

The final column reflects the timer meaning as defined in RFC 3261 [26].

Table 7.8: SIP timers

SIP Timer	Value to be applied between IM CN subsystem elements	Value to be applied at the UE	Value to be applied at the P-CSCF toward a UE	Meaning
T1	500ms default	2s default	2s default	RTT estimate
T2	4s	16s	16s	The maximum retransmit interval for non-INVITE requests and INVITE responses
T4	5s	17s	17s	Maximum duration a message will remain in the network
Timer A	initially T1	initially T1	initially T1	INVITE request retransmit interval, for UDP only
Timer B	64*T1	64*T1	64*T1	INVITE transaction timeout timer
Timer C	> 3min	> 3 min	> 3 min	proxy INVITE transaction timeout
Timer D	> 32s for UDP	>128s	>128s	Wait time for response retransmits
	0s for TCP/SCTP	0s for TCP/SCTP	0s for TCP/SCTP	
Timer E	initially T1	initially T1	initially T1	non-INVITE request retransmit interval, UDP only
Timer F	64*T1	64*T1	64*T1	non-INVITE transaction timeout timer
Timer G	initially T1	initially T1	initially T1	INVITE response retransmit interval
Timer H	64*T1	64*T1	64*T1	Wait time for ACK receipt.
Timer I	T4 for UDP	T4 for UDP	T4 for UDP	Wait time for ACK retransmits
	0s for TCP/SCTP	0s for TCP/SCTP	0s for TCP/SCTP	
Timer J	64*T1 for UDP	64*T1 for UDP	64*T1 for UDP	Wait time for non-INVITE request retransmits
	0s for TCP/SCTP	0s for TCP/SCTP	0s for TCP/SCTP	
Timer K	T4 for UDP	T4 for UDP	T4 for UDP	Wait time for response retransmits
	0s for TCP/SCTP	0s for TCP/SCTP	0s for TCP/SCTP	

7.8 IM CN subsystem timers

Table 7.9 shows recommended values for timers specific to the IM CN subsystem.

Table 7.9: IM CN subsystem

Timer	Value to be applied at the UE	Value to be applied at the P-CSCF	Value to be applied at the S-CSCF	Meaning
reg-await-auth	not applicable	not applicable	4 minutes	The timer is used by the S-CSCF during the authentication procedure of the UE. For detailed usage of the timer see subclause 5.4.1.2. The authentication procedure may take in the worst case as long as 2 times Timer F. The IM CN subsystem value for Timer F is 128 seconds.

NOTE: The UE and the P-CSCF use the value of the reg-await-auth timer to set the SIP level lifetime of the temporary set of security associations.

7.9 Media feature tags defined within the current document

7.9.1 General

This subclause describes the media feature tag definitions that are applicable for the 3GPP IM CN subsystem.

7.9.2 Definition of media feature tag g.3gpp.icsi-ref

Media feature-tag name: g.3gpp.icsi-ref.

ASN.1 Identifier: 1.3.6.1.8.2.4

Summary of the media feature indicated by this tag: Each value of the Service Reference media feature-tag indicates the software applications supported by the agent. The values for this tag equal the IMS communication Service Identifier (ICSI) values supported by the agent.

The Service Reference media feature tag is defined to fulfil the requirements for forking to an appropriate UE when multiple UEs are registered and dispatch to an appropriate application within the UE based upon the IMS communication Service Identifier (ICSI) values as stated in 3GPP TS 23.228 [7].

Multiple tag-values can be included in the Service Reference media feature-tag.

Values appropriate for use with this feature-tag: Token with an equality relationship.

The feature-tag is intended primarily for use in the following applications, protocols, services, or negotiation mechanisms:

> This feature-tag is most useful in a communications application, for describing the capabilities of a device, such as a phone or PDA.

Examples of typical use: Routeing an IMS Communication Session to a device that supports a particular software application or understands a particular service.

Related standards or documents:

> 3GPP TS 24.229: "IP Multimedia Call Control Protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP), stage 3"

Security Considerations: Security considerations for this media feature-tag are discussed in subclause 11.1 of RFC 3840 [6].

7.9.3 Definition of media feature tag g.3gpp.iari-ref

Media feature-tag name: g.3gpp.iari-ref.

ASN.1 Identifier: 1.3.6.1.8.2.5

Summary of the media feature indicated by this tag: Each value of the Application Reference media feature-tag indicates the software applications supported by the agent. The values for this tag equal IMS Application Reference Identifier (IARI) values supported by the agent

The Application Reference media feature tag is defined to fulfil the requirements for forking to an appropriate UE when multiple UEs are registered and dispatch to an appropriate application within the UE based upon and IMS Application Reference Identifier (IARI) values as stated in 3GPP TS 23.228 [7].

Multiple tag-values can be included in the Application Reference media feature-tag.

Values appropriate for use with this feature-tag: Token with an equality relationship.

The feature-tag is intended primarily for use in the following applications, protocols, services, or negotiation mechanisms:

> This feature-tag is most useful in a communications application, for describing the capabilities of a device, such as a phone or PDA.

Examples of typical use: Routeing an IMS Application Session to a device that supports a particular software application or understands a particular application.

Related standards or documents:

> 3GPP TS 24.229: "IP Multimedia Call Control Protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP), stage 3"

Security Considerations: Security considerations for this media feature-tag are discussed in subclause 11.1 of RFC 3840 [6].

7.10 Reg-event package extensions defined within the current document

7.10.1 General

This subclause describes the reg-event package extensions that are applicable for the IM CN subsystem.

7.10.2 Reg-Event package extension to transport wildcarded public user identities

7.10.2.1 Structure and data semantics

This subclause defines an extension to the event registration package (RFC 3680 [43]) to transport policy to transport wildcarded public user identities that are encoded using regular expression.

In order to include a wildcared public user identity in the event registration package, the notifier shall

1. if the registration set of the identity whose registration status is notified contains a wildcarded public user identity, add a <wildcardedIdentity> sub-element defined in subclause 7.10.2.2 of this document to the <registration> element of the wildcarded identiy;

2. for the <registration> element containing a <wildcardedIdentity> sub-element:

   a) set the aor attribute to any public user identity that is represented by the wildcarded identity; and

   b) set the <wildcardedIdentity> sub-element inside of the <registration> element to the wildcarded identity as received via the Cx interface.

NOTE: The public user identity that is put into the aor attribute does not have any extra priviledges over any other public user identity that is represented by a wildcarded public user identity.

7.10.2.2 XML Schema

Table 7.10.1 in this subclause defines the XML Schema describing the extension to transport wildcarded public user identities which can be included in the reg event package sent from the S-CSCF in NOTIFY requests.

Editor"s note: IMS_Corp CR#3798: The XML namespace needs to be registered once the work on the current release is complete.

Table 7.10: Wildcarded Identity, XML Schema

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema
  targetNamespace="urn:3gpp:ns:extRegExp:1.0"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified" attributeFormDefault="unqualified">
    <xs:element name="wildcardedIdentity" type="xs:string"/>
</xs:schema>
```

NOTE: Multiple wildcarded elements can be included in one registration element.

7.11 Void

7.12 Info package definitions and associated MIME type definitions

7.12.1 Session-info MIME type

7.12.1.1 Legacy INFO usage

The digit message body and associated MIME type can be used as defined in other specifications in a legacy manner as defined by RFC 6086 [25].

7.12.1.2 Overlap digit message body

7.12.1.2.1 Scope

This section defines a message body that shall be used for sending additional digits, which have not previously been sent, in SIP INFO messages ("legacy" mode of usage of the INFO method as defined in RFC 6086 [25]) when the in-dialog method is used for overlap dialling.

The support of this message body is a network option.

7.12.1.2.2 MIME type

The message body defined in the present Annex is registered at IANA as "application/session-info" MIME type.

If the message body is embedded in SIP INFO messages, the Content-Type header shall be set to "application/session-info" and the Content-Disposition header shall be set to "signal" with the handling parameter set to "optional".

7.12.1.2.3 ABNF

session-info = SubsequentDigit

SubsequentDigit = "SubsequentDigit" HCOLON phonedigits

phonedigits = 1*(HEXDIG / "*" / "#")

HEXDIG = DIGIT / "A" / "B" / "C" / "D" / "E" / "F"

7.12.1.2.4 IANA registration template

Within the present subclause, information required for an IANA registration at http://www.iana.org/cgi-bin/mediatypes.pl is provided.

1. Media Type Name

Application

2. Subtype name

"session-info" (Standards Tree)

3. Required parameters

none

4. Optional parameters

none

5. Encoding considerations

binary

6. Security considerations

Modifications of the MIME body by a man-in-the-middle can have severe consequences:

The overlap digits that can be transported with this MIME body influence the routeing of the SIP session that is being setup.

Dual Tone Multi Frequency (DTMF) tones that can also be transported with this MIME body will be interpreted by the application of the end points of the communication for various purposes.

However, this MIME body is used only attached to SIP INFO messages, and modifications of other parts of the SIP signalling will lead to comparable consequences. Protection of the SIP signalling will also protect the present MIME body.

The information transported in this MIME media type does not include active or executable content.

Mechanisms for privacy and intregrity protection of protocol parameters exist. Those mechanisms as well as authentication and further security mechanisms are described in 3GPP TS 24.229.

7. Interoperability considerations

none

8. Published specification

3GPP TS 24.229: "IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP), stage 3".

9. Applications which use this media type

This MIME type is used as a message body within SIP INFO messages.

It is either used for sending additional digits of the callee´s number, which have not previously been sent, in SIP INFO messages ("legacy" mode of usage of the INFO method as defined in RFC 6086 [25]) when the in-dialog method is used for overlap dialling.

10. Additional information

Magic number(s): none

File extension(s): none

Macintosh File Type Code(s): none

Object Identifier(s) or OID(s): none

11. Intended usage

Limited Use

12. Other Information/General Comment

none.

8 SIP compression

8.1 SIP compression procedures at the UE

8.1.1 SIP compression

If in normal operation the UE generates requests or responses containing a P-Access-Network-Info header field which included a value of "3GPP-GERAN","3GPP-UTRAN-FDD", "3GPP-UTRAN-TDD", "3GPP-E-UTRAN-FDD", "3GPP-E-UTRAN-TDD", "3GPP2-1X", "3GPP2-1X-HRPD", "3GPP2-UMB", "IEEE-802.11", "IEEE-802.11a", "IEEE-802.11b" or "IEEE-802.11g", or "IEEE-802.11n", then the UE shall support:

- SigComp as specified in RFC 3320 [32] and as updated by RFC 4896 [118]; and
- the additional requirements specified in RFC 5049 [79], with the exception that the UE shall take a State Memory Size of at least 4096 bytes as a minimum value.

If in normal operation the UE generates requests or responses containing a P-Access-Network-Info header field which included a value of "3GPP-GERAN","3GPP-UTRAN-FDD", "3GPP-UTRAN-TDD", "3GPP-E-UTRAN-FDD", "3GPP-E-UTRAN-TDD", "3GPP2-1X", "3GPP2-1X-HRPD", "3GPP2-UMB", "IEEE-802.11", "IEEE-802.11a", "IEEE-802.11b" or "IEEE-802.11g", or "IEEE-802.11n", then the UE may support:

- the negative acknowledgement mechanism specified in RFC 4077 [65A].

When using SigComp the UE shall send compressed SIP messages in accordance with RFC 3486 [55]. When the UE will create the compartment is implementation specific, but the compartment shall not be created until a set of security associations or a TLS session is set up if signalling security is in use. The UE shall finish the compartment when the UE is deregistered. The UE shall alow state creations and announcements only for messages received in a security association.

NOTE: Exchange of bytecodes during registration will prevent unnecessary delays during session setup.

If the UE supports SigComp:

- the UE shall support the SIP dictionary specified in RFC 3485 [42] and as updated by RFC 4896 [118]. If compression is enabled, the UE shall use the dictionary to compress the first message; and
- if the UE supports the presence user agent or watcher roles as specified in table A.3A/2 and table A.3A/4, the UE may support the presence specific dictionary specified in RFC 5112 [119].

8.1.2 Compression of SIP requests and responses transmitted to the P-CSCF

If in normal operation the UE generates requests or responses containing a P-Access-Network-Info header field which included a value of "3GPP-GERAN","3GPP-UTRAN-FDD", "3GPP-UTRAN-TDD", "3GPP-E-UTRAN-FDD", "3GPP-E-UTRAN-TDD", "3GPP2-1X", "3GPP2-1X-HRPD", "3GPP2-UMB", "IEEE-802.11", "IEEE-802.11a", "IEEE-802.11b" or IEEE-802.11g", or "IEEE-802.11n", then the UE should compress the requests and responses transmitted to the P-CSCF according to subclause 8.1.1. In other cases where SigComp is supported, it need not.

NOTE 1: Compression of SIP messages is an implementation option. However, compression is strongly recommended.

NOTE 2: In an IP-CAN where compression support is mandatory, the UE may send even the first message compressed. Sigcomp provides mechanisms to allow the UE to know if state has been created in the P-CSCF or not.

8.1.3 Decompression of SIP requests and responses received from the P-CSCF

If the UE supports SigComp, then theUE shall decompress the compressed requests and responses received from the P-CSCF according to subclause 8.1.1.

If the UE detects a decompression failure at the P-CSCF, the recovery mechanism is implementation specific.

8.2 SIP compression procedures at the P-CSCF

8.2.1 SIP compression

The P-CSCF shall support:

- SigComp as specified in RFC 3320 [32] and as updated by RFC 4896 [118]; and
- the additional requirements specified in RFC 5049 [79], with the exception that the P-CSCF shall take a State Memory Size of at least 4096 bytes as a minimum value.

The P-CSCF may support:

- the negative acknowledgement mechanism specified in RFC 4077 [65A].

When using SigComp the P-CSCF shall send compressed SIP messages in accordance with RFC 3486 [55]. When the P-CSCF will create the compartment is implementation specific, but the compartment shall not be created until a set of security associations are set up. The P-CSCF shall finish the compartment when the UE is deregistered. The P-CSCF shall allow state creations and announcements only for messages received in a security association.

The P-CSCF:

- shall support the SIP dictionary specified in RFC 3485 [42] and as updated by RFC 4896 [118]. If compression is enabled, the P-CSCF shall use the dictionary to compress the first message; and
- may support the presence specific dictionary specified in RFC 5112 [119].

NOTE: Exchange of bytecodes during registration will prevent unnecessary delays during session setup.

8.2.2 Compression of SIP requests and responses transmitted to the UE

The P-CSCF should compress the requests and responses transmitted to the UE according to subclause 8.2.1.

For all SIP transactions on a specific security association where the security association was established using a REGISTER request from the UE containing a P-Access-Network-Info header field which included a value of "3GPP-GERAN","3GPP-UTRAN-FDD", "3GPP-UTRAN-TDD", "3GPP-E-UTRAN-FDD", "3GPP-E-UTRAN-TDD", "3GPP2-1X", "3GPP2-1X-HRPD", "3GPP2-UMB", "IEEE-802.11", "IEEE-802.11a", "IEEE-802.11b" or "IEEE-802.11g", or "IEEE-802.11n", then the P-CSCF should compress the requests and responses transmitted to the UE according to subclause 8.2.1. In other cases where SigComp is supported, it need not.

NOTE: Compression of SIP messages is an implementation option. However, compression is strongly recommended.

8.2.3 Decompression of SIP requests and responses received from the UE

The P-CSCF shall decompress the compressed requests and responses received from the UE according to subclause 8.2.1.

If the P-CSCF detects a decompression failure at the UE, the recovery mechanism is implementation specific.

9 IP-Connectivity Access Network aspects when connected to the IM CN subsystem

9.1 Introduction

A UE accessing the IM CN subsystem and the IM CN subsystem itself utilises the services supported by the IP-CAN to provide packet-mode communication between the UE and the IM CN subsystem. General requirements for the UE on the use of these packet-mode services are specified in this clause.

Possible aspects particular to each IP-CAN is described separately for each IP-CAN.

9.2 Procedures at the UE

9.2.1 Connecting to the IP-CAN and P-CSCF discovery

Prior to communication with the IM CN subsystem, the UE shall:

a) establish a connection with the IP-CAN;

b) obtain an IP address using either the standard IETF protocols (e.g., DHCP or IPCP) or a protocol that is particular to the IP-CAN technology that the UE is utilising. The UE shall fix the obtained IP address throughout the period the UE is connected to the IM CN subsystem, i.e. from the initial registration and at least until the last deregistration; and

c) acquire a P-CSCF address(es).

The UE may acquire an IP address via means other than the DHCP. In this case, upon acquiring an IP address, the UE shall request the configuration information (that includes the DNS and P-CSCF addresses) from the DHCP server through a single request and reply exchanged with the DHCP server.

The methods for acquiring a P-CSCF address(es) are:

I. Employ Dynamic Host Configuration Protocol for IPv4 RFC 2131 [40A] or for IPv6 (DHCPv6) RFC 3315 [40]. Employ the DHCP options for SIP servers RFC 3319 [41] or, for IPv6, RFC 3361 [35A]. Employ the DHCP options for Domain Name Servers (DNS) RFC 3646 [56C].

The UE shall either:

- in the DHCP query, request a list of SIP server domain names of P-CSCF(s) and the list of Domain Name Servers (DNS); or

- request a list of SIP server IP addresses of P-CSCF(s).

II. Obtain the P-CSCF address(es) by employing a procedure that the IP-CAN technology supports. (e.g. GPRS).

III. The UE may use pre-configured P-CSCF address(es) (IP address or domain name). For example:

a. The UE selects a P-CSCF from the list stored in ISIM or IMC;

b. The UE selects a P-CSCF from the list in IMS management object.

NOTE: Access-specific annexes provide additional guidance on the method to be used by the UE to acquire P-CSCF address(es).

When acquiring a P-CSCF address(es), the UE can freely select either method I or II or III.

The UE may also request a DNS Server IP address(es) as specified in RFC 3315 [40] and RFC 3646 [56C] or RFC 2131 [40A].

9.2.2 Handling of the IP-CAN

The means to ensure that appropriate resources are available for the media flow(s) on the IP-CAN(s) related to a SIP session is dependant on the characteristics for each IP-CAN, and is described separately for each IP-CAN in question.

GPRS is described in annex B. I-WLAN is described in annex D. xDSL is described in annex E. DOCSIS is described in Annex H. EPS is described in annex L. cdma2000® packet data subsystem is is described in Annex M. If a particular handling of the IP-CAN is needed for emergency calls, this is described in the annex for each access technology.

9.2.3 Special requirements applying to forked responses

Since the UE does not know that forking has occurred until a second provisional response arrives, the UE will request the radio/bearer resources as required by the first provisional response. For each subsequent provisional response that may be received, different alternative actions may be performed depending on the requirements in the SDP answer:

- the UE has sufficient radio/bearer resources to handle the media specified in the SDP of the subsequent provisional response, or

- the UE must request additional radio/bearer resources to accommodate the media specified in the SDP of the subsequent provisional response.

NOTE 1: When several forked responses are received, the resources requested by the UE is the "logical OR" of the resources indicated in the multiple responses to avoid allocation of unnecessary resources. The UE does not request more resources than proposed in the original INVITE request.

NOTE 2: When service-based local policy is applied, the UE receives the same authorization token for all forked requests/responses related to the same SIP session.

When an 199 (Early Dialog Terminated) response for the INVITE request is received for an early dialogue, the UE shall release reserved radio/bearer resources associated with that early dialogue.

When the first final 200 (OK) response for the INVITE request is received for one of the early dialogues, the UE proceeds to set up the SIP session using the radio/bearer resources required for this session. Upon the reception of the first final 200 (OK) response for the INVITE request, the UE shall release all unneeded radio/bearer resources.

10 Media control

10.1 General

The choice of which media control methods below to use is service specific, it depends on the functionality required and physical deployment architectures.

Combinations of the capabilities below are supported by the use of the control channel framework RFC 6230 [146] with associated media control packages.

For security, the principles and protocols described in 3GPP TS 33.210 [19A] shall take precedence over those specified in the referenced specifications in this clause.

For codecs, those described in access specific specifications shall take precedence over those specified in the referenced specifications in this clause.

10.2 Procedures at the AS

10.2.1 General

An AS requesting charging information and authorisation for specific media operations and media usage controlled by the MRFC shall use RFC 6230 [146] together with appropriate packages.

NOTE: This is in addition to the charging related procedures in clause 5 and to the charging information and authorisation requests, defined in 3GPP TS 32.260 [17] which provide charging information and authorisation for SIP session and SDP information.

An AS may support delegation of an XML (such as CCXML or SCXML) script execution to an MRFC. An AS supporting delegation of XML script execution shall use RFC 6230 [146] together with appropriate packages.

The packages, or extensions to existing packages using the RFC 6230 [146] framework are not specified in this release.

10.2.2 Tones and announcements

10.2.2.1 General

An AS may support control of the MRFC for tones and announcements. An AS supporting control of the MRFC for tones and announcements shall support one or more of the following methods:

- RFC 4240 [144] announcement service;
- RFC 5552 [145]; or
- RFC 6230 [146] and RFC 6231 [147].

10.2.2.2 Basic network media services with SIP

The AS may support control of the MRFC for basic announcements by the use of RFC 4240 [144] and the announcement service described in RFC 4240 [144] subclause 3.

The media control commands are carried between the AS and the MRFC (via the S-CSCF) over the ISC and Mr interfaces.

The AS shall provide remote prompts to the MRFC using the AS-MRFC Cr interface.

10.2.2.3 SIP interface to VoiceXML media services

The AS may support control of the MRFC for voice dialogs by the use of RFC 5552 [145].

The media control commands are carried between the AS and the MRFC (via the S-CSCF) over the ISC and Mr interfaces.

The AS shall provide remote prompts and scripts to the MRFC using the AS-MRFC Cr interface.

Data shall be returned to the AS from the MRFC by either use of the AS-MRFC Cr interface (subclause 4.1 of RFC 5552 [145]) or via the ISC interface (subclause 4.2 of RFC 5552 [145]).

10.2.2.4 Media control channel framework and packages

The AS may support control of the MRFC for interactive voice response by the use of RFC 6231 [147] and RFC 6230 [146].

The AS shall provide remote prompts, media control commands and scripts to the MRFC using the AS-MRFC Cr interface.

The AS shall implement the control client role as described in RFC 6230 [146].

10.2.3 Ad-hoc conferences

10.2.3.1 General

An AS may support control of the MRFC for ad-hoc conferencing. An AS supporting control of the MRFC for ad-hoc conferencing shall support one or more of the following methods:

- RFC 4240 [144] conference service; or

- RFC 6230 [146] and RFC 6505 [148].

10.2.3.2 Basic network media services with SIP

The AS may support control of the MRFC for basic conferencing by the use of RFC 4240 [144] and the conference service described in RFC 4240 [144] subclause 5.

The media control commands are carried between the AS and the MRFC (via the S-CSCF) over the ISC and Mr interfaces.

10.2.3.3 Media control channel framework and packages

The AS may support control of the MRFC for conference mixing by the use of RFC 6505 [148] and RFC 6230 [146].

An AS may support control of the MRFC for floor controlled conferences (as specified in 3GPP TS 24.147 [8B]), via the use of RFC 6230 [146] together with appropriate packages. The packages, or extensions to existing packages using the RFC 6230 [146] framework are not specified in this release.

An AS may support control of the MRFC for session-mode messaging conferences (as specified in 3GPP TS 24.247 [8F]), via the use of RFC 6230 [146] together with appropriate packages. The packages, or extensions to existing packages using the RFC 6230 [146] framework are not specified in this release.

The AS shall provide media control commands to the MRFC using the AS-MRFC Cr interface.

The AS shall implement the control client role as described in RFC 6230 [146].

10.2.4 Transcoding

10.2.4.1 General

An AS may support control of the MRFC for transcoding. An AS supporting control of the MRFC for transcoding shall support one or more of the following methods:

- RFC 4240 [144] conference service; or

- RFC 6230 [146] and RFC 6505 [148].

10.2.4.2 Basic network media services with SIP

The AS may support control of the MRFC for transcoding by the use of RFC 4240 [144] and the conference service described in RFC 4240 [144] subclause 5.

The media control commands are carried between the AS and the MRFC (via the S-CSCF) over the ISC and Mr interfaces.

10.2.4.3 Media control channel framework and packages

The AS may support control of the MRFC for transcoding by the use of RFC 6505 [148] and RFC 6230 [146].

The AS shall provide media control commands to the MRFC using the AS-MRFC Cr interface.

The AS shall implement the control client role as described in RFC 6230 [146].

10.3 Procedures at the MRFC

10.3.1 General

An MRFC required to generate charging information and authorize requests from an AS for specific media operations and media usage shall support RFC 6230 [146] together with appropriate packages.

NOTE: This is in addition to the charging related procedures in clause 5 and to the charging information and authorisation requests, defined in 3GPP TS 32.260 [17] which provide charging information and authorisation for SIP session and SDP information.

An MRFC may support delegated XML (such as CCXML or SCXML) script execution from an AS. An MRFC supporting delegation of XML script execution shall use RFC 6230 [146] together with appropriate packages.

The packages, or extensions to existing packages using the RFC 6230 [146] framework above are not specified in this release.

10.3.2 Tones and announcements

10.3.2.1 General

An MRFC may support control of tones and announcements. An MRFC supporting control of tones and announcements shall support one or more of the following methods:

- RFC 4240 [144] announcement service;
- RFC 5552 [145]; or
- RFC 6230 [146] and RFC 6231 [147].

10.3.2.2 Basic network media services with SIP

The MRFC may support control of basic announcements by the use of RFC 4240 [144] and the announcement service described in RFC 4240 [144] subclause 3.

The media control commands are received from the AS (via the S-CSCF) over the ISC and Mr interfaces.

The MRFC shall fetch remote prompts from the AS using the AS-MRFC Cr interface.

The MRFC acts as the media server described in RFC 4240 [144].

10.3.2.3 SIP interface to VoiceXML media services

The MRFC may support control of voice dialogs by the use of RFC 5552 [145].

The media control commands are received from the AS (via the S-CSCF) over the ISC and Mr interfaces.

The MRFC shall fetch remote prompts and scripts from the MRFC using the AS-MRFC Cr interface.

Data shall be returned to the AS from the MRFC by either use of the AS-MRFC Cr interface (subclause 4.1 of RFC 5552 [145]) or via the ISC interface (subclause 4.2 of RFC 5552 [145]).

The MRFC acts as the VoiceXML media server described in RFC 5552 [145].

10.3.2.4 Media control channel framework and packages

The MRFC may support control of interactive voice response by the use of RFC 6231 [147] and RFC 6230 [146].

The MRFC shall fetch remote prompts and scripts from the MRFC using the AS-MRFC Cr interface. The MRFC shall send media control command responses and notifications to the AS using the AS-MRFC Cr interface.

The MRFC shall implement the control server role as described in RFC 6230 [146].

10.3.3 Ad-hoc conferences

10.3.3.1 General

An MRFC may support control of ad-hoc conferencing. An MRFC supporting control of ad-hoc conferencing shall support one or more of the following methods:

- RFC 4240 [144] conference service; or
- RFC 6230 [146] and RFC 6505 [148].

10.3.3.2 Basic network media services with SIP

The MRFC may support control of basic conferencing by the use of RFC 4240 [144] and the conference service described in RFC 4240 [144] subclause 5.

The media control commands are received from the AS (via the S-CSCF) over the ISC and Mr interfaces.

The MRFC acts as the media server described in RFC 4240 [144].

10.3.3.3 Media control channel framework and packages

The MRFC may support control of conference mixing by the use of RFC 6505 [148] and RFC 6230 [146].

An MRFC may support control of floor controlled conferences (as specified in 3GPP TS 24.147 [8B]), via the use of RFC 6230 [146] together with appropriate packages. The packages, or extensions to existing packages using the RFC 6230 [146] framework are not specified in this release.

An MRFC may support control of session-mode messaging conferences (as specified in 3GPP TS 24.247 [8F]), via the use of RFC 6230 [146] together with appropriate packages. The packages, or extensions to existing packages using the RFC 6230 [146] framework are not specified in this release.

The MRFC shall send media control command responses and notifications to the AS using the AS-MRFC Cr interface.

The MRFC shall implement the control server role as described in RFC 6230 [146].

10.3.4 Transcoding

10.3.4.1 General

An MRFC may support control of transcoding. An MRFC supporting control of transcoding shall support one or more of the following methods:

- RFC 4240 [144] conference service; or
- RFC 6230 [146] and RFC 6505 [148].

10.3.4.2 Basic network media services with SIP

The MRFC may support control of transcoding by the use of RFC 4240 [144] and the conference service described in RFC 4240 [144] subclause 5.

The media control commands are received from the AS (via the S-CSCF) over the ISC and Mr interfaces.

The MRFC acts as the media server described in RFC 4240 [144].

10.3.4.3 Media control channel framework and packages

The MRFC may support control of transcoding by the use of RFC 6505 [148] and RFC 6230 [146].

The MRFC shall send media control command responses and notifications to the AS using the AS-MRFC Cr interface.

The MRFC shall implement the control server role as described in RFC 6230 [146].

Annex A (normative): Profiles of IETF RFCs for 3GPP usage

A.1 Profiles

A.1.1 Relationship to other specifications

This annex contains a profile to the IETF specifications which are referenced by this specification, and the PICS proformas underlying profiles do not add requirements to the specifications they are proformas for.

This annex provides a profile specification according to both the current IETF specifications for SIP, SDP and other protocols (as indicated by the "RFC status" column in the tables in this annex) which are referenced by this specification and to the 3GPP specifications using SIP (as indicated by the "Profile status" column in the tables in this annex.

In the "RFC status" column the contents of the referenced specification takes precedence over the contents of the entry in the column.

In the "Profile status" column, there are a number of differences from the "RFC status" column. Where these differences occur, these differences take precedence over any requirements of the IETF specifications. Where specification concerning these requirements exists in the main body of the present document, the main body of the present document takes precedence.

Where differences occur in the "Profile status" column, the "Profile status" normally gives more strength to a "RFC status" and is not in contradiction with the "RFC status", e.g. it may change an optional "RFC status" to a mandatory "Profile status". If the "Profile status" weakens the strength of a "RFC status" then additionally this will be indicated by further textual description in the present document.

For all IETF specifications that are not referenced by this document or that are not mentioned within the 3GPP profile of SIP and SDP, the generic rules as defined by RFC 3261 [26] and in addition the rules in clauses 5 and 6 of this specification apply, e.g..

- a proxy which is built in accordance to this specification passes on any unknown method, unknown header field or unknown header field parameter after applying procedures such as filtering, insertion of P-Asserted-Identity header field, etc.;

- an UA which is built in accordance to this specification will

    - handle received unknown methods in accordance to the procedures defined in RFC 3261 [26], e.g. respond with a 501 (Not Implemented) response; and

    - handle unknown header fields and unknown header field parameters in accordance to the procedures defined in RFC 3261 [26], e.g. respond with a 420 (Bad Extension) if an extension identified by an option-tag in the Require header field of the received request is not supported by the UA.

A.1.2 Introduction to methodology within this profile

This subclause does not reflect dynamic conformance requirements but static ones. In particular, a condition for support of a PDU parameter does not reflect requirements about the syntax of the PDU (i.e. the presence of a parameter) but the capability of the implementation to support the parameter.

In the sending direction, the support of a parameter means that the implementation is able to send this parameter (but it does not mean that the implementation always sends it).

In the receiving direction, it means that the implementation supports the whole semantic of the parameter that is described in the main part of this specification.

As a consequence, PDU parameter tables in this subclause are not the same as the tables describing the syntax of a PDU in the reference specification, e.g. RFC 3261 [26] tables 2 and 3. It is not rare to see a parameter which is optional in the syntax but mandatory in subclause below.

The various statii used in this subclause are in accordance with the rules in table A.1.

Table A.1: Key to status codes

Status code	Status name	Meaning
m	mandatory	the capability shall be supported. It is a static view of the fact that the conformance requirements related to the capability in the reference specification are mandatory requirements. This does not mean that a given behaviour shall always be observed (this would be a dynamic view), but that it shall be observed when the implementation is placed in conditions where the conformance requirements from the reference specification compel it to do so. For instance, if the support for a parameter in a sent PDU is mandatory, it does not mean that it shall always be present, but that it shall be present according to the description of the behaviour in the reference specification (dynamic conformance requirement).
o	optional	the capability may or may not be supported. It is an implementation choice.
n/a	not applicable	it is impossible to use the capability. No answer in the support column is required.
x	prohibited (excluded)	It is not allowed to use the capability. This is more common for a profile.
c <integer>	conditional	the requirement on the capability ("m", "o", "n/a" or "x") depends on the support of other optional or conditional items. <integer> is the identifier of the conditional expression.
o.<integer>	qualified optional	for mutually exclusive or selectable options from a set. <integer> is the identifier of the group of options, and the logic of selection of the options.
i	irrelevant	capability outside the scope of the given specification. Normally, this notation should be used in a base specification ICS proforma only for transparent parameters in received PDUs. However, it may be useful in other cases, when the base specification is in fact based on another standard.

In the context of this specification the "i" status code mandates that the implementation does not change the content of the parameter. It is an implementation option if the implementation acts upon the content of the parameter (e.g. by setting filter criteria to known or unknown parts of parameters in order to find out the route a message has to take).

It must be understood, that this 3GPP SIP profile does not list all parameters which an implementation will treat as indicated by the status code "irrelevant". In general an implementation will pass on all unknown messages, header fields and header field parameters, as long as it can perform its normal behaviour.

The following additional comments apply to the interpretation of the tables in this Annex.

NOTE 1: The tables are constructed according to the conventional rules for ICS proformas and profile tables.

NOTE 2: The notation (either directly or as part of a conditional) of "m" for the sending of a parameter and "i" for the receipt of the same parameter, may be taken as indicating that the parameter is passed on transparently, i.e. without modification. Where a conditional applies, this behaviour only applies when the conditional is met.

As an example, the profile for the MGCF is found by first referring to clause 4.1, which states "The MGCF shall provide the UA role". Profiles are divided at the top level into the two roles in table A.2, user agent and proxy. The UA role is defined in subclause A.2.1 and the proxy role is defined in subclause A.2.2. More specific roles are listed in table A.3, table A.3A, table A.3B and table A.3C. The MGCF role is item 6 in table A.3 (the MGCF role is not found in table A.3A or table A.3B). Therefore, all profile entries for the MGCF are found by searching for A.3/6 in subclause A.2.1.

As a further example, to look up support of the Reason header field, table A.4 item 38 lists the Resaon header field as a major capability that is optional for the user agent role. A subsequent search for A.4/38 in subclause A.2.1 shows that the Reason header field is optional for a user agent role to send and receive for ACK, BYE, CANCEL, INVITE, MESSAGE, NOTIFY, OPTIONS, PRACK, PUBLISH, REFER, REGISTER, SUBSCRIBE, and UPDATE requests. Also, table A.162 item 48 lists the Reason header field as a major capability that is optional for the proxy role. A subsequent search for A.162/48 in subclause A.2.2 shows that, if supported, the Reason header field is mandatory to send and irrelevant to receive for ACK, BYE, CANCEL, INVITE, MESSAGE, NOTIFY, OPTIONS, PRACK, PUBLISH, REFER, REGISTER, SUBSCRIBE, and UPDATE requests.

A.1.3 Roles

Table A.2: Roles

Item	Roles	Reference	RFC status	Profile status
1	User agent	[26]	o.1	o.1
2	Proxy	[26]	o.1	o.1
o.1:	It is mandatory to support exactly one of these items.			
NOTE:	For the purposes of the present document it has been chosen to keep the specification simple by the tables specifying only one role at a time. This does not preclude implementations providing two roles, but an entirely separate assessment of the tables shall be made for each role.			

Table A.3: Roles specific to this profile

Item	Roles	Reference	RFC status	Profile status
1	UE	5.1	n/a	o.1
1A	UE containing UICC	5.1	n/a	c5
1B	UE without UICC	5.1	n/a	c5
2	P-CSCF	5.2	n/a	o.1
3	I-CSCF	5.3	n/a	o.1
3A	void			
4	S-CSCF	5.4	n/a	o.1
5	BGCF	5.6	n/a	o.1
6	MGCF	5.5	n/a	o.1
7	AS	5.7	n/a	o.1
7A	AS acting as terminating UA, or redirect server	5.7.2	n/a	c2
7B	AS acting as originating UA	5.7.3	n/a	c2
7C	AS acting as a SIP proxy	5.7.4	n/a	c2
7D	AS performing 3rd party call control	5.7.5	n/a	c2
8	MRFC	5.8	n/a	o.1
9	IBCF	5.10	n/a	o.1
9A	IBCF (THIG)	5.10.4	n/a	c4
9B	IBCF (IMS-ALG)	5.10.5, 5.10.7	n/a	c4
9C	IBCF (Screening of SIP signalling)	5.10.6	n/a	c4
10	Additional routeing functionality	Annex I	n/a	c3
11	E-CSCF	5.11	n/a	o.1
c2:	IF A.3/7 THEN o.2 ELSE n/a - - AS.			
c3:	IF A.3/3 OR A.3/4 OR A.3/5 OR A.3/6 OR A.3/9 THEN o ELSE o.1 - - I-CSCF, S-CSCF, BGCF, MGCF, IBCF.			
c4:	IF A.3/9 THEN o.3 ELSE n/a - - IBCF.			
c5:	IF A.3/1 THEN o.4 ELSE n/a - - UE.			
o.1:	It is mandatory to support exactly one of these items.			
o.2:	It is mandatory to support at least one of these items.			
o.3:	It is mandatory to support at least one of these items.			
o.4	It is mandatory to support exactly one of these items.			
NOTE:	For the purposes of the present document it has been chosen to keep the specification simple by the tables specifying only one role at a time. This does not preclude implementations providing two roles, but an entirely separate assessment of the tables shall be made for each role.			

Table A.3A: Roles specific to additional capabilities

Item	Roles	Reference	RFC status	Profile status
1	Presence server	3GPP TS 24.141 [8A]	n/a	c1
2	Presence user agent	3GPP TS 24.141 [8A]	n/a	c2
3	Resource list server	3GPP TS 24.141 [8A]	n/a	c3
4	Watcher	3GPP TS 24.141 [8A]	n/a	c4
11	Conference focus	3GPP TS 24.147 [8B]	n/a	c11
12	Conference participant	3GPP TS 24.147 [8B]	n/a	c6
21	CSI user agent	3GPP TS 24.279 [8E]	n/a	c7
22	CSI application server	3GPP TS 24.279 [8E]	n/a	c8
31	Messaging application server	3GPP TS 24.247 [8F]	n/a	c5
32	Messaging list server	3GPP TS 24.247 [8F]	n/a	c5
33	Messaging participant	3GPP TS 24.247 [8F]	n/a	c2
33A	Page-mode messaging participant	3GPP TS 24.247 [8F]	n/a	c2
33B	Session-mode messaging participant	3GPP TS 24.247 [8F]	n/a	c2
34	Session-mode messaging intermediate node	3GPP TS 24.247 [8F]	n/a	c5
50	Multimedia telephony service participant	3GPP TS 24.173 [8H]	n/a	c2
50A	Multimedia telephony service application server	3GPP TS 24.173 [8H]	n/a	c9
51	Message waiting indication subscriber UA	3GPP TS 24.606 [8I]	n/a	c2
52	Message waiting indication notifier UA	3GPP TS 24.606 [8I]	n/a	c3
53	Advice of charge application server	3GPP TS 24.647 [8N]	n/a	c8
54	Advice of charge UA client	3GPP TS 24.647 [8N]	n/a	c2
61	SM-over-IP sender	3GPP TS 24.341 [8L]	n/a	c2
62	SM-over-IP receiver	3GPP TS 24.341 [8L]	n/a	c2
63	IP-SM-GW	3GPP TS 24.341 [8L]	n/a	c1
71	IP-SM-GW	3GPP TS 29.311 [15A]	n/a	c10
81	MSC Server enhanced for ICS	3GPP TS 24.292 [8O]	n/a	c12
82	ICS user agent	3GPP TS 24.292 [8O]	n/a	c2
83	SCC application server	3GPP TS 24.292 [8O]	n/a	c9
85	In-dialog overlap signalling application server	Annex N.2, Annex N.3.3	n/a	c9
86	In-dialog overlap signalling UA client	Annex N.2, Annex N.3.3	n/a	c2
91	Malicious communication identification application server	3GPP TS 24.616 [8S]	n/a	c9

c1:	IF A.3/7A AND A.3/7B THEN o ELSE n/a - - AS acting as terminating UA, or redirect server and AS acting as originating UA.
c2:	IF A.3/1 THEN o ELSE n/a - - UE.
c3:	IF A.3/7A THEN o ELSE n/a - - AS acting as terminating UA, or redirect server.
c4:	IF A.3/1 OR A.3/7B THEN o ELSE n/a - - UE or AS acting as originating UA.
c5:	IF A.3/7D AND A.3/8 THEN o ELSE n/a - - AS performing 3rd party call control and MRFC (note 2).
c6:	IF A.3/1 OR A.3A/11 THEN o ELSE n/a - - UE or conference focus.
c7:	IF A.3/1 THEN o ELSE n/a - - UE.
c8:	IF A.3/7D THEN o ELSE n/a - - AS performing 3rd party call control.
c9:	IF A.3/7A OR A.3/7B OR A.3/7C OR A.3/7D THEN o ELSE n/a - - AS acting as terminating UA, or redirect server, AS acting as originating UA, AS acting as a SIP proxy, AS performing 3rd party call control.
c10:	IF A.3/7A OR A.3/7B OR A.3/7D THEN o ELSE n/a - - AS acting as terminating UA, or redirect server, AS acting as originating UA, AS performing 3rd party call control.
c11:	IF A.3/7D THEN o ELSE n/a - - AS performing 3rd party call control.
c12:	IF A.2/1 THEN o ELSE n/a - - UA.
NOTE 1:	For the purposes of the present document it has been chosen to keep the specification simple by the tables specifying only one role at a time. This does not preclude implementations providing two roles, but an entirely separate assessment of the tables shall be made for each role.
NOTE 2:	The functional split between the MRFC and the AS for page-mode messaging is out of scope of this document and they are assumed to be collocated.
NOTE 3:	A.3A/63 is an AS providing the IP-SM-GW role to support the transport level interworking defined in 3GPP TS 24.341 [8L]. A.3A/71 is an AS providing the IP-SM-GW role to support the service level interworking for messaging as defined in 3GPP TS 29.311 [15A].

Table A.3B: Roles with respect to access technology

Item	Value used in P-Access-Network-Info header field	Reference	RFC status	Profile status
1	3GPP-GERAN	[52] 4.4	o	c1
2	3GPP-UTRAN-FDD	[52] 4.4	o	c1
3	3GPP-UTRAN-TDD	[52] 4.4	o	c1
4	3GPP2-1X	[52] 4.4	o	c1
5	3GPP2-1X-HRPD	[52] 4.4	o	c1
6	3GPP2-UMB	[52] 4.4	o	c1
7	3GPP-E-UTRAN-FDD	[52] 4.4	o	c1
8	3GPP-E-UTRAN-TDD	[52] 4.4	o	c1
11	IEEE-802.11	[52] 4.4	o	c1
12	IEEE-802.11a	[52] 4.4	o	c1
13	IEEE-802.11b	[52] 4.4	o	c1
14	IEEE-802.11g	[52] 4.4	o	c1
15	IEEE-802.11n	[52] 4.4	o	c1
21	ADSL	[52] 4.4	o	c1
22	ADSL2	[52] 4.4	o	c1
23	ADSL2+	[52] 4.4	o	c1
24	RADSL	[52] 4.4	o	c1
25	SDSL	[52] 4.4	o	c1
26	HDSL	[52] 4.4	o	c1
27	HDSL2	[52] 4.4	o	c1
28	G.SHDSL	[52] 4.4	o	c1
29	VDSL	[52] 4.4	o	c1
30	IDSL	[52] 4.4	o	c1
41	DOCSIS	[52] 4.4	o	c1
c1:	If A.3/1 OR A.3/2 THEN o.1 ELSE n/a - - UE or P-CSCF.			
o.1:	It is mandatory to support at least one of these items.			

Table A.3C: Modifying roles

Item	Roles	Reference	RFC status	Profile status
1	UE performing the functions of an external attached network	4.1		
NOTE:	This table identifies areas where the behaviour is modified from that of the underlying role. Subclause 4.1 indicates which underlying roles are modified for this behaviour.			

Table A.3D: Roles with respect to security mechanism

Item	Security mechanism	Reference	RFC status	Profile status
1	IMS AKA plus IPsec ESP	clause 4.2B	n/a	c1
2	SIP digest plus check of IP association	clause 4.2B	n/a	c2
3	SIP digest plus Proxy Authentication	clause 4.2B	n/a	c2
4	SIP digest with TLS	clause 4.2B	n/a	c2
5	NASS-IMS bundled authentication	clause 4.2B	n/a	c2
6	GPRS-IMS-Bundled authentication	clause 4.2B	n/a	c2
7	Authentication already performed by preceding node	clause 4.2B	n/a	c3
c1:	IF (A.3/1A OR A.3/2 OR A.3/3 OR A.3/4) THEN m ELSE IF A.3/1B THEN o ELSE n/a - - UE containing UICC or P-CSCF or I-CSCF or S-CSCF, UE without UICC.			
c2	IF (A.3/1 OR A.3/2 OR A.3/3 OR A.3/4) THEN o ELSE n/a - - UE or P-CSCF or I-CSCF or S-CSCF.			
c3	IF (A.3/3 OR A.3/4) THEN o ELSE n/a - - I-CSCF or S-CSCF.			

A.2 Profile definition for the Session Initiation Protocol as used in the present document

A.2.1 User agent role

A.2.1.1 Introduction

This subclause contains the ICS proforma tables related to the user role. They need to be completed only for UA implementations:

Prerequisite: A.2/1 - - user agent role.

A.2.1.2 Major capabilities

Table A.4: Major capabilities

Item	Does the implementation support	Reference	RFC status	Profile status
	Capabilities within main protocol			
1	client behaviour for registration?	[26] subclause 10.2	o	c3
2	registrar?	[26] subclause 10.3	o	c4
2A	registration of multiple contacts for a single address of record	[26] 10.2.1.2, 16.6	o	o
2B	initiating a session?	[26] subclause 13	o	o
2C	initiating a session which require local and/or remote resource reservation?	[27]	o	c43
3	client behaviour for INVITE requests?	[26] subclause 13.2	c18	c18
4	server behaviour for INVITE requests?	[26] subclause 13.3	c18	c18
5	session release?	[26] subclause 15.1	c18	c18
6	timestamping of requests?	[26] subclause 8.2.6.1	o	o
7	authentication between UA and UA?	[26] subclause 22.2	c34	c34
8	authentication between UA and registrar?	[26] subclause 22.2	o	c74
8A	authentication between UA and proxy?	[26] 20.28, 22.3	o	c75
9	server handling of merged requests due to forking?	[26] 8.2.2.2	m	m
10	client handling of multiple responses due to forking?	[26] 13.2.2.4	m	m
11	insertion of date in requests and responses?	[26] subclause 20.17	o	o
12	downloading of alerting information?	[26] subclause 20.4	o	o
	Extensions			
13	SIP INFO method and package framework?	[25]	o	o
13A	legacy INFO usage?	[25] 2, 3	o	c90
14	reliability of provisional responses in SIP?	[27]	c19	c44
15	the REFER method?	[36]	o	c33
16	integration of resource management and SIP?	[30] [64]	c19	c44
17	the SIP UPDATE method?	[29]	c5	c44
19	SIP extensions for media authorization?	[31]	o	c14
20	SIP specific event notification?	[28]	o	c13
21	the use of NOTIFY to establish a dialog?	[28] 4.2	o	n/a
22	acting as the notifier of event information?	[28]	c2	c15
23	acting as the subscriber to event information?	[28]	c2	c16
24	session initiation protocol extension header field for registering non-adjacent contacts?	[35]	o	c6
25	private extensions to the Session Initiation Protocol (SIP) for network asserted identity within trusted networks?	[34]	o	m
26	a privacy mechanism for the Session Initiation Protocol (SIP)?	[33]	o	m
26A	request of privacy by the inclusion of a Privacy header indicating any privacy option?	[33]	c9	c11
26B	application of privacy based on the received Privacy header?	[33]	c9	n/a
26C	passing on of the Privacy header transparently?	[33]	c9	c12
26D	application of the privacy option "header" such that those headers which cannot be completely expunged of identifying information without the	[33] 5.1	c10	c27

	assistance of intermediaries are obscured?			
26E	application of the privacy option "session" such that anonymization for the session(s) initiated by this message occurs?	[33] 5.2	c10	c27
26F	application of the privacy option "user" such that user level privacy functions are provided by the network?	[33] 5.3	c10	c27
26G	application of the privacy option "id" such that privacy of the network asserted identity is provided by the network?	[34] 7	c10	n/a
26H	application of the privacy option "history" such that privacy of the History-Info header is provided by the network?	[66] 7.2	c37	c37
27	a messaging mechanism for the Session Initiation Protocol (SIP)?	[50]	o	c7
28	session initiation protocol extension header field for service route discovery during registration?	[38]	o	c17
29	compressing the session initiation protocol?	[55]	o	c8
30	private header extensions to the session initiation protocol for the 3rd-Generation Partnership Project (3GPP)?	[52]	o	m
31	the P-Associated-URI header extension?	[52] 4.1	c21	c22
32	the P-Called-Party-ID header extension?	[52] 4.2	c21	c23
33	the P-Visited-Network-ID header extension?	[52] 4.3	c21	c24
34	the P-Access-Network-Info header extension?	[52] 4.4	c21	c25
35	the P-Charging-Function-Addresses header extension?	[52] 4.5	c21	c26
36	the P-Charging-Vector header extension?	[52] 4.6	c21	c26
37	security mechanism agreement for the session initiation protocol?	[48]	o	c20
38	the Reason header field for the session initiation protocol?	[34A]	o	c68
38A	carrying Q.850 codes in reason header fields in SIP (Session Initiation Protocol) responses?	[130]	o	c82
39	an extension to the session initiation protocol for symmetric response routeing?	[56A]	o	c62
40	caller preferences for the session initiation protocol?	[56B]	C29	c29
40A	the proxy-directive within caller-preferences?	[56B] 9.1	o.5	o.5
40B	the cancel-directive within caller-preferences?	[56B] 9.1	o.5	o.5
40C	the fork-directive within caller-preferences?	[56B] 9.1	o.5	o.5
40D	the recurse-directive within caller-preferences?	[56B] 9.1	o.5	o.5
40E	the parallel-directive within caller-preferences?	[56B] 9.1	o.5	o.5
40F	the queue-directive within caller-preferences?	[56B] 9.1	o.5	o.5
41	an event state publication extension to the session initiation protocol?	[70]	o	c30
42	SIP session timer?	[58]	c19	c19

43	the SIP Referred-By mechanism?	[59]	o	c33
44	the Session Inititation Protocol (SIP) "Replaces" header?	[60]	c19	c38 (note 1)
45	the Session Inititation Protocol (SIP) "Join" header?	[61]	c19	c19 (note 1)
46	the callee capabilities?	[62]	o	c35
47	an extension to the session initiation protocol for request history information?	[66]	o	o
48	Rejecting anonymous requests in the session initiation protocol?	[67]	o	o
49	session initiation protocol URIs for applications such as voicemail and interactive voice response?	[68]	o	o
50	Session Initiation Protocol's (SIP) non-INVITE transactions?	[84]	m	m
51	the P-User-Database private header extension?	[82] 4	o	c94
52	a uniform resource name for services?	[69]	n/a	c39
53	obtaining and using GRUUs in the Session Initiation Protocol (SIP)	[93]	o	c40 (note 2)
55	the Stream Control Transmission Protocol (SCTP) as a Transport for the Session Initiation Protocol (SIP)?	[96]	o	c42
56	the SIP P-Profile-Key private header extension?	[97]	n/a	n/a
57	managing client initiated connections in SIP?	[92]	o	c45
58	indicating support for interactive connectivity establishment in SIP?	[102]	o	c46
59	multiple-recipient MESSAGE requests in the session initiation protocol?	[104]	c47	c48
60	SIP location conveyance?	[89]	o	c49
61	referring to multiple resources in the session initiation protocol?	[105]	c50	c50
62	conference establishment using request-contained lists in the session initiation protocol?	[106]	c51	c52
63	subscriptions to request-contained resource lists in the session initiation protocol?	[107]	c53	c53
64	dialstring parameter for the session initiation protocol uniform resource identifier?	[103]	o	c19
65	the P-Answer-State header extension to the session initiation protocol for the open mobile alliance push to talk over cellular?	[111]	o	c60
66	the SIP P-Early-Media private header extension for authorization of early media?	[109] 8	o	c58
67	number portability parameters for the "tel" URI?	[112]	o	c54
67A	assert or process carrier indication?	[112]	o	c55
67B	local number portability?	[112]	o	c57
69	extending the session initiation protocol Reason header for preemption events	[115]	c69	c69
70	communications resource priority for the session initiation protocol?	[116]	o	c70
70A	inclusion of MESSAGE, SUBSCRIBE, NOTIFY in communications resource priority for the session initiation protocol?	[116] 4.2	c72	c72
70B	inclusion of CANCEL, BYE, REGISTER and PUBLISH in communications resource priority for the session initiation protocol?	[116] 4.2	c72	c72

71	addressing an amplification vulnerability in session initiation protocol forking proxies?	[117]	o	c87
72	the remote application identification of applying signalling compression to SIP	[79] 9.1	o	c8
73	a session initiation protocol media feature tag for MIME application subtypes?	[120]	o	c59
74	SIP extension for the identification of services?	[121]	o	c61
75	a framework for consent-based communications in SIP?	[125]	c76	c76
75A	a relay within the framework for consent-based communications in SIP?	[125]	c77	c78
75B	a recipient within the framework for consent-based communications in SIP?	[125]	c80	c79
76	a mechanism for transporting user-to-user call control information in SIP?	[126]	c109	c109 (NOTE 3)
76A	interworking ISDN call control user information with SIP?	[126A]	o	c81
77	The SIP P-Private-Network-Indication private-header (P-Header)?	[134]	o	o
78	the SIP P-Served-User private header for the 3GPP IM CN subsystem?	[133] 6	o	c93
81	the 199 (Early Dialog Terminated) response code)	[142]	o	c86
82	message body handling in SIP?	[150]	m	m
83	indication of support for keep-alive	[143]	o	c88
84	SIP Interface to VoiceXML Media Services?	[145]	o	c89
85	common presence and instant messaging (CPIM): message format?	[151]	o	c91
86	instant message disposition notification?	[157]	o	c91
87	requesting answering modes for SIP?	[158]	o	c60
89	the early session disposition type for SIP?	[74B]	o	o
92	correct transaction handling for 2xx responses to Session Initiation Protocol INVITE requests?	[163]	c18	c18
94	essential correction for IPv6 ABNF and URI comparison in RFC3261?	[165]	m	m
96	Alert-Info URNs for the Session Initiation Protocol?	[175]	o	o
97	multiple registrations?	Subclause 3.1	n/a	c103
99	request authorization through dialog Identification in the session initiation protocol?	[184]	o	c105

c2: IF A.4/20 THEN o.1 ELSE n/a - - SIP specific event notification extension.
c3: IF A.3/1 OR A.3/4 OR A.3A/81 THEN m ELSE n/a - - UE or S-CSCF functional entity or MSC Server enhanced for ICS.
c4: IF A.3/4 THEN m ELSE IF A.3/7 THEN o ELSE n/a - - S-CSCF or AS functional entity.
c5: IF A.4/16 THEN m ELSE o - - integration of resource management and SIP extension.
c6: IF A.3/4 OR A.3/1 OR A.3A/81 THEN m ELSE n/a. - - S-CSCF or UE or MSC Server enhanced for ICS.
c7: IF A.3/1 OR A.3/4 OR A.3/7A OR A.3/7B OR A.3/7D OR A.3/9B THEN m ELSE n/a - - UA or S-CSCF or AS acting as terminating UA or AS acting as originating UA or AS performing 3rd party call control or IBCF (IMS-ALG).
c8: IF A.3/1 THEN (IF (A.3B/1 OR A.3B/2 OR A.3B/3 OR A.3B/4 OR A.3B/5 OR A.3B/6 OR A.3B/7 OR A.3B/11 OR A.3B/12 OR A.3B/13 OR A.3B/14 OR A.3B/15) THEN m ELSE o) ELSE n/a - - UE behaviour (based on P-Access-Network-Info usage).
c9: IF A.4/26 THEN o.2 ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c10: IF A.4/26B THEN o.3 ELSE n/a - - application of privacy based on the received Privacy header.
c11: IF A.3/1 OR A.3/6 OR A.3A/81 THEN o ELSE IF A.3/9B THEN m ELSE n/a - - UE or MGCF, IBCF (IMS-ALG), MSC Server enhanced for ICS.
c12: IF A.3/7D THEN m ELSE n/a - - AS performing 3rd-party call control.
c13: IF A.3/1 OR A.3/2 OR A.3/4 OR A.3/9B OR A.3A/81 THEN m ELSE o - - UE or S-CSCF or IBCF (IMS-ALG) or MSC Server enhanced for ICS.
c14: IF A.3/1 AND A4/2B AND (A.3B/1 OR A.3B/2 OR A.3B/3) THEN m ELSE IF A.3/2 THEN o ELSE n/a – UE and initiating sessions and GPRS IP-CAN or P-CSCF.
c15: IF A.4/20 AND (A.3/4 OR A.3/9B) THEN m ELSE o – SIP specific event notification extensions and S-CSCF or IBCF (IMS-ALG).
c16: IF A.4/20 AND (A.3/1 OR A.3/2 OR A.3/9B OR A.3A/81) THEN m ELSE o - - SIP specific event notification extension and UE or P-CSCF or IBCF (IMS-ALG) or MSC Server enhanced for ICS.
c17: IF A.3/1 OR A.3/4 OR A.3A/81 THEN m ELSE n/a - - UE or S-CSCF or MSC Server enhanced for ICS.
c18: IF A.4/2B THEN m ELSE n/a - - initiating sessions.
c19: IF A.4/2B THEN o ELSE n/a - - initiating sessions.
c20: IF A.3/1 AND (A.3D/1 OR A.3D/4) THEN m ELSE n/a - - UE behaviour.
c21: IF A.4/30 THEN o.4 ELSE n/a - - private header extensions to the session initiation protocol for the 3rd-Generation Partnership Project (3GPP).
c22: IF A.4/30 AND (A.3/1 OR A.3/4 OR A.3A/81) THEN m ELSE n/a - - private header extensions to the session initiation protocol for the 3rd-Generation Partnership Project (3GPP) and S-CSCF or UE or MSC Server enhanced for ICS.
c23: IF A.4/30 AND (A.3/1 OR A.3A/81) THEN o ELSE n/a - - private header extensions to the session initiation protocol for the 3rd-Generation Partnership Project (3GPP) and UE or MSC Server enhanced for ICS.
c24: IF A.4/30 AND (A.3/4 OR A.3A/81) THEN m ELSE n/a - - private header extensions to the session initiation protocol for the 3rd-Generation Partnership Project (3GPP) and S-CSCF or MSC Server enhanced for ICS.
c25: IF A.4/30 AND (A.3A/81 OR A.3/4 OR A.3/7A OR A.3/7D OR A.3/9B) THEN m ELSE IF A.4/30 AND A.3/1 AND (A.3B/1OR A.3B/2 OR A.3B/3 OR A.3B/4 OR A.3B/5 OR A.3B/6 OR A.3A/7 OR A.3A/8 OR A.3B/11OR A.3B/12 OR A.3B/13 OR A.3B/14 OR A.3A/15 OR A.3B/41) THEN m ELSE IF A4/30 AND A.3/1 AND (A.3B/21 OR A.3B/22 OR A.3B/23 OR A.3B/24 OR A.3B/25 OR A.3B/26 OR A.3A/27 OR A.3A/28 OR A.3B/29 OR A.3B/30) THEN o ELSE n/a - - private header extensions to the session initiation protocol for the 3rd-Generation Partnership Project (3GPP), MSC Server enhanced for ICS, S-CSCF or AS acting as terminating UA or AS acting as third-party call controller or IBCF (IMS-ALG), UE, P-Access-Network-Info values.
c26: IF A.4/30 AND (A.3A/81 OR (A.3/4 AND A.4/2) OR A.3/6 OR A.3/7A OR A.3/7B or A.3/7D OR A.3/9B) THEN m ELSE n/a - - private header extensions to the session initiation protocol for the 3rd-Generation Partnership Project (3GPP) MSC Server enhanced for ICS, S-CSCF, registrar, MGCF, AS acting as a terminating UA, or AS acting as an originating UA, or AS acting as third-party call controller, IBCF (IMS-ALG).
c27: IF A.3/7D THEN o ELSE x - - AS performing 3rd party call control.
c29: IF A.4/40A OR A.4/40B OR A.4/40C OR A.4/40D OR A.4/40E OR A.4/40F THEN m ELSE n/a - - support of any directives within caller preferences for the session initiation protocol.
c30: IF A.3A/1 OR A.3A/2 THEN m ELSE IF A.3/1 THEN o ELSE n/a - - presence server, presence user agent, UE, AS.
c33: IF A.3/9B OR A.3A/81 OR A.3A/11 OR A.3A/12 OR A.4/44 THEN m ELSE o - - IBCF (IMS-ALG) or MSC Server enhanced for ICS or conference focus or conference participant or the Session Inititation Protocol (SIP) "Replaces" header.
c34: IF A.4/44 OR A.4/45 OR A.3/9B THEN m ELSE n/a - - the Session Inititation Protocol (SIP) "Replaces" header or the Session Inititation Protocol (SIP) "Join" header or IBCF (IMS-ALG).
c35: IF A.3/4 OR A.3/9B OR A.3A/82 OR A.3A/83 OR A.3A/21 OR A.3A/22 THEN m ELSE IF (A.3/1 OR A.3/6 OR A.3/7 OR A.3/8 OR A.3A/81) THEN o ELSE n/a - - S-CSCF or IBCF (IMS-ALG) functional entities or ICS user agent or SCC application server or CSI user agent or CSI application server, UE or MGCF or AS or MRFC functional entity or MSC Server enhanced for ICS.

c37	IF A.4/47 THEN o.3 ELSE n/a - - an extension to the session initiation protocol for request history information.
c38:	IF A.4/2B AND (A.3A/11 OR A.3A/12 OR A.3/7D) THEN m ELSE IF A.4/2B THEN o ELSE n/a - - initiating sessions, conference focus, conference participant, AS performing 3rd party call control.
c39:	IF A.3/1 THEN m ELSE n/a - - UE.
c40	IF A.3/4 OR (A.3/1 AND NOT A.3C/1) OR A.3A/81 THEN m ELSE IF (A.3/7A OR A.3/7B OR A.3/7D) THEN o ELSE n/a - - S-CSCF, UE, UE performing the functions of an external attached network, MSC Server enhanced for ICS, AS, AS acting as terminating UA, or redirect server, AS acting as originating UA, AS performing 3rd party call control.
c42:	IF A.3/1 THEN n/a ELSE o - - UE.
c43:	IF A.4/2B THEN o ELSE n/a - - initiating sessions.
c44:	IF A.4/2C THEN m ELSE o - - initiating a session which require local and/or remote resource reservation.
c45:	IF A.4/97 THEN m ELSE n/a - - multiple registrations.
c46	IF A.3/1 OR A.3/4 THEN o ELSE n/a - - UE, S-CSCF.
c47:	IF A.4/27 THEN o ELSE n/a - - a messaging mechanism for the Session Initiation Protocol (SIP).
c48:	IF A.3A/32 AND A.4/27 THEN m ELSE IF A.4/27 THEN o ELSE n/a - - messaging list server, a messaging mechanism for the Session Initiation Protocol (SIP).
c49:	IF A.3/1 OR A.3/9B OR A.3A/81 OR A/3/11 THEN m ELSE o - - UE, IBCF (IMS-ALG), MSC Server enhanced for ICS, E-CSCF.
c50:	IF A.3A/81 THEN n/a ELSE IF A.4/15 THEN o ELSE n/a - - MSC Server enhanced for ICS, the REFER method.
c51:	IF A.4/2B THEN o ELSE n/a - - initiating a session.
c52:	IF A.3A/11 AND A.4/2B THEN m ELSE IF A.4/2B THEN o ELSE n/a - - conference focus, initiating a session.
c53:	IF A.3A/81 THEN n/a ELSE IF A.4/20 THEN o ELSE n/a - - MSC Server enhanced for ICS, SIP specific event notification.
c54:	IF A.3/1 OR A.3/6 OR A.3/7A OR A.3/7D OR A.3/9 THEN o, ELSE n/a - - UE, MGCF, AS acting as originating UA, AS performing 3rd party call control, IBCF.
c55:	IF A.4/67 THEN m ELSE n/a - - number portability parameters for the "tel" URI.
c57:	IF A.4/67 THEN m ELSE n/a - - number portability parameters for the 'tel' URI.
c58:	IF A.3/9B OR A.3/6 OR A.3A/81 THEN m ELSE o - - IBCF (IMS-ALG), MGCF, MSC Server enhanced for ICS.
c59:	IF (A.3/4 THEN m ELSE IF (A.3/1 OR A.3/6 OR A.3/7A OR A.3/7B OR A.3/7D OR A.3/8) THEN o ELSE n/a - - S-CSCF, UE, MGCF, AS, AS acting as terminating UA, or redirect server, AS acting as originating UA, AS performing 3rd party call control, or MRFC.
c60:	IF A.3/9B THEN m ELSE IF A.3/1 OR A.3/7A OR A.3/7B OR A.3/7D THEN o ELSE n/a - - IBCF (IMS-ALG), UE, AS acting as terminating UA, AS acting as originating UA, AS performing 3rd party call control.
c61:	IF (A.3/1 OR A.3A/81 OR OR A.3/6 OR A.3/7A OR A.3/7B OR A.3/7D OR A.3/8 OR A.3/9B) THEN o ELSE n/a - - UE, MSC Server enhanced for ICS, MGCF, AS, AS acting as terminating UA, or redirect server, AS acting as originating UA, AS performing 3rd party call control, or MRFC or IBCF (IMS-ALG).
c62:	IF A.3/1 THEN o ELSE n/a - - UE.
c68:	IF A.4/69 THEN m ELSE o - - extending the session initiation protocol Reason header for preemption events and Q.850 causes.
c69:	IF A.4/70 THEN o ELSE n/a - - communications resource priority for the session initiation protocol.
c70:	IF A.3/9B THEN m ELSE IF A.3/1 OR A.3/6 OR A.3/7A OR A.3/7B OR A.3/7D OR A.3A/81 THEN o ELSE n/a - - IBCF (IMS-ALG), UE, MGCF, AS, AS acting as terminating UA, or redirect server, AS acting as originating UA, AS performing 3rd party call control, MSC Server enhance for ICS.
c72:	IF A.4/70 THEN o ELSE n/a - - communications resource priority for the session initiation protocol
c74:	IF A.3/4 OR A.3/1 THEN o ELSE n/a. - - S-CSCF or UE.
c75:	IF A.3/1 THEN o ELSE n/a. - - UE.
c76:	IF A.4/75A OR A.4/75B THEN m ELSE n/a - - a relay within the framework for consent-based communications in SIP, a recipient within the framework for consent-based communications in SIP.
c77:	IF A.4/59 OR A.4/61 OR A.4/62 OR A.4/63 THEN m ELSE o - - multiple-recipient MESSAGE requests in the session initiation protocol, referring to multiple resources in the session initiation protocol, conference establishment using request-contained lists in the session initiation protocol, subscriptions to request-contained resource lists in the session initiation protocol.
c78:	IF (A.4/59 OR A.4/61 OR A.4/62 OR A.4/63) AND (A.3A/11 OR A.3A/31) THEN m ELSE o - - multiple-recipient MESSAGE requests in the session initiation protocol, referring to multiple resources in the session initiation protocol, conference establishment using request-contained lists in the session initiation protocol, subscriptions to request-contained resource lists in the session initiation protocol, conference focus, messaging application server.
c79:	IF A.3/9B OR (A.3/1 AND (A.4/2B OR A.4/15 OR A.4/20 OR A.4/27)) THEN m ELSE IF A.3/6 OR A.3/7A OR A.3/7D THEN o ELSE n/a - - IBCF (IMS-ALG), UE, initiating a session, the REFER method, SIP specific event notification, a messaging mechanism for the Session Initiation Protocol (SIP), AS acting as terminating UA, or redirect server, AS performing 3rd party call control.
c80:	IF A.4/2B OR A.4/15 OR A.4/20 OR A.4/27 THEN m ELSE n/a - - initiating a session, the REFER method, SIP specific event notification, a messaging mechanism for the Session Initiation Protocol (SIP).

c81:	IF A.3/1 OR A.3/6 OR A.3/7A OR A.3/7B OR A.3/7D THEN o ELSE IF A.3/9B THEN m ELSE n/a - - UE, MGCF, AS acting as terminating UA, or redirect server, AS acting as originating UA, AS performing 3rd party call control, IBCF (IMS-ALG).
c82:	IF A.3/6 THEN m ELSE n/a - - MGCF.
c86:	IF A.4/3 OR A.4/4 THEN m ELSE n/a - - client behaviour for INVITE requests, server behaviour for INVITE requests.
c87:	IF A.3/9B OR A.3/9C THEN m ELSE o - - IBCF (IMS-ALG), IBCF (Screening of SIP signalling).
c88:	IF A.3/1 OR A.3/2 THEN m ELSE o - - UE, P-CSCF.
c89:	IF A.3/7A OR A.3/8 THEN o ELSE n/a - - AS performing 3rd party call control, MRFC.
c90:	IF A.4/13 OR A.3A/53 OR A.3A/54 OR A.3A/91 OR A.3A/85 OR A.3A/86 OR A.3/6 THEN m ELSE o - - SIP INFO method and package framework, advice of charge application server, advice of charge UE client, malicious communication identification application server, in-dialog overlap signalling application server, in-dialog overlap signalling UA client, MGCF.
c91:	IF A.3A/61 OR A.3A/62 OR A.3A/63 OR A.3A/71 THEN m ELSE o - - SM-over-IP sender, SM-over-IP receiver, IP-SM-GW, IP-SM-GW.
c93:	IF A.3/7B OR A.3/7D THEN o ELSE n/a - - AS acting as originating UA, AS performing 3rd party call control.
c94:	IF A.3/4 OR A.3/7A OR A.3/7D THEN o ELSE n/a - - S-CSCF and AS acting as terminating UA or redirect server or AS performing 3rd party call control.
c103:	IF A.3/1 THEN o ELSE IF A.3/2 OR A.3/4 THEN m ELSE n/a - - UE, P-CSCF, S-CSCF.
c105:	IF A.3/9B OR A.3A/82 OR A.3A/83 THEN m ELSE o - - IBCF (IMS-ALG), ICS user agent, SCC application server.
c109:	IF A.4/76A THEN m ELSE n/a - - a mechanism for transporting user to user call control information in SIP.
o.1:	At least one of these capabilities is supported.
o.2:	At least one of these capabilities is supported.
o.3:	At least one of these capabilities is supported.
o.4:	At least one of these capabilities is supported.
o.5:	At least one of these capabilities is supported.
o.6:	It is mandatory to support at least one of these items.
NOTE 1:	Void
NOTE 2:	If a UE is unable to become engaged in a service that potentially requires the ability to identify and interact with a specific UE even when multiple UEs share the same single Public User Identity then the UE support can be "o" instead of "m". Examples include telemetry applications, where point-to-point communication is desired between two users.
NOTE 3:	For this release, the requirements for this major capability in UAs is limited to those necessary to support the package defined in A.4/76A. Implementation of other features not used by this package is not required in this release.

Prerequisite A.5/20 - - SIP specific event notification

Table A.4A: Supported event packages

Item	Does the implementation support	Subscriber			Notifier		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	reg event package?	[43]	c1	c3	[43]	c2	c4
1A	reg event package extension for GRUUs?	[94]	c1	c25	[94]	c2	c4
2	refer package?	[36] 3	c13	c13	[36] 3	c13	c13
3	presence package?	[74] 6	c1	c5	[74] 6	c2	c6
4	eventlist with underlying presence package?	[75], [74] 6	c1	c7	[75], [74] 6	c2	c8
5	presence.winfo template-package?	[72] 4	c1	c9	[72] 4	c2	c10
6	xcap-diff package?	[77] 4	c1	c11	[77] 4	c2	c12
7	conference package?	[78] 3	c1	c21	[78] 3	c1	c22
8	message-summary package?	[65]	c1	c23	[65] 3	c2	c24
9	poc-settings package?	[110]	c1	c26	[110]	c2	c27

c1: IF A.4/23 THEN o ELSE n/a - - acting as the subscriber to event information.
c2: IF A.4/22 THEN o ELSE n/a - - acting as the notifier of event information.
c3: IF A.3/1 OR A.3A/81 OR A.3/2 THEN m ELSE IF A.3/7 THEN o ELSE n/a - - UE, MSC Server enhanced for ICS, P-CSCF, AS.
c4: IF A.3/4 THEN m ELSE n/a - - S-CSCF.
c5: IF A.3A/3 OR A.3A/4 THEN m ELSE IF A.4/23 THEN o ELSE n/a - - resource list server or watcher, acting as the subscriber to event information.
c6: IF A.3A/1 THEN m ELSE IF A.4/22 THEN o ELSE n/a - - presence server, acting as the notifier of event information.
c7: IF A.3A/4 THEN m ELSE IF A.4/23 THEN o ELSE n/a - - watcher, acting as the subscriber to event information.
c8: IF A.3A/3 THEN m ELSE IF A.4/22 THEN o ELSE n/a - - resource list server, acting as the notifier of event information.
c9: IF A.3A/2 THEN m ELSE IF A.4/23 THEN o ELSE n/a - - presence user agent, acting as the subscriber to event information.
c10: IF A.3A/1 THEN m ELSE IF A.4/22 THEN o ELSE n/a - - presence server, acting as the notifier of event information.
c11: IF A.3A/2 OR A.3A/4 THEN o ELSE IF A.4/23 THEN o ELSE n/a - - presence user agent or watcher, acting as the subscriber to event information.
c12: IF A.3A/1 OR A.3A/3 THEN m ELSE IF A.4/22 THEN o ELSE n/a - - presence server or resource list server, acting as the notifier of event information.
c13: IF A.4/15 THEN m ELSE n/a - - the REFER method.
c21: IF A.3A/12 THEN m ELSE IF A.4/23 THEN o ELSE n/a - - conference participant or acting as the subscriber to event information.
c22: IF A.3A/11 THEN m ELSE IF A.4/22 THEN o ELSE n/a - - conference focus or acting as the notifier of event information.
c23: IF A.3A/52 THEN m ELSE (A.3/1 OR A.3/7A OR A.3/7B) AND A.4/23 THEN o ELSE n/a - - message waiting indication subscriber UA, UE, AS acting as terminating UA, or redirect server, AS acting as originating UA all as subscriber of event information.
c24: IF A.3A/52 THEN m ELSE (A.3/1 OR A.3/7A OR A.3/7B) AND A.4/22 THEN o ELSE n/a - - message waiting indication notifier UA, UE, AS acting as terminating UA, or redirect server, AS acting as originating UA all as notifier of event information.
c25: IF A.4A/1 THEN (IF A.3/1 AND A.4/53 THEN m ELSE o) ELSE n/a - - reg event package, UE, reg event package extension for GRUUs.
c26: IF (A.3/7B OR A.3/1) AND (A.4/23 OR A.4/41) THEN o ELSE n/a - - AS acting as originating UA, UE ,acting as the subscriber to event information, an event state publication extension to the session initiation protocol.
c27: IF (A.4/22 OR A.4/41) AND A.3/1 THEN o ELSE n/a - - UE, acting as the notifier of event information, an event state publication extension to the session initiation protocol.

Prerequisite A.4/13 - - SIP INFO method and package framework.

Table A.4B: Supported info packages

Item	Does the implementation support	Sender			Receiver		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

A.2.1.3 PDUs

Table A.5: Supported methods

Item	PDU	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	ACK request	[26] 13	c10	c10	[26] 13	c11	c11
2	BYE request	[26] 15.1	c12	c12	[26] 15.1	c12	c12
3	BYE response	[26] 15.1	c12	c12	[26] 15.1	c12	c12
4	CANCEL request	[26] 9	m	m	[26] 9	m	m
5	CANCEL response	[26] 9	m	m	[26] 9	m	m
6	INFO request	[25] 4.2	c21	c21	[25] 4.2	c21	c21
7	INFO response	[25] 4.2	c21	c21	[25] 4.2	c21	c21
8	INVITE request	[26] 13	c10	c10	[26] 13	c11	c11
9	INVITE response	[26] 13	c11	c11	[26] 13	c10	c10
9A	MESSAGE request	[50] 4	c7	c7	[50] 7	c7	c7
9B	MESSAGE response	[50] 4	c7	c7	[50] 7	c7	c7
10	NOTIFY request	[28] 8.1.2	c4	c4	[28] 8.1.2	c3	c3
11	NOTIFY response	[28] 8.1.2	c3	c3	[28] 8.1.2	c4	c4
12	OPTIONS request	[26] 11	m	m	[26] 11	m	m
13	OPTIONS response	[26] 11	m	m	[26] 11	m	m
14	PRACK request	[27] 6	c5	c5	[27] 6	c5	c5
15	PRACK response	[27] 6	c5	c5	[27] 6	c5	c5
15A	PUBLISH request	[70] 11.1.3	c20	c20	[70] 11.1.3	c20	c20
15B	PUBLISH response	[70] 11.1.3	c20	c20	[70] 11.1.3	c20	c20
16	REFER request	[36] 3	c1	c1	[36] 3	c1	c1
17	REFER response	[36] 3	c1	c1	[36] 3	c1	c1
18	REGISTER request	[26] 10	c8	c8	[26] 10	c9	c9
19	REGISTER response	[26] 10	c9	c9	[26] 10	c8	c8
20	SUBSCRIBE request	[28] 8.1.1	c3	c3	[28] 8.1.1	c4	c4
21	SUBSCRIBE response	[28] 8.1.1	c4	c4	[28] 8.1.1	c3	c3
22	UPDATE request	[29] 6.1	c6	c6	[29] 6.2	c6	c6
23	UPDATE response	[29] 6.2	c6	c6	[29] 6.1	c6	c6

c1: IF A.4/15 THEN m ELSE n/a - - the REFER method extension.
c3: IF A.4/23 THEN m ELSE n/a - - recipient for event information.
c4: IF A.4/22 THEN m ELSE n/a - - notifier of event information.
c5: IF A.4/14 THEN m ELSE n/a - - reliability of provisional responses extension.
c6: IF A.4/17 THEN m ELSE n/a - - the SIP update method extension.
c7: IF A.4/27 THEN m ELSE n/a - - the SIP MESSAGE method.
c8: IF A.4/1 THEN m ELSE n/a - - client behaviour for registration.
c9: IF A.4/2 THEN m ELSE n/a - - registrar.
c10: IF A.4/3 THEN m ELSE n/a - - client behaviour for INVITE requests.
c11: IF A.4/4 THEN m ELSE n/a - - server behaviour for INVITE requests.
c12: IF A.4/5 THEN m ELSE n/a - - session release.
c20: IF A.4/41 THEN m ELSE n/a - - event state publication extension.
c21: IF A.4/13 OR A.4/13A THEN m ELSE n/a - - SIP INFO method and package framework.

A.2.1.4 PDU parameters

A.2.1.4.1 Status-codes

Table A.6: Supported status-codes

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	100 (Trying)	[26] 21.1.1	c21	c21	[26] 21.1.1	c11	c11
101	1xx response	[26] 21.1	p21	p21	[26] 21.1	p21	p21
101A	18x response	[26] 21.1	p21	p21	[26] 21.1	p21	p21
2	180 (Ringing)	[26] 21.1.2	c2	c2	[26] 21.1.2	c1	c1
3	181 (Call Is Being Forwarded)	[26] 21.1.3	c2	c2	[26] 21.1.3	c1	c1
4	182 (Queued)	[26] 21.1.4	c2	c2	[26] 21.1.4	c1	c1
5	183 (Session Progress)	[26] 21.1.5	c1	c1	[26] 21.1.5	c1	c1
5A	199 (Early Dialog Terminated)	[142] 11.1	c32	c32	[142] 11.1	c32	c32
102	2xx response	[26] 21.2	p22	p22	[26] 21.1	p22	p22
6	200 (OK)	[26] 21.2.1	m	m	[26] 21.2.1	m	m
7	202 (Accepted)	[28] 8.3.1	c3	c3	[28] 8.3.1	c3	c3
103	3xx response	[26] 21.3	p23	p23	[26] 21.1	p23	p23
8	300 (Multiple Choices)	[26] 21.3.1	m	m	[26] 21.3.1	m	m
9	301 (Moved Permanently)	[26] 21.3.2	m	m	[26] 21.3.2	m	m
10	302 (Moved Temporarily)	[26] 21.3.3	m	m	[26] 21.3.3	m	m
11	305 (Use Proxy)	[26] 21.3.4	m	m	[26] 21.3.4	m	m
12	380 (Alternative Service)	[26] 21.3.5	m	m	[26] 21.3.5	m	m
104	4xx response	[26] 21.4	p24	p24	[26] 21.4	p24	p24
13	400 (Bad Request)	[26] 21.4.1	m	m	[26] 21.4.1	m	m
14	401 (Unauthorized)	[26] 21.4.2	o	c12	[26] 21.4.2	m	m
15	402 (Payment Required)	[26] 21.4.3	n/a	n/a	[26] 21.4.3	n/a	n/a
16	403 (Forbidden)	[26] 21.4.4	m	m	[26] 21.4.4	m	m
17	404 (Not Found)	[26] 21.4.5	m	m	[26] 21.4.5	m	m
18	405 (Method Not Allowed)	[26] 21.4.6	m	m	[26] 21.4.6	m	m
19	406 (Not Acceptable)	[26] 21.4.7	m	m	[26] 21.4.7	m	m
20	407 (Proxy Authentication Required)	[26] 21.4.8	o	o	[26] 21.4.8	m	m
21	408 (Request Timeout)	[26] 21.4.9	c2	c2	[26] 21.4.9	m	m
22	410 (Gone)	[26] 21.4.10	m	m	[26] 21.4.10	m	m
22A	412 (Conditional Request Failed)	[70] 11.2.1	c20	c20	[70] 11.2.1	c20	c20
23	413 (Request Entity Too Large)	[26] 21.4.11	m	m	[26] 21.4.11	m	m
24	414 (Request-URI Too Large)	[26] 21.4.12	m	m	[26] 21.4.12	m	m
25	415 (Unsupported Media Type)	[26] 21.4.13	m	m	[26] 21.4.13	m	m
26	416 (Unsupported URI Scheme)	[26] 21.4.14	m	m	[26] 21.4.14	m	m
26A	417 (Unknown Resource Priority)	[116] 4.6.2	c24	c24	[116] 4.6.2	c24	c24
27	420 (Bad Extension)	[26] 21.4.15	m	c13	[26] 21.4.15	m	m
28	421 (Extension Required)	[26] 21.4.16	o		[26] 21.4.16	i	i
28A	422 (Session Interval Too Small)	[58] 6	c7	c7	[58] 6	c7	c7
29	423 (Interval Too Brief)	[26] 21.4.17	c4	c4	[26] 21.4.17	m	m
29A	424 (Bad Location Information)	[89] 4.2	c23	c23	[89] 4.2	c23	c23
29B	429 (Provide Referrer Identity)	[59] 5	c8	c8	[59] 5	c9	c9
29C	430 (Flow Failed)	[92] 11	n/a	n/a	[92] 11	c22	c22
29D	433 (Anonymity Disallowed)	[67] 4	c14	c14	[67] 4	c14	c14
29E	439 (First Hop Lacks	[92] 11	c28	c28	[92] 11	c29	c29

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
	Outbound Support)						
29F	440 (Max Breadth Exceeded)	[117] 5	n/a	c30	[117] 5	c31	c31
29G	469 (Bad INFO Package)	[25] 4.2	c33	c33	[25] 4.2	c33	c33
29H	470 (Consent Needed)	[125] 5.9.2	c26	c26	[125] 5.9.2	c27	c27
30	480 (Temporarily Unavailable)	[26] 21.4.18	m	m	[26] 21.4.18	m	m
31	481 (Call/Transaction Does Not Exist)	[26] 21.4.19	m	m	[26] 21.4.19	m	m
32	482 (Loop Detected)	[26] 21.4.20	m	m	[26] 21.4.20	m	m
33	483 (Too Many Hops)	[26] 21.4.21	m	m	[26] 21.4.21	m	m
34	484 (Address Incomplete)	[26] 21.4.22	o	o	[26] 21.4.22	m	m
35	485 (Ambiguous)	[26] 21.4.23	o	o	[26] 21.4.23	m	m
36	486 (Busy Here)	[26] 21.4.24	m	m	[26] 21.4.24	m	m
37	487 (Request Terminated)	[26] 21.4.25	m	m	[26] 21.4.25	m	m
38	488 (Not Acceptable Here)	[26] 21.4.26	m	m	[26] 21.4.26	m	m
39	489 (Bad Event)	[28] 7.3.2	c3	c3	[28] 7.3.2	c3	c3
40	491 (Request Pending)	[26] 21.4.27	m	m	[26] 21.4.27	m	m
41	493 (Undecipherable)	[26] 21.4.28	m	m	[26] 21.4.28	m	m
41A	494 (Security Agreement Required)	[48] 2	c5	c5	[48] 2	c6	c6
105	5xx response	[26] 21.5	p25	p25	[26] 21.5	p25	p25
42	500 (Internal Server Error)	[26] 21.5.1	m	m	[26] 21.5.1	m	m
43	501 (Not Implemented)	[26] 21.5.2	m	m	[26] 21.5.2	m	m
44	502 (Bad Gateway)	[26] 21.5.3	o	o	[26] 21.5.3	m	m
45	503 (Service Unavailable)	[26] 21.5.4	m	m	[26] 21.5.4	m	m
46	504 (Server Time-out)	[26] 21.5.5	m	m	[26] 21.5.5	m	m
47	505 (Version not supported)	[26] 21.5.6	m	m	[26] 21.5.6	m	m
48	513 (Message Too Large)	[26] 21.5.7	m	m	[26] 21.5.7	m	m
49	580 (Precondition Failure)	[30] 8	c35	c35	[30] 8	c35	c35
106	6xx response	[26] 21.6	p26	p26	[26] 21.6	p26	p26
50	600 (Busy Everywhere)	[26] 21.6.1	m	m	[26] 21.6.1	m	m
51	603 (Decline)	[26] 21.6.2	c10	c10	[26] 21.6.2	m	m
52	604 (Does Not Exist Anywhere)	[26] 21.6.3	m	m	[26] 21.6.3	m	m
53	606 (Not Acceptable)	[26] 21.6.4	m	m	[26] 21.6.4	m	m

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
c1:	IF A.5/9 THEN m ELSE n/a - - INVITE response.						
c2:	IF A.5/9 THEN o ELSE n/a - - INVITE response.						
c3:	IF A.4/20 THEN m ELSE n/a - - SIP specific event notification extension.						
c4:	IF A.5/19 OR A.5/21 THEN m ELSE n/a - - REGISTER response or SUBSCRIBE response.						
c5:	IF A.4/37 AND A.4/2 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol and registrar.						
c6:	IF A.4/37 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						
c7:	IF A.4/42 AND (A.5/9 OR A.5/23) THEN m ELSE n/a - - the SIP session timer AND (INVITE response OR UPDATE response).						
c8:	IF A.4/43 AND A.5/17 THEN o ELSE n/a - - the SIP Referred-By mechanism and REFER response.						
c9:	IF A.4/43 AND A.5/17 THEN m ELSE n/a - - the SIP Referred-By mechanism and REFER response.						
c10:	IF A.4/44 THEN m ELSE o - - the Session Inititation Protocol (SIP) "Replaces" header.						
c11:	IF A.5/3 OR A.5/9 OR A.5/9B OR A.5/11OR A.5/13 OR A.5/15 OR A.5/15B OR A.5/17 OR A.5/19 OR A.5/21 OR A.5/23 THEN m ELSE n/a - - BYE response or INVITE response or MESSAGE response or NOTIFY response or OPTIONS response or PRACK response or PUBLISH response or REFER response or REGISTER response or SUBSCRIBE response or UPDATE response.						
c12:	IF A.3/4 THEN m ELSE o - - S-CSCF.						
c13:	IF A.3/1 OR A.3/2 OR A.3/4 THEN m ELSE o - - UE, P-CSCF, S-CSCF.						
c14:	IF A.4/48 THEN m ELSE n/a - - rejecting anonymous requests in the session initiation protocol.						
c20:	IF A.4/41 THEN m ELSE n/a - - an event state publication extension to the session initiation protocol.						
c21:	IF A.5/3 OR A.5/9 OR A.5/9B OR A.5/11 or A.5/13 OR A.5/15 OR A.5/15B OR A.5/17 OR A.5/19 OR A.5/21 OR A.5/23 THEN o ELSE n/a - - BYE response or INVITE response or MESSAGE response or NOTIFY response or OPTIONS response or PRACK response or PUBLISH response or REFER response or REGISTER response or SUBSCRIBE response or UPDATE response.						
c22:	IF A.4/57 THEN m ELSE n/a - - managing client initiated connections in SIP.						
c23:	IF A.4/60 THEN m ELSE n/a - - SIP location conveyance.						
c24:	IF A.4/70 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.						
c26:	IF A.4/75B THEN m ELSE n/a - - a recipient within the framework for consent-based communications in SIP.						
c27:	IF A.4/75A THEN m ELSE n/a - - a relay within the framework for consent-based communications in SIP.						
c28:	IF A.4/2 AND A.4/57 THEN m ELSE n/a - - registrar, managing client initiated connections in SIP.						
c29:	IF A.4/1 AND A.4/57 THEN m ELSE n/a - - client behaviour for registration, managing client initiated connections in SIP.						
c30:	IF A.4/71 AND (A.3/9B OR A.3/9C) THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies, IBCF (IMS-ALG), IBCF (Screening of SIP signalling).						
c31:	IF A.4/71 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.						
c32:	IF A.5/9 AND A.4/81 THEN m ELSE n/a - - INVITE response and 199 (Early Dialog Terminated) response.						
c33:	IF A.4/13 THEN m ELSE n/a - - SIP INFO method and package framework.						
c35:	IF A.4/16 THEN m ELSE n/a -- integration of resource management and SIP.						
p21:	A.6/2 OR A.6/3 OR A.6/4 OR A.6/5 OR A.6/5A - - 1xx response.						
p22:	A.6/6 OR A.6/7 - - 2xx response.						
p23:	A.6/8 OR A.6/9 OR A.6/10 OR A.6/11 OR A.6/12 - - 3xx response.						
p24:	A.6/13 OR A.6/14 OR A.6/15 OR A.6/16 OR A.6/17 OR A.6/18 OR A.6/19 OR A.6/20 OR A.6/21 OR A.6/22 OR A.6/22A OR A.6/23 OR A.6/24 OR A.6/25 OR A.6/26 OR A.6/26A OR A.6/27 OR A.6/28 OR A.6/28A OR A.6/29 OR A.6/29A OR A.6/29B OR A.6/29C OR A.6/29D OR A.6/29E OR A.6/29F OR A.6/29G OR A.6/29H OR A.6/30 OR A.6/31 OR A.6/32 OR A.6/33 OR A.6/34 OR A.6/35 OR A.6/36 OR A.6/436 OR A.6/38 OR A.6/39 OR A.6/40 OR A.6/41 OR A.6/41A. - 4xx response.						
p25:	A.6/42 OR A.6/43 OR A.6/44 OR A.6/45 OR A.6/46 OR A.6/47 OR A.6/48 OR A.6/49 - - 5xx response						
p26:	A.6/50 OR A.6/51 OR A.6/52 OR A.6/53 - - 6xx response.						

A.2.1.4.2 ACK method

Prerequisite A.5/1 – ACK request

Table A.7: Supported header fields within the ACK request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Contact	[56B] 9.2	c9	c9	[56B] 9.2	c10	c10
2	Allow-Events	[28] 7.2.2	c1	c1	[28] 7.2.2	c2	c2
3	Authorization	[26] 20.7	c3	c3	[26] 20.7	c3	c3
4	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
6	Content-Disposition	[26] 20.11	o	o	[26] 20.11	m	m
7	Content-Encoding	[26] 20.12	o	o	[26] 20.12	m	m
8	Content-Language	[26] 20.13	o	o	[26] 20.13	m	m
9	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
10	Content-Type	[26] 20.15	m	m	[26] 20.15	m	m
11	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
12	Date	[26] 20.17	c4	c4	[26] 20.17	m	m
13	From	[26] 20.20	m	m	[26] 20.20	m	m
13A	Max-Breadth	[117] 5.8	n/a	c14	[117] 5.8	c15	c15
14	Max-Forwards	[26] 20.22	m	m	[26] 20.22	n/a	c16
15	MIME-Version	[26] 20.24	o	o	[26] 20.24	m	m
15B	Privacy	[33] 4.2	c6	n/a	[33] 4.2	c6	n/a
16	Proxy-Authorization	[26] 20.28	c5	c5	[26] 20.28	n/a	n/a
17	Proxy-Require	[26] 20.29	o	n/a	[26] 20.29	n/a	n/a
17A	Reason	[34A] 2	c8	c8	[34A] 2	c8	c8
17B	Recv-Info	[25] 5.2.3	c17	c17	[25] 5.2.3	c17	c17
17C	Reject-Contact	[56B] 9.2	c9	c9	[56B] 9.2	c10	c10
17D	Request-Disposition	[56B] 9.1	c9	c9	[56B] 9.1	c10	c10
18	Require	[26] 20.32	o	o	[26] 20.32	m	m
18A	Resource-Priority	[116] 3.1	c11	c11	[116] 3.1	c11	c11
19	Route	[26] 20.34	m	m	[26] 20.34	n/a	n/a
20	Timestamp	[26] 20.38	c7	c7	[26] 20.38	m	m
21	To	[26] 20.39	m	m	[26] 20.39	m	m
22	User-Agent	[26] 20.41	o	o	[26] 20.41	m	m
23	Via	[26] 20.42	m	m	[26] 20.42	m	m

c1: IF A.4/20 THEN o ELSE n/a - - SIP specific event notification extension.
c2: IF A.4/20 THEN m ELSE n/a - - SIP specific event notification extension.
c3: IF A.4/7 THEN m ELSE n/a - - authentication between UA and UA.
c4: IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.
c5: IF A.4/8A THEN m ELSE n/a - - authentication between UA and proxy.
c6: IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c7: IF A.4/6 THEN o ELSE n/a - - timestamping of requests.
c8: IF A.4/38 THEN o ELSE n/a - - the Reason header field for the session initiation protocol.
c9: IF A.4/40 THEN o ELSE n/a - - caller preferences for the session initiation protocol.
c10: IF A.4/40 THEN m ELSE n/a - - caller preferences for the session initiation protocol.
c11: IF A.4/70 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.
c14: IF A.4/71 AND (A.3/9B OR A.3/9C) THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies, IBCF (IMS-ALG), IBCF (Screening of SIP signalling).
c15: IF A.4/71 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.
c16: IF A.3/1 AND NOT A.3C/1 THEN n/a ELSE o - - UE, UE performing the functions of an external attached network.
c17: IF A.4/13 THEN m ELSE IF A.4/13A THEN m ELSE n/a - - SIP INFO method and package framework, legacy INFO usage.

Prerequisite A.5/1 – ACK request

Table A.8: Supported message bodies within the ACK request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

A.2.1.4.3 BYE method

Prerequisite A.5/2 - - BYE request

Table A.9: Supported header fields within the BYE request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	o	o	[26] 20.1	m	m
1A	Accept-Contact	[56B] 9.2	c18	c18	[56B] 9.2	c22	c22
2	Accept-Encoding	[26] 20.2	o	o	[26] 20.2	m	m
3	Accept-Language	[26] 20.3	o	o	[26] 20.3	m	m
3A	Allow	[26] 20.5	o	o	[26] 20.5	m	m
4	Allow-Events	[28] 7.2.2	c1	c1	[28] 7.2.2	c2	c2
5	Authorization	[26] 20.7	c3	c3	[26] 20.7	c3	c3
6	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
7	Content-Disposition	[26] 20.11	o	o	[26] 20.11	m	m
8	Content-Encoding	[26] 20.12	o	o	[26] 20.12	m	m
9	Content-Language	[26] 20.13	o	o	[26] 20.13	m	m
10	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
11	Content-Type	[26] 20.15	m	m	[26] 20.15	m	m
12	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
13	Date	[26] 20.17	c4	c4	[26] 20.17	m	m
14	From	[26] 20.20	m	m	[26] 20.20	m	m
14A	Geolocation	[89] 4.1	c23	c23	[89] 4.1	c23	c23
14B	Geolocation-Routing	[89] 4.1	c23	c23	[89] 4.1	c23	c23
14C	Max-Breadth	[117] 5.8	n/a	c29	[117] 5.8	c30	c30
15	Max-Forwards	[26] 20.22	m	m	[26] 20.22	n/a	c31
16	MIME-Version	[26] 20.24	o	o	[26] 20.24	m	m
16A	P-Access-Network-Info	[52] 4.4	c9	c10	[52] 4.4	c9	c11
16B	P-Asserted-Identity	[34] 9.1	n/a	n/a	[34] 9.1	c6	c6
16C	P-Charging-Function-Addresses	[52] 4.5	c13	c14	[52] 4.5	c13	c14
16D	P-Charging-Vector	[52] 4.6	c12	n/a	[52] 4.6	c12	n/a
16F	P-Preferred-Identity	[34] 9.2	c6	x	[34] 9.2	n/a	n/a
16G	Privacy	[33] 4.2	c7	n/a	[33] 4.2	c7	c7
17	Proxy-Authorization	[26] 20.28	c5	c5	[26] 20.28	n/a	n/a
18	Proxy-Require	[26] 20.29	o	n/a	[26] 20.29	n/a	n/a
18A	Reason	[34A] 2	c17	c21	[34A] 2	c24	c24
19	Record-Route	[26] 20.30	n/a	c31	[26] 20.30	n/a	c31
19A	Referred-By	[59] 3	c19	c19	[59] 3	c20	c20
19B	Reject-Contact	[56B] 9.2	c18	c18	[56B] 9.2	c22	c22
19C	Request-Disposition	[56B] 9.1	c18	c18	[56B] 9.1	c22	c22
20	Require	[26] 20.32	o	o	[26] 20.32	m	m
20A	Resource-Priority	[116] 3.1	c25	c25	[116] 3.1	c25	c25
21	Route	[26] 20.34	m	m	[26] 20.34	n/a	c31
21A	Security-Client	[48] 2.3.1	c15	c15	[48] 2.3.1	n/a	n/a
21B	Security-Verify	[48] 2.3.1	c16	c16	[48] 2.3.1	n/a	n/a
22	Supported	[26] 20.37	o	o	[26] 20.37	m	m
23	Timestamp	[26] 20.38	c8	c8	[26] 20.38	m	m
24	To	[26] 20.39	m	m	[26] 20.39	m	m
25	User-Agent	[26] 20.41	o	o	[26] 20.41	o	o
25A	User-to-User	[126] 7	c26	c26	[126] 7	c26	c26
26	Via	[26] 20.42	m	m	[20] 20.42	m	m

c1:	IF A.4/20 THEN o ELSE n/a - - SIP specific event notification extension.
c2:	IF A.4/20 THEN m ELSE n/a - - SIP specific event notification extension.
c3:	IF A.4/7 THEN m ELSE n/a - - authentication between UA and UA.
c4:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.
c5:	IF A.4/8A THEN m ELSE n/a - - authentication between UA and proxy.
c6:	IF A.4/25 THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c7:	IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c8:	IF A.4/6 THEN o ELSE n/a - - timestamping of requests.
c9:	IF A.4/34 THEN o ELSE n/a - - the P-Access-Network-Info header extension.
c10:	IF A.4/34 AND A.3/1 THEN m ELSE n/a - - the P-Access-Network-Info header extension and UE.
c11:	IF A.4/34 AND (A.3/7A OR A.3/7D) THEN m ELSE n/a - - the P-Access-Network-Info header extension and AS acting as terminating UA or AS acting as third-party call controller.
c12:	IF A.4/36 THEN o ELSE n/a - - the P-Charging-Vector header extension.
c13:	IF A.4/35 THEN o ELSE n/a - - the P-Charging-Function-Addresses header extension.
c14:	IF A.4/35 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c15:	IF A.4/37 THEN o ELSE n/a - - security mechanism agreement for the session initiation protocol (note).
c16:	IF A.4/37 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.
c17:	IF A.4/38 THEN o ELSE n/a - - the Reason header field for the session initiation protocol.
c18:	IF A.4/40 THEN o ELSE n/a - - caller preferences for the session initiation protocol.
c19:	IF A.4/43 THEN m ELSE n/a - - the SIP Referred-By mechanism.
c20:	IF A.4/43 THEN o ELSE n/a - - the SIP Referred-By mechanism.
c21:	IF A.3/2 THEN m ELSE IF A.4/38 THEN o ELSE n/a - - P-CSCF, the Reason header field for the session initiation protocol.
c22:	IF A.4/40 THEN m ELSE n/a - - caller preferences for the session initiation protocol.
c23:	IF A.4/60 THEN m ELSE n/a - - SIP location conveyance.
c24:	IF A.4/38 THEN m ELSE n/a - - the Reason header field for the session initiation protocol.
c25:	IF A.4/70B THEN m ELSE n/a - - inclusion of CANCEL, BYE, REGISTER and PUBLISH in communications resource priority for the session initiation protocol.
c26:	IF A.4/76 THEN o ELSE n/a - - transporting user to user information for call centers using SIP.
c29:	IF A.4/71 AND (A.3/9B OR A.3/9C) THEN m ELSE IF A.3/1 AND NOT A.3C/1 THEN n/a ELSE o - - addressing an amplification vulnerability in session initiation protocol forking proxies, IBCF (IMS-ALG), IBCF (Screening of SIP signalling), UE, UE performing the functions of an external attached network.
c30:	IF A.4/71 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.
c31:	IF A.3/1 AND NOT A.3C/1 THEN n/a ELSE o - - UE, UE performing the functions of an external attached network.
NOTE:	Support of this header in this method is dependent on the security mechanism and the security architecture which is implemented. Use of this header in this method is not appropriate to the security mechanism defined by 3GPP TS 33.203 [19].

Prerequisite A.5/2 - - BYE request

Table A.10: Supported message bodies within the BYE request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	XML Schema for PSTN	[11B]		c1	[11B]		c1
2	VoiceXML expr / namelist data	[145] 4.2	m	c2	[145] 4.2	m	c2
c1:	IF A.3/6 OR A.3/7A OR A.3/7B OR A.3/7D OR A.3/9B THEN o ELSE n/a - - MGCF, AS acting as terminating UA, or redirect server, AS acting as originating UA, AS performing 3rd party call control, IBCF (IMS-ALG).						
c2:	IF A.4/84 THEN m ELSE n/a - - SIP Interface to VoiceXML Media Services.						

Table A.11: Void

Prerequisite A.5/3 - - BYE response

Prerequisite: A.6/1 - - Additional for 100 (Trying) response

Table A.11A: Supported header fields within the BYE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
3	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
4	Date	[26] 20.17	c1	c1	[26] 20.17	m	m
5	From	[26] 20.20	m	m	[26] 20.20	m	m
6	To	[26] 20.39	m	m	[26] 20.39	m	m
7	Via	[26] 20.42	m	m	[26] 20.42	m	m
c1:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.						

Prerequisite A.5/3 - - BYE response for all remaining status-codes

Table A.12: Supported header fields within the BYE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Allow	[26] 20.5	c11	c11	[26] 20.5	m	m
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Disposition	[26] 20.11	o	o	[26] 20.11	m	m
3	Content-Encoding	[26] 20.12	o	o	[26] 20.12	m	m
4	Content-Language	[26] 20.13	o	o	[26] 20.13	m	m
5	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
6	Content-Type	[26] 20.15	m	m	[26] 20.15	m	m
7	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
8	Date	[26] 20.17	c1	c1	[26] 20.17	m	m
9	From	[26] 20.20	m	m	[26] 20.20	m	m
9A	Geolocation-Error	[89] 4.3	c12	c12	[89] 4.3	c12	c12
10	MIME-Version	[26] 20.24	o	o	[26] 20.24	m	m
10A	P-Access-Network-Info	[52] 4.4	c5	c6	[52] 4.4	c5	c7
10B	P-Asserted-Identity	[34] 9.1	n/a	n/a	[34] 9.1	c3	c3
10C	P-Charging-Function-Addresses	[52] 4.5	c9	c10	[52] 4.5	c9	c10
10D	P-Charging-Vector	[52] 4.6	c8	n/a	[52] 4.6	c8	n/a
10F	Privacy	[33] 4.2	c4	n/a	[33] 4.2	c4	c4
10G	Require	[26] 20.32	o	o	[26] 20.32	m	m
10H	Server	[26] 20.35	o	o	[26] 20.35	o	o
11	Timestamp	[26] 20.38	m	m	[26] 20.38	c2	c2
12	To	[26] 20.39	m	m	[26] 20.39	m	m
12A	User-Agent	[26] 20.41	o	o	[26] 20.41	o	o
12B	User-to-User	[126] 7	c13	c13	[126] 7	c13	c13
13	Via	[26] 20.42	m	m	[26] 20.42	m	m
14	Warning	[26] 20.43	o (note)	o (note)	[26] 20.43	o	o

c1: IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.
c2: IF A.4/6 THEN m ELSE n/a - - timestamping of requests.
c3: IF A.4/25 THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c4: IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c5: IF A.4/34 THEN o ELSE n/a - - the P-Access-Network-Info header extension.
c6: IF A.4/34 AND A.3/1 THEN m ELSE n/a - - the P-Access-Network-Info header extension and UE.
c7: IF A.4/34 AND (A.3/7A OR A.3/7D) THEN m ELSE n/a - - the P-Access-Network-Info header extension and AS acting as terminating UA or AS acting as third-party call controller.
c8: IF A.4/36 THEN o ELSE n/a - - the P-Charging-Vector header extension.
c9: IF A.4/35 THEN o ELSE n/a - - the P-Charging-Function-Addresses header extension.
c10: IF A.4/35 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c11: IF A.6/18 THEN m ELSE o - - 405 (Method Not Allowed).
c12: IF A.4/60 THEN m ELSE n/a - - SIP location conveyance.
c13: IF A.4/76 THEN o ELSE n/a - - transporting user to user information for call centers using SIP.

NOTE: For a 488 (Not Acceptable Here) response, RFC 3261 [26] gives the status of this header as SHOULD rather than OPTIONAL.

Prerequisite A.5/3 - - BYE response

Prerequisite: A.6/102 - - Additional for 2xx response

Table A.13: Supported header fields within the BYE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Accept-Resource-Priority	[116] 3.2	c5	c5	[116] 3.2	c5	c5
0B	Allow-Events	[28] 7.2.2	c3	c3	[28] 7.2.2	c4	c4
1	Authentication-Info	[26] 20.6	c1	c1	[26] 20.6	c2	c2
4	Supported	[26] 20.37	o	m	[26] 20.37	m	m

c1:	IF A.4/7 THEN o ELSE n/a - - authentication between UA and UA.
c2:	IF A.4/7 THEN m ELSE n/a - - authentication between UA and UA.
c3:	IF A.4/20 THEN o ELSE n/a - - SIP specific event notification extension.
c4:	IF A.4/20 THEN m ELSE n/a - - SIP specific event notification extension.
c5:	IF A.4/70B THEN m ELSE n/a - - inclusion of CANCEL, BYE, REGISTER and PUBLISH in communications resource priority for the session initiation protocol.

Prerequisite A.5/3 - - BYE response

Prerequisite: A.6/103 OR A.6/104 OR A.6/105 OR A.6/106 - - Additional for 3xx – 6xx response

Table A.13A: Supported header fields within the BYE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Error-Info	[26] 20.18	o	o	[26] 20.18	o	o

Prerequisite A.5/3 - - BYE response

Prerequisite: A.6/103 OR A.6/35 - - Additional for 3xx or 485 (Ambiguous) response

Table A.14: Supported header fields within the BYE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0B	Contact	[26] 20.10	o (note)	o	[26] 20.10	m	m
NOTE:	RFC 3261 [26] gives the status of this header as SHOULD rather than OPTIONAL.						

Prerequisite A.5/3 - - BYE response

Prerequisite: A.6/14 - - Additional for 401 (Unauthorized) response

Table A.15: Supported header fields within the BYE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
2	Proxy-Authenticate	[26] 20.27	c1	c1	[26] 20.27	c1	c1
8	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	m	m
c1:	IF A.4/7 THEN m ELSE n/a - - support of authentication between UA and UA.						

Prerequisite A.5/3 - - BYE response

Prerequisite: A.6/17 OR A.6/23 OR A.6/30 OR A.6/36 OR A.6/42 OR A.6/45 OR A.6/50 OR A.6/51 - - Additional for 404 (Not Found), 413 (Request Entity Too Large), 480(Temporarily not available), 486 (Busy Here), 500 (Internal Server Error), 503 (Service Unavailable), 600 (Busy Everywhere), 603 (Decline) response

Table A.16: Supported header fields within the BYE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Retry-After	[26] 20.33	o	o	[26] 20.33	o	o

Table A.17: Void

Prerequisite A.5/3 - - BYE response

Prerequisite: A.6/19 - - Additional for 407 (Proxy Authentication Required) response

Table A.18: Supported header fields within the BYE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
2	Proxy-Authenticate	[26] 20.27	c1	c1	[26] 20.27	c1	c1
6	WWW-Authenticate	[26] 20.44	o	o	[26] 20.44	o	o
c1:	IF A.4/7 THEN m ELSE n/a - - support of authentication between UA and UA.						

Prerequisite A.5/3 - - BYE response

Prerequisite A.6/25 - - Additional for 415 (Unsupported Media Type) response

Table A.19: Supported header fields within the BYE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	o.1	o.1	[26] 20.1	m	m
2	Accept-Encoding	[26] 20.2	o.1	o.1	[26] 20.2	m	m
3	Accept-Language	[26] 20.3	o.1	o.1	[26] 20.3	m	m
o.1	At least one of these capabilities is supported.						

Prerequisite A.5/3 - - BYE response

Prerequisite: A.6/26A - - Additional for 417 (Unknown Resource-Priority) response

Table A.19A: Supported header fields within the BYE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
c1:	IF A.4/70B THEN m ELSE n/a - - inclusion of CANCEL, BYE, REGISTER and PUBLISH in communications resource priority for the session initiation protocol.						

Prerequisite A.5/3 - - BYE response

Prerequisite: A.6/27 - - Additional for 420 (Bad Extension) response

Table A.20: Supported header fields within the BYE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
5	Unsupported	[26] 20.40	m	m	[26] 20.40	m	m

Prerequisite A.5/3 - - BYE response

Prerequisite: A.6/28 OR A.6/41A - - Additional for 421 (Extension Required), 494 (Security Agreement Required) response

Table A.20A: Supported header fields within the BYE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Security-Server	[48] 2	x	x	[48] 2	c1	c1
c1:	IF A.4/37 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						

Table A.21: Void

Prerequisite A.5/3 - - BYE response

Prerequisite: A.6/6 - - Additional for 200 (OK) response

Table A.22: Supported message bodies within the BYE response

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	VoiceXML expr / namelist data	[145] 4.2	o	c1	[145] 4.2	o	c1
c1:	IF A.4/84 THEN o ELSE n/a - - SIP Interface to VoiceXML Media Services.						

A.2.1.4.4 CANCEL method

Prerequisite A.5/4 - - CANCEL request

Table A.23: Supported header fields within the CANCEL request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Contact	[56B] 9.2	c9	c9	[56B] 9.2	c11	c11
5	Authorization	[26] 20.7	c3	c3	[26] 20.7	c3	c3
6	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
8	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
9	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
10	Date	[26] 20.17	c4	c4	[26] 20.17	m	m
11	From	[26] 20.20	m	m	[26] 20.20	m	m
11A	Max-Breadth	[117] 5.8	n/a	c16	[117] 5.8	c17	c17
12	Max-Forwards	[26] 20.22	m	m	[26] 20.22	n/a	c18
14	Privacy	[33] 4.2	c6	n/a	[33] 4.2	c6	n/a
15	Reason	[34A] 2	c7	c10	[34A] 2	c12	c12
16	Record-Route	[26] 20.30	n/a	c18	[26] 20.30	n/a	c18
17	Reject-Contact	[56B] 9.2	c9	c9	[56B] 9.2	c11	c11
17A	Request-Disposition	[56B] 9.1	c9	c9	[56B] 9.1	c11	c11
17B	Resource-Priority	[116] 3.1	c13	c13	[116] 3.1	c13	c13
18	Route	[26] 20.34	m	m	[26] 20.34	n/a	c18
19	Supported	[26] 20.37	o	o	[26] 20.37	m	m
20	Timestamp	[26] 20.38	c8	c8	[26] 20.38	m	m
21	To	[26] 20.39	m	m	[26] 20.39	m	m
22	User-Agent	[26] 20.41	o	o	[26] 20.41	o	o
23	Via	[26] 20.42	m	m	[26] 20.42	m	m
c3:	IF A.4/7 THEN m ELSE n/a - - authentication between UA and UA.						
c4:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.						
c6:	IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).						
c7:	IF A.4/38 THEN o ELSE n/a - - the Reason header field for the session initiation protocol.						
c8:	IF A.4/6 THEN o ELSE n/a - - timestamping of requests.						
c9:	IF A.4/40 THEN o ELSE n/a - - caller preferences for the session initiation protocol.						
c10:	IF A.3/2 THEN m ELSE IF A.4/38 THEN o ELSE n/a - - P-CSCF, the Reason header field for the session initiation protocol.						
c11:	IF A.4/40 THEN m ELSE n/a - - caller preferences for the session initiation protocol.						
c12:	IF A.4/38 THEN m ELSE n/a - - the Reason header field for the session initiation protocol.						
c13:	IF A.4/70B THEN m ELSE n/a - - inclusion of CANCEL, BYE, REGISTER and PUBLISH in communications resource priority for the session initiation protocol.						
c16:	IF A.4/71 AND (A.3/9B OR A.3/9C) THEN m ELSE IF A.3/1 AND NOT A.3C/1 THEN n/a ELSE o - - addressing an amplification vulnerability in session initiation protocol forking proxies, IBCF (IMS-ALG), IBCF (Screening of SIP signalling), UE, UE performing the functions of an external attached network.						
c17:	IF A.4/71 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.						
c18:	IF A.3/1 AND NOT A.3C/1 THEN n/a ELSE o - - UE, UE performing the functions of an external attached network.						

Prerequisite A.5/4 - - CANCEL request

Table A.24: Supported message bodies within the CANCEL request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	XML Schema for PSTN	[11B]		c1	[11B]		c1
c1:	IF A.3/6 OR A.3/7A OR A.3/7B OR A.3/7D OR A.3/9B THEN o ELSE n/a - - MGCF, AS acting as terminating UA, or redirect server, AS acting as originating UA, AS performing 3rd party call control, IBCF (IMS-ALG).						

Prerequisite A.5/5 - - CANCEL response for all status-codes

Table A.25: Supported header fields within the CANCEL response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
3	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
4	Date	[26] 20.17	c1	c1	[26] 20.17	m	m
5	From	[26] 20.20	m	m	[26] 20.20	m	m
5B	Privacy	[33] 4.2	c3	n/a	[33] 4.2	c3	n/a
6	Timestamp	[26] 20.38	m	m	[26] 20.38	c2	c2
7	To	[26] 20.39	m	m	[26] 20.39	m	m
7A	User-Agent	[26] 20.41	o	o	[26] 20.41	o	o
8	Via	[26] 20.42	m	m	[26] 20.42	m	m
9	Warning	[26] 20.43	o (note)	o	[26] 20.43	o	o
c1:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.						
c2:	IF A.4/6 THEN m ELSE n/a - - timestamping of requests.						
c3:	IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).						
NOTE:	For a 488 (Not Acceptable Here) response, RFC 3261 [26] gives the status of this header as SHOULD rather than OPTIONAL.						

Prerequisite A.5/5 - - CANCEL response

Prerequisite: A.6/102 - - Additional for 2xx response

Table A.26: Supported header fields within the CANCEL response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
2	Record-Route	[26] 20.30	n/a	n/a	[26] 20.30	n/a	n/a
4	Supported	[26] 20.37	o	m	[26] 20.37	m	m
c1:	IF A.4/70B THEN m ELSE n/a - - inclusion of CANCEL, BYE, REGISTER and PUBLISH in communications resource priority for the session initiation protocol.						

Prerequisite A.5/5 - - CANCEL response

Prerequisite: A.6/103 OR A.6/104 OR A.6/105 OR A.6/106 - - Additional for 3xx – 6xx response

Table A.26A: Supported header fields within the CANCEL response

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Error-Info	[26] 20.18	o	o	[26] 20.18	o	o

Table A.27: Void

Prerequisite A.5/5 - - CANCEL response

Prerequisite: A.6/17 OR A.6/23 OR A.6/30 OR A.6/42 OR A.6/45 OR A.6/50 OR A.6/51 - - Additional for Entity Too Large), 480(Temporarily not available), 486 (Busy Here), 500 (Internal Server Error), 503 (Service Unavailable), 600 (Busy Everywhere), 603 (Decline) response

Table A.28: Supported header fields within the CANCEL response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
4	Retry-After	[26] 20.33	o	o	[26] 20.33	o	o

Table A.29: Void

Table A.30: Void

Prerequisite A.5/5 - - CANCEL response

Prerequisite: A.6/26A - - Additional for 417 (Unknown Resource-Priority) response

Table A.30A: Supported header fields within the CANCEL response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
c1:	IF A.4/70B THEN m ELSE n/a - - inclusion of CANCEL, BYE, REGISTER and PUBLISH in communications resource priority for the session initiation protocol.						

Prerequisite A.5/5 - - CANCEL response

Table A.31: Supported message bodies within the CANCEL response

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

A.2.1.4.5 COMET method

Void

A.2.1.4.6 INFO method

Prerequisite A.5/9A - - INFO request

Table A.32: Supported header fields within the INFO request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	o	o	[26] 20.1	m	m
2	Accept-Encoding	[26] 20.2	o	o	[26] 20.2	m	m
3	Accept-Language	[26] 20.3	o	o	[26] 20.3	m	m
4	Allow	[26] 20.5	o	o	[26] 20.5	m	m
5	Allow-Events	[28] 7.2.2	c1	c1	[28] 7.2.2	c2	c2
6	Authorization	[26] 20.7	c3	c3	[26] 20.7	c3	c3
7	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
7A	Call-Info	[26] 20.9	o	o	[26] 20.9	o	o
9	Content-Disposition	[26] 20.11	o	o	[26] 20.11	m	m
10	Content-Encoding	[26] 20.12	o	o	[26] 20.12	m	m
11	Content-Language	[26] 20.13	o	o	[26] 20.13	m	m
12	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
13	Content-Type	[26] 20.15	m	m	[26] 29.15	m	m
14	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
15	Date	[26] 20.17	c4	c4	[26] 20.17	m	m
16	From	[26] 20.20	m	m	[26] 20.20	m	m
17	Geolocation	[89] 4.1	c29	c29	[89] 4.1	c29	c29
17A	Geolocation-Routing	[89] 4.1	c29	c29	[89] 4.1	c29	c29
18	Info-Package	[25] 7.2	c42	c42	[25] 7.2	c42	c42
19	Max-Breadth	[117] 5.8	n/a	c39	[117] 5.8	c40	c40
20	Max-Forwards	[26] 20.22	m	m	[26] 20.22	n/a	c41
21	MIME-Version	[26] 20.24	o	o	[26] 20.24	m	m
22	P-Access-Network-Info	[52] 4.4	c15	c16	[52] 4.4	c15	c17
23	P-Charging-Function-Addresses	[52] 4.5	c20	c21	[52] 4.5	c20	c21
24	P-Charging-Vector	[52] 4.6	c18	c19	[52] 4.6	c18	c19
26	Privacy	[33] 4.2	c12	c12	[33] 4.2	c12	c12
27	Proxy-Authorization	[26] 20.28	c5	c5	[26] 20.28	n/a	n/a
28	Proxy-Require	[26] 20.29	o	n/a	[26] 20.29	n/a	n/a
29	Reason	[34A] 2	c6	c6	[34A] 2	c6	c6
30	Record-Route	[26] 20.30	n/a	c41	[26] 20.30	n/a	c41
31	Referred-By	[59] 3	c25	c25	[59] 3	c26	c26
33	Request-Disposition	[56B] 9.1	c24	c24	[56B] 9.1	c28	c28
34	Require	[26] 20.32	m	m	[26] 20.32	m	m
35	Resource-Priority	[116] 3.1	c30	c30	[116] 3.1	c30	c30
36	Route	[26] 20.34	m	m	[26] 20.34	n/a	c41
37	Security-Client	[48] 2.3.1	c22	c22	[48] 2.3.1	n/a	n/a
38	Security-Verify	[48] 2.3.1	c23	c23	[48] 2.3.1	n/a	n/a
39	Subject	[26] 20.35	o	o	[26] 20.36	o	o
40	Supported	[26] 20.37	m	m	[26] 20.37	m	m
41	Timestamp	[26] 20.38	c10	c10	[26] 20.38	m	m
42	To	[26] 20.39	m	m	[26] 20.39	m	m
43	User-Agent	[26] 20.41	o	o	[26] 20.41	o	o
44	Via	[26] 20.42	m	m	[26] 20.42	m	m

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
c1:	IF A.4/20 THEN o ELSE n/a - - SIP specific event notification extension.						
c2:	IF A.4/20 THEN m ELSE n/a - - SIP specific event notification extension.						
c3:	IF A.4/7 THEN m ELSE n/a - - authentication between UA and UA.						
c4:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.						
c5:	IF A.4/8A THEN m ELSE n/a - - authentication between UA and proxy.						
c6:	IF A.4/38 THEN o ELSE n/a - - the Reason header field for the session initiation protocol.						
c10:	IF A.4/6 THEN o ELSE n/a - - timestamping of requests.						
c12:	IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).						
c15:	IF A.4/34 THEN o ELSE n/a - - the P-Access-Network-Info header extension.						
c16:	IF A.4/34 AND A.3/1 THEN m ELSE n/a - - the P-Access-Network-Info header extension and UE.						
c17:	IF A.4/34 AND (A.3/7A OR A.3/7D) THEN m ELSE n/a - - the P-Access-Network-Info header extension and AS acting as terminating UA or AS acting as third-party call controller.						
c18:	IF A.4/36 THEN o ELSE n/a - - the P-Charging-Vector header extension.						
c19:	IF A.4/36 THEN m ELSE n/a - - the P-Charging-Vector header extension.						
c20:	IF A.4/35 THEN o ELSE n/a - - the P-Charging-Function-Addresses header extension.						
c21:	IF A.4/35 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.						
c22:	IF A.4/37 THEN o ELSE n/a - - security mechanism agreement for the session initiation protocol (note 2).						
c23:	IF A.4/37 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						
c24	IF A.4/40 THEN o ELSE n/a - - caller preferences for the session initiation protocol.						
c25:	IF A.4/43 THEN m ELSE n/a - - the SIP Referred-By mechanism.						
c26:	IF A.4/43 THEN o ELSE n/a - - the SIP Referred-By mechanism.						
c28:	IF A.4/40 THEN m ELSE n/a - - caller preferences for the session initiation protocol.						
c29:	IF A.4/60 THEN m ELSE n/a - - SIP location conveyance.						
c30:	IF A.4/70A THEN m ELSE n/a - - inclusion of INFO, SUBSCRIBE, NOTIFY in communications resource priority for the session initiation protocol.						
c39:	IF A.4/71 AND (A.3/9B OR A.3/9C) THEN m ELSE IF A.3/1 AND NOT A.3C/1 THEN n/a ELSE o - - addressing an amplification vulnerability in session initiation protocol forking proxies, IBCF (IMS-ALG), IBCF (Screening of SIP signalling), UE, UE performing the functions of an external attached network.						
c40:	IF A.4/71 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.						
c41:	IF A.3/1 AND NOT A.3C/1 THEN n/a ELSE o - - UE, UE performing the functions of an external attached network.						
c42:	IF A.4/13A THEN n/a ELSE m - - legacy INFO usage.						
NOTE 2:	Support of this header field in this method is dependent on the security mechanism and the security architecture which is implemented. Use of this header field in this method is not appropriate to the security mechanism defined by 3GPP TS 33.203 [19].						

Prerequisite A.5/9A - - INFO request

Table A.33: Supported message bodies within the INFO request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Info-Package	[25]	m	m	[25]	m	m

Prerequisite A.5/9B - - INFO response

Prerequisite: A.6/1 - - Additional for 100 (Trying) response

Table A.34: Supported header fields within the INFO response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
3	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
4	Date	[26] 20.17	c1	c1	[26] 20.17	m	m
5	From	[26] 20.20	m	m	[26] 20.20	m	m
6	To	[26] 20.39	m	m	[26] 20.39	m	m
7	Via	[26] 20.42	m	m	[26] 20.42	m	m
c1:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.						

Prerequisite A.5/9B - - INFO response for all remaining status-codes

Table A.35: Supported header fields within the INFO response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Allow	[26] 20.5	c12	c12	[26] 20.5	m	m
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Call-Info	[26] 20.9	o	o	[26] 20.9	o	o
3	Content-Disposition	[26] 20.11	o	o	[26] 20.11	m	m
4	Content-Encoding	[26] 20.12	o	o	[26] 20.12	m	m
5	Content-Language	[26] 20.13	o	o	[26] 20.13	m	m
6	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
7	Content-Type	[26] 20.15	m	m	[26] 20.15	m	m
8	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
9	Date	[26] 20.17	c1	c1	[26] 20.17	m	m
10	From	[26] 20.20	m	m	[26] 20.20	m	m
11	Geolocation-Error	[89] 4.3	c14	c14	[89] 4.3	c14	c14
12	MIME-Version	[26] 20.24	o	o	[26] 20.24	m	m
13	Organization	[26] 20.25	o	o	[26] 20.25	o	o
14	P-Access-Network-Info	[52] 4.4	c5	c6	[52] 4.4	c5	c7
15	P-Charging-Function-Addresses	[52] 4.5	c10	c11	[52] 4.5	c10	c11
16	P-Charging-Vector	[52] 4.6	c8	c9	[52] 4.6	c8	c9
18	Privacy	[33] 4.2	c4	c4	[33] 4.2	c4	c4
19	Require	[26] 20.32	m	m	[26] 20.32	m	m
20	Server	[26] 20.35	o	o	[26] 20.35	o	o
21	Timestamp	[26] 20.38	m	m	[26] 20.38	c2	c2
22	To	[26] 20.39	m	m	[26] 20.39	m	m
23	User-Agent	[26] 20.41	o	o	[26] 20.41	o	o
24	Via	[26] 20.42	m	m	[26] 20.42	m	m
25	Warning	[26] 20.43	o	o	[26] 20.43	o	o
c1:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.						
c2:	IF A.4/6 THEN m ELSE n/a - - timestamping of requests.						
c4:	IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).						
c5:	IF A.4/34 THEN o ELSE n/a - - the P-Access-Network-Info header extension.						
c6:	IF A.4/34 AND A.3/1 THEN m ELSE n/a - - the P-Access-Network-Info header extension and UE.						
c7:	IF A.4/34 AND (A.3/7A OR A.3/7D) THEN m ELSE n/a - - the P-Access-Network-Info header extension and AS acting as terminating UA or AS acting as third-party call controller.						
c8:	IF A.4/36 THEN o ELSE n/a - - the P-Charging-Vector header extension.						
c9:	IF A.4/36 THEN m ELSE n/a - - the P-Charging-Vector header extension.						
c10:	IF A.4/35 THEN o ELSE n/a - - the P-Charging-Function-Addresses header extension.						
c11:	IF A.4/35 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.						
c12:	IF A.6/18 THEN m ELSE o - - 405 (Method Not Allowed).						
c14:	IF A.4/60 THEN m ELSE n/a - - SIP location conveyance.						

Prerequisite A.5/9B - - INFO response

Prerequisite: A.6/102 - - Additional for 2xx response

Table A.36: Supported header fields within the INFO response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	o	o	[26] 20.1	m	m
2	Accept-Encoding	[26] 20.2	o	o	[26] 20.2	m	m
3	Accept-Language	[26] 20.3	o	o	[26] 20.3	m	m
4	Accept-Resource-Priority	[116] 3.2	c5	c5	[116] 3.2	c5	c5
5	Allow-Events	[28] 7.2.2	c3	c3	[28] 7.2.2	c4	c4
6	Authentication-Info	[26] 20.6	c1	c1	[26] 20.6	c2	c2
9	Supported	[26] 20.37	o	o	[26] 20.37	m	m

c1:	IF A.4/7 THEN o ELSE n/a - - authentication between UA and UA.
c2:	IF A.4/7 THEN m ELSE n/a - - authentication between UA and UA.
c3:	IF A.4/20 THEN o ELSE n/a - - SIP specific event notification extension.
c4:	IF A.4/20 THEN m ELSE n/a - - SIP specific event notification extension.
c5:	IF A.4/70A THEN m ELSE n/a - - inclusion of INFO, SUBSCRIBE, NOTIFY in communications resource priority for the session initiation protocol.

Prerequisite A.5/9B - - INFO response

Prerequisite: A.6/103 OR A.6/104 OR A.6/105 OR A.6/106 - - Additional for 3xx – 6xx response

Table A.37: Supported header fields within the INFO response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Error-Info	[26] 20.18	o	o	[26] 20.18	o	o

Prerequisite A.5/9B - - INFO response

Prerequisite: A.6/103 - - Additional for 3xx or 485 (Ambiguous) response

Table A.37A: void

Prerequisite A.5/9B - - INFO response

Prerequisite: A.6/14 - - Additional for 401 (Unauthorized) response

Table A.38: Supported header fields within the INFO response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Proxy-Authenticate	[26] 20.27	c1	c1	[26] 20.27	c1	c1
6	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	m	m
c1:	IF A.4/7 THEN m ELSE n/a - - support of authentication between UA and UA.						

Prerequisite A.5/9B - - INFO response

Prerequisite: A.6/17 OR A.6/23 OR A.6/30 OR A.6/36 OR A.6/42 OR A.6/45 OR A.6/50 OR A.6/51 - - Additional for 404 (Not Found), 413 (Request Entity Too Large), 480 (Temporarily not available), 486 (Busy Here), 500 (Internal Server Error), 503 (Service Unavailable), 600 (Busy Everywhere), 603 (Decline) response

Table A.39: Supported header fields within the INFO response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
4	Retry-After	[26] 20.33	o	o	[26] 20.33	o	o

Table A.40: Void

Prerequisite A.5/9B - - INFO response

Prerequisite: A.6/25 - - Additional for 415 (Unsupported Media Type) response

Table A.41: Supported header fields within the INFO response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	o.1	o.1	[26] 20.1	m	m
2	Accept-Encoding	[26] 20.2	o.1	o.1	[26] 20.2	m	m
3	Accept-Language	[26] 20.3	o.1	o.1	[26] 20.3	m	m
o.1	At least one of these capabilities is supported.						

Prerequisite A.5/9B - - INFO response

Prerequisite: A.6/26A - - Additional for 417 (Unknown Resource-Priority) response

Table A.41A: Supported header fields within the INFO response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
c1:	IF A.4/70A THEN m ELSE n/a - - inclusion of INFO, SUBSCRIBE, NOTIFY in communications resource priority for the session initiation protocol.						

Prerequisite A.5/9B - - INFO response

Prerequisite: A.6/27 - - Additional for 420 (Bad Extension) response

Table A.42: Supported header fields within the INFO response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
5	Unsupported	[26] 20.40	m	m	[26] 20.40	m	m

Prerequisite A.5/9B - - INFO response

Prerequisite: A.6/28 OR A.6/41A - - Additional for 421 (Extension Required), 494 (Security Agreement Required) response

Table A.42A: Supported header fields within the INFO response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Security-Server	[48] 2	x	x	[48] 2	c1	c1
c1:	IF A.4/37 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						

Table A.43: Void

Table A.44: Void

Prerequisite A.5/9B - - INFO response

Table A.45: Supported message bodies within the INFO response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

A.2.1.4.7 INVITE method

Prerequisite A.5/8 - - INVITE request

Table A.46: Supported header fields within the INVITE request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	o	c47	[26] 20.1	m	m
1A	Accept-Contact	[56B] 9.2	c24	c24	[56B] 9.2	c32	c32
2	Accept-Encoding	[26] 20.2	o	o	[26] 20.2	m	m
3	Accept-Language	[26] 20.3	o	o	[26] 20.3	m	m
4	Alert-Info	[26] 20.4	o	o	[26] 20.4	c1	c1
5	Allow	[26] 20.5, [26] 5.1	o (note 1)	o	[26] 20.5, [26] 5.1	m	m
6	Allow-Events	[28] 7.2.2	c2	c2	[28] 7.2.2	c2	c2
7	Answer-Mode	[158]	c49	c49	[158]	c50	c50
8	Authorization	[26] 20.7	c3	c3	[26] 20.7	c3	c3
9	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
10	Call-Info	[26] 20.9	o	o	[26] 20.9	o	o
11	Contact	[26] 20.10	m	m	[26] 20.10	m	m
12	Content-Disposition	[26] 20.11	o	o	[26] 20.11	m	m
13	Content-Encoding	[26] 20.12	o	o	[26] 20.12	m	m
14	Content-Language	[26] 20.13	o	o	[26] 20.13	m	m
15	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
16	Content-Type	[26] 20.15	m	m	[26] 20.15	m	m
17	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
18	Date	[26] 20.17	c4	c4	[26] 20.17	m	m
19	Expires	[26] 20.19	o	o	[26] 20.19	o	o
20	From	[26] 20.20	m	m	[26] 20.20	m	m
20A	Geolocation	[89] 4.1	c33	c33	[89] 4.1	c33	c33
20B	Geolocation-Routing	[89] 4.1	c33	c33	[89] 4.1	c33	c33
20C	History-Info	[66] 4.1	c31	c31	[66] 4.1	c31	c31
21	In-Reply-To	[26] 20.21	o	o	[26] 20.21	o	o
21A	Join	[61] 7.1	c30	c30	[61] 7.1	c30	c30
21B	Max-Breadth	[117] 5.8	n/a	c45	[117] 5.8	c46	c46
22	Max-Forwards	[26] 20.22	m	m	[26] 20.22	n/a	c52
23	MIME-Version	[26] 20.24	o	o	[26] 20.24	m	m
23A	Min-SE	[58] 5	c26	c26	[58] 5	c25	c25
24	Organization	[26] 20.25	o	o	[26] 20.25	o	o
24A	P-Access-Network-Info	[52] 4.4	c15	c16	[52] 4.4	c15	c17
24B	P-Asserted-Identity	[34] 9.1	n/a	c65	[34] 9.1	c7	c7
24C	P-Asserted-Service	[121] 4.1	n/a	c67	[121] 4.1	c38	c38
24D	P-Called-Party-ID	[52] 4.2	x	x	[52] 4.2	c13	c13
24E	P-Charging-Function-Addresses	[52] 4.5	c20	c21	[52] 4.5	c20	c21
24F	P-Charging-Vector	[52] 4.6	c18	c19	[52] 4.6	c18	c19
24H	P-Early-Media	[109] 8	c34	c34	[109] 8	c34	c34
25	P-Media-Authorization	[31] 5.1	n/a	n/a	[31] 5.1	c11	c12
25A	P-Preferred-Identity	[34] 9.2	c7	c5	[34] 9.2	n/a	n/a
25B	P-Preferred-Service	[121] 4.2	c37	c36	[121] 4.2	n/a	n/a
25C	P-Private-Network-Indication	[134]	c42	c42	[134]	c42	c42
25D	P-Profile-Key	[97] 5	n/a	n/a	[97] 5	n/a	n/a
25E	P-Served-User	[133] 6	c51	c51	[133] 6	c51	c51
25F	P-User-Database	[82] 4	n/a	n/a	[82] 4	n/a	n/a
25G	P-Visited-Network-ID	[52] 4.3	x (note 3)	x	[52] 4.3	c14	n/a
26	Priority	[26] 20.26	o	o	[26] 20.26	o	o
26A	Privacy	[33] 4.2	c9	c9	[33] 4.2	c9	c9
26B	Priv-Answer-Mode	[158]	c49	c49	[158]	c50	c50
27	Proxy-Authorization	[26] 20.28	c6	c6	[26] 20.28	n/a	n/a
28	Proxy-Require	[26] 20.29	o (note 2)	o (note 2)	[26] 20.29	n/a	n/a
28A	Reason	[34A] 2	c8	c8	[34A] 2	c8	c8
29	Record-Route	[26] 20.30	n/a	c52	[26] 20.30	m	m
29A	Recv-Info	[25] 5.2.3	c48	c48	[25] 5.2.3	c48	c48

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
30	Referred-By	[59] 3	c27	c27	[59] 3	c28	c28
31	Reject-Contact	[56B] 9.2	c24	c24	[56B] 9.2	c32	c32
31A	Replaces	[60] 6.1	c29	c29	[60] 6.1	c29	c29
31B	Reply-To	[26] 20.31	o	o	[26] 20.31	o	o
31C	Request-Disposition	[56B] 9.1	c24	c24	[56B] 9.1	c32	c32
32	Require	[26] 20.32	o	m	[26] 20.32	m	m
32A	Resource-Priority	[116] 3.1	c35	c35	[116] 3.1	c35	c35
33	Route	[26] 20.34	m	m	[26] 20.34	n/a	c52
33A	Security-Client	[48] 2.3.1	c22	c22	[48] 2.3.1	n/a	n/a
33B	Security-Verify	[48] 2.3.1	c23	c23	[48] 2.3.1	n/a	n/a
33C	Session-Expires	[58] 4	c25	c25	[58] 4	c25	c25
34	Subject	[26] 20.36	o	o	[26] 20.36	o	o
35	Supported	[26] 20.37	m	m	[26] 20.37	m	m
35A	Target-Dialog	[184] 7	c56	c56	[184] 7	c57	c57
36	Timestamp	[26] 20.38	c10	c10	[26] 20.38	m	m
37	To	[26] 20.39	m	m	[26] 20.39	m	m
37A	Trigger-Consent	[125] 5.11.2	c39	c39	[125] 5.11.2	c40	c40
38	User-Agent	[26] 20.41	o	o	[26] 20.41	o	o
38A	User-to-User	[126] 7	c41	c41	[126] 7	c41	c41
39	Via	[26] 20.42	m	m	[26] 20.42	m	m

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
c1:	IF A.4/12 THEN m ELSE n/a - - downloading of alerting information.						
c2:	IF A.4/20 THEN m ELSE n/a - - SIP specific event notification extension.						
c3:	IF A.4/7 THEN m ELSE n/a - - authentication between UA and UA.						
c4:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.						
c5:	IF A.3/1 AND A.4/25 THEN o ELSE n/a - - UE and private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.						
c6:	IF A.4/8A THEN m ELSE n/a - - authentication between UA and proxy.						
c7:	IF A.4/25 THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.						
c8:	IF A.4/38 THEN o ELSE n/a - - the Reason header field for the session initiation protocol.						
c9:	IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).						
c10:	IF A.4/6 THEN o ELSE n/a - - timestamping of requests.						
c11:	IF A.4/19 THEN m ELSE n/a - - SIP extensions for media authorization.						
c12:	IF A.3/1 AND A.4/19 THEN m ELSE n/a - - UE, SIP extensions for media authorization.						
c13:	IF A.4/32 THEN o ELSE n/a - - the P-Called-Party-ID extension.						
c14:	IF A.4/33 THEN o ELSE n/a - - the P-Visited-Network-ID extension.						
c15:	IF A.4/34 THEN o ELSE n/a - - the P-Access-Network-Info header extension.						
c16:	IF A.4/34 AND A.3/1 THEN m ELSE n/a - - the P-Access-Network-Info header extension and UE.						
c17:	IF A.4/34 AND (A.3/7A OR A.3/7D) THEN m ELSE n/a - - the P-Access-Network-Info header extension and AS acting as terminating UA or AS acting as third-party call controller.						
c18:	IF A.4/36 THEN o ELSE n/a - - the P-Charging-Vector header extension.						
c19:	IF A.4/36 THEN m ELSE n/a - - the P-Charging-Vector header extension.						
c20:	IF A.4/35 THEN o ELSE n/a - - the P-Charging-Function-Addresses header extension.						
c21:	IF A.4/35 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.						
c22:	IF A.4/37 THEN o ELSE n/a - - security mechanism agreement for the session initiation protocol (note 4).						
c23:	IF A.4/37 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						
c24:	IF A.4/40 THEN o ELSE n/a - - caller preferences for the session initiation protocol.						
c25:	IF A.4/42 THEN m ELSE n/a - - the SIP session timer.						
c26:	IF A.4/42 THEN o ELSE n/a - - the SIP session timer.						
c27:	IF A.4/43 THEN m ELSE n/a - - the SIP Referred-By mechanism.						
c28:	IF A.4/43 THEN o ELSE n/a - - the SIP Referred-By mechanism.						
c29:	IF A.4/44 THEN m ELSE n/a - - the Session Inititation Protocol (SIP) "Replaces" header.						
c30:	IF A.4/45 THEN m ELSE n/a - - the Session Inititation Protocol (SIP) "Join" header.						
c31:	IF A.4/47 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.						
c32:	IF A.4/40 THEN m ELSE n/a - - caller preferences for the session initiation protocol.						
c33:	IF A.4/60 THEN m ELSE n/a - - SIP location conveyance.						
c34:	IF A.4/66 THEN m ELSE n/a - - The SIP P-Early-Media private header extension for authorization of early media.						
c35:	IF A.4/70 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.						
c36:	IF (A.3/1 OR A.3A/81) AND A.4/74 THEN o ELSE n/a - - UE, MSC Server enhanced for ICS and SIP extension for the identification of services.						
c37:	IF A.4/74 THEN o ELSE n/a - - SIP extension for the identification of services.						
c38:	IF A.4/74 THEN m ELSE n/a - - SIP extension for the identification of services.						
c39:	IF A.4/75A THEN m ELSE n/a - - a relay within the framework for consent-based communications in SIP.						
c40:	IF A.4/75B THEN m ELSE n/a - - a recipient within the framework for consent-based communications in SIP.						
c41:	IF A.4/76 THEN o ELSE n/a - - transporting user to user information for call centers using SIP.						
c42:	IF A.4/77 THEN m ELSE n/a - - the SIP P-Private-Network-Indication private-header (P-Header).						
c45:	IF A.4/71 AND (A.3/9B OR A.3/9C) THEN m ELSE IF A.3/1 AND NOT A.3C/1 THEN n/a ELSE o - - addressing an amplification vulnerability in session initiation protocol forking proxies, IBCF (IMS-ALG), IBCF (Screening of SIP signalling), UE, UE performing the functions of an external attached network.						
c46:	IF A.4/71 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.						
c47:	IF A.3/1 AND A.4/2B THEN m ELSE o - - UE and initiating a session.						
c48:	IF A.4/13 THEN m ELSE IF A.4/13A THEN m ELSE n/a - - SIP INFO method and package framework, legacy INFO usage.						
c49:	IF A.4/87 THEN o ELSE n/a - - requesting answering modes for SIP.						
c50:	IF A.4/87 THEN m ELSE n/a - - requesting answering modes for SIP.						

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
c51:	IF A.4/78 THEN m ELSE n/a - - the SIP P-Served-User private header.						
c52:	IF A.3/1 AND NOT A.3C/1 THEN n/a ELSE o - - UE, UE performing the functions of an external attached network.						
c56:	IF A.4/99 THEN o ELSE n/a - - request authorization through dialog Identification in the session initiation protocol.						
c57:	IF A.4/99 THEN m ELSE n/a - - request authorization through dialog Identification in the session initiation protocol.						
c65:	IF A.4/25 AND (A.3/6 OR A.3/7B OR A.3/8 OR A.3/81 OR A.3A/83) THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks and MGCF, AS acting as originating UA, MRFC, MSC Server enhanced for ICS, SCC application server.						
c67:	IF A.4/74 AND A.3/7B THEN o ELSE n/a - - SIP extension for the identification of services and AS acting as originating UA.						
o.1:	At least one of these shall be supported.						
NOTE 1:	RFC 3261 [26] gives the status of this header as SHOULD rather than OPTIONAL.						
NOTE 2:	No distinction has been made in these tables between first use of a request on a From/To/Call-ID combination, and the usage in a subsequent one. Therefore the use of "o" etc. above has been included from a viewpoint of first usage.						
NOTE 3:	The strength of this requirement in RFC 3455 [52] is SHOULD NOT, rather than MUST NOT.						
NOTE 4:	Support of this header in this method is dependent on the security mechanism and the security architecture which is implemented. Use of this header in this method is not appropriate to the security mechanism defined by 3GPP TS 33.203 [19].						

Prerequisite A.5/8 - - INVITE request

Table A.47: Supported message bodies within the INVITE request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	XML Schema for PSTN	[11B]		c1	[11B]		c1
c1:	IF A.3/6 OR A.3/7A OR A.3/7B OR A.3/7D OR A.3/9B THEN o ELSE n/a - - MGCF, AS acting as terminating UA, or redirect server, AS acting as originating UA, AS performing 3rd party call control, IBCF (IMS-ALG).						

Prerequisite A.5/9 - - INVITE response

Prerequisite: A.6/1 - - Additional for 100 (Trying) response

Table A.48: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
3	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
4	Date	[26] 20.17	c1	c1	[26] 20.17	m	m
5	From	[26] 20.20	m	m	[26] 20.20	m	m
6	To	[26] 20.39	m	m	[26] 20.39	m	m
7	Via	[26] 20.42	m	m	[26] 20.42	m	m
c1:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.						

Prerequisite A.5/9 - - INVITE response for all remaining status-codes

Table A.49: Supported headerfields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Allow	[26] 20.5	c12	c12	[26] 20.5	m	m
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
1A	Call-Info	[26] 20.9	o	o	[26] 20.9	o	o
2	Content-Disposition	[26] 20.11	o	o	[26] 20.11	m	m
3	Content-Encoding	[26] 20.12	o	o	[26] 20.12	m	m
4	Content-Language	[26] 20.13	o	o	[26] 20.13	m	m
5	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
6	Content-Type	[26] 20.15	m	m	[26] 20.15	m	m
7	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
8	Date	[26] 20.17	c1	c1	[26] 20.17	m	m
8[a]	Expires	[26] 20.19	o	o	[26] 20.19	o	o
9	From	[26] 20.20	m	m	[26] 20.20	m	m
9A	Geolocation-Error	[89] 4.3	c14	c14	[89] 4.3	c14	c14
9B	History-Info	[66] 4.1	c13	c13	[66] 4.1	c13	c13
10	MIME-Version	[26] 20.24	o	o	[26] 20.24	m	m
11	Organization	[26] 20.25	o	o	[26] 20.25	o	o
11A	P-Access-Network-Info	[52] 4.4	c5	c6	[52] 4.4	c5	c7
11B	P-Asserted-Identity	[34] 9.1	n/a	c22	[34] 9.1	c3	c3
11C	P-Charging-Function-Addresses	[52] 4.5	c10	c11	[52] 4.5	c11	c11
11D	P-Charging-Vector	[52] 4.6	c8	c9	[52] 4.6	c8	c9
11F	P-Preferred-Identity	[34] 9.2	c3	x	[34] 9.2	n/a	n/a
11G	Privacy	[33] 4.2	c4	c4	[33] 4.2	c4	c4
11H	Reply-To	[26] 20.31	o	o	[26] 20.31	o	o
11I	Require	[26] 20.32	m	m	[26] 20.32	m	m
11J	Server	[26] 20.35	o	o	[26] 20.35	o	o
12	Timestamp	[26] 20.38	m	m	[26] 20.38	c2	c2
13	To	[26] 20.39	m	m	[26] 20.39	m	m
13A	User-Agent	[26] 20.41	o	o	[26] 20.41	o	o
13B	User-to-User	[126] 7	c15	c15	[126] 7	c15	c15
14	Via	[26] 20.42	m	m	[26] 20.42	m	m
15	Warning	[26] 20.43	o (note)	o	[26] 20.43	o	o

c1: IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.
c2: IF A.4/6 THEN m ELSE n/a - - timestamping of requests.
c3: IF A.4/25 THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c4: IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c5: IF A.4/34 THEN o ELSE n/a - - the P-Access-Network-Info header extension.
c6: IF A.4/34 AND A.3/1 THEN m ELSE n/a - - the P-Access-Network-Info header extension and UE.
c7: IF A.4/34 AND (A.3/7A OR A.3/7D) THEN m ELSE n/a - - the P-Access-Network-Info header extension and AS acting as terminating UA or AS acting as third-party call controller.
c8: IF A.4/36 THEN o ELSE n/a - - the P-Charging-Vector header extension.
c9: IF A.4/36 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c10: IF A.4/35 THEN o ELSE n/a - - the P-Charging-Function-Addresses header extension.
c11: IF A.4/35 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c12: IF A.6/6 OR A.6/18 THEN m ELSE o - - 200 (OK), 405 (Method Not Allowed).
c13: IF A.4/47 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.
c14: IF A.4/60 THEN m ELSE n/a - - SIP location conveyance.
c15: IF A.4/76 THEN o ELSE n/a - - transporting user to user information for call centers using SIP.
c22: IF A.4/25 AND (A.3/6 OR A.3/7B OR A.3/8 OR A.3A/81 OR A.3A/83) THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks and MGCF, AS acting as originating UA, MRFC, MSC Server enhanced for ICS, SCC application server.

NOTE: For a 488 (Not Acceptable Here) response, RFC 3261 [26] gives the status of this header as SHOULD rather than OPTIONAL.

Prerequisite A.5/9 - - INVITE response

Prerequisite: A.6/101A - - Additional for 18x response

Table A.50: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
4	Contact	[26] 20.10	o	m	[26] 20.10	m	m
5	P-Answer-State	[111]	c13	c13	[111]	c13	c13
5A	P-Early-Media	[109] 8	c14	c14	[109] 8	c14	c14
6	P-Media-Authorization	[31] 5.1	n/a	n/a	[31] 5.1	c11	c12
7	Record-Route	[26] 20.30	o	m	[26] 20.30	m	m
8	Recv-Info	[25] 5.2.3	c4	c4	[25] 5.2.3	c4	c4
9	Rseq	[27] 7.1	c2	m	[27] 7.1	c3	m
c2:	IF A.4/14 THEN o ELSE n/a - - reliability of provisional responses in SIP.						
c3:	IF A.4/14 THEN m ELSE n/a - - reliability of provisional responses in SIP.						
c4:	IF A.4/13 THEN m ELSE IF A.4/13A THEN m ELSE n/a - - SIP INFO method and package framework, legacy INFO usage.						
c11:	IF A.4/19 THEN m ELSE n/a - - SIP extensions for media authorization.						
c12:	IF A.3/1 AND A.4/19 THEN m ELSE n/a - - UE, SIP extensions for media authorization.						
c13:	IF A.4/65 THEN m ELSE n/a - - the P-Answer-State header extension to the session initiation protocol for the open mobile alliance push to talk over cellular.						
c14:	IF A.4/66 THEN m ELSE n/a - - the SIP P-Early-Media private header extension for authorization of early media.						

Prerequisite A.5/9 - - INVITE response

Prerequisite: A.6/2 - - Additional for 180 (Ringing) response

Table A.50A: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Alert-Info	[26] 20.4	o	c1	[26] 20.4	o	c1
c1:	IF A.4/96 THEN m ELSE o - - Alert-Info URNs for the Session Initiation Protocol.						

Prerequisite A.5/9 - - INVITE response

Prerequisite: A.6/5A - - Additional for 199 (Early Dialog Terminated) response

Table A.50B: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
4	Contact	[26] 20.10	o	m	[26] 20.10	m	m
7	Record-Route	[26] 20.30	o	m	[26] 20.30	m	m
8	Recv-Info	[25] 5.2.3	c4	c4	[25] 5.2.3	c4	c4
9	Rseq	[27] 7.1	c2	m	[27] 7.1	c3	m
c2:	IF A.4/14 THEN o ELSE n/a - - reliability of provisional responses in SIP.						
c3:	IF A.4/14 THEN m ELSE n/a - - reliability of provisional responses in SIP.						
c4:	IF A.4/13 THEN m ELSE IF A.4/13A THEN m ELSE n/a - - SIP INFO method and package framework, legacy INFO usage.						

Prerequisite A.5/9 - - INVITE response

Prerequisite: A.6/102 - - Additional for 2xx response

Table A.51: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	o	o	[26] 20.1	m	m
1A	Accept-Encoding	[26] 20.2	o	o	[26] 20.2	m	m
1B	Accept-Language	[26] 20.3	o	o	[26] 20.3	m	m
1C	Accept-Resource-Priority	[116] 3.2	c15	c15	[116] 3.2	c15	c15
2	Allow-Events	[28] 7.2.2	c3	c3	[28] 7.2.2	c4	c4
3	Answer-Mode	[158]	c6	c6	[158]	c7	c7
4	Authentication-Info	[26] 20.6	c1	c1	[26] 20.6	c2	c2
6	Contact	[26] 20.10	m	m	[26] 20.10	m	m
7	P-Answer-State	[111]	c14	c14	[111]	c14	c14
8	P-Media-Authorization	[31] 5.1	n/a	n/a	[31] 5.1	c11	c12
8A	Priv-Answer-Mode	[158]	c6	c6	[158]	c7	c7
9	Record-Route	[26] 20.30	m	m	[26] 20.30	m	m
9A	Recv-Info	[25] 5.2.3	c5	c5	[25] 5.2.3	c5	c5
10	Session-Expires	[58] 4	c13	c13	[58] 4	c13	c13
13	Supported	[26] 20.37	m	m	[26] 20.37	m	m
c1:	IF A.4/7 THEN o ELSE n/a - - authentication between UA and UA.						
c2:	IF A.4/7 THEN m ELSE n/a - - authentication between UA and UA.						
c3:	IF A.4/20 THEN o ELSE n/a - - SIP specific event notification extension.						
c4:	IF A.4/20 THEN m ELSE n/a - - SIP specific event notification extension.						
c5:	IF A.4/13 THEN m ELSE IF A.4/13A THEN m ELSE n/a - - SIP INFO method and package framework, legacy INFO usage.						
c6	IF A.4/87 THEN o ELSE n/a - - requesting answering modes for SIP.						
c7	IF A.4/87 THEN m ELSE n/a - - requesting answering modes for SIP.						
c11:	IF A.4/19 THEN m ELSE n/a - - SIP extensions for media authorization.						
c12:	IF A.3/1 AND A.4/19 THEN m ELSE n/a - - UE, SIP extensions for media authorization.						
c13:	IF A.4/42 THEN m ELSE n/a - - the SIP session timer.						
c14:	IF A.4/65 THEN m ELSE n/a - - the P-Answer-State header extension to the session initiation protocol for the open mobile alliance push to talk over cellular.						
c15:	IF A.4/70 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.						

Prerequisite A.5/9 - - INVITE response

Prerequisite: A.6/103 OR A.6/104 OR A.6/105 OR A.6/106 - - Additional for 3xx – 6xx response

Table A.51A: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Error-Info	[26] 20.18	o	o	[26] 20.18	o	o

Prerequisite A.5/9 - - INVITE response

Prerequisite: A.6/103 OR A.6/35 - - Additional for 3xx or 485 (Ambiguous) response

Table A.52: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
4	Contact	[26] 20.10	o (note 1)	o	[26] 20.10	m	m
NOTE:	The strength of this requirement is RECOMMENDED rather than OPTIONAL.						

Prerequisite A.5/9 - - INVITE response

Prerequisite: A.6/14 - - Additional for 401 (Unauthorized) response

Table A.53: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
6	Proxy-Authenticate	[26] 20.27	c3	c3	[26] 20.27	c3	c3
13	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	m	m
c1:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.						
c2:	IF A.4/6 THEN m ELSE n/a - - timestamping of requests.						
c3:	IF A.4/7 THEN m ELSE n/a - - support of authentication between UA and UA.						

Prerequisite A.5/9 - - INVITE response

Prerequisite: A.6/17 OR A.6/23 OR A.6/30 OR A.6/36 OR A.6/50 OR A.6/51 - - Additional for 404 (Not Found), 413 (Request Entity Too Large), 480(Temporarily not available), 486 (Busy Here), 500 (Internal Server Error), 600 (Busy Everywhere), 603 (Decline) response

Table A.54: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
8	Retry-After	[26] 20.33	o	o	[26] 20.33	o	o

Table A.55: Void

Prerequisite A.5/9 - - INVITE response

Prerequisite: A.6/20 - - Additional for 407 (Proxy Authentication Required) response

Table A.56: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
6	Proxy-Authenticate	[26] 20.27	c1	c1	[26] 20.27	c1	c1
11	WWW-Authenticate	[26] 20.44	o	o	[26] 20.44	o	o
c1:	IF A.4/7 THEN m ELSE n/a - - support of authentication between UA and UA.						

Prerequisite A.5/9 - - INVITE response

Prerequisite: A.6/25 - - Additional for 415 (Unsupported Media Type) response

Table A.57: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	o.1	o.1	[26] 20.1	m	m
2	Accept-Encoding	[26] 20.2	o.1	o.1	[26] 20.2	m	m
3	Accept-Language	[26] 20.3	o.1	o.1	[26] 20.3	m	m
o.1	At least one of these capabilities is supported.						

Prerequisite A.5/9 - - INVITE response

Prerequisite: A.6/26A - - Additional for 417 (Unknown Resource-Priority) response

Table A.57A: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
c1:	IF A.4/70 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.						

Prerequisite A.5/9 - - INVITE response

Prerequisite: A.6/27 - - Additional for 420 (Bad Extension) response

Table A.58: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
10	Unsupported	[26] 20.40	m	m	[26] 20.40	m	m

Prerequisite A.5/9 - - INVITE response

Prerequisite: A.6/28 OR A.6/41A - - Additional for 421 (Extension Required), 494 (Security Agreement Required) response

Table A.58A: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Security-Server	[48] 2	x	x	[48] 2	c1	c1
c1:	IF A.4/37 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						

Prerequisite A.5/9 - - INVITE response

Prerequisite: A.6/28A - - Additional for 422 (Session Interval Too Small) response

Table A.58B: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Min-SE	[58] 5	c1	c1	[58] 5	c1	c1
c1:	IF A.4/42 THEN o ELSE n/a - - the SIP session timer.						

Table A.59: Void

Table A.60: Void

Prerequisite A.5/9 - - INVITE response

Prerequisite: A.6/29H - - Additional for 470 (Consent Needed) response

Table A.60A: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Permission-Missing	[125] 5.9.3	m	m	[125] 5.9.3	m	m

Prerequisite A.5/9 - - INVITE response

Prerequisite: A.6/45 - - 503 (Service Unavailable)

Table A.61: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
8	Retry-After	[26] 20.33	o	o	[26] 20.33	o	m

Prerequisite A.5/9 - - INVITE response

Prerequisite: A.6/17 OR A.6/22 OR A.6/29D OR A.6/30 OR A.6/34 OR A.6/36 OR A.6/42 OR A.6/44 - - Additional for 404 (Not Found), 410 (Gone), 433(Anonymity Disallowed), 480(Temporarily not available), 484 (Address Incomplete), 486 (Busy Here), 500 (Internal Server Error), 502 (Busy Everywhere) response

Table A.61A: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
8	Reason	[130]	o	c1	[130]	o	c1
c1: IF A.4/38A THEN o ELSE n/a - - use of the Reason header field in Session Initiation Protocol (SIP) responses?							

Prerequisite A.5/9 - - INVITE response

Table A.62: Supported message bodies within the INVITE response

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	XML Schema for PSTN	[11B]		c1	[11B]		c1
c1:	IF A.3/6 OR A.3/7A OR A.3/7B OR A.3/7D OR A.3/9B THEN o ELSE n/a - - MGCF, AS acting as						

terminating UA, or redirect server, AS acting as originating UA, AS performing 3rd party call control, IBCF (IMS-ALG).

A.2.1.4.7A MESSAGE method

Prerequisite A.5/9A - - MESSAGE request

Table A.62A: Supported header fields within the MESSAGE request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Contact	[56B] 9.2	c24	c24	[56B] 9.2	c28	c28
1A	Allow	[26] 20.5	o	o	[26] 20.5	m	m
2	Allow-Events	[28] 7.2.2	c1	c1	[28] 7.2.2	c2	c2
3	Authorization	[26] 20.7	c3	c3	[26] 20.7	c3	c3
4	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
5	Call-Info	[26] 20.9	o	o	[26] 20.9	o	o
6	Content-Disposition	[26] 20.11	o	o	[26] 20.11	m	m
7	Content-Encoding	[26] 20.12	o	o	[26] 20.12	m	m
8	Content-Language	[26] 20.13	o	o	[26] 20.13	m	m
9	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
10	Content-Type	[26] 20.15	m	m	[26] 29.15	m	m
11	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
12	Date	[26] 20.17	c4	c4	[26] 20.17	m	m
13	Expires	[26] 20.19	o	o	[26] 20.19	o	o
14	From	[26] 20.20	m	m	[26] 20.20	m	m
14A	Geolocation	[89] 4.1	c29	c29	[89] 4.1	c29	c29
14B	Geolocation-Routing	[89] 4.1	c29	c29	[89] 4.1	c29	c29
14B	History-Info	[66] 4.1	c27	c27	[66] 4.1	c27	c27
15	In-Reply-To	[26] 20.21	o	o	[26] 20.21	o	o
15A	Max-Breadth	[117] 5.8	n/a	c39	[117] 5.8	c40	c40
16	Max-Forwards	[26] 20.22	m	m	[26] 20.22	n/a	c42
17	MIME-Version	[26] 20.24	o	o	[26] 20.24	m	m
18	Organization	[26] 20.25	o	o	[26] 20.25	o	o
18A	P-Access-Network-Info	[52] 4.4	c15	c16	[52] 4.4	c15	c16
18B	P-Asserted-Identity	[34] 9.1	n/a	c49	[34] 9.1	c11	c11
18C	P-Asserted-Service	[121] 4.1	n/a	c50	[121] 4.1	c33	c33
18D	P-Called-Party-ID	[52] 4.2	x	x	[52] 4.2	c13	c13
18E	P-Charging-Function-Addresses	[52] 4.5	c20	c21	[52] 4.5	c20	c21
18F	P-Charging-Vector	[52] 4.6	c18	c19	[52] 4.6	c18	c19
18H	P-Preferred-Identity	[34] 9.2	c11	c7	[34] 9.2	n/a	n/a
18I	P-Preferred-Service	[121] 4.2	c32	c31	[121] 4.2	n/a	n/a
18J	P-Private-Network-Indication	[134]	c36	c36	[134]	c36	c36
18K	P-Profile-Key	[97] 5	n/a	n/a	[97] 5	n/a	n/a
18L	P-Served-User	[133] 6	c41	c41	[133] 6	c41	c41
18M	P-User-Database	[82] 4	n/a	n/a	[82] 4	n/a	n/a
18N	P-Visited-Network-ID	[52] 4.3	x (note 1)	x	[52] 4.3	c14	n/a
19	Priority	[26] 20.26	o	o	[26] 20.26	o	o
19A	Privacy	[33] 4.2	c12	c12	[33] 4.2	c12	c12
20	Proxy-Authorization	[26] 20.28	c5	c5	[26] 20.28	n/a	n/a
21	Proxy-Require	[26] 20.29	o	n/a	[26] 20.29	n/a	n/a
21A	Reason	[34A] 2	c6	c6	[34A] 2	c6	c6
22	Record-Route	[26] 20.30	n/a	c42	[26] 20.30	n/a	c42
22A	Referred-By	[59] 3	c25	c25	[59] 3	c26	c26
23	Reject-Contact	[56B] 9.2	c24	c24	[56B] 9.2	c28	c28
23A	Reply-To	[26] 20.31	o	o	[26] 20.31	o	o
23B	Request-Disposition	[56B] 9.1	c24	c24	[56B] 9.1	c28	c28
24	Require	[26] 20.32	c8	o	[26] 20.32	m	m
24A	Resource-Priority	[116] 3.1	c30	c30	[116] 3.1	c30	c30
25	Route	[26] 20.34	m	m	[26] 20.34	n/a	n/a
25A	Security-Client	[48] 2.3.1	c22	c22	[48] 2.3.1	n/a	n/a
25B	Security-Verify	[48] 2.3.1	c23	c23	[48] 2.3.1	n/a	n/a
26	Subject	[26] 20.35	o	o	[26] 20.36	o	o
27	Supported	[26] 20.37	c9	m	[26] 20.37	m	m
28	Timestamp	[26] 20.38	c10	c10	[26] 20.38	m	m
29	To	[26] 20.39	m	m	[26] 20.39	m	m

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
29A	Trigger-Consent	[125] 5.11.2	c34	c34	[125] 5.11.2	c35	c35
30	User-Agent	[26] 20.41	o	o	[26] 20.41	o	o
31	Via	[26] 20.42	m	m	[26] 20.42	m	m

c1: IF A.4/20 THEN o ELSE n/a - - SIP specific event notification extension.
c2: IF A.4/20 THEN m ELSE n/a - - SIP specific event notification extension.
c3: IF A.4/7 THEN m ELSE n/a - - authentication between UA and UA.
c4: IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.
c5: IF A.4/8A THEN m ELSE n/a - - authentication between UA and proxy.
c6: IF A.4/38 THEN o ELSE n/a - - the Reason header field for the session initiation protocol.
c7: IF A.3/1 AND A.4/25 THEN o ELSE n/a - - UE and private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c8: IF A.4/14 THEN o.1 ELSE o - - Reliable transport.
c9: IF IF A.4/14 THEN o.1 ELSE o - - support of reliable transport.
c10: IF A.4/6 THEN o ELSE n/a - - timestamping of requests.
c11: IF A.4/25 THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c12: IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c13: IF A.4/32 THEN o ELSE n/a - - the P-Called-Party-ID extension.
c14: IF A.4/33 THEN o ELSE n/a - - the P-Visited-Network-ID extension.
c15: IF A.4/34 THEN o ELSE n/a - - the P-Access-Network-Info header extension.
c16: IF A.4/34 AND A.3/1 THEN m ELSE n/a - - the P-Access-Network-Info header extension and UE.
c17: IF A.4/34 AND (A.3/7A OR A.3/7D) THEN m ELSE n/a - - the P-Access-Network-Info header extension and AS acting as terminating UA or AS acting as third-party call controller.
c18: IF A.4/36 THEN o ELSE n/a - - the P-Charging-Vector header extension.
c19: IF A.4/36 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c20: IF A.4/35 THEN o ELSE n/a - - the P-Charging-Function-Addresses header extension.
c21: IF A.4/35 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c22: IF A.4/37 THEN o ELSE n/a - - security mechanism agreement for the session initiation protocol (note 2).
c23: IF A.4/37 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.
c24: IF A.4/40 THEN o ELSE n/a - - caller preferences for the session initiation protocol.
c25: IF A.4/43 THEN m ELSE n/a - - the SIP Referred-By mechanism.
c26: IF A.4/43 THEN o ELSE n/a - - the SIP Referred-By mechanism.
c27: IF A.4/47 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.
c28: IF A.4/40 THEN m ELSE n/a - - caller preferences for the session initiation protocol.
c29: IF A.4/60 THEN m ELSE n/a - - SIP location conveyance.
c30: IF A.4/70A THEN m ELSE n/a - - inclusion of MESSAGE, SUBSCRIBE, NOTIFY in communications resource priority for the session initiation protocol.
c31: IF A.3/1 AND A.4/74 THEN o ELSE n/a - - UE and SIP extension for the identification of services.
c32: IF A.4/74 THEN o ELSE n/a - - SIP extension for the identification of services.
c33: IF A.4/74 THEN m ELSE n/a - - SIP extension for the identification of services.
c34: IF A.4/75A THEN m ELSE n/a - - a relay within the framework for consent-based communications in SIP.
c35: IF A.4/75B THEN m ELSE n/a - - a recipient within the framework for consent-based communications in SIP.
c36: IF A.4/77 THEN m ELSE n/a - - the SIP P-Private-Network-Indication private-header (P-Header).
c39: IF A.4/71 AND (A.3/9B OR A.3/9C) THEN m ELSE IF A.3/1 AND NOT A.3C/1 THEN n/a ELSE o - - addressing an amplification vulnerability in session initiation protocol forking proxies, IBCF (IMS-ALG), IBCF (Screening of SIP signalling), UE, UE performing the functions of an external attached network.
c40: IF A.4/71 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.
c41: IF A.4/78 THEN m ELSE n/a - - the SIP P-Served-User private header.
c42: IF A.3/1 AND NOT A.3C/1 THEN n/a ELSE o - - UE, UE performing the functions of an external attached network.
c49: IF A.4/25 AND (A.3/7B OR A.3/8) THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks and AS acting as originating UA, MRFC.
c50: IF A.4/74 AND A.3/7B THEN o ELSE n/a - - SIP extension for the identification of services and AS acting as originating UA.

NOTE 1: The strength of this requirement in RFC 3455 [52] is SHOULD NOT, rather than MUST NOT.
NOTE 2: Support of this header in this method is dependent on the security mechanism and the security architecture which is implemented. Use of this header in this method is not appropriate to the security mechanism defined by 3GPP TS 33.203 [19].

Prerequisite A.5/9A - - MESSAGE request

Table A.62B: Supported message bodies within the MESSAGE request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	permission document	[125] 5.4	c1	c1	[125] 5.4	c2	c2
2	application/vnd.3gpp.sms	[4D]	c3	c3	[4D]	c3	c3
3	message/cpim	[151]	c4	c4	[151]	c4	c4
4	message/imdn+xml	[157]	c5	c5	[157]	c5	c5
c1:	IF A.4/75A THEN m ELSE n/a - - a relay within the framework for consent-based communications in SIP.						
c2:	IF A.4/75B THEN m ELSE n/a - - a recipient within the framework for consent-based communications in SIP.						
c3:	IF A.3A/61 OR A.3A/62 OR A.3A/63 THEN m ELSE o - - an SM-over-IP sender or an SM-over-IP receiver or an IP-SM-GW for SMS over IP.						
c4:	IF A.3A/71 AND A.4/85 THEN m ELSE n/a - - common presence and instant messaging (CPIM): message format.						
c5:	IF A.3A/71 AND A.4/86 THEN m ELSE n/a - - instant message disposition notification.						

Prerequisite A.5/9B - - MESSAGE response

Prerequisite: A.6/1 - - Additional for 100 (Trying) response

Table A.62BA: Supported header fields within the MESSAGE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
3	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
4	Date	[26] 20.17	c1	c1	[26] 20.17	m	m
5	From	[26] 20.20	m	m	[26] 20.20	m	m
6	To	[26] 20.39	m	m	[26] 20.39	m	m
7	Via	[26] 20.42	m	m	[26] 20.42	m	m
c1:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.						

Prerequisite A.5/9B - - MESSAGE response for all remaining status-codes

Table A.62C: Supported header fields within the MESSAGE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Allow	[26] 20.5	c12	c12	[26] 20.5	m	m
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Call-Info	[26] 20.9	o	o	[26] 20.9	o	o
3	Content-Disposition	[26] 20.11	o (note 1)	o (note 1)	[26] 20.11	m (note 1)	m (note 1)
4	Content-Encoding	[26] 20.12	o (note 1)	o (note 1)	[26] 20.12	m (note 1)	m (note 1)
5	Content-Language	[26] 20.13	o (note 1)	o (note 1)	[26] 20.13	m (note 1)	m (note 1)
6	Content-Length	[26] 20.14	m (note 1)	m (note 1)	[26] 20.14	m (note 1)	m (note 1)
7	Content-Type	[26] 20.15	m (note 1)	m (note 1)	[26] 20.15	m (note 1)	m (note 1)
8	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
9	Date	[26] 20.17	c1	c1	[26] 20.17	m	m
9A	Expires	[26] 20.19	o	o	[26] 20.19	o	o
10	From	[26] 20.20	m	m	[26] 20.20	m	m
10A	Geolocation-Error	[89] 4.3	c14	c14	[89] 4.3	c14	c14
10B	History-Info	[66] 4.1	c13	c13	[66] 4.1	c13	c13
11	MIME-Version	[26] 20.24	o	o	[26] 20.24	m	m
12	Organization	[26] 20.25	o	o	[26] 20.25	o	o
12A	P-Access-Network-Info	[52] 4.4	c5	c6	[52] 4.4	c5	c7
12B	P-Asserted-Identity	[34] 9.1	n/a	c21	[34] 9.1	c3	c3
12C	P-Charging-Function-Addresses	[52] 4.5	c10	c11	[52] 4.5	c10	c11
12D	P-Charging-Vector	[52] 4.6	c8	c9	[52] 4.6	c8	c9
12F	P-Preferred-Identity	[34] 9.2	c3	x	[34] 9.2	n/a	n/a
12G	Privacy	[33] 4.2	c4	c4	[33] 4.2	c4	c4
12H	Reply-To	[26] 20.31	o	o	[26] 20.31	o	o
12I	Require	[26] 20.32	o	o	[26] 20.32	m	m
13	Server	[26] 20.35	o	o	[26] 20.35	o	o
14	Timestamp	[26] 20.38	m	m	[26] 20.38	c2	c2
15	To	[26] 20.39	m	m	[26] 20.39	m	m
16	User-Agent	[26] 20.41	o	o	[26] 20.41	o	o
17	Via	[26] 20.42	m	m	[26] 20.42	m	m
18	Warning	[26] 20.43	o	o	[26] 20.43	o	o

c1: IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.
c2: IF A.4/6 THEN m ELSE n/a - - timestamping of requests.
c3: IF A.4/25 THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c4: IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c5: IF A.4/34 THEN o ELSE n/a - - the P-Access-Network-Info header extension.
c6: IF A.4/34 AND A.3/1 THEN m ELSE n/a - - the P-Access-Network-Info header extension and UE.
c7: IF A.4/34 AND (A.3/7A OR A.3/7D) THEN m ELSE n/a - - the P-Access-Network-Info header extension and AS acting as terminating UA or AS acting as third-party call controller.
c8: IF A.4/36 THEN o ELSE n/a - - the P-Charging-Vector header extension.
c9: IF A.4/36 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c10: IF A.4/35 THEN o ELSE n/a - - the P-Charging-Function-Addresses header extension.
c11: IF A.4/35 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c12: IF A.6/18 THEN m ELSE o - - 405 (Method Not Allowed).
c13: IF A.4/47 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.
c14: IF A.4/60 THEN m ELSE n/a - - SIP location conveyance.
c21: IF A.4/25 AND (A.3/7B OR A.3/8 OR A.3A/83) THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks and AS acting as originating UA, MRFC, SCC application server.

NOTE 1:	RFC 3428 [50] clause 7 states that all 2xx class responses to a MESSAGE request must not include any body, therefore for 2xx responses to the MESSAGE request the values on Sending side for "RFC status" and "Profile status" are "x", the values for Receiving side for "RFC status" and "Profile Status" are "n/a". RFC 3261 [26] subclause 7.4 states that all responses may contain bodies, therefore for all responses to the MESSAGE request other than 2xx responses, the values on Sending side for "RFC status" and "Profile status" are "o", the values for Receiving side for "RFC status" and "Profile Status" are "m".

Prerequisite A.5/9B - - MESSAGE response

Prerequisite: A.6/102 - - Additional for 2xx response

Table A.62D: Supported header fields within the MESSAGE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Accept-Resource-Priority	[116] 3.2	c5	c5	[116] 3.2	c5	c5
1	Allow-Events	[28] 7.2.2	c3	c3	[28] 7.2.2	c4	c4
2	Authentication-Info	[26] 20.6	c1	c1	[26] 20.6	c2	c2
4	Supported	[26] 20.37	o	o	[26] 20.37	m	m
c1:	IF A.4/7 THEN o ELSE n/a - - authentication between UA and UA.						
c2:	IF A.4/7 THEN m ELSE n/a - - authentication between UA and UA.						
c3:	IF A.4/20 THEN o ELSE n/a - - SIP specific event notification extension.						
c4:	IF A.4/20 THEN m ELSE n/a - - SIP specific event notification extension.						
c5:	IF A.4/70A THEN m ELSE n/a - - inclusion of MESSAGE, SUBSCRIBE, NOTIFY in communications resource priority for the session initiation protocol.						

Prerequisite A.5/9B - - MESSAGE response

Prerequisite: A.6/103 OR A.6/104 OR A.6/105 OR A.6/106 - - Additional for 3xx – 6xx response

Table A.62DA: Supported header fields within the MESSAGE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Error-Info	[26] 20.18	o	o	[26] 20.18	o	o

Prerequisite A.5/9B - - MESSAGE response

Prerequisite: A.6/103 - - Additional for 3xx or 485 (Ambiguous) response

Table A.62E: Supported header fields within the MESSAGE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
2	Contact	[26] 20.10	o (note)	o	[26] 20.10	m	m
NOTE:	The strength of this requirement is RECOMMENDED rather than OPTIONAL.						

Prerequisite A.5/9B - - MESSAGE response

Prerequisite: A.6/14 - - Additional for 401 (Unauthorized) response

Table A.62F: Supported header fields within the MESSAGE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Proxy-Authenticate	[26] 20.27	c1	c1	[26] 20.27	c1	c1
6	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	m	m
c1:	IF A.4/7 THEN m ELSE n/a - - support of authentication between UA and UA.						

Prerequisite A.5/9B - - MESSAGE response

Prerequisite: A.6/17 OR A.6/23 OR A.6/30 OR A.6/36 OR A.6/42 OR A.6/45 OR A.6/50 OR A.6/51 - - Additional for 404 (Not Found), 413 (Request Entity Too Large), 480(Temporarily not available), 486 (Busy Here), 500 (Internal Server Error), 503 (Service Unavailable), 600 (Busy Everywhere), 603 (Decline) response

Table A.62G: Supported header fields within the MESSAGE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
4	Retry-After	[26] 20.33	o	o	[26] 20.33	o	o

Table A.62H: Void

Prerequisite A.5/9B - - MESSAGE response

Prerequisite: A.6/20 - - Additional for 407 (Proxy Authentication Required) response

Table A.62I: Supported header fields within the MESSAGE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Proxy-Authenticate	[26] 20.27	c1	c1	[26] 20.27	c1	c1
6	WWW-Authenticate	[26] 20.44	o	o	[26] 20.44	o	o
c1:	IF A.4/7 THEN m ELSE n/a - - support of authentication between UA and UA.						

Prerequisite A.5/9B - - MESSAGE response

Prerequisite: A.6/25 - - Additional for 415 (Unsupported Media Type) response

Table A.62J: Supported header fields within the MESSAGE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	o.1	o.1	[26] 20.1	m	m
2	Accept-Encoding	[26] 20.2	o.1	o.1	[26] 20.2	m	m
3	Accept-Language	[26] 20.3	o.1	o.1	[26] 20.3	m	m
o.1	At least one of these capabilities is supported.						

Prerequisite A.5/9B - - MESSAGE response

Prerequisite: A.6/26A - - Additional for 417 (Unknown Resource-Priority) response

Table A.62JA: Supported header fields within the MESSAGE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
c1:	IF A.4/70A THEN m ELSE n/a - - inclusion of MESSAGE, SUBSCRIBE, NOTIFY in communications resource priority for the session initiation protocol.						

Prerequisite A.5/9B - - MESSAGE response

Prerequisite: A.6/27 - - Additional for 420 (Bad Extension) response

Table A.62K: Supported header fields within the MESSAGE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
5	Unsupported	[26] 20.40	m	m	[26] 20.40	m	m

Prerequisite A.5/9B - - MESSAGE response

Prerequisite: A.6/28 OR A.6/41A - - Additional for 421 (Extension Required), 494 (Security Agreement Required) response

Table A.62L: Supported header fields within the MESSAGE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Security-Server	[48] 2	x	x	[48] 2	c1	c1
c1:	IF A.4/37 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						

Table A.62M: Void

Prerequisite A.5/9B - - MESSAGE response

Prerequisite: A.6/29H - - Additional for 470 (Consent Needed) response

Table A.62MA: Supported header fields within the MESSAGE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Permission-Missing	[125] 5.9.3	m	m	[125] 5.9.3	m	m

Prerequisite A.5/9B - - MESSAGE response

Table A.62N: Supported message bodies within the MESSAGE response

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

A.2.1.4.8 NOTIFY method

Prerequisite A.5/10 - - NOTIFY request

Table A.63: Supported header fields within the NOTIFY request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	o	o	[26] 20.1	m	m
1A	Accept-Contact	[56B] 9.2	c19	c19	[56B] 9.2	c23	c23
2	Accept-Encoding	[26] 20.2	o	o	[26] 20.2	m	m
3	Accept-Language	[26] 20.3	o	o	[26] 20.3	m	m
3A	Allow	[26] 20.5	o	o	[26] 20.5	m	m
4	Allow-Events	[28] 7.2.2	c1	c1	[28] 7.2.2	c2	c2
5	Authorization	[26] 20.7	c3	c3	[26] 20.7	c3	c3
6	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
6A	Call-Info	[26] 20.9	o	o	[26] 20.9	c25	c25
6B	Contact	[26] 20.10	m	m	[26] 20.10	m	m
7	Content-Disposition	[26] 20.11	o	o	[26] 20.11	m	m
8	Content-Encoding	[26] 20.12	o	o	[26] 20.12	m	m
9	Content-Language	[26] 20.13	o	o	[26] 20.13	m	m
10	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
11	Content-Type	[26] 20.15	m	m	[26] 20.15	m	m
12	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
13	Date	[26] 20.17	c4	c4	[26] 20.17	m	m
14	Event	[28] 7.2.1	m	m	[28] 7.2.1	m	m
15	From	[26] 20.20	m	m	[26] 20.20	m	m
15A	Geolocation	[89] 4.1	c24	c24	[89] 4.1	c24	c24
15B	Geolocation-Routing	[89] 4.1	c24	c24	[89] 4.1	c24	c24
15C	History-Info	[66] 4.1	c22	c22	[66] 4.1	c22	c22
15D	Max-Breadth	[117] 5.8	n/a	c26	[117] 5.8	c27	c27
16	Max-Forwards	[26] 20.22	m	m	[26] 20.22	n/a	c32
17	MIME-Version	[26] 20.24	o	o	[26] 20.24	m	m
17A	P-Access-Network-Info	[52] 4.4	c10	c11	[52] 4.4	c10	c12
17B	P-Asserted-Identity	[34] 9.1	n/a	c40	[34] 9.1	c6	c6
17C	P-Charging-Function-Addresses	[52] 4.5	c14	c15	[52] 4.5	c14	c15
17D	P-Charging-Vector	[52] 4.6	c13	n/a	[52] 4.6	c13	n/a
17F	P-Preferred-Identity	[34] 9.2	c6	x	[34] 9.2	n/a	n/a
17G	Privacy	[33] 4.2	c7	n/a	[33] 4.2	c7	c7
18	Proxy-Authorization	[26] 20.28	c5	c5	[26] 20.28	n/a	n/a
19	Proxy-Require	[26] 20.29	o	n/a	[26] 20.29	n/a	n/a
19A	Reason	[34A] 2	c18	c18	[34A] 2	c18	c18
20	Record-Route	[26] 20.30	n/a	c32	[26] 20.30	c9	c9
20A	Referred-By	[59] 3	c20	c20	[59] 3	c21	c21
20B	Reject-Contact	[56B] 9.2	c19	c19	[56B] 9.2	c23	c23
20C	Request-Disposition	[56B] 9.1	c19	c19	[56B] 9.1	c23	c23
21	Require	[26] 20.32	o	o	[26] 20.32	m	m
21A	Resource-Priority	[116] 3.1	c29	c29	[116] 3.1	c29	c29
22	Route	[26] 20.34	m	m	[26] 20.34	n/a	c32
22A	Security-Client	[48] 2.3.1	c16	c16	[48] 2.3.1	n/a	n/a
22B	Security-Verify	[48] 2.3.1	c17	c17	[48] 2.3.1	n/a	n/a
23	Subscription-State	[28] 8.2.3	m	m	[28] 8.2.3	m	m
24	Supported	[26] 20.37	o	o	[26] 20.37	m	m
25	Timestamp	[26] 20.38	c8	c8	[26] 20.38	m	m
26	To	[26] 20.39	m	m	[26] 20.39	m	m
27	User-Agent	[26] 20.41	o	o	[26] 20.41	o	o
28	Via	[26] 20.42	m	m	[26] 20.42	m	m
29	Warning	[26] 20.43	o	o	[26] 20.43	o	o

c1:	IF A.4/20 THEN o ELSE n/a - - SIP specific event notification extension.
c2:	IF A.4/20 THEN m ELSE n/a - - SIP specific event notification extension.
c3:	IF A.4/7 THEN m ELSE n/a - - authentication between UA and UA.
c4:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.
c5:	IF A.4/8A THEN m ELSE n/a - - authentication between UA and proxy.
c6:	IF A.4/25 THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c7:	IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c8:	IF A.4/6 THEN o ELSE n/a - - timestamping of requests.
c9:	IF A.4/15 OR A.4/20 THEN m ELSE n/a - - the REFER method extension or SIP specific event notification extension.
c10:	IF A.4/34 THEN o ELSE n/a - - the P-Access-Network-Info header extension.
c11:	IF A.4/34 AND A.3/1 THEN m ELSE n/a - - the P-Access-Network-Info header extension and UE.
c12:	IF A.4/34 AND (A.3/7A OR A.3/7D) THEN m ELSE n/a - - the P-Access-Network-Info header extension and AS acting as terminating UA or AS acting as third-party call controller.
c13:	IF A.4/36 THEN o ELSE n/a - - the P-Charging-Vector header extension.
c14:	IF A.4/35 THEN o ELSE n/a - - the P-Charging-Function-Addresses header extension.
c15:	IF A.4/35 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c16:	IF A.4/37 THEN o ELSE n/a - - security mechanism agreement for the session initiation protocol (note).
c17:	IF A.4/37 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.
c18:	IF A.4/38 THEN o ELSE n/a - - the Reason header field for the session initiation protocol.
c19:	IF A.4/40 THEN o ELSE n/a - - caller preferences for the session initiation protocol.
c20:	IF A.4/43 THEN m ELSE n/a - - the SIP Referred-By mechanism.
c21:	IF A.4/43 THEN o ELSE n/a - - the SIP Referred-By mechanism.
c22:	IF A.4/47 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.
c23:	IF A.4/40 THEN m ELSE n/a - - caller preferences for the session initiation protocol.
c24:	IF A.4/60 THEN m ELSE n/a - - SIP location conveyance.
c25:	IF A.4/63 THEN m ELSE o - - subscriptions to request-contained resource lists in the session initiation protocol.
c26:	IF A.4/71 AND (A.3/9B OR A.3/9C) THEN m ELSE IF A.3/1 AND NOT A.3C/1 THEN n/a ELSE o - - addressing an amplification vulnerability in session initiation protocol forking proxies, IBCF (IMS-ALG), IBCF (Screening of SIP signalling), UE, UE performing the functions of an external attached network.
c27:	IF A.4/71 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.
c29:	IF A.4/70A THEN m ELSE n/a - - inclusion of MESSAGE, SUBSCRIBE, NOTIFY in communications resource priority for the session initiation protocol.
c32:	IF A.3/1 AND NOT A.3C/1 THEN n/a ELSE o - - UE, UE performing the functions of an external attached network.
c40:	IF A.4/25 AND (A.3/7B OR A.3/8) THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks and AS acting as originating UA, MRFC.
NOTE:	Support of this header in this method is dependent on the security mechanism and the security architecture which is implemented. Use of this header in this method is not appropriate to the security mechanism defined by 3GPP TS 33.203 [19].

Prerequisite A.5/10 - - NOTIFY request

Table A.64: Supported message bodies within the NOTIFY request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	sipfrag	[37] 2	c1	c1	[37]	c1	c1
c1:	IF A.4/15 THEN m ELSE o - - the REFER method extension						

Prerequisite A.5/11 - - NOTIFY response

Prerequisite: A.6/1 - - Additional for 100 (Trying) response

Table A.64A: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
3	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
4	Date	[26] 20.17	c1	c1	[26] 20.17	m	m
5	From	[26] 20.20	m	m	[26] 20.20	m	m
6	To	[26] 20.39	m	m	[26] 20.39	m	m
7	Via	[26] 20.42	m	m	[26] 20.42	m	m
c1:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.						

Prerequisite A.5/11 - - NOTIFY response for all remaining status-codes

Table A.65: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Allow	[26] 20.5	o	o	[26] 20.5	m	m
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Disposition	[26] 20.11	o	o	[26] 20.11	m	m
3	Content-Encoding	[26] 20.12	o	o	[26] 20.12	m	m
4	Content-Language	[26] 20.13	o	o	[26] 20.13	m	m
5	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
6	Content-Type	[26] 20.15	m	m	[26] 20.15	m	m
7	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
8	Date	[26] 20.17	c1	c1	[26] 20.17	m	m
9	From	[26] 20.20	m	m	[26] 20.20	m	m
9A	Geolocation-Error	[89] 4.3	c12	c12	[89] 4.3	c12	c12
10	MIME-Version	[26] 20.24	o	o	[26] 20.24	m	m
10A	P-Access-Network-Info	[52] 4.4	c5	c6	[52] 4.4	c5	c7
10B	P-Asserted-Identity	[34] 9.1	n/a	c20	[34] 9.1	c3	c3
10C	P-Charging-Function-Addresses	[52] 4.5	c9	c10	[52] 4.5	c9	c10
10D	P-Charging-Vector	[52] 4.6	c8	n/a	[52] 4.6	c8	n/a
10F	P-Preferred-Identity	[34] 9.2	c3	x	[34] 9.2	n/a	n/a
10G	Privacy	[33] 4.2	c4	n/a	[33] 4.2	c4	c4
10H	Require	[26] 20.32	m	m	[26] 20.32	m	m
10I	Server	[26] 20.35	o	o	[26] 20.35	o	o
11	Timestamp	[26] 20.38	m	m	[26] 20.38	c2	c2
12	To	[26] 20.39	m	m	[26] 20.39	m	m
12A	User-Agent	[26] 20.41	o	o	[26] 20.41	o	o
13	Via	[26] 20.42	m	m	[26] 20.42	m	m
14	Warning	[26] 20.43	o (note)	o	[26] 20.43	o	o
c1:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.						
c2:	IF A.4/6 THEN m ELSE n/a - - timestamping of requests.						
c3:	IF A.4/25 THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.						
c4:	IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).						
c5:	IF A.4/34 THEN o ELSE n/a - - the P-Access-Network-Info header extension.						
c6:	IF A.4/34 AND A.3/1 THEN m ELSE n/a - - the P-Access-Network-Info header extension and UE.						
c7:	IF A.4/34 AND (A.3/7A OR A.3/7D) THEN m ELSE n/a - - the P-Access-Network-Info header extension and AS acting as terminating UA or AS acting as third-party call controller.						
c8:	IF A.4/36 THEN o ELSE n/a - - the P-Charging-Vector header extension.						
c9:	IF A.4/35 THEN o ELSE n/a - - the P-Charging-Function-Addresses header extension.						
c10:	IF A.4/35 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.						
c11:	IF A.6/18 THEN m ELSE o - - 405 (Method Not Allowed).						
c12:	IF A.4/60 THEN m ELSE n/a - - SIP location conveyance.						
c20:	IF A.4/25 AND (A.3/7B OR A.3/8) THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks and AS acting as originating UA, MRFC.						
NOTE:	RFC 3261 [26] gives the status of this header as SHOULD rather than OPTIONAL.						

Prerequisite A.5/11 - - NOTIFY response

Prerequisite: A.6/102 - - Additional for 2xx response

Table A.66: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Accept-Resource-Priority	[116] 3.2	c6	c6	[116] 3.2	c6	c6
0B	Allow-Events	[28] 7.2.2	c4	c4	[28] 7.2.2	c5	c5
1	Authentication-Info	[26] 20.6	c1	c1	[26] 20.6	c2	c2
1A	Contact	[26] 20.10	o	o	[26] 20.10	m	m
2	Record-Route	[26] 20.30	c3	c3	[26] 20.30	c3	c3

5	Supported	[26] 20.37	m	m	[26] 20.37	m	m
c1:	IF A.4/7 THEN o ELSE n/a - - authentication between UA and UA.						
c2:	IF A.4/7 THEN m ELSE n/a - - authentication between UA and UA.						
c3:	IF A.4/15 OR A.4/20 THEN m ELSE n/a - - the REFER method extension or SIP specific event notification extension.						
c4:	IF A.4/20 THEN o ELSE n/a - - SIP specific event notification extension.						
c5:	IF A.4/20 THEN m ELSE n/a - - SIP specific event notification extension.						
c6:	IF A.4/70A THEN m ELSE n/a - - inclusion of MESSAGE, SUBSCRIBE, NOTIFY in communications resource priority for the session initiation protocol.						

Prerequisite A.5/11 - - NOTIFY response

Prerequisite: A.6/103 OR A.6/104 OR A.6/105 OR A.6/106 - - Additional for 3xx – 6xx response

Table A.66A: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Error-Info	[26] 20.18	o	o	[26] 20.18	o	o

Prerequisite A.5/11 - - NOTIFY response

Prerequisite: A.6/103 - - Additional for 3xx response

Table A.67: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Contact	[26] 20.10	m	m	[26] 20.10	m	m

Prerequisite A.5/11 - - NOTIFY response

Prerequisite: A.6/14 - - Additional for 401 (Unauthorized) response

Table A.68: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
2	Proxy-Authenticate	[26] 20.27	c1	c1	[26] 20.27	c1	c1
8	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	m	m
c1:	IF A.4/7 THEN m ELSE n/a - - support of authentication between UA and UA.						

Prerequisite A.5/11 - - NOTIFY response

Prerequisite: A.6/17 OR A.6/23 OR A.6/30 OR A.6/36 OR A.6/42 OR A.6/45 OR A.6/50 OR A.6/51 - - Additional for 404 (Not Found), 413 (Request Entity Too Large), 480(Temporarily not available), 486 (Busy Here), 500 (Internal Server Error), 503 (Service Unavailable), 600 (Busy Everywhere), 603 (Decline) response

Table A.69: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Retry-After	[26] 20.33	o	o	[26] 20.33	o	o

Table A.70: Void

Prerequisite A.5/11 - - NOTIFY response

Prerequisite: A.6/20 - - Additional for 407 (Proxy Authentication Required) response

Table A.71: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
2	Proxy-Authenticate	[26] 20.27	c3	c3	[26] 20.27	c3	c3
6	WWW-Authenticate	[26] 20.44	o	o	[26] 20.44	o	o
c3:	IF A.4/7 THEN m ELSE n/a - - support of authentication between UA and UA.						

Prerequisite A.5/11 - - NOTIFY response

Prerequisite A.6/25 - - Additional for 415 (Unsupported Media Type) response

Table A.72: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	o.1	o.1	[26] 20.1	m	m
2	Accept-Encoding	[26] 20.2	o.1	o.1	[26] 20.2	m	m
3	Accept-Language	[26] 20.3	o.1	o.1	[26] 20.3	m	m
o.1	At least one of these capabilities is supported.						

Prerequisite A.5/11 - - NOTIFY response

Prerequisite: A.6/26A - - Additional for 417 (Unknown Resource-Priority) response

Table A.72A: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
c1:	IF A.4/70A THEN m ELSE n/a - - inclusion of MESSAGE, SUBSCRIBE, NOTIFY in communications resource priority for the session initiation protocol.						

Prerequisite A.5/11 - - NOTIFY response

Prerequisite: A.6/27 - - Addition for 420 (Bad Extension) response

Table A.73: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
5	Unsupported	[26] 20.40	m	m	[26] 20.40	m	m

Prerequisite A.5/11 - - NOTIFY response

Prerequisite: A.6/28 OR A.6/41A - - Additional for 421 (Extension Required), 494 (Security Agreement Required) response

Table A.73A: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Security-Server	[48] 2	x	x	[48] 2	c1	c1
c1:	IF A.4/37 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						

Table A.74: Void

Prerequisite A.5/11 - - NOTIFY response

Prerequisite: A.6/35 - - Additional for 485 (Ambigious) response

Table A.74A: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Contact	[26] 20.10	o	o	[26] 20.10	m	m

Prerequisite A.5/11 - - NOTIFY response

Prerequisite: A.6/39 - - Additional for 489 (Bad Event) response

Table A.75: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	m	m

Prerequisite A.5/11 - - NOTIFY response

Table A.76: Supported message bodies within the NOTIFY response

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

A.2.1.4.9 OPTIONS method

Prerequisite A.5/12 - - OPTIONS request

Table A.77: Supported header fields within the OPTIONS request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	m	m
1A	Accept-Contact	[56B] 9.2	c21	c21	[56B] 9.2	c26	c26
2	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	m	m
3	Accept-Language	[26] 20.3	m	m	[26] 20.3	m	m
3A	Allow	[26] 20.5	o	o	[26] 20.5	m	m
4	Allow-Events	[28] 7.2.2	c24	c24	[28] 7.2.2	c1	c1
5	Authorization	[26] 20.7	c2	c2	[26] 20.7	c2	c2
6	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
7	Call-Info	[26] 20.9	o	o	[26] 20.9	o	o
8	Contact	[26] 20.10	o	o	[26] 20.10	o	o
9	Content-Disposition	[26] 20.11	o	o	[26] 20.11	m	m
10	Content-Encoding	[26] 20.12	o	o	[26] 20.12	m	m
11	Content-Language	[26] 20.13	o	o	[26] 20.13	m	m
12	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
13	Content-Type	[26] 20.15	m	m	[26] 20.15	m	m
14	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
15	Date	[26] 20.17	c3	c3	[26] 20.17	m	m
16	From	[26] 20.20	m	m	[26] 20.20	m	m
16A	Geolocation	[89] 4.1	c27	c27	[89] 4.1	c27	c27
16B	Geolocation-Routing	[89] 4.1	c27	c27	[89] 4.1	c27	c27
16C	History-Info	[66] 4.1	c25	c25	[66] 4.1	c25	c25
16D	Max-Breadth	[117] 5.8	n/a	c31	[117] 5.8	c32	c32
17	Max-Forwards	[26] 20.22	m	m	[26] 20.22	n/a	c39
18	MIME-Version	[26] 20.24	o	o	[26] 20.24	m	m
19	Organization	[26] 20.25	o	o	[26] 20.25	o	o
19A	P-Access-Network-Info	[52] 4.4	c11	c12	[52] 4.4	c11	c13
19B	P-Asserted-Identity	[34] 9.1	n/a	c46	[34] 9.1	c6	c6
19C	P-Asserted-Service	[121] 4.1	n/a	c47	[121] 4.1	c30	c30
19D	P-Called-Party-ID	[52] 4.2	x	x	[52] 4.2	c9	c9
19E	P-Charging-Function-Addresses	[52] 4.5	c16	c17	[52] 4.5	c16	c17
19F	P-Charging-Vector	[52] 4.6	c14	c15	[52] 4.6	c14	c15
19H	P-Preferred-Identity	[34] 9.2	c6	c4	[34] 9.2	n/a	n/a
19I	P-Preferred-Service	[121] 4.2	c29	c28	[121] 4.2	n/a	n/a
19J	P-Private-Network-Indication	[134]	c34	c34	[134]	c34	c34
19K	P-Profile-Key	[97] 5	n/a	n/a	[97] 5	n/a	n/a
19L	P-Served-User	[133] 6	c38	c38	[133] 6	c38	c38
19M	P-User-Database	[82] 4	n/a	n/a	[82] 4	n/a	n/a
19N	P-Visited-Network-ID	[52] 4.3	x (note 2)	x	[52] 4.3	c10	n/a
19O	Privacy	[33] 4.2	c8	c8	[33] 4.2	c8	c8
20	Proxy-Authorization	[26] 20.28	c5	c5	[26] 20.28	n/a	n/a
21	Proxy-Require	[26] 20.29	o	o (note 1)	[26] 20.29	n/a	n/a
21A	Reason	[34A] 2	c20	c20	[34A] 2	c20	c20
22	Record-Route	[26] 20.30	n/a	c39	[26] 20.30	n/a	c39
22A	Recv-Info	[25] 5.2.3	c37	c37	[25] 5.2.3	c37	c37
22B	Referred-By	[59] 3	c22	c22	[59] 3	c23	c23
22C	Reject-Contact	[56B] 9.2	c21	c21	[56B] 9.2	c26	c26
22D	Request-Disposition	[56B] 9.1	c21	c21	[56B] 9.1	c26	c26
23	Require	[26] 20.32	o	o	[26] 20.32	m	m
23A	Resource-Priority	[116] 3.1	c33	c33	[116] 3.1	c33	c33
24	Route	[26] 20.34	m	m	[26] 20.34	n/a	n/a
24A	Security-Client	[48] 2.3.1	c18	c18	[48] 2.3.1	n/a	n/a
24B	Security-Verify	[48] 2.3.1	c19	c19	[48] 2.3.1	n/a	n/a
25	Supported	[26] 20.37	c6	c6	[26] 20.37	m	m
26	Timestamp	[26] 20.38	c7	c7	[26] 20.38	m	m
27	To	[26] 20.39	m	m	[26] 20.39	m	m

28	User-Agent	[26] 20.41	o	o	[26] 20.41	o	o
29	Via	[26] 20.42	m	m	[26] 20.42	m	m

c1: IF A.4/20 THEN m ELSE n/a - - SIP specific event notification extension.
c2: IF A.4/7 THEN m ELSE n/a - - authentication between UA and UA.
c3: IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.
c4: IF A.3/1 AND A.4/25 THEN o ELSE n/a - - UE and private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c5: IF A.4/8A THEN m ELSE n/a - - authentication between UA and proxy.
c6: IF A.4/25 THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c7: IF A.4/6 THEN o ELSE n/a - - timestamping of requests.
c8: IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c9: IF A.4/32 THEN o ELSE n/a - - the P-Called-Party-ID extension.
c10: IF A.4/33 THEN o ELSE n/a - - the P-Visited-Network-ID extension.
c11: IF A.4/34 THEN o ELSE n/a - - the P-Access-Network-Info header extension.
c12: IF A.4/34 AND A.3/1 THEN m ELSE n/a - - the P-Access-Network-Info header extension and UE.
c13: IF A.4/34 AND (A.3/7A OR A.3/7D) THEN m ELSE n/a - - the P-Access-Network-Info header extension and AS acting as terminating UA or AS acting as third-party call controller.
c14: IF A.4/36 THEN o ELSE n/a - - the P-Charging-Vector header extension.
c15: IF A.4/36 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c16: IF A.4/35 THEN o ELSE n/a - - the P-Charging-Function-Addresses header extension.
c17: IF A.4/35 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c18: IF A.4/37 THEN o ELSE n/a - - security mechanism agreement for the session initiation protocol (note 3).
c19: IF A.4/37 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.
c20: IF A.4/38 THEN o ELSE n/a - - the Reason header field for the session initiation protocol.
c21: IF A.4/40 THEN o ELSE n/a - - caller preferences for the session initiation protocol.
c22: IF A.4/43 THEN m ELSE n/a - - the SIP Referred-By mechanism.
c23: IF A.4/43 THEN o ELSE n/a - - the SIP Referred-By mechanism.
c24: IF A.4/20 THEN o ELSE n/a - - SIP specific event notification extension.
c25: IF A.4/47 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.
c26: IF A.4/40 THEN m ELSE n/a - - caller preferences for the session initiation protocol.
c27: IF A.4/60 THEN m ELSE n/a - - SIP location conveyance.
c28: IF (A.3/1 OR A.3A/81) AND A.4/74 THEN o ELSE n/a - - UE, MSC Server enhanced for ICS and SIP extension for the identification of services.
c29: IF A.4/74 THEN o ELSE n/a - - SIP extension for the identification of services.
c30: IF A.4/74 THEN m ELSE n/a - - SIP extension for the identification of services.
c31: IF A.4/71 AND (A.3/9B OR A.3/9C) THEN m ELSE IF A.3/1 AND NOT A.3C/1 - - addressing an amplification vulnerability in session initiation protocol forking proxies, IBCF (IMS-ALG), IBCF (Screening of SIP signalling), UE, UE performing the functions of an external attached network.
c32: IF A.4/71 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.
c33: IF A.4/70 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.
c34: IF A.4/77 THEN m ELSE n/a - - the SIP P-Private-Network-Indication private-header (P-Header).
c37: IF A.4/13 THEN m ELSE IF A.4/13A THEN m ELSE n/a - - SIP INFO method and package framework, legacy INFO usage.
c38: IF A.4/78 THEN m ELSE n/a - - the SIP P-Served-User private header.
c39: IF A.3/1 AND NOT A.3C/1 THEN n/a ELSE o - - UE, UE performing the functions of an external attached network.
c46: IF A.4/25 AND (A.3/7B OR A.3/8) THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks and AS acting as originating UA, MRFC.
c47: IF A.4/74 AND A.3/7B THEN o ELSE n/a - - SIP extension for the identification of services and AS acting as originating UA.

NOTE 1: No distinction has been made in these tables between first use of a request on a From/To/Call-ID combination, and the usage in a subsequent one. Therefore the use of "o" etc. above has been included from a viewpoint of first usage.
NOTE 2: The strength of this requirement in RFC 3455 [52] is SHOULD NOT, rather than MUST NOT.
NOTE 3: Support of this header in this method is dependent on the security mechanism and the security architecture which is implemented. Use of this header in this method is not appropriate to the security mechanism defined by 3GPP TS 33.203 [19].

Prerequisite A.5/12 - - OPTIONS request

Table A.78: Supported message bodies within the OPTIONS request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

Table A.79: Void

Prerequisite A.5/13 - - OPTIONS response

Prerequisite: A.6/1 - - Additional for 100 (Trying) response

Table A.79A: Supported header fields within the OPTIONS response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
3	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
4	Date	[26] 20.17	c1	c1	[26] 20.17	m	m
5	From	[26] 20.20	m	m	[26] 20.20	m	m
6	To	[26] 20.39	m	m	[26] 20.39	m	m
7	Via	[26] 20.42	m	m	[26] 20.42	m	m
c1:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.						

Prerequisite A.5/13 - - OPTIONS response for all remaining status-codes

Table A.80: Supported header fields within the OPTIONS response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Allow	[26] 20.5	c12	c12	[26] 20.5	m	m
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
1A	Call-Info	[26] 20.9	o	o	[26] 20.9	o	o
2	Content-Disposition	[26] 20.11	o	o	[26] 20.11	m	m
3	Content-Encoding	[26] 20.12	o	o	[26] 20.12	m	m
4	Content-Language	[26] 20.13	o	o	[26] 20.13	m	m
5	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
6	Content-Type	[26] 20.15	m	m	[26] 20.15	m	m
7	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
8	Date	[26] 20.17	c1	c1	[26] 20.17	m	m
9	From	[26] 20.20	m	m	[26] 20.20	m	m
9A	Geolocation-Error	[89] 4.3	c14	c14	[89] 4.3	c14	c14
9B	History-Info	[66] 4.1	c13	c13	[66] 4.1	c13	c13
10	MIME-Version	[26] 20.24	o	o	[26] 20.24	m	m
11	Organization	[26] 20.25	o	o	[26] 20.25	o	o
11A	P-Access-Network-Info	[52] 4.4	c5	c6	[52] 4.4	c5	c7
11B	P-Asserted-Identity	[34] 9.1	n/a	c22	[34] 9.1	c3	c3
11C	P-Charging-Function-Addresses	[52] 4.5	c10	c11	[52] 4.5	c10	c11
11D	P-Charging-Vector	[52] 4.6	c8	c9	[52] 4.6	c8	c9
11F	P-Preferred-Identity	[34] 9.2	c3	x	[34] 9.2	n/a	n/a
11G	Privacy	[33] 4.2	c4	c4	[33] 4.2	c4	c4
11H	Recv-Info	[25] 5.2.3	c17	c17	[25] 5.2.3	c17	c17
11I	Require	[26] 20.32	m	m	[26] 20.32	m	m
11J	Server	[26] 20.35	o	o	[26] 20.35	o	o
12	Timestamp	[26] 20.38	m	m	[26] 20.38	c2	c2
13	To	[26] 20.39	m	m	[26] 20.39	m	m
13A	User-Agent	[26] 20.41	o	o	[26] 20.41	o	o
14	Via	[26] 20.42	m	m	[26] 20.42	m	m
15	Warning	[26] 20.43	o (note)	o	[26] 20.43	o	o
c1:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.						
c2:	IF A.4/6 THEN m ELSE n/a - - timestamping of requests.						
c3:	IF A.4/25 THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.						
c4:	IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).						
c5:	IF A.4/34 THEN o ELSE n/a - - the P-Access-Network-Info header extension.						
c6:	IF A.4/34 AND A.3/1 THEN m ELSE n/a - - the P-Access-Network-Info header extension and UE.						
c7:	IF A.4/34 AND (A.3/7A OR A.3/7D) THEN m ELSE n/a - - the P-Access-Network-Info header extension and AS acting as terminating UA or AS acting as third-party call controller.						
c8:	IF A.4/36 THEN o ELSE n/a - - the P-Charging-Vector header extension.						
c9:	IF A.4/36 THEN m ELSE n/a - - the P-Charging-Vector header extension.						
c10:	IF A.4/35 THEN o ELSE n/a - - the P-Charging-Function-Addresses header extension.						
c11:	IF A.4/35 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.						
c12:	IF A.6/6 OR A.6/18 THEN m ELSE o - - 200 (OK), 405 (Method Not Allowed).						
c13:	IF A.4/47 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.						
c14:	IF A.4/60 THEN m ELSE n/a - - SIP location conveyance.						
c17:	IF A.4/13 THEN m ELSE IF A.4/13A THEN m ELSE n/a - - SIP INFO method and package framework, legacy INFO usage.						
c22:	IF A.4/25 AND (A.3/7B OR A.3/8) THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks and AS acting as originating UA, MRFC.						
NOTE:	RFC 3261 [26] gives the status of this header as SHOULD rather than OPTIONAL.						

Prerequisite A.5/13 - - OPTIONS response

Prerequisite: A.6/102 - - Additional for 2xx response

Table A.81: Supported header fields within the OPTIONS response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	m	m
1A	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	m	m
1B	Accept-Language	[26] 20.3	m	m	[26] 20.3	m	m
1C	Accept-Resource-Priority	[116] 3.2	c14	c14	[116] 3.2	c14	c14
2	Allow-Events	[28] 7.2.2	c3	c3	[28] 7.2.2	c4	c4
3	Authentication-Info	[26] 20.6	c1	c1	[26] 20.6	c2	c2
5	Contact	[26] 20.10	o	o	[26] 20.10	o	o
7	Recv-Info	[25] 5.2.3	c6	c6	[25] 5.2.3	c6	c6
8	Supported	[26] 20.37	m	m	[26] 20.37	m	m
c1:	IF A.4/7 THEN o ELSE n/a - - authentication between UA and UA.						
c2:	IF A.4/7 THEN m ELSE n/a - - authentication between UA and UA.						
c3:	IF A.4/20 THEN o ELSE n/a - - SIP specific event notification extension.						
c4:	IF A.4/20 THEN m ELSE n/a - - SIP specific event notification extension.						
c6:	IF A.4/13 THEN m ELSE n/a - - SIP INFO method and package framework.						
c14:	IF A.4/70 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.						

Prerequisite A.5/13 - - OPTIONS response

Prerequisite: A.6/103 OR A.6/104 OR A.6/105 OR A.6/106 - - Additional for 3xx – 6xx response

Table A.81A: Supported header fields within the OPTIONS response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Error-Info	[26] 20.18	o	o	[26] 20.18	o	o

Prerequisite A.5/13 - - OPTIONS response

Prerequisite: A.6/103 OR A.6/35 - - Additional for 3xx or 485 (Ambiguous) response

Table A.82: Supported header fields within the OPTIONS response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Contact	[26] 20.10	o (note)	o	[26] 20.10	m	m
NOTE:	RFC 3261 [26] gives the status of this header as SHOULD rather than OPTIONAL.						

Prerequisite A.5/13 - - OPTIONS response

Prerequisite: A.6/14 - - Additional for 401 (Unauthorized) response

Table A.83: Supported header fields within the OPTIONS response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
4	Proxy-Authenticate	[26] 20.27	c1	c1	[26] 20.27	c1	c1
10	WWW-Authenticate	[26] 20.44	o	o	[26] 20.44	o	o
c1:	IF A.4/7 THEN m ELSE n/a - - support of authentication between UA and UA.						

Prerequisite A.5/13 - - OPTIONS response

Prerequisite: A.6/17 OR A.6/23 OR A.6/30 OR A.6/36 OR A.6/42 OR A.6/45 OR A.6/50 OR A.6/51 - - Additional for 404 (Not Found), 413 (Request Entity Too Large), 480(Temporarily not available), 486 (Busy Here), 500 (Internal Server Error), 503 (Service Unavailable), 600 (Busy Everywhere), 603 (Decline) response.

Table A.84: Supported header fields within the OPTIONS response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
5	Retry-After	[26] 20.33	o	o	[26] 20.33	o	o

Table A.85: Void

Prerequisite A.5/13 - - OPTIONS response

Prerequisite: A.6/20 - - Additional for 407 (Proxy Authentication Required) response

Table A.86: Supported header field s within the OPTIONS response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
4	Proxy-Authenticate	[26] 20.27	c1	c1	[26] 20.27	c1	c1
8	WWW-Authenticate	[26] 20.44	o	o	[26] 20.44	o	o
c1:	IF A.4/7 THEN m ELSE n/a - - support of authentication between UA and UA.						

Prerequisite A.5/13 - - OPTIONS response

Prerequisite: A.6/25 - - Additional for 415 (Unsupported Media Type) response

Table A.87: Supported header fields within the OPTIONS response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	o.1	o.1	[26] 20.1	m	m
2	Accept-Encoding	[26] 20.2	o.1	o.1	[26] 20.2	m	m
3	Accept-Language	[26] 20.3	o.1	o.1	[26] 20.3	m	m
o.1	At least one of these capabilities is supported.						

Prerequisite A.5/13 - - OPTIONS response

Prerequisite: A.6/26A - - Additional for 417 (Unknown Resource-Priority) response

Table A.87A: Supported header fields within the OPTIONS response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
c1:	IF A.4/70 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.						

Prerequisite A.5/13 - - OPTIONS response

Prerequisite: A.6/27 - - Additional for 420 (Bad Extension) response

Table A.88: Supported header fields within the OPTIONS response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
7	Unsupported	[26] 20.40	m	m	[26] 20.40	m	m

Prerequisite A.5/13 - - OPTIONS response

Prerequisite: A.6/28 OR A.6/41A - - Additional 421 (Extension Required), 494 (Security Agreement Required) response

Table A.88A: Supported header fields within the OPTIONS response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Security-Server	[48] 2	x	x	[48] 2	c1	c1
c1:	IF A.4/37 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						

Table A.89: Void

Prerequisite A.5/13 - - OPTIONS response

Table A.90: Supported message bodies within the OPTIONS response

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

A.2.1.4.10 PRACK method

Prerequisite A.5/14 - - PRACK request

Table A.91: Supported header fields within the PRACK request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	o	o	[26] 20.1	m	m
1A	Accept-Contact	[56B] 9.2	c15	c15	[56B] 9.2	c18	c18
2	Accept-Encoding	[26] 20.2	o	o	[26] 20.2	m	m
3	Accept-Language	[26] 20.3	o	o	[26] 20.3	m	m
3A	Allow	[26] 20.5	o	o	[26] 20.5	m	m
4	Allow-Events	[28] 7.2.2	c1	c1	[28] 7.2.2	c2	c2
5	Authorization	[26] 20.7	c3	c3	[26] 20.7	c3	c3
6	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
7	Content-Disposition	[26] 20.11	o	o	[26] 20.11	m	m
8	Content-Encoding	[26] 20.12	o	o	[26] 20.12	m	m
9	Content-Language	[26] 20.13	o	o	[26] 20.13	m	m
10	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
11	Content-Type	[26] 20.15	m	m	[26] 20.15	m	m
12	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
13	Date	[26] 20.17	c4	c4	[26] 20.17	m	m
14	From	[26] 20.20	m	m	[26] 20.20	m	m
14A	Max-Breadth	[117] 5.8	n/a	c21	[117] 5.8	c22	c22
15	Max-Forwards	[26] 20.22	m	m	[26] 20.22	n/a	c34
16	MIME-Version	[26] 20.24	o	o	[26] 20.24	m	m
16A	P-Access-Network-Info	[52] 4.4	c9	c10	[52] 4.4	c9	c11
16B	P-Charging-Function-Addresses	[52] 4.5	c13	c14	[52] 4.5	c13	c14
16C	P-Charging-Vector	[52] 4.6	c12	n/a	[52] 4.6	c12	n/a
16E	Privacy	[33] 4.2	c6	n/a	[33] 4.2	c6	n/a
17	Proxy-Authorization	[26] 20.28	c5	c5	[26] 20.28	n/a	n/a
18	Proxy-Require	[26] 20.29	o	n/a	[26] 20.29	n/a	n/a
19	Rack	[27] 7.2	m	m	[27] 7.2	m	m
19A	Reason	[34A] 2	c7	c7	[34A] 2	c7	c7
20	Record-Route	[26] 20.30	n/a	c34	[26] 20.30	n/a	c34
20A	Recv-Info	[25] 5.2.3	c35	c35	[25] 5.2.3	c35	c35
20B	Referred-By	[59] 3	c16	c16	[59] 3	c17	c17
20C	Reject-Contact	[56B] 9.2	c15	c15	[56B] 9.2	c18	c18
20D	Request-Disposition	[56B] 9.1	c15	c15	[56B] 9.1	c18	c18
21	Require	[26] 20.32	o	o	[26] 20.32	m	m
21A	Resource-Priority	[116] 3.1	c33	c33	[116] 3.1	c33	c33
22	Route	[26] 20.34	m	m	[26] 20.34	n/a	c34
23	Supported	[26] 20.37	o	o	[26] 20.37	m	m
24	Timestamp	[26] 20.38	c8	c8	[26] 20.38	m	m
25	To	[26] 20.39	m	m	[26] 20.39	m	m
26	User-Agent	[26] 20.41	o	o	[26] 20.41	o	o
27	Via	[26] 20.42	m	m	[26] 20.42	m	m

c1:	IF A.4/20 THEN o ELSE n/a - - SIP specific event notification extension.
c2:	IF A.4/20 THEN m ELSE n/a - - SIP specific event notification extension.
c3:	IF A.4/7 THEN m ELSE n/a - - authentication between UA and UA.
c4:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.
c5:	IF A.4/8A THEN m ELSE n/a - - authentication between UA and proxy.
c6:	IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c7:	IF A.4/38 THEN o ELSE n/a - - the Reason header field for the session initiation protocol.
c8:	IF A.4/6 THEN o ELSE n/a - - timestamping of requests.
c9:	IF A.4/34 THEN o ELSE n/a - - the P-Access-Network-Info header extension.
c10:	IF A.4/34 AND A.3/1 THEN m ELSE n/a - - the P-Access-Network-Info header extension and UE.
c11:	IF A.4/34 AND (A.3/7A OR A.3/7D) THEN m ELSE n/a - - the P-Access-Network-Info header extension and AS acting as terminating UA or AS acting as third-party call controller.
c12:	IF A.4/36 THEN o ELSE n/a - - the P-Charging-Vector header extension.
c13:	IF A.4/35 THEN o ELSE n/a - - the P-Charging-Function-Addresses header extension.
c14:	IF A.4/35 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c15:	IF A.4/40 THEN o ELSE n/a - - caller preferences for the session initiation protocol.
c16:	IF A.4/43 THEN m ELSE n/a - - the SIP Referred-By mechanism.
c17:	IF A.4/43 THEN o ELSE n/a - - the SIP Referred-By mechanism.
c18:	IF A.4/40 THEN m ELSE n/a - - caller preferences for the session initiation protocol.
c21:	IF A.4/71 AND (A.3/9B OR A.3/9C) THEN m ELSE IF A.3/1 AND NOT A.3C/1 THEN n/a ELSE o - - addressing an amplification vulnerability in session initiation protocol forking proxies, IBCF (IMS-ALG), IBCF (Screening of SIP signalling), UE, UE performing the functions of an external attached network.
c22:	IF A.4/71 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.
c33:	IF A.4/70 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.
c34:	IF A.3/1 AND NOT A.3C/1 THEN n/a ELSE o - - UE, UE performing the functions of an external attached network.
c35:	IF A.4/13 THEN m ELSE IF A.4/13A THEN m ELSE n/a - - SIP INFO method and package framework, legacy INFO usage.

Prerequisite A.5/14 - - PRACK request

Table A.92: Supported message bodies within the PRACK request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

Table A.93: Void

Prerequisite A.5/15 - - PRACK response

Prerequisite: A.6/1 - - Additional for 100 (Trying) response

Table A.93A: Supported header fields within the PRACK response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
3	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
4	Date	[26] 20.17	c1	c1	[26] 20.17	m	m
5	From	[26] 20.20	m	m	[26] 20.20	m	m
6	To	[26] 20.39	m	m	[26] 20.39	m	m
7	Via	[26] 20.42	m	m	[26] 20.42	m	m
c1:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.						

Prerequisite A.5/15 - - PRACK response for all remaining status-codes

Table A.94: Supported header fields within the PRACK response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Allow	[26] 20.5	c9	c9	[26] 20.5	m	m
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Disposition	[26] 20.11	o	o	[26] 20.11	m	m
3	Content-Encoding	[26] 20.12	o	o	[26] 20.12	m	m
4	Content-Language	[26] 20.13	o	o	[26] 20.13	m	m
5	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
6	Content-Type	[26] 20.15	m	m	[26] 20.15	m	m
7	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
8	Date	[26] 20.17	c1	c1	[26] 20.17	m	m
9	From	[26] 20.20	m	m	[26] 20.20	m	m
10	MIME-Version	[26] 20.24	o	o	[26] 20.24	m	m
10A	P-Access-Network-Info	[52] 4.4	c3	c4	[52] 4.4	c3	c5
10B	P-Charging-Function-Addresses	[52] 4.5	c7	c8	[52] 4.5	c7	c8
10C	P-Charging-Vector	[52] 4.6	c6	n/a	[52] 4.6	c6	n/a
10E	P-Early-Media	[109] 8	c10	c10	[109] 8	c10	c10
10F	Privacy	[33] 4.2	c2	n/a	[33] 4.2	c2	n/a
10G	Recv-Info	[25] 5.2.3	c13	c13	[25] 5.2.3	c13	c13
10H	Require	[26] 20.32	o	o	[26] 20.32	m	m
10I	Server	[26] 20.35	o	o	[26] 20.35	o	o
11	Timestamp	[26] 20.38	m	m	[26] 20.38	c2	c2
12	To	[26] 20.39	m	m	[26] 20.39	m	m
12A	User-Agent	[26] 20.41	o	o	[26] 20.41	o	o
13	Via	[26] 20.42	m	m	[26] 20.42	m	m
14	Warning	[26] 20.43	o (note)	o	[26] 20.43	o	o
c1:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.						
c2:	IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).						
c3:	IF A.4/34 THEN o ELSE n/a - - the P-Access-Network-Info header extension.						
c4:	IF A.4/34 AND A.3/1 THEN m ELSE n/a - - the P-Access-Network-Info header extension and UE.						
c5:	IF A.4/34 AND (A.3/7A OR A.3/7D) THEN m ELSE n/a - - the P-Access-Network-Info header extension and AS acting as terminating UA or AS acting as third-party call controller.						
c6:	IF A.4/36 THEN o ELSE n/a - - the P-Charging-Vector header extension.						
c7:	IF A.4/35 THEN o ELSE n/a - - the P-Charging-Function-Addresses header extension.						
c8:	IF A.4/35 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.						
c9:	IF A.6/18 THEN m ELSE o - - 405 (Method Not Allowed)						
c10:	IF A.4/66 THEN m ELSE n/a - - the SIP P-Early-Media private header extension for authorization of early media.						
c13:	IF A.4/13 THEN m ELSE IF A.4/13A THEN m ELSE n/a - - SIP INFO method and package framework, legacy INFO usage.						
NOTE:	RFC 3261 [26] gives the status of this header as SHOULD rather than OPTIONAL.						

Prerequisite A.5/15 - - PRACK response

Prerequisite: A.6/102 - - Additional for 2xx response

Table A.95: Supported header fields within the PRACK response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Accept-Resource-Priority	[116] 3.2	c14	c14	[116] 3.2	c14	c14
0B	Allow-Events	[28] 7.2.2	c3	c3	[28] 7.2.2	c4	c4
0C	Authentication-Info	[26] 20.6	c1	c1	[26] 20.6	c2	c2
0D	P-Early-Media	[109] 8	c5	c5	[109] 8	c5	c5
3	Supported	[26] 20.37	m	m	[26] 20.37	m	m

c1:	IF A.4/7 THEN o ELSE n/a - - authentication between UA and UA.
c2:	IF A.4/7 THEN m ELSE n/a - - authentication between UA and UA.
c3:	IF A.4/20 THEN o ELSE n/a - - SIP specific event notification extension.
c4:	IF A.4/20 THEN m ELSE n/a - - SIP specific event notification extension.
c5:	IF A.4/66 THEN m ELSE n/a - - the SIP P-Early-Media private header extension for authorization of early media.
c14:	IF A.4/70 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.

Prerequisite A.5/15 - - PRACK response

Prerequisite: A.6/103 OR A.6/104 OR A.6/105 OR A.6/106 - - Additional for 3xx – 6xx response

Table A.95A: Supported header fields within the PRACK response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Error-Info	[26] 20.18	o	o	[26] 20.18	o	o

Prerequisite A.5/15 - - PRACK response

Prerequisite: A.6/103 OR A.6/35 - - Additional for 3xx or 485 (Ambiguous) response

Table A.96: Supported header fields within the PRACK response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Contact	[26] 20.10	o (note)	o	[26] 20.10	m	m
NOTE:	RFC 3261 [26] gives the status of this header field as SHOULD rather than OPTIONAL.						

Prerequisite A.5/15 - - PRACK response

Prerequisite: A.6/14 - - Additional for 401 (Unauthorized) response

Table A.97: Supported header fields within the PRACK response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
2	Proxy-Authenticate	[26] 20.27	c1	c1	[26] 20.27	c1	c1
8	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	m	m
c1:	IF A.4/7 THEN m ELSE n/a - - support of authentication between UA and UA.						

Prerequisite A.5/15 - - PRACK response

Prerequisite: A.6/17 OR A.6/23 OR A.6/30 OR A.6/36 OR A.6/42 OR A.6/45 OR A.6/50 OR A.6/51 - - Additional for 404 (Not Found), 413 (Request Entity Too Large), 480(Temporarily not available), 486 (Busy Here), 500 (Internal Server Error), 503 (Service Unavailable), 600 (Busy Everywhere), 603 (Decline) response.

Table A.98: Supported header fields within the PRACK response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Retry-After	[26] 20.33	o	o	[26] 20.33	o	o

Table A.99: Void

Prerequisite A.5/15 - - PRACK response

Prerequisite: A.6/20 - - Additional for 407 (Proxy Authentication Required) response

Table A.100: Supported header fields within the PRACK response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
2	Proxy-Authenticate	[26] 20.27	c1	c1	[26] 20.27	c1	c1
6	WWW-Authenticate	[26] 20.44	o	o	[26] 20.44	o	o
c1:	IF A.4/7 THEN m ELSE n/a - - support of authentication between UA and UA.						

Prerequisite A.5/15 - - PRACK response

Prerequisite: A.6/25 - - Additional for 415 (Unsupported Media Type) response

Table A.101: Supported header fields within the PRACK response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	o.1	o.1	[26] 20.1	m	m
2	Accept-Encoding	[26] 20.2	o.1	o.1	[26] 20.2	m	m
3	Accept-Language	[26] 20.3	o.1	o.1	[26] 20.3	m	m

Prerequisite A.5/15 - - PRACK response

Prerequisite: A.6/26A - - Additional for 417 (Unknown Resource-Priority) response

Table A.101A: Supported header fields within the PRACK response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
c1:	IF A.4/70 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.						

Prerequisite A.5/15 - - PRACK response

Prerequisite: A.6/27 - - Additional for 420 (Bad Extension) response

Table A.102: Supported header fields within the PRACK response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
5	Unsupported	[26] 20.40	m	m	[26] 20.40	m	m

Prerequisite A.5/15 - - PRACK response

Prerequisite: A.6/28 OR A.6/41A - - Additional for 421 (Extension Required), 494 (Security Agreement Required) response

Table A.102A: Supported header fields within the PRACK response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Security-Server	[48] 2	x	x	[48] 2	c1	c1
c1:	IF A.4/37 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						

Table A.103: Void

Prerequisite A.5/15 - - PRACK response

Table A.104: Supported message bodies within the PRACK response

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

A.2.1.4.10A PUBLISH method

Prerequisite A.5/15A – PUBLISH request

Table A.104A: Supported header fields within the PUBLISH request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Contact	[56B] 9.2	c22	c22	[56B] 9.2	c28	c28
2	Allow	[26] 20.5	o	o	[26] 20.5	m	m
3	Allow-Events	[26] 7.2.2	c1	c1	[26] 7.2.2	c2	c2
4	Authorization	[26] 20.7	c3	c3	[26] 20.7	c3	c3
5	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
6	Call-Info	[26] 20.9	o	o	[26] 20.9	o	o
6A	Contact	[26] 20.10	o	o	[26] 20.10	o	o
7	Content-Disposition	[26] 20.11	o	o	[26] 20.11	m	m
8	Content-Encoding	[26] 20.12	o	o	[26] 20.12	m	m
9	Content-Language	[26] 20.13	o	o	[26] 20.13	m	m
10	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
11	Content-Type	[26] 20.15	m	m	[26] 20.15	m	m
12	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
13	Date	[26] 20.17	c4	c4	[26] 20.17	m	m
14	Event	[70] 4, 6	m	m	[70] 4, 6	m	m
15	Expires	[26] 20.19, [70] 4, 5, 6	o	o	[26] 20.19, [70] 4, 5, 6	m	m
16	From	[26] 20.20	m	m	[26] 20.20	m	m
16A	Geolocation	[89] 4.1	c38	c38	[89] 4.1	c38	c38
16B	Geolocation-Routing	[89] 4.1	c38	c38	[89] 4.1	c38	c38
16C	History-Info	[66] 4.1	c27	c27	[66] 4.1	c27	c27
17	In-Reply-To	[26] 20.21	o	o	[26] 20.21	o	o
17A	Max-Breadth	[117] 5.8	n/a	c23	[117] 5.8	c24	c24
18	Max-Forwards	[26] 20.22	m	m	[26] 20.22	n/a	c37
19	MIME-Version	[26] 20.24	o	o	[26] 20.24	m	m
20	Organization	[26] 20.25	o	o	[26] 20.25	o	o
21	P-Access-Network-Info	[52] 4.4	c15	c16	[52] 4.4	c15	c17
22	P-Asserted-Identity	[34] 9.1	n/a	c45	[34] 9.1	c11	c11
22A	P-Asserted-Service	[121] 4.1	n/a	c46	[121] 4.1	c31	c31
23	P-Called-Party-ID	[52] 4.2	x	x	[52] 4.2	c13	c13
24	P-Charging-Function-Addresses	[52] 4.5	c20	c21	[52] 4.5	c20	c21
25	P-Charging-Vector	[52] 4.6	c18	c19	[52] 4.6	c18	c19
26	P-Preferred-Identity	[34] 9.2	c11	c7	[34] 9.2	n/a	n/a
26A	P-Preferred-Service	[121] 4.2	c31	c30	[121] 4.2	n/a	n/a
26B	P-Private-Network-Indication	[134]	c33	c33	[134]	c33	c33
26C	P-Profile-Key	[97] 5	n/a	n/a	[97] 5	n/a	n/a
26D	P-Served-User	[133] 6	c36	c36	[133] 6	c36	c36
26E	P-User-Database	[82] 4	n/a	n/a	[82] 4	n/a	n/a
27	P-Visited-Network-ID	[52] 4.3	x (note 3)	x	[52] 4.3	c14	n/a
28	Priority	[26] 20.26	o	o	[26] 20.26	o	o
29	Privacy	[33] 4.2	c12	c12	[33] 4.2	c12	c12
30	Proxy-Authorization	[26] 20.28	c5	c5	[26] 20.28	n/a	n/a
31	Proxy-Require	[26] 20.29	o	n/a	[26] 20.29	n/a	n/a
32	Reason	[34A] 2	c8	c8	[34A] 2	c8	c8
33	Reject-Contact	[56B] 9.2	c22	c22	[56B] 9.2	c28	c28
33A	Referred-By	[59] 3	c25	c25	[59] 3	c26	c26
34	Request-Disposition	[56B] 9.1	c22	c22	[56B] 9.1	c28	c28
35	Reply-To	[26] 20.31	o	o	[26] 20.31	o	o
36	Require	[26] 20.32	o	o	[26] 20.32	m	m
36A	Resource-Priority	[116] 3.1	c29	c29	[116] 3.1	c29	c29
37	Route	[26] 20.34	m	m	[26] 20.34	n/a	c37
38	Security-Client	[48] 2.3.1	c9	c9	[48] 2.3.1	n/a	n/a
39	Security-Verify	[48] 2.3.1	c10	c10	[48] 2.3.1	n/a	n/a

40	SIP-If-Match	[70] 11.3.2	o	o	[70] 11.3.2	m	m
41	Subject	[26] 20.36	o	o	[26] 20.36	o	o
42	Supported	[26] 20.37, [26] 7.1	o	o	[26] 20.37, [26] 7.1	m	m
43	Timestamp	[26] 20.38	c6	c6	[26] 20.38	m	m
44	To	[26] 20.39	m	m	[26] 20.39	m	m
45	User-Agent	[26] 20.41	o	o	[26] 20.41	o	o
46	Via	[26] 20.42	m	m	[26] 20.42	m	m

c1: IF A.4/20 THEN o ELSE n/a - - SIP specific event notification extension.
c2: IF A.4/20 THEN m ELSE n/a - - SIP specific event notification extension.
c3: IF A.4/7 THEN m ELSE n/a - - authentication between UA and UA.
c4: IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.
c5: IF A.4/8A THEN m ELSE n/a - - authentication between UA and proxy.
c6: IF A.4/6 THEN o ELSE n/a - - timestamping of requests.
c7: IF A.3/1 AND A.4/25 THEN o ELSE n/a - - UE and private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c8: IF A.4/38 THEN o ELSE n/a - - the Reason header field for the session initiation protocol.
c9: IF A.4/37 THEN o ELSE n/a - - security mechanism agreement for the session initiation protocol (note 1).
c10: IF A.4/37 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.
c11: IF A.4/25 THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c12: IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c13: IF A.4/32 THEN o ELSE n/a - - the P-Called-Party-ID extension.
c14: IF A.4/33 THEN o ELSE n/a - - the P-Visited-Network-ID extension.
c15: IF A.4/34 THEN o ELSE n/a - - the P-Access-Network-Info header extension.
c16: IF A.4/34 AND A.3/1 THEN m ELSE n/a - - the P-Access-Network-Info header extension and UE.
c17: IF A.4/34 AND (A.3/7A OR A.3/7D) THEN m ELSE n/a - - the P-Access-Network-Info header extension and AS acting as terminating UA or AS acting as third-party call controller.
c18: IF A.4/36 THEN o ELSE n/a - - the P-Charging-Vector header extension.
c19: IF A.4/36 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c20: IF A.4/35 THEN o ELSE n/a - - the P-Charging-Function-Addresses header extension.
c21: IF A.4/35 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c22: IF A.4/40 THEN o ELSE n/a - - caller preferences for the session initiation protocol.
c23: IF A.4/71 AND (A.3/9B OR A.3/9C) THEN m ELSE IF A.3/1 AND NOT A.3C/1 THEN n/a ELSE o - - addressing an amplification vulnerability in session initiation protocol forking proxies, IBCF (IMS-ALG), IBCF (Screening of SIP signalling), UE, UE performing the functions of an external attached network.
c24: IF A.4/71 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.
c25: IF A.4/43 THEN m ELSE n/a - - the SIP Referred-By mechanism.
c26: IF A.4/43 THEN o ELSE n/a - - the SIP Referred-By mechanism.
c27: IF A.4/47 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.
c28: IF A.4/40 THEN m ELSE n/a - - caller preferences for the session initiation protocol.
c29: IF A.4/70B THEN m ELSE n/a - - inclusion of CANCEL, BYE, REGISTER and PUBLISH in communications resource priority for the session initiation protocol.
c30: IF (A.3/1 OR A.3A/81) AND A.4/74 THEN o ELSE n/a - - UE, MSC Server enhanced for ICS and SIP extension for the identification of services.
c31: IF A.4/74 THEN o ELSE n/a - - SIP extension for the identification of services.
c32: IF A.4/74 THEN m ELSE n/a - - SIP extension for the identification of services.
c33: IF A.4/77 THEN m ELSE n/a - - the SIP P-Private-Network-Indication private-header (P-Header).
c36: IF A.4/78 THEN m ELSE n/a - - the SIP P-Served-User private header.
c37: IF A.3/1 AND NOT A.3C/1 THEN n/a ELSE o - - UE, UE performing the functions of an external attached network.
c38: IF A.4/60 THEN m ELSE n/a - - SIP location conveyance.
c45: IF A.4/25 AND (A.3/7B OR A.3/8) THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks and AS acting as originating UA, MRFC.
c46: IF A.4/74 AND A.3/7B THEN o ELSE n/a - - SIP extension for the identification of services and AS acting as originating UA.

NOTE 1: Support of this header in this method is dependent on the security mechanism and the security architecture which is implemented.
NOTE 2: The strength of this requirement in RFC 3455 [52] is SHOULD NOT, rather than MUST NOT.

Prerequisite A.5/15A - - PUBLISH request

Table A.104B: Supported message bodies within the PUBLISH request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

Prerequisite A.5/15B - - PUBLISH response

Prerequisite: A.6/1 - - Additional for 100 (Trying) response

Table A.104BA: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
3	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
4	Date	[26] 20.17	c1	c1	[26] 20.17	m	m
5	From	[26] 20.20	m	m	[26] 20.20	m	m
6	To	[26] 20.39	m	m	[26] 20.39	m	m
7	Via	[26] 20.42	m	m	[26] 20.42	m	m
c1:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.						

Prerequisite A.5/15B - - PUBLISH response for all remaining status-codes

Table A.104C: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Allow	[26] 20.5	c12	c12	[26] 20.5	m	m
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Call-Info	[26] 24.9	o	o	[26] 24.9	m	m
3	Content-Disposition	[26] 20.11	o	o	[26] 20.11	m	m
4	Content-Encoding	[26] 20.12	o	o	[26] 20.12	m	m
5	Content-Language	[26] 20.13	o	o	[26] 20.13	m	m
6	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
7	Content-Type	[26] 20.15	m	m	[26] 20.15	m	m
8	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
9	Date	[26] 20.17	c1	c1	[26] 20.17	m	m
10	From	[26] 20.20	m	m	[26] 20.20	m	m
10A	Geolocation-Error	[89] 4.3	c16	c16	[89] 4.3	c16	c16
10B	History-Info	[66] 4.1	c13	c13	[66] 4.1	c13	c13
11	MIME-Version	[26] 20.24	o	o	[26] 20.24	m	m
12	Organization	[26] 20.25	o	o	[26] 20.25	o	o
13	P-Access-Network-Info	[52] 4.4	c5	c6	[52] 4.4	c5	c7
14	P-Asserted-Identity	[34] 9.1	n/a	c21	[34] 9.1	c3	c3
15	P-Charging-Function-Addresses	[52] 4.5	c10	c11	[52] 4.5	c10	c11
16	P-Charging-Vector	[52] 4.6	c8	c9	[52] 4.6	c8	c9
17	P-Preferred-Identity	[34] 9.2	c3	x	[34] 9.2	n/a	n/a
18	Privacy	[33] 4.2	c4	c4	[33] 4.2	c4	c4
19	Require	[26] 20.32	m	m	[26] 20.32	m	m
20	Server	[26] 20.35	o	o	[26] 20.35	o	o
21	Timestamp	[26] 20.38	m	m	[26] 20.38	c2	c2
22	To	[26] 20.39	m	m	[26] 20.39	m	m
23	User-Agent	[26] 20.41	o	o	[26] 20.41	o	o
24	Via	[26] 20.42	m	m	[26] 20.42	m	m
25	Warning	[26] 20.43	o	o	[26] 20.43	o	o

c1: IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.
c2: IF A.4/6 THEN m ELSE n/a - - timestamping of requests.
c3: IF A.4/25 THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c4: IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c5: IF A.4/34 THEN o ELSE n/a - - the P-Access-Network-Info header extension.
c6: IF A.4/34 AND A.3/1 THEN m ELSE n/a - - the P-Access-Network-Info header extension and UE.
c7: IF A.4/34 AND (A.3/7A OR A.3/7D) THEN m ELSE n/a - - the P-Access-Network-Info header extension and AS acting as terminating UA or AS acting as third-party call controller.
c8: IF A.4/36 THEN o ELSE n/a - - the P-Charging-Vector header extension.
c9: IF A.4/36 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c10: IF A.4/35 THEN o ELSE n/a - - the P-Charging-Function-Addresses header extension.
c11: IF A.4/35 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c12: IF A.6/18 THEN m ELSE o - - 405 (Method Not Allowed).
c13: IF A.4/47 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.
c16: IF A.4/60 THEN m ELSE n/a - - SIP location conveyance.
c21: IF A.4/25 AND (A.3/7B OR A.3/8) THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks and AS acting as originating UA, MRFC.

NOTE: For a 488 (Not Acceptable Here) response, RFC 3261 [26] gives the status of this header field as SHOULD rather than OPTIONAL.

Prerequisite A.5/15B - - PUBLISH response

Prerequisite: A.6/7 - - Additional for 200 (OK) response

Table A.104D: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c3	c3	[116] 3.2	c3	c3
2	Authentication-Info	[26] 20.6	c1	c1	[26] 20.6	c2	c2
3	Expires	[26] 20.19, [70] 4, 5, 6	m	m	[26] 20.19, [70] 4, 5, 6	m	m
4	SIP-Etag	[70] 11.3.1	m	m	[70] 11.3.1	m	m
5	Supported	[26] 20.37	m	m	[26] 20.37	m	m
c1:	IF A.4/7 THEN o ELSE n/a - - authentication between UA and UA.						
c2:	IF A.4/7 THEN m ELSE n/a - - authentication between UA and UA.						
c3:	IF A.4/70B THEN m ELSE n/a - - inclusion of CANCEL, BYE, REGISTER and PUBLISH in communications resource priority for the session initiation protocol.						

Prerequisite A.5/15B - - PUBLISH response

Prerequisite: A.6/103 OR A.6/104 OR A.6/105 OR A.6/106 - - Additional for 3xx – 6xx response

Table A.104DA: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Error-Info	[26] 20.18	o	o	[26] 20.18	o	o

Prerequisite A.5/15B - - PUBLISH response

Prerequisite: A.6/103 OR A.6/35 - - Additional for 3xx or 485 (Ambiguous) response

Table A.104E: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
2	Contact	[26] 20.10	o	o	[26] 20.10	m	m

Prerequisite A.5/15B - - PUBLISH response

Prerequisite: A.6/8 OR A.6/9 OR A.6/10 OR A.6/11OR A.6/12 – Additional for 401 (Unauthorized) response

Table A.104F: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Proxy-Authenticate	[26] 20.27	c1	c1	[26] 20.27	c1	c1
5	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	m	m
c1:	IF A.4/7 THEN m ELSE n/a - - support of authentication between UA and UA.						

Prerequisite A.5/15B - - PUBLISH response

Prerequisite: A.6/17 OR A.6/23 OR A.6/30 OR A.6/36 OR A.6/42 OR A.6/45 OR A.6/50 OR A.6/51 - - Additional for 404 (Not Found), 413 (Request Entity Too Large), 480(Temporarily not available), 486 (Busy Here), 500 (Internal Server Error), 503 (Service Unavailable), 600 (Busy Everywhere), 603 (Decline) response

Table A.104G: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Retry-After	[26] 20.33	o	o	[26] 20.33	o	o

Table A.104H: Void

Prerequisite A.5/15B - - PUBLISH response

Prerequisite: A.6/20 - - Additional for 407 (Proxy Authentication Required) response

Table A.104I: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Proxy-Authenticate	[26] 20.27	c1	c1	[26] 20.27	c1	c1
5	WWW-Authenticate	[26] 20.44	o	o	[26] 20.44	o	o
c1:	IF A.4/7 THEN m ELSE n/a - - support of authentication between UA and UA.						

Prerequisite A.5/15B - - PUBLISH response

Prerequisite: A.6/25 - - Additional for 415 (Unsupported Media Type) response

Table A.104J: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	o.1	o.1	[26] 20.1	m	m
2	Accept-Encoding	[26] 20.2	o.1	o.1	[26] 20.2	m	m
3	Accept-Language	[26] 20.3	o.1	o.1	[26] 20.3	m	m
o.1	At least one of these capabilities is supported.						

Prerequisite A.5/15B - - PUBLISH response

Prerequisite: A.6/26A - - Additional for 417 (Unknown Resource-Priority) response

Table A.104JA: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
c1:	IF A.4/70B THEN m ELSE n/a - - inclusion of CANCEL, BYE, REGISTER and PUBLISH in communications resource priority for the session initiation protocol.						

Prerequisite A.5/15B - - PUBLISH response

Prerequisite: A.6/27 - - Additional for 420 (Bad Extension) response

Table A.104K: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
4	Unsupported	[26] 20.40	m	m	[26] 20.40	m	m

Prerequisite A.5/15B - - PUBLISH response

Prerequisite: A.6/28 OR A.6/41A - - Additional for 421 (Extension Required), 494 (Security Agreement Required) response

Table A.104L: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Security-Server	[48] 2	x	x	[48] 2	c1	c1
c1:	IF A.4/37 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						

Prerequisite A.5/15B - - PUBLISH response

Prerequisite: A.6/29 - - Additional for 423 (Interval Too Brief) response

Table A.104M: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Min-Expires	[26] 20.23, [70] 5, 6	m	m	[26] 20.23, [70] 5, 6	m	m

Table A.104N: Void

Prerequisite A.5/15B - - PUBLISH response

Prerequisite: A.6/39 - - Additional for 489 (Bad Event) response

Table A.104O: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
2	Allow-Events	[28] 8.2.2	m	m	[28] 8.2.2	m	m

Prerequisite A.5/15B - - PUBLISH response

Table A.104P: Supported message bodies within the PUBLISH response

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

A.2.1.4.11 REFER method

Prerequisite A.5/16 - - REFER request

Table A.105: Supported header fields within the REFER request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Accept	[26] 20.1	o	o	[26] 20.1	m	m
0B	Accept-Contact	[56B] 9.2	c22	c22	[56B] 9.2	c25	c25
0C	Accept-Encoding	[26] 20.2	o	o	[26] 20.2	m	m
1	Accept-Language	[26] 20.3	o	o	[26] 20.3	m	m
1A	Allow	[26] 20.5	o	o	[26] 20.5	m	m
2	Allow-Events	[28] 7.2.2	c1	c1	[28] 7.2.2	c2	c2
3	Authorization	[26] 20.7	c3	c3	[26] 20.7	c3	c3
4	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
5	Contact	[26] 20.10	m	m	[26] 20.10	m	m
5A	Content-Disposition	[26] 20.11	o	o	[26] 20.11	m	m
5B	Content-Encoding	[26] 20.12	o	o	[26] 20.12	m	m
5C	Content-Language	[26] 20.13	o	o	[26] 20.13	m	m
6	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
7	Content-Type	[26] 20.15	m	m	[26] 20.15	m	m
8	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
9	Date	[26] 20.17	c4	c4	[26] 20.17	m	m
10	Expires	[26] 20.19	o	o	[26] 20.19	o	o
11	From	[26] 20.20	m	m	[26] 20.20	m	m
11A	Geolocation	[89] 4.1	c26	c26	[89] 4.1	c26	c26
11B	Geolocation-Routing	[89] 4.1	c26	c26	[89] 4.1	c26	c26
11C	History-Info	[66] 4.1	c24	c24	[66] 4.1	c24	c24
11D	Max-Breadth	[117] 5.8	n/a	c30	[117] 5.8	c31	c31
12	Max-Forwards	[26] 20.22	m	m	[26] 20.22	n/a	c39
13	MIME-Version	[26] 20.24	o	o	[26] 20.24	m	m
14	Organization	[26] 20.25	o	o	[26] 20.25	o	o
14A	P-Access-Network-Info	[52] 4.4	c12	c13	[52] 4.4	c12	c14
14B	P-Asserted-Identity	[34] 9.1	n/a	c50	[34] 9.1	c8	c8
14C	P-Asserted-Service	[121] 4.1	n/a	c51	[121] 4.1	c29	c29
14D	P-Called-Party-ID	[52] 4.2	x	x	[52] 4.2	c10	c10
14E	P-Charging-Function-Addresses	[52] 4.5	c17	c18	[52] 4.5	c17	c18
14F	P-Charging-Vector	[52] 4.6	c15	c16	[52] 4.6	c15	c16
14H	P-Preferred-Identity	[34] 9.2	c8	c7	[34] 9.2	n/a	n/a
14I	P-Preferred-Service	[121] 4.2	c28	c27	[121] 4.2	n/a	n/a
14J	P-Private-Network-Indication	[134]	c36	c36	[134]	c36	c36
14K	P-Profile-Key	[97] 5	n/a	n/a	[97] 5	n/a	n/a
14L	P-Served-User	[133] 6	c40	c40	[133] 6	c40	c40
14M	P-User-Database	[82] 4	n/a	n/a	[82] 4	n/a	n/a
14N	P-Visited-Network-ID	[52] 4.3	x (note 1)	x	[52] 4.3	c11	n/a
14O	Privacy	[33] 4.2	c9	c9	[33] 4.2	c9	c9
15	Proxy-Authorization	[26] 20.28	c5	c5	[26] 20.28	n/a	n/a
16	Proxy-Require	[26] 20.29	o	n/a	[26] 20.29	n/a	n/a
16A	Reason	[34A] 2	c21	c21	[34A] 2	c21	c21
17	Record-Route	[26] 20.30	n/a	c39	[26] 20.30	m	m
18	Refer-To	[36] 3	m	m	[36] 3	m	m
18A	Referred-By	[59] 3	c23	c23	[59] 3	c23	c23
18B	Reject-Contact	[56B] 9.2	c22	c22	[56B] 9.2	c25	c25
18C	Request-Disposition	[56B] 9.1	c22	c22	[56B] 9.1	c25	c25
19	Require	[26] 20.32	o	o	[26] 20.32	m	m
19A	Resource-Priority	[116] 3.1	c33	c33	[116] 3.1	c33	c33
20	Route	[26] 20.34	m	m	[26] 20.34	n/a	c39
20A	Security-Client	[48] 2.3.1	c19	c19	[48] 2.3.1	n/a	n/a
20B	Security-Verify	[48] 2.3.1	c20	c20	[48] 2.3.1	n/a	n/a
21	Supported	[26] 20.37, [26] 7.1	o	o	[26] 20.37, [26] 7.1	m	m

21A	Target-Dialog	[184] 7	c43	c43	[xxa] 7	c44	c44
22	Timestamp	[26] 20.38	c6	c6	[26] 20.38	m	m
23	To	[26] 20.39	m	m	[26] 20.39	m	m
23A	Trigger-Consent	[125] 5.11.2	c34	c34	[125] 5.11.2	c35	c35
24	User-Agent	[26] 20.41	o	o	[26] 20.41	o	o
25	Via	[26] 20.42	m	m	[26] 20.42	m	m

c1: IF A.4/20 THEN o ELSE n/a - - SIP specific event notification extension.
c2: IF A.4/20 THEN m ELSE n/a - - SIP specific event notification extension.
c3: IF A.4/7 THEN m ELSE n/a - - authentication between UA and UA.
c4: IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.
c5: IF A.4/8A THEN m ELSE n/a - - authentication between UA and proxy.
c6: IF A.4/6 THEN o ELSE n/a - - timestamping of requests.
c7: IF A.3/1 AND A.4/25 THEN o ELSE n/a - - UE and private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c8: IF A.4/25 THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c9: IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c10: IF A.4/32 THEN o ELSE n/a - - the P-Called-Party-ID extension.
c11: IF A.4/33 THEN o ELSE n/a - - the P-Visited-Network-ID extension.
c12: IF A.4/34 THEN o ELSE n/a - - the P-Access-Network-Info header extension.
c13: IF A.4/34 AND A.3/1 THEN m ELSE n/a - - the P-Access-Network-Info header extension and UE.
c14: IF A.4/34 AND (A.3/7A OR A.3/7D) THEN m ELSE n/a - - the P-Access-Network-Info header extension and AS acting as terminating UA or AS acting as third-party call controller.
c15: IF A.4/36 THEN o ELSE n/a - - the P-Charging-Vector header extension.
c16: IF A.4/36 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c17: IF A.4/35 THEN o ELSE n/a - - the P-Charging-Function-Addresses header extension.
c18: IF A.4/35 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c19: IF A.4/37 THEN o ELSE n/a - - security mechanism agreement for the session initiation protocol (note 2).
c20: IF A.4/37 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.
c21: IF A.4/38 THEN o ELSE n/a - - the Reason header field for the session initiation protocol.
c22: IF A.4/40 THEN o ELSE n/a - - caller preferences for the session initiation protocol.
c23: IF A.4/43 THEN m ELSE n/a - - the SIP Referred-By Mechanism.
c24: IF A.4/47 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.
c25: IF A.4/40 THEN m ELSE n/a - - caller preferences for the session initiation protocol.
c26: IF A.4/60 THEN m ELSE n/a - - SIP location conveyance.
c27: IF (A.3/1 OR A.3A/81) AND A.4/74 THEN o ELSE n/a - - UE, MSC Server enhanced for ICS and SIP extension for the identification of services.
c28: IF A.4/74 THEN o ELSE n/a - - SIP extension for the identification of services.
c29: IF A.4/74 THEN m ELSE n/a - - SIP extension for the identification of services.
c30: IF A.4/71 AND (A.3/9B OR A.3/9C) THEN m ELSE IF A.3/1 AND NOT A.3C/1 THEN n/a ELSE o - - addressing an amplification vulnerability in session initiation protocol forking proxies, IBCF (IMS-ALG), IBCF (Screening of SIP signalling), UE, UE performing the functions of an external attached network.
c31: IF A.4/71 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.
c33: IF A.4/70 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.
c34: IF A.4/75A THEN m ELSE n/a - - a relay within the framework for consent-based communications in SIP.
c35: IF A.4/75B THEN m ELSE n/a - - a recipient within the framework for consent-based communications in SIP.
c36: IF A.4/77 THEN m ELSE n/a - - the SIP P-Private-Network-Indication private-header (P-Header).
c39: IF A.3/1 AND NOT A.3C/1 THEN n/a ELSE o - - UE, UE performing the functions of an external attached network.
c40: IF A.4/78 THEN m ELSE n/a - - the SIP P-Served-User private header.
c43: IF A.4/99 THEN o ELSE n/a - - request authorization through dialog Identification in the session initiation protocol.
c44: IF A.4/99 THEN m ELSE n/a - - request authorization through dialog Identification in the session initiation protocol.
c50: IF A.4/25 AND (A.3/7B OR A.3/8) THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks and AS acting as originating UA, MRFC.
c51: IF A.4/74 AND A.3/7B THEN o ELSE n/a - - SIP extension for the identification of services and AS acting as originating UA.

NOTE 1: The strength of this requirement in RFC 3455 [52] is SHOULD NOT, rather than MUST NOT.
NOTE 2: Support of this header field in this method is dependent on the security mechanism and the security architecture which is implemented. Use of this header field in this method is not appropriate to the security mechanism defined by 3GPP TS 33.203 [19].

Prerequisite A.5/16 - - REFER request

Table A.106: Supported message bodies within the REFER request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

Table A.107: Void

Prerequisite A.5/17 - - REFER response

Prerequisite: A.6/1 - - Additional for 100 (Trying) response

Table A.107A: Supported header fields within the REFER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
3	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
4	Date	[26] 20.17	c1	c1	[26] 20.17	m	m
5	From	[26] 20.20	m	m	[26] 20.20	m	m
6	To	[26] 20.39	m	m	[26] 20.39	m	m
7	Via	[26] 20.42	m	m	[26] 20.42	m	m
c1:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.						

Prerequisite A.5/17 - - REFER response for all remaining status-codes

Table A.108: Supported header fields within the REFER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Allow	[26] 20.5	c12	c12	[26] 20.5	m	m
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
1A	Contact	[26] 20.10	c13	c13	[26] 20.10	m	m
1B	Content-Disposition	[26] 20.11	o	o	[26] 20.11	m	m
2	Content-Encoding	[26] 20.12	o	o	[26] 20.12	m	m
3	Content-Language	[26] 20.13	o	o	[26] 20.13	m	m
4	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
5	Content-Type	[26] 20.15	m	m	[26] 20.15	m	m
6	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
7	Date	[26] 20.17	c1	c1	[26] 20.17	m	m
8	From	[26] 20.20	m	m	[26] 20.20	m	m
8A	Geolocation-Error	[89] 4.3	c15	c15	[89] 4.3	c15	c15
8B	History-Info	[66] 4.1	c14	c14	[66] 4.1	c14	c14
9	MIME-Version	[26] 20.24	o	o	[26] 20.24	m	m
10	Organization	[26] 20.25	o	o	[26] 20.25	o	o
10A	P-Access-Network-Info	[52] 4.4	c5	c6	[52] 4.4	c5	c7
10B	P-Asserted-Identity	[34] 9.1	n/a	c22	[34] 9.1	c3	c3
10C	P-Charging-Function-Addresses	[52] 4.5	c10	c11	[52] 4.5	c10	c11
10D	P-Charging-Vector	[52] 4.6	c8	c9	[52] 4.6	c8	c9
10F	P-Preferred-Identity	[34] 9.2	c3	x	[34] 9.2	n/a	n/a
10G	Privacy	[33] 4.2	c4	c4	[33] 4.2	c4	c4
10H	Require	[26] 20.32	m	m	[26] 20.32	m	m
10I	Server	[26] 20.35	o	o	[26] 20.35	o	o
11	Timestamp	[26] 20.38	m	m	[26] 20.38	c2	c2
12	To	[26] 20.39	m	m	[26] 20.39	m	m
12A	User-Agent	[26] 20.41	o	o	[26] 20.41	o	o
13	Via	[26] 20.42	m	m	[26] 20.42	m	m
14	Warning	[26] 20.43	o (note)	o	[26] 20.43	o	o
c1:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.						
c2:	IF A.4/6 THEN m ELSE n/a - - timestamping of requests.						
c3:	IF A.4/25 THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.						
c4:	IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).						
c5:	IF A.4/34 THEN o ELSE n/a - - the P-Access-Network-Info header extension.						
c6:	IF A.4/34 AND A.3/1 THEN m ELSE n/a - - the P-Access-Network-Info header extension and UE.						
c7:	IF A.4/34 AND (A.3/7A OR A.3/7D) THEN m ELSE n/a - - the P-Access-Network-Info header extension and AS acting as terminating UA or AS acting as third-party call controller.						
c8:	IF A.4/36 THEN o ELSE n/a - - the P-Charging-Vector header extension.						
c9:	IF A.4/36 THEN m ELSE n/a - - the P-Charging-Vector header extension.						
c10:	IF A.4/35 THEN o ELSE n/a - - the P-Charging-Function-Addresses header extension.						
c11:	IF A.4/35 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.						
c12:	IF A.6/18 THEN m ELSE o - - 405 (Method Not Allowed)						
c13:	IF A.6/102 THEN m ELSE o - - 2xx response.						
c14:	IF A.4/47 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.						
c15:	IF A.4/60 THEN m ELSE n/a - - SIP location conveyance.						
c22:	IF A.4/25 AND (A.3/7B OR A.3/8) THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks and AS acting as originating UA, MRFC.						
NOTE:	For a 488 (Not Acceptable Here) response, RFC 3261 [26] gives the status of this header field as SHOULD rather than OPTIONAL.						

Prerequisite A.5/17 - - REFER response

Prerequisite: A.6/102 - - Additional for 2xx response

Table A.109: Supported header fields within the REFER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Accept-Resource-Priority	[116] 3.2	c12	c12	[116] 3.2	c12	c12
1	Allow-Events	[28] 7.2.2	c3	c3	[28] 7.2.2	c4	c4
2	Authentication-Info	[26] 20.6	c1	c1	[26] 20.6	c2	c2
5	Record-Route	[26] 20.30	m	m	[26] 20.30	m	m
8	Supported	[26] 20.37	m	m	[26] 20.37	m	m
c1:	IF A.4/7 THEN o ELSE n/a - - authentication between UA and UA.						
c2:	IF A.4/7 THEN m ELSE n/a - - authentication between UA and UA.						
c3:	IF A.4/20 THEN o ELSE n/a - - SIP specific event notification extension.						
c4:	IF A.4/20 THEN m ELSE n/a - - SIP specific event notification extension.						
c12:	IF A.4/70 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.						

Prerequisite A.5/17 - - REFER response

Prerequisite: A.6/103 OR A.6/104 OR A.6/105 OR A.6/106 - - Additional for 3xx – 6xx response

Table A.109A: Supported header fields within the REFER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Error-Info	[26] 20.18	o	o	[26] 20.18	o	o

Table A.110: Void

Prerequisite A.5/17 - - REFER response

Prerequisite: A.6/14 - - Additional for 401 (Unauthorized) response

Table A.111: Supported header fields within the REFER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
4	Proxy-Authenticate	[26] 20.27	c1	c1	[26] 20.27	c1	c1
10	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	m	m
c1:	IF A.4/7 THEN m ELSE n/a - - support of authentication between UA and UA.						

Prerequisite A.5/17 - - REFER response

Prerequisite: A.6/17 OR A.6/23 OR A.6/30 OR A.6/36 OR A.6/42 OR A.6/45 OR A.6/50 OR A.6/51 - - Additional for 404 (Not Found), 413 (Request Entity Too Large), 480(Temporarily not available), 486 (Busy Here), 500 (Internal Server Error), 503 (Service Unavailable), 600 (Busy Everywhere), 603 (Decline) response

Table A.112: Supported header fields within the REFER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
6	Retry-After	[26] 20.33	o	o	[26] 20.33	o	o

Table A.113: Void

Prerequisite A.5/17 - - REFER response

Prerequisite: A.6/20 - - Additional for 407 (Proxy Authentication Required) response

Table A.114: Supported header fields within the REFER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
4	Proxy-Authenticate	[26] 20.27	c1	c1	[26] 20.27	c1	c1
8	WWW-Authenticate	[26] 20.44	o	o	[26] 20.44	o	o
c1:	IF A.4/7 THEN m ELSE n/a - - support of authentication between UA and UA.						

Prerequisite A.5/17 - - REFER response

Prerequisite: A.6/25 - - Additional for 415 (Unsupported Media Type) response

Table A.115: Supported header fields within the REFER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	o.1	o.1	[26] 20.1	m	m
2	Accept-Encoding	[26] 20.2	o.1	o.1	[26] 20.2	m	m
3	Accept-Language	[26] 20.3	o.1	o.1	[26] 20.3	m	m
o.1	At least one of these capabilities is supported.						

Prerequisite A.5/17 - - REFER response

Prerequisite: A.6/26A - - Additional for 417 (Unknown Resource-Priority) response

Table A.115A: Supported header fields within the REFER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
c1:	IF A.4/70 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.						

Prerequisite A.5/17 - - REFER response

Prerequisite: A.6/27 - - Additional for 420 (Bad Extension) response

Table A.116: Supported header fields within the REFER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
8	Unsupported	[26] 20.40	m	m	[26] 20.40	m	m

Prerequisite A.5/17 - - REFER response

Prerequisite: A.6/28 OR A.6/41A - - Additional for 421 (Extension Required), 494 (Security Agreement Required) response

Table A.116A: Supported header fields within the REFER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Security-Server	[48] 2	x	x	[48] 2	c1	c1
c1:	IF A.4/37 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						

Table A.117: Void

Prerequisite A.5/17 - - REFER response

Prerequisite: A.6/29H - - Additional for 470 (Consent Needed) response

Table A.117A: Supported header fields within the REFER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Permission-Missing	[125] 5.9.3	m	m	[125] 5.9.3	m	m

Prerequisite A.5/17 - - REFER response

Table A.118: Supported message bodies within the REFER response

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

A.2.1.4.12 REGISTER method

Prerequisite A.5/18 - - REGISTER request

Table A.119: Supported header fields within the REGISTER request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	o	o	[26] 20.1	m	m
2	Accept-Encoding	[26] 20.2	o	o	[26] 20.2	m	m
3	Accept-Language	[26] 20.3	o	o	[26] 20.3	m	m
3A	Allow	[26] 20.5	o	o	[26] 20.5	m	m
4	Allow-Events	[28] 7.2.2	c27	c27	[28] 7.2.2	c1	c1
5	Authorization	[26] 20.7, [49]	c2	c29	[26] 20.7, [49]	m	c22
6	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
7	Call-Info	[26] 20.9	o	o	[26] 20.9	o	o
8	Contact	[26] 20.10	o	m	[26] 20.10	m	m
9	Content-Disposition	[26] 20.11	o	o	[26] 20.11	m	m
10	Content-Encoding	[26] 20.12	o	o	[26] 20.12	m	m
11	Content-Language	[26] 20.13	o	o	[26] 20.13	m	m
12	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
13	Content-Type	[26] 20.15	m	m	[26] 20.15	m	m
14	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
15	Date	[26] 20.17	c3	c3	[26] 20.17	m	m
16	Expires	[26] 20.19	o	o	[26] 20.19	m	m
17	From	[26] 20.20	m	m	[26] 20.20	m	m
17A	Geolocation	[89] 4.1	c31	c31	[89] 4.1	c31	c31
17B	Geolocation-Routing	[89] 4.1	c31	c31	[89] 4.1	c31	c31
17C	History-Info	[66] 4.1	c28	c28	[66] 4.1	c28	c28
17D	Max-Breadth	[117] 5.8	n/a	c35	[117] 5.8	c36	c36
18	Max-Forwards	[26] 20.22	m	m	[26] 20.22	n/a	n/a
19	MIME-Version	[26] 20.24	o	o	[26] 20.24	m	m
20	Organization	[26] 20.25	o	o	[26] 20.25	o	o
20A	P-Access-Network-Info	[52] 4.4	c12	c13	[52] 4.4	c12	c14
20B	P-Charging-Function-Addresses	[52] 4.5	c17	c18	[52] 4.5	c17	c18
20C	P-Charging-Vector	[52] 4.6	c15	c16	[52] 4.6	c15	c16
20E	P-User-Database	[82] 4	n/a	n/a	[82] 4	c30	c30
20F	P-Visited-Network-ID	[52] 4.3	x (note 2)	x	[52] 4.3	c10	c11
20G	Path	[35] 4	c4	c5	[35] 4	m	c6
20H	Privacy	[33] 4.2	c9	n/a	[33] 4.2	c9	n/a
21	Proxy-Authorization	[26] 20.28	c8	c8	[26] 20.28	n/a	n/a
22	Proxy-Require	[26] 20.29	o	o (note 1)	[26] 20.29	n/a	n/a
22A	Reason	[34A] 2	c23	c23	[34A] 2	c23	c23
22B	Recv-Info	[25] 5.2.3	c37	c37	[25] 5.2.3	c37	c37
22C	Referred-By	[59] 3	c25	c25	[59] 3	c26	c26
22D	Request-Disposition	[56B] 9.1	c24	c24	[56B] 9.1	n/a	n/a
23	Require	[26] 20.32	o	o	[26] 20.32	m	m
23A	Resource-Priority	[116] 3.1	c32	c32	[116] 3.1	c32	c32
24	Route	[26] 20.34	o	n/a	[26] 20.34	n/a	n/a
24A	Security-Client	[48] 2.3.1	c19	c20	[48] 2.3.1	n/a	n/a
24B	Security-Verify	[48] 2.3.1	c20	c20	[48] 2.3.1	c21	n/a
25	Supported	[26] 20.37	o	c29	[26] 20.37	m	m
26	Timestamp	[26] 20.38	c7	c7	[26] 20.38	c7	c7
27	To	[26] 20.39	m	m	[26] 20.39	m	m
28	User-Agent	[26] 20.41	o	o	[26] 20.41	o	o
29	Via	[26] 20.42	m	m	[26] 20.42	m	m

c1:	IF A.4/20 THEN m ELSE n/a - - SIP specific event notification extension.
c2:	IF A.4/8 THEN m ELSE n/a - - authentication between UA and registrar.
c3:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.
c4:	IF A.4/24 THEN o ELSE n/a - - session initiation protocol extension header field for registering non-adjacent contacts.
c5:	IF A.4/24 THEN x ELSE n/a - - session initiation protocol extension header field for registering non-adjacent contacts.
c6:	IF A.3/4 THEN m ELSE n/a. - - S-CSCF.
c7:	IF A.4/6 THEN m ELSE n/a - - timestamping of requests.
c8:	IF A.4/8A THEN m ELSE n/a - - authentication between UA and proxy.
c9:	IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c10:	IF A.4/33 THEN o ELSE n/a - - the P-Visited-Network-ID extension.
c11:	IF A.4/33 THEN m ELSE n/a - - the P-Visited-Network-ID extension.
c12:	IF A.4/34 THEN o ELSE n/a - - the P-Access-Network-Info header extension.
c13:	IF A.4/34 AND (A.3/1 OR A.3/4) THEN o ELSE n/a - - the P-Access-Network-Info header extension and UE or S-CSCF.
c14:	IF A.4/34 AND (A.3/4 OR A.3/7A) THEN m ELSE n/a - - the P-Access-Network-Info header extension and S-CSCF or AS acting as terminating UA.
c15:	IF A.4/36 THEN o ELSE n/a - - the P-Charging-Vector header extension.
c16:	IF A.4/36 OR A.3/4 THEN m ELSE n/a - - the P-Charging-Vector header extension (including S-CSCF as registrar).
c17:	IF A.4/35 THEN o ELSE n/a - - the P-Charging-Function-Addresses header extension.
c18:	IF A.4/35 OR A.3/4 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension (including S-CSCF as registrar).
c19:	IF A.4/37 THEN o ELSE n/a - - security mechanism agreement for the session initiation protocol (note 3).
c20:	IF A.4/37 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.
c21:	IF A.4/37 AND A.4/2 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol and registrar.
c22:	IF A.3/4 THEN m ELSE n/a - - S-CSCF.
c23:	IF A.4/38 THEN o ELSE n/a - - the Reason header field for the session initiation protocol.
c24:	IF A.4/40 THEN o ELSE n/a - - caller preferences for the session initiation protocol.
c25:	IF A.4/43 THEN m ELSE n/a - - the SIP Referred-By mechanism.
c26:	IF A.4/43 THEN o ELSE n/a - - the SIP Referred-By mechanism.
c27:	IF A.4/20 THEN o ELSE n/a - - SIP specific event notification extension.
c28:	IF A.4/47 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.
c29:	IF (A.3/1 OR A.3A/81) THEN m ELSE o - - UE, MSC Server enhanced for ICS.
c30:	IF A.4/48 THEN m ELSE n/a - - the P-User-Database private header extension.
c31:	IF A.4/60 THEN m ELSE n/a - - SIP location conveyance.
c32:	IF A.4/70B THEN m ELSE n/a - - inclusion of CANCEL, BYE, REGISTER and PUBLISH in communications resource priority for the session initiation protocol.
c35:	IF A.4/71 AND (A.3/9B OR A.3/9C THEN m) ELSE n/a - - IF A.4/71 AND (A.3/9B OR A.3/9C) THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies, IBCF (IMS-ALG), IBCF (Screening of SIP signalling).
c36:	IF A.4/71 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.
c37:	IF A.4/13 THEN m ELSE IF A.4/13A THEN m ELSE n/a - - SIP INFO method and package framework, legacy INFO usage.
NOTE 1:	No distinction has been made in these tables between first use of a request on a From/To/Call-ID combination, and the usage in a subsequent one. Therefore the use of "o" etc. above has been included from a viewpoint of first usage.
NOTE 2:	The strength of this requirement in RFC 3455 [52] is SHOULD NOT, rather than MUST NOT.
NOTE 3:	Support of this header field in this method is dependent on the security mechanism and the security architecture which is implemented.

Prerequisite A.5/18 - - REGISTER request

Table A.120: Supported message bodies within the REGISTER request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

Table A.121: Void

Prerequisite A.5/19 - - REGISTER response

Prerequisite: A.6/1 - - Additional for 100 (Trying) response

Table A.121A: Supported header fields within the REGISTER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
3	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
4	Date	[26] 20.17	c1	c1	[26] 20.17	m	m
5	From	[26] 20.20	m	m	[26] 20.20	m	m
6	To	[26] 20.39	m	m	[26] 20.39	m	m
7	Via	[26] 20.42	m	m	[26] 20.42	m	m
c1:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.						

Prerequisite A.5/19 - - REGISTER response for all remaining status-codes

Table A.122: Supported header fields within the REGISTER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Allow	[26] 20.5	c8	c8	[26] 20.5	m	m
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
1A	Call-Info	[26] 20.9	o	o	[26] 20.9	o	o
2	Content-Disposition	[26] 20.11	o	o	[26] 20.11	m	m
3	Content-Encoding	[26] 20.12	o	o	[26] 20.12	m	m
4	Content-Language	[26] 20.13	o	o	[26] 20.13	m	m
5	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
6	Content-Type	[26] 20.15	m	m	[26] 20.15	m	m
7	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
8	Date	[26] 20.17	c1	c1	[26] 20.17	m	m
9	From	[26] 20.20	m	m	[26] 20.20	m	m
9A	Geolocation-Error	[89] 4.3	c10	c10	[89] 4.3	c10	c10
9B	History-Info	[66] 4.1	c9	c9	[66] 4.1	c9	c9
10	MIME-Version	[26] 20.24	o	o	[26] 20.24	m	m
11	Organization	[26] 20.25	o	o	[26] 20.25	o	o
11A	P-Access-Network-Info	[52] 4.4	c3	n/a	[52] 4.4	c3	n/a
11B	P-Charging-Function-Addresses	[52] 4.5	c6	c7	[52] 4.5	c6	c7
11C	P-Charging-Vector	[52] 4.6	c4	c5	[52] 4.6	c4	c5
11E	Privacy	[33] 4.2	c2	n/a	[33] 4.2	c2	n/a
11F	Require	[26] 20.32	m	m	[26] 20.32	m	m
11G	Server	[26] 20.35	o	o	[26] 20.35	o	o
12	Timestamp	[26] 20.38	c2	c2	[26] 20.38	m	m
13	To	[26] 20.39	m	m	[26] 20.39	m	m
13A	User-Agent	[26] 20.41	o	o	[26] 20.41	o	o
14	Via	[26] 20.42	m	m	[26] 20.42	m	m
15	Warning	[26] 20.43	o (note)	o	[26] 20.43	o	o
c1:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.						
c2:	IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).						
c3:	IF A.4/34 THEN o ELSE n/a - - the P-Access-Network-Info header extension.						
c4:	IF A.4/36 THEN o ELSE n/a - - the P-Charging-Vector header extension.						
c5:	IF A.4/36 OR A.3/4 THEN m ELSE n/a - - the P-Charging-Vector header extension (including S-CSCF as registrar).						
c6:	IF A.4/35 THEN o ELSE n/a - - the P-Charging-Function-Addresses header extension.						
c7:	IF A.4/35 OR A.3/4 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension (including S-CSCF as registrar).						
c8:	IF A.6/18 THEN m ELSE o - - 405 (Method Not Allowed).						
c9:	IF A.4/47 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.						
c10:	IF A.4/60 THEN m ELSE n/a - - SIP location conveyance.						
NOTE:	For a 488 (Not Acceptable Here) response, RFC 3261 [26] gives the status of this header field as SHOULD rather than OPTIONAL.						

Prerequisite A.5/19 - - REGISTER response

Prerequisite: A.6/102 - - Additional for 2xx response

Table A.123: Supported header fields within the REGISTER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	o	o	[26] 20.1	o	o
1A	Accept-Encoding	[26] 20.2	o	o	[26] 20.2	m	m
1B	Accept-Language	[26] 20.3	o	o	[26] 20.3	m	m
1C	Accept-Resource-Priority	[116] 3.2	c14	c14	[116] 3.2	c14	c14
2	Allow-Events	[28] 7.2.2	c12	c12	[28] 7.2.2	c13	c13
3	Authentication-Info	[26] 20.6	c6	c6	[26] 20.6	c7	c7
5	Contact	[26] 20.10	o	o	[26] 20.10	m	m
5A	Flow-Timer	[92] 11	c15	c15	[92] 11	c15	c15
5B	P-Associated-URI	[52] 4.1	c8	c9	[52] 4.1	c10	c11
6	Path	[35] 4	c3	c3	[35] 4	c4	c4
8	Service-Route	[38] 5	c5	c5	[38] 5	c5	c5
9	Supported	[26] 20.37	m	m	[26] 20.37	m	m
c1:	IF (A.3/4 AND A.4/2) THEN m ELSE n/a. - - S-CSCF acting as registrar.						
c2:	IF A.3/4 OR A.3/1THEN m ELSE n/a. - - S-CSCF or UE.						
c3:	IF A.4/24 THEN m ELSE n/a - - session initiation protocol extension header field for registering non-adjacent contacts.						
c4:	IF A.4/24 THEN o ELSE n/a - - session initiation protocol extension header field for registering non-adjacent contacts.						
c5:	IF A.4/28 THEN m ELSE n/a - - session initiation protocol extension header field for service route discovery during registration.						
c6:	IF A.4/8 THEN o ELSE n/a - - authentication between UA and registrar.						
c7:	IF A.4/8 THEN m ELSE n/a - - authentication between UA and registrar.						
c8:	IF A.4/2 AND A.4/31 THEN m ELSE n/a - - P-Assocated-URI header extension and registrar.						
c9:	IF A.3/1 AND A.4/31 THEN m ELSE n/a - - P-Assocated-URI header extension and S-CSCF.						
c10:	IF A.4/31 THEN o ELSE n/a - - P-Assocated-URI header extension.						
c11:	IF A.4/31 AND A.3/1 THEN m ELSE n/a - - P-Assocated-URI header extension and UE.						
c12:	IF A.4/20 THEN o ELSE n/a - - SIP specific event notification extension.						
c13:	IF A.4/20 THEN m ELSE n/a - - SIP specific event notification extension.						
c14:	IF A.4/70B THEN m ELSE n/a - - inclusion of CANCEL, BYE, REGISTER and PUBLISH in communications resource priority for the session initiation protocol.						
c15:	IF A.4/57 THEN m ELSE n/a - - managing client initiated connections in SIP.						

Prerequisite A.5/19 - - REGISTER response

Prerequisite: A.6/103 OR A.6/104 OR A.6/105 OR A.6/106 - - Additional for 3xx – 6xx response

Table A.123A: Supported header fields within the REGISTER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Error-Info	[26] 20.18	o	o	[26] 20.18	o	o

Prerequisite A.5/19 - - REGISTER response

Prerequisite: A.6/103 OR A.6/35 - - Additional for 3xx or 485 (Ambiguous) response

Table A.124: Supported header fields within the REGISTER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Contact	[26] 20.10	o (note)	o	[26] 20.10	m	m

Prerequisite A.5/19 - - REGISTER response

Prerequisite: A.6/14 - - Additional for 401 (Unauthorized) response

Table A.125: Supported header fields within the REGISTER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
4	Proxy-Authenticate	[26] 20.27	c1	x	[26] 20.27	c1	x
6	Security-Server	[48] 2	x	x	[48] 2	n/a	c2
10	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	m	m
c1:	IF A.4/8 THEN m ELSE n/a - - support of authentication between UA and registrar.						
c2:	IF A.4/37 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						

Prerequisite A.5/19 - - REGISTER response

Prerequisite: A.6/17 OR A.6/23 OR A.6/30 OR A.6/36 OR A.6/42 OR A.6/45 OR A.6/50 OR A.6/51 - - Additional for 404 (Not Found), 413 (Request Entity Too Large), 480(Temporarily not available), 486 (Busy Here), 500 (Internal Server Error), 503 (Service Unavailable), 600 (Busy Everywhere), 603 (Decline) response

Table A.126: Supported header fields within the REGISTER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
6	Retry-After	[26] 20.33	o	o	[26] 20.33	o	o

Table A.127: Void

Prerequisite A.5/19 - - REGISTER response

Prerequisite: A.6/20 - - Additional for 407 (Proxy Authentication Required) response

Table A.128: Supported header fields within the REGISTER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
5	Proxy-Authenticate	[26] 20.27	c1	x	[26] 20.27	c1	x
9	WWW-Authenticate	[26] 20.44	o	o	[26] 20.44	o	o
c1:	IF A.4/8 THEN m ELSE n/a - - support of authentication between UA and registrar.						

Prerequisite A.5/19 - - REGISTER response

Prerequisite: A.6/25 - - Additional for 415 (Unsupported Media Type) response

Table A.129: Supported header fields within the REGISTER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	o.1	o.1	[26] 20.1	m	m
2	Accept-Encoding	[26] 20.2	o.1	o.1	[26] 20.2	m	m
3	Accept-Language	[26] 20.3	o.1	o.1	[26] 20.3	m	m
o.1	At least one of these capabilities is supported.						

Prerequisite A.5/19 - - REGISTER response

Prerequisite: A.6/26A - - Additional for 417 (Unknown Resource-Priority) response

Table A.129A: Supported header fields within the REGISTER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
c1:	IF A.4/70B THEN m ELSE n/a - - inclusion of CANCEL, BYE, REGISTER and PUBLISH in communications resource priority for the session initiation protocol.						

Prerequisite A.5/19 - - REGISTER response

Prerequisite: A.6/27 - - Additional for 420 (Bad Extension) response

Table A.130: Supported header fields within the REGISTER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
8	Unsupported	[26] 20.40	m	m	[26] 20.40	m	m

Prerequisite A.5/19 - - REGISTER response

Prerequisite: A.6/28 OR A.6/41A - - Additional for 421 (Extension Required), 494 (Security Agreement Required) response

Table A.130A: Supported header fields within the REGISTER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Security-Server	[48] 2	c2	c2	[48] 2	c1	c1
c1:	IF A.4/37 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						
c2:	IF A.4/37 AND A.4/2 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol and registrar.						

Prerequisite A.5/19 - - REGISTER response

Prerequisite: A.6/29 - - Additional for 423 (Interval Too Brief) response

Table A.131: Supported header fields within the REGISTER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
5	Min-Expires	[26] 20.23	m	m	[26] 20.23	m	m

Table A.132: Void

Prerequisite A.5/19 - - REGISTER response

Table A.133: Supported message bodies within the REGISTER response

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

A.2.1.4.13 SUBSCRIBE method

Prerequisite A.5/20 - - SUBSCRIBE request

Table A.134: Supported header fields within the SUBSCRIBE request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	o	o	[26] 20.1	m	m
1A	Accept-Contact	[56B] 9.2	c22	c22	[56B] 9.2	c26	c26
2	Accept-Encoding	[26] 20.2	o	o	[26] 20.2	m	m
3	Accept-Language	[26] 20.3	o	o	[26] 20.3	m	m
3A	Allow	[26] 20.5	o	o	[26] 20.5	m	m
4	Allow-Events	[28] 7.2.2	o	o	[28] 7.2.2	m	m
5	Authorization	[26] 20.7	c3	c3	[26] 20.7	c3	c3
6	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
6A	Call-Info	[26] 20.9	o	o	[26] 20.9	o	o
6B	Contact	[26] 20.10	m	m	[26] 20.10	m	m
7	Content-Disposition	[26] 20.11	o	o	[26] 20.11	m	m
8	Content-Encoding	[26] 20.12	o	o	[26] 20.12	m	m
9	Content-Language	[26] 20.13	o	o	[26] 20.13	m	m
10	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
11	Content-Type	[26] 20.15	m	m	[26] 20.15	m	m
12	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
13	Date	[26] 20.17	c4	c4	[26] 20.17	m	m
14	Event	[28] 7.2.1	m	m	[28] 7.2.1	m	m
15	Expires	[26] 20.19	o (note 1)	o (note 1)	[26] 20.19	m	m
16	From	[26] 20.20	m	m	[26] 20.20	m	m
16A	Geolocation	[89] 4.1	c27	c27	[89] 4.1	c27	c27
16B	Geolocation-Routing	[89] 4.1	c27	c27	[89] 4.1	c27	c27
16C	History-Info	[66] 4.1	c25	c25	[66] 4.1	c25	c25
16D	Max-Breadth	[117] 5.8	n/a	c38	[117] 5.8	c39	c39
17	Max-Forwards	[26] 20.22	m	m	[26] 20.22	n/a	c41
18	MIME-Version	[26] 20.24	o	o	[26] 20.24	m	m
18A	Organization	[26] 20.25	o	o	[26] 20.25	o	o
18B	P-Access-Network-Info	[52] 4.4	c12	c13	[52] 4.4	c12	c14
18C	P-Asserted-Identity	[34] 9.1	n/a	c50	[34] 9.1	c6	c6
18D	P-Asserted-Service	[121] 4.1	n/a	c51	[121] 4.1	c32	c32
18E	P-Called-Party-ID	[52] 4.2	x	x	[52] 4.2	c10	c10
18F	P-Charging-Function-Addresses	[52] 4.5	c17	c18	[52] 4.5	c17	c18
18G	P-Charging-Vector	[52] 4.6	c15	c16	[52] 4.6	c15	c16
18I	P-Preferred-Identity	[34] 9.2	c6	c7	[34] 9.2	n/a	n/a
18J	P-Preferred-Service	[121] 4.2	c31	c30	[121] 4.2	n/a	n/a
18K	P-Private-Network-Indication	[134]	c35	c35	[134]	c35	c35
18L	P-Profile-Key	[97] 5	n/a	n/a	[97] 5	n/a	n/a
18M	P-Served-User	[133] 6	c40	c40	[133] 6	c40	c40
18N	P-User-Database	[82] 4	n/a	n/a	[82] 4	n/a	n/a
18O	P-Visited-Network-ID	[52] 4.3	x (note 2)	x	[52] 4.3	c11	n/a
18P	Privacy	[33] 4.2	c9	c9	[33] 4.2	c9	c9
19	Proxy-Authorization	[26] 20.28	c5	c5	[26] 20.28	n/a	n/a
20	Proxy-Require	[26] 20.29	o	n/a	[26] 20.29	n/a	n/a
20A	Reason	[34A] 2	c21	c21	[34A] 2	c21	c21
21	Record-Route	[26] 20.30	n/a	c41	[26] 20.30	m	m
21A	Referred-By	[59] 3	c23	c23	[59] 3	c24	c24
21B	Reject-Contact	[56B] 9.2	c22	c22	[56B] 9.2	c26	c26
21C	Request-Disposition	[56B] 9.1	c22	c22	[56B] 9.1	c26	c26
22	Require	[26] 20.32	o	o	[26] 20.32	m	m
22A	Resource-Priority	[116] 3.1	c29	c29	[116] 3.1	c29	c29
23	Route	[26] 20.34	m	m	[26] 20.34	n/a	c41
23A	Security-Client	[48] 2.3.1	c19	c19	[48] 2.3.1	n/a	n/a
23B	Security-Verify	[48] 2.3.1	c20	c20	[48] 2.3.1	n/a	n/a
24	Supported	[26] 20.37	o	o	[26] 20.37	m	m
24A	Target-Dialog	[184] 7	c43	c43	[184] 7	c44	c44

25	Timestamp	[26] 20.38	c8	c8	[26] 20.38	m	m
26	To	[26] 20.39	m	m	[26] 20.39	m	m
26A	Trigger-Consent	[125] 5.11.2	c33	c33	[125] 5.11.2	c34	c34
27	User-Agent	[26] 20.41	o	o	[26] 20.41	o	o
28	Via	[26] 20.42	m	m	[26] 20.42	m	m

c3: IF A.4/7 THEN m ELSE n/a - - authentication between UA and UA.
c4: IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.
c5: IF A.4/8A THEN m ELSE n/a - - authentication between UA and proxy.
c6: IF A.4/25 THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c7: IF A.3/1 AND A.4/25 THEN o ELSE n/a - - UE and private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c8: IF A.4/6 THEN o ELSE n/a - - timestamping of requests.
c9: IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c10: IF A.4/32 THEN o ELSE n/a - - the P-Called-Party-ID extension.
c11: IF A.4/33 THEN o ELSE n/a - - the P-Visited-Network-ID extension.
c12: IF A.4/34 THEN o ELSE n/a - - the P-Access-Network-Info header extension.
c13: IF A.4/34 AND A.3/1 THEN m ELSE n/a - - the P-Access-Network-Info header extension and UE.
c14: IF A.4/34 AND (A.3/7A OR A.3/7D) THEN m ELSE n/a - - the P-Access-Network-Info header extension and AS acting as terminating UA or AS acting as third-party call controller.
c15: IF A.4/36 THEN o ELSE n/a - - the P-Charging-Vector header extension.
c16: IF A.4/36 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c17: IF A.4/35 THEN o ELSE n/a - - the P-Charging-Function-Addresses header extension.
c18: IF A.4/35 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c19: IF A.4/37 THEN o ELSE n/a - - security mechanism agreement for the session initiation protocol (note 3).
c20: IF A.4/37 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.
c21: IF A.4/38 THEN o ELSE n/a - - the Reason header field for the session initiation protocol.
c22: IF A.4/40 THEN o ELSE n/a - - caller preferences for the session initiation protocol.
c23: IF A.4/43 THEN m ELSE n/a - - the SIP Referred-By mechanism.
c24: IF A.4/43 THEN o ELSE n/a - - the SIP Referred-By mechanism.
c25: IF A.4/47 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.
c26: IF A.4/40 THEN m ELSE n/a - - caller preferences for the session initiation protocol.
c27: IF A.4/60 THEN m ELSE n/a - - SIP location conveyance.
c29: IF A.4/70A THEN m ELSE n/a - - inclusion of MESSAGE, SUBSCRIBE, NOTIFY in communications resource priority for the session initiation protocol.
c30: IF (A.3/1 OR A.3A/81) AND A.4/74 THEN o ELSE n/a - - UE, MSC Server enhanced for ICS and SIP extension for the identification of services.
c31: IF A.4/74 THEN o ELSE n/a - - SIP extension for the identification of services.
c32: IF A.4/74 THEN m ELSE n/a - - SIP extension for the identification of services.
c33: IF A.4/75A THEN m ELSE n/a - - a relay within the framework for consent-based communications in SIP.
c34: IF A.4/75B THEN m ELSE n/a - - a recipient within the framework for consent-based communications in SIP.
c35: IF A.4/77 THEN m ELSE n/a - - the SIP P-Private-Network-Indication private-header (P-Header).
c38: IF A.4/71 AND (A.3/9B OR A.3/9C) THEN m ELSE IF A.3/1 AND NOT A.3C/1 THEN n/a ELSE o - - addressing an amplification vulnerability in session initiation protocol forking proxies, IBCF (IMS-ALG), IBCF (Screening of SIP signalling), UE, UE performing the functions of an external attached network.
c39: IF A.4/71 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.
c40: IF A.4/78 THEN m ELSE n/a - - the SIP P-Served-User private header.
c41: IF A.3/1 AND NOT A.3C/1 THEN n/a ELSE o - - UE, UE performing the functions of an external attached network.
c43: IF A.4/99 THEN o ELSE n/a - - request authorization through dialog Identification in the session initiation protocol.
c44: IF A.4/99 THEN m ELSE n/a - - request authorization through dialog Identification in the session initiation protocol.
c50: IF A.4/25 AND (A.3/7B OR A.3/8 OR A.3A/81) THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks and AS acting as originating UA, MRFC, MSC Server enhanced for ICS.
c51: IF A.4/74 AND A.3/7B THEN o ELSE n/a - - SIP extension for the identification of services and AS acting as originating UA.

NOTE 1: The strength of this requirement is RECOMMENDED rather than OPTIONAL.
NOTE 2: The strength of this requirement in RFC 3455 [52] is SHOULD NOT, rather than MUST NOT.
NOTE 3: Support of this header field in this method is dependent on the security mechanism and the security architecture which is implemented. Use of this header field in this method is not appropriate to the security mechanism defined by 3GPP TS 33.203 [19].

Prerequisite A.5/20 - - SUBSCRIBE request

Table A.135: Supported message bodies within the SUBSCRIBE request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

Prerequisite A.5/21 - - SUBSCRIBE response

Prerequisite: A.6/1 - - Additional for 100 (Trying) response

Table A.135A: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
3	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
4	Date	[26] 20.17	c1	c1	[26] 20.17	m	m
5	From	[26] 20.20	m	m	[26] 20.20	m	m
6	To	[26] 20.39	m	m	[26] 20.39	m	m
7	Via	[26] 20.42	m	m	[26] 20.42	m	m
c1:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.						

Prerequisite A.5/21 - - SUBSCRIBE response for all remaining status-codes

Table A.136: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Allow	[26] 20.5	c12	c12	[26] 20.5	m	m
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
1A	Call-Info	[26] 20.9	o	o	[26] 20.9	o	o
2	Content-Disposition	[26] 20.11	o	o	[26] 20.11	m	m
3	Content-Encoding	[26] 20.12	o	o	[26] 20.12	m	m
4	Content-Language	[26] 20.13	o	o	[26] 20.13	m	m
5	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
6	Content-Type	[26] 20.15	m	m	[26] 20.15	m	m
7	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
8	Date	[26] 20.17	c1	c1	[26] 20.17	m	m
9	From	[26] 20.20	m	m	[26] 20.20	m	m
9A	Geolocation-Error	[89] 4.3	c14	c14	[89] 4.3	c14	c14
9B	History-Info	[66] 4.1	c13	c13	[66] 4.1	c13	c13
10	MIME-Version	[26] 20.24	o	o	[26] 20.24	m	m
10A	Organization	[26] 20.25	o	o	[26] 20.25	o	o
10B	P-Access-Network-Info	[52] 4.4	c5	c6	[52] 4.4	c5	c7
10C	P-Asserted-Identity	[34] 9.1	n/a	c21	[34] 9.1	c3	c3
10D	P-Charging-Function-Addresses	[52] 4.5	c10	c11	[52] 4.5	c10	c11
10E	P-Charging-Vector	[52] 4.6	c8	c9	[52] 4.6	c8	c9
10G	P-Preferred-Identity	[34] 9.2	c3	x	[34] 9.2	n/a	n/a
10H	Privacy	[33] 4.2	c4	c4	[33] 4.2	c4	c4
10I	Require	[26] 20.32	m	m	[26] 20.32	m	m
10J	Server	[26] 20.35	o	o	[26] 20.35	o	o
11	Timestamp	[26] 20.38	m	m	[26] 20.38	c2	c2
12	To	[26] 20.39	m	m	[26] 20.39	m	m
12A	User-Agent	[26] 20.41	o	o	[26] 20.41	o	o
13	Via	[26] 20.42	m	m	[26] 20.42	m	m
14	Warning	[26] 20.43	o (note)	o	[26] 20.43	o	o
c1:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.						
c2:	IF A.4/6 THEN m ELSE n/a - - timestamping of requests.						
c3:	IF A.4/25 THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.						
c4:	IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).						
c5:	IF A.4/34 THEN o ELSE n/a - - the P-Access-Network-Info header extension.						
c6:	IF A.4/34 AND A.3/1 THEN m ELSE n/a - - the P-Access-Network-Info header extension and UE.						
c7:	IF A.4/34 AND (A.3/7A OR A.3/7D) THEN m ELSE n/a - - the P-Access-Network-Info header extension and AS acting as terminating UA or AS acting as third-party call controller.						
c8:	IF A.4/36 THEN o ELSE n/a - - the P-Charging-Vector header extension.						
c9:	IF A.4/36 THEN m ELSE n/a - - the P-Charging-Vector header extension.						
c10:	IF A.4/35 THEN o ELSE n/a - - the P-Charging-Function-Addresses header extension.						
c11:	IF A.4/35 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.						
c12:	IF A.6/18 THEN m ELSE o - - 405 (Method Not Allowed).						
c13:	IF A.4/47 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.						
c14:	IF A.4/60 THEN m ELSE n/a - - SIP location conveyance.						
c21:	IF A.4/25 AND (A.3/7B OR A.3/8) THEN o ELSE n/a - - private extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks and AS acting as originating UA, MRFC.						
NOTE:	For a 488 (Not Acceptable Here) response, RFC 3261 [26] gives the status of this header field as SHOULD rather than OPTIONAL.						

Prerequisite A.5/21 - - SUBSCRIBE response

Prerequisite: A.6/102 - - Additional for 2xx response

Table A.137: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending	Receiving

		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Accept-Resource-Priority	[116] 3.2	c5	c5	[116] 3.2	c5	c5
0B	Allow-Events	[28] 7.2.2	o	o	[28] 7.2.2	m	m
1	Authentication-Info	[26] 20.6	c1	c1	[26] 20.6	c2	c2
1A	Contact	[26] 20.10	m	m	[26] 20.10	m	m
2	Expires	[26] 20.19	m	m	[26] 20.19	m	m
3	Record-Route	[26] 20.30	m	m	[26] 20.30	m	m
4	Require	[26] 20.32	m	m	[26] 20.32	m	m
6	Supported	[26] 20.37	m	m	[26] 20.37	m	m
c1:	IF A.4/7 THEN o ELSE n/a - - authentication between UA and UA.						
c2:	IF A.4/7 THEN m ELSE n/a - - authentication between UA and UA.						
c5:	IF A.4/70A THEN m ELSE n/a - - inclusion of MESSAGE, SUBSCRIBE, NOTIFY in communications resource priority for the session initiation protocol.						

Prerequisite A.5/21 - - SUBSCRIBE response

Prerequisite: A.6/103 OR A.6/104 OR A.6/105 OR A.6/106 - - Additional for 3xx – 6xx response

Table A.137A: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Error-Info	[26] 20.18	o	o	[26] 20.18	o	o

Prerequisite A.5/21 - - SUBSCRIBE response

Prerequisite: A.6/103 OR A.6/35 - - Additional for 3xx or 485 (Ambiguous) response

Table A.138: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Contact	[26] 20.10	m (note)	m	[26] 20.10	m	m
NOTE:	The strength of this requirement is RECOMMENDED rather than MANDATORY for a 485 response.						

Prerequisite A.5/21 - - SUBSCRIBE response

Prerequisite: A.6/14 - - Additional for 401 (Unauthorized) response

Table A.139: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
2	Proxy-Authenticate	[26] 20.27	c1	c1	[26] 20.27	c1	c1
8	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	m	m
c1:	IF A.4/7 THEN m ELSE n/a - - support of authentication between UA and UA.						

Prerequisite A.5/21 - - SUBSCRIBE response

Prerequisite: A.6/17 OR A.6/23 OR A.6/30 OR A.6/36 OR A.6/42 OR A.6/45 OR A.6/50 OR A.6/51 - - Additional for 404 (Not Found), 413 (Request Entity Too Large), 480 (Temporarily not available), 486 (Busy Here), 500 (Internal Server Error), 503 (Service Unavailable), 600 (Busy Everywhere), 603 (Decline) response

Table A.140: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Retry-After	[26] 20.33	o	o	[26] 20.33	o	o

Table A.141: Void

Prerequisite A.5/21 - - SUBSCRIBE response

Prerequisite: A.6/20 - - Additional for 407 (Proxy Authentication Required) response

Table A.142: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
2	Proxy-Authenticate	[26] 20.27	c1	c1	[26] 20.27	c1	c1
6	WWW-Authenticate	[26] 20.44	o	o	[26] 20.44	o	o
c1:	IF A.4/7 THEN m ELSE n/a - - support of authentication between UA and UA.						

Prerequisite A.5/21 - - SUBSCRIBE response

Prerequisite A.6/25 - - Additional for 415 (Unsupported Media Type) response

Table A.143: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	o.1	o.1	[26] 20.1	m	m
2	Accept-Encoding	[26] 20.2	o.1	o.1	[26] 20.2	m	m
3	Accept-Language	[26] 20.3	o.1	o.1	[26] 20.3	m	m
6	Server	[26] 20.35	o	o	[26] 20.35	o	o
o.1	At least one of these capabilities is supported.						

Prerequisite A.5/21 - - SUBSCRIBE response

Prerequisite: A.6/26A - - Additional for 417 (Unknown Resource-Priority) response

Table A.143A: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
c1:	IF A.4/70A THEN m ELSE n/a - - inclusion of MESSAGE, SUBSCRIBE, NOTIFY in communications resource priority for the session initiation protocol.						

Prerequisite A.5/21 - - SUBSCRIBE response

Prerequisite: A.6/27 - - Additional for 420 (Bad Extension) response

Table A.144: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
5	Unsupported	[26] 20.40	m	m	[26] 20.40	m	m

Prerequisite A.5/21 - - SUBSCRIBE response

Prerequisite: A.6/28 OR A.6/41A - - Additional for 421 (Extension Required), 494 (Security Agreement Required) response

Table A.144A: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Security-Server	[48] 2	x	x	[48] 2	c1	c1
c1:	IF A.4/37 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						

Prerequisite A.5/21 - - SUBSCRIBE response

Prerequisite: A.6/29 - - Additional for 423 (Interval Too Brief) response

Table A.145: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
2	Min-Expires	[26] 20.23	m	m	[26] 20.23	m	m

Table A.146: Void

Prerequisite A.5/21 - - SUBSCRIBE response

Prerequisite: A.6/29H - - Additional for 470 (Consent Needed) response

Table A.146A: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Permission-Missing	[125] 5.9.3	m	m	[125] 5.9.3	m	m

Prerequisite A.5/21 - - SUBSCRIBE response

Prerequisite: A.6/39 - - Additional for 489 (Bad Event) response

Table A.147: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	m	m

Table A.148: Void

Prerequisite A.5/21 - - SUBSCRIBE response

Table A.149: Supported message bodies within the SUBSCRIBE response

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

A.2.1.4.14 UPDATE method

Prerequisite A.5/22 - - UPDATE request

Table A.150: Supported header fields within the UPDATE request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	o	o	[26] 20.1	m	m
1A	Accept-Contact	[56B] 9.2	c20	c20	[56B] 9.2	c24	c24
2	Accept-Encoding	[26] 20.2	o	o	[26] 20.2	m	m
3	Accept-Language	[26] 20.3	o	o	[26] 20.3	m	m
4	Allow	[26] 20.5	o	o	[26] 20.5	m	m
5	Allow-Events	[28] 7.2.2	c2	c2	[28] 7.2.2	c3	c3
6	Authorization	[26] 20.7	c4	c4	[26] 20.7	c4	c4
7	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
8	Call-Info	[26] 20.9	o	o	[26] 20.9	o	o
9	Contact	[26] 20.10	m	m	[26] 20.10	m	m
10	Content-Disposition	[26] 20.11	o	o	[26] 20.11	m	m
11	Content-Encoding	[26] 20.12	o	o	[26] 20.12	m	m
12	Content-Language	[26] 20.13	o	o	[26] 20.13	m	m
13	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
14	Content-Type	[26] 20.15	m	m	[26] 20.15	m	m
15	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
16	Date	[26] 20.17	c5	c5	[26] 20.17	m	m
17	From	[26] 20.20	m	m	[26] 20.20	m	m
17A	Geolocation	[89] 4.1	c25	c25	[89] 4.1	c25	c25
17B	Geolocation-Routing	[89] 4.1	c25	c25	[89] 4.1	c25	c25
17C	Max-Breadth	[117] 5.8	n/a	c29	[117] 5.8	c30	c30
18	Max-Forwards	[26] 20.22	m	m	[26] 20.22	n/a	c31
19	MIME-Version	[26] 20.24	o	o	[26] 20.24	m	m
19A	Min-SE	[58] 5	c21	c21	[58] 5	c21	c21
20	Organization	[26] 20.25	o	o	[26] 20.25	o	o
20A	P-Access-Network-Info	[52] 4.4	c11	c12	[52] 4.4	c11	c13
20B	P-Charging-Function-Addresses	[52] 4.5	c16	c17	[52] 4.5	c16	c17
20C	P-Charging-Vector	[52] 4.6	c14	c15	[52] 4.6	c14	c15
20E	P-Early-Media	[109] 8	c26	c26	[109] 8	c26	c26
20F	Privacy	[33] 4.2	c6	n/a	[33] 4.2	c6	n/a
21	Proxy-Authorization	[26] 20.28	c10	c10	[26] 20.28	n/a	n/a
22	Proxy-Require	[26] 20.29	o	n/a	[26] 20.29	n/a	n/a
22A	Reason	[34A] 2	c8	c8	[34A] 2	c8	c8
23	Record-Route	[26] 20.30	n/a	c31	[26] 20.30	n/a	c31
23A	Recv-Info	[25] 5.2.3	c34	c34	[25] 5.2.3	c34	c34
23B	Referred-By	[59] 3	c22	c22	[59] 3	c23	c23
23C	Reject-Contact	[56B] 9.2	c20	c20	[56B] 9.2	c24	c24
23D	Request-Disposition	[56B] 9.1	c20	c20	[56B] 9.1	c24	c24
24	Require	[26] 20.32	o	o	[26] 20.32	m	m
24A	Resource-Priority	[116] 3.1	c33	c33	[116] 3.1	c33	c33
25	Route	[26] 20.34	m	m	[26] 20.34	n/a	c31
25A	Security-Client	[48] 2.3.1	c18	c18	[48] 2.3.1	n/a	n/a
25B	Security-Verify	[48] 2.3.1	c19	c19	[48] 2.3.1	n/a	n/a
25C	Session-Expires	[58] 4	c21	c21	[58] 4	c21	c21
26	Supported	[26] 20.37	o	o	[26] 20.37	m	m
27	Timestamp	[26] 20.38	c9	c9	[26] 20.38	m	m
28	To	[26] 20.39	m	m	[26] 20.39	m	m
29	User-Agent	[26] 20.41	o	o	[26] 20.41	o	o
30	Via	[26] 20.42	m	m	[26] 20.42	m	m

c2:	IF A.4/20 THEN o ELSE n/a - - SIP specific event notification extension.
c3:	IF A.4/20 THEN m ELSE n/a - - SIP specific event notification extension.
c4:	IF A.4/7 THEN m ELSE n/a - - authentication between UA and UA.
c5:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.
c6:	IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c8:	IF A.4/38 THEN o ELSE n/a - - the Reason header field for the session initiation protocol.
c9:	IF A.4/6 THEN o ELSE n/a - - timestamping of requests.
c10:	IF A.4/8A THEN m ELSE n/a - - authentication between UA and proxy.
c11:	IF A.4/34 THEN o ELSE n/a - - the P-Access-Network-Info header extension.
c12:	IF A.4/34 AND A.3/1 THEN m ELSE n/a - - the P-Access-Network-Info header extension and UE.
c13:	IF A.4/34 AND (A.3/7A OR A.3/7D) THEN m ELSE n/a - - the P-Access-Network-Info header extension and AS acting as terminating UA or AS acting as third-party call controller.
c14:	IF A.4/36 THEN o ELSE n/a - - the P-Charging-Vector header extension.
c15:	IF A.4/36 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c16:	IF A.4/35 THEN o ELSE n/a - - the P-Charging-Function-Addresses header extension.
c17:	IF A.4/35 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c18:	IF A.4/37 THEN o ELSE n/a - - security mechanism agreement for the session initiation protocol (note).
c19:	IF A.4/37 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.
c20:	IF A.4/40 THEN o ELSE n/a - - caller preferences for the session initiation protocol.
c21:	IF A.4/42 THEN m ELSE n/a - - the SIP session timer.
c22:	IF A.4/43 THEN m ELSE n/a - - the SIP Referred-By mechanism.
c23:	IF A.4/43 THEN o ELSE n/a - - the SIP Referred-By mechanism.
c24:	IF A.4/40 THEN m ELSE n/a - - caller preferences for the session initiation protocol.
c25:	IF A.4/60 THEN m ELSE n/a - - SIP location conveyance.
c26:	IF A.4/66 THEN m ELSE n/a - - the SIP P-Early-Media private header extension for authorization of early media.
c29:	IF A.4/71 AND (A.3/9B OR A.3/9C) THEN m ELSE IF A.3/1 AND NOT A.3C/1 THEN n/a ELSE o - - addressing an amplification vulnerability in session initiation protocol forking proxies, IBCF (IMS-ALG), IBCF (Screening of SIP signalling), UE, UE performing the functions of an external attached network.
c30:	IF A.4/71 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.
c31:	IF A.3/1 AND NOT A.3C/1 THEN n/a ELSE o - - UE, UE performing the functions of an external attached network.
c33:	IF A.4/70 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.
c34:	IF A.4/13 THEN m ELSE IF A.4/13A THEN m ELSE n/a - - SIP INFO method and package framework, legacy INFO usage.
NOTE:	Support of this header field in this method is dependent on the security mechanism and the security architecture which is implemented. Use of this header field in this method is not appropriate to the security mechanism defined by 3GPP TS 33.203 [19].

Prerequisite A.5/22 - - UPDATE request

Table A.151: Supported message bodies within the UPDATE request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

Prerequisite A.5/23 - - UPDATE response

Prerequisite: A.6/1 - - Additional for 100 (Trying) response

Table A.151A: Supported header fields within the UPDATE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
3	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
4	Date	[26] 20.17	c1	c1	[26] 20.17	m	m
5	From	[26] 20.20	m	m	[26] 20.20	m	m
6	To	[26] 20.39	m	m	[26] 20.39	m	m
7	Via	[26] 20.42	m	m	[26] 20.42	m	m
c1:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.						

Prerequisite A.5/23 - - UPDATE response for all remaining status-codes

Table A.152: Supported header fields within the UPDATE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Allow	[26] 20.5	c11	c11	[26] 20.5	m	m
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
1A	Call-Info	[26] 20.9	o	o	[26] 20.9	o	o
1B	Contact	[26] 20.10	o	o	[26] 20.10	o	o
2	Content-Disposition	[26] 20.11	o	o	[26] 20.11	m	m
3	Content-Encoding	[26] 20.12	o	o	[26] 20.12	m	m
4	Content-Language	[26] 20.13	o	o	[26] 20.13	m	m
5	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
6	Content-Type	[26] 20.15	m	m	[26] 20.15	m	m
7	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
8	Date	[26] 20.17	c1	c1	[26] 20.17	m	m
9	From	[26] 20.20	m	m	[26] 20.20	m	m
9A	Geolocation-Error	[89] 4.3	c13	c13	[89] 4.3	c13	c13
10	MIME-Version	[26] 20.24	o	o	[26] 20.24	m	m
10A	Organization	[26] 20.25	o	o	[26] 20.25	o	o
10B	P-Access-Network-Info	[52] 4.4	c4	c5	[52] 4.4	c4	c6
10C	P-Charging-Function-Addresses	[52] 4.5	c9	c10	[52] 4.5	c9	c10
10D	P-Charging-Vector	[52] 4.6	c7	c8	[52] 4.6	c7	c8
10F	Privacy	[33] 4.2	c3	n/a	[33] 4.2	c3	n/a
10G	Recv-Info	[25] 5.2.3	c16	c16	[25] 5.2.3	c16	c16
10H	Require	[26] 20.31	m	m	[26] 20.31	m	m
10I	Server	[26] 20.35	o	o	[26] 20.35	o	o
11	Timestamp	[26] 20.38	c12	c12	[26] 20.38	c2	c2
12	To	[26] 20.39	m	m	[26] 20.39	m	m
12A	User-Agent	[26] 20.41	o	o	[26] 20.41	o	o
13	Via	[26] 20.42	m	m	[26] 20.42	m	m
14	Warning	[26] 20.43	o (note)	o	[26] 20.43	o	o
c1:	IF A.4/11 THEN o ELSE n/a - - insertion of date in requests and responses.						
c2:	IF A.4/6 THEN m ELSE n/a - - timestamping of requests.						
c3:	IF A.4/26 THEN o ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).						
c4:	IF A.4/34 THEN o ELSE n/a - - the P-Access-Network-Info header extension.						
c5:	IF A.4/34 AND A.3/1 THEN m ELSE n/a - - the P-Access-Network-Info header extension and UE.						
c6:	IF A.4/34 AND (A.3/7A OR A.3/7D) THEN m ELSE n/a - - the P-Access-Network-Info header extension and AS acting as terminating UA or AS acting as third-party call controller.						
c7:	IF A.4/36 THEN o ELSE n/a - - the P-Charging-Vector header extension.						
c8:	IF A.4/36 THEN m ELSE n/a - - the P-Charging-Vector header extension.						
c9:	IF A.4/35 THEN o ELSE n/a - - the P-Charging-Function-Addresses header extension.						
c10:	IF A.4/35 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.						
c11:	IF A.6/18 THEN m ELSE o - - 405 (Method Not Allowed)						
c12:	IF A.4/6 THEN o ELSE n/a - - timestamping of requests.						
c13:	IF A.4/60 THEN m ELSE n/a - - SIP location conveyance.						
c16:	IF A.4/13 THEN m ELSE IF A.4/13A THEN m ELSE n/a - - SIP INFO method and package framework, legacy INFO usage.						
NOTE:	For a 488 (Not Acceptable Here) response, RFC 3261 [26] gives the status of this header field as SHOULD rather than OPTIONAL.						

Prerequisite A.5/23 - - UPDATE response

Prerequisite: A.6/102 - - Additional for 2xx response

Table A.153: Supported header fields within the UPDATE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Accept	[26] 20.1	o	o	[26] 20.1	m	m
0B	Accept-Encoding	[26] 20.2	o	o	[26] 20.2	m	m

0C	Accept-Language	[26] 20.3	o	o	[26] 20.3	m	m
0D	Accept-Resource-Priority	[116] 3.2	c14	c14	[116] 3.2	c14	c14
1	Allow-Events	[28] 7.2.2	c4	c4	[28] 7.2.2	c5	c5
2	Authentication-Info	[26] 20.6	c1	c1	[26] 20.6	c2	c2
3	Contact	[26] 20.10	m	m	[26] 20.10	m	m
3A	P-Early-Media	[109] 8	c6	c6	[109] 8	c6	c6
4	Session-Expires	[58]	c3	c3	[58]	c3	c3
6	Supported	[26] 20.37	m	m	[26] 20.37	m	m
c1:	IF A.4/7 THEN o ELSE n/a - - authentication between UA and UA.						
c2:	IF A.4/7 THEN m ELSE n/a - - authentication between UA and UA.						
c3:	IF A.4/42 THEN m ELSE n/a - - the SIP session timer						
c4:	IF A.4/20 THEN o ELSE n/a - - SIP specific event notification extension.						
c5:	IF A.4/20 THEN m ELSE n/a - - SIP specific event notification extension.						
c6:	IF A.4/66 THEN m ELSE n/a - - the SIP P-Early-Media private header extension for authorization of early media.						
c14:	IF A.4/70 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.						

Prerequisite A.5/23 - - UPDATE response

Prerequisite: A.6/103 OR A.6/104 OR A.6/105 OR A.6/106 - - Additional for 3xx – 6xx response

Table A.153A: Supported header fields within the UPDATE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Error-Info	[26] 20.18	o	o	[26] 20.18	o	o

Prerequisite A.5/23 - - UPDATE response

Prerequisite: A.6/103 OR A.6/35 - - Additional for 3xx, 485 (Ambiguous) response

Table A.154: Supported header fields within the UPDATE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
2	Contact	[26] 20.10	o	o	[26] 20.10	o	o

Prerequisite A.5/23 - - UPDATE response

Prerequisite: A.6/14 - - Additional for 401 (Unauthorized) response

Table A.154A: Supported header fields within the UPDATE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Proxy-Authenticate	[26] 20.27	c1	c1	[26] 20.27	c1	c1
6	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	m	m
c1:	IF A.4/7 THEN m ELSE n/a - - support of authentication between UA and UA.						

Prerequisite A.5/23 - - UPDATE response

Prerequisite: A.6/17 OR A.6/23 OR A.6/30 OR A.6/36 OR A.6/42 OR A.6/45 OR A.6/50 OR A.6/51 - - Additional for 404 (Not Found), 413 (Request Entity Too Large), 480(Temporarily not available), 486 (Busy Here), 500 (Internal Server Error), 503 (Service Unavailable), 600 (Busy Everywhere), 603 (Decline) response

Table A.155: Supported header fields within the UPDATE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
5	Retry-After	[26] 20.33	o	o	[26] 20.33	o	o

Table A.156: Void

Prerequisite A.5/23 - - UPDATE response

Prerequisite: A.6/20 - - Additional for 407 (Proxy Authentication Required) response

Table A.157: Supported header fields within the UPDATE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
4	Proxy-Authenticate	[26] 20.27	c1	c1	[26] 20.27	c1	c1
8	WWW-Authenticate	[26] 20.44	o	o	[26] 20.44	o	o
c1:	IF A.4/7 THEN m ELSE n/a - - support of authentication between UA and UA.						

Prerequisite A.5/23 - - UPDATE response

Prerequisite: A.6/25 - - Additional for 415 (Unsupported Media Type) response

Table A.158: Supported header fields within the UPDATE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	o.1	o.1	[26] 20.1	m	m
2	Accept-Encoding	[26] 20.2	o.1	o.1	[26] 20.2	m	m
3	Accept-Language	[26] 20.3	o.1	o.1	[26] 20.3	m	m
o.1	At least one of these capabilities is supported.						

Prerequisite A.5/23 - - UPDATE response

Prerequisite: A.6/26A - - Additional for 417 (Unknown Resource-Priority) response

Table A.158A: Supported header fields within the UPDATE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
c1:	IF A.4/70 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.						

Prerequisite A.5/23 - - UPDATE response

Prerequisite: A.6/27 - - Additional for 420 (Bad Extension) response

Table A.159: Supported header fields within the UPDATE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
7	Unsupported	[26] 20.40	m	m	[26] 20.40	m	m

Prerequisite A.5/23 - - UPDATE response

Prerequisite: A.6/28 OR A.6/41A - - Additional for 421 (Extension Required), 494 (Security Agreement Required) response

Table A.159A: Supported header fields within the UPDATE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Security-Server	[48] 2	x	x	[48] 2	c1	c1
c1:	IF A.4/37 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						

Prerequisite A.5/23 - - UPDATE response

Prerequisite: A.6/28A - - Additional for 422 (Session Interval Too Small) response

Table A.159B: Supported header fields within the UPDATE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Min-SE	[58] 5	c1	c1	[58] 5	c1	c1
c1:	IF A.4/42 THEN m ELSE n/a - - the SIP session timer.						

Table A.160: Void

Prerequisite A.5/23 - - UPDATE response

Table A.161: Supported message bodies within the UPDATE response

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

A.2.2 Proxy role

A.2.2.1 Introduction

This subclause contains the ICS proforma tables related to the proxy role. They need to be completed only for proxy implementations.

Prerequisite: A.2/2 - - proxy role

A.2.2.2 Major capabilities

Table A.162: Major capabilities

Item	Does the implementation support	Reference	RFC status	Profile status
	Capabilities within main protocol			
3	initiate session release?	[26] 16	x	c27
4	stateless proxy behaviour?	[26] 16.11	o.1	c29
5	stateful proxy behaviour?	[26] 16.2	o.1	c28
6	forking of initial requests?	[26] 16.1	c1	c31
7	support of indication of TLS connections in the Record-Route header on the upstream side?	[26] 16.7	o	n/a
8	support of indication TLS connections in the Record-Route header on the downstream side?	[26] 16.7	o	n/a
8A	authentication between UA and proxy?	[26] 20.28, 22.3	o	c85
9	insertion of date in requests and responses?	[26] 20.17	o	o
10	suppression or modification of alerting information data?	[26] 20.4	o	o
11	reading the contents of the Require header before proxying the request or response?	[26] 20.32	o	o
12	adding or modifying the contents of the Require header before proxying the REGISTER request or response	[26] 20.32	o	m
13	adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER?	[26] 20.32	o	o
14	being able to insert itself in the subsequent transactions in a dialog (record-routing)?	[26] 16.6	o	c2
15	the requirement to be able to use separate URIs in the upstream direction and downstream direction when record routeing?	[26] 16.7	c3	c3
16	reading the contents of the Supported header before proxying the response?	[26] 20.37	o	o
17	reading the contents of the Unsupported header before proxying the 420 response to a REGISTER?	[26] 20.40	o	m
18	reading the contents of the Unsupported header before proxying the 420 response to a method other than REGISTER?	[26] 20.40	o	o
19	the inclusion of the Error-Info header in 3xx - 6xx responses?	[26] 20.18	o	o
19A	reading the contents of the Organization header before proxying the request or response?	[26] 20.25	o	o
19B	adding or concatenating the Organization header before proxying the request or response?	[26] 20.25	o	o
19C	reading the contents of the Call-Info header before proxying the request or response?	[26] 20.9	o	o
19D	adding or concatenating the Call-Info header before proxying the request or response?	[26] 20.9	o	o
19E	delete Contact headers from 3xx responses prior to relaying the response?	[26] 20	o	o
19F	proxy reading the contents of a body or including a body in a request or	[26]	o	c88

	response?			
	Extensions			
20	SIP INFO method and package framework?	[25]	o	o
20A	legacy INFO usage?	[25] 2, 3	o	o
21	reliability of provisional responses in SIP?	[27]	o	i
22	the REFER method?	[36]	o	o
23	integration of resource management and SIP?	[30] [64]	o	i
24	the SIP UPDATE method?	[29]	c4	i
26	SIP extensions for media authorization?	[31]	o	c7
27	SIP specific event notification	[28]	o	i
28	the use of NOTIFY to establish a dialog	[28] 4.2	o	n/a
29	Session Initiation Protocol Extension Header Field for Registering Non-Adjacent Contacts	[35]	o	c6
30	extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks	[34]	o	m
30A	act as first entity within the trust domain for asserted identity?	[34]	c5	c8
30B	act as subsequent entity within trust network that can route outside the trust network?	[34]	c5	c9
30C	act as entity passing on identity transparently independent of trust domain?	[34]	c5	c96
31	a privacy mechanism for the Session Initiation Protocol (SIP)	[33]	o	m
31A	request of privacy by the inclusion of a Privacy header	[33]	n/a	n/a
31B	application of privacy based on the received Privacy header	[33]	c10	c12
31C	passing on of the Privacy header transparently	[33]	c10	c13
31D	application of the privacy option "header" such that those headers which cannot be completely expunged of identifying information without the assistance of intermediaries are obscured?	[33] 5.1	x	x
31E	application of the privacy option "session" such that anonymization for the session(s) initiated by this message occurs?	[33] 5.2	n/a	n/a
31F	application of the privacy option "user" such that user level privacy functions are provided by the network?	[33] 5.3	n/a	n/a
31G	application of the privacy option "id" such that privacy of the network asserted identity is provided by the network?	[34] 7	c11	c12
31H	application of the privacy option "history" such that privacy of the History-Info header is provided by the network?	[66] 7.2	c34	c34
32	Session Initiation Protocol Extension Header Field for Service Route Discovery During Registration	[38]	o	c30
33	a messaging mechanism for the Session Initiation Protocol (SIP)	[50]	o	m
34	Compressing the Session Initiation Protocol	[55]	o	c7
35	private header extensions to the session initiation protocol for the 3rd-Generation Partnership Project	[52]	o	m

	(3GPP)?			
36	the P-Associated-URI header extension?	[52] 4.1	c14	c15
37	the P-Called-Party-ID header extension?	[52] 4.2	c14	c16
38	the P-Visited-Network-ID header extension?	[52] 4.3	c14	c17
39	reading, or deleting the P-Visited-Network-ID header before proxying the request or response?	[52] 4.3	c18	n/a
41	the P-Access-Network-Info header extension?	[52] 4.4	c14	c19
42	act as first entity within the trust domain for access network information?	[52] 4.4	c20	c21
43	act as subsequent entity within trust network for access network information that can route outside the trust network?	[52] 4.4	c20	c22
44	the P-Charging-Function-Addresses header extension?	[52] 4.5	c14	m
44A	adding, deleting or reading the P-Charging-Function-Addresses header before proxying the request or response?	[52] 4.6	c25	c26
45	the P-Charging-Vector header extension?	[52] 4.6	c14	m
46	adding, deleting, reading or modifying the P-Charging-Vector header before proxying the request or response?	[52] 4.6	c23	c24
47	security mechanism agreement for the session initiation protocol?	[48]	o	c7
48	the Reason header field for the session initiation protocol	[34A]	o	c78
48A	carrying Q.850 codes in reason header fields in SIP (Session Initiation Protocol) responses?	[130]	o	o
49	an extension to the session initiation protocol for symmetric response routeing	[56A]	o	m
50	caller preferences for the session initiation protocol?	[56B]	c33	c33
50A	the proxy-directive within caller-preferences?	[56B] 9.1	o.4	o.4
50B	the cancel-directive within caller-preferences?	[56B] 9.1	o.4	o.4
50C	the fork-directive within caller-preferences?	[56B] 9.1	o.4	c32
50D	the recurse-directive within caller-preferences?	[56B] 9.1	o.4	o.4
50E	the parallel-directive within caller-preferences?	[56B] 9.1	o.4	c32
50F	the queue-directive within caller-preferences?	[56B] 9.1	o.4	o.4
51	an event state publication extension to the session initiation protocol?	[70]	o	m
52	SIP session timer?	[58]	o	o
53	the SIP Referred-By mechanism?	[59]	o	o
54	the Session Inititation Protocol (SIP) "Replaces" header?	[60]	o	o
55	the Session Inititation Protocol (SIP) "Join" header?	[61]	o	o
56	the callee capabillities?	[62]	o	o
57	an extension to the session initiation protocol for request history information?	[66]	o	o
58	Rejecting anonymous requests in the session initiation protocol?	[67]	o	o
59	session initiation protocol URIs for	[68]	o	o

	applications such as voicemail and interactive voice response			
60	the P-User-Database private header extension?	[82]	o	c95
61	Session initiation protocol's non-INVITE transactions?	[84]	m	m
62	a uniform resource name for services	[69]	n/a	c35
63	obtaining and using GRUUs in the Session Initiation Protocol (SIP)	[93]	o	c36
65	the Stream Control Transmission Protocol (SCTP) as a Transport for the Session Initiation Protocol (SIP)?	[96]	o	o (note2)
66	the SIP P-Profile-Key private header extension?	[97]	o	c41
66A	making the first query to the database in order to populate the P-Profile-Key header?	[97]	c38	c39
66B	using the information in the P-Profile-Key header?	[97]	c38	c40
67	managing client initiated connections in SIP?	[92] 11	o	c42
68	indicating support for interactive connectivity establishment in SIP?	[102]	o	o
69	multiple-recipient MESSAGE requests in the session initiation protocol	[104]	n/a	n/a
70	SIP location conveyance?	[89]	o	c94
70A	addition or modification of location in a SIP method?	[89]	c44	c45
70B	passes on locations in SIP method without modification?	[89]	c44	c46
71	referring to multiple resources in the session initiation protocol?	[105]	n/a	n/a
72	conference establishment using request-contained lists in the session initiation protocol?	[106]	n/a	n/a
73	subscriptions to request-contained resource lists in the session initiation protocol?	[107]	n/a	n/a
74	dialstring parameter for the session initiation protocol uniform resource identifier?	[103]	o	n/a
75	the P-Answer-State header extension to the session initiation protocol for the open mobile alliance push to talk over cellular?	[111]	o	c60
76	the SIP P-Early-Media private header extension for authorization of early media?	[109] 8	o	c51
77	number portability parameters for the "tel" URI?	[112]	o	c47
77A	assert or process carrier indication?	[112]	o	c48
77B	local number portability?	[112]	o	c50
79	extending the session initiation protocol Reason header for preemption events	[115]	c79	c79
80	communications resource priority for the session initiation protocol?	[116]	o	c80
80A	inclusion of MESSAGE, SUBSCRIBE, NOTIFY in communications resource priority for the session initiation protocol?	[116] 4.2	c82	c82
80B	inclusion of CANCEL, BYE, REGISTER and PUBLISH in communications resource priority for the session initiation protocol?	[116] 4.2	c82	c82
81	addressing an amplification vulnerability in session initiation protocol forking	[117]	c52	c52

	proxies?			
82	the remote application identification of applying signalling compression to SIP	[79] 9.1	o	c7
83	a session initiation protocol media feature tag for MIME application subtypes?	[120]	o	c53
84	SIP extension for the identification of services?	[121]	o	c54
84A	act as authentication entity within the trust domain for asserted service?	[121]	c55	c56
85	a framework for consent-based communications in SIP?	[125]	o	m
86	a mechanism for transporting user-to-user call control information in SIP?	[126]	o	c84 (NOTE 3)
87	the SIP P-Private-Network-Indication private-header (P-Header)?	[134]	o	o
88	the SIP P-Served-User private header in the 3GPP IM CN subsystem?	[133] 6	o	o
91	the 199 (Early Dialog Terminated) response code	[142]	o	c90
92	message body handling in SIP?	[150]	o	c89
93	indication of support for keep-alive?	[143]	o	c51
94	SIP Interface to VoiceXML Media Services?	[145]	o	c91
95	common presence and instant messaging (CPIM): message format?	[151]	o	o
96	instant message disposition notification?	[157]	o	o
97	requesting answering modes for SIP?	[158]	o	o
97A	adding, deleting or reading the Answer-Mode header or Priv-Answer-Mode before proxying the request or response?	[158]	o	c92
99	the early session disposition type for SIP?	[74B]	i	i
102	correct transaction handling for 2xx responses to Session Initiation Protocol INVITE requests?	[163]	m	m
104	essential correction for IPv6 ABNF and URI comparison in RFC3261?	[165]	m	m
105	Alert-Info URNs for the Session Initiation Protocol?	[175]	o	o
107	multiple registrations?	Subclause 3.1	n/a	c101
109	request authorization through dialog Identification in the session initiation protocol?	[184]	o	o

c1:	IF A.162/5 THEN o ELSE n/a - - stateful proxy behaviour.
c2:	IF A.3/2 OR A.3/9A OR A.3/4 THEN m ELSE o - - P-CSCF, IBCF (THIG) or S-CSCF.
c3:	IF (A.162/7 AND NOT A.162/8) OR (NOT A.162/7 AND A.162/8) THEN m ELSE IF A.162/14 THEN o ELSE n/a - - TLS interworking with non-TLS else proxy insertion.
c4:	IF A.162/23 THEN m ELSE o - - integration of resource management and SIP.
c5:	IF A.162/30 THEN o ELSE n/a - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c6:	IF A.3/2 OR A.3/9A THEN m ELSE n/a - - P-CSCF or IBCF (THIG).
c7:	IF A.3/2 AND (A.3D/1 OR A.3D/4) THEN m ELSE n/a - - P-CSCF.
c8:	IF A.3/2 AND A.162/30 THEN m ELSE n/a - - P-CSCF and extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c9:	IF A.3/2 AND A.162/30 THEN m ELSE IF A.3/7C AND A.162/30 THEN o ELSE n/a - - S-CSCF or AS acting as proxy and extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks (NOTE 1).
c10:	IF A.162/31 THEN o.2 ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c11:	IF A.162/31B THEN o ELSE x - - application of privacy based on the received Privacy header.
c12:	IF A.162/31 AND A.3/4 THEN m ELSE IF A.3/11 THEN o ELSE n/a - - S-CSCF, E.CSCF.
c13:	IF A.162/31 AND (A.3/2 OR A.3/3 OR A.3/7C OR A.3/9A) THEN m ELSE n/a - - P-CSCF or I-CSCF or AS acting as a SIP proxy or IBCF (THIG).
c14:	IF A.162/35 THEN o.3 ELSE n/a - - private header extensions to the session initiation protocol for the 3rd-Generation Partnership Project (3GPP).
c15:	IF A.162/35 AND (A.3/2 OR A.3/3 OR A.3/9A) THEN m ELSE n/a - - private header extensions to the session initiation protocol for the 3rd-Generation Partnership Project (3GPP) and P-CSCF or I-CSCF or IBCF (THIG).
c16:	IF A.162/35 AND (A.3/2 OR A.3/3 OR A.3/4 OR A.3/9A) THEN m ELSE n/a - - private header extensions to the session initiation protocol for the 3rd-Generation Partnership Project (3GPP) and P-CSCF or I-CSCF or S-CSCF or IBCF (THIG).
c17:	IF A.162/35 AND (A.3/2 OR A.3/3 OR A.3/9A) THEN m ELSE n/a - - private header extensions to the session initiation protocol for the 3rd-Generation Partnership Project (3GPP) and P-CSCF or I-CSCF or IBCF (THIG).
c18:	IF A.162/38 THEN o ELSE n/a - - the P-Visited-Network-ID header extension.
c19:	IF A.162/35 AND (A.3/2 OR A.3.3 OR A.3/4 OR A.3/7 THEN m ELSE n/a - - private header extensions to the session initiation protocol for the 3rd-Generation Partnership Project (3GPP) and P-CSCF, I-CSCF, S-CSCF, AS acting as a proxy.
c20:	IF A.162/41 THEN o ELSE n/a - - the P-Access-Network-Info header extension.
c21:	IF A.162/41 AND A.3/2 THEN m ELSE n/a - - the P-Access-Network-Info header extension and P-CSCF.
c22:	IF A.162/41 AND A.3/4 THEN m ELSE n/a - - the P-Access-Network-Info header extension and S-CSCF.
c23:	IF A.162/45 THEN o ELSE n/a - - the P-Charging-Vector header extension.
c24:	IF A.162/45 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c25:	IF A.162/44 THEN o ELSE n/a - - the P-Charging-Function-Addresses header extension.
c26:	IF A.162/44 THEN m ELSE n/a - - the P-Charging-Function Addresses header extension.
c27:	IF A.3/2 OR A.3/4 THEN m ELSE x - - P-CSCF or S-CSCF.
c28:	IF A.3/2 OR A.3/3 OR A.3/4 THEN m ELSE o.8 - - P-CSCF or I-CSCF or S-CSCF.
c29:	IF A.3/2 OR A.3/4 THEN n/a ELSE IF A.3/3 THEN o ELSE o.8 - - P-CSCF or S-CSCF or I-CSCF.
c30:	IF A.3/2 o ELSE i - - P-CSCF.
c31:	IF A.3/4 THEN m ELSE x - - S-CSCF.
c32:	IF A.3/4 THEN m ELSE o.4 - - S-CSCF.
c33:	IF A.162/50A OR A.162/50B OR A.162/50C OR A.162/50D OR A.162/50E OR A.162/50F THEN m ELSE n/a - - support of any directives within caller preferences for the session initiation protocol.
c34:	IF A.162/57 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.
c35:	IF A.3/2 OR A.3/11 THEN m ELSE n/a - - P-CSCF, E-CSCF.
c36:	IF A.3/4 THEN m ELSE n/a - - S-CSCF.
c38:	IF A.162/66 THEN o ELSE n/a - - the SIP P-Profile-Key private header.
c39:	IF A.162/66 AND (A.3/3 OR A.3/9A) THEN m ELSE n/a - - the SIP P-Profile-Key private header, I-CSCF or IBCF (THIG).

c40:	IF A.162/66 AND A.3/4 THEN m ELSE n/a - - the SIP P-Profile-Key private header, S-CSCF.
c41:	IF A.3/3 OR A.3/4 OR A.3/9A THEN o ELSE n/a - - I-CSCF or S-CSCF or IBCF (THIG).
c42:	IF A.162/107 THEN m ELSE n/a - - multiple registrations.
c44:	IF A.162/70 THEN o.5 ELSE n/a - - SIP location conveyance.
c45:	IF A.3/11 THEN m ELSE IF A.162/70 AND A.3/7C THEN o.6 ELSE n/a - - E-CSCF, SIP location conveyance, AS acting as a SIP proxy.
c46:	IF A.162/70 AND A.3/2 OR A.3/3 OR A.3/5 OR A.3/10 THEN m ELSE IF A.162/70 AND A.3/7C THEN o.6 ELSE n/a - - SIP location conveyance, P-CSCF, I-CSCF, S-CSCF, BGCF, additional routeing functionality.
c47:	IF A.3/3 OR A.3/4 OR A.3/5 OR A.3/7C THEN o ELSE n/a - - I-CSCF, S-CSCF, BGCF, AS acting as a SIP proxy.
c48:	IF A.162/77 THEN m ELSE n/a - - number portability parameters for the "tel" URI.
c50:	IF A.162/77 THEN m ELSE n/a - - number portability parameters for the 'tel' URI.
c51:	IF A.3/2 THEN m ELSE o - - P-CSCF.
c52:	IF A.162/6 THEN m ELSE o - - forking of initial requests.
c53:	IF A.3/4 THEN m ELSE n/a - - S-CSCF.
c54:	IF A.3/3 OR A.3/4 OR A.3/7 OR A.3/2 OR A.3/9A THEN m ELSE n/a - - I-CSCF, S-CSCF, BGCF, P-CSCF. IBCF (THIG).
c55:	IF A.162/84 THEN o ELSE n/a - - SIP extension for the identification of services.
c56:	IF A.3/4 AND A.162/84 THEN m ELSE n/a - - S-CSCF and SIP extension for the identification of services.
c60:	IF A.3/2 OR A.3/3 OR A.3/4 THEN o ELSE n/a - - P=CSCF, I-CSCF, S-CSCF.
c78:	IF A.162/79 THEN m ELSE o - - extending the session initiation protocol Reason header for preemption events.
c79:	IF A.162/80 THEN o ELSE n/a - - communications resource priority for the session initiation protocol.
c80:	IF A.3/2 OR A.3/3 OR A.3/4 OR A.3/5 OR A.3/7C OR A.3/9A OR A.3/10 THEN o ELSE n/a - - P-CSCF, I-CSCF, S-CSCF, BGCF, AS acting as proxy, IBCF (THIG), additional routeing functionality.
c82:	IF A.162/80 THEN o ELSE n/a - - communications resource priority for the session initiation protocol.
c84:	A.3/2 OR A.3/3 OR A.3/4 OR A.3/5 OR A.3/7C OR A.3/9A OR A.3/10 OR A.3/11 THEN o ELSE n/a - - P-CSCF, I-CSCF, S-CSCF, BGCF, AS acting as proxy, IBCF (THIG), additional routeing functionality, E-CSCF.
c85:	IF A.3/2 OR A.3/3 OR A.3/4 THEN o ELSE x - - P-CSCF, I-CSCF, S-CSCF.
c88:	IF A.3/2 OR A.3/4 OR A.3/7 OR A.3/7C OR A.3/9C OR A.3/11 THEN m ELSE o - - P-CSCF or S-CSCF or AS or AS acting as a SIP proxy or IBCF (Screening of SIP signalling) or E-CSCF.
c89:	IF A.162/19F THEN m ELSE n/a - - proxy reading the contents of a body or including a body in a request or response?.
c90:	IF A.3/4 THEN m ELSE i - - S-CSCF.
c91:	IF A.3/4 THEN o ELSE n/a - - S-CSCF.
c92:	IF A.162/92 THEN o ELSE n/a - - requesting answering modes for SIP.
c94:	IF A.3/11 THEN m ELSE o - - E-CSCF.
c95:	IF A.3/3 OR A.3/4 OR A.3/7C THEN o ELSE n/a - - I-CSCF, S-CSCF, AS acting as a SIP proxy.
c96:	IF (A.3/2 OR A.3/11) AND A.162/98 THEN m ELSE n/a - - P-CSCF, E-CSCF, SOS URI parameter for marking SIP requests related to emergency calls.
c101:	IF A.3/2 OR A.3/4 THEN m ELSE n/a - - P-CSCF, S-CSCF.
o.1:	It is mandatory to support at least one of these items.
o.2:	It is mandatory to support at least one of these items.
o.3:	It is mandatory to support at least one of these items.
o.4	At least one of these capabilities is supported.
o.5:	It is mandatory to support exactly one of these items.
o.6:	It is mandatory to support exactly one of these items.
o.7:	It is mandatory to support at least one of these items.
o.8	It is mandatory to support at least one of these items.
NOTE 1:	An AS acting as a proxy may be outside the trust domain, and therefore not able to support the capability for that reason; in this case it is perfectly reasonable for the header to be passed on transparently, as specified in the PDU parts of the profile.
NOTE 2:	Not applicable over Gm reference point (UE – P-CSCF).
NOTE 3:	For this release, the requirements for this major capability in UAs is limited to those necessary to support the package defined in A.4/76A. Implementation of other features not used by this package is not required in this release.

A.2.2.3 PDUs

Table A.163: Supported methods

Item	PDU	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	ACK request	[26] 13	m	m	[26] 13	m	m
2	BYE request	[26] 16	m	m	[26] 16	m	m
3	BYE response	[26] 16	m	m	[26] 16	m	m
4	CANCEL request	[26] 16.10	m	m	[26] 16.10	m	m
5	CANCEL response	[26] 16.10	m	m	[26] 16.10	m	m
6	INFO request	[25] 4.2	c2	c2	[25] 4.2	c2	c2
7	INFO response	[25] 4.2	c2	c2	[25] 4.2	c2	c2
8	INVITE request	[26] 16	m	m	[26] 16	m	m
9	INVITE response	[26] 16	m	m	[26] 16	m	m
9A	MESSAGE request	[50] 4	c5	c5	[50] 7	c5	c5
9B	MESSAGE response	[50] 4	c5	c5	[50] 7	c5	c5
10	NOTIFY request	[28] 8.1.2	c3	c3	[28] 8.1.2	c3	c3
11	NOTIFY response	[28] 8.1.2	c3	c3	[28] 8.1.2	c3	c3
12	OPTIONS request	[26] 16	m	m	[26] 16	m	m
13	OPTIONS response	[26] 16	m	m	[26] 16	m	m
14	PRACK request	[27] 6	c6	c6	[27] 6	c6	c6
15	PRACK response	[27] 6	c6	c6	[27] 6	c6	c6
15A	PUBLISH request	[70] 11.1.1	c20	c20	[70] 11.1.1	c20	c20
15B	PUBLISH response	[70] 11.1.1	c20	c20	[70] 11.1.1	c20	c20
16	REFER request	[36] 3	c1	c1	[36] 3	c1	c1
17	REFER response	[36] 3	c1	c1	[36] 3	c1	c1
18	REGISTER request	[26] 16	m	m	[26] 16	m	m
19	REGISTER response	[26] 16	m	m	[26] 16	m	m
20	SUBSCRIBE request	[28] 8.1.1	c3	c3	[28] 8.1.1	c3	c3
21	SUBSCRIBE response	[28] 8.1.1	c3	c3	[28] 8.1.1	c3	c3
22	UPDATE request	[29] 7	c4	c4	[29] 7	c4	c4
23	UPDATE response	[29] 7	c4	c4	[29] 7	c4	c4
c1:	IF A.162/22 THEN m ELSE n/a - - the REFER method.						
c2:	IF A.162/20 OR A.162/20A THEN m ELSE n/a - - SIP INFO method and package framework, legacy INFO usage.						
c3	IF A.162/27 THEN m ELSE n/a - - SIP specific event notification.						
c4	IF A.162/24 THEN m ELSE n/a - - the SIP UPDATE method.						
c5:	IF A.162/33 THEN m ELSE n/a - - the SIP MESSAGE method.						
c6:	ÌF A.162/21 THEN m ELSE n/a - - reliability of provisional responses.						
c20:	IF A.4/51 THEN m ELSE n/a						

A.2.2.4 PDU parameters

A.2.2.4.1 Status-codes

Table A.164: Supported-status codes

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	100 (Trying)	[26] 21.1.1	c1	c1	[26] 21.1.1	c2	c2
101	1xx response	[26] 21.1	p21	p21	[26] 21.1	p21	p21
101A	18x response	[26] 21.1	p21	p21	[26] 21.1	p21	p21
2	180 (Ringing)	[26] 21.1.2	c3	c3	[26] 21.1.2	c3	c3
3	181 (Call Is Being Forwarded)	[26] 21.1.3	c3	c3	[26] 21.1.3	c3	c3
4	182 (Queued)	[26] 21.1.4	c3	c3	[26] 21.1.4	c3	c3
5	183 (Session Progress)	[26] 21.1.5	c3	c3	[26] 21.1.5	c3	c3
5A	199 (Early Dialog Terminated)	[142] 11.1	c32	c32	[142] 11.1	c32	c32
102	2xx response	[26] 21.2	p22	p22	[26] 21.1	p22	p22
6	200 (OK)	[26] 21.2.1	m	m	[26] 21.2.1	i	m
7	202 (Accepted)	[28] 8.3.1	c4	c4	[28] 8.3.1	c4	c4
103	3xx response	[26] 21.3	p23	p23	[26] 21.1	p23	p23
8	300 (Multiple Choices)	[26] 21.3.1	m	m	[26] 21.3.1	i	i
9	301 (Moved Permanently)	[26] 21.3.2	m	m	[26] 21.3.2	i	i
10	302 (Moved Temporarily)	[26] 21.3.3	m	m	[26] 21.3.3	i	i
11	305 (Use Proxy)	[26] 21.3.4	m	m	[26] 21.3.4	i	i
12	380 (Alternative Service)	[26] 21.3.5	m	m	[26] 21.3.5	i	i
104	4xx response	[26] 21.4	p24	p24	[26] 21.4	p24	p24
13	400 (Bad Request)	[26] 21.4.1	m	m	[26] 21.4.1	i	i
14	401 (Unauthorized)	[26] 21.4.2	m	m	[26] 21.4.2	i	c10
15	402 (Payment Required)	[26] 21.4.3	n/a	n/a	[26] 21.4.3	n/a	n/a
16	403 (Forbidden)	[26] 21.4.4	m	m	[26] 21.4.4	i	i
17	404 (Not Found)	[26] 21.4.5	m	m	[26] 21.4.5	i	i
18	405 (Method Not Allowed)	[26] 21.4.6	m	m	[26] 21.4.6	i	i
19	406 (Not Acceptable)	[26] 21.4.7	m	m	[26] 21.4.7	i	i
20	407 (Proxy Authentication Required)	[26] 21.4.8	m	m	[26] 21.4.8	i	i
21	408 (Request Timeout)	[26] 21.4.9	c3	c3	[26] 21.4.9	i	i
22	410 (Gone)	[26] 21.4.10	m	m	[26] 21.4.10	i	i
22A	412 (Conditional Request Failed)	[70] 11.2.1	c20	c20	[70] 11.2.1	c19	c19
23	413 (Request Entity Too Large)	[26] 21.4.11	m	m	[26] 21.4.11	i	i
24	414 (Request-URI Too Large)	[26] 21.4.12	m	m	[26] 21.4.12	i	i
25	415 (Unsupported Media	[26]	m	m	[26]	i	i

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
	Type)	21.4.13			21.4.13		
26	416 (Unsupported URI Scheme)	[26] 21.4.14	m	m	[26] 21.4.14	i	i
26A	417 (Unknown Resource Priority)	[116] 4.6.2	c25	c25	[116] 4.6.2	c25	c25
27	420 (Bad Extension)	[26] 21.4.15	m	m	[26] 21.4.15	i	i
28	421 (Extension Required)	[26] 21.4.16	m	m	[26] 21.4.16	i	i
28A	422 (Session Interval Too Small)	[58] 6	c8	c8	[58] 6	c8	c8
29	423 (Interval Too Brief)	[26] 21.4.17	c5	c5	[26] 21.4.17	c6	c6
29A	424 (Bad Location Information)	[89] 4.2	c23	c23	[89] 4.2	c24	c24
29B	429 (Provide Referrer Identity)	[59] 5	c9	c9	[59] 5	c9	c9
29C	430 (Flow Failed)	[92] 11	o	c21	[92] 11	m	c22
29D	433 (Anonymity Disallowed)	[67] 4	c14	c14	[67] 4	c14	c14
29E	439 (First Hop Lacks Outbound Support)	[92] 11	c28	c28	[92] 11	c29	c29
29F	440 (Max Breadth Exceeded)	[117] 5	c30	c30	[117] 5	c31	c31
29G	469 (Bad INFO Package)	[25] 4.2	c33	c33	[25] 4.2	c33	c33
29H	470 (Consent Needed)	[125] 5.9.2	c26	c26	[125] 5.9.2	c27	c27
30	480 (Temporarily not available)	[26] 21.4.18	m	m	[26] 21.4.18	i	i
31	481 (Call /Transaction Does Not Exist)	[26] 21.4.19	m	m	[26] 21.4.19	i	i
32	482 (Loop Detected)	[26] 21.4.20	m	m	[26] 21.4.20	i	i
33	483 (Too Many Hops)	[26] 21.4.21	m	m	[26] 21.4.21	i	i
34	484 (Address Incomplete)	[26] 21.4.22	m	m	[26] 21.4.22	i	i
35	485 (Ambiguous)	[26] 21.4.23	m	m	[26] 21.4.23	i	i
36	486 (Busy Here)	[26] 21.4.24	m	m	[26] 21.4.24	i	i
37	487 (Request Terminated)	[26] 21.4.25	m	m	[26] 21.4.25	i	i
38	488 (Not Acceptable Here)	[26] 21.4.26	m	m	[26] 21.4.26	i	i
39	489 (Bad Event)	[28] 7.3.2	c4	c4	[28] 7.3.2	c4	c4
40	491 (Request Pending)	[26] 21.4.27	m	m	[26] 21.4.27	i	i
41	493 (Undecipherable)	[26] 21.4.28	m	m	[26] 21.4.28	i	i
41A	494 (Security Agreement Required)	[48] 2	c7	c7	[48] 2	n/a	n/a
105	5xx response	[26] 21.5	p25	p25	[26] 21.5	p25	p25
42	500 (Internal Server Error)	[26] 21.5.1	m	m	[26] 21.5.1	i	i
43	501 (Not Implemented)	[26] 21.5.2	m	m	[26] 21.5.2	i	i
44	502 (Bad Gateway)	[26] 21.5.3	m	m	[26] 21.5.3	i	i
45	503 (Service Unavailable)	[26] 21.5.4	m	m	[26] 21.5.4	i	i
46	504 (Server Time-out)	[26] 21.5.5	m	m	[26] 21.5.5	i	i
47	505 (Version not supported)	[26] 21.5.6	m	m	[26] 21.5.6	i	i
48	513 (Message Too Large)	[26] 21.5.7	m	m	[26] 21.5.7	i	i

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
49	580 (Precondition Failure)	[30] 8	m	m	[30] 8	i	i
106	6xx response	[26] 21.6	p26	p26	[26] 21.6	p26	p26
50	600 (Busy Everywhere)	[26] 21.6.1	m	m	[26] 21.6.1	i	i
51	603 (Decline)	[26] 21.6.2	m	m	[26] 21.6.2	i	i
52	604 (Does Not Exist Anywhere)	[26] 21.6.3	m	m	[26] 21.6.3	i	i
53	606 (Not Acceptable)	[26] 21.6.4	m	m	[26] 21.6.4	i	i

c1: IF A.163/3 OR A.163/9 OR A.163/9B OR A.163/11 OR A.163/13 OR A.163/15 OR A.163/15B OR A.163/17 OR A.163/19 OR A.163/21 OR A.163/23 AND A.162/5 THEN m ELSE n/a - - BYE response or INVITE response or MESSAGE response or NOTIFY response or OPTIONS response or PRACK response or PUBLISH response or REFER response or REGISTER response or SUBSCRIBE response or UPDATE response, stateful proxy.

c2: IF A.163/3 OR A.163/9 OR A.163/9B OR A.163/11 OR A.163/13 OR A.163/15 OR A.163/15B OR A.163/17 OR A.163/19 OR A.163/21 OR A.163/23 THEN (IF A.162/5 THEN m ELSE i) ELSE n/a - - BYE response or INVITE response or MESSAGE response or NOTIFY response or OPTIONS response or PRACK response or PUBLISH response or REFER response or REGISTER response or SUBSCRIBE response or UPDATE response, stateful proxy.

c3: IF A.163/9 THEN m ELSE n/a - - INVITE response.

c4: IF A.162/27 THEN m ELSE n/a - - SIP specific event notification.

c5: IF A.163/19 OR A.163/21 THEN m ELSE n/a - - REGISTER response or SUBSCRIBE response.

c6: IF A.163/19 OR A.163/21 THEN i ELSE n/a - - REGISTER response or SUBSCRIBE response.

c7: IF A.162/47 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.

c8: IF A.162/52 THEN m ELSE n/a - - the SIP session timer.

c9: IF A.162/53 AND A.163/17 THEN m ELSE n/a - - the SIP Referred-By mechanism and REFER response.

c10: IF A.3/2 THEN m ELSE i - - P-CSCF.

c14: IF A.162/58 THEN m ELSE n/a - - rejecting anonymous requests in the session initiation protocol.

c19: IF A.162/51 THEN i ELSE n/a - - an event state publication extension to the session initiation protocol.

c20: IF A.162/51 THEN m ELSE n/a - - an event state publication extension to the session initiation protocol.

c21: IF A.4/57 AND A.3/2 THEN o ELSE n/a - - managing client initiated connections in SIP, P-CSCF.

c22: IF A.4/57 AND A.3/4 THEN m ELSE i - - managing client initiated connections in SIP, S-CSCF.

c23: IF A.162/70 THEN m ELSE n/a - - SIP location conveyance.

c24: IF A.162/70 THEN i ELSE n/a - - SIP location conveyance.

c25: IF A.162/80 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.

c26: IF A.162/85 THEN m ELSE n/a - - a framework for consent-based communications in SIP.

c27: IF A.162/85 THEN i ELSE n/a - - a framework for consent-based communications in SIP.

c28: IF A.162/57 AND THEN m ELSE n/a - - managing client initiated connections in SIP.

c29: IF A.162/57 AND THEN i ELSE n/a - - managing client initiated connections in SIP.

c30: IF A.162/81 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.

c31: IF A.162/81 THEN i ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.

c32: IF A.162/91 AND A.163/9 THEN m ELSE n/a - - INVITE response and 199 (Early Dialog Terminated) response.

c33 IF A.162/20 THEN m ELSE n/a - - SIP INFO method and package framework.

p21: A.164/2 OR A.164/3 OR A.164/4 OR A.164/5 OR A.164/5A - - 1xx response

p22: A.164/6 OR A.164/7 - - 2xx response

p23: A.164/8 OR A.164/9 OR A.164/10 OR A.164/11 OR A.164/12 OR A.164/13 - - 3xx response

p24: A.164/14 OR A.164/15 OR A.164/16 OR A.164/17 OR A.164/18 OR A.164/19 OR A.164/20 OR A.164/21 OR A.164/22 OR A.164/22A OR A.164/23 OR A.164/24 OR A.164/25 OR A.164/26 OR A.164/26A OR A.164/27 OR A.164/28 OR A.164/28A OR A.164/29 OR A.164/29A OR A.164/29B OR A.164/29C OR A.164/29D OR A.164/29E OR A.164/29F OR A.164/29G OR A.164/29H OR A.164/30 OR A.164/31 OR A.164/32 OR A.164/33 OR A.164/34 OR A.164/35 OR A.164/36 OR A.164/436 OR A.164/38 OR A.164/39 OR A.164/40 OR A.164/41 OR A.164/41A. - - 4xx response

p25: A.164/42 OR A.164/43 OR A.164/44 OR A.164/45 OR A.164/46 OR A.164/47 OR A.164/48 OR A.164/49 - - 5xx response

p26: A.164/50 OR A.164/51 OR A.164/52 OR A.164/53 - - 6xx response

A.2.2.4.2 ACK method

Prerequisite A.163/1 - - ACK request

Table A.165: Supported header fields within the ACK request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Contact	[56B] 9.2	c10	c10	[56B] 9.2	c11	c11
2	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	c1	c1
3	Authorization	[26] 20.7	m	m	[26] 20.7	i	i
4	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
6	Content-Disposition	[26] 20.11	m	m	[26] 20.11	i	i
7	Content-Encoding	[26] 20.12	m	m	[26] 20.12	i	i
8	Content-Language	[26] 20.13	m	m	[26] 20.13	i	i
9	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
10	Content-Type	[26] 20.15	m	m	[26] 20.15	i	c3
11	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
12	Date	[26] 20.17	m	m	[26] 20.17	c2	c2
13	From	[26] 20.20	m	m	[26] 20.20	m	m
13A	Max-Breadth	[117] 5.8	c15	c15	[117] 5.8	c16	c16
14	Max-Forwards	[26] 20.22	m	m	[26] 20.22	m	m
15	MIME-Version	[26] 20.24	m	m	[26] 20.24	i	c3
15B	Privacy	[33] 4.2	c6	c6	[33] 4.2	c7	c7
16	Proxy-Authorization	[26] 20.28	m	m	[26] 20.28	c4	c4
17	Proxy-Require	[26] 20.29	m	m	[26] 20.29	m	m
17A	Reason	[34A] 2	c8	c8	[34A] 2	c9	c9
17B	Recv-Info	[25] 5.2.3	c17	c17	[25] 5.2.3	c18	c18
17C	Reject-Contact	[56B] 9.2	c10	c10	[56B] 9.2	c11	c11
17D	Request-Disposition	[56B] 9.1	c10	c10	[56B] 9.1	c11	c11
18	Require	[26] 20.32	m	m	[26] 20.32	c5	c5
18A	Resource-Priority	[116] 3.1	c12	c12	[116] 3.1	c12	c47
19	Route	[26] 20.34	m	m	[26] 20.34	m	m
20	Timestamp	[26] 20.38	m	m	[26] 20.38	i	i
21	To	[26] 20.39	m	m	[26] 20.39	m	m
22	User-Agent	[26] 20.41	m	m	[26] 20.41	i	i
23	Via	[26] 20.42	m	m	[26] 20.42	m	m

c1: IF A.4/20 THEN m ELSE i - - SIP specific event notification extension.
c2: IF A.162/9 THEN m ELSE i - - insertion of date in requests and responses.
c3: IF A.3/2 OR A.3/4 THEN m ELSE i - - P-CSCF or S-CSCF.
c4: IF A.162/8A THEN m ELSE i - - authentication between UA and proxy.
c5: IF A.162/11 OR A.162/13 THEN m ELSE i - - reading the contents of the Require header before proxying the request or response or adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER.
c6: IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c7: IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.
c8: IF A.162/48 THEN m ELSE n/a - - the Reason header field for the session initiation protocol.
c9: IF A.162/48 THEN i ELSE n/a - - the Reason header field for the session initiation protocol.
c10: IF A.162/50 THEN m ELSE n/a - - caller preferences for the session initiation protocol.
c11: IF A.162/50 THEN i ELSE n/a - - caller preferences for the session initiation protocol.
c12: IF A.162/80 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.
c15: IF A.162/81 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.
c16: IF A.162/81 AND A.162/6 THEN m ELSE IF A.162/81 AND NOT A.162/6 THEN i ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies, forking of initial requests.
c17: IF A.162/20 THEN m ELSE n/a - - SIP INFO method and package framework.
c18: IF A.162/20 THEN i ELSE n/a - - SIP INFO method and package framework.

NOTE: c1 refers to the UA role major capability as this is the case of a proxy that also acts as a UA specifically for SUBSCRIBE and NOTIFY.

Prerequisite A.163/1 - - ACK request

Table A.166: Supported message bodies within the ACK request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

A.2.2.4.3 BYE method

Prerequisite A.163/2 - - BYE request

Table A.167: Supported header fields within the BYE request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	i	i
1A	Accept-Contact	[56B] 9.2	c22	c22	[56B] 9.2	c23	c23
2	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
3	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i
3A	Allow	[26] 20.5	m	m	[26] 20.5	i	i
4	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	c1	c1
5	Authorization	[26] 20.7	m	m	[26] 20.7	i	i
6	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
7	Content-Disposition	[26] 20.11	m	m	[26] 20.11	i	c3
8	Content-Encoding	[26] 20.12	m	m	[26] 20.12	i	c3
9	Content-Language	[26] 20.13	m	m	[26] 20.13	i	c3
10	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
11	Content-Type	[26] 20.15	m	m	[26] 20.15	i	c3
12	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
13	Date	[26] 20.17	m	m	[26] 20.17	c2	c2
14	From	[26] 20.20	m	m	[26] 20.20	m	m
14A	Geolocation	[89] 4.1	c26	c26	[89] 4.1	c27	c27
14B	Geolocation-Routing	[89] 4.1	c26	c26	[89] 4.1	c27	c27
14C	Max-Breadth	[117] 5.8	c33	c33	[117] 5.8	c34	c34
15	Max-Forwards	[26] 20.22	m	m	[26] 20.22	m	m
16	MIME-Version	[26] 20.24	m	m	[26] 20.24	i	c3
16A	P-Access-Network-Info	[52] 4.4	c13	c13	[52] 4.4	c14	c14
16B	P-Asserted-Identity	[34] 9.1	c9	c9	[34] 9.1	c10	c10
16C	P-Charging-Function-Addresses	[52] 4.5	c17	c17	[52] 4.5	c18	c18
16D	P-Charging-Vector	[52] 4.6	c15	n/a	[52] 4.6	c16	n/a
16F	P-Preferred-Identity	[34] 9.2	x	x	[34] 9.2	c8	n/a
16G	Privacy	[33] 4.2	c11	c11	[33] 4.2	c12	c12
17	Proxy-Authorization	[26] 20.28	m	m	[26] 20.28	c4	c4
18	Proxy-Require	[26] 20.29	m	m	[26] 20.29	m	m
18A	Reason	[34A] 2	c20	c20	[34A] 2	c21	c21
19	Record-Route	[26] 20.30	m	m	[26] 20.30	c7	c7
19A	Referred-By	[59] 3	c24	c24	[59] 3	c25	c25
19B	Reject-Contact	[56B] 9.2	c22	c22	[56B] 9.2	c23	c23
19C	Request-Disposition	[56B] 9.1	c22	c22	[56B] 9.1	c23	c23
20	Require	[26] 20.32	m	m	[26] 20.32	c5	c5
20A	Resource-Priority	[116] 3.1	c28	c28	[116] 3.1	c28	c28
21	Route	[26] 20.34	m	m	[26] 20.34	m	m
21A	Security-Client	[48] 2.3.1	x	x	[48] 2.3.1	c19	c19
21B	Security-Verify	[48] 2.3.1	x	x	[48] 2.3.1	c19	c19
22	Supported	[26] 20.37	m	m	[26] 20.37	c6	c6
23	Timestamp	[26] 20.38	m	m	[26] 20.38	i	i
24	To	[26] 20.39	m	m	[26] 20.39	m	m
25	User-Agent	[26] 20.41	m	m	[26] 20.41	i	i
25A	User-to-User	[126] 7	c29	c29	[126] 7	c30	c30
26	Via	[26] 20.42	m	m	[26] 20.42	m	m

c1:	IF A.4/20 THEN m ELSE i - - SIP specific event notification extension.
c2:	IF A.162/9 THEN m ELSE i - - insertion of date in requests and responses.
c3:	IF A.3/2 OR A.3/4 THEN m ELSE i - - P-CSCF or S-CSCF.
c4:	IF A.162/8A THEN m ELSE i - - authentication between UA and proxy.
c5:	IF A.162/11 OR A.162/13 THEN m ELSE i - - reading the contents of the Require header before proxying the request or response or adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER.
c6:	IF A.162/16 THEN m ELSE i - - reading the contents of the Supported header before proxying the response.
c7:	IF A.162/14 THEN o ELSE i - - the requirement to be able to insert itself in the subsequent transactions in a dialog.
c8:	IF A.162/30A THEN m ELSE n/a - - act as first entity within the trust domain for asserted identity.
c9:	IF A.162/30 THEN m ELSE n/a - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c10:	IF A.162/30A or A.162/30B THEN m ELSE i - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks or subsequent entity within trust network that can route outside the trust network.
c11:	IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c12:	IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.
c13:	IF A.162/43 THEN x ELSE IF A.162/41 THEN m ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c14:	IF A.162/43 THEN m ELSE IF A.162/41 THEN i ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c15:	IF A.162/45 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c16:	IF A.162/46 THEN m ELSE IF A.162/45 THEN i ELSE n/a - - adding, deleting, reading or modifying the P-Charging-Vector header before proxying the request or response or the P-Charging-Vector header extension.
c17:	IF A.162/44 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c18:	IF A.162/44A THEN m ELSE IF A.162/44 THEN i ELSE n/a - - adding, deleting or reading the P-Charging-Function-Addresses header before proxying the request or response, or the P-Charging-Function-Addresses header extension.
c19:	IF A.162/47 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.
c20:	IF A.162/48 THEN m ELSE n/a - - the Reason header field for the session initiation protocol.
c21:	IF A.162/48 THEN i ELSE n/a - - the Reason header field for the session initiation protocol.
c22:	IF A.162/50 THEN m ELSE n/a - - caller preferences for the session initiation protocol.
c23:	IF A.162/50 THEN i ELSE n/a - - caller preferences for the session initiation protocol.
c24:	IF A.162/53 THEN i ELSE n/a - - the SIP Referred-By mechanism.
c25:	IF A.162/53 THEN m ELSE n/a - - the SIP Referred-By mechanism.
c26:	IF A.162/70 THEN m ELSE n/a - - SIP location conveyance.
c27:	IF A.162/70A THEN m ELSE IF A.162/70B THEN i ELSE n/a - - addition or modification of location in a SIP method, passes on locations in SIP method without modification.
c28:	IF A.162/80B THEN m ELSE n/a - - inclusion of CANCEL, BYE, REGISTER and PUBLISH in communications resource priority for the session initiation protocol.
c29:	IF A.162/86 THEN m - - transporting user to user information for call centers using SIP.
c30:	IF A.162/86 THEN i - - transporting user to user information for call centers using SIP.
c33:	IF A.162/81 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.
c34:	IF A.162/81 AND A.162/6 THEN m ELSE IF A.162/81 AND NOT A.162/6 THEN i ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies, forking of initial requests.
NOTE:	c1 refers to the UA role major capability as this is the case of a proxy that also acts as a UA specifically for SUBSCRIBE and NOTIFY.

Prerequisite A.163/2 - - BYE request

Table A.168: Supported message bodies within the BYE request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	XML Schema for PSTN	[11B]		c1	[11B]		i
2	VoiceXML expr / namelist data	[145] 4.2	m	c2	[145] 4.2	m	c2
c1:	A.3/3 OR A.3/4 OR A.3/5 OR A.3/7C OR A.3/9A OR A.3/10 OR A.3/11 THEN m ELSE n/a - - I-CSCF, S-CSCF, BGCF, AS acting as proxy, IBCF (THIG), additional routeing functionality, E-CSCF.						
c2:	IF A.162/94 THEN m ELSE n/a - - SIP Interface to VoiceXML Media Services.						

Table A.169: Void

Prerequisite A.163/3 - - BYE response

Prerequisite: A.164/1 - - Additional for 100 (Trying) response

Table A.169A: Supported header fields within the BYE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
3	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
4	Date	[26] 20.17	c1	c1	[26] 20.17	c2	c2
5	From	[26] 20.20	m	m	[26] 20.20	m	m
6	To	[26] 20.39	m	m	[26] 20.39	m	m
7	Via	[26] 20.42	m	m	[26] 20.42	m	m
c1:	IF (A.162/9 AND A.162/5) OR A.162/4 THEN m ELSE n/a - - stateful proxy behaviour that inserts date, or stateless proxies.						
c2:	IF A.162/4 THEN i ELSE m - - Stateless proxy passes on.						

Prerequisite A.163/3 - - BYE response

Table A.170: Supported header fields within the BYE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Allow	[26] 20.5	m	m	[26] 20.5	i	i
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Disposition	[26] 20.11	m	m	[26] 20.11	i	c2
3	Content-Encoding	[26] 20.12	m	m	[26] 20.12	i	c2
4	Content-Language	[26] 20.13	m	m	[26] 20.13	i	c2
5	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
6	Content-Type	[26] 20.15	m	m	[26] 20.15	i	c2
7	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
8	Date	[26] 20.17	m	m	[26] 20.17	c1	c1
9	From	[26] 20.20	m	m	[26] 20.20	m	m
9A	Geolocation-Error	[89] 4.3	c15	c15	[89] 4.3	c16	c16
10	MIME-Version	[26] 20.24	m	m	[26] 20.24	i	c2
10A	P-Access-Network-Info	[52] 4.4	c12	c12	[52] 4.4	c13	c13
10B	P-Asserted-Identity	[34] 9.1	c4	c4	[34] 9.1	c5	c5
10C	P-Charging-Function-Addresses	[52] 4.5	c10	c10	[52] 4.5	c11	c11
10D	P-Charging-Vector	[52] 4.6	c8	n/a	[52] 4.6	c9	n/a
10F	P-Preferred-Identity	[34] 9.2	x	x	[34] 9.2	c3	n/a
10G	Privacy	[33] 4.2	c6	c6	[33] 4.2	c7	c7
10H	Require	[26] 20.32	m	m	[26] 20.32	c14	c14
10I	Server	[26] 20.35	m	m	[26] 20.35	i	i
11	Timestamp	[26] 20.38	m	m	[26] 20.38	i	i
12	To	[26] 20.39	m	m	[26] 20.39	m	m
12A	User-Agent	[26] 20.41	m	m	[26] 20.41	i	i
12B	User-to-User	[126] 7	c17	c17	[126] 7	c18	c18
13	Via	[26] 20.42	m	m	[26] 20.42	m	m
14	Warning	[26] 20.43	m	m	[26] 20.43	i	i

c1: IF A.162/9 THEN m ELSE i - - insertion of date in requests and responses.
c2: IF A.3/2 OR A.3/4 THEN m ELSE i - - P-CSCF or S-CSCF.
c3: IF A.162/30A THEN m ELSE n/a - - act as first entity within the trust domain for asserted identity.
c4: IF A.162/30 THEN m ELSE n/a - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c5: IF A.162/30A or A.162/30B THEN m ELSE i - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks or subsequent entity within trust network that can route outside the trust network.
c6: IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c7: IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.
c8: IF A.162/45 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c9: IF A.162/46 THEN m ELSE IF A.162/45 THEN i ELSE n/a - - adding, deleting, reading or modifying the P-Charging-Vector header before proxying the request or response or the P-Charging-Vector header extension.
c10: IF A.162/44 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c11: IF A.162/44A THEN m ELSE IF A.162/44 THEN i ELSE n/a - - adding, deleting or reading the P-Charging-Function-Addresses header before proxying the request or response, or the P-Charging-Function-Addresses header extension.
c12: IF A.162/43 THEN x ELSE IF A.162/41 THEN m ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c13: IF A.162/43 THEN m ELSE IF A.162/41 THEN i ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c14: IF A.162/11 OR A.162/13 THEN m ELSE i - - reading the contents of the Require header before proxying the request or response or adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER.
c15: IF A.162/70 THEN m ELSE n/a - - SIP location conveyance.
c16: IF A.162/70A THEN m ELSE IF A.162/70B THEN i ELSE n/a - - addition or modification of location in a SIP method, passes on locations in SIP method without modification.
c17: IF A.162/86 THEN m - - transporting user to user information for call centers using SIP.
c18: IF A.162/86 THEN i - - transporting user to user information for call centers using SIP.

Prerequisite A.163/3 - - BYE response

Prerequisite: A.164/102 - - Additional for 2xx response

Table A.171: Supported header fields within the BYE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Accept-Resource-Priority	[116] 3.2	c4	c4	[116] 3.2	c4	c4
0B	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	i	c1
1	Authentication-Info	[26] 20.6	m	m	[26] 20.6	i	i
2	Record-Route	[26] 20.30	m	m	[26] 20.30	c3	c3
5	Supported	[26] 20.37	m	m	[26] 20.37	i	i
c1:	IF A.4/20 THEN m ELSE i - - SIP specific event notification extension.						
c3:	IF A.162/15 THEN o ELSE i - - the requirement to be able to use separate URIs in the upstream direction and downstream direction when record routeing.						
c4:	IF A.162/80B THEN m ELSE n/a - - inclusion of CANCEL, BYE, REGISTER and PUBLISH in communications resource priority for the session initiation protocol.						

Prerequisite A.163/3 - - BYE response

Prerequisite: A.164/103 OR A.164/104 OR A.164/105 OR A.164/106 - - Additional for 3xx – 6xx response

Table A.171A: Supported header fields within the BYE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Error-Info	[26] 20.18	m	m	[26] 20.18	i	i

Prerequisite A.163/3 - BYE response

Prerequisite: A.164/103 OR A.164/35 - - Additional for 3xx or 485 (Ambiguous) response

Table A.172: Supported header fields within the BYE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Contact	[26] 20.10	m	m	[26] 20.10	c1	c1
c1:	IF A.162/19E THEN m ELSE i - - deleting Contact headers.						

Prerequisite A.163/3 - - BYE response

Prerequisite: A.164/14 - - Additional for 401 (Unauthorized) response

Table A.173: Supported header fields within the BYE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
2	Proxy-Authenticate	[26] 20.27	m	m	[26] 20.27	m	m
8	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	i	i

Prerequisite A.163/3 - - BYE response

Prerequisite: A.164/17 OR A.164/23 OR A.164/30 OR A.164/36 OR A.164/42 OR A.164/45 OR A.164/50 OR A.164/51 - - Additional for 404 (Not Found), 413 (Request Entity Too Large), 480(Temporarily not available), 486 (Busy Here), 500 (Internal Server Error), 503 (Service Unavailable), 600 (Busy Everywhere), 603 (Decline) response

Table A.174: Supported header fields within the BYE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Retry-After	[26] 20.33	m	m	[26] 20.33	i	i

Table A.175: Void

Prerequisite A.163/3 - - BYE response

Prerequisite: A.164/20 - - Additional for 407 (Proxy Authentication Required) response

Table A.176: Supported header fields within the BYE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
2	Proxy-Authenticate	[26] 20.27	m	m	[26] 20.27	m	m
6	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	i	i

Prerequisite A.163/3 - - BYE response

Prerequisite: A.164/25 - - Additional for 415 (Unsupported Media Type) response

Table A.177: Supported header fields within the BYE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	i	i
2	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
3	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i

Prerequisite A.163/3 - - BYE response

Prerequisite: A.164/26A - - Additional for 417 (Unknown Resource-Priority) response

Table A.177A: Supported header fields within the BYE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
c1:	IF A.162/80B THEN m ELSE n/a - - inclusion of CANCEL, BYE, REGISTER and PUBLISH in communications resource priority for the session initiation protocol.						

Prerequisite A.163/3 - - BYE response

Prerequisite: A.164/27 - - Additional for 420 (Bad Extension) response

Table A.178: Supported header fields within the BYE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
5	Unsupported	[26] 20.40	m	m	[26] 20.40	c3	c3
c3:	IF A.162/18 THEN m ELSE i - - reading the contents of the Unsupported header before proxying the 420 response to a method other than REGISTER.						

Prerequisite A.163/3 - - BYE response

Prerequisite: A.164/28 OR A.164/41A - - Additional for 421 (Extension Required), 494 (Security Agreement Required) response

Table A.178A: Supported header fields within the BYE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Security-Server	[48] 2	c1	c1	[48] 2	n/a	n/a
c1:	IF A.162/47 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						

Table A.179: Void

Prerequisite A.163/3 - - BYE response

Prerequisite: A.164/6 - - Additional for 200 (OK) response

Table A.180: Supported message bodies within the BYE response

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	VoiceXML expr / namelist data	[145] 4.2	o	c1	[145] 4.2	o	c1
c1:	IF A.162/94 THEN o ELSE n/a - - SIP Interface to VoiceXML Media Services.						

A.2.2.4.4 CANCEL method

Prerequisite A.163/4 - - CANCEL request

Table A.181: Supported header fields within the CANCEL request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Contact	[56B] 9.2	c10	c10	[56B] 9.2	c11	c11
5	Authorization	[26] 20.7	m	m	[26] 20.7	i	i
6	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
8	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
9	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
10	Date	[26] 20.17	m	m	[26] 20.17	c2	c2
11	From	[26] 20.20	m	m	[26] 20.20	m	m
11A	Max-Breadth	[117] 5.8	c15	c15	[117] 5.8	c16	c16
12	Max-Forwards	[26] 20.22	m	m	[26] 20.22	m	m
14	Privacy	[33] 4.2	c3	c3	[33] 4.2	c4	c4
15	Reason	[34A] 2	c8	c8	[34A] 2	c9	c9
16	Record-Route	[26] 20.30	m	m	[26] 20.30	c7	c7
17	Reject-Contact	[56B] 9.2	c10	c10	[56B] 9.2	c11	c11
17A	Request-Disposition	[56B] 9.1	c10	c10	[56B] 9.1	c11	c11
17B	Resource-Priority	[116] 3.1	c12	c12	[116] 3.1	c12	c12
18	Route	[26] 20.34	m	m	[26] 20.34	m	m
19	Supported	[26] 20.37	m	m	[26] 20.37	c6	c6
20	Timestamp	[26] 20.38	m	m	[26] 20.38	i	i
21	To	[26] 20.39	m	m	[26] 20.39	m	m
22	User-Agent	[26] 20.41	m	m	[26] 20.41	i	i
23	Via	[26] 20.42	m	m	[26] 20.42	m	m
c2:	IF A.162/9 THEN m ELSE i - - insertion of date in requests and responses.						
c3:	IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).						
c4:	IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.						
c6:	IF A.162/16 THEN m ELSE i - - reading the contents of the Supported header before proxying the response.						
c7:	IF A.162/14 THEN o ELSE i - - the requirement to be able to insert itself in the subsequent transactions in a dialog.						
c8:	IF A.162/48 THEN m ELSE n/a - - the Reason header field for the session initiation protocol.						
c9:	IF A.162/48 THEN i ELSE n/a - - the Reason header field for the session initiation protocol.						
c10:	IF A.162/50 THEN m ELSE n/a - - caller preferences for the session initiation protocol.						
c11:	IF A.162/50 THEN i ELSE n/a - - caller preferences for the session initiation protocol.						
c12:	IF A.162/80B THEN m ELSE n/a - - inclusion of CANCEL, BYE, REGISTER and PUBLISH in communications resource priority for the session initiation protocol.						
c15:	IF A.162/81 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.						
c16:	IF A.162/81 AND A.162/6 THEN m ELSE IF A.162/81 AND NOT A.162/6 THEN i ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies, forking of initial requests.						
NOTE:	c1 refers to the UA role major capability as this is the case of a proxy that also acts as a UA specifically for SUBSCRIBE and NOTIFY.						

Prerequisite A.163/4 - - CANCEL request

Table A.182: Supported message bodies within the CANCEL request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	XML Schema for PSTN	[11B]		c1	[11B]		i
c1:	A.3/3 OR A.3/4 OR A.3/5 OR A.3/7C OR A.3/9A OR A.3/10 OR A.3/11 THEN m ELSE n/a - - I-CSCF, S-CSCF, BGCF, AS acting as proxy, IBCF (THIG), additional routeing functionality, E-CSCF.						

Prerequisite A.163/5 - - CANCEL response for all status-codes

Table A.183: Supported header fields within the CANCEL response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
3	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
4	Date	[26] 20.17	m	m	[26] 20.17	c1	c1
5	From	[26] 20.20	m	m	[26] 20.20	m	m
5B	Privacy	[33] 4.2	c2	c2	[33] 4.2	c3	c3
6	Timestamp	[26] 20.38	m	m	[26] 20.38	i	i
7	To	[26] 20.39	m	m	[26] 20.39	m	m
7A	User-Agent	[26] 20.41	o		[26] 20.41	o	
8	Via	[26] 20.42	m	m	[26] 20.42	m	m
9	Warning	[26] 20.43	m	m	[26] 20.43	i	i
c1:	IF A.162/9 THEN m ELSE i - - insertion of date in requests and responses.						
c2:	IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).						
c3:	IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.						

Prerequisite A.163/5 - - CANCEL response

Prerequisite: A.164/102 - - Additional for 2xx response

Table A.184: Supported header fields within the CANCEL response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c4	c4	[116] 3.2	c4	c4
2	Record-Route	[26] 20.30	m	m	[26] 20.30	c3	c3
4	Supported	[26] 20.37	m	m	[26] 20.37	i	i
c3:	IF A.162/15 THEN o ELSE i - - the requirement to be able to use separate URIs in the upstream direction and downstream direction when record routeing.						
c4:	IF A.162/80B THEN m ELSE n/a - - inclusion of CANCEL, BYE, REGISTER and PUBLISH in communications resource priority for the session initiation protocol.						

Prerequisite A.163/5 - - CANCEL response

Prerequisite: A.164/103 OR A.164/104 OR A.164/105 OR A.164/106 - - Additional for 3xx – 6xx response

Table A.184A: Supported header fields within the CANCEL response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Error-Info	[26] 20.18	m	m	[26] 20.18	i	i

Table A.185: Void

Prerequisite A.163/5 - - CANCEL response

Prerequisite: A.164/17 OR A.164/23 OR A.164/30 OR A.164/42 OR A.164/45 OR A.164/50 OR A.164/51 - - Additional for Entity Too Large), 480(Temporarily not available), 486 (Busy Here), 500 (Internal Server Error), 503 (Service Unavailable), 600 (Busy Everywhere), 603 (Decline) response

Table A.186: Supported header fields within the CANCEL response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
4	Retry-After	[26] 20.33	m	m	[26] 20.33	i	i

Prerequisite A.163/5 - - CANCEL response

Prerequisite: A.164/26A - - Additional for 417 (Unknown Resource-Priority) response

Table A.186A: Supported header fields within the CANCEL response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
c1:	IF A.162/80B THEN m ELSE n/a - - inclusion of CANCEL, BYE, REGISTER and PUBLISH in communications resource priority for the session initiation protocol.						

Table A.187: Void

Table A.188: Void

Prerequisite A.163/5 - - CANCEL response

Table A.189: Supported message bodies within the CANCEL response

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

A.2.2.4.5 COMET method

Void

A.2.2.4.6 INFO method

Prerequisite A.163/9A - - INFO request

Table A.190: Supported header fields within the INFO request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	i	i
2	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
3	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i
4	Allow	[26] 20.5	m	m	[50] 10	i	i
5	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	c1	c1
6	Authorization	[26] 20.7	m	m	[26] 20.7	i	i
7	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
7A	Call-Info	[26] 20.9	m	m	[26] 20.9	c3	c3
9	Content-Disposition	[26] 20.11	m	m	[26] 20.11	i	i
10	Content-Encoding	[26] 20.12	m	m	[26] 20.12	i	i
11	Content-Language	[26] 20.13	m	m	[26] 20.13	i	i
12	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
13	Content-Type	[26] 20.15	m	m	[26] 20.15	i	i
14	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
15	Date	[26] 20.17	m	m	[26] 20.17	c2	c2
16	From	[26] 20.20	m	m	[26] 20.20	m	m
17	Geolocation	[89] 4.1	c36	c36	[89] 4.1	c37	c37
17A	Geolocation-Routing	[89] 4.1	c36	c36	[89] 4.1	c37	c37
18	Info-Package	[25] 7.2	c50	c50	[25] 7.2	c51	c51
19	Max-Breadth	[117] 5.8	c48	c48	[117] 5.8	c49	c49
20	Max-Forwards	[26] 20.22	m	m	[26] 20.22	m	m
21	MIME-Version	[26] 20.24	m	m	[26] 20.24	i	i
22	P-Access-Network-Info	[52] 4.4	c23	c23	[52] 4.4	c24	c24
23	P-Charging-Function-Addresses	[52] 4.5	c21	c21	[52] 4.5	c22	c22
24	P-Charging-Vector	[52] 4.6	c19	c19	[52] 4.6	c20	c20
26	Privacy	[33] 4.2	c12	c12	[33] 4.2	c13	c13
27	Proxy-Authorization	[26] 20.28	m	m	[26] 20.28	c8	c8
28	Proxy-Require	[26] 20.29	m	m	[26] 20.29	m	m
29	Reason	[34A] 2	c26	c26	[34A] 2	c27	c27
30	Record-Route	[26] 20.30	m	m	[26] 20.30	c7	c7
31	Referred-By	[59] 3	c30	c30	[59] 3	c31	c31
33	Request-Disposition	[56B] 9.1	c28	c28	[56B] 9.1	c28	c28
34	Require	[26] 20.32	m	m	[26] 20.32	c5	c5
35	Resource-Priority	[116] 3.1	c38	c38	[116] 3.1	c38	c38
36	Route	[26] 20.34	m	m	[26] 20.34	m	m
37	Security-Client	[48] 2.3.1	x	x	[48] 2.3.1	c25	c25
38	Security-Verify	[48] 2.3.1	x	x	[48] 2.3.1	c25	c25
39	Subject	[26] 20.36	m	m	[26] 20.36	i	i
40	Supported	[26] 20.37	m	m	[26] 20.37	c6	c6
41	Timestamp	[26] 20.38	m	m	[26] 20.38	i	i
42	To	[26] 20.39	m	m	[26] 20.39	m	m
43	User-Agent	[26] 20.41	m	m	[26] 20.41	i	i
44	Via	[26] 20.42	m	m	[26] 20.42	m	m

c1:	IF A.4/20 THEN m ELSE i - - SIP specific event notification extension.
c2:	IF A.162/9 THEN m ELSE i - - insertion of date in requests and responses.
c3:	IF A.162/19C OR A.162/19D THEN m ELSE i - - reading, adding or concatenating the Call-Info header.
c5:	IF A.162/11 OR A.162/13 THEN m ELSE i - - reading the contents of the Require header before proxying the request or response or adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER.
c6:	IF A.162/16 THEN m ELSE i - - reading the contents of the Supported header before proxying the response.
c7:	IF A.162/14 THEN o ELSE i - - the requirement to be able to insert itself in the subsequent transactions in a dialog.
c8:	IF A.162/8A THEN m ELSE i - - authentication between UA and proxy.
c12:	IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c13:	IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.
c19:	IF A.162/45 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c20:	IF A.162/46 THEN m ELSE IF A.162/45 THEN i ELSE n/a - - adding, deleting, reading or modifying the P-Charging-Vector header before proxying the request or response or the P-Charging-Vector header extension.
c21:	IF A.162/44 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c22:	IF A.162/44A THEN m ELSE IF A.162/44 THEN i ELSE n/a - - adding, deleting or reading the P-Charging-Function-Addresses header before proxying the request or response, or the P-Charging-Function-Addresses header extension.
c23:	IF A.162/43 THEN x ELSE IF A.162/41 THEN m ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c24:	IF A.162/43 THEN m ELSE IF A.162/41 THEN i ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c25:	IF A.162/47 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.
c26:	IF A.162/48 THEN m ELSE n/a - - the Reason header field for the session initiation protocol.
c27:	IF A.162/48 THEN i ELSE n/a - - the Reason header field for the session initiation protocol.
c28:	IF A.162/50 THEN m ELSE n/a - - caller preferences for the session initiation protocol.
c30:	IF A.162/53 THEN i ELSE n/a - - the SIP Referred-By mechanism.
c31:	IF A.162/53 THEN m ELSE n/a - - the SIP Referred-By mechanism.
c36:	IF A.162/70 THEN m ELSE n/a - - SIP location conveyance.
c37:	IF A.162/70A THEN m ELSE IF A.162/70B THEN i ELSE n/a - - addition or modification of location in a SIP method, passes on locations in SIP method without modification.
c38:	IF A.162/80A THEN m ELSE n/a - - inclusion of INFO, SUBSCRIBE, NOTIFY in communications resource priority for the session initiation protocol.
c48:	IF A.162/81 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.
c49:	IF A.162/81 AND A.162/6 THEN m ELSE IF A.162/81 AND NOT A.162/6 THEN i ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies, forking of initial requests.
c50:	IF A.162/20 THEN m ELSE n/a - - SIP INFO method and package framework.
c51:	IF A.162/20 THEN i ELSE n/a - - SIP INFO method and package framework.
NOTE:	c1 refers to the UA role major capability as this is the case of a proxy that also acts as a UA specifically for SUBSCRIBE and NOTIFY.

Prerequisite A.163/9A - - INFO request

Table A.191: Supported message bodies within the INFO request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Info-Package	[25]	m	m	[25]	i	i

Prerequisite A.163/9B - - INFO response

Prerequisite: A.164/1 - - Additional for 100 (Trying) response

Table A.192: Supported header fields within the INFO response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
3	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
4	Date	[26] 20.17	c1	c1	[26] 20.17	c2	c2
5	From	[26] 20.20	m	m	[26] 20.20	m	m
6	To	[26] 20.39	m	m	[26] 20.39	m	m
7	Via	[26] 20.42	m	m	[26] 20.42	m	m
c1:	IF (A.162/9 AND A.162/5) OR A.162/4 THEN m ELSE n/a - - stateful proxy behaviour that inserts date, or stateless proxies.						
c2:	IF A.162/4 THEN i ELSE m - - Stateless proxy passes on.						

Prerequisite A.163/9B - - INFO response for all remaining status-codes

Table A.193: Supported header fields within the INFO response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Allow	[26] 20.5	m	m	[26] 20.5	i	i
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Call-Info	[26] 20.9	m	m	[26] 20.9	c3	c3
3	Content-Disposition	[26] 20.11	m	m	[26] 20.11	i	i
4	Content-Encoding	[26] 20.12	m	m	[26] 20.12	i	i
5	Content-Language	[26] 20.13	m	m	[26] 20.13	i	i
6	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
7	Content-Type	[26] 20.15	m	m	[26] 20.15	i	i
8	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
9	Date	[26] 20.17	m	m	[26] 20.17	c1	c1
10	From	[26] 20.20	m	m	[26] 20.20	m	m
11	Geolocation-Error	[89] 4.3	c17	c17	[89] 4.3	c18	c18
12	MIME-Version	[26] 20.24	m	m	[26] 20.24	i	i
13	Organization	[26] 20.25	m	m	[26] 20.25	c2	c2
14	P-Access-Network-Info	[52] 4.4	c13	c13	[52] 4.4	c14	c14
15	P-Charging-Function-Addresses	[52] 4.5	c11	c11	[52] 4.5	c12	c12
16	P-Charging-Vector	[52] 4.6	c9	n/a	[52] 4.6	c10	n/a
18	Privacy	[33] 4.2	c7	c7	[33] 4.2	c8	c8
19	Require	[26] 20.32	m	m	[26] 20.32	c15	c15
20	Server	[26] 20.35	m	m	[26] 20.35	i	i
21	Timestamp	[26] 20.38	i	i	[26] 20.38	i	i
22	To	[26] 20.39	m	m	[26] 20.39	m	m
23	User-Agent	[26] 20.41	m	m	[26] 20.41	i	i
24	Via	[26] 20.42	m	m	[26] 20.42	m	m
25	Warning	[26] 20.43	m	m	[26] 20.43	i	i

c1: IF A.162/9 THEN m ELSE i - - insertion of date in requests and responses.
c2: IF A.162/19A OR A.162/19B THEN m ELSE i - - reading, adding or concatenating the Organization header.
c3: IF A.162/19C OR A.162/19D THEN m ELSE i - - reading, adding or concatenating the Call-Info header.
c7: IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c8: IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.
c9: IF A.162/45 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c10: IF A.162/46 THEN m ELSE IF A.162/45 THEN i ELSE n/a - - adding, deleting, reading or modifying the P-Charging-Vector header before proxying the request or response or the P-Charging-Vector header extension.
c11: IF A.162/44 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c12: IF A.162/44A THEN m ELSE IF A.162/44 THEN i ELSE n/a - - adding, deleting or reading the P-Charging-Function-Addresses header before proxying the request or response, or the P-Charging-Function-Addresses header extension.
c13: IF A.162/43 THEN x ELSE IF A.162/41 THEN m ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c14: IF A.162/43 THEN m ELSE IF A.162/41 THEN i ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c15: IF A.162/11 OR A.162/13 THEN m ELSE i - - reading the contents of the Require header before proxying the request or response or adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER.
c17: IF A.162/70 THEN m ELSE n/a - - SIP location conveyance.
c18: IF A.162/70A THEN m ELSE IF A.162/70B THEN i ELSE n/a - - addition or modification of location in a SIP method, passes on locations in SIP method without modification.

Prerequisite A.163/9B - - INFO response

Prerequisite: A.164/102 - - Additional for 2xx response

Table A.194: Supported header fields within the INFO response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	i	i
2	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
3	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i
4	Accept-Resource-Priority	[116] 3.2	c4	c4	[116] 3.2	c4	c4
5	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	c1	c1
6	Authentication-Info	[26] 20.6	m	m	[26] 20.6	i	i
9	Supported	[26] 20.37	m	m	[26] 20.37	i	i
c1: IF A.4/20 THEN m ELSE i - - SIP specific event notification extension. c4: IF A.162/80A THEN m ELSE n/a - - inclusion of INFO, SUBSCRIBE, NOTIFY in communications resource priority for the session initiation protocol.							

Prerequisite A.163/9B - - INFO response

Prerequisite: A.164/103 OR A.164/104 OR A.164/105 OR A.164/106 - - Additional for 3xx – 6xx response

Table A.195: Supported header fields within the INFO response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Error-Info	[26] 20.18	m	m	[26] 20.18	i	i

Prerequisite A.163/9B - - INFO response

Prerequisite: A.164/103 OR A.164/35 - - Additional for 3xx or 485 (Ambiguous) response

Table A.195A: Void

Prerequisite A.163/9B - - INFO response

Prerequisite: A.164/14 - - Additional for 401 (Unauthorized) response

Table A.196: Supported header fields within the INFO response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Proxy-Authenticate	[26] 20.27	m	m	[26] 20.27	m	m
6	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	i	i

Prerequisite A.163/9B - - INFO response

Prerequisite: A.164/17 OR A.164/23 OR A.164/30 OR A.164/36 OR A.164/42 OR A.164/45 OR A.164/50 OR A.164/51 - - Additional for 404 (Not Found), 413 (Request Entity Too Large), 480(Temporarily not available), 486 (Busy Here), 500 (Internal Server Error), 503 (Service Unavailable), 600 (Busy Everywhere), 603 (Decline) response

Table 197: Supported header fields within the INFO response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
4	Retry-After	[26] 20.33	m	m	[26] 20.33	i	i

Table A.198: Void

Prerequisite A.163/9B - - INFO response

Prerequisite: A.164/25 - - Additional for 415 (Unsupported Media Type)

Table A.199: Supported header fields within the INFO response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	i	i
2	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
3	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i

Prerequisite A.163/9B - - INFO response

Prerequisite: A.164/26A - - Additional for 417 (Unknown Resource-Priority) response

Table A.199A: Supported header fields within the INFO response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
c1:	IF A.162/80A THEN m ELSE n/a - - inclusion of INFO, SUBSCRIBE, NOTIFY in communications resource priority for the session initiation protocol.						

Prerequisite A.163/9B - - INFO response

Prerequisite: A.164/27 - - Additional for 420 (Bad Extension) response

Table A.200: Supported header fields within the INFO response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
5	Unsupported	[26] 20.40	m	m	[26] 20.40	c3	c3
c3:	IF A.162/18 THEN m ELSE i - - reading the contents of the Unsupported header before proxying the 420 response to a method other than REGISTER.						

Prerequisite A.163/9B - - INFO response

Prerequisite: A.164/28 OR A.164/41A - - Additional for 421 (Extension Required), 494 (Security Agreement Required) response

Table A.200A: Supported header fields within the INFO response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Security-Server	[48] 2	c1	c1	[48] 2	n/a	n/a
c1:	IF A.162/47 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						

Table A.201: Void

Table A.202: Void

Prerequisite A.163/9B - - INFO response

Table A.203: Supported message bodies within the INFO response

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

A.2.2.4.7 INVITE method

Prerequisite A.163/8 - - INVITE request

Table A.204: Supported header fields within the INVITE request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	i	i
1A	Accept-Contact	[56B] 9.2	c34	c34	[56B] 9.2	c34	c35
2	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
3	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i
4	Alert-Info	[26] 20.4	c2	c2	[26] 20.4	c3	c3
5	Allow	[26] 20.5	m	m	[26] 20.5	i	i
6	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	c1	c1
7	Answer-Mode	[158]	c67	c67	[158]	c68	c68
8	Authorization	[26] 20.7	m	m	[26] 20.7	i	i
9	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
10	Call-Info	[26] 20.9	m	m	[26] 20.9	c12	c12
11	Contact	[26] 20.10	m	m	[26] 20.10	i	i
12	Content-Disposition	[26] 20.11	m	m	[26] 20.11	i	c6
13	Content-Encoding	[26] 20.12	m	m	[26] 20.12	i	c6
14	Content-Language	[26] 20.13	m	m	[26] 20.13	i	c6
15	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
16	Content-Type	[26] 20.15	m	m	[26] 20.15	i	c6
17	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
18	Date	[26] 20.17	m	m	[26] 20.17	c4	c4
19	Expires	[26] 20.19	m	m	[26] 20.19	i	i
20	From	[26] 20.20	m	m	[26] 20.20	m	m
20A	Geolocation	[89] 4.1	c47	c47	[89] 4.1	c48	c48
20B	Geolocation-Routing	[89] 4.1	c47	c47	[89] 4.1	c48	c48
20C	History-Info	[66] 4.1	c43	c43	[66] 4.1	c43	c43
21	In-Reply-To	[26] 20.21	m	m	[26] 20.21	i	i
21A	Join	[61] 7.1	c41	c41	[61] 7.1	c42	c42
21B	Max-Breadth	[117] 5.8	c63	c63	[117] 5.8	c64	c64
22	Max-Forwards	[26] 20.22	m	m	[26] 20.22	m	m
23	MIME-Version	[26] 20.24	m	m	[26] 20.24	i	c6
23A	Min-SE	[58] 5	o	o	[58] 5	o	o
24	Organization	[26] 20.25	m	m	[26] 20.25	c5	c5
24A	P-Access-Network-Info	[52] 4.4	c28	c28	[52] 4.4	c29	c30
24B	P-Asserted-Identity	[34] 9.1	c15	c15	[34] 9.1	c16	c16
24C	P-Asserted-Service	[121] 4.1	c53	c53	[121] 4.1	c54	c54
24D	P-Called-Party-ID	[52] 4.2	c19	c19	[52] 4.2	c20	c21
24E	P-Charging-Function-Addresses	[52] 4.5	c26	c27	[52] 4.5	c26	c27
24F	P-Charging-Vector	[52] 4.6	c24	c24	[52] 4.6	c25	c25
24H	P-Early-Media	[109] 8	o	c50	[109] 8	o	c51
25	P-Media-Authorization	[31] 5.1	c9	x	[31] 5.1	n/a	n/a
25A	P-Preferred-Identity	[34] 9.2	x	c69	[34] 9.2	c14	c14
25B	P-Preferred-Service	[121] 4.2	x	x	[121] 4.2	c52	c52
25C	P-Private-Network-Indication	[134]	c59	c59	[134]	c59	c59
25D	P-Profile-Key	[97] 5	c45	c45	[97] 5	c46	c46
25E	P-Served-User	[133] 6	c60	c60	[133] 6	c60	c60
25F	P-User-Database	[82] 4	c44	c44	[82] 4	c44	c44
25G	P-Visited-Network-ID	[52] 4.3	c22	n/a	[52] 4.3	c23	n/a
26	Priority	[26] 20.26	m	m	[26] 20.26	i	i
26A	Privacy	[33] 4.2	c17	c17	[33] 4.2	c18	c18
26B	Priv-Answer-Mode	[158]	c67	c67	[158]	c68	c68
27	Proxy-Authorization	[26] 20.28	m	m	[26] 20.28	c13	c13
28	Proxy-Require	[26] 20.29, [34] 4	m	m	[26] 20.29, [34] 4	m	m
28A	Reason	[34A] 2	c32	c32	[34A] 2	c33	c33
29	Record-Route	[26] 20.30	m	m	[26] 20.30	c11	c11

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
29A	Recv-Info	[25] 5.2.3	c65	c65	[25] 5.2.3	c66	c66
30	Referred-By	[59] 3	c37	c37	[59] 3	c38	c38
31	Reject-Contact	[56B] 9.2	c34	c34	[56B] 9.2	c34	c35
31A	Replaces	[60] 6.1	c39	c39	[60] 6.1	c40	c40
31B	Reply-To	[26] 20.31	m	m	[26] 20.31	i	i
31C	Request-Disposition	[56B] 9.1	c34	c34	[56B] 9.1	c34	c34
32	Require	[26] 20.32	m	m	[26] 20.32	c7	c7
32A	Resource-Priority	[116] 3.1	c49	c49	[116] 3.1	c49	c49
33	Route	[26] 20.34	m	m	[26] 20.34	m	m
33A	Security-Client	[48] 2.3.1	x	x	[48] 2.3.1	c31	c31
33B	Security-Verify	[48] 2.3.1	x	x	[48] 2.3.1	c31	c31
33D	Session-Expires	[58] 4	c36	c36	[58] 4	c36	c36
34	Subject	[26] 20.36	m	m	[26] 20.36	i	i
35	Supported	[26] 20.37	m	m	[26] 20.37	c8	c8
35A	Target-Dialog	[184] 7	c71	c71	[184] 7	c72	c72
36	Timestamp	[26] 20.38	m	m	[26] 20.38	i	i
37	To	[26] 20.39	m	m	[26] 20.39	m	m
37A	Trigger-Consent	[125] 5.11.2	c55	c55	[125] 5.11.2	c56	c56
38	User-Agent	[26] 20.41	m	m	[26] 20.41	i	i
38A	User-to-User	[126] 7	c57	c57	[126] 7	c58	c58
39	Via	[26] 20.42	m	m	[26] 20.42	m	m

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
c1:	IF A.4/20 THEN m ELSE i - - SIP specific event notification extension.						
c2:	IF A.162/10 THEN n/a ELSE m - - suppression or modification of alerting information data.						
c3:	IF A.162/10 THEN m ELSE i - - suppression or modification of alerting information data.						
c4:	IF A.162/9 THEN m ELSE i - - insertion of date in requests and responses.						
c5:	IF A.162/19A OR A.162/19B THEN m ELSE i - - reading, adding or concatenating the Organization header.						
c6:	IF A.3/2 OR A.3/4 THEN m ELSE i - - P-CSCF or S-CSCF.						
c7:	IF A.162/11 OR A.162/13 THEN m ELSE i - - reading the contents of the Require header before proxying the request or response or adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER.						
c8:	IF A.162/16 THEN m ELSE i - - reading the contents of the Supported header before proxying the response.						
c9:	IF A.162/26 THEN m ELSE n/a - - SIP extensions for media authorization.						
c11:	IF A.162/14 THEN m ELSE i - - the requirement to be able to insert itself in the subsequent transactions in a dialog.						
c12:	IF A.162/19C OR A.162/19D THEN m ELSE i - - reading, adding or concatenating the Call-Info header.						
c13:	IF A.162/8A THEN m ELSE i - - authentication between UA and proxy.						
c14:	IF A.162/30A OR A.162/30C THEN m ELSE n/a - - act as first entity within the trust domain for asserted identity, act as entity passing on identity transparently independent of trust domain.						
c15:	IF A.162/30 THEN m ELSE n/a - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.						
c16:	IF A.162/30A or A.162/30B THEN m ELSE i - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks or subsequent entity within trust network that can route outside the trust network.						
c17:	IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).						
c18:	IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.						
c19:	IF A.162/37 THEN m ELSE n/a - - the P-Called-Party-ID header extension.						
c20:	IF A.162/37 THEN i ELSE n/a - - the P-Called-Party-ID header extension.						
c21:	IF A.162/37 AND A.3/2 THEN m ELSE IF A.162/37 AND (A.3/3 OR A.3/9A) THEN i ELSE n/a - - the P-Called-Party-ID header extension and P-CSCF or (I-CSCF or IBCF (THIG)).						
c22:	IF A.162/38 THEN m ELSE n/a - - the P-Visited-Network-ID header extension.						
c23:	IF A.162/39 THEN m ELSE i - - reading, or deleting the P-Visited-Network-ID header before proxying the request or response.						
c24:	IF A.162/45 THEN m ELSE n/a - - the P-Charging-Vector header extension.						
c25:	IF A.162/46 THEN m ELSE IF A.162/45 THEN i ELSE n/a - - adding, deleting, reading or modifying the P-Charging-Vector header before proxying the request or response or the P-Charging-Vector header extension.						
c26:	IF A.162/44 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.						
c27:	IF A.162/44A THEN m ELSE IF A.162/44 THEN i ELSE n/a - - adding, deleting or reading the P-Charging-Function-Addresses header before proxying the request or response, or the P-Charging-Function-Addresses header extension.						
c28:	IF A.162/43 THEN x ELSE IF A.162/41 THEN m ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.						
c29:	IF A.162/43 THEN m ELSE IF A.162/41 THEN i ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.						
c30:	IF A.162/43 OR (A.162/41 AND A.3/2) THEN m ELSE IF A.162/41 THEN i ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension (with or without P-CSCF).						
c31:	IF A.162/47 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						
c32:	IF A.162/48 THEN m ELSE n/a - - the Reason header field for the session initiation protocol.						
c33:	IF A.162/48 THEN i ELSE n/a - - the Reason header field for the session initiation protocol.						
c34:	IF A.162/50 THEN m ELSE n/a - - caller preferences for the session initiation protocol.						
c35:	IF A.162/50 AND A.4/3 THEN m ELSE IF A.162/50 AND NOT A.4/3 THEN i ELSE n/a - - caller preferences for the session initiation protocol, and S-CSCF.						
c36:	IF A.162/52 THEN m ELSE n/a - - the SIP session timer.						
c37:	IF A.162/53 THEN i ELSE n/a - - the SIP Referred-By mechanism.						
c38:	IF A.162/53 THEN m ELSE n/a - - the SIP Referred-By mechanism.						
c39:	IF A.162/54 THEN m ELSE n/a - - the Session Inititation Protocol (SIP) "Replaces" header.						
c40:	IF A.162/54 THEN i ELSE n/a - - the Session Inititation Protocol (SIP) "Replaces" header.						
c41:	IF A.162/55 THEN m ELSE n/a - - the Session Inititation Protocol (SIP) "Join" header.						

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
c42:	IF A.162/55 THEN i ELSE n/a - - the Session Initiation Protocol (SIP) "Join" header.						
c43:	IF A.162/57 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.						
c44:	IF A.162/60 THEN m ELSE n/a - - the P-User-Database private header extension.						
c45:	IF A.162/66A THEN m ELSE n/a - - making the first query to the database in order to populate the P-Profile-Key header.						
c46:	IF A.162/66B THEN m ELSE n/a - - using the information in the P-Profile-Key header.						
c47:	IF A.162/70 THEN m ELSE n/a - - SIP location conveyance.						
c48:	IF A.162/70A THEN m ELSE IF A.162/70B THEN i ELSE n/a - - addition or modification of location in a SIP method, passes on locations in SIP method without modification.						
c49:	IF A.162/80 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.						
c50:	IF A.162/76 THEN m ELSE n/a - - the SIP P-Early-Media private header extension for authorization of early media.						
c51:	IF A.162/76 THEN (IF A.3/2 THEN m ELSE i) ELSE n/a - - P-CSCF, using the information in the P-Early-Media header.						
c52:	IF A.162/84A THEN m ELSE n/a - - act as authentication entity within the trust domain for asserted service.						
c53:	IF A.162/84 THEN m ELSE n/a - - SIP extension for the identification of services.						
c54:	IF A.162/84 OR A.162/30B THEN m ELSE i - - SIP extension for the identification of services or subsequent entity within trust network that can route outside the trust network.						
c55:	IF A.162/85 THEN m ELSE n/a - - a framework for consent-based communications in SIP.						
c56:	IF A.162/85 THEN i ELSE n/a - - a framework for consent-based communications in SIP.						
c57:	IF A.162/86 THEN m - - transporting user to user information for call centers using SIP.						
c58:	IF A.162/86 THEN i - - transporting user to user information for call centers using SIP.						
c59:	IF A.162/87 THEN m ELSE n/a - - the SIP P-Private-Network-Indication private-header (P-Header).						
c60:	IF A.162/88 THEN m - - the SIP P-Served-User private header.						
c63:	IF A.162/81 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.						
c64:	IF A.162/81 AND A.162/6 THEN m ELSE IF A.162/81 AND NOT A.162/6 THEN i ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies, forking of initial requests.						
c65:	IF A.162/20 THEN m ELSE n/a - - SIP INFO method and package framework.						
c66:	IF A.162/20 THEN i ELSE n/a - - SIP INFO method and package framework.						
c67:	IF A.162/97 THEN m ELSE n/a - - requesting answering modes for SIP.						
c68:	IF NOT A.162/97 THEN n/a ELSE IF A.162/97A THEN m ELSE i - - requesting answering modes for SIP, adding, deleting or reading the Answer-Mode header or Priv-Answer-Mode header before proxying the request or response.						
c69:	IF A.162/30C THEN m ELSE x - - act as entity passing on identity transparently independent of trust domain.						
c71:	IF A.162/109 THEN m ELSE n/a - - request authorization through dialog Identification in the session initiation protocol.						
c72:	IF A.162/109 THEN i ELSE n/a - - request authorization through dialog Identification in the session initiation protocol.						
NOTE:	c1 refers to the UA role major capability as this is the case of a proxy that also acts as a UA specifically for SUBSCRIBE and NOTIFY.						

Prerequisite A.163/8 - - INVITE request

Table A.205: Supported message bodies within the INVITE request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	XML Schema for PSTN	[11B]		c1	[11B]		i
c1:	A.3/3 OR A.3/4 OR A.3/5 OR A.3/7C OR A.3/9A OR A.3/10 OR A.3/11 THEN m ELSE n/a - - I-CSCF, S-CSCF, BGCF, AS acting as proxy, IBCF (THIG), additional routeing functionality, E-CSCF.						

Prerequisite A.163/9 - - INVITE response

Prerequisite: A.164/1 - - Additional for 100 (Trying) response

Table A.206: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
3	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
4	Date	[26] 20.17	c1	c1	[26] 20.17	c2	c2
5	From	[26] 20.20	m	m	[26] 20.20	m	m
6	To	[26] 20.39	m	m	[26] 20.39	m	m
7	Via	[26] 20.42	m	m	[26] 20.42	m	m
c1:	IF (A.162/9 AND A.162/5) OR A.162/4 THEN m ELSE n/a - - stateful proxy behaviour that inserts date, or stateless proxies.						
c2:	IF A.162/4 THEN i ELSE m - - Stateless proxy passes on.						

Prerequisite A.163/9 - - INVITE response for all remaining status-codes

Table A.207: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Allow	[26] 20.5	m	m	[26] 20.5	i	i
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
1A	Call-Info	[26] 20.9	m	m	[26] 20.9	c4	c4
2	Content-Disposition	[26] 20.11	m	m	[26] 20.11	i	c3
3	Content-Encoding	[26] 20.12	m	m	[26] 20.12	i	c3
4	Content-Language	[26] 20.13	m	m	[26] 20.13	i	c3
5	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
6	Content-Type	[26] 20.15	m	m	[26] 20.15	i	c3
7	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
8	Date	[26] 20.17	m	m	[26] 20.17	c1	c1
8A	Expires	[26] 20.19	m	m	[26] 20.19	i	i
9	From	[26] 20.20	m	m	[26] 20.20	m	m
9A	Geolocation-Error	[89] 4.3	c24	c24	[89] 4.3	c24	c24
9B	History-Info	[66] 4.1	c17	c17	[66] 4.1	c17	c17
10	MIME-Version	[26] 20.24	m	m	[26] 20.24	i	c3
11	Organization	[26] 20.25	m	m	[26] 20.25	c2	c2
11A	P-Access-Network-Info	[52] 4.4	c14	c14	[52] 4.4	c15	c15
11B	P-Asserted-Identity	[34] 9.1	c6	c6	[34] 9.1	c7	c7
11C	P-Charging-Function-Addresses	[52] 4.5	c12	c12	[52] 4.5	c13	c13
11D	P-Charging-Vector	[52] 4.6	c10	c10	[52] 4.6	c11	c11
11F	P-Preferred-Identity	[34] 9.2	x	x	[34] 9.2	c5	n/a
11G	Privacy	[33] 4.2	c8	c8	[33] 4.2	c9	c9
11H	Reply-To	[26] 20.31	m	m	[26] 20.31	i	i
11I	Require	[26] 20.32	m	m	[26] 20.32	c16	c16
11J	Server	[26] 20.35	m	m	[26] 20.35	i	i
12	Timestamp	[26] 20.38	m	m	[26] 20.38	i	i
13	To	[26] 20.39	m	m	[26] 20.39	m	m
13A	User-Agent	[26] 20.41	m	m	[26] 20.41	i	i
13B	User-to-User	[126] 7	c20	c20	[126] 7	c21	c21
14	Via	[26] 20.42	m	m	[26] 20.42	m	m
15	Warning	[26] 20.43	m	m	[26] 20.43	i	i

c1:	IF A.162/9 THEN m ELSE i - - insertion of date in requests and responses.
c2:	IF A.162/19A OR A.162/19B THEN m ELSE i - - reading, adding or concatenating the Organization header.
c3:	IF A.3/2 OR A.3/4 THEN m ELSE i - - P-CSCF or S-CSCF.
c4:	IF A.162/19C OR A.162/19D THEN m ELSE i - - reading, adding or concatenating the Call-Info header.
c5:	IF A.162/30A THEN m ELSE n/a - - act as first entity within the trust domain for asserted identity.
c6:	IF A.162/30 THEN m ELSE n/a - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c7:	IF A.162/30A or A.162/30B THEN m ELSE i - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks or subsequent entity within trust network that can route outside the trust network.
c8:	IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c9:	IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.
c10:	IF A.162/45 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c11:	IF A.162/46 THEN m ELSE IF A.162/45 THEN i ELSE n/a - - adding, deleting, reading or modifying the P-Charging-Vector header before proxying the request or response or the P-Charging-Vector header extension.
c12:	IF A.162/44 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c13:	IF A.162/44A THEN m ELSE IF A.162/44 THEN i ELSE n/a - - adding, deleting or reading the P-Charging-Function-Addresses header before proxying the request or response, or the P-Charging-Function-Addresses header extension.
c14:	IF A.162/43 THEN x ELSE IF A.162/41 THEN m ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c15:	IF A.162/43 THEN m ELSE IF A.162/41 THEN i ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c16:	IF A.162/11 OR A.162/13 THEN m ELSE i - - reading the contents of the Require header before proxying the request or response or adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER.
c17:	IF A.162/57 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.
c18:	IF A.162/70 THEN m ELSE n/a - - SIP location conveyance.
c19:	IF A.162/70A THEN m ELSE IF A.162/70B THEN i ELSE n/a - - addition or modification of location in a SIP method, passes on locations in SIP method without modification.
c20:	IF A.162/86 THEN m - - transporting user to user information for call centers using SIP.
c21:	IF A.162/86 THEN i - - transporting user to user information for call centers using SIP.
c24:	IF A.4/60 THEN m ELSE n/a - - SIP location conveyance.

Prerequisite A.163/9 - - INVITE response

Prerequisite: A.164/101A - - Additional for 18x response

Table A.208: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
4	Contact	[26] 20.10	m	m	[26] 20.10	i	i
5	P-Answer-State	[111]	c13	c13	[111]	c14	c14
5A	P-Early-Media	[109] 8	o	c11	[109] 8	o	c12
6	P-Media-Authorization	[31] 5.1	c9	x	[31] 5.1	n/a	n/a
7	Record-Route	[26] 20.10	m	m	[26] 20.10	c15	c15
8	Recv-Info	[25] 5.2.3	c16	c16	[25] 5.2.3	c17	c17
9	Rseq	[27] 7.1	m	m	[27] 7.1	i	i
11	Supported	[26] 20.37	m	m	[26] 20.37	i	i
c9:	IF A.162/26 THEN m ELSE n/a - - SIP extensions for media authorization.						
c11:	IF A.162/76 THEN m ELSE n/a - - the SIP P-Early-Media private header extension for authorization of early media.						
c12:	IF A.162/76 THEN (IF A.3/2 THEN m ELSE i) ELSE n/a - - P-CSCF, using the information in the P-Early-Media header.						
c13:	IF A.162/75 THEN m ELSE n/a - - the P-Answer-State header extension to the session initiation protocol for the open mobile alliance push to talk over cellular.						
c14:	IF A.162/75 THEN i ELSE n/a - - the P-Answer-State header extension to the session initiation protocol for the open mobile alliance push to talk over cellular.						
c15:	IF A.162/14 THEN m ELSE i - - the requirement to be able to insert itself in the subsequent transactions in a dialog.						
c16:	IF A.162/20 THEN m ELSE n/a - - SIP INFO method and package framework.						
c17:	IF A.162/20 THEN i ELSE n/a - - SIP INFO method and package framework.						

Prerequisite A.163/9 - - INVITE response

Prerequisite: A.164/5A - - Additional for 199 (Early Dialog Terminated) response

Prerequisite A.163/9 - - INVITE response

Prerequisite: A.164/2 - - Additional for 180 (Ringing) response

Table A.208A: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Alert-Info	[26] 20.4	m	m	[26] 20.4	i	i

Table A.208B: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
4	Contact	[26] 20.10	m	m	[26] 20.10	i	i
7	Record-Route	[26] 20.10	m	m	[26] 20.10	c15	c15
8	Recv-Info	[25] 5.2.3	c16	c16	[25] 5.2.3	c17	c17
9	Rseq	[27] 7.1	m	m	[27] 7.1	i	i
11	Supported	[26] 20.37	m	m	[26] 20.37	i	i
c15:	IF A.162/14 THEN m ELSE i - - the requirement to be able to insert itself in the subsequent transactions in a dialog.						
c16:	IF A.162/20 THEN m ELSE n/a - - SIP INFO method and package framework.						
c17:	IF A.162/20 THEN i ELSE n/a - - SIP INFO method and package framework.						

Prerequisite A.163/9 - - INVITE response

Prerequisite: A.164/102 - - Additional for 2xx response

Table A.209: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	i	i
1A	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
1B	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i
1C	Accept-Resource-Priority	[116] 3.2	c12	c12	[116] 3.2	c12	c12
2	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	c1	c1
3	Answer-Mode	[158]	c19	c19	[158]	c20	c20
4	Authentication-Info	[26] 20.6	m	m	[26] 20.6	i	i
6	Contact	[26] 20.10	m	m	[26] 20.10	i	i
7	P-Answer-State	[111]	c13	c13	[111]	c14	c14
8	P-Media-Authorization	[31] 5.1	c9	x	[31] 5.1	n/a	n/a
8A	Priv-Answer-Mode	[158]	c19	c19	[158]	c20	c20
9	Record-Route	[26] 20.30	m	m	[26] 20.30	c3	c3
9A	Recv-Info	[25] 5.2.3	c17	c17	[25] 5.2.3	c18	c18
10	Session-Expires	[58] 4	c11	c11	[58] 4	c11	c11
13	Supported	[26] 20.37	m	m	[26] 20.37	i	i
c1:	IF A.4/20 THEN m ELSE i - - SIP specific event notification extension.						
c3:	IF A.162/14 THEN m ELSE i - - the requirement to be able to insert itself in the subsequent transactions in a dialog.						
c9:	IF A.162/26 THEN m ELSE n/a - - SIP extensions for media authorization.						
c11:	IF A.162/52 THEN m ELSE n/a - - the SIP session timer.						
c12:	IF A.162/80 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.						
c13:	IF A.162/75 THEN m ELSE n/a - - the P-Answer-State header extension to the session initiation protocol for the open mobile alliance push to talk over cellular.						
c14:	IF A.162/75 THEN i ELSE n/a - - the P-Answer-State header extension to the session initiation protocol for the open mobile alliance push to talk over cellular.						
c17:	IF A.162/20 THEN m ELSE n/a - - SIP INFO method and package framework.						
c18:	IF A.162/20 THEN i ELSE n/a - - SIP INFO method and package framework.						
c19:	IF A.162/97 THEN m ELSE n/a - - requesting answering modes for SIP.						
c20:	IF NOT A.162/97 THEN n/a ELSE IF A.162/97A THEN m ELSE i - - requesting answering modes for SIP, adding, deleting or reading the Answer-Mode header or Priv-Answer-Mode header before proxying the request or response.						

Prerequisite A.163/9 - - INVITE response

Prerequisite: A.164/103 OR A.164/104 OR A.164/105 OR A.164/106 - - Additional for 3xx – 6xx response

Table A.209A: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Error-Info	[26] 20.18	m	m	[26] 20.18	i	i

Prerequisite A.163/9 - - INVITE response

Prerequisite: A.164/103 OR A.164/35 - - Additional for 3xx or 485 (Ambiguous) response

Table A.210: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
4	Contact	[26] 20.10	m	m	[26] 20.10	c1	c1
c1:	IF A.162/19E THEN m ELSE i - - deleting Contact headers.						

Prerequisite A.163/9 - - INVITE response

Prerequisite: A.164/14 - - Additional for 401 (Unauthorized) response

Table A.211: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
6	Proxy-Authenticate	[26] 20.27	m	m	[26] 20.27	m	m
15	WWW-Authenticate	[26] 20.44	o		[26] 20.44	o	

Prerequisite A.163/9 - - INVITE response

Prerequisite: A.164/17 OR A.164/23 OR A.164/30 OR A.164/36 OR A.164/50 OR A.164/51 - - Additional for 404 (Not Found), 413 (Request Entity Too Large), 480(Temporarily not available), 486 (Busy Here), 500 (Internal Server Error), 600 (Busy Everywhere), 603 (Decline) response

Table A.212: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
8	Retry-After	[26] 20.33	m	m	[26] 20.33	i	i
12	Via	[26] 20.42	m	m	[26] 20.42	m	m

Table A.213: Void

Prerequisite A.163/9 - - INVITE response

Prerequisite: A.164/20 - - Additional for 407 (Proxy Authentication Required) response

Table A.214: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
6	Proxy-Authenticate	[26] 20.27	m	m	[26] 20.27	m	m
11	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	i	i

Prerequisite A.163/9 - - INVITE response

Prerequisite: A.164/25 - - Additional for 415 (Unsupported Media Type) response

Table A.215: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	i	i
2	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
3	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i

Prerequisite A.163/9 - - INVITE response

Prerequisite: A.164/26A - - Additional for 417 (Unknown Resource-Priority) response

Table A.215A: Supported header field s within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
c1:	IF A.162/80 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.						

Prerequisite A.163/9 - - INVITE response

Prerequisite: A.164/27 - - Additional for 420 (Bad Extension) response

Table A.216: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
10	Unsupported	[26] 20.40	m	m	[26] 20.40	c3	c3
c3:	IF A.162/18 THEN m ELSE i - - reading the contents of the Unsupported header before proxying the 420 response to a method other than REGISTER.						

Prerequisite A.163/9 - - INVITE response

Prerequisite: A.164/28 OR A.164/41A - - Additional for 421 (Extension Required), 494 (Security Agreement Required) response

Table A.216A: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Security-Server	[48] 2	c1	c1	[48] 2	n/a	n/a
c1:	IF A.162/47 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						

Prerequisite A.16/9 - - INVITE response

Prerequisite: A.164/28A - - Additional for 422 (Session Interval Too Small) response

Table A.216B: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Min-SE	[58] 5	c1	c1	[58] 5	c1	c1
c1:	IF A.162/52 THEN m ELSE n/a - - the SIP session timer.						

Table A.217: Void

Table A.217A: Void

Prerequisite A.163/9 - - INVITE response

Prerequisite: A.164/29H - - Additional for 470 (Consent Needed) response

Table A.217AA: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Permission-Missing	[125] 5.9.3	m	m	[125] 5.9.3	m	m

Prerequisite A.163/9 - - INVITE response

Prerequisite: A.164/45 - - 503 (Service Unavailable)

Table A.217B: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
8	Retry-After	[26] 20.33	m	m	[26] 20.33	i	i

Prerequisite A.163/9 - - INVITE response

Prerequisite: A.164/17 OR A.164/22 OR A.164/29D OR A.164/30 OR A.166/34 OR A.164/36 OR A.164/42 OR A.164/44 - - Additional for 404 (Not Found), 410 (Gone), 433 (Anonymity Disallowed). 480 (Temporarily not available), 484 (Address Incomplete) 486 (Busy Here), 500 (Internal Server Error), 502 (Bad Gateway) response

Table A.217C: Supported header fields within the INVITE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Reason	[130]	o	c1	[130]	o	c1
c1: IF A.162/48A THEN o ELSE n/a - - use of the Reason header field in Session Initiation Protocol (SIP) responses.							

Prerequisite A.163/9 - - INVITE response

Table A.218: Supported message bodies within the INVITE response

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	XML Schema for PSTN	[11B]		c1	[11B]		i
c1:	A.3/3 OR A.3/4 OR A.3/5 OR A.3/7C OR A.3/9A OR A.3/10 OR A.3/11 THEN m ELSE n/a - - I-CSCF, S-						

CSCF, BGCF, AS acting as proxy, IBCF (THIG), additional routeing functionality, E-CSCF.

A.2.2.4.7A MESSAGE method

Prerequisite A.163/9A - - MESSAGE request

Table A.218A: Supported header fields within the MESSAGE request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Contact	[56B] 9.2	c28	c28	[56B] 9.2	c28	c29
1A	Allow	[26] 20.5	m	m	[50] 10	i	i
2	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	c1	c1
3	Authorization	[26] 20.7	m	m	[26] 20.7	i	i
4	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
5	Call-Info	[26] 20.9	m	m	[26] 20.9	c4	c4
6	Content-Disposition	[26] 20.11	m	m	[26] 20.11	i	i
7	Content-Encoding	[26] 20.12	m	m	[26] 20.12	i	i
8	Content-Language	[26] 20.13	m	m	[26] 20.13	i	i
9	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
10	Content-Type	[26] 20.15	m	m	[26] 20.15	i	i
11	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
12	Date	[26] 20.17	m	m	[26] 20.17	c2	c2
13	Expires	[26] 20.19	m	m	[26] 20.19	I	i
14	From	[26] 20.20	m	m	[26] 20.20	m	m
14A	Geolocation	[89] 4.1	c36	c36	[89] 4.1	c37	c37
14B	Geolocation-Routing	[89] 4.1	c36	c36	[89] 4.1	c37	c37
14C	History-Info	[66] 4.1	c32	c32	[66] 4.1	c32	c32
15	In-Reply-To	[26] 20.21	m	m	[50] 10	i	i
15A	Max-Breadth	[117] 5.8	c48	c48	[117] 5.8	c49	c49
16	Max-Forwards	[26] 20.22	m	m	[26] 20.22	m	m
17	MIME-Version	[26] 20.24	m	m	[26] 20.24	i	i
18	Organization	[26] 20.25	m	m	[26] 20.25	c3	c3
18A	P-Access-Network-Info	[52] 4.4	c23	c23	[52] 4.4	c24	c24
18B	P-Asserted-Identity	[34] 9.1	c10	c10	[34] 9.1	c11	c11
18C	P-Asserted-Service	[121] 4.1	c40	c40	[121] 4.1	c41	c41
18D	P-Called-Party-ID	[52] 4.2	c14	c14	[52] 4.2	c15	c16
18E	P-Charging-Function-Addresses	[52] 4.5	c21	c21	[52] 4.5	c22	c22
18F	P-Charging-Vector	[52] 4.6	c19	c19	[52] 4.6	c20	c20
18H	P-Preferred-Identity	[34] 9.2	x	c69	[34] 9.2	c9	c9
18I	P-Preferred-Service	[121] 4.2	x	x	[121] 4.2	c39	c39
18J	P-Private-Network-Indication	[134]	c44	c44	[134]	c44	c44
18K	P-Profile-Key	[97] 5	c34	c34	[97] 5	c35	c35
18L	P-Served-User	[133] 6	c45	c45	[133] 6	c45	c45
18M	P-User-Database	[82] 4	c33	c33	[82] 4	c33	c33
18N	P-Visited-Network-ID	[52] 4.3	c17	n/a	[52] 4.3	c18	n/a
19	Priority	[26] 20.26	m	m	[26] 20.26	i	i
19A	Privacy	[33] 4.2	c12	c12	[33] 4.2	c13	c13
20	Proxy-Authorization	[26] 20.28	m	m	[26] 20.28	c8	c8
21	Proxy-Require	[26] 20.29	m	m	[26] 20.29	m	m
21A	Reason	[34A] 2	c26	c26	[34A] 2	c27	c27
22	Record-Route	[26] 20.30	m	m	[26] 20.30	c7	c7
22A	Referred-By	[59] 3	c30	c30	[59] 3	c31	c31
23	Reject-Contact	[56B] 9.2	c28	c28	[56B] 9.2	c28	c29
23A	Reply-To	[26] 20.31	m	m	[26] 20.31	i	i
23B	Request-Disposition	[56B] 9.1	c28	c28	[56B] 9.1	c28	c28
24	Require	[26] 20.32	m	m	[26] 20.32	c5	c5
24A	Resource-Priority	[116] 3.1	c38	c38	[116] 3.1	c38	c38
25	Route	[26] 20.34	m	m	[26] 20.34	m	m
25A	Security-Client	[48] 2.3.1	x	x	[48] 2.3.1	c25	c25
25B	Security-Verify	[48] 2.3.1	x	x	[48] 2.3.1	c25	c25
26	Subject	[26] 20.36	m	m	[26] 20.36	i	i
27	Supported	[26] 20.37	m	m	[26] 20.37	c6	c6
28	Timestamp	[26] 20.38	m	m	[26] 20.38	i	i
29	To	[26] 20.39	m	m	[26] 20.39	m	m

29A	Trigger-Consent	[125] 5.11.2	c42	c42	[125] 5.11.2	c43	c43
30	User-Agent	[26] 20.41	m	m	[26] 20.41	i	i
31	Via	[26] 20.42	m	m	[26] 20.42	m	m

c1:	IF A.4/20 THEN m ELSE i - - SIP specific event notification extension.
c2:	IF A.162/9 THEN m ELSE i - - insertion of date in requests and responses.
c3:	IF A.162/19A OR A.162/19B THEN m ELSE i - - reading, adding or concatenating the Organization header.
c4:	IF A.162/19C OR A.162/19D THEN m ELSE i - - reading, adding or concatenating the Call-Info header.
c5:	IF A.162/11 OR A.162/13 THEN m ELSE i - - reading the contents of the Require header before proxying the request or response or adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER.
c6:	IF A.162/16 THEN m ELSE i - - reading the contents of the Supported header before proxying the response.
c7:	IF A.162/14 THEN o ELSE i - - the requirement to be able to insert itself in the subsequent transactions in a dialog.
c8:	IF A.162/8A THEN m ELSE i - - authentication between UA and proxy.
c9:	IF A.162/30A OR A.162/30C THEN m ELSE n/a - - act as first entity within the trust domain for asserted identity, act as entity passing on identity transparently independent of trust domain.
c10:	IF A.162/30 THEN m ELSE n/a - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c11:	IF A.162/30A or A.162/30B THEN m ELSE i - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks or subsequent entity within trust network that can route outside the trust network.
c12:	IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c13:	IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.
c14:	IF A.162/37 THEN m ELSE n/a - - the P-Called-Party-ID header extension.
c15:	IF A.162/37 THEN i ELSE n/a - - the P-Called-Party-ID header extension.
c16:	IF A.162/37 AND A.3/2 THEN m ELSE IF A.162/37 AND (A.3/3 OR A.3/9A) THEN i ELSE n/a - - the P-Called-Party-ID header extension and P-CSCF or (I-CSCF or IBCF (THIG).
c17:	IF A.162/38 THEN m ELSE n/a - - the P-Visited-Network-ID header extension.
c18:	IF A.162/39 THEN m ELSE i - - reading, or deleting the P-Visited-Network-ID header before proxying the request or response.
c19:	IF A.162/45 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c20:	IF A.162/46 THEN m ELSE IF A.162/45 THEN i ELSE n/a - - adding, deleting, reading or modifying the P-Charging-Vector header before proxying the request or response or the P-Charging-Vector header extension.
c21:	IF A.162/44 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c22:	IF A.162/44A THEN m ELSE IF A.162/44 THEN i ELSE n/a - - adding, deleting or reading the P-Charging-Function-Addresses header before proxying the request or response, or the P-Charging-Function-Addresses header extension.
c23:	IF A.162/43 THEN x ELSE IF A.162/41 THEN m ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c24:	IF A.162/43 THEN m ELSE IF A.162/41 THEN i ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c25:	IF A.162/47 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.
c26:	IF A.162/48 THEN m ELSE n/a - - the Reason header field for the session initiation protocol.
c27:	IF A.162/48 THEN i ELSE n/a - - the Reason header field for the session initiation protocol.
c28:	IF A.162/50 THEN m ELSE n/a - - caller preferences for the session initiation protocol.
c29:	IF A.162/50 AND A.4/3 THEN m ELSE IF A.162/50 AND NOT A.4/3 THEN i ELSE n/a - - caller preferences for the session initiation protocol, and S-CSCF.
c30:	IF A.162/53 THEN i ELSE n/a - - the SIP Referred-By mechanism.
c31:	IF A.162/53 THEN m ELSE n/a - - the SIP Referred-By mechanism.
c32:	IF A.162/57 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.
c33:	IF A.162/60 THEN m ELSE n/a - - the P-User-Database private header extension.
c34:	IF A.162/66A THEN m ELSE n/a - - making the first query to the database in order to populate the P-Profile-Key header.
c35:	IF A.162/66B THEN m ELSE n/a - - using the information in the P-Profile-Key header.
c36:	IF A.162/70 THEN m ELSE n/a - - SIP location conveyance.
c37:	IF A.162/70A THEN m ELSE IF A.162/70B THEN i ELSE n/a - - addition or modification of location in a SIP method, passes on locations in SIP method without modification.
c38:	IF A.162/80A THEN m ELSE n/a - - inclusion of MESSAGE, SUBSCRIBE, NOTIFY in communications resource priority for the session initiation protocol.
c39:	IF A.162/84A THEN m ELSE n/a - - act as authentication entity within the trust domain for asserted service.
c40:	IF A.162/84 THEN m ELSE n/a - - SIP extension for the identification of services.
c41:	IF A.162/84 OR A.162/30B THEN m ELSE i - - SIP extension for the identification of services or subsequent entity within trust network that can route outside the trust network.
c42:	IF A.162/85 THEN m ELSE n/a - - a framework for consent-based communications in SIP.

c43:	IF A.162/85 THEN i ELSE n/a - - a framework for consent-based communications in SIP.
c44:	IF A.162/87 THEN m ELSE n/a - - the SIP P-Private-Network-Indication private-header (P-Header).
c45:	IF A.162/88 THEN m ELSE n/a - - the SIP P-Served-User private header.
c48:	IF A.162/81 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.
c49:	IF A.162/81 AND A.162/6 THEN m ELSE IF A.162/81 AND NOT A.162/6 THEN i ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies, forking of initial requests.
c69:	IF A.162/30C THEN m ELSE x - - act as entity passing on identity transparently independent of trust domain.
NOTE:	c1 refers to the UA role major capability as this is the case of a proxy that also acts as a UA specifically for SUBSCRIBE and NOTIFY.

Prerequisite A.163/9A - - MESSAGE request

Table A.218B: Supported message bodies within the MESSAGE request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	permission document	[125] 5.4	c1	c1	[125] 5.4	c2	c2
2	application/vnd.3gpp.sms	[4D]	m	m	[4D]	i	i
2	message/cpim	[151]	c3	c3	[151]	c4	c4
3	message/imdn+xml	[157]	c5	c5	[157]	c6	c6
c1:	IF A.162/85 THEN m ELSE n/a - - a framework for consent-based communications in SIP.						
c2:	IF A.162/85 THEN i ELSE n/a - - a framework for consent-based communications in SIP.						
c3:	IF A.162/95 THEN m ELSE n/a - - common presence and instant messaging (CPIM): message format.						
c4:	IF A.162/95 THEN i ELSE n/a - - common presence and instant messaging (CPIM): message format.						
c5:	IF A.162/96 THEN m ELSE n/a - - instant message disposition notification.						
c6:	IF A.162/96 THEN i ELSE n/a - - instant message disposition notification.						

Prerequisite A.163/9B - - MESSAGE response

Prerequisite: A.164/1 - - Additional for 100 (Trying) response

Table A.218BA: Supported header fields within the MESSAGE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
3	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
4	Date	[26] 20.17	c1	c1	[26] 20.17	c2	c2
5	From	[26] 20.20	m	m	[26] 20.20	m	m
6	To	[26] 20.39	m	m	[26] 20.39	m	m
7	Via	[26] 20.42	m	m	[26] 20.42	m	m
c1:	IF (A.162/9 AND A.162/5) OR A.162/4 THEN m ELSE n/a - - stateful proxy behaviour that inserts date, or stateless proxies.						
c2:	IF A.162/4 THEN i ELSE m - - Stateless proxy passes on.						

Prerequisite A.163/9B - - MESSAGE response for all remaining status-codes

Table A.218C: Supported header fields within the MESSAGE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Allow	[26] 20.5	m	m	[26] 20.5	i	i
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Call-Info	[26] 20.9	m	m	[26] 20.9	c3	c3
3	Content-Disposition	[26] 20.11	m	m	[26] 20.11	i	i
4	Content-Encoding	[26] 20.12	m	m	[26] 20.12	i	i
5	Content-Language	[26] 20.13	m	m	[26] 20.13	i	i
6	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
7	Content-Type	[26] 20.15	m	m	[26] 20.15	i	i
8	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
9	Date	[26] 20.17	m	m	[26] 20.17	c1	c1
9A	Expires	[26] 20.19	m	m	[26] 20.19	i	i
10	From	[26] 20.20	m	m	[26] 20.20	m	m
10A	Geolocation-Error	[89] 4.3	c17	c17	[89] 4.3	c18	c18
10B	History-Info	[66] 4.1	c16	c16	[66] 4.1	c16	c16
11	MIME-Version	[26] 20.24	m	m	[26] 20.24	i	i
12	Organization	[26] 20.25	m	m	[26] 20.25	c2	c2
12A	P-Access-Network-Info	[52] 4.4	c13	c13	[52] 4.4	c14	c14
12B	P-Asserted-Identity	[34] 9.1	c5	c5	[34] 9.1	c6	c6
12C	P-Charging-Function-Addresses	[52] 4.5	c11	c11	[52] 4.5	c12	c12
12D	P-Charging-Vector	[52] 4.6	c9	n/a	[52] 4.6	c10	n/a
12F	P-Preferred-Identity	[34] 9.2	x	x	[34] 9.2	c4	n/a
12G	Privacy	[33] 4.2	c7	c7	[33] 4.2	c8	c8
12H	Reply-To	[26] 20.31	m	m	[26] 20.31	i	i
12I	Require	[26] 20.32	m	m	[26] 20.32	c15	c15
13	Server	[26] 20.35	m	m	[26] 20.35	i	i
14	Timestamp	[26] 20.38	i	i	[26] 20.38	i	i
15	To	[26] 20.39	m	m	[26] 20.39	m	m
16	User-Agent	[26] 20.41	m	m	[26] 20.41	i	i
17	Via	[26] 20.42	m	m	[26] 20.42	m	m
18	Warning	[26] 20.43	m	m	[26] 20.43	i	i

c1:	IF A.162/9 THEN m ELSE i - - insertion of date in requests and responses.
c2:	IF A.162/19A OR A.162/19B THEN m ELSE i - - reading, adding or concatenating the Organization header.
c3:	IF A.162/19C OR A.162/19D THEN m ELSE i - - reading, adding or concatenating the Call-Info header.
c4:	IF A.162/30A THEN m ELSE n/a - - act as first entity within the trust domain for asserted identity.
c5:	IF A.162/30 THEN m ELSE n/a - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c6:	IF A.162/30A or A.162/30B THEN m ELSE i - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks or subsequent entity within trust network that can route outside the trust network.
c7:	IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c8:	IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.
c9:	IF A.162/45 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c10:	IF A.162/46 THEN m ELSE IF A.162/45 THEN i ELSE n/a - - adding, deleting, reading or modifying the P-Charging-Vector header before proxying the request or response or the P-Charging-Vector header extension.
c11:	IF A.162/44 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c12:	IF A.162/44A THEN m ELSE IF A.162/44 THEN i ELSE n/a - - adding, deleting or reading the P-Charging-Function-Addresses header before proxying the request or response, or the P-Charging-Function-Addresses header extension.
c13:	IF A.162/43 THEN x ELSE IF A.162/41 THEN m ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c14:	IF A.162/43 THEN m ELSE IF A.162/41 THEN i ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c15:	IF A.162/11 OR A.162/13 THEN m ELSE i - - reading the contents of the Require header before proxying the request or response or adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER.
c16:	IF A.162/57 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.
c17:	IF A.162/70 THEN m ELSE n/a - - SIP location conveyance.
c18:	IF A.162/70A THEN m ELSE IF A.162/70B THEN i ELSE n/a - - addition or modification of location in a SIP method, passes on locations in SIP method without modification.

Prerequisite A.163/9B - - MESSAGE response

Prerequisite: A.164/102 - - Additional for 2xx response

Table A.218D: Supported header fields within the MESSAGE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Accept-Resource-Priority	[116] 3.2	c4	c4	[116] 3.2	c4	c4
1	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	c1	c1
2	Authentication-Info	[26] 20.6	m	m	[26] 20.6	i	i
4	Record-Route	[26] 20.30	m	m	[26] 20.30	c3	c3
6	Supported	[26] 20.37	m	m	[26] 20.37	i	i
c1:	IF A.4/20 THEN m ELSE i - - SIP specific event notification extension.						
c3:	IF A.162/15 THEN o ELSE i - - the requirement to be able to use separate URIs in the upstream direction and downstream direction when record routeing.						
c4:	IF A.162/80A THEN m ELSE n/a - - inclusion of MESSAGE, SUBSCRIBE, NOTIFY in communications resource priority for the session initiation protocol.						

Prerequisite A.163/9B - - MESSAGE response

Prerequisite: A.164/103 OR A.164/104 OR A.164/105 OR A.164/106 - - Additional for 3xx – 6xx response

Table A.218DA: Supported header fields within the MESSAGE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Error-Info	[26] 20.18	m	m	[26] 20.18	i	i

Prerequisite A.163/9B - - MESSAGE response

Prerequisite: A.164/103 OR A.164/35 - - Additional for 3xx or 485 (Ambiguous) response

Table A.218E: Supported header fields within the MESSAGE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
2	Contact	[26] 20.10	m	m	[26] 20.10	c1	c1
c1:	IF A.162/19E THEN m ELSE i - - deleting Contact headers.						

Prerequisite A.163/9B - - MESSAGE response

Prerequisite: A.164/14 - - Additional for 401 (Unauthorized) response

Table A.218F: Supported header fields within the MESSAGE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Proxy-Authenticate	[26] 20.27	m	m	[26] 20.27	m	m
6	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	i	i

Prerequisite A.163/9B - - MESSAGE response

Prerequisite: A.164/17 OR A.164/23 OR A.164/30 OR A.164/36 OR A.164/42 OR A.164/45 OR A.164/50 OR A.164/51 - - Additional for 404 (Not Found), 413 (Request Entity Too Large), 480(Temporarily not available), 486 (Busy Here), 500 (Internal Server Error), 503 (Service Unavailable), 600 (Busy Everywhere), 603 (Decline) response

Table A.218G: Supported header fields within the MESSAGE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
4	Retry-After	[26] 20.33	m	m	[26] 20.33	i	i

Table A.218H: Void

Prerequisite A.163/9B - - MESSAGE response

Prerequisite: A.164/20 - - Additional for 407 (Proxy Authentication Required) response

Table A.218I: Supported header fields within the MESSAGE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Proxy-Authenticate	[26] 20.27	m	m	[26] 20.27	m	m
6	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	i	i

Prerequisite A.163/9B - - MESSAGE response

Prerequisite: A.164/25 - - Additional for 415 (Unsupported Media Type)

Table A.218J: Supported header fields within the MESSAGE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	i	i
2	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
3	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i

Prerequisite A.163/9B - - MESSAGE response

Prerequisite: A.164/26A - - Additional for 417 (Unknown Resource-Priority) response

Table A.218JA: Supported header fields within the MESSAGE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
c1:	IF A.162/80A THEN m ELSE n/a - - inclusion of MESSAGE, SUBSCRIBE, NOTIFY in communications resource priority for the session initiation protocol.						

Prerequisite A.163/9B - - MESSAGE response

Prerequisite: A.164/27 - - Additional for 420 (Bad Extension) response

Table A.218K: Supported header fields within the MESSAGE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
5	Unsupported	[26] 20.40	m	m	[26] 20.40	c3	c3
c3:	IF A.162/18 THEN m ELSE i - - reading the contents of the Unsupported header before proxying the 420 response to a method other than REGISTER.						

Prerequisite A.163/9B - - MESSAGE response

Prerequisite: A.164/28 OR A.164/41A - - Additional for 421 (Extension Required), 494 (Security Agreement Required) response

Table A.218L: Supported header fields within the MESSAGE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Security-Server	[48] 2	c1	c1	[48] 2	n/a	n/a
c1:	IF A.162/47 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						

Table A.218M: Void

Prerequisite A.163/9B - - MESSAGE response

Prerequisite: A.164/29H - - Additional for 470 (Consent Needed) response

Table A.218MA: Supported header fields within the MESSAGE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Permission-Missing	[125] 5.9.3	m	m	[125] 5.9.3	m	m

Prerequisite A.163/9B - - MESSAGE response

Table A.218N: Supported message bodies within the MESSAGE response

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

A.2.2.4.8 NOTIFY method

Prerequisite A.163/10 - - NOTIFY request

Table A.219: Supported header fields within the NOTIFY request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	i	i
1A	Accept-Contact	[56B] 9.2	c21	c21	[56B] 9.2	c22	c22
2	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
3	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i
3A	Allow	[26] 20.5	m	m	[26] 20.5	i	i
4	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	c1	c1
5	Authorization	[26] 20.7	m	m	[26] 20.7	i	i
6	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
6A	Call-Info	[26] 20.9	m	m	[26] 20.9	c28	c28
6B	Contact	[26] 20.10	m	m	[26] 20.10	i	i
7	Content-Disposition	[26] 20.11	m	m	[26] 20.11	i	i
8	Content-Encoding	[26] 20.12	m	m	[26] 20.12	i	i
9	Content-Language	[26] 20.13	m	m	[26] 20.13	i	i
10	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
11	Content-Type	[26] 20.15	m	m	[26] 20.15	i	i
12	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
13	Date	[26] 20.17	m	m	[26] 20.17	c2	c2
14	Event	[28] 7.2.1	m	m	[28] 7.2.1	m	m
15	From	[26] 20.20	m	m	[26] 20.20	m	m
15A	Geolocation	[89] 4.1	c26	c26	[89] 4.1	c27	c27
15B	Geolocation-Routing	[89] 4.1	c26	c26	[89] 4.1	c27	c27
15C	History-Info	[66] 4.1	c25	c25	[66] 4.1	c25	c25
15D	Max-Breadth	[117] 5.8	c29	c29	[117] 5.8	c30	c30
16	Max-Forwards	[26] 20.22	m	m	[26] 20.22	m	m
17	MIME-Version	[26] 20.24	m	m	[26] 20.24	i	i
17A	P-Access-Network-Info	[52] 4.4	c16	c16	[52] 4.4	c17	c17
17B	P-Asserted-Identity	[34] 9.1	c8	c8	[34] 9.1	c9	c9
17C	P-Charging-Function-Addresses	[52] 4.5	c14	c14	[52] 4.5	c15	c15
17D	P-Charging-Vector	[52] 4.6	c12	n/a	[52] 4.6	c13	n/a
17F	P-Preferred-Identity	[34] 9.2	x	x	[34] 9.2	c3	n/a
17G	Privacy	[33] 4.2	c10	c10	[33] 4.2	c11	c11
18	Proxy-Authorization	[26] 20.28	m	m	[26] 20.28	c4	c4
19	Proxy-Require	[26] 20.29	m	m	[26] 20.29	m	m
19A	Reason	[34A] 2	c19	c19	[34A] 2	c20	c20
20	Record-Route	[26] 20.30	m	m	[26] 20.30	c7	c7
20A	Referred-By	[59] 3	c23	c23	[59] 3	c24	c24
20B	Reject-Contact	[56B] 9.2	c21	c21	[56B] 9.2	c22	c22
20C	Request-Disposition	[56B] 9.1	c21	c21	[56B] 9.1	c22	c22
21	Require	[26] 20.32	m	m	[26] 20.32	c5	c5
22	Route	[26] 20.34	m	m	[26] 20.34	m	m
22A	Security-Client	[48] 2.3.1	x	x	[48] 2.3.1	c18	c18
22B	Security-Verify	[48] 2.3.1	x	x	[48] 2.3.1	c18	c18
23	Subscription-State	[28] 8.2.3	m	m	[28] 8.2.3	i	i
24	Supported	[26] 20.37	m	m	[26] 20.37	c6	c6
24A	Resource-Priority	[116] 3.1	c36	c36	[116] 3.1	c36	c36
25	Timestamp	[26] 20.38	m	m	[26] 20.38	i	i
26	To	[26] 20.39	m	m	[26] 20.39	m	m
27	User-Agent	[26] 20.41	m	m	[26] 20.41	i	i
28	Via	[26] 20.42	m	m	[26] 20.42	m	m
29	Warning	[26] 20.43	m	m	[26] 20.43	i	i

c1:	IF A.4/20 THEN m ELSE i - - SIP specific event notification extension.
c2:	IF A.162/9 THEN m ELSE i - - insertion of date in requests and responses.
c3:	IF A.162/30A THEN m ELSE n/a - - act as first entity within the trust domain for asserted identity.
c4:	IF A.162/8A THEN m ELSE i - - authentication between UA and proxy.
c5:	IF A.162/11 OR A.162/13 THEN m ELSE i - - reading the contents of the Require header before proxying the request or response or adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER.
c6:	IF A.162/16 THEN m ELSE i - - reading the contents of the Supported header before proxying the response.
c7:	IF A.162/14 THEN (IF A.162/22 OR A.162/27 THEN m ELSE o) ELSE i - - the requirement to be able to insert itself in the subsequent transactions in a dialog or (the REFER method or SIP specific event notification).
c8:	IF A.162/30 THEN m ELSE n/a - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c9:	IF A.162/30A or A.162/30B THEN m ELSE i - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks or subsequent entity within trust network that can route outside the trust network.
c10:	IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c11:	IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.
c12:	IF A.162/45 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c13:	IF A.162/46 THEN m ELSE IF A.162/45 THEN i ELSE n/a - - adding, deleting, reading or modifying the P-Charging-Vector header before proxying the request or response or the P-Charging-Vector header extension.
c14:	IF A.162/44 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c15:	IF A.162/44A THEN m ELSE IF A.162/44 THEN i ELSE n/a - - adding, deleting or reading the P-Charging-Function-Addresses header before proxying the request or response, or the P-Charging-Function-Addresses header extension.
c16:	IF A.162/43 THEN x ELSE IF A.162/41 THEN m ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c17:	IF A.162/43 THEN m ELSE IF A.162/41 THEN i ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c18:	IF A.162/47 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.
c19:	IF A.162/48 THEN m ELSE n/a - - the Reason header field for the session initiation protocol.
c20:	IF A.162/48 THEN i ELSE n/a - - the Reason header field for the session initiation protocol.
c21:	IF A.162/50 THEN m ELSE n/a - - caller preferences for the session initiation protocol.
c22:	IF A.162/50 THEN i ELSE n/a - - caller preferences for the session initiation protocol.
c23:	IF A.162/53 THEN i ELSE n/a - - the SIP Referred-By mechanism.
c24:	IF A.162/53 THEN m ELSE n/a - - the SIP Referred-By mechanism.
c25:	IF A.162/57 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.
c26:	IF A.162/70 THEN m ELSE n/a - - SIP location conveyance.
c27:	IF A.162/70A THEN m ELSE IF A.162/70B THEN i ELSE n/a - - addition or modification of location in a SIP method, passes on locations in SIP method without modification.
c28:	IF A.162/19C OR A.162/19D THEN m ELSE i - - reading, adding or concatenating the Call-Info header.
c29:	IF A.162/81 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.
c30:	IF A.162/81 AND A.162/6 THEN m ELSE IF A.162/81 AND NOT A.162/6 THEN i ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies, forking of initial requests.
c36:	IF A.162/80A THEN m ELSE n/a - - inclusion of MESSAGE, SUBSCRIBE, NOTIFY in communications resource priority for the session initiation protocol.
NOTE:	c1 refers to the UA role major capability as this is the case of a proxy that also acts as a UA specifically for SUBSCRIBE and NOTIFY.

Prerequisite A.163/10 - - NOTIFY request

Table A.220: Supported message bodies within the NOTIFY request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	sipfrag	[37] 2	m	m	[37] 2	i	i

Prerequisite A.163/11 - - NOTIFY response

Prerequisite: A.164/1 - - Additional for 100 (Trying) response

Table A.220A: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
3	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
4	Date	[26] 20.17	c1	c1	[26] 20.17	c2	c2
5	From	[26] 20.20	m	m	[26] 20.20	m	m
6	To	[26] 20.39	m	m	[26] 20.39	m	m
7	Via	[26] 20.42	m	m	[26] 20.42	m	m
c1:	IF (A.162/9 AND A.162/5) OR A.162/4 THEN m ELSE n/a - - stateful proxy behaviour that inserts date, or stateless proxies.						
c2:	IF A.162/4 THEN i ELSE m - - Stateless proxy passes on.						

Prerequisite A.163/11 - - NOTIFY response for all remaining status-codes

Table A.221: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Allow	[26] 20.5	m	m	[26] 20.5	i	i
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Disposition	[26] 20.11	m	m	[26] 20.11	i	i
3	Content-Encoding	[26] 20.12	m	m	[26] 20.12	i	i
4	Content-Language	[26] 20.13	m	m	[26] 20.13	i	i
5	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
6	Content-Type	[26] 20.15	m	m	[26] 20.15	i	i
7	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
8	Date	[26] 20.17	m	m	[26] 20.17	c1	c1
9	From	[26] 20.20	m	m	[26] 20.20	m	m
9A	Geolocation-Error	[89] 4.3	c14	c14	[89] 4.3	c15	c15
10	MIME-Version	[26] 20.24	m	m	[26] 20.24	i	i
10A	P-Access-Network-Info	[52] 4.4	c11	c11	[52] 4.4	c12	c12
10B	P-Asserted-Identity	[34] 9.1	c3	c3	[34] 9.1	c4	c4
10C	P-Charging-Function-Addresses	[52] 4.5	c9	c9	[52] 4.5	c10	c10
10D	P-Charging-Vector	[52] 4.6	c7	n/a	[52] 4.6	c8	n/a
10F	P-Preferred-Identity	[34] 9.2	x	x	[34] 9.2	c2	n/a
10G	Privacy	[33] 4.2	c5	c5	[33] 4.2	c6	c6
10H	Require	[26] 20.32	m	m	[26] 20.32	c13	c13
10I	Server	[26] 20.35	m	m	[26] 20.35	i	i
11	Timestamp	[26] 20.38	m	m	[26] 20.38	i	i
12	To	[26] 20.39	m	m	[26] 20.39	m	m
12A	User-Agent	[26] 20.41	m	m	[26] 20.41	i	i
13	Via	[26] 20.42	m	m	[26] 20.42	m	m
14	Warning	[26] 20.43	m	m	[26] 20.43	i	i
c1:	IF A.162/9 THEN m ELSE i - - insertion of date in requests and responses.						
c2:	IF A.162/30A THEN m ELSE n/a - - act as first entity within the trust domain for asserted identity.						
c3:	IF A.162/30 THEN m ELSE n/a - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.						
c4:	IF A.162/30A or A.162/30B THEN m ELSE i - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks or subsequent entity within trust network that can route outside the trust network.						
c5:	IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).						
c6:	IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.						
c7:	IF A.162/45 THEN m ELSE n/a - - the P-Charging-Vector header extension.						
c8:	IF A.162/46 THEN m ELSE IF A.162/45 THEN i ELSE n/a - - adding, deleting, reading or modifying the P-Charging-Vector header before proxying the request or response or the P-Charging-Vector header extension.						
c9:	IF A.162/44 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.						
c10:	IF A.162/44A THEN m ELSE IF A.162/44 THEN i ELSE n/a - - adding, deleting or reading the P-Charging-Function-Addresses header before proxying the request or response, or the P-Charging-Function-Addresses header extension.						
c11:	IF A.162/43 THEN x ELSE IF A.162/41 THEN m ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.						
c12:	IF A.162/43 THEN m ELSE IF A.162/41 THEN i ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.						
c13:	IF A.162/11 OR A.162/13 THEN m ELSE i - - reading the contents of the Require header before proxying the request or response or adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER.						
c14:	IF A.162/70 THEN m ELSE n/a - - SIP location conveyance.						
c15:	IF A.162/70A THEN m ELSE IF A.162/70B THEN i ELSE n/a - - addition or modification of location in a SIP method, passes on locations in SIP method without modification.						

Prerequisite A.163/11 - - NOTIFY response

Prerequisite: A.164/102 - - Additional for 2xx response

Table A.222: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Accept-Resource-Priority	[116] 3.2	c4	c4	[116] 3.2	c4	c4
0B	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	c1	c1
1	Authentication-Info	[26] 20.6	m	m	[26] 20.6	i	i
1A	Contact	[26] 20.10	m	m	[26] 20.10	i	i
2	Record-Route	[26] 20.30	m	m	[26] 20.30	c3	c3
5	Supported	[26] 20.37	m	m	[26] 20.37	i	i
c1:	IF A.4/20 THEN m ELSE i - - SIP specific event notification extension.						
c3:	IF A.162/15 THEN m ELSE i - - the requirement to be able to use separate URIs in the upstream direction and downstream direction when record routeing.						
c4:	IF A.162/80A THEN m ELSE n/a - - inclusion of MESSAGE, SUBSCRIBE, NOTIFY in communications resource priority for the session initiation protocol.						

Prerequisite A.163/11 - - NOTIFY response

Prerequisite: A.164/103 OR A.164/104 OR A.164/105 OR A.164/106 - - Additional for 3xx – 6xx response

Table A.222A: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Error-Info	[26] 20.18	m	m	[26] 20.18	i	i

Prerequisite A.163/11 - - NOTIFY response

Prerequisite: A.164/103 - - Additional for 3xx response

Table A.223: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Contact	[26] 20.10	m	m	[26] 20.10	c1	c1
c1:	IF A.162/19E THEN m ELSE i - - deleting Contact headers.						

Prerequisite A.163/11 - - NOTIFY response

Prerequisite: A.164/14 - - Additional for 401 (Unauthorized) response

Table A.224: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
2	Proxy-Authenticate	[26] 20.27	m	m	[26] 20.27	m	m
8	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	i	i

Prerequisite A.163/11 - - NOTIFY response

Prerequisite: A.164/17 OR A.164/23 OR A.164/30 OR A.164/36 OR A.164/42 OR A.164/45 OR A.164/50 OR A.164/51 - - Additional for 404 (Not Found), 413 (Request Entity Too Large), 480(Temporarily not available), 486 (Busy Here), 500 (Internal Server Error), 503 (Service Unavailable), 600 (Busy Everywhere), 603 (Decline) response

Table A.225: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Retry-After	[26] 20.33	m	m	[26] 20.33	i	i

Table A.226: Void

Prerequisite A.163/11 - - NOTIFY response

Prerequisite: A.164/20 - - Additional for 407 (Proxy Authentication Required) response

Table A.227: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
2	Proxy-Authenticate	[26] 20.27	m	m	[26] 20.27	m	m
6	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	i	i

Prerequisite A.163/11 - - NOTIFY response

Prerequisite: A.164/25 - - Additional for 415 (Unsupported Media Type) response

Table A.228: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	i	i
2	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
3	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i

Prerequisite A.163/11 - - NOTIFY response

Prerequisite: A.164/26A - - Additional for 417 (Unknown Resource-Priority) response

Table A.228A: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
c1:	IF A.162/80A THEN m ELSE n/a - - inclusion of MESSAGE, SUBSCRIBE, NOTIFY in communications resource priority for the session initiation protocol.						

Prerequisite A.163/11 - - NOTIFY response

Prerequisite: A.164/27 - - Additional for 420 (Bad Extension) response

Table A.229: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
5	Unsupported	[26] 20.40	m	m	[26] 20.40	c3	c3
c3:	IF A.162/18 THEN m ELSE i - - reading the contents of the Unsupported header before proxying the 420 response to a method other than REGISTER.						

Prerequisite A.163/11 - - NOTIFY response

Prerequisite: A.164/28 OR A.164/41A - - Additional for 421 (Extension Required), 494 (Security Agreement Required) response

Table A.229A: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Security-Server	[48] 2	c1	c1	[48] 2	n/a	n/a
c1:	IF A.162/47 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						

Table A.230: Void

Prerequisite A.163/11 - - NOTIFY response

Prerequisite: A.164/35 - - Additional for 485 (Ambigious) response

Table A.230A: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Contact	[26] 20.10	m	m	[26] 20.10	i	i

Prerequisite A.163/11 - - NOTIFY response

Prerequisite: A.164/39 - - Additional for 489 (Bad Event) response

Table A.231: Supported header fields within the NOTIFY response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	c1	c1
c1:	IF A.4/20 THEN m ELSE i - - SIP specific event notification extension.						
NOTE:	c1 refers to the UA role major capability as this is the case of a proxy that also acts as a UA specifically for SUBSCRIBE and NOTIFY.						

Prerequisite A.163/11 - - NOTIFY response

Table A.232: Supported message bodies within the NOTIFY response

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

A.2.2.4.9 OPTIONS method

Prerequisite A.163/12 - - OPTIONS request

Table A.233: Supported header fields within the OPTIONS request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	i	i
1A	Accept-Contact	[56B] 9.2	c28	c28	[56B] 9.2	c28	c29
2	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
3	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i
3A	Allow	[26] 20.5	m	m	[26] 20.5	i	i
4	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	c1	c1
5	Authorization	[26] 20.7	m	m	[26] 20.7	i	i
6	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
7	Call-Info	[26] 20.9	m	m	[26] 20.9	c4	c4
8	Contact	[26] 20.10	m	m	[26] 20.10	i	i
9	Content-Disposition	[26] 20.11	m	m	[26] 20.11	i	i
10	Content-Encoding	[26] 20.12	m	m	[26] 20.12	i	i
11	Content-Language	[26] 20.13	m	m	[26] 20.13	i	i
12	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
13	Content-Type	[26] 20.15	m	m	[26] 20.15	i	i
14	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
15	Date	[26] 20.17	m	m	[26] 20.17	c2	c2
16	From	[26] 20.20	m	m	[26] 20.20	m	m
16A	Geolocation	[89] 4.1	c36	c36	[89] 4.1	c37	c37
16B	Geolocation-Routing	[89] 4.1	c36	c36	[89] 4.1	c37	c37
16C	History-Info	[66] 4.1	c32	c32	[66] 4.1	c32	c32
16D	Max-Breadth	[117] 5.8	c41	c41	[117] 5.8	c42	c42
17	Max-Forwards	[26] 20.22	m	m	[26] 20.22	m	m
18	MIME-Version	[26] 20.24	m	m	[26] 20.24	i	i
19	Organization	[26] 20.25	m	m	[26] 20.25	c3	c3
19A	P-Access-Network-Info	[52] 4.4	c23	c23	[52] 4.4	c24	c24
19B	P-Asserted-Identity	[34] 9.1	c10	c10	[34] 9.1	c11	c11
19C	P-Asserted-Service	[121] 4.1	c39	c39	[121] 4.1	c40	c40
19D	P-Called-Party-ID	[52] 4.2	c14	c14	[52] 4.2	c15	c16
19E	P-Charging-Function-Addresses	[52] 4.5	c21	c21	[52] 4.5	c22	c22
19F	P-Charging-Vector	[52] 4.6	c19	c19	[52] 4.6	c20	c20
19H	P-Preferred-Identity	[34] 9.2	x	c54	[34] 9.2	c9	c55
19I	P-Preferred-Service	[121] 4.2	x	x	[121] 4.2	c38	c38
19J	P-Private-Network-Indication	[134]	c48	c48	[134]	c48	c48
19K	P-Profile-Key	[97] 5	c34	c34	[97] 5	c35	c35
19L	P-Served-User	[133] 6	c49	c49	[133] 6	c49	c49
19M	P-User-Database	[82] 4	c33	c33	[82] 4	c33	c33
19N	P-Visited-Network-ID	[52] 4.3	c17	n/a	[52] 4.3	c18	n/a
19O	Privacy	[33] 4.2	c12	c12	[33] 4.2	c13	c13
20	Proxy-Authorization	[26] 20.28	m	m	[26] 20.28	c8	c8
21	Proxy-Require	[26] 20.29	m	m	[26] 20.29	m	m
21A	Reason	[34A] 2	c26	c26	[34A] 2	c27	c27
22	Record-Route	[26] 20.30	m	m	[26] 20.30	c7	c7
22A	Recv-Info	[25] 5.2.3	c52	c52	[25] 5.2.3	c53	c53
22B	Referred-By	[59] 3	c30	c30	[59] 3	c31	c31
22C	Reject-Contact	[56B] 9.2	c28	c28	[56B] 9.2	c28	c29
22D	Request-Disposition	[56B] 9.1	c28	c28	[56B] 9.1	c28	c28
23	Require	[26] 20.32	m	m	[26] 20.32	c5	c5
23A	Resource-Priority	[116] 3.1	c47	c47	[116] 3.1	c47	c47
24	Route	[26] 20.34	m	m	[26] 20.34	m	m
24A	Security-Client	[48] 2.3.1	x	x	[48] 2.3.1	c25	c25
24B	Security-Verify	[48] 2.3.1	x	x	[48] 2.3.1	c25	c25
25	Supported	[26] 20.37	m	m	[26] 20.37	c6	c6
26	Timestamp	[26] 20.38	m	m	[26] 20.38	i	i

27	To	[26] 20.39	m	m	[26] 20.39	m	m
28	User-Agent	[26] 20.41	m	m	[26] 20.41	i	i
29	Via	[26] 20.42	m	m	[26] 20.42	m	m

c1:	IF A.4/20 THEN m ELSE i - - SIP specific event notification extension.
c2:	IF A.162/9 THEN m ELSE i - - insertion of date in requests and responses.
c3:	IF A.162/19A OR A.162/19B THEN m ELSE i - - reading, adding or concatenating the Organization header.
c4:	IF A.162/19C OR A.162/19D THEN m ELSE i - - reading, adding or concatenating the Call-Info header.
c5:	IF A.162/11 OR A.162/13 THEN m ELSE i - - reading the contents of the Require header before proxying the request or response or adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER.
c6:	IF A.162/16 THEN m ELSE i - - reading the contents of the Supported header before proxying the response.
c7:	IF A.162/14 THEN o ELSE i - - the requirement to be able to insert itself in the subsequent transactions in a dialog.
c8:	IF A.162/8A THEN m ELSE i - - authentication between UA and proxy.
c9:	IF A.162/30A THEN m ELSE n/a - - act as first entity within the trust domain for asserted identity.
c10:	IF A.162/30 THEN m ELSE n/a - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c11:	IF A.162/30A or A.162/30B THEN m ELSE i - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks or subsequent entity within trust network that can route outside the trust network.
c12:	IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c13:	IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.
c14:	IF A.162/37 THEN m ELSE n/a - - the P-Called-Party-ID header extension.
c15:	IF A.162/37 THEN i ELSE n/a - - the P-Called-Party-ID header extension.
c16:	IF A.162/37 AND A.3/2 THEN m ELSE IF A.162/37 AND (A.3/3 OR A.3/9A) THEN i ELSE n/a - - the P-Called-Party-ID header extension and P-CSCF or (I-CSCF or IBCF (THIG)).
c17:	IF A.162/38 THEN m ELSE n/a - - the P-Visited-Network-ID header extension.
c18:	IF A.162/39 THEN m ELSE i - - reading, or deleting the P-Visited-Network-ID header before proxying the request or response.
c19:	IF A.162/45 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c20:	IF A.162/46 THEN m ELSE IF A.162/45 THEN i ELSE n/a - - adding, deleting, reading or modifying the P-Charging-Vector header before proxying the request or response or the P-Charging-Vector header extension.
c21:	IF A.162/44 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c22:	IF A.162/44A THEN m ELSE IF A.162/44 THEN i ELSE n/a - - adding, deleting or reading the P-Charging-Function-Addresses header before proxying the request or response, or the P-Charging-Function-Addresses header extension.
c23:	IF A.162/43 THEN x ELSE IF A.162/41 THEN m ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c24:	IF A.162/43 THEN m ELSE IF A.162/41 THEN i ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c25:	IF A.162/47 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.
c26:	IF A.162/48 THEN m ELSE n/a - - the Reason header field for the session initiation protocol.
c27:	IF A.162/48 THEN i ELSE n/a - - the Reason header field for the session initiation protocol.
c28:	IF A.162/50 THEN m ELSE n/a - - caller preferences for the session initiation protocol.
c29:	IF A.162/50 AND A.4/3 THEN m ELSE IF A.162/50 AND NOT A.4/3 THEN i ELSE n/a - - caller preferences for the session initiation protocol, and S-CSCF.
c30:	IF A.162/53 THEN i ELSE n/a - - the SIP Referred-By mechanism.
c31:	IF A.162/53 THEN m ELSE n/a - - the SIP Referred-By mechanism.
c32:	IF A.162/57 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.
c33:	IF A.162/60 THEN m ELSE n/a - - the P-User-Database private header extension.
c34:	IF A.162/66A THEN m ELSE n/a - - making the first query to the database in order to populate the P-Profile-Key header.
c35:	IF A.162/66B THEN m ELSE n/a - - using the information in the P-Profile-Key header.
c36:	IF A.162/70 THEN m ELSE n/a - - SIP location conveyance.
c37:	IF A.162/70A THEN m ELSE IF A.162/70B THEN i ELSE n/a - - addition or modification of location in a SIP method, passes on locations in SIP method without modification.
c38:	IF A.162/84A THEN m ELSE n/a - - act as authentication entity within the trust domain for asserted service.
c39:	IF A.162/84 THEN m ELSE n/a - - SIP extension for the identification of services.
c40:	IF A.162/84 OR A.162/30B THEN m ELSE i - - SIP extension for the identification of services or subsequent entity within trust network that can route outside the trust network.
c41:	IF A.162/81 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.
c42:	IF A.162/81 AND A.162/6 THEN m ELSE IF A.162/81 AND NOT A.162/6 THEN i ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies, forking of initial requests.

c47:	IF A.162/80 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.
c48:	IF A.162/87 THEN m ELSE n/a - - the SIP P-Private-Network-Indication private-header (P-Header).
c49:	IF A.162/88 THEN m ELSE n/a - - the SIP P-Served-User private header.
c52:	IF A.162/20 THEN m ELSE n/a - - SIP INFO method and package framework.
c53:	IF A.162/20 THEN i ELSE n/a - - SIP INFO method and package framework.
c54:	IF A.162/30C THEN m ELSE x - - act as entity passing on identity transparently independent of trust domain.
c55:	IF A.162/30A OR A.162/30C THEN m ELSE n/a - - act as first entity within the trust domain for asserted identity, act as entity passing on identity transparently independent of trust domain.
NOTE:	c1 refers to the UA role major capability as this is the case of a proxy that also acts as a UA specifically for SUBSCRIBE and NOTIFY.

Prerequisite A.163/12 - - OPTIONS request

Table A.234: Supported message bodies within the OPTIONS request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

Table A.235: Void

Prerequisite A.163/13 - - OPTIONS response

Prerequisite: A.164/1 - - Additional for 100 (Trying) response

Table A.235A: Supported header fields within the OPTIONS response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
3	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
4	Date	[26] 20.17	c1	c1	[26] 20.17	c2	c2
5	From	[26] 20.20	m	m	[26] 20.20	m	m
6	To	[26] 20.39	m	m	[26] 20.39	m	m
7	Via	[26] 20.42	m	m	[26] 20.42	m	m
c1:	IF (A.162/9 AND A.162/5) OR A.162/4 THEN m ELSE n/a - - stateful proxy behaviour that inserts date, or stateless proxies.						
c2:	IF A.162/4 THEN i ELSE m - - Stateless proxy passes on.						

Prerequisite A.163/13 - - OPTIONS response for all remaining status-codes

Table A.236: Supported header fields within the OPTIONS response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Allow	[26] 20.5	m	m	[26] 20.5	i	i
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
1A	Call-Info	[26] 20.9	m	m	[26] 20.9	c3	c3
2	Content-Disposition	[26] 20.11	m	m	[26] 20.11	i	i
3	Content-Encoding	[26] 20.12	m	m	[26] 20.12	i	i
4	Content-Language	[26] 20.13	m	m	[26] 20.13	i	i
5	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
6	Content-Type	[26] 20.15	m	m	[26] 20.15	i	i
7	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
8	Date	[26] 20.17	m	m	[26] 20.17	c1	c1
9	From	[26] 20.20	m	m	[26] 20.20	m	m
9A	Geolocation-Error	[89] 4.3	c17	c17	[89] 4.3	c18	c18
9B	History-Info	[66] 4.1	c16	c16	[66] 4.1	c16	c16
10	MIME-Version	[26] 20.24	m	m	[26] 20.24	i	i
11	Organization	[26] 20.25	m	m	[26] 20.25	c2	c2
11A	P-Access-Network-Info	[52] 4.4	c13	c13	[52] 4.4	c14	c14
11B	P-Asserted-Identity	[34] 9.1	c5	c5	[34] 9.1	c6	c6
11C	P-Charging-Function-Addresses	[52] 4.5	c11	c11	[52] 4.5	c12	c12
11D	P-Charging-Vector	[52] 4.6	c9	c9	[52] 4.6	c10	c10
11F	P-Preferred-Identity	[34] 9.2	x	x	[34] 9.2	c4	n/a
11G	Privacy	[33] 4.2	c7	c7	[33] 4.2	c8	c8
11H	Recv-Info	[25] 5.2.3	c21	c21	[25] 5.2.3	c22	c22
11I	Require	[26] 20.32	m	m	[26] 20.32	c15	c15
11J	Server	[26] 20.35	m	m	[26] 20.35	i	i
12	Timestamp	[26] 20.38	m	m	[26] 20.38	i	i
13	To	[26] 20.39	m	m	[26] 20.39	m	m
13A	User-Agent	[26] 20.41	m	m	[26] 20.41	i	i
14	Via	[26] 20.42	m	m	[26] 20.42	m	m
15	Warning	[26] 20.43	m	m	[26] 20.43	i	i

c1:	IF A.162/9 THEN m ELSE i - - insertion of date in requests and responses.
c2:	IF A.162/19A OR A.162/19B THEN m ELSE i - - reading, adding or concatenating the Organization header.
c3:	IF A.162/19C OR A.162/19D THEN m ELSE i - - reading, adding or concatenating the Call-Info header.
c4:	IF A.162/30A THEN m ELSE n/a - - act as first entity within the trust domain for asserted identity.
c5:	IF A.162/30 THEN m ELSE n/a - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c6:	IF A.162/30A or A.162/30B THEN m ELSE i - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks or subsequent entity within trust network that can route outside the trust network.
c7:	IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c8:	IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.
c9:	IF A.162/45 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c10:	IF A.162/46 THEN m ELSE IF A.162/45 THEN i ELSE n/a - - adding, deleting, reading or modifying the P-Charging-Vector header before proxying the request or response or the P-Charging-Vector header extension.
c11:	IF A.162/44 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c12:	IF A.162/44A THEN m ELSE IF A.162/44 THEN i ELSE n/a - - adding, deleting or reading the P-Charging-Function-Addresses header before proxying the request or response, or the P-Charging-Function-Addresses header extension.
c13:	IF A.162/43 THEN x ELSE IF A.162/41 THEN m ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c14:	IF A.162/43 THEN m ELSE IF A.162/41 THEN i ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c15:	IF A.162/11 OR A.162/13 THEN m ELSE i - - reading the contents of the Require header before proxying the request or response or adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER.
c16:	IF A.162/57 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.
c17:	IF A.162/70 THEN m ELSE n/a - - SIP location conveyance.
c18:	IF A.162/70A THEN m ELSE IF A.162/70B THEN i ELSE n/a - - addition or modification of location in a SIP method, passes on locations in SIP method without modification.
c21:	IF A.162/20 THEN m ELSE n/a - - SIP INFO method and package framework.
c22:	IF A.162/20 THEN i ELSE n/a - - SIP INFO method and package framework.

Prerequisite A.163/13 - - OPTIONS response

Prerequisite: A.164/102 - - Additional for 2xx response

Table A.237: Supported header fields within the OPTIONS response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	i	i
1A	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
1B	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i
1C	Accept-Resource-Priority	[116] 3.2	c12	c12	[116] 3.2	c12	c12
2	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	c1	c1
3	Authentication-Info	[26] 20.6	m	m	[26] 20.6	i	i
5	Contact	[26] 20.10	m	m	[26] 20.10	i	i
7	Recv-Info	[25] 5.2.3	c7	c7	[25] 5.2.3	c8	c8
9	Record-Route	[26] 20.30	m	m	[26] 20.30	c3	c3
12	Supported	[26] 20.37	m	m	[26] 20.37	i	i
c1:	IF A.4/20 THEN m ELSE i - - SIP specific event notification extension.						
c3:	IF A.162/15 THEN o ELSE i - - the requirement to be able to use separate URIs in the upstream direction and downstream direction when record routeing.						
c7:	IF A.162/20 THEN m ELSE n/a - - SIP INFO method and package framework.						
c8:	IF A.162/20 THEN i ELSE n/a - - SIP INFO method and package framework.						
c12:	IF A.162/80 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.						

Prerequisite A.163/13 - - OPTIONS response

Prerequisite: A.164/103 OR A.164/104 OR A.164/105 OR A.164/106 - - Additional for 3xx – 6xx response

Table A.237A: Supported header fields within the OPTIONS response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Error-Info	[26] 20.18	m	m	[26] 20.18	i	i

Prerequisite A.163/13 - - OPTIONS response

Prerequisite: A.164/103 OR A.164/35 - - Additional for 3xx or 485 (Ambiguous) response

Table A.238: Supported header fields within the OPTIONS response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Contact	[26] 20.10	m	m	[26] 20.10	c1	c1
c1:	IF A.162/19E THEN m ELSE i - - deleting Contact headers.						

Prerequisite A.163/13 - - OPTIONS response

Prerequisite: A.164/14 - - Additional for 401 (Unauthorized) response

Table A.239: Supported header fields within the OPTIONS response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
4	Proxy-Authenticate	[26] 20.27	m	m	[26] 20.27	m	m
10	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	i	i

Prerequisite A.163/13 - - OPTIONS response

Prerequisite: A.164/17 OR A.164/23 OR A.164/30 OR A.164/36 OR A.164/42 OR A.164/45 OR A.164/50 OR A.164/51 - - Additional for 404 (Not Found), 413 (Request Entity Too Large), 480(Temporarily not available), 486 (Busy Here), 500 (Internal Server Error), 503 (Service Unavailable), 600 (Busy Everywhere), 603 (Decline) response

Table A.240: Supported header fields within the OPTIONS response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
5	Retry-After	[26] 20.33	m	m	[26] 20.33	i	i

Table A.241: Void

Prerequisite A.163/13 - - OPTIONS response

Prerequisite: A.164/20 - - Additional for 407 (Proxy Authentication Required) response

Table A.242: Supported header fields within the OPTIONS response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
4	Proxy-Authenticate	[26] 20.27	m	m	[26] 20.27	m	m
8	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	i	i

Prerequisite A.163/13 - - OPTIONS response

Prerequisite: A.164/25 - - Additional for 415 (Unsupported Media Type) response

Table A.243: Supported header fields within the OPTIONS response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	i	i
2	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
3	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i

Prerequisite A.163/13 - - OPTIONS response

Prerequisite: A.164/26A - - Additional for 417 (Unknown Resource-Priority) response

Table A.243A: Supported header fields within the OPTIONS response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
c1:	IF A.162/80 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.						

Prerequisite A.163/13 - - OPTIONS response

Prerequisite: A.164/27 - - Additional for 420 (Bad Extension) response

Table A.244: Supported header fields within the OPTIONS response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
7	Unsupported	[26] 20.40	m	m	[26] 20.40	c3	c3
c3:	IF A.162/18 THEN m ELSE i - - reading the contents of the Unsupported header before proxying the 420 response to a method other than REGISTER.						

Prerequisite A.163/13 - - OPTIONS response

Prerequisite: A.164/28 OR A.164/41A - - Additional for 421 (Extension Required), 494 (Security Agreement Required) response

Table A.244A: Supported header fields within the OPTIONS response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Security-Server	[48] 2	c1	c1	[48] 2	n/a	n/a
c1:	IF A.162/47 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						

Table A.245: Void

Prerequisite A.163/13 - - OPTIONS response

Table A.246: Supported message bodies within the OPTIONS response

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

A.2.2.4.10 PRACK method

Prerequisite A.163/14 - - PRACK request

Table A.247: Supported header fields within the PRACK request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	i	i
1A	Accept-Contact	[56B] 9.2	c18	c18	[56B] 9.2	c19	c19
2	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
3	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i
3A	Allow	[26] 20.5	m	m	[26] 20.5	i	i
4	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	c1	c1
5	Authorization	[26] 20.7	m	m	[26] 20.7	i	i
6	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
7	Content-Disposition	[26] 20.11	m	m	[26] 20.11	i	c3
8	Content-Encoding	[26] 20.12	m	m	[26] 20.12	i	c3
9	Content-Language	[26] 20.13	m	m	[26] 20.13	i	c3
10	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
11	Content-Type	[26] 20.15	m	m	[26] 20.15	i	c3
12	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
13	Date	[26] 20.17	m	m	[26] 20.17	c2	c2
14	From	[26] 20.20	m	m	[26] 20.20	m	m
14A	Max-Breadth	[117] 5.8	c26	c26	[117] 5.8	c27	c27
15	Max-Forwards	[26] 20.22	m	m	[26] 20.22	m	m
16	MIME-Version	[26] 20.24	m	m	[26] 20.24	i	c3
16A	P-Access-Network-Info	[52] 4.4	c14	c14	[52] 4.4	c15	c15
16B	P-Charging-Function-Addresses	[52] 4.5	c12	c12	[52] 4.5	c13	c13
16C	P-Charging-Vector	[52] 4.6	c10	n/a	[52] 4.6	c11	n/a
16E	P-Early-Media	[109] 8	o	c22	[109] 8	o	c23
16F	Privacy	[33] 4.2	c8	c8	[33] 4.2	c9	c9
17	Proxy-Authorization	[26] 20.28	m	m	[26] 20.28	c4	c4
18	Proxy-Require	[26] 20.29	m	m	[26] 20.29	m	m
19	Rack	[27] 7.2	m	m	[27] 7.2	i	i
19A	Reason	[34A] 2	c16	c16	[34A] 2	c17	c17
20	Record-Route	[26] 20.30	m	m	[26] 20.30	c7	c7
20A	Recv-Info	[25] 5.2.3	c28	c28	[25] 5.2.3	c29	c29
20B	Referred-By	[59] 3	c20	c20	[59] 3	c21	c21
20C	Reject-Contact	[56B] 9.2	c18	c18	[56B] 9.2	c19	c19
20D	Request-Disposition	[56B] 9.1	c18	c18	[56B] 9.1	c19	c19
21	Require	[26] 20.32	m	m	[26] 20.32	c5	c5
21A	Resource-Priority	[16] 3.1	c47	c47	[116] 3.1	c47	c47
22	Route	[26] 20.34	m	m	[26] 20.34	m	m
23	Supported	[26] 20.37	m	m	[26] 20.37	c6	c6
24	Timestamp	[26] 20.38	m	m	[26] 20.38	i	i
25	To	[26] 20.39	m	m	[26] 20.39	m	m
26	User-Agent	[26] 20.41	m	m	[26] 20.41	i	i
27	Via	[26] 20.42	m	m	[26] 20.42	m	m

c1:	IF A.4/20 THEN m ELSE i - - SIP specific event notification extension.
c2:	IF A.162/9 THEN m ELSE i - - insertion of date in requests and responses.
c3:	IF A.3/2 OR A.3/4 THEN m ELSE i - - P-CSCF or S-CSCF.
c4:	IF A.162/8A THEN m ELSE i - - authentication between UA and proxy.
c5:	IF A.162/11 OR A.162/13 THEN m ELSE i - - reading the contents of the Require header before proxying the request or response or adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER.
c6:	IF A.162/16 THEN m ELSE i - - reading the contents of the Supported header before proxying the response.
c7:	IF A.162/14 THEN 0 ELSE i - - the requirement to be able to insert itself in the subsequent transactions in a dialog.
c8:	IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c9:	IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.
c10:	IF A.162/45 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c11:	IF A.162/46 THEN m ELSE IF A.162/45 THEN i ELSE n/a - - adding, deleting, reading or modifying the P-Charging-Vector header before proxying the request or response or the P-Charging-Vector header extension.
c12:	IF A.162/44 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c13:	IF A.162/44A THEN m ELSE IF A.162/44 THEN i ELSE n/a - - adding, deleting or reading the P-Charging-Function-Addresses header before proxying the request or response, or the P-Charging-Function-Addresses header extension.
c14:	IF A.162/43 THEN x ELSE IF A.162/41 THEN m ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c15:	IF A.162/43 THEN m ELSE IF A.162/41 THEN i ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c16:	IF A.162/48 THEN m ELSE n/a - - the Reason header field for the session initiation protocol.
c17:	IF A.162/48 THEN i ELSE n/a - - the Reason header field for the session initiation protocol.
c18:	IF A.162/50 THEN m ELSE n/a - - caller preferences for the session initiation protocol.
c19:	IF A.162/50 THEN i ELSE n/a - - caller preferences for the session initiation protocol.
c20:	IF A.162/53 THEN i ELSE n/a - - the SIP Referred-By mechanism.
c21:	IF A.162/53 THEN m ELSE n/a - - the SIP Referred-By mechanism.
c22:	IF A.162/76 THEN m ELSE n/a - - the SIP P-Early-Media private header extension for authorization of early media.
c23:	IF A.162/76 THEN (IF A.3/2 THEN m ELSE i) ELSE n/a - - P-CSCF, using the information in the P-Early-Media header.
c26:	IF A.162/81 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.
c27:	IF A.162/81 AND A.162/6 THEN m ELSE IF A.162/81 AND NOT A.162/6 THEN i ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies, forking of initial requests.
c28:	IF A.162/20 THEN m ELSE n/a - - SIP INFO method and package framework.
c29:	IF A.162/20 THEN i ELSE n/a - - SIP INFO method and package framework.
c47:	IF A.162/80 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.
NOTE:	c1 refers to the UA role major capability as this is the case of a proxy that also acts as a UA specifically for SUBSCRIBE and NOTIFY.

Prerequisite A.163/14 - - PRACK request

Table A.248: Supported message bodies within the PRACK request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

Table A.249: Void

Prerequisite A.163/15 - - PRACK response

Prerequisite: A.164/1 - - Additional for 100 (Trying) response

Table A.249A: Supported header fields within the PRACK response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
3	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
4	Date	[26] 20.17	c1	c1	[26] 20.17	c2	c2
5	From	[26] 20.20	m	m	[26] 20.20	m	m
6	To	[26] 20.39	m	m	[26] 20.39	m	m
7	Via	[26] 20.42	m	m	[26] 20.42	m	m
c1:	IF (A.162/9 AND A.162/5) OR A.162/4 THEN m ELSE n/a - - stateful proxy behaviour that inserts date, or stateless proxies.						
c2:	IF A.162/4 THEN i ELSE m - - Stateless proxy passes on.						

Prerequisite A.163/15 - - PRACK response for all remaining status-codes

Table A.250: Supported header fields within the PRACK response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Allow	[26] 20.5	m	m	[26] 20.5	i	i
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Disposition	[26] 20.11	m	m	[26] 20.11	i	c2
3	Content-Encoding	[26] 20.12	m	m	[26] 20.12	i	c2
4	Content-Language	[26] 20.13	m	m	[26] 20.13	i	c2
5	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
6	Content-Type	[26] 20.15	m	m	[26] 20.15	i	c2
7	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
8	Date	[26] 20.17	m	m	[26] 20.17	c1	c1
9	From	[26] 20.20	m	m	[26] 20.20	m	m
10	MIME-Version	[26] 20.24	m	m	[26] 20.24	i	c2
10A	P-Access-Network-Info	[52] 4.4	c9	c9	[52] 4.4	c10	c10
10B	P-Charging-Function-Addresses	[52] 4.5	c7	c7	[52] 4.5	c8	c8
10C	P-Charging-Vector	[52] 4.6	c5	n/a	[52] 4.6	c6	n/a
10E	Privacy	[33] 4.2	c3	c3	[33] 4.2	c4	c4
10F	Recv-Info	[25] 5.2.3	c14	c14	[25] 5.2.3	c15	c15
10G	Require	[26] 20.32	m	m	[26] 20.32	c11	c11
10H	Server	[26] 20.35	m	m	[26] 20.35	i	i
11	Timestamp	[26] 20.38	m	m	[26] 20.38	i	i
12	To	[26] 20.39	m	m	[26] 20.39	m	m
12A	User-Agent	[26] 20.41	m	m	[26] 20.41	i	i
13	Via	[26] 20.42	m	m	[26] 20.42	m	m
14	Warning	[26] 20.43	m	m	[26] 20.43	i	i
c1:	IF A.162/9 THEN m ELSE i - - insertion of date in requests and responses.						
c2:	IF A.3/2 OR A.3/4 THEN m ELSE i - - P-CSCF or S-CSCF.						
c3:	IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).						
c4:	IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.						
c5:	IF A.162/45 THEN m ELSE n/a - - the P-Charging-Vector header extension.						
c6:	IF A.162/46 THEN m ELSE IF A.162/45 THEN i ELSE n/a - - adding, deleting, reading or modifying the P-Charging-Vector header before proxying the request or response or the P-Charging-Vector header extension.						
c7:	IF A.162/44 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.						
c8:	IF A.162/44A THEN m ELSE IF A.162/44 THEN i ELSE n/a - - adding, deleting or reading the P-Charging-Function-Addresses header before proxying the request or response, or the P-Charging-Function-Addresses header extension.						
c9:	IF A.162/43 THEN x ELSE IF A.162/41 THEN m ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.						
c10:	IF A.162/43 THEN m ELSE IF A.162/41 THEN i ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.						
c11:	IF A.162/11 OR A.162/13 THEN m ELSE i - - reading the contents of the Require header before proxying the request or response or adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER.						
c14:	IF A.162/20 THEN m ELSE n/a - - SIP INFO method and package framework.						
c15:	IF A.162/20 THEN i ELSE n/a - - SIP INFO method and package framework.						

Prerequisite A.163/15 - - PRACK response

Prerequisite: A.164/102 - - Additional for 2xx response

Table A.251: Supported header fields within the PRACK response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	c1	c1

0B	Authentication-Info	[26] 20.6	m	m	[26] 20.6	i	i
0C	Accept-Resource-Priority	[116] 3.2	c12	c12	[116] 3.2	c12	c12
0D	P-Early-Media	[109] 8	o	c4	[109] 8	o	c5
1	Record-Route	[26] 20.30	m	m	[26] 20.30	c3	c3
2	Recv-Info	[25] 5.2.3	c6	c6	[25] 5.2.3	c7	c7
3	Supported	[26] 20.37	m	m	[26] 20.37	i	i
c1:	IF A.4/20 THEN m ELSE i - - SIP specific event notification extension.						
c3:	IF A.162/15 THEN o ELSE i - - the requirement to be able to use separate URIs in the upstream direction and downstream direction when record routeing.						
c4:	IF A.162/76 THEN m ELSE n/a - - the SIP P-Early-Media private header extension for authorization of early media.						
c5:	IF A.162/76 THEN (IF A.3/2 THEN m ELSE i) ELSE n/a - - P-CSCF, using the information in the P-Early-Media header.						
c6:	IF A.162/20 THEN m ELSE n/a - - SIP INFO method and package framework.						
c7:	IF A.162/20 THEN i ELSE n/a - - SIP INFO method and package framework.						
c12:	IF A.162/80 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.						

Prerequisite A.163/3 - - PRACK response

Prerequisite: A.164/103 OR A.164/104 OR A.164/105 OR A.164/106 - - Additional for 3xx – 6xx response

Table A.251A: Supported header fields within the PRACK response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Error-Info	[26] 20.18	m	m	[26] 20.18	i	i

Prerequisite A.163/15 - - PRACK response

Prerequisite: A.164/103 OR A.164/35 - - Additional for 3xx or 485 (Ambiguous) response

Table A.252: Supported header fields within the PRACK response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Contact	[26] 20.10	m	m	[26] 20.10	c1	c1
c1:	IF A.162/19E THEN m ELSE i - - deleting Contact headers.						

Prerequisite A.163/15 - - PRACK response

Prerequisite: A.164/14 - - Additional for 401 (Unauthorized) response

Table A.253: Supported header fields within the PRACK response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
2	Proxy-Authenticate	[26] 20.27	m	m	[26] 20.27	m	m
8	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	i	i

Prerequisite A.163/15 - - PRACK response

Prerequisite: A.164/17 OR A.164/23 OR A.164/30 OR A.164/36 OR A.164/42 OR A.164/45 OR A.164/50 OR A.164/51 - - Additional for 404 (Not Found), 413 (Request Entity Too Large), 480(Temporarily not available), 486 (Busy Here), 500 (Internal Server Error), 503 (Service Unavailable), 600 (Busy Everywhere), 603 (Decline) response

Table A.254: Supported header fields within the PRACK response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Retry-After	[26] 20.33	m	m	[26] 20.33	i	i

Table A.255: Void

Prerequisite A.163/15 - - PRACK response

Prerequisite: A.164/20 - - Additional for 407 (Proxy Authentication Required) response

Table A.256: Supported header fields within the PRACK response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
2	Proxy-Authenticate	[26] 20.27	m	m	[26] 20.27	m	m
6	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	i	i

Prerequisite A.163/15 - - PRACK response

Prerequisite: A.164/25 - - Additional for 415 (Unsupported Media Type) response

Table A.257: Supported header fields within the PRACK response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	i	i
2	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
3	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i

Prerequisite A.163/15 - - PRACK response

Prerequisite: A.164/26A - - Additional for 417 (Unknown Resource-Priority) response

Table A.257A: Supported header fields within the PRACK response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
c1:	IF A.162/80 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.						

Prerequisite A.163/15 - - PRACK response

Prerequisite: A.164/27 - - Addition for 420 (Bad Extension) response

Table A.258: Supported header fields within the PRACK response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
5	Unsupported	[26] 20.40	m	m	[26] 20.40	c3	c3
c3:	IF A.162/18 THEN m ELSE i - - reading the contents of the Unsupported header before proxying the 420 response to a method other than REGISTER.						

Prerequisite A.163/15 - - PRACK response

Prerequisite: A.164/28 OR A.164/41A - - Additional for 421 (Extension Required), 494 (Security Agreement Required) response

Table A.258A: Supported header fields within the PRACK response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Security-Server	[48] 2	c1	c1	[48] 2	n/a	n/a
c1:	IF A.162/47 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						

Table A.259: Void

Prerequisite A.163/15 - - PRACK response

Table A.260: Supported message bodies within the PRACK response

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

A.2.2.4.10A PUBLISH method

Prerequisite A.163/15A - - PUBLISH request

Table A.260A: Supported header fields within the PUBLISH request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Contact	[56B] 9.2	c28	c28	[56B] 9.2	c28	c29
2	Allow	[26] 20.5	m	m	[26] 20.5	i	i
3	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	c29	c29
4	Authorization	[26] 20.7	m	m	[26] 20.7	i	i
5	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
6	Call-Info	[26] 24.9	m	m	[26] 24.9	c4	c4
6A	Contact	[26] 20.10	o	o	[26] 20.10	o	o
7	Content-Disposition	[26] 20.11	m	m	[26] 20.11	i	i
8	Content-Encoding	[26] 20.12	m	m	[26] 20.12	i	i
9	Content-Language	[26] 20.13	m	m	[26] 20.13	i	i
10	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
11	Content-Type	[26] 20.15	m	m	[26] 20.15	i	i
12	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
13	Date	[26] 20.17	m	m	[26] 20.17	c2	c2
14	Event	[70] 4, 6	m	m	[70] 4, 6	m	m
15	Expires	[26] 20.19, [70] 4, 5, 6	m	m	[26] 20.19, [70] 4, 5, 6	i	i
16	From	[26] 20.20	m	m	[26] 20.20	m	m
16A	Geolocation	[89] 4.1	c46	c46	[89] 4.1	c47	c47
16B	Geolocation-Routing	[89] 4.1	c46	c46	[89] 4.1	c47	c47
16C	History-Info	[66] 4.1	c32	c32	[66] 4.1	c32	c32
17	In-Reply-To	[26] 20.21	m	m	[26] 20.21	i	i
17A	Max-Breadth	[117] 5.8	c44	c44	[117] 5.8	c45	c45
18	Max-Forwards	[26] 20.22	m	m	[26] 20.22	m	m
19	MIME-Version	[26] 20.24	m	m	[26] 20.24	i	i
20	Organization	[26] 20.25	m	m	[26] 20.25	c3	c3
21	P-Access-Network-Info	[52] 4.4	c23	c23	[52] 4.4	c24	c24
22	P-Asserted-Identity	[34] 9.1	c10	c10	[34] 9.1	c11	c11
22A	P-Asserted-Service	[121] 4.1	c38	c38	[121] 4.1	c39	c39
23	P-Called-Party-ID	[52] 4.2	c14	c14	[52] 4.2	c15	c16
24	P-Charging-Function-Addresses	[52] 4.5	c21	c21	[52] 4.5	c22	c22
25	P-Charging-Vector	[52] 4.6	c19	c19	[52] 4.6	c20	c20
26	P-Preferred-Identity	[34] 9.2	x	c69	[34] 9.2	c9	c9

26A	P-Preferred-Service	[121] 4.2	x	x	[121] 4.2	c37	c37
26B	P-Private-Network-Indication	[134]	c40	c40	[134]	c40	c40
26C	P-Profile-Key	[97] 5	c34	c34	[97] 5	c35	c35
26D	P-Served-User	[133] 6	c41	c41	[133] 6	c41	c41
26E	P-User-Database	[82] 4	c33	c33	[82] 4	c33	c33
27	P-Visited-Network-ID	[52] 4.3	c17	n/a	[52] 4.3	c18	n/a
28	Priority	[26] 20.26	m	m	[26] 20.26	i	i
29	Privacy	[33] 4.2	c12	c12	[33] 4.2	c13	c13
30	Proxy-Authorization	[26] 20.28	m	m	[26] 20.28	c7	c7
31	Proxy-Require	[26] 20.29	m	m	[26] 20.29	m	m
32	Reason	[34A] 2	c8	c8	[34A] 2	c1	c1
33	Referred-By	[59] 3	c30	c30	[59] 3	c31	c31
34	Reject-Contact	[56B] 9.2	c27	c27	[56B] 9.2	c27	c28
34A	Reply-To	[26] 20.31	m	m	[26] 20.31	i	i
35	Request-Disposition	[56B] 9.1	c27	c27	[56B] 9.1	c27	c27
36	Require	[26] 20.32	m	m	[26] 20.32	c5	c5
36A	Resource-Priority	[116] 3.1	c36	c36	[116] 3.1	c36	c36
37	Route	[26] 20.34	m	m	[26] 20.34	m	m
38	Security-Client	[48] 2.3.1	x	x	[48] 2.3.1	c25	c25
39	Security-Verify	[48] 2.3.1	x	x	[48] 2.3.1	c26	c26
40	SIP-If-Match	[70] 11.3.2	m	m	[70] 11.3.2	i	i
41	Subject	[26] 20.36	m	m	[26] 20.36	i	i
42	Supported	[26] 20.37	m	m	[26] 20.37	c6	c6
43	Timestamp	[26] 20.38	m	m	[26] 20.38	i	i
44	To	[26] 20.39	m	m	[26] 20.39	m	m
45	User-Agent	[26] 20.41	m	m	[26] 20.41	i	i
46	Via	[26] 20.42	m	m	[26] 20.42	m	m

c1:	IF A.162/48 THEN i ELSE n/a - - the Reason header field for the session initiation protocol.
c2:	IF A.162/9 THEN m ELSE i - - insertion of date in requests and responses.
c3:	IF A.162/19A OR A.162/19B THEN m ELSE i - - reading, adding or concatenating the Organization header.
c4:	IF A.162/19C OR A.162/19D THEN m ELSE i - - reading, adding or concatenating the Call-Info header.
c5:	IF A.162/11 OR A.162/13 THEN m ELSE i - - reading the contents of the Require header before proxying the request or response or adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER.
c6:	IF A.162/16 THEN m ELSE i - - reading the contents of the Supported header before proxying the response.
c7:	IF A.162/8A THEN m ELSE i - - authentication between UA and proxy.
c8:	IF A.162/48 THEN m ELSE n/a - - the Reason header field for the session initiation protocol.
c9:	IF A.162/30A OR A.162/30C THEN m ELSE n/a - - act as first entity within the trust domain for asserted identity, act as entity passing on identity transparently independent of trust domain.
c10:	IF A.162/30 THEN m ELSE n/a - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c11:	IF A.162/30A or A.162/30B THEN m ELSE i - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks or subsequent entity within trust network that can route outside the trust network.
c12:	IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c13:	IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.
c14:	IF A.162/37 THEN m ELSE n/a - - the P-Called-Party-ID header extension.
c15:	IF A.162/37 THEN i ELSE n/a - - the P-Called-Party-ID header extension.
c16:	IF A.162/37 AND A.3/2 THEN m ELSE IF A.162/37 AND (A.3/3 OR A.3/9A) THEN i ELSE n/a - - the P-Called-Party-ID header extension and P-CSCF or (I-CSCF or IBCF (THIG).
c17:	IF A.162/38 THEN m ELSE n/a - - the P-Visited-Network-ID header extension.
c18:	IF A.162/39 THEN m ELSE i - - reading, or deleting the P-Visited-Network-ID header before proxying the request or response.
c19:	IF A.162/45 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c20:	IF A.162/46 THEN m ELSE IF A.162/45 THEN i ELSE n/a - - adding, deleting, reading or modifying the P-Charging-Vector header before proxying the request or response or the P-Charging-Vector header extension.
c21:	IF A.162/44 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c22:	IF A.162/44A THEN m ELSE IF A.162/44 THEN i ELSE n/a - - adding, deleting or reading the P-Charging-Function-Addresses header before proxying the request or response, or the P-Charging-Function-Addresses header extension.
c23:	IF A.162/43 THEN x ELSE IF A.162/41 THEN m ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c24:	IF A.162/43 THEN m ELSE IF A.162/41 THEN i ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c25:	IF A.162/47 THEN o ELSE n/a - - security mechanism agreement for the session initiation protocol (note 1).
c26:	IF A.162/47 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.
c27:	IF A.162/50 THEN m ELSE n/a - - caller preferences for the session initiation protocol.
c28:	IF A.162/50 AND A.4/3 THEN m ELSE IF A.162/50 AND NOT A.4/3 THEN i ELSE n/a - - caller preferences for the session initiation protocol, and S-CSCF.
c29:	IF A.4/20 THEN m ELSE i - - SIP specific event notification extension (note 2).
c30:	IF A.162/53 THEN i ELSE n/a - - the SIP Referred-By mechanism.
c31:	IF A.162/53 THEN m ELSE n/a - - the SIP Referred-By mechanism.
c32:	IF A.162/57 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.
c33:	IF A.162/60 THEN m ELSE n/a - - the P-User-Database private header extension.
c34:	IF A.162/66A THEN m ELSE n/a - - making the first query to the database in order to populate the P-Profile-Key header.
c35:	IF A.162/66B THEN m ELSE n/a - - using the information in the P-Profile-Key header.
c36:	IF A.162/80B THEN m ELSE n/a - - inclusion of CANCEL, BYE, REGISTER and PUBLISH in communications resource priority for the session initiation protocol.
c37:	IF A.162/84A THEN m ELSE n/a - - act as authentication entity within the trust domain for asserted service.
c38:	IF A.162/84 THEN m ELSE n/a - - SIP extension for the identification of services.
c39:	IF A.162/84 OR A.162/30B THEN m ELSE i - - SIP extension for the identification of services or subsequent entity within trust network that can route outside the trust network.
c40:	IF A.162/87 THEN m ELSE n/a - - the SIP P-Private-Network-Indication private-header (P-Header).
c41:	IF A.162/88 THEN m ELSE n/a - - the SIP P-Served-User private header.

c44:	IF A.162/81 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.
c45:	IF A.162/81 AND A.162/6 THEN m ELSE IF A.162/81 AND NOT A.162/6 THEN i ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies, forking of initial requests.
c46:	IF A.162/70 THEN m ELSE n/a - - SIP location conveyance.
c47:	IF A.162/70A THEN m ELSE IF A.162/70B THEN i ELSE n/a - - addition or modification of location in a SIP method, passes on locations in SIP method without modification.
c69:	IF A.162/30C THEN m ELSE x - - act as entity passing on identity transparently independent of trust domain.
NOTE 1:	Support of this header in this method is dependent on the security mechanism and the security architecture which is implemented.
NOTE 2:	c29 refers to the UA role major capability as this is the case of a proxy that also acts as a UA specifically for SUBSCRIBE and NOTIFY.

Prerequisite A.163/15A - - PUBLISH request

Table A.260B: Supported message bodies within the PUBLISH request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

Prerequisite A.163/15B - - PUBLISH response

Prerequisite: A.164/1 - - Additional for 100 (Trying) response

Table A.260BA: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
3	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
4	Date	[26] 20.17	c1	c1	[26] 20.17	c2	c2
5	From	[26] 20.20	m	m	[26] 20.20	m	m
6	To	[26] 20.39	m	m	[26] 20.39	m	m
7	Via	[26] 20.42	m	m	[26] 20.42	m	m
c1:	IF (A.162/9 AND A.162/5) OR A.162/4 THEN m ELSE n/a - - stateful proxy behaviour that inserts date, or stateless proxies.						
c2:	IF A.162/4 THEN i ELSE m - - Stateless proxy passes on.						

Prerequisite A.163/15B - - PUBLISH response for all remaining status-codes

Table A.260C: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Allow	[26] 20.5	m	m	[26] 20.5	i	i
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Call-Info	[26] 24.9	m	m	[26] 24.9	c3	c3
3	Content-Disposition	[26] 20.11	m	m	[26] 20.11	i	i
4	Content-Encoding	[26] 20.12	m	m	[26] 20.12	i	i
5	Content-Language	[26] 20.13	m	m	[26] 20.13	i	i
6	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
7	Content-Type	[26] 20.15	m	m	[26] 20.15	i	i
8	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
9	Date	[26] 20.17	m	m	[26] 20.17	c1	c1
10	From	[26] 20.20	m	m	[26] 20.20	m	m
10A	Geolocation-Error	[89] 4.3	c19	c19	[89] 4.3	c20	c20
10B	History-Info	[66] 4.1	c16	c16	[66] 4.1	c16	c16
11	MIME-Version	[26] 20.24	m	m	[26] 20.24	i	i
12	Organization	[26] 20.25	m	m	[26] 20.25	c2	c2
13	P-Access-Network-Info	[52] 4.4	c13	c13	[52] 4.4	c14	c14
14	P-Asserted-Identity	[34] 9.1	c5	c5	[34] 9.1	c6	c6
15	P-Charging-Function-Addresses	[52] 4.5	c11	c11	[52] 4.5	c12	c12
16	P-Charging-Vector	[52] 4.6	c9	n/a	[52] 4.6	c10	n/a
17	P-Preferred-Identity	[34] 9.2	x	x	[34] 9.2	c4	n/a
18	Privacy	[33] 4.2	c7	c7	[33] 4.2	c8	c8
19	Require	[26] 20.32	m	m	[26] 20.32	c15	c15
20	Server	[26] 20.35	m	m	[26] 20.35	i	i
21	Timestamp	[26] 20.38	m	m	[26] 20.38	i	i
22	To	[26] 20.39	m	m	[26] 20.39	m	m
23	User-Agent	[26] 20.41	m	m	[26] 20.41	i	i
24	Via	[26] 20.42	m	m	[26] 20.42	m	m
25	Warning	[26] 20.43	m	m	[26] 20.43	i	i

c1:	IF A.162/9 THEN m ELSE i - - insertion of date in requests and responses.
c2:	IF A.162/19A OR A.162/19B THEN m ELSE i - - reading, adding or concatenating the Organization header.
c3:	IF A.162/19C OR A.162/19D THEN m ELSE i - - reading, adding or concatenating the Call-Info header.
c4:	IF A.162/30A THEN m ELSE n/a - - act as first entity within the trust domain for asserted identity.
c5:	IF A.162/30 THEN m ELSE n/a - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c6:	IF A.162/30A or A.162/30B THEN m ELSE i - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks or subsequent entity within trust network that can route outside the trust network.
c7:	IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c8:	IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.
c9:	IF A.162/45 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c10:	IF A.162/46 THEN m ELSE IF A.162/45 THEN i ELSE n/a - - adding, deleting, reading or modifying the P-Charging-Vector header before proxying the request or response or the P-Charging-Vector header extension.
c11:	IF A.162/44 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c12:	IF A.162/44A THEN m ELSE IF A.162/44 THEN i ELSE n/a - - adding, deleting or reading the P-Charging-Function-Addresses header before proxying the request or response, or the P-Charging-Function-Addresses header extension.
c13:	IF A.162/43 THEN x ELSE IF A.162/41 THEN m ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c14:	IF A.162/43 THEN m ELSE IF A.162/41 THEN i ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c15:	IF A.162/11 OR A.162/13 THEN m ELSE i - - reading the contents of the Require header before proxying the request or response or adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER.
c16:	IF A.162/57 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.
c19:	IF A.162/70 THEN m ELSE n/a - - SIP location conveyance.
c20:	IF A.162/70A THEN m ELSE IF A.162/70B THEN i ELSE n/a - - addition or modification of location in a SIP method, passes on locations in SIP method without modification.

Prerequisite A.163/15B - - PUBLISH response

Prerequisite: A.164/7 - - Additional for 200 (OK) response

Table A.260D: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c4	c4	[116] 3.2	c4	c4
2	Authentication-Info	[26] 20.6	m	m	[26] 20.6	i	i
3	Expires	[26] 20.19, [70] 4, 5, 6	m	m	[26] 20.19, [70] 4, 5, 6	i	i
4	SIP-Etag	[70] 11.3.1	m	m	[70] 11.3.1	i	i
5	Supported	[26] 20.37	m	m	[26] 20.37	i	i
c4:	IF A.162/80B THEN m ELSE n/a - - inclusion of CANCEL, BYE, REGISTER and PUBLISH in communications resource priority for the session initiation protocol.						

Prerequisite A.163/15B - - PUBLISH response

Prerequisite: A.164/103 OR A.164/104 OR A.164/105 OR A.164/106 - - Additional for 3xx – 6xx response

Table A.260DA: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Error-Info	[26] 20.18	m	m	[26] 20.18	i	i

Prerequisite A.163/15B - - PUBLISH response

Prerequisite: A.164/103 OR A.164/35 - - Additional for 3xx or 485 (Ambiguous) response

Table A.260E: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
2	Contact	[26] 20.10	m	m	[26] 20.10	c1	c1
c1:	IF A.162/19E THEN m ELSE i - - deleting Contact headers.						

Prerequisite A.163/15B - - PUBLISH response

Prerequisite: A.164/8 OR A.164/9 OR A.164/10 OR A.164/11 OR A.164/12 - - Additional for 401 (Unauthorized) response

Table A.260F: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Proxy-Authenticate	[26] 20.27	m	m	[26] 20.27	m	m
5	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	i	i

Prerequisite A.163/15B - - PUBLISH response

Prerequisite: A.164/17 OR A.164/23 OR A.164/30 OR A.164/36 OR A.164/42 OR A.164/45 OR A.164/50 OR A.164/51 - - Additional for 404 (Not Found), 413 (Request Entity Too Large), 480(Temporarily not available), 486 (Busy Here), 500 (Internal Server Error), 503 (Service Unavailable), 600 (Busy Everywhere), 603 (Decline) response

Table A.260G: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Retry-After	[26] 20.33	m	m	[26] 20.33	i	i

Table A.260H: Void

Prerequisite A.163/15B - - PUBLISH response

Prerequisite: A.164/20 - - Additional for 407 (Proxy Authentication Required) response

Table A.260I: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Proxy-Authenticate	[26] 20.27	m	m	[26] 20.27	m	m
5	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	i	i

Prerequisite A.163/15B - - PUBLISH response

Prerequisite: A.164/25 - - Additional for 415 (Unsupported Media Type) response

Table A.260J: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	i	i
2	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
3	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i

Prerequisite A.163/15B - - PUBLISH response

Prerequisite: A.164/26A - - Additional for 417 (Unknown Resource-Priority) response

Table A.260JA: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
c1:	IF A.162/80B THEN m ELSE n/a - - inclusion of CANCEL, BYE, REGISTER and PUBLISH in communications resource priority for the session initiation protocol.						

Prerequisite A.163/15B - - PUBLISH response

Prerequisite: A.164/27 - - Additional for 420 (Bad Extension) response

Table A.260K: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
4	Unsupported	[26] 20.40	m	m	[26] 20.40	c3	c3
c3:	IF A.162/18 THEN m ELSE i - - reading the contents of the Unsupported header before proxying the 420 response to a method other than REGISTER.						

Prerequisite A.163/15B - - PUBLISH response

Prerequisite: A.164/28 OR A.164/41A - - Additional for 421 (Extension Required), 494 (Security Agreement Required) response

Table A.260L: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Security-Server	[48] 2	c1	c1	[48] 2	n/a	n/a
c1:	IF A.162/47 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						

Prerequisite A.163/15B - - PUBLISH response

Prerequisite: A.164/29 - - Additional for 423 (Interval Too Brief) response

Table A.260M: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Min-Expires	[26] 20.23, [70] 5, 6	m	m	[26] 20.23, [70] 5, 6	i	i

Table A.260N: Void

Prerequisite A.163/15B - - PUBLISH response

Prerequisite: A.164/39 - - Additional for 489 (Bad Event) response

Table A.260O: Supported header fields within the PUBLISH response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
2	Allow-Events	[28] 8.2.2	m	m	[28] 8.2.2	i	i

Prerequisite A.163/17 - - PUBLISH response

Table A.260P: Supported message bodies within the PUBLISH response

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

A.2.2.4.11 REFER method

Prerequisite A.163/16 - - REFER request

Table A.261: Supported header fields within the REFER request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Accept	[26] 20.1	m	m	[26] 20.1	i	i
0B	Accept-Contact	[56B] 9.2	c27	c27	[56B] 9.2	c27	c28
0C	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
1	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i
1A	Allow	[26] 20.5	m	m	[26] 20.5	i	i
2	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	c1	c1
3	Authorization	[26] 20.7	m	m	[26] 20.7	i	i
4	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
5	Contact	[26] 20.10	m	m	[26] 20.10	i	i
5A	Content-Disposition	[26] 20.11	m	m	[26] 20.11	i	i
5B	Content-Encoding	[26] 20.12	m	m	[26] 20.12	i	i
5C	Content-Language	[26] 20.13	m	m	[26] 20.13	i	i
6	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
7	Content-Type	[26] 20.15	m	m	[26] 20.15	i	i
8	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
9	Date	[26] 20.17	m	m	[26] 20.17	c2	c2
10	Expires	[26] 20.19	m	m	[26] 20.19	i	i
11	From	[26] 20.20	m	m	[26] 20.20	m	m
11A	Geolocation	[89] 4.1	c35	c35	[89] 4.1	c36	c36
11B	Geolocation-Routing	[89] 4.1	c35	c35	[89] 4.1	c36	c36
11C	History-Info	[66] 4.1	c31	c31	[66] 4.1	c31	c31
11D	Max-Breadth	[117] 5.8	c40	c40	[117] 5.8	c41	c41
12	Max-Forwards	[26] 20.22	m	m	[26] 20.22	m	m
13	MIME-Version	[26] 20.24	m	m	[26] 20.24	i	i
14	Organization	[26] 20.25	m	m	[26] 20.25	c3	c3
14A	P-Access-Network-Info	[52] 4.4	c22	c22	[52] 4.4	c23	c23
14B	P-Asserted-Identity	[34] 9.1	c9	c9	[34] 9.1	c10	c10
14C	P-Asserted-Service	[121] 4.1	c38	c38	[121] 4.1	c39	c39
14D	P-Called-Party-ID	[52] 4.2	c13	c13	[52] 4.2	c14	c15
14E	P-Charging-Function-Addresses	[52] 4.5	c20	c20	[52] 4.5	c21	c21
14F	P-Charging-Vector	[52] 4.6	c18	c18	[52] 4.6	c19	c19
14H	P-Preferred-Identity	[34] 9.2	x	c69	[34] 9.2	c8	c8
14I	P-Preferred-Service	[121] 4.2	x	x	[121] 4.2	c37	c37
14J	P-Private-Network-Indication	[134]	c50	c50	[134]	c50	c50
14K	P-Profile-Key	[97] 5	c33	c33	[97] 5	c34	c34
14L	P-Served-User	[133] 6	c53	c53	[133] 6	c53	c53
14M	P-User-Database	[82] 4	c32	c32	[82] 4	c32	c32
14N	P-Visited-Network-ID	[52] 4.3	c16	n/a	[52] 4.3	c17	n/a
14O	Privacy	[33] 4.2	c11	c11	[33] 4.2	c12	c12
15	Proxy-Authorization	[26] 20.28	m	m	[26] 20.28	c4	c4
16	Proxy-Require	[26] 20.29	m	m	[26] 20.29	m	m
16A	Reason	[34A] 2	c25	c25	[34A] 2	c26	c26
17	Record-Route	[26] 20.30	m	m	[26] 20.30	c7	c7
18	Refer-To	[36] 3	c3	c3	[36] 3	c4	c4
18A	Referred-By	[59] 3	c29	c29	[59] 3	c30	c30
18B	Reject-Contact	[56B] 9.2	c27	c27	[56B] 9.2	c27	c28
18C	Request-Disposition	[56B] 9.1	c27	c27	[56B] 9.1	c27	c27
19	Require	[26] 20.32	m	m	[26] 20.32	c5	c5
19A	Resource-Priority	[116] 3.1	c47	c47	[116] 3.1	c47	c47
20	Route	[26] 20.34	m	m	[26] 20.34	m	m
20A	Security-Client	[48] 2.3.1	x	x	[48] 2.3.1	c24	c24
20B	Security-Verify	[48] 2.3.1	x	x	[48] 2.3.1	c24	c24
21	Supported	[26] 20.37	m	m	[26] 20.37	c6	c6
21A	Target-Dialog	[184] 7	c71	c71	[184] 7	c72	c72
22	Timestamp	[26] 20.38	m	m	[26] 20.38	i	i

23	To	[26] 20.39	m	m	[26] 20.39	m	m
23A	Trigger-Consent	[125] 5.11.2	c48	c48	[125] 5.11.2	c49	c49
24	User-Agent	[26] 20.41	m	m	[26] 20.41	i	i
25	Via	[26] 20.42	m	m	[26] 20.42	m	m

c1:	IF A.4/20 THEN m ELSE i - - SIP specific event notification extension.
c2:	IF A.162/9 THEN m ELSE i - - insertion of date in requests and responses.
c3:	IF A.162/19A OR A.162/19B THEN m ELSE i - - reading, adding or concatenating the Organization header.
c4:	IF A.162/8A THEN m ELSE i - - authentication between UA and proxy.
c5:	IF A.162/11 OR A.162/13 THEN m ELSE i - - reading the contents of the Require header before proxying the request or response or adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER.
c6:	IF A.162/16 THEN m ELSE i - - reading the contents of the Supported header before proxying the response.
c7:	IF A.162/14 THEN m ELSE i - - the requirement to be able to insert itself in the subsequent transactions in a dialog.
c8:	IF A.162/30A OR A.162/30C THEN m ELSE n/a - - act as first entity within the trust domain for asserted identity, act as entity passing on identity transparently independent of trust domain.
c9:	IF A.162/30 THEN m ELSE n/a - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c10:	IF A.162/30A or A.162/30B THEN m ELSE i - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks or subsequent entity within trust network that can route outside the trust network.
c11:	IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c12:	IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.
c13:	IF A.162/37 THEN m ELSE n/a - - the P-Called-Party-ID header extension.
c14:	IF A.162/37 THEN i ELSE n/a - - the P-Called-Party-ID header extension.
c15:	IF A.162/37 AND A.3/2 THEN m ELSE IF A.162/37 AND (A.3/3 OR A.3/9A) THEN i ELSE n/a - - the P-Called-Party-ID header extension and P-CSCF or (I-CSCF or IBCF (THIG).
c16:	IF A.162/38 THEN m ELSE n/a - - the P-Visited-Network-ID header extension.
c17:	IF A.162/39 THEN m ELSE i - - reading, or deleting the P-Visited-Network-ID header before proxying the request or response.
c18:	IF A.162/45 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c19:	IF A.162/46 THEN m ELSE IF A.162/45 THEN i ELSE n/a - - adding, deleting, reading or modifying the P-Charging-Vector header before proxying the request or response or the P-Charging-Vector header extension.
c20:	IF A.162/44 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c21:	IF A.162/44A THEN m ELSE IF A.162/44 THEN i ELSE n/a - - adding, deleting or reading the P-Charging-Function-Addresses header before proxying the request or response, or the P-Charging-Function-Addresses header extension.
c22:	IF A.162/43 THEN x ELSE IF A.162/41 THEN m ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c23:	IF A.162/43 THEN m ELSE IF A.162/41 THEN i ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c24:	IF A.162/47 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.
c25:	IF A.162/48 THEN m ELSE n/a - - the Reason header field for the session initiation protocol.
c26:	IF A.162/48 THEN i ELSE n/a - - the Reason header field for the session initiation protocol.
c27:	IF A.162/50 THEN m ELSE n/a - - caller preferences for the session initiation protocol.
c28:	IF A.162/50 AND A.4/3 THEN m ELSE IF A.162/50 AND NOT A.4/3 THEN i ELSE n/a - - caller preferences for the session initiation protocol, and S-CSCF.
c29:	IF A.162/53 THEN i ELSE n/a - - the SIP Referred-By mechanism.
c30:	IF A.162/53 THEN m ELSE n/a - - the SIP Referred-By mechanism.
c31:	IF A.162/57 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.
c32:	IF A.162/60 THEN m ELSE n/a - - the P-User-Database private header extension.
c33:	IF A.162/66A THEN m ELSE n/a - - making the first query to the database in order to populate the P-Profile-Key header.
c34:	IF A.162/66B THEN m ELSE n/a - - using the information in the P-Profile-Key header.
c35:	IF A.162/70 THEN m ELSE n/a - - SIP location conveyance.
c36:	IF A.162/70A THEN m ELSE IF A.162/70B THEN i ELSE n/a - - addition or modification of location in a SIP method, passes on locations in SIP method without modification.
c37:	IF A.162/84A THEN m ELSE n/a - - act as authentication entity within the trust domain for asserted service.
c38:	IF A.162/84 THEN m ELSE n/a - - SIP extension for the identification of services.
c39:	IF A.162/84 OR A.162/30B THEN m ELSE i - - SIP extension for the identification of services or subsequent entity within trust network that can route outside the trust network.
c40:	IF A.162/81 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.
c41:	IF A.162/81 AND A.162/6 THEN m ELSE IF A.162/81 AND NOT A.162/6 THEN i ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies, forking of initial requests.

c47:	IF A.162/80 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.
c48:	IF A.162/85 THEN m ELSE n/a - - a framework for consent-based communications in SIP.
c49:	IF A.162/85 THEN i ELSE n/a - - a framework for consent-based communications in SIP.
c50:	IF A.162/87 THEN m ELSE n/a - - the SIP P-Private-Network-Indication private-header (P-Header).
c53:	IF A.162/88 THEN m ELSE n/a - - the SIP P-Served-User private header.
c69:	IF A.162/30C THEN m ELSE x - - act as entity passing on identity transparently independent of trust domain.
c71:	IF A.162/109 THEN m ELSE n/a - - request authorization through dialog Identification in the session initiation protocol.
c72:	IF A.162/109 THEN i ELSE n/a - - request authorization through dialog Identification in the session initiation protocol.
NOTE:	c1 refers to the UA role major capability as this is the case of a proxy that also acts as a UA specifically for SUBSCRIBE and NOTIFY.

Prerequisite A.163/16 - - REFER request

Table A.262: Supported message bodies within the REFER request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

Table A.263: Void

Prerequisite A.163/17 - - REFER response

Prerequisite: A.164/1 - - Additional for 100 (Trying) response

Table A.263A: Supported header fields within the REFER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
3	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
4	Date	[26] 20.17	c1	c1	[26] 20.17	c2	c2
5	From	[26] 20.20	m	m	[26] 20.20	m	m
6	To	[26] 20.39	m	m	[26] 20.39	m	m
7	Via	[26] 20.42	m	m	[26] 20.42	m	m
c1:	IF (A.162/9 AND A.162/5) OR A.162/4 THEN m ELSE n/a - - stateful proxy behaviour that inserts date, or stateless proxies.						
c2:	IF A.162/4 THEN i ELSE m - - Stateless proxy passes on.						

Prerequisite A.163/17 - - REFER response for all remaining status-codes

Table A.264: Supported header fields within the REFER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Allow	[26] 20.5	m	m	[26] 20.5	i	i
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
1A	Contact	[26] 20.10	m	m	[26] 20.10	i	i
1B	Content-Disposition	[26] 20.11	m	m	[26] 20.11	i	i
2	Content-Encoding	[26] 20.12	m	m	[26] 20.12	i	i
3	Content-Language	[26] 20.13	m	m	[26] 20.13	i	i
4	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
5	Content-Type	[26] 20.15	m	m	[26] 20.15	i	i
6	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
7	Date	[26] 20.17	m	m	[26] 20.17	c1	c1
8	From	[26] 20.20	m	m	[26] 20.20	m	m
8A	Geolocation-Error	[89] 4.3	c16	c16	[89] 4.3	c17	c17
8B	History-Info	[66] 4.1	c15	c15	[66] 4.1	c15	c15
9	MIME-Version	[26] 20.24	m	m	[26] 20.24	i	i
10	Organization	[26] 20.25	m	m	[26] 20.25	c2	c2
10A	P-Access-Network-Info	[52] 4.4	c12	c12	[52] 4.4	c13	c13
10B	P-Asserted-Identity	[34] 9.1	c4	c4	[34] 9.1	c5	c5
10C	P-Charging-Function-Addresses	[52] 4.5	c10	c10	[52] 4.5	c11	c11
10D	P-Charging-Vector	[52] 4.6	c8	c8	[52] 4.6	c9	c9
10F	P-Preferred-Identity	[34] 9.2	x	x	[34] 9.2	c3	n/a
10G	Privacy	[33] 4.2	c6	c6	[33] 4.2	c7	c7
10H	Require	[26] 20.32	m	m	[26] 20.32	c14	c14
10I	Server	[26] 20.35	m	m	[26] 20.35	i	i
11	Timestamp	[26] 20.38	m	m	[26] 20.38	i	i
12	To	[26] 20.39	m	m	[26] 20.39	m	m
12A	User-Agent	[26] 20.41	m	m	[26] 20.41	i	i
13	Via	[26] 20.42	m	m	[26] 20.42	m	m
14	Warning	[26] 20.43	m	m	[26] 20.43	i	i

c1:	IF A.162/9 THEN m ELSE i - - insertion of date in requests and responses.
c2:	IF A.162/19A OR A.162/19B THEN m ELSE i - - reading, adding or concatenating the Organization header.
c3:	IF A.162/30A THEN m ELSE n/a - - act as first entity within the trust domain for asserted identity.
c4:	IF A.162/30 THEN m ELSE n/a - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c5:	IF A.162/30A or A.162/30B THEN m ELSE i - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks or subsequent entity within trust network that can route outside the trust network.
c6:	IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c7:	IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.
c8:	IF A.162/45 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c9:	IF A.162/46 THEN m ELSE IF A.162/45 THEN i ELSE n/a - - adding, deleting, reading or modifying the P-Charging-Vector header before proxying the request or response or the P-Charging-Vector header extension.
c10:	IF A.162/44 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c11:	IF A.162/44A THEN m ELSE IF A.162/44 THEN i ELSE n/a - - adding, deleting or reading the P-Charging-Function-Addresses header before proxying the request or response, or the P-Charging-Function-Addresses header extension.
c12:	IF A.162/43 THEN x ELSE IF A.162/41 THEN m ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c13:	IF A.162/43 THEN m ELSE IF A.162/41 THEN i ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c14:	IF A.162/11 OR A.162/13 THEN m ELSE i - - reading the contents of the Require header before proxying the request or response or adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER.
c15:	IF A.162/57 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.
c16:	IF A.162/70 THEN m ELSE n/a - - SIP location conveyance.
c17:	IF A.162/70A THEN m ELSE IF A.162/70B THEN i ELSE n/a - - addition or modification of location in a SIP method, passes on locations in SIP method without modification.

Prerequisite A.163/17 - - REFER response

Prerequisite: A.164/102 - - Additional for 2xx response

Table A.265: Supported header fields within the REFER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Accept-Resource-Priority	[116] 3.2	c12	c12	[116] 3.2	c12	c12
1	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	c1	c1
2	Authentication-Info	[26] 20.6	m	m	[26] 20.6	i	i
5	Record-Route	[26] 20.30	m	m	[26] 20.30	c3	c3
8	Supported	[26] 20.37	m	m	[26] 20.37	i	i
c1:	IF A.4/20 THEN m ELSE i - - SIP specific event notification extension.						
c3:	IF A.162/15 THEN m ELSE i - - the requirement to be able to use separate URIs in the upstream direction and downstream direction when record routeing.						
c12:	IF A.162/80 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.						

Prerequisite A.163/17 - - REFER response

Prerequisite: A.164/103 OR A.164/104 OR A.164/105 OR A.164/106 - - Additional for 3xx – 6xx response

Table A.265A: Supported header fields within the REFER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Error-Info	[26] 20.18	m	m	[26] 20.18	i	i

Table A.266: Void

Prerequisite A.163/17 - - REFER response

Prerequisite: A.164/8 OR A.164/9 OR A.164/10 OR A.164/11 OR A.164/12 - - Additional for 401 (Unauthorized) response

Table A.267: Supported header fields within the REFER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
4	Proxy-Authenticate	[26] 20.27	m	m	[26] 20.27	m	m
10	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	i	i

Prerequisite A.163/17 - - REFER response

Prerequisite: A.164/17 OR A.164/23 OR A.164/30 OR A.164/36 OR A.164/42 OR A.164/45 OR A.164/50 OR A.164/51 - - Additional for 404 (Not Found), 413 (Request Entity Too Large), 480(Temporarily not available), 486 (Busy Here), 500 (Internal Server Error), 503 (Service Unavailable), 600 (Busy Everywhere), 603 (Decline) response

Table A.268: Supported header fields within the REFER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
6	Retry-After	[26] 20.33	m	m	[26] 20.33	i	i

Table A.269: Void

Prerequisite A.163/17 - - REFER response

Prerequisite: A.164/20 - - Additional for 407 (Proxy Authentication Required) response

Table A.270: Supported header fields within the REFER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
4	Proxy-Authenticate	[26] 20.27	o		[26] 20.27	o	
8	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	i	i

Prerequisite A.163/17 - - REFER response

Prerequisite: A.164/25 - - Additional for 415 (Unsupported Media Type) response

Table A.271: Supported header fields within the REFER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	i	i
2	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
3	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i

Prerequisite A.163/17 - - REFER response

Prerequisite: A.164/26A - - Additional for 417 (Unknown Resource-Priority) response

Table A.271A: Supported header fields within the REFER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
c1:	IF A.162/80 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.						

Prerequisite A.163/17 - - REFER response

Prerequisite: A.164/27 - - Additional for 420 (Bad Extension) response

Table A.272: Supported header fields within the REFER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
8	Unsupported	[26] 20.40	m	m	[26] 20.40	c3	c3
c3:	IF A.162/18 THEN m ELSE i - - reading the contents of the Unsupported header before proxying the 420 response to a method other than REGISTER.						

Prerequisite A.163/17 - - REFER response

Prerequisite: A.164/28 OR A.164/41A - - Additional for 421 (Extension Required), 494 (Security Agreement Required) response

Table A.272A: Supported header fields within the REFER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Security-Server	[48] 2	c1	c1	[48] 2	n/a	n/a
c1:	IF A.162/47 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						

Table A.273: Void

Prerequisite A.163/17 - - REFER response

Prerequisite: A.164/29H - - Additional for 470 (Consent Needed) response

Table A.273A: Supported header fields within the REFER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Permission-Missing	[125] 5.9.3	m	m	[125] 5.9.3	m	m

Prerequisite A.163/17 - - REFER response

Table A.274: Supported message bodies within the REFER response

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

A.2.2.4.12 REGISTER method

Prerequisite A.163/18 - - REGISTER request

Table A.275: Supported header fields within the REGISTER request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	i	i
2	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
3	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i
3A	Allow	[26] 20.5	m	m	[26] 20.5	i	i
4	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	c1	c1
5	Authorization	[26] 20.7, [49]	m	m	[26] 20.7, [49]	i	i
6	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
7	Call-Info	[26] 20.9	m	m	[26] 20.9	c2	c2
8	Contact	[26] 20.10	m	m	[26] 20.10	i	i
9	Content-Disposition	[26] 20.11	m	m	[26] 20.11	i	i
10	Content-Encoding	[26] 20.12	m	m	[26] 20.12	i	i
11	Content-Language	[26] 20.13	m	m	[26] 20.13	i	i
12	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
13	Content-Type	[26] 20.15	m	m	[26] 20.15	i	i
14	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
15	Date	[26] 20.17	m	m	[26] 20.17	m	m
16	Expires	[26] 20.19	m	m	[26] 20.19	i	i
17	From	[26] 20.20	m	m	[26] 20.20	m	m
17A	Geolocation	[89] 4.1	c26	c26	[89] 4.1	c27	c27
17B	Geolocation-Routing	[89] 4.1	c26	c26	[89] 4.1	c27	c27
17C	History-Info	[66] 4.1	c24	c24	[66] 4,1	c24	c24
17D	Max-Breadth	[117] 5.8	c31	c31	[117] 5.8	c32	c32
18	Max-Forwards	[26] 20.22	m	m	[26] 20.22	m	m
19	MIME-Version	[26] 20.24	m	m	[26] 20.24	i	i
20	Organization	[26] 20.25	m	m	[26] 20.25	c3	c3
20A	P-Access-Network-Info	[52] 4.4	c16	c16	[52] 4.4	c17	c17
20B	P-Charging-Function-Addresses	[52] 4.5	c14	c14	[52] 4.5	c15	c15
20C	P-Charging-Vector	[52] 4.6	c12	c12	[52] 4.6	c13	c13
20E	P-User-Database	[82] 4	c25	c25	[82] 4	n/a	n/a
20F	P-Visited-Network-ID	[52] 4.3	c10	c10	[52] 4.3	c11	c11
20G	Path	[35] 4.2	c6	c6	[35] 4.2	c6	c6
20H	Privacy	[33] 4.2	c8	c8	[33] 4.2	c9	c9
21	Proxy-Authorization	[26] 20.28	m	m	[26] 20.28	c7	c7
22	Proxy-Require	[26] 20.29	m	m	[26] 20.29	m	m
22A	Reason	[34A] 2	c19	c19	[34A] 2	c20	c20
22B	Recv-Info	[25] 5.2.3	c33	c33	[25] 5.2.3	c34	c34
22C	Referred-By	[59] 3	c22	c22	[59] 3	c23	c23
22D	Request-Disposition	[56B] 9.1	c21	c21	[56B] 9.1	c21	c21
23	Require	[26] 20.32	m	m	[26] 20.32	c4	c4
23A	Resource-Priority	[116] 3.1	c28	c28	[116] 3.1	c28	c28
24	Route	[26] 20.34	m	m	[26] 20.34	m	m
24A	Security-Client	[48] 2.3.1	x	x	[48] 2.3.1	c18	c18
24B	Security-Verify	[48] 2.3.1	x	x	[48] 2.3.1	c18	c18
25	Supported	[26] 20.37	m	m	[26] 20.37	c5	c5
26	Timestamp	[26] 20.38	m	m	[26] 20.38	i	i
27	To	[26] 20.39	m	m	[26] 20.39	m	m
28	User-Agent	[26] 20.41	m	m	[26] 20.41	i	i
29	Via	[26] 20.42	m	m	[26] 20.42	m	m

c1:	IF A.4/20 THEN m ELSE i - - SIP specific event notification extension.
c2:	IF A.162/19C OR A.162/19D THEN m ELSE i - - reading, adding or concatenating the Call-Info header.
c3:	IF A.162/19A OR A.162/19B THEN m ELSE i - - reading, adding or concatenating the Organization header.
c4:	IF A.162/11 OR A.162/12 THEN m ELSE i - - reading the contents of the Require header before proxying the request or response or adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER.
c5:	IF A.162/16 THEN m ELSE i - - reading the contents of the Supported header before proxying the response.
c6:	IF A.162/29 THEN m ELSE n/a - - PATH header support.
c7:	IF A.162/8A THEN m ELSE i - - authentication between UA and proxy.
c8:	IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c9:	IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.
c10:	IF A.162/38 THEN m ELSE n/a - - the P-Visited-Network-ID header extension.
c11:	IF A.162/39 THEN m ELSE i - - reading, or deleting the P-Visited-Network-ID header before proxying the request or response.
c12:	IF A.162/45 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c13:	IF A.162/46 THEN m ELSE IF A.162/45 THEN i ELSE n/a - - adding, deleting, reading or modifying the P-Charging-Vector header before proxying the request or response or the P-Charging-Vector header extension.
c14:	IF A.162/44 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c15:	IF A.162/44A THEN m ELSE IF A.162/44 THEN i ELSE n/a - - adding, deleting or reading the P-Charging-Function-Addresses header before proxying the request or response, or the P-Charging-Function-Addresses header extension.
c16:	IF A.162/43 THEN x ELSE IF A.162/41 THEN m ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c17:	IF A.162/43 THEN m ELSE IF A.162/41 THEN i ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c18:	IF A.162/47 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.
c19:	IF A.162/48 THEN m ELSE n/a - - the Reason header field for the session initiation protocol.
c20:	IF A.162/48 THEN i ELSE n/a - - the Reason header field for the session initiation protocol.
c21:	IF A.162/50 THEN m ELSE n/a - - caller preferences for the session initiation protocol.
c22:	IF A.162/53 THEN i ELSE n/a - - the SIP Referred-By mechanism.
c23:	IF A.162/53 THEN m ELSE n/a - - the SIP Referred-By mechanism.
c24:	IF A.162/57 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.
c25:	IF A.162/60 THEN m ELSE n/a - - the P-User-Database private header extension.
c26:	IF A.162/70 THEN m ELSE n/a - - SIP location conveyance.
c27:	IF A.162/70A THEN m ELSE IF A.162/70B THEN i ELSE n/a - - addition or modification of location in a SIP method, passes on locations in SIP method without modification.
c28:	IF A.162/80B THEN m ELSE n/a - - inclusion of CANCEL, BYE, REGISTER and PUBLISH in communications resource priority for the session initiation protocol.
c31:	IF A.162/81 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.
c32:	IF A.162/81 AND A.162/6 THEN m ELSE IF A.162/81 AND NOT A.162/6 THEN i ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies, forking of initial requests.
c33:	IF A.162/20 THEN m ELSE n/a - - SIP INFO method and package framework.
c34:	IF A.162/20 THEN i ELSE n/a - - SIP INFO method and package framework.
NOTE:	c1 refers to the UA role major capability as this is the case of a proxy that also acts as a UA specifically for SUBSCRIBE and NOTIFY.

Prerequisite A.163/18 - - REGISTER request

Table A.276: Supported message bodies within the REGISTER request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

Table A.277: Void

Prerequisite A.163/19 - - REGISTER response

Prerequisite: A.164/1 - - Additional for 100 (Trying) response

Table A.277A: Supported header fields within the REGISTER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
3	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
4	Date	[26] 20.17	c1	c1	[26] 20.17	c2	c2
5	From	[26] 20.20	m	m	[26] 20.20	m	m
6	To	[26] 20.39	m	m	[26] 20.39	m	m
7	Via	[26] 20.42	m	m	[26] 20.42	m	m
c1:	IF (A.162/9 AND A.162/5) OR A.162/4 THEN m ELSE n/a - - stateful proxy behaviour that inserts date, or stateless proxies.						
c2:	IF A.162/4 THEN i ELSE m - - Stateless proxy passes on.						

Prerequisite A.163/19 - - REGISTER response for all remaining status-codes

Table A.278: Supported header fields within the REGISTER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Allow	[26] 20.5	m	m	[26] 20.5	i	i
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
1A	Call-Info	[26] 20.9	m	m	[26] 20.9	c2	c2
2	Content-Disposition	[26] 20.11	m	m	[26] 20.11	i	i
3	Content-Encoding	[26] 20.12	m	m	[26] 20.12	i	i
4	Content-Language	[26] 20.13	m	m	[26] 20.13	i	i
5	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
6	Content-Type	[26] 20.15	m	m	[26] 20.15	i	i
7	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
8	Date	[26] 20.17	m	m	[26] 20.17	m	m
9	From	[26] 20.20	m	m	[26] 20.20	m	m
9A	Geolocation-Error	[89] 4.3	c13	c13	[89] 4.3	c14	c14
9B	History-Info	[66] 4.1	c12	c12	[66] 4.1	c12	c12
10	MIME-Version	[26] 20.24	m	m	[26] 20.24	i	i
11	Organization	[26] 20.25	m	m	[26] 20.25	c1	c1
11A	P-Access-Network-Info	[52] 4.4	c9	c9	[52] 4.4	c10	c10
11B	P-Charging-Function-Addresses	[52] 4.5	c7	c7	[52] 4.5	c8	c8
11C	P-Charging-Vector	[52] 4.6	c5	c5	[52] 4.6	c6	c6
11E	Privacy	[33] 4.2	c3	c3	[33] 4.2	c4	c4
11F	Require	[26] 20.32	m	m	[26] 20.32	c11	c11
11G	Server	[26] 20.35	m	m	[26] 20.35	i	i
12	Timestamp	[26] 20.38	m	m	[26] 20.38	i	i
13	To	[26] 20.39	m	m	[26] 20.39	m	m
13A	User-Agent	[26] 20.41	m	m	[26] 20.41	i	i
14	Via	[26] 20.42	m	m	[26] 20.42	m	m
15	Warning	[26] 20.43	m	m	[26] 20.43	i	i

c1: IF A.162/19A OR A.162/19B THEN m ELSE i - - reading, adding or concatenating the Organization header.
c2: IF A.162/19C OR A.162/19D THEN m ELSE i - - reading, adding or concatenating the Call-Info header.
c3: IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c4: IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.
c5: IF A.162/45 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c6: IF A.162/46 THEN m ELSE IF A.162/45 THEN i ELSE n/a - - adding, deleting, reading or modifying the P-Charging-Vector header before proxying the request or response or the P-Charging-Vector header extension.
c7: IF A.162/44 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c8: IF A.162/44A THEN m ELSE IF A.162/44 THEN i ELSE n/a - - adding, deleting or reading the P-Charging-Function-Addresses header before proxying the request or response, or the P-Charging-Function-Addresses header extension.
c9: IF A.162/43 THEN x ELSE IF A.162/41 THEN m ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c10: IF A.162/43 THEN m ELSE IF A.162/41 THEN i ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c11: IF A.162/11 OR A.162/12 THEN m ELSE i - - reading the contents of the Require header before proxying the request or response or adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER.
c12: IF A.162/57 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.
c13: IF A.162/70 THEN m ELSE n/a - - SIP location conveyance.
c14: IF A.162/70A THEN m ELSE IF A.162/70B THEN i ELSE n/a - - addition or modification of location in a SIP method, passes on locations in SIP method without modification.

Prerequisite A.163/19 - - REGISTER response

Prerequisite: A.164/102 - - Additional for 2xx response

Table A.279: Supported header fields within the REGISTER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	i	i
1A	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
1B	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i
1C	Accept-Resource-Priority	[116] 3.2	c11	c11	[116] 3.2	c11	c11
2	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	c1	c1
3	Authentication-Info	[26] 20.6	m	m	[26] 20.6	i	i
5	Contact	[26] 20.10	m	m	[26] 20.10	i	i
5A	Flow-Timer	[92] 11	c12	c12	[92] 11	c13	c14
5B	P-Associated-URI	[52] 4.1	c8	c8	[52] 4.1	c9	c10
6	Path	[35] 4.2	c3	c3	[35] 4.2	c4	c4
8	Service-Route	[38] 5	c5	c5	[38] 5	c6	c7
9	Supported	[26] 20.37	m	m	[26] 20.37	i	i
c1:	IF A.4/20 THEN m ELSE i - - SIP specific event notification extension.						
c3:	IF A.162/29 THEN m ELSE n/a - - Path extension support.						
c4:	IF A.162/29 THEN i ELSE n/a - - Path extension support.						
c5:	IF A.162/32 THEN m ELSE n/a - - Service-Route extension support.						
c6:	IF A.162/32 THEN i ELSE n/a - - Service-Route extension support.						
c7:	IF A.162/32 THEN (IF A.3/2 THEN m ELSE i) ELSE n/a - - Service-Route extension and P-CSCF.						
c8:	IF A.162/36 THEN m ELSE n/a - - the P-Associated-URI extension.						
c9:	IF A.162/36 THEN i ELSE n/a - - the P-Associated-URI extension.						
c10:	IF A.162/36 AND A.3/2 THEN m ELSE IF A.162/36 AND (A.3/3 OR A.3/9A) THEN i ELSE n/a - - the P-Associated-URI extension and P-CSCF or I-CSCF or IBCF (THIG).						
c11:	IF A.162/80B THEN m ELSE n/a - - inclusion of CANCEL, BYE, REGISTER and PUBLISH in communications resource priority for the session initiation protocol.						
c12:	IF A.162/67 THEN m ELSE n/a - - managing client initiated transactions in SIP.						
c13:	IF A.162/67 THEN m ELSE n/a - - managing client initiated transactions in SIP, P-CSCF, I-CSCF.						
c14:	IF A.162/67 AND A.3/2 THEN m ELSE IF A.162/67 AND A.3/3 THEN i ELSE n/a - - managing client initiated transactions in SIP, P-CSCF, I-CSCF.						

Prerequisite A.163/19 - - REGISTER response

Prerequisite: A.164/103 OR A.164/104 OR A.164/105 OR A.164/106 - - Additional for 3xx – 6xx response

Table A.279A: Supported header fields within the REGISTER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Error-Info	[26] 20.18	m	m	[26] 20.18	i	i

Prerequisite A.163/19 - - REGISTER response

Prerequisite: A.164/103 OR A.164/35 - - Additional for 3xx or 485 (Ambiguous) response

Table A.280: Supported header fields within the REGISTER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Contact	[26] 20.10	m	m	[26] 20.10	c2	c2
c2:	IF A.162/19E THEN m ELSE i - - deleting Contact headers.						

Prerequisite A.163/19 - - REGISTER response

Prerequisite: A.164/14 - - Additional for 401 (Unauthorized) response

Table A.281: Supported header fields within the REGISTER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
4	Proxy-Authenticate	[26] 20.27	m	m	[26] 20.27	m	m
6	Security-Server	[48] 2	x	c1	[48] 2	n/a	n/a
10	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	i	i
c1:	IF A.162/47 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						

Prerequisite A.163/19 - - REGISTER response

Prerequisite: A.164/17 OR A.164/23 OR A.164/30 OR A.164/36 OR A.164/42 OR A.164/45 OR A.164/50 OR A.164/51 - - Additional for 404 (Not Found), 413 (Request Entity Too Large), 480(Temporarily not available), 486 (Busy Here), 500 (Internal Server Error), 503 (Service Unavailable), 600 (Busy Everywhere), 603 (Decline) response

Table A.282: Supported header fields within the REGISTER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
6	Retry-After	[26] 20.33	m	m	[26] 20.33	i	i

Table A.283: Void

Prerequisite A.163/19 - - REGISTER response

Prerequisite: A.164/20 - - Additional for 407 (Proxy Authentication Required) response

Table A.284: Supported header fields within the REGISTER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
5	Proxy-Authenticate	[26] 20.27	m	m	[26] 20.27	m	m
9	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	i	i

Prerequisite A.163/19 - - REGISTER response

Prerequisite: A.164/25 - - Additional for 415 (Unsupported Media Type) response

Table A.285: Supported header fields within the REGISTER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	i	i
2	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
3	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i

Prerequisite A.163/19 - - REGISTER response

Prerequisite: A.164/26A - - Additional for 417 (Unknown Resource-Priority) response

Table A.285A: Supported header fields within the REGISTER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
c1:	IF A.162/80B THEN m ELSE n/a - - inclusion of CANCEL, BYE, REGISTER and PUBLISH in communications resource priority for the session initiation protocol.						

Prerequisite A.163/19 - - REGISTER response

Prerequisite: A.164/27 - - Additional for 420 (Bad Extension) response

Table A.286: Supported header fields within the REGISTER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
8	Unsupported	[26] 20.40	m	m	[26] 20.40	c3	c3
c3:	IF A.162/17 THEN m ELSE.i						

Prerequisite A.163/19 - - REGISTER response

Prerequisite: A.164/28 OR A.164/41A - - Additional for 421 (Extension Required), 494 (Security Agreement Required) response

Table A.286A: Supported header fields within the REGISTER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Security-Server	[48] 2	c1	c1	[48] 2	n/a	n/a
c1:	IF A.162/47 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						

Prerequisite A.163/19 - - REGISTER response

Prerequisite: A.164/29 - - Additional for 423 (Interval Too Brief) response

Table A.287: Supported header fields within the REGISTER response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
5	Min-Expires	[26] 20.23	m	m	[26] 20.23	i	i

Table A.288: Void

Prerequisite A.163/19 - - REGISTER response

Table A.289: Supported message bodies within the REGISTER response

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

A.2.2.4.13 SUBSCRIBE method

Prerequisite A.163/20 - - SUBSCRIBE request

Table A.290: Supported header fields within the SUBSCRIBE request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	i	i
1A	Accept-Contact	[56B] 9.2	c27	c27	[56B] 9.2	c27	c28
2	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
3	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i
3A	Allow	[26] 20.5	m	m	[26] 20.5	i	i
4	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	c1	c1
5	Authorization	[26] 20.7	m	m	[26] 20.7	i	i
6	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
6A	Call-Info	[26] 20.9	m	m	[26] 20.9	c73	c73
6B	Contact	[26] 20.10	m	m	[26] 20.10	i	i
7	Content-Disposition	[26] 20.11	m	m	[26] 20.11	i	i
8	Content-Encoding	[26] 20.12	m	m	[26] 20.12	i	i
9	Content-Language	[26] 20.13	m	m	[26] 20.13	i	i
10	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
11	Content-Type	[26] 20.15	m	m	[26] 20.15	i	i
12	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
13	Date	[26] 20.17	m	m	[26] 20.17	c2	c2
14	Event	[28] 7.2.1	m	m	[28] 7.2.1	m	m
15	Expires	[26] 20.19	m	m	[26] 20.19	i	i
16	From	[26] 20.20	m	m	[26] 20.20	m	m
16A	Geolocation	[89] 4.1	c35	c35	[89] 4.1	c36	c36
16B	Geolocation-Routing	[89] 4.1	c35	c35	[89] 4.1	c36	c36
16C	History-Info	[66] 4.1	c31	c31	[66] 4.1	c31	c31
16D	Max-Breadth	[117] 5.8	c47	c47	[117] 5.8	c48	c48
17	Max-Forwards	[26] 20.22	m	m	[26] 20.22	m	m
18	MIME-Version	[26] 20.24	m	m	[26] 20.24	i	i
18A	Organization	[26] 20.25	m	m	[26] 20.25	c3	c3
18B	P-Access-Network-Info	[52] 4.4	c22	c22	[52] 4.4	c23	c23
18C	P-Asserted-Identity	[34] 9.1	c9	c9	[34] 9.1	c10	c10
18D	P-Asserted-Service	[121] 4.1	c39	c39	[121] 4.1	c40	c40
18E	P-Called-Party-ID	[52] 4.2	c13	c13	[52] 4.2	c14	c15
18F	P-Charging-Function-Addresses	[52] 4.5	c20	c20	[52] 4.5	c21	c21
18G	P-Charging-Vector	[52] 4.6	c18	c18	[52] 4.6	c19	c19
18I	P-Preferred-Identity	[34] 9.2	x	c69	[34] 9.2	c8	c8
18J	P-Preferred-Service	[121] 4.2	x	x	[121] 4.2	c38	c38
18K	P-Private-Network-Indication	[134]	c43	c43	[134]	c43	c43
18L	P-Profile-Key	[97] 5	c33	c33	[97] 5	c34	c34
18M	P-Served-User	[133] 6	c44	c44	[133] 6	c44	c44
18N	P-User-Database	[82] 4	c32	c32	[82] 4	c32	c32
18O	P-Visited-Network-ID	[52] 4.3	c16	n/a	[52] 4.3	c17	n/a
18P	Privacy	[33] 4.2	c11	c11	[33] 4.2	c12	c12
19	Proxy-Authorization	[26] 20.28	m	m	[26] 20.28	c4	c4
20	Proxy-Require	[26] 20.29	m	m	[26] 20.29	m	m
20A	Reason	[34A] 2	c25	c25	[34A] 2	c26	c26
21	Record-Route	[26] 20.30	m	m	[26] 20.30	c7	c7
21A	Referred-By	[59] 3	c29	c29	[59] 3	c30	c30
21B	Reject-Contact	[56B] 9.2	c27	c27	[56B] 9.2	c27	c28
21C	Request-Disposition	[56B] 9.1	c27	c27	[56B] 9.1	c27	c27
22	Require	[26] 20.32	m	m	[26] 20.32	c5	c5
22A	Resource-Priority	[116] 3.1	c37	c37	[116] 3.1	c37	c37
23	Route	[26] 20.34	m	m	[26] 20.34	m	m
23A	Security-Client	[48] 2.3.1	x	x	[48] 2.3.1	c24	c24
23B	Security-Verify	[48] 2.3.1	x	x	[48] 2.3.1	c24	c24
24	Supported	[26] 20.37	m	m	[26] 20.37	c6	c6
24A	Target-Dialog	[184] 7	c71	c71	[184] 7	c72	c72

25	Timestamp	[26] 20.38	m	m	[26] 20.38	i	i
26	To	[26] 20.39	m	m	[26] 20.39	m	m
26A	Trigger-Consent	[125] 5.11.2	c41	c41	[125] 5.11.2	c42	c42
27	User-Agent	[26] 20.41	m	m	[26] 20.41	i	i
28	Via	[26] 20.42	m	m	[26] 20.42	m	m

c1:	IF A.4/20 THEN m ELSE i - - SIP specific event notification extension.
c2:	IF A.162/9 THEN m ELSE i - - insertion of date in requests and responses.
c3:	IF A.162/19A OR A.162/19B THEN m ELSE i - - reading, adding or concatenating the Organization header.
c4:	IF A.162/8A THEN m ELSE i - - authentication between UA and proxy.
c5:	IF A.162/11 OR A.162/13 THEN m ELSE i - - reading the contents of the Require header before proxying the request or response or adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER.
c6:	IF A.162/16 THEN m ELSE i - - reading the contents of the Supported header before proxying the response.
c7:	IF A.162/14 THEN m ELSE i - - the requirement to be able to insert itself in the subsequent transactions in a dialog.
c8:	IF A.162/30A OR A.162/30C THEN m ELSE n/a - - act as first entity within the trust domain for asserted identity, act as entity passing on identity transparently independent of trust domain.
c9:	IF A.162/30 THEN m ELSE n/a - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c10:	IF A.162/30A or A.162/30B THEN m ELSE i - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks or subsequent entity within trust network that can route outside the trust network.
c11:	IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c12:	IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.
c13:	IF A.162/37 THEN m ELSE n/a - - the P-Called-Party-ID header extension.
c14:	IF A.162/37 THEN i ELSE n/a - - the P-Called-Party-ID header extension.
c15:	IF A.162/37 AND A.3/2 THEN m ELSE IF A.162/37 AND (A.3/3 OR A.3/9A) THEN i ELSE n/a - - the P-Called-Party-ID header extension and P-CSCF or I-CSCF or IBCF (THIG).
c16:	IF A.162/38 THEN m ELSE n/a - - the P-Visited-Network-ID header extension.
c17:	IF A.162/39 THEN m ELSE i - - reading, or deleting the P-Visited-Network-ID header before proxying the request or response.
c18:	IF A.162/45 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c19:	IF A.162/46 THEN m ELSE IF A.162/45 THEN i ELSE n/a - - adding, deleting, reading or modifying the P-Charging-Vector header before proxying the request or response or the P-Charging-Vector header extension.
c20:	IF A.162/44 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c21:	IF A.162/44A THEN m ELSE IF A.162/44 THEN i ELSE n/a - - adding, deleting or reading the P-Charging-Function-Addresses header before proxying the request or response, or the P-Charging-Function-Addresses header extension.
c22:	IF A.162/43 THEN x ELSE IF A.162/41 THEN m ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c23:	IF A.162/43 THEN m ELSE IF A.162/41 THEN i ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c24:	IF A.162/47 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.
c25:	IF A.162/48 THEN m ELSE n/a - - the Reason header field for the session initiation protocol.
c26:	IF A.162/48 THEN i ELSE n/a - - the Reason header field for the session initiation protocol.
c27:	IF A.162/50 THEN m ELSE n/a - - caller preferences for the session initiation protocol.
c28:	IF A.162/50 AND A.4/3 THEN m ELSE IF A.162/50 AND NOT A.4/3 THEN i ELSE n/a - - caller preferences for the session initiation protocol, and S-CSCF.
c29:	IF A.162/53 THEN i ELSE n/a - - the SIP Referred-By mechanism.
c30:	IF A.162/53 THEN m ELSE n/a - - the SIP Referred-By mechanism.
c31:	IF A.162/57 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.
c32:	IF A.162/60 THEN m ELSE n/a - - the P-User-Database private header extension.
c33:	IF A.162/66A THEN m ELSE n/a - - making the first query to the database in order to populate the P-Profile-Key header.
c34:	IF A.162/66B THEN m ELSE n/a - - using the information in the P-Profile-Key header.
c35:	IF A.162/70 THEN m ELSE n/a - - SIP location conveyance.
c36:	IF A.162/70A THEN m ELSE IF A.162/70B THEN i ELSE n/a - - addition or modification of location in a SIP method, passes on locations in SIP method without modification.
c37:	IF A.162/80A THEN m ELSE n/a - - inclusion of MESSAGE, SUBSCRIBE, NOTIFY in communications resource priority for the session initiation protocol.
c38:	IF A.162/84A THEN m ELSE n/a - - act as authentication entity within the trust domain for asserted service.
c39:	IF A.162/84 THEN m ELSE n/a - - SIP extension for the identification of services.

c40:	IF A.162/84 OR A.162/30B THEN m ELSE i - - SIP extension for the identification of services or subsequent entity within trust network that can route outside the trust network.
c41:	IF A.162/85 THEN m ELSE n/a - - a framework for consent-based communications in SIP.
c42:	IF A.162/85 THEN i ELSE n/a - - a framework for consent-based communications in SIP.
c43:	IF A.162/87 THEN m ELSE n/a - - the SIP P-Private-Network-Indication private-header (P-Header).
c44	IF A.162/88 THEN m ELSE n/a - - the SIP P-Served-User private header.
c47:	IF A.162/81 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.
c48:	IF A.162/81 AND A.162/6 THEN m ELSE IF A.162/81 AND NOT A.162/6 THEN i ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies, forking of initial requests.
c69:	IF A.162/30C THEN m ELSE x - - act as entity passing on identity transparently independent of trust domain.
c71:	IF A.162/109 THEN m ELSE n/a - - request authorization through dialog Identification in the session initiation protocol.
c72:	IF A.162/109 THEN i ELSE n/a - - request authorization through dialog Identification in the session initiation protocol.
c73:	IF A.162/19C OR A.162/19D THEN m ELSE i - - reading, adding or concatenating the Call-Info header field.
NOTE:	c1 refers to the UA role major capability as this is the case of a proxy that also acts as a UA specifically for SUBSCRIBE and NOTIFY.

Prerequisite A.163/20 - - SUBSCRIBE request

Table A.291: Supported message bodies within the SUBSCRIBE request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

Prerequisite A.163/21 - - SUBSCRIBE response

Prerequisite: A.164/1 - - Additional for 100 (Trying) response

Table A.291A: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
3	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
4	Date	[26] 20.17	c1	c1	[26] 20.17	c2	c2
5	From	[26] 20.20	m	m	[26] 20.20	m	m
6	To	[26] 20.39	m	m	[26] 20.39	m	m
7	Via	[26] 20.42	m	m	[26] 20.42	m	m
c1:	IF (A.162/9 AND A.162/5) OR A.162/4 THEN m ELSE n/a - - stateful proxy behaviour that inserts date, or stateless proxies.						
c2:	IF A.162/4 THEN i ELSE m - - Stateless proxy passes on.						

Prerequisite A.163/21 - - SUBSCRIBE response for all remaining status-codes

Table A.292: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Allow	[26] 20.5	m	m	[26] 20.5	i	i
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
1A	Call-Info	[26] 20.9	m	m	[26] 20.9	c23	c23
2	Content-Disposition	[26] 20.11	m	m	[26] 20.11	i	i
3	Content-Encoding	[26] 20.12	m	m	[26] 20.12	i	i
4	Content-Language	[26] 20.13	m	m	[26] 20.13	i	i
5	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
6	Content-Type	[26] 20.15	m	m	[26] 20.15	i	i
7	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
8	Date	[26] 20.17	m	m	[26] 20.17	c1	c1
9	From	[26] 20.20	m	m	[26] 20.20	m	m
9A	Geolocation-Error	[89] 4.3	c20	c20	[89] 4.3	c21	c21
9B	History-Info	[66] 4.1	c15	c15	[66] 4.1	c15	c15
10	MIME-Version	[26] 20.24	m	m	[26] 20.24	i	i
10A	Organization	[26] 20.25	m	m	[26] 20.25	c2	c2
10B	P-Access-Network-Info	[52] 4.4	c12	c12	[52] 4.4	c13	c13
10C	P-Asserted-Identity	[34] 9.1	c4	c4	[34] 9.1	c5	c5
10D	P-Charging-Function-Addresses	[52] 4.5	c10	c10	[52] 4.5	c11	c11
10E	P-Charging-Vector	[52] 4.6	c8	c8	[52] 4.6	c9	c9
10G	P-Preferred-Identity	[34] 9.2	x	x	[34] 9.2	c3	n/a
10H	Privacy	[33] 4.2	c6	c6	[33] 4.2	c7	c7
10I	Require	[26] 20.32	m	m	[26] 20.32	c14	c14
10J	Server	[26] 20.35	m	m	[26] 20.35	i	i
11	Timestamp	[26] 20.38	m	m	[26] 20.38	i	i
12	To	[26] 20.39	m	m	[26] 20.39	m	m
12A	User-Agent	[26] 20.41	m	m	[26] 20.41	i	i
13	Via	[26] 20.42	m	m	[26] 20.42	m	m
14	Warning	[26] 20.43	m	m	[26] 20.43	i	i

c1:	IF A.162/9 THEN m ELSE i - - insertion of date in requests and responses.
c2:	IF A.162/19A OR A.162/19B THEN m ELSE i - - reading, adding or concatenating the Organization header.
c3:	IF A.162/30A THEN m ELSE n/a - - act as first entity within the trust domain for asserted identity.
c4:	IF A.162/30 THEN m ELSE n/a - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks.
c5:	IF A.162/30A or A.162/30B THEN m ELSE i - - extensions to the Session Initiation Protocol (SIP) for asserted identity within trusted networks or subsequent entity within trust network that can route outside the trust network.
c6:	IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c7:	IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.
c8:	IF A.162/45 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c9:	IF A.162/46 THEN m ELSE IF A.162/45 THEN i ELSE n/a - - adding, deleting, reading or modifying the P-Charging-Vector header before proxying the request or response or the P-Charging-Vector header extension.
c10:	IF A.162/44 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c11:	IF A.162/44A THEN m ELSE IF A.162/44 THEN i ELSE n/a - - adding, deleting or reading the P-Charging-Function-Addresses header before proxying the request or response, or the P-Charging-Function-Addresses header extension.
c12:	IF A.162/43 THEN x ELSE IF A.162/41 THEN m ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c13:	IF A.162/43 THEN m ELSE IF A.162/41 THEN i ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c14:	IF A.162/11 OR A.162/13 THEN m ELSE i - - reading the contents of the Require header before proxying the request or response or adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER.
c15:	IF A.162/57 THEN m ELSE n/a - - an extension to the session initiation protocol for request history information.
c16:	IF A.162/70 THEN m ELSE n/a - - SIP location conveyance.
c17:	IF A.162/70A THEN m ELSE IF A.162/70B THEN i ELSE n/a - - addition or modification of location in a SIP method, passes on locations in SIP method without modification.
c20:	IF A.162/70 THEN m ELSE n/a - - SIP location conveyance.
c21:	IF A.162/70A THEN m ELSE IF A.162/70B THEN i ELSE n/a - - addition or modification of location in a SIP method, passes on locations in SIP method without modification.
c23:	IF A.162/19C OR A.162/19D THEN m ELSE i - - reading, adding or concatenating the Call-Info header field.

Prerequisite A.163/21 - - SUBSCRIBE response

Prerequisite: A.164/102 - - Additional for 2xx response

Table A.293: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Accept-Resource-Priority	[116] 3.2	c4	c4	[116] 3.2	c4	c4
0B	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	i	i
1	Authentication-Info	[26] 20.6	m	m	[26] 20.6	i	i
1A	Contact	[26] 20.10	m	m	[26] 20.10	i	i
2	Expires	[26] 20.19	m	m	[26] 20.19	i	i
3	Record-Route	[26] 20.30	m	m	[26] 20.30	c3	c3
6	Supported	[26] 20.37	m	m	[26] 20.37	i	i
c3:	IF A.162/15 THEN m ELSE i - - the requirement to be able to use separate URIs in the upstream direction and downstream direction when record routeing.						
c4:	IF A.162/80A THEN m ELSE n/a - - inclusion of MESSAGE, SUBSCRIBE, NOTIFY in communications resource priority for the session initiation protocol.						

Prerequisite A.163/21 - - SUBSCRIBE response

Prerequisite: A.164/103 OR A.164/104 OR A.164/105 OR A.164/106 - - Additional for 3xx – 6xx response

Table A.293A: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Error-Info	[26] 20.18	m	m	[26] 20.18	i	i

Prerequisite A.163/21 - - SUBSCRIBE response

Prerequisite: A.164/103 OR A.164/35 - - Additional for 3xx or 485 (Ambiguous) response

Table A.294: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Contact	[26] 20.10	m	m	[26] 20.10	c1	c1
c1:	IF A.162/19E THEN m ELSE i - - deleting Contact headers.						

Prerequisite A.163/21 - - SUBSCRIBE response

Prerequisite: A.164/14 - - Additional for 401 (Unauthorized) response

Table A.295: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
2	Proxy-Authenticate	[26] 20.27	m	m	[26] 20.27	m	m
8	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	i	i

Prerequisite A.163/21 - - SUBSCRIBE response

Prerequisite: A.164/17 OR A.164/23 OR A.164/30 OR A.164/36 OR A.164/42 OR A.164/45 OR A.164/50 OR A.164/51 - - Additional for 404 (Not Found), 413 (Request Entity Too Large), 480 (Temporarily not available), 486 (Busy Here), 500 (Internal Server Error), 503 (Service Unavailable), 600 (Busy Everywhere), 603 (Decline) response

Table A.296: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Retry-After	[26] 20.33	m	m	[26] 20.33	i	i

Table A.297: Void

Prerequisite A.163/21 - - SUBSCRIBE response

Prerequisite: A.164/20 - - Additional for 407 (Proxy Authentication Required) response

Table A.298: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
2	Proxy-Authenticate	[26] 20.27	m	m	[26] 20.27	m	m
6	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	i	i

Prerequisite A.163/21 - - SUBSCRIBE response

Prerequisite: A.164/25 - - Additional for 415 (Unsupported Media Type) response

Table A.299: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	i	i
2	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
3	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i

Prerequisite A.163/21 - - SUBSCRIBE response

Prerequisite: A.164/26A - - Additional for 417 (Unknown Resource-Priority) response

Table A.299A: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
c1:	IF A.162/80A THEN m ELSE n/a - - inclusion of MESSAGE, SUBSCRIBE, NOTIFY in communications resource priority for the session initiation protocol.						

Prerequisite A.163/21 - - SUBSCRIBE response

Prerequisite: A.164/27 - - Additional for 420 (Bad Extension) response

Table A.300: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
5	Unsupported	[26] 20.40	m	m	[26] 20.40	c3	c3
c3:	IF A.162/18 THEN m ELSE i - - reading the contents of the Unsupported header before proxying the 420 response to a method other than REGISTER.						

Prerequisite A.163/21 - - SUBSCRIBE response

Prerequisite: A.164/28 OR A.164/41A - - Additional for 421 (Extension Required), 494 (Security Agreement Required) response

Table A.300A: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Security-Server	[48] 2	c1	c1	[48] 2	n/a	n/a
c1:	IF A.162/47 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						

Prerequisite A.163/21 - - SUBSCRIBE response

Prerequisite: A.164/29 - - Additional for 423 (Interval Too Brief) response

Table A.301: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
2	Min-Expires	[26] 20.23	m	m	[26] 20.23	i	i

Table A.302: Void

Prerequisite A.163/21 - - SUBSCRIBE response

Prerequisite: A.164/29H - - Additional for 470 (Consent Needed) response

Table A.302A: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Permission-Missing	[125] 5.9.3	m	m	[125] 5.9.3	m	m

Prerequisite A.163/21 - - SUBSCRIBE response

Prerequisite: A.164/39 - - Additional for 489 (Bad Event) response

Table A.303: Supported header fields within the SUBSCRIBE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	c1	c1
c1:	IF A.4/20 THEN m ELSE i - - SIP specific event notification extension.						
NOTE:	c1 refers to the UA role major capability as this is the case of a proxy that also acts as a UA specifically for SUBSCRIBE and NOTIFY.						

Table A.303A: Void

Prerequisite A.163/21 - - SUBSCRIBE response

Table A.304: Supported message bodies within the SUBSCRIBE response

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

A.2.2.4.14 UPDATE method

Prerequisite A.163/22 - - UPDATE request

Table A.305: Supported header fields within the UPDATE request

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	i	i
1A	Accept-Contact	[56B] 9.2	c21	c21	[56B] 9.2	c22	c22
2	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
3	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i
4	Allow	[26] 20.5	m	m	[26] 20.5	i	i
5	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	c1	c1
6	Authorization	[26] 20.7	m	m	[26] 20.7	i	i
7	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
8	Call-Info	[26] 20.9	m	m	[26] 20.9	c8	c8
9	Contact	[26] 20.10	m	m	[26] 20.10	i	i
10	Content-Disposition	[26] 20.11	m	m	[26] 20.11	c4	c4
11	Content-Encoding	[26] 20.12	m	m	[26] 20.12	c4	c4
12	Content-Language	[26] 20.13	m	m	[26] 20.13	c4	c4
13	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
14	Content-Type	[26] 20.15	m	m	[26] 20.15	c4	c4
15	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
16	Date	[26] 20.17	m	m	[26] 20.17	c2	c2
17	From	[26] 20.20	m	m	[26] 20.20	m	m
17A	Geolocation	[89] 4.1	c26	c26	[89] 4.1	c27	c27
17B	Geolocation-Routing	[89] 4.1	c26	c26	[89] 4.1	c27	c27
17C	Max-Breadth	[117] 5.8	c32	c32	[117] 5.8	c33	c33
18	Max-Forwards	[26] 20.22	m	m	[26] 20.22	m	m
19	MIME-Version	[26] 20.24	m	m	[26] 20.24	i	c4
19A	Min-SE	[58] 5	c23	c23	[58] 5	c23	c23
20	Organization	[26] 20.25	m	m	[26] 20.25	c3	c3
20A	P-Access-Network-Info	[52] 4.4	c16	c16	[52] 4.4	c17	c17
20B	P-Charging-Function-Addresses	[52] 4.5	c14	c14	[52] 4.5	c15	c15
20C	P-Charging-Vector	[52] 4.6	c12	c12	[52] 4.6	c13	c13
20E	P-Early-Media	[109] 8	o	c28	[109] 8	o	c29
20F	Privacy	[33] 4.2	c10	c10	[33] 4.2	c11	c11
21	Proxy-Authorization	[26] 20.28	m	m	[26] 20.28	c9	c9
22	Proxy-Require	[26] 20.29	m	m	[26] 20.29	m	m
22A	Reason	[34A] 2	c19	c19	[34A] 2	c20	c20
23	Record-Route	[26] 20.30	m	m	[26] 20.30	c7	c7
23A	Recv-Info	[25] 5.2.3	c34	c34	[25] 5.2.3	c35	c35
23B	Referred-By	[59] 3	c24	c24	[59] 3	c25	c25
23C	Reject-Contact	[56B] 9.2	c21	c21	[56B] 9.2	c22	c22
23D	Request-Disposition	[56B] 9.1	c21	c21	[56B] 9.1	c22	c22
24	Require	[26] 20.32	m	m	[26] 20.32	c5	c5
24A	Resource-Priority	[116] 3.1	c47	c47	[116] 3.1	c47	c47
25	Route	[26] 20.34	m	m	[26] 20.34	m	m
25A	Security-Client	[48] 2.3.1	x	x	[48] 2.3.1	c18	c18
25B	Security-Verify	[48] 2.3.1	x	x	[48] 2.3.1	c18	c18
25C	Session-Expires	[58] 4	c23	c23	[58] 4	c23	c23
26	Supported	[26] 20.37	m	m	[26] 20.37	c6	c6
27	Timestamp	[26] 20.38	m	m	[26] 20.38	i	i
28	To	[26] 20.39	m	m	[26] 20.39	m	m
29	User-Agent	[26] 20.41	m	m	[26] 20.41	i	i
30	Via	[26] 20.42	m	m	[26] 20.42	m	m

c1:	IF A.4/20 THEN m ELSE i - - SIP specific event notification extension.
c2:	IF A.162/9 THEN m ELSE i - - insertion of date in requests and responses.
c3:	IF A.162/19A OR A.162/19B THEN m ELSE i - - reading, adding or concatenating the Organization header.
c4:	IF A.3/2 OR A.3/4 THEN m ELSE i - - P-CSCF or S-CSCF.
c5:	IF A.162/11 OR A.162/13 THEN m ELSE i - - reading the contents of the Require header before proxying the request or response or adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER.
c6:	IF A.162/16 THEN m ELSE i - - reading the contents of the Supported header before proxying the response.
c7:	IF A.162/14 THEN o ELSE i - - the requirement to be able to insert itself in the subsequent transactions in a dialog.
c8:	IF A.162/19C OR A.162/19D THEN m ELSE i - - reading, adding or concatenating the Call-Info header.
c9:	IF A.162/8A THEN m ELSE i - - authentication between UA and proxy.
c10:	IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).
c11:	IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.
c12:	IF A.162/45 THEN m ELSE n/a - - the P-Charging-Vector header extension.
c13:	IF A.162/46 THEN m ELSE IF A.162/45 THEN i ELSE n/a - - adding, deleting, reading or modifying the P-Charging-Vector header before proxying the request or response or the P-Charging-Vector header extension.
c14:	IF A.162/44 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.
c15:	IF A.162/44A THEN m ELSE IF A.162/44 THEN i ELSE n/a - - adding, deleting or reading the P-Charging-Function-Addresses header before proxying the request or response, or the P-Charging-Function-Addresses header extension.
c16:	IF A.162/43 THEN x ELSE IF A.162/41 THEN m ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c17:	IF A.162/43 THEN m ELSE IF A.162/41 THEN i ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.
c18:	IF A.162/47 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.
c19:	IF A.162/48 THEN m ELSE n/a - - the Reason header field for the session initiation protocol.
c20:	IF A.162/48 THEN i ELSE n/a - - the Reason header field for the session initiation protocol.
c21:	IF A.162/50 THEN m ELSE n/a - - caller preferences for the session initiation protocol.
c22:	IF A.162/50 THEN i ELSE n/a - - caller preferences for the session initiation protocol.
c23:	IF A.162/52 THEN m ELSE n/a - - the SIP session timer.
c24:	IF A.162/53 THEN i ELSE n/a - - the SIP Referred-By mechanism.
c25:	IF A.162/53 THEN m ELSE n/a - - the SIP Referred-By mechanism.
c26:	IF A.162/70 THEN m ELSE n/a - - SIP location conveyance.
c27:	IF A.162/70A THEN m ELSE IF A.162/70B THEN i ELSE n/a - - addition or modification of location in a SIP method, passes on locations in SIP method without modification.
c28:	IF A.162/76 THEN m ELSE n/a - - the SIP P-Early-Media private header extension for authorization of early media.
c29:	IF A.162/76 THEN (IF A.3/2 THEN m ELSE i) ELSE n/a - - P-CSCF, using the information in the P-Early-Media header.
c32:	IF A.162/81 THEN m ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies.
c33:	IF A.162/81 AND A.162/6 THEN m ELSE IF A.162/81 AND NOT A.162/6 THEN i ELSE n/a - - addressing an amplification vulnerability in session initiation protocol forking proxies, forking of initial requests.
c34:	IF A.162/20 THEN m ELSE n/a - - SIP INFO method and package framework.
c35:	IF A.162/20 THEN i ELSE n/a - - SIP INFO method and package framework.
c47:	IF A.162/80 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.
NOTE:	c1 refers to the UA role major capability as this is the case of a proxy that also acts as a UA specifically for SUBSCRIBE and NOTIFY.

Prerequisite A.163/22 - - UPDATE request

Table A.306: Supported message bodies within the UPDATE request

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

Prerequisite A.163/23 - - UPDATE response

Prerequisite: A.164/1 - - Additional for 100 (Trying) response

Table A.306A: Supported header fields within the UPDATE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
2	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
3	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
4	Date	[26] 20.17	c1	c1	[26] 20.17	c2	c2
5	From	[26] 20.20	m	m	[26] 20.20	m	m
6	To	[26] 20.39	m	m	[26] 20.39	m	m
7	Via	[26] 20.42	m	m	[26] 20.42	m	m
c1:	IF (A.162/9 AND A.162/5) OR A.162/4 THEN m ELSE n/a - - stateful proxy behaviour that inserts date, or stateless proxies.						
c2:	IF A.162/4 THEN i ELSE m - - Stateless proxy passes on.						

Prerequisite A.163/22 - - UPDATE response for all remaining status-codes

Table A.307: Supported header fields within the UPDATE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Allow	[26] 20.5	m	m	[26] 20.5	i	i
1	Call-ID	[26] 20.8	m	m	[26] 20.8	m	m
1A	Call-Info	[26] 20.9	m	m	[26] 20.9	c4	c4
1B	Contact	[26] 20.10	m	m	[26] 20.10	i	i
2	Content-Disposition	[26] 20.11	m	m	[26] 20.11	i	c3
3	Content-Encoding	[26] 20.12	m	m	[26] 20.12	i	c3
4	Content-Language	[26] 20.13	m	m	[26] 20.13	i	c3
5	Content-Length	[26] 20.14	m	m	[26] 20.14	m	m
6	Content-Type	[26] 20.15	m	m	[26] 20.15	i	c3
7	Cseq	[26] 20.16	m	m	[26] 20.16	m	m
8	Date	[26] 20.17	m	m	[26] 20.17	c1	c1
9	From	[26] 20.20	m	m	[26] 20.20	m	m
9A	Geolocation-Error	[89] 4.3	c14	c14	[89] 4.3	c15	c15
10	MIME-Version	[26] 20.24	m	m	[26] 20.24	i	c3
10A	Organization	[26] 20.25	m	m	[26] 20.25	c2	c2
10B	P-Access-Network-Info	[52] 4.4	c11	c11	[52] 4.4	c12	c12
10C	P-Charging-Function-Addresses	[52] 4.5	c9	c9	[52] 4.5	c10	c10
10D	P-Charging-Vector	[52] 4.6	c7	n/a	[52] 4.6	c8	n/a
10F	Privacy	[33] 4.2	c5	c5	[33] 4.2	c6	c6
10G	Recv-Info	[25] 5.2.3	c18	c18	[25] 5.2.3	c19	c19
10H	Require	[26] 20.32	m	m	[26] 20.32	c13	c13
10I	Server	[26] 20.35	m	m	[26] 20.35	i	i
11	Timestamp	[26] 20.38	m	m	[26] 20.38	i	i
12	To	[26] 20.39	m	m	[26] 20.39	m	m
12A	User-Agent	[26] 20.41	m	m	[26] 20.41	i	i
13	Via	[26] 20.42	m	m	[26] 20.42	m	m
14	Warning	[26] 20.43	m	m	[26] 20.43	i	i
c1:	IF A.162/9 THEN m ELSE i - - insertion of date in requests and responses.						
c2:	IF A.162/19A OR A.162/19B THEN m ELSE i - - reading, adding or concatenating the Organization header.						
c3:	IF A.3/2 OR A.3/4 THEN m ELSE i - - P-CSCF or S-CSCF.						
c4:	IF A.162/19C OR A.162/19D THEN m ELSE i - - reading, adding or concatenating the Call-Info header.						
c5:	IF A.162/31 THEN m ELSE n/a - - a privacy mechanism for the Session Initiation Protocol (SIP).						
c6:	IF A.162/31D OR A.162/31G THEN m ELSE IF A.162/31C THEN i ELSE n/a - - application of the privacy option "header" or application of the privacy option "id" or passing on of the Privacy header transparently.						
c7:	IF A.162/45 THEN m ELSE n/a - - the P-Charging-Vector header extension.						
c8:	IF A.162/46 THEN m ELSE IF A.162/45 THEN i ELSE n/a - - adding, deleting, reading or modifying the P-Charging-Vector header before proxying the request or response or the P-Charging-Vector header extension.						
c9:	IF A.162/44 THEN m ELSE n/a - - the P-Charging-Function-Addresses header extension.						
c10:	IF A.162/44A THEN m ELSE IF A.162/44 THEN i ELSE n/a - - adding, deleting or reading the P-Charging-Function-Addresses header before proxying the request or response, or the P-Charging-Function-Addresses header extension.						
c11:	IF A.162/43 THEN x ELSE IF A.162/41 THEN m ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.						
c12:	IF A.162/43 THEN m ELSE IF A.162/41 THEN i ELSE n/a - - act as subsequent entity within trust network for access network information that can route outside the trust network, the P-Access-Network-Info header extension.						
c13:	IF A.162/11 OR A.162/13 THEN m ELSE i - - reading the contents of the Require header before proxying the request or response or adding or modifying the contents of the Require header before proxying the request or response for methods other than REGISTER.						
c14:	IF A.162/70 THEN m ELSE n/a - - SIP location conveyance.						
c15:	IF A.162/70A THEN m ELSE IF A.162/70B THEN i ELSE n/a - - addition or modification of location in a SIP method, passes on locations in SIP method without modification.						
c18:	IF A.162/20 THEN m ELSE n/a - - SIP INFO method and package framework.						
c19:	IF A.162/20 THEN i ELSE n/a - - SIP INFO method and package framework.						

Prerequisite A.163/23 - - UPDATE response

Prerequisite: A.164/102 - - Additional for 2xx response

Table A.308: Supported header fields within the UPDATE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
0A	Accept	[26] 20.1	m	m	[26] 20.1	i	i
0B	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
0C	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i
0D	Accept-Resource-Priority	[116] 3.2	c12	c12	[116] 3.2	c12	c12
1	Allow-Events	[28] 7.2.2	m	m	[28] 7.2.2	c1	c1
2	Authentication-Info	[26] 20.6	m	m	[26] 20.6	i	i
3	Contact	[26] 20.10	m	m	[26] 20.10	i	i
3A	P-Early-Media	[109] 8	o	c10	[109] 8	o	c11
3B	Recv-Info	[25] 5.2.3	c5	c5	[25] 5.2.3	c6	c6
4	Session-Expires	[58] 4	c4	c4	[58] 4	c4	c4
6	Supported	[26] 20.37	m	m	[26] 20.37	i	i
c1:	IF A.4/20 THEN m ELSE i - - SIP specific event notification extension.						
c3:	IF A.162/15 THEN o ELSE i - - the requirement to be able to use separate URIs in the upstream direction and downstream direction when record routeing.						
c4:	IF A.162/52 THEN m ELSE n/a - - the SIP session timer.						
c5:	IF A.162/20 THEN m ELSE n/a - - SIP INFO method and package framework.						
c6:	IF A.162/20 THEN i ELSE n/a - - SIP INFO method and package framework.						
c10:	IF A.162/76 THEN m ELSE n/a - - the SIP P-Early-Media private header extension for authorization of early media.						
c11:	IF A.162/76 THEN (IF A.3/2 THEN m ELSE i) ELSE n/a - - P-CSCF, using the information in the P-Early-Media header.						
c12:	IF A.162/80 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.						

Prerequisite A.163/23 - - UPDATE response

Prerequisite: A.164/103 OR A.164/104 OR A.164/105 OR A.164/106 - - Additional for 3xx – 6xx response

Table A.308A: Supported header fields within the UPDATE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Error-Info	[26] 20.18	m	m	[26] 20.18	i	i

Prerequisite A.163/23 - - UPDATE response

Prerequisite: A.164/103 or A.164/35 - - Additional for 3xx, 485 (Ambiguous) response

Table A.309: Supported header fields within the UPDATE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
2	Contact	[26] 20.10	m	m	[26] 20.10	c1	c1
c1:	IF A.162/19E THEN m ELSE i - - deleting Contact headers.						

Prerequisite A.163/23 - - UPDATE response

Prerequisite: A.164/14 - - Additional for 401 (Unauthorized) response

Table A.309A: Supported header fields within the UPDATE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Proxy-Authenticate	[26] 20.27	m	m	[26] 20.27	m	m
6	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	i	i

Prerequisite A.163/23 - - UPDATE response

Prerequisite: A.164/17 OR A.164/23 OR A.164/30 OR A.164/36 OR A.164/42 OR A.164/45 OR A.164/50 OR A.164/51 - - Additional for 404 (Not Found), 413 (Request Entity Too Large), 480(Temporarily not available), 486 (Busy Here), 500 (Internal Server Error), 503 (Service Unavailable), 600 (Busy Everywhere), 603 (Decline) response

Table A.310: Supported header fields within the UPDATE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
5	Retry-After	[26] 20.33	m	m	[26] 20.33	i	i

Table A.311: Void

Prerequisite A.163/23 - - UPDATE response

Prerequisite: A.164/20 - - Additional for 407 (Proxy Authentication Required) response

Table A.312: Supported header fields within the UPDATE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
4	Proxy-Authenticate	[26] 20.27	m	m	[26] 20.27	m	m
8	WWW-Authenticate	[26] 20.44	m	m	[26] 20.44	i	i

Prerequisite A.163/23 - - UPDATE response

Prerequisite: A.164/25 - - Additional for 415 (Unsupported Media Type) response

Table A.313: Supported header fields within the UPDATE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept	[26] 20.1	m	m	[26] 20.1	i	i
2	Accept-Encoding	[26] 20.2	m	m	[26] 20.2	i	i
3	Accept-Language	[26] 20.3	m	m	[26] 20.3	i	i

Prerequisite A.163/23 - - UPDATE response

Prerequisite: A.164/26A - - Additional for 417 (Unknown Resource-Priority) response

Table A.313A: Supported header fields within the UPDATE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Accept-Resource-Priority	[116] 3.2	c1	c1	[116] 3.2	c1	c1
c1:	IF A.162/80 THEN m ELSE n/a - - communications resource priority for the session initiation protocol.						

Prerequisite A.163/23 - - UPDATE response

Prerequisite: A.164/27 - - Additional for 420 (Bad Extension) response

Table A.314: Supported header fields within the UPDATE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
7	Unsupported	[26] 20.40	m	m	[26] 20.40	c3	c3
c3:	IF A.162/18 THEN m ELSE i - - reading the contents of the Unsupported header before proxying the 420 response to a method other than REGISTER.						

Prerequisite A.163/23 - - UPDATE response

Prerequisite: A.164/28 OR A.164/41A - - Additional for 421 (Extension Required), 494 (Security Agreement Required) response

Table A.314A: Supported header fields within the UPDATE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
3	Security-Server	[48] 2	c1	c1	[48] 2	n/a	n/a
c1:	IF A.162/47 THEN m ELSE n/a - - security mechanism agreement for the session initiation protocol.						

Prerequisite A.163/23 - - UPDATE response

Prerequisite: A.164/28A - - Additional for 422 (Session Interval Too Small) response

Table A.314B: Supported header fields within the UPDATE response

Item	Header field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	Min-SE	[58] 5	c1	c1	[58] 5	c1	c1
c1:	IF A.162/52 THEN m ELSE n/a - - the SIP session timer.						

Table A.315: Void

Prerequisite A.163/23 - - UPDATE response

Table A.316: Supported message bodies within the UPDATE response

Item	Header	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1							

A.3 Profile definition for the Session Description Protocol as used in the present document

A.3.1 Introduction

Void.

A.3.2 User agent role

This subclause contains the ICS proforma tables related to the user agent role. They need to be completed only for UA implementations.

Prerequisite: A.2/1 -- user agent role

A.3.2.1 Major capabilities

Table A.317: Major capabilities

Item	Does the implementation support	Reference	RFC status	Profile status
	Capabilities within main protocol			
1	video	[8H]	n/a	o
	Extensions			
22	integration of resource management and SIP?	[30] [64]	o	c14
23	grouping of media lines?	[53]	c3	c3
24	mapping of media streams to resource reservation flows?	[54]	o	c1
25	SDP bandwidth modifiers for RTCP bandwidth?	[56]	o	o (NOTE 1)
26	TCP-based media transport in the session description protocol?	[83]	o	c2
27	interactive connectivity establishment?	[99]	o	c4
28	session description protocol format for binary floor control protocol streams?	[108]	o	o
29	extended RTP profile for real-time transport control protocol (RTCP)-based feedback (RTP/AVPF)?	[135]	o	c5
30	SDP capability negotiation?	[137]	o	c6
31	Session Description Protocol (SDP) extension for setting up audio media streams over circuit-switched bearers in the Public Switched Telephone Network (PSTN)?	[155]	o	c7
32	miscellaneous capabilities negotiation in the Session Description Protocol (SDP)?	[156]	o	c7
33	transport independent bandwidth modifier for the Session Description Protocol?	[152]	o	c8
38	SDP media capabilities negotiation?	[172]	o	c12
39	Message Session Relay Protocol?	[178]	o	c17
41	a SDP offer/answer mechanism to enable file transfer?	[185]	o	o

c1: IF A.3/1 THEN m ELSE n/a - - UE role.
c2: IF A.3/9B THEN m ELSE IF A.3/1 OR A.3/6 OR A.3/7 THEN o ELSE n/a - - IBCF (IMS-ALG), UE, MGCF, AS.
c3: IF A.317/24 THEN m ELSE o - - mapping of media streams to resource reservation flows.
c4: IF A.3/9B THEN m ELSE IF A.3/1 OR A.3/6 THEN o ELSE n/a - - IBCF, UE, MGCF.
c5: IF (A.3A/50 AND A.317/1) OR A.3A/50A OR A.3/6 OR A.3/9B THEN m ELSE o - - multimedia telephony service participant, video, multimedia telephony service application server, MGCF, IBCF.
c6: IF A.3A/50A OR A.3/6 OR A.3/9B THEN m ELSE o - - multimedia telephony service application server, MGCF, IBCF.
c7: IF A.3A/82 OR A.3A/83 THEN m ELSE o - - ICS user agent, SCC application server.
c8: IF A.317/25 AND (A.3/1 OR A.3/6) THEN o ELSE n/a - - SDP bandwidth modifiers for RTCP bandwidth, UE, MGCF.
c12: IF A.3A/82 OR A.3A/83 THEN m ELSE o - - ICS user agent, SCC application server.
c14: IF A.4/2C THEN m ELSE o - - initiating a session which require local and/or remote resource reservation.
c17: IF A.3A/33B OR A.3A/34 THEN m ELSE IF A.3A/8 OR A.3A/9 THEN o ELSE n/a - - session-mode messaging participant, session-mode messaging intermediate node, IBCF, MRFC.

NOTE 1: For "video" and "audio" media types that utilise RTP/RTCP, if the RTCP bandwidth level for the session is different than the default RTCP bandwidth as specified in RFC 3556 [56], then, it shall be specified. For other media types, it may be specified.

A.3.2.2 SDP types

Table A.318: SDP types

Item	Type	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
	Session level description						
1	v= (protocol version)	[39] 5.1	m	m	[39] 5.1	m	m
2	o= (owner/creator and session identifier)	[39] 5.2	m	m	[39] 5.2	m	m
3	s= (session name)	[39] 5.3	m	m	[39] 5.3	m	m
4	i= (session information)	[39] 5.4	o	c2	[39] 5.4	m	c3
5	u= (URI of description)	[39] 5.5	o	c4	[39] 5.5	o	n/a
6	e= (email address)	[39] 5.6	o	c4	[39] 5.6	o	n/a
7	p= (phone number)	[39] 5.6	o	c4	[39] 5.6	o	n/a
8	c= (connection information)	[39] 5.7	c5	c5	[39] 5.7	m	m
9	b= (bandwidth information)	[39] 5.8	o	o (NOTE 1)	[39] 5.8	m	m
	Time description (one or more per description)						
10	t= (time the session is active)	[39] 5.9	m	m	[39] 5.9	m	m
11	r= (zero or more repeat times)	[39] 5.10	o	c4	[39] 5.10	o	n/a
	Session level description (continued)						
12	z= (time zone adjustments)	[39] 5.11	o	n/a	[39] 5.11	o	n/a
13	k= (encryption key)	[39] 5.12	x	x	[39] 5.12	n/a	n/a
14	a= (zero or more session attribute lines)	[39] 5.13	o	o	[39] 5.13	m	m
	Media description (zero or more per description)						
15	m= (media name and transport address)	[39] 5.14	m	m	[39] 5.14	m	m
16	i= (media title)	[39] 5.4	o	c2	[39] 5.4	o	c3
17	c= (connection information)	[39] 5.7	c1	c1	[39] 5.7	m	m
18	b= (bandwidth information)	[39] 5.8	o	o (NOTE 1)	[39] 5.8	m	m
19	k= (encryption key)	[39] 5.12	x	x	[39] 5.12	n/a	n/a
20	a= (zero or more media attribute lines)	[39] 5.13	o	o	[39] 5.13	m	m

c1: IF (A.318/15 AND NOT A.318/8) THEN m ELSE (IF (A.318/15 AND A.318/8) THEN o ELSE n/a - - 'c=' contained in session level description and SDP contains media descriptions.
c2: IF A.3A/6 THEN x ELSE o - - MGCF.
c3: IF A.3A/6 THEN n/a ELSE m - - MGCF.
c4: IF A.3A/6 THEN x ELSE n/a - - MGCF.
c5: IF A.318/17 THEN o ELSE m - - "c=" contained in all media description.
NOTE 1: The UE may use b=TIAS and b=AS as described in RFC 3890 [152]. For "video" and "audio" media types that utilise RTP/RTCP, and if the UE is configured to request an RTCP bandwidth level different than the default RTCP bandwidth as specified in RFC 3556 [56], then the UE shall include the 'b=' media descriptors with the bandwidth modifiers 'RS' and 'RR'. For other media types, the UE may include the 'b=' media descriptor with the bandwidth modifiers 'RS' and 'RR'.

Prerequisite A.318/14 OR A.318/20 - - a= (zero or more session/media attribute lines)

Table A.319: zero or more session / media attribute lines (a=)

Item	Field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	category (a=cat)	[39] 6	c8	c8	[39] 6	c9	c9
2	keywords (a=keywds)	[39] 6	c8	c8	[39] 6	c9	c9
3	name and version of tool (a=tool)	[39] 6	c8	c8	[39] 6	c9	c9
4	packet time (a=ptime)	[39] 6	c10	c10	[39] 6	c11	c11
5	maximum packet time (a=maxptime)	[39] 6 (NOTE 1)	c10	c10	[39] 6 (NOTE 1)	c11	c11
6	receive-only mode (a=recvonly)	[39] 6	o	o	[39] 6	m	m
7	send and receive mode (a=sendrecv)	[39] 6	o	o	[39] 6	m	m
8	send-only mode (a=sendonly)	[39] 6	o	o	[39] 6	m	m
8A	Inactive mode (a=inactive)	[39] 6	o	o	[39] 6	m	m
9	whiteboard orientation (a=orient)	[39] 6	c10	c10	[39] 6	c11	c11
10	conference type (a=type)	[39] 6	c8	c8	[39] 6	c9	c9
11	character set (a=charset)	[39] 6	c8	c8	[39] 6	c9	c9
12	language tag (a=sdplang)	[39] 6	o	o	[39] 6	m	m
13	language tag (a=lang)	[39] 6	o	o	[39] 6	m	m
14	frame rate (a=framerate)	[39] 6	c10	c10	[39] 6	c11	c11
15	quality (a=quality)	[39] 6	c10	c10	[39] 6	c11	c11
16	format specific parameters (a=fmtp)	[39] 6	c10	c10	[39] 6	c11	c11
17	rtpmap attribute (a=rtpmap)	[39] 6	c10	c10	[39] 6	c11	c11
18	current-status attribute (a=curr)	[30] 5	c1	c1	[30] 5	c2	c2
19	desired-status attribute (a=des)	[30] 5	c1	c1	[30] 5	c2	c2
20	confirm-status attribute (a=conf)	[30] 5	c1	c1	[30] 5	c2	c2
21	media stream identification attribute (a=mid)	[53] 3	c3	c3	[53] 3	c4	c4
22	group attribute (a=group)	[53] 4	c5	c5	[53] 3	c6	c6
23	setup attribute (a=setup)	[83] 4	c7	c7	[83] 4	c7	c7
24	connection attribute (a=connection)	[83] 5	c7	c7	[83] 5	c7	c7
25	candidate IP addresses (a=candidate)	[99]	c12	c12	[99]	c13	c13
26	floor control server determination (a=floorctrl)	[108] 4	c14	c14	[108] 4	c14	c14
27	conference id (a=confid)	[108] 5	c14	c14	[108] 5	c14	c14
28	user id (a=userid)	[108] 5	c14	c14	[108] 5	c14	c14
29	association between streams and floors (a=floorid)	[108] 6	c14	c14	[108] 6	c14	c14
30	RTCP feedback capability attribute (a=rtcp-fb)	[135] 4.2	c15	c15	[135] 4.2	c15	c15
31	extension of the rtcp-fb attribute (a=rtcp-fb)	[136] 7.1	c15	c15	[136] 7.1	c15	c15
32	supported capability negotiation extensions (a=csup)	[137] 3.3.1	c16	c16	[137] 3.3.1	c16	c16
33	required capability negotiation extensions (a=creq)	[137] 3.3.2	c16	c16	[137] 3.3.2	c16	c16
34	attribute capability (a=acap)	[137] 3.4.1	c16	c16	[137] 3.4.1	c16	c16
35	transport protocol capability (a=tcap)	[137] 3.4.2	c16	c16	[137] 3.4.2	c16	c16
36	potential configuration (a=pcfg)	[137] 3.5.1	c16	c16	[137] 3.5.1	c16	c16

		[167] 3.3.6			[167] 3.3.6		
37	actual configuration (a=acfg)	[137] 3.5.2	c16	c16	[137] 3.5.2	c16	c16
38	connection data capability (a=ccap)	[156] 3.1	c17	c17	[156] 3.1	c18	c18
39	maximum packet rate (a=maxprate)	[152] 6.3	c19	c19	[152] 6.3	c19	c19
43	media capability (a=rmcap)	[172] 3.3.1	c23	c23	[172] 3.3.1	c23	c23
43A	media capability (a=omcap)	[172] 3.3.1	c23	c23	[172] 3.3.1	c23	c23
44	media format capability (a=mfcap)	[172] 3.3.2	c23	c23	[172] 3.3.2	c23	c23
45	media-specific capability (a=mscap)	[172] 3.3.3	c23	c23	[172] 3.3.3	c23	c23
46	latent configuration (a=lcfg)	[172] 3.3.5	c44	c44	[172] 3.3.5	c44	c44
47	session capability (a=sescap)	[172] 3.3.8	c24	c24	[172] 3.3.8	c24	c24
48	msrp path (a=path)	[178]	c25	c25	[178]	c25	c25
49	file selector (a=file-selector)	[185] 6	c27	c27	[185] 6	c28	c28
50	file transfer identifier (a= file-transfer-id)	[185] 6	c26	c26	[185] 6	c28	c28
51	file disposition (a=file-disposition)	[185] 6	c26	c26	[185] 6	c28	c28
52	file date (a=file-date)	[185] 6	c26	c26	[185] 6	c28	c28
53	file icon (a=file-icon	[185] 6	c26	c26	[185] 6	c28	c28
54	file range (a=file-range)	[185] 6	c26	c26	[185] 6	c28	c28
85	CS correlation (a=cs-correlation)	[155] 5.2.3.1	c49	c49	[155] 5.2.3.1	c49	c49

c1:	IF A.317/22 AND A.318/20 THEN o ELSE n/a - - integration of resource management and SIP, media level attribute name "a=".
c2:	IF A.317/22 AND A.318/20 THEN m ELSE n/a - - integration of resource management and SIP, media level attribute name "a=".
c3:	IF A.317/23 AND A.318/20 THEN o ELSE n/a - - grouping of media lines, media level attribute name "a=".
c4:	IF A.317/23 AND A.318/20 THEN m ELSE n/a - - grouping of media lines, media level attribute name "a=".
c5:	IF A.317/23 AND A.318/14 THEN o ELSE n/a - - grouping of media lines, session level attribute name "a=".
c6:	IF A.317/23 AND A.318/14 THEN m ELSE n/a - - grouping of media lines, session level attribute name "a=".
c7:	IF A.317/26 AND A.318/20 THEN m ELSE n/a - - TCP-based media transport in the session description protocol, media level attribute name "a=".
c8:	IF A.318/14 THEN o ELSE x - - session level attribute name "a=".
c9:	IF A.318/14 THEN m ELSE n/a - - session level attribute name "a=".
c10:	IF A.318/20 THEN o ELSE x - - media level attribute name "a=".
c11:	IF A.318/20 THEN m ELSE n/a - - media level attribute name "a=".
c12:	IF A.317/27 AND A.318/20 THEN o ELSE n/a - - candidate IP addresses, media level attribute name "a=".
c13:	IF A.317/27 AND A.318/20 THEN m ELSE n/a - - candidate IP addresses, media level attribute name "a=".
c14:	IF A.317/28 AND A.318/20 THEN m ELSE n/a - - session description protocol format for binary floor control protocol streams, media level attribute name "a=".
c15:	IF (A.317/29 AND A.318/20) THEN m ELSE n/a - - extended RTP profile for real-time transport control protocol (RTCP)-based feedback (RTP/AVPF), media level attribute name "a=".
c16:	IF A.317/30 AND A.318/20 THEN m ELSE n/a - - SDP capability negotiation, media level attribute name "a=".
c17:	IF A.317/32 AND A.318/20 THEN o ELSE n/a - - miscellaneous capabilities negotiation in the Session Description Protocol (SDP), media level attribute name "a=".
c18:	IF A.317/32 AND A.318/20 THEN m ELSE n/a - - miscellaneous capabilities negotiation in the Session Description Protocol (SDP), media level attribute name "a=".
c19:	IF A.317/33 AND (A.318/14 OR A.318/20) THEN o ELSE n/a - - bandwidth modifier packet rate parameter, media or session level attribute name "a=".
c23:	IF A.317/38 AND THEN m ELSE n/a - - SDP media capabilities negotiation.
c24:	IF A.317/38 AND A.318/14 THEN m ELSE n/a - - SDP media capabilities negotiation, session level attribute name "a=".
c25:	IF A.317/39 AND A.318/20 THEN m ELSE n/a - - message session relay protocol, media level attribute name "a=".
c26:	IF A.317/41 AND A.318/20 THEN o ELSE n/a - - a SDP offer/answer mechanism to enable file transfer, media level attribute name "a=".
c27:	IF A.317/41 AND A.318/20 AND (A.3A/31 OR A.3A/33) THEN m ELSE IF A.317/41 AND A.318/20 AND NOT (A.3A/31 OR A.3A/33) THEN o ELSE n/a - - a SDP offer/answer mechanism to enable file transfer, media level attribute name "a=", messaging application server, messaging participant.
c28:	IF A.317/41 AND A.318/20 THEN m ELSE n/a - - a SDP offer/answer mechanism to enable file transfer, media level attribute name "a=".
c44:	IF A.317/38 AND A.318/20 THEN m ELSE n/a - - SDP media capabilities negotiation, media level attribute name "a=".
c49:	IF A.317/31 AND A.318/20 THEN m ELSE n/a - - Session Description Protocol (SDP) extension for setting up audio media streams over circuit-switched bearers in the Public Switched Telephone Network (PSTN) and SIP, media level attribute name "a="
NOTE 1:	Further specification of the usage of this attribute is defined by specifications relating to individual codecs.

A.3.2.3 Void

Table A.320: Void

Table A.321: Void

Table A.322: Void

Table A.323: Void

Table A.324: Void

Table A.325: Void

Table A.326: Void

Table A.327: Void

A.3.2.4 Void

Table A.327A: Void

A.3.3 Proxy role

This subclause contains the ICS proforma tables related to the user role. They need to be completed only for proxy implementations.

Prerequisite: A.2/2 -- proxy role

A.3.3.1 Major capabilities

Table A.328: Major capabilities

Item	Does the implementation support	Reference	RFC status	Profile status
	Capabilities within main protocol			
0A	application of session policy?	6.2, 6.3	x	c2
	Extensions			
1	integration of resource management and SIP?	[30] [64]	o	n/a
2	grouping of media lines?	[53]	c3	x
3	mapping of media streams to resource reservation flows?	[54]	o	x
4	SDP bandwidth modifiers for RTCP bandwidth?	[56]	o	c1
5	TCP-based media transport in the session description protocol?	[83]	o	c4
6	interactive connectivity establishment?	[99]	o	c4
7	session description protocol format for binary floor control protocol streams?	[108]	o	o
8	extended RTP profile for real-time transport control protocol (RTCP)-based feedback (RTP/AVPF)?	[135]	o	c5
9	SDP capability negotiation?	[137]	c7	c9
10	Session Description Protocol (SDP) extension for setting up audio media streams over circuit-switched bearers in the Public Switched Telephone Network (PSTN)	[155]	o	c6
11	miscellaneous capabilities negotiation in the Session Description Protocol (SDP)	[156]	o	c6
18	SDP media capabilities negotiation?	[172]	o	c8
19	Message Session Relay Protocol?	[178]	o	o
21	a SDP offer/answer mechanism to enable file transfer?	[185]	o	o

c1: IF A.3/2 THEN m ELSE n/a - - P-CSCF role.
c2: IF A.3/2 OR A.3/4 THEN o ELSE x – P-CSCF, S-CSCF.
c3: IF A.328/3 THEN m ELSE o - - mapping of media streams to resource reservation flows.
c4: IF A.3/2 OR A.3/4 THEN m ELSE n/a - - P-CSCF, S-CSCF.
c5: IF (A.3A/50A AND A.3/7C) OR A.3/2 OR A.3/4 THEN m ELSE n/a - - multimedia telephony service application server as AS acting as a SIP proxy, P-CSCF, S-CSCF.
c6: IF (A.3A/83 AND A.3/7C) OR A.3/4 THEN m ELSE n/a - - SCC application server, AS acting as a SIP proxy, S-CSCF.
c7: IF A.328/18 THEN m ELSE o - - SDP media capabilities negotiation.
c8: IF A.3/2 OR A.3/4 THEN m ELSE o - - P-CSCF, S-CSCF.
c9: IF (A.3A/50A AND A.3/7C) OR A.3/2 OR A.3/4 OR A.328/18 THEN m ELSE n/a - - multimedia telephony service application server as AS acting as a SIP proxy, P-CSCF, S-CSCF, SDP media capabilities negotiation.

A.3.3.2 SDP types

Table A.329: SDP types

Item	Type	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
	Session level description						
1	v= (protocol version)	[39] 5.1	m	m	[39] 5.1	m	m
2	o= (owner/creator and session identifier).	[39] 5.2	m	m	[39] 5.2	i	i
3	s= (session name)	[39] 5.3	m	m	[39] 5.3	i	i
4	i= (session information)	[39] 5.4	m	m	[39] 5.4	i	i
5	u= (URI of description)	[39] 5.5	m	m	[39] 5.5	i	i
6	e= (email address)	[39] 5.6	m	m	[39] 5.6	i	i
7	p= (phone number)	[39] 5.6	m	m	[39] 5.6	i	i
8	c= (connection information)	[39] 5.7	m	m	[39] 5.7	i	i
9	b= (bandwidth information)	[39] 5.8	m	m	[39] 5.8	i	i
	Time description (one or more per description)						
10	t= (time the session is active)	[39] 5.9	m	m	[39] 5.9	i	i
11	r= (zero or more repeat times)	[39] 5.10	m	m	[39] 5.10	i	i
	Session level description (continued)						
12	z= (time zone adjustments)	[39] 5.11	m	m	[39] 5.11	i	i
13	k= (encryption key)	[39] 5.12	m	m	[39] 5.12	i	i
14	a= (zero or more session attribute lines)	[39] 5.13	m	m	[39] 5.13	i	i
	Media description (zero or more per description)						
15	m= (media name and transport address)	[39] 5.14	m	m	[39] 5.14	m	m
16	i= (media title)	[39] 5.4	m	m	[39] 5.4	i	i
17	c= (connection information)	[39] 5.7	m	m	[39] 5.7	i	i
18	b= (bandwidth information)	[39] 5.8	m	m	[39] 5.8	i	c1
19	k= (encryption key)	[39] 5.12	m	m	[39] 5.12	i	i
20	a= (zero or more media attribute lines)	[39] 5.13	m	m	[39] 5.13	i	c1
c1:	IF A.328/0A THEN m ELSE i - - application of session policy.						

Prerequisite A.329/14 OR A.329/20 - - a= (zero or more session/media attribute lines)

Table A.330: zero or more session / media attribute lines (a=)

Item	Field	Sending			Receiving		
		Ref.	RFC status	Profile status	Ref.	RFC status	Profile status
1	category (a=cat)	[39] 6	m	m	[39] 6	i	i
2	keywords (a=keywds)	[39] 6	m	m	[39] 6	i	i
3	name and version of tool (a=tool)	[39] 6	m	m	[39] 6	i	i
4	packet time (a=ptime)	[39] 6	m	m	[39] 6	i	c9
5	maximum packet time (a=maxptime)	[39] 6 (NOTE 1)	m	m	[39] 6 (NOTE 1)	i	c9
6	receive-only mode (a=recvonly)	[39] 6	m	m	[39] 6	i	c9
7	send and receive mode (a=sendrecv)	[39] 6	m	m	[39] 6	i	c9
8	send-only mode (a=sendonly)	[39] 6	m	m	[39] 6	i	c9
8A	Inactive mode (a=inactive)	[39] 6	m	m	[39] 6	i	c9
9	whiteboard orientation (a=orient)	[39] 6	m	m	[39] 6	i	c9
10	conference type (a=type)	[39] 6	m	m	[39] 6	i	i
11	character set (a=charset)	[39] 6	m	m	[39] 6	i	i
12	language tag (a=sdplang)	[39] 6	m	m	[39] 6	i	c9
13	language tag (a=lang)	[39] 6	m	m	[39] 6	i	c9
14	frame rate (a=framerate)	[39] 6	m	m	[39] 6	i	c9
15	quality (a=quality)	[39] 6	m	m	[39] 6	i	c9
16	format specific parameters (a=fmtp)	[39] 6	m	m	[39] 6	i	c9
17	rtpmap attribute (a=rtpmap)	[39] 6	m	m	[39] 6	i	c9
18	current-status attribute (a=curr)	[30] 5	m	m	[30] 5	c2	c2
19	desired-status attribute (a=des)	[30] 5	m	m	[30] 5	c2	c2
20	confirm-status attribute (a=conf)	[30] 5	m	m	[30] 5	c2	c2
21	media stream identification attribute (a=mid)	[53] 3	c5	x	[53] 3	c6	x
22	group attribute (a=group)	[53] 4	c5	x	[53] 4	c6	x
23	setup attribute (a=setup)	[83] 4	c7	c7	[83] 4	c8	c8
24	connection attribute (a=connection)	[83] 5	c7	c7	[83] 5	c8	c8
25	candidate IP addresses (a=candidate)	[99]	c9	c9	[99]	c10	c10
26	floor control server determination (a=floorctrl)	[108] 4	c11	c11	[108] 4	c12	c13
27	conference id (a=confid)	[108] 5	c11	c11	[108] 5	c12	c13
28	user id (a=userid)	[108] 5	c11	c11	[108] 5	c12	c13
29	association between streams and floors (a=floorid)	[108] 6	c11	c11	[108] 6	c12	c13
30	RTCP feedback capability attribute (a=rtcp-fb)	[135] 4.2	c14	c14	[135] 4.2	c15	c15
31	extension of the rtcp-fb attribute (a=rtcp-fb)	[136] 7.1	c14	c14	[136] 7.1	c15	c15
32	supported capability negotiation extensions (a=csup)	[137] 3.3.1	c16	c16	[137] 3.3.1	c17	c17
33	required capability negotiation extensions (a=creq)	[137] 3.3.2	c16	c16	[137] 3.3.2	c17	c17
34	attribute capability (a=acap)	[137] 3.4.1	c16	c16	[137] 3.4.1	c17	c17
35	transport protocol capability (a=tcap)	[137] 3.4.2	c16	c16	[137] 3.4.2	c17	c17
36	potential configuration (a=pcfg)	[137] 3.5.1	c16	c16	[137] 3.5.1	c17	c17

		[172] 3.3.6			[172] 3.3.6		
37	actual configuration (a=acfg)	[137] 3.5.2	c16	c16	[137] 3.5.2	c17	c17
38	connection data capability (a=ccap)	[156] 3.1	c18	c18	[156] 3.1	c19	c19
43	media capability (a=rmcap)	[172] 3.3.1	c24	c24	[172] 3.3.1	c26	c26
43A	media capability (a=omcap)	[172] 3.3.1	c24	c24	[172] 3.3.1	c26	c26
44	media format capability (a=mfcap)	[172] 3.3.2	c24	c24	[172] 3.3.2	c26	c26
45	media-specific capability (a=mscap)	[172] 3.3.3	c24	c24	[172] 3.3.3	c26	c26
46	latent configuration (a=lcfg)	[172] 3.3.5	c48	c48	[172] 3.3.5	c49	c49
47	session capability (a=sescap)	[172] 3.3.8	c25	c25	[172] 3.3.8	c27	c27
48	msrp path (a=path)	[178]	c28	c28	[178]	c29	c29
49	file selector (a=file-selector)	[185] 6	c30	c30	[185] 6	c31	c31
50	file transfer identifier (a= file-transfer-id)	[185] 6	c30	c30	[185] 6	c31	c31
51	file disposition (a=file-disposition)	[185] 6	c30	c30	[185] 6	c31	c31
52	file date (a=file-date)	[185] 6	c30	c30	[185] 6	c31	c31
53	file icon (a=file-icon	[185] 6	c30	c30	[185] 6	c31	c31
54	file range (a=file-range)	[185] 6	c30	c30	[185] 6	c31	c31
85	CS correlation (a=cs-correlation)	[155] 5.2.3.1	c57	c57	[155] 5.2.3.1	c57	c57

c2:	IF A.328/1 THEN m ELSE i - - integration of resource management and SIP.
c5:	IF A.328/2 THEN m ELSE n/a - - grouping of media lines.
c6:	IF A.328/3 THEN m ELSE IF A.328/2 THEN i ELSE n/a - - mapping of media streams to resource reservation flows, grouping of media lines.
c7:	IF A.328/5 THEN m ELSE n/a.
c8:	IF A.328/5 THEN i ELSE n/a.
c9:	IF A.329/20 AND A.328/0A THEN m ELSE i - - media level attribute name "a=" and application of session policy.
c9:	IF A.328/6 THEN m ELSE n/a - - interactive connectivity establishment.
c10:	IF A.328/1 AND A.328/6 THEN m ELSE IF A.328/6 THEN i ELSE n/a - - integration of resource management and SIP, interactive connectivity establishment.
c11:	IF A.328/7 THEN m ELSE n/a - - session description protocol format for binary floor control protocol streams.
c12:	IF A.328/7 THEN i ELSE n/a - - session description protocol format for binary floor control protocol streams.
c13:	IF A.328/7 AND A.328/0A AND A.329/20 THEN m ELSE IF A.328/7 AND A.329/20 THEN i ELSE n/a - - session description protocol format for binary floor control protocol streams, media level attribute name "a=" and application of session policy.
c14:	IF (A.328/8 AND A.329/20) THEN m ELSE n/a - - extended RTP profile for real-time transport control protocol (RTCP)-based feedback (RTP/AVPF), media level attribute name "a=".
c15:	IF (A.328/8 AND A.329/20) THEN i ELSE n/a - - extended RTP profile for real-time transport control protocol (RTCP)-based feedback (RTP/AVPF), media level attribute name "a=".
c16:	IF A.328/9 AND A.329/20 THEN m ELSE n/a - - SDP capability negotiation, media level attribute name "a=".
c17:	IF A.328/9 AND A.329/20 THEN i ELSE n/a - - SDP capability negotiation, media level attribute name "a=".
c18:	IF A.328/11 AND A.329/20 THEN o ELSE n/a - - miscellaneous capabilities negotiation in the Session Description Protocol (SDP), media level attribute name "a=".
c19:	IF A.328/11 AND A.329/20 THEN m ELSE n/a - - miscellaneous capabilities negotiation in the Session Description Protocol (SDP), media level attribute name "a=".
c24:	IF A.328/18 THEN m ELSE n/a - - SDP media capabilities negotiation.
c25:	IF A.328/18 AND A.329/14 THEN m ELSE n/a - - SDP media capabilities negotiation, session level attribute name "a=".
c26:	IF A.328/18 AND A.328/0A THEN m ELSE IF A.328/18 THEN i ELSE n/a - - SDP media capabilities negotiation, application of session policy.
c27:	IF A.328/18 AND A.329/14 AND A.328/0A THEN m ELSE IF A.328/18 AND A.329/14 THEN i ELSE n/a - - SDP media capabilities negotiation, session level attribute name "a=", application of session policy.
c28:	IF A.328/19 AND A.329/20 THEN m ELSE n/a - - message session relay protocol, media level attribute name "a=".
c29:	IF A.328/19 AND A.329/20 THEN i ELSE n/a - - message session relay protocol, media level attribute name "a=".
c30:	IF A.328/21 AND A.329/20 THEN m ELSE n/a - - a SDP offer/answer mechanism to enable file transfer, media level attribute name "a=".
c31:	IF A.328/21 AND A.329/20 THEN i ELSE n/a - - a SDP offer/answer mechanism to enable file transfer, media level attribute name "a=".
c48:	IF A.328/18 AND A.329/20 THEN m ELSE n/a - - SDP media capabilities negotiation, media level attribute name "a=".
c49:	IF A.328/18 AND A.329/20 AND A.328/0A THEN m ELSE IF A.328/18 AND A.329/20 THEN i ELSE n/a - - SDP media capabilities negotiation, media level attribute name "a=", application of session policy.
c57:	IF A.318/10 AND A.329/20 THEN m ELSE n/a - - Session Description Protocol (SDP) extension for setting up audio media streams over circuit-switched bearers in the Public Switched Telephone Network (PSTN) and SIP, media level attribute name "a=".
NOTE 1:	Further specification of the usage of this attribute is defined by specifications relating to individual codecs.

A.3.3.3 Void

Table A.331: Void

Table A.332: Void

Table A.333: Void

Table A.334: Void

Table A.335: Void

Table A.336: Void

Table A.337: Void

Table A.338: Void

A.3.3.4 Void

Table A.339: Void

A.4 Profile definition for other message bodies as used in the present document

Void.

Annex B (normative): IP-Connectivity Access Network specific concepts when using GPRS to access IM CN subsystem

B.1 Scope

The present annex defines IP-CAN specific requirements for a call control protocol for use in the IP Multimedia (IM) Core Network (CN) subsystem based on the Session Initiation Protocol (SIP), and the associated Session Description Protocol (SDP), where the IP-CAN is General Packet Radio Service (GPRS). It also defines procedures for invoking CS domain services.

B.2 GPRS aspects when connected to the IM CN subsystem

B.2.1 Introduction

A UE accessing the IM CN subsystem, and the IM CN subsystem itself, utilise the services provided by GPRS to provide packet-mode communication between the UE and the IM CN subsystem.

Requirements for the UE on the use of these packet-mode services are specified in this clause. Requirements for the GGSN in support of this communication are specified in 3GPP TS 29.061 [11], 3GPP TS 29.207 [12] and 3GPP TS 29.212 [13B].

When using the GPRS, each IP-CAN bearer is provided by a PDP context.

B.2.2 Procedures at the UE

B.2.2.1 PDP context activation and P-CSCF discovery

Prior to communication with the IM CN subsystem, the UE shall:

a) if not attached for GPRS services yet, perform a GPRS attach procedure as specified in 3GPP TS 24.008 [8];

b) ensure that a PDP context used for SIP signalling according to the APN and GGSN selection criteria described in 3GPP TS 23.060 [4] and 3GPP TS 27.060 [10A] is available. This PDP context shall remain active throughout the period the UE is connected to the IM CN subsystem, i.e. from the initial registration and at least until the deregistration. As a result, the PDP context provides the UE with information that makes the UE able to construct an IPv4 or an IPv6 address;

NOTE 1: During the PDP context activation procedure, the UE and network negotiate whether the UE or the GPRS IP-CAN is responsible for the resource reservation applicable to all PDP contexts within the activated PDP address/APN pair, as described in 3GPP TS 24.008 [8].

When the bearer establishment is controlled by the UE, the UE shall choose one of the following options when performing establishment of this PDP context:

I. A dedicated PDP context for SIP signalling:

The UE shall indicate to the GGSN that this is a PDP context intended to carry IM CN subsystem-related signalling only by setting the IM CN Subsystem Signalling Flag. The UE may also use this PDP context for DNS and DHCP signalling according to the static packet filters as described in 3GPP TS 29.061 [11]. The UE can also set the Signalling Indication attribute within the QoS information element;

II. A general-purpose PDP context:

The UE may decide to use a general-purpose PDP Context to carry IM CN subsystem-related signalling. The UE shall indicate to the GGSN that this is a general-purpose PDP context by not setting the IM CN Subsystem Signalling Flag. The UE may carry both signalling and media on the general-purpose PDP context. The UE can also set the Signalling Indication attribute within the QoS information element.

NOTE 2: When the bearer establishment is controlled by the GPRS IP-CAN, the GGSN follows the procedures described in 3GPP TS 29.061 [11] in order to establish a dedicated PDP context for SIP signalling.

The UE indicates the IM CN Subsystem Signalling Flag to the GGSN within the Protocol Configuration Options information element of the ACTIVATE PDP CONTEXT REQUEST message or ACTIVATE SECONDARY PDP CONTEXT REQUEST message. Upon successful signalling PDP context establishment the UE receives an indication from GGSN in the form of IM CN Subsystem Signalling Flag within the Protocol Configuration Options information element. If the flag is not received, the UE shall consider the PDP context as a general-purpose PDP context.

The encoding of the IM CN Subsystem Signalling Flag within the Protocol Configuration Options information element is described in 3GPP TS 24.008 [8].

The UE can indicate a request for prioritised handling over the radio interface by setting the Signalling Indication attribute (see 3GPP TS 23.107 [4A]). The general QoS negotiation mechanism and the encoding of the Signalling Indication attribute within the QoS information element are described in 3GPP TS 24.008 [8].

NOTE 3: A general-purpose PDP Context can carry both IM CN subsystem signalling and media, in case the media does not need to be authorized by Policy and Charging control mechanisms as defined in 3GPP TS 29.212 [13C] and Service Based Local Policy mechanisms defined in 3GPP TS 29.207 [12] and the media stream is not mandated by the P-CSCF to be carried in a separate PDP Context.

c) acquire a P-CSCF address(es).

The methods for P-CSCF discovery are:

I. When using IPv4, employ the Dynamic Host Configuration Protocol (DHCP) RFC 2132 [20F], the DHCPv4 options for SIP servers RFC 3361 [35A], and RFC 3263 [27A] as described in subclause 9.2.1. When using IPv6, employ Dynamic Host Configuration Protocol for IPv6 (DHCPv6) RFC 3315 [40], the DHCPv6 options for SIP servers RFC 3319 [41] and DHCPv6 options for Domain Name Servers (DNS) RFC 3646 [56C] as described in subclause 9.2.1.

II. Transfer P-CSCF address(es) within the PDP context activation procedure.

The UE shall indicate the request for a P-CSCF address to the GGSN within the Protocol Configuration Options information element of the ACTIVATE PDP CONTEXT REQUEST message or ACTIVATE SECONDARY PDP CONTEXT REQUEST message.

If the GGSN provides the UE with a list of P-CSCF IPv4 or IPv6 addresses in the ACTIVATE PDP CONTEXT ACCEPT message or ACTIVATE SECONDARY PDP CONTEXT ACCEPT message, the UE shall assume that the list is prioritised with the first address within the Protocol Configuration Options information element as the P-CSCF address with the highest priority.

III. The UE selects a P-CSCF from the list (see 3GPP TS 31.103 [15B]) stored in the ISIM.

IV. The UE selects a P-CSCF from the list in IMS management object.

The UE shall use method IV to select a P-CSCF, if:

- a P-CSCF is to be discovered in the home network;
- the UE is roaming; and
- the IMS management object contains the P-CSCF list.

The UE shall use method III to select the P-CSCF, if:

- a P-CSCF is to be discovered in the home network;
- the UE is roaming;

- either the UE does not contain the IMS management object, or the UE contains the IMS management object, but the IMS management object does not contain the P-CSCF list; and

- the ISIM residing in the UICC supports the P-CSCF list.

The UE can freely select method I or II for P-CSCF discovery, if:

- the UE is in the home network; or

- the UE is roaming and the P-CSCF is to be discovered in the visited network .

In case method I is selected and several P-CSCF addresses or FQDNs are provided to the UE, the selection of P-CSCF address or FQDN shall be performed as indicated in RFC 3361 [35A] when using IPv4 or RFC 3319 [41] when using IPv6. If sufficient information for P-CSCF address selection is not available, selection of the P-CSCF address by the UE is implementation specific.

NOTE 4: The UE decides whether the P-CSCF is to be discovered in the serving network or in the home network based on local configuration, e.g. whether the application on the UE is permitted to use local breakout.

If the UE is designed to use I above, but receives P-CSCF address(es) according to II, then the UE shall either ignore the received address(es), or use the address(es) in accordance with II, and not proceed with the DHCP request according to I.

When using IPv4, the UE may request a DNS Server IPv4 address(es) via RFC 2132 [20F] or by the Protocol Configuration Options information element when activating a PDP context according to 3GPP TS 27.060 [10A].

When using IPv6, the UE may request a DNS Server IPv6 address(es) via RFC 3315 [40] and RFC 3646 [56C] or by the Protocol Configuration Options information element when activating a PDP context according to 3GPP TS 27.060 [10A].

The encoding of the request and response for IPv4 or IPv6 address(es) for DNS server(s) and list of P-CSCF address(es) within the Protocol Configuration Options information element is described in 3GPP TS 24.008 [8].

B.2.2.1A Modification of a PDP context used for SIP signalling

The PDP context shall not be modified from a dedicated PDP context for SIP signalling to a general-purpose PDP context or vice versa. The IM CN Subsystem Signalling Flag shall not be set in the Protocol Configuration Options information element of the MODIFY PDP CONTEXT REQUEST message.

The UE shall not indicate the request for a P-CSCF address to the GGSN within the Protocol Configuration Options information element of the MODIFY PDP CONTEXT REQUEST message. The UE shall ignore P-CSCF address(es) if received from the GGSN in the Protocol Configuration Options information element of the MODIFY PDP CONTEXT RESPONSE message.

B.2.2.1B Re-establishment of the PDP context for SIP signalling

If the UE registered a public user identity with an IP address allocated for the APN of the PDP context used for SIP signalling, the PDP context used for SIP signalling is deactivated as result of signalling from the network (e.g. lost as a result of a successful GPRS routeing area update procedure) and:

i) if the signalling from the network results in requiring the UE to initiate activation of the PDP context used for SIP signalling; or

ii) if the UE needs to continue having a public user identity registered with an IP address allocated for the APN;

the UE shall:

A) if the non-access stratum is performing the PDP context activation procedure for the APN triggered as result of the signalling from the network, wait until the PDP context activation procedure for the APN finishes; and

B) perform the procedures in subclause B.2.2.1, bullets a), b) and c).

If:

- none of the bullets i) and ii) of this subclause evaluate to true;

- the procedures in bullet B) of this subclause were unable to ensure that the PDP context used for SIP signalling is available; or

- the procedures in bullet B) of this subclause were unable to acquire any P-CSCF address(es);

and if the PDP context used for SIP signalling was a dedicated PDP context for SIP signalling as described in subclause B.2.2.1, the UE shall deactivate all PDP contexts established as a result of SIP signalling according to the 3GPP TS 24.008 [8].

If all PDP contexts for the APN were deactivated at the start of this subclause and the procedures in bullet B) of this subclause ensured that the PDP context used for SIP signalling is available and acquired the P-CSCF address(es), the UE shall perform a new initial registration according to subclause 5.1.1.2.

B.2.2.2 Session management procedures

The existing procedures for session management as described in 3GPP TS 24.008 [8] shall apply while the UE is connected to the IM CN subsystem.

B.2.2.3 Mobility management procedures

The existing procedures for mobility management as described in 3GPP TS 24.008 [8] shall apply while the UE is connected to the IM CN subsystem.

B.2.2.4 Cell selection and lack of coverage

The existing mechanisms and criteria for cell selection as described in 3GPP TS 25.304 [9] and 3GPP TS 44.018 [20] shall apply while the UE is connected to the IM CN subsystem.

B.2.2.5 PDP contexts for media

B.2.2.5.1 General requirements

The UE can establish media streams that belong to different SIP sessions on the same PDP context.

During establishment of a session, the UE establishes data streams(s) for media related to the session. Such data stream(s) may result in activation of additional PDP context(s). Such additional PDP context(s) shall be established as secondary PDP contexts associated to the PDP context used for signalling. Such secondary PDP contexts for media can be established either by the UE or the GGSN.

If the bearer establishment is controlled by the UE, the UE starts reserving its local resources whenever it has sufficient information about the media streams, media authorization and used codecs available as specified in 3GPP TS 24.008 [8].

NOTE 1: If the bearer establishment is controlled by the GPRS IP CAN, the resource reservation requests are initiated by the GGSN after the P-CSCF has authorised the respective IP flows and provided the QoS requirements over the Rx interface to the PCRF, as described in 3GPP TS 29.214 [13D].

NOTE 2: When the UE has to allocate bandwidth for RTP and RTCP in a PDP context, the UE uses the rules as those outlined in 3GPP TS 29.213 [13C].

B.2.2.5.1A Activation or modification of PDP contexts for media by the UE

If the UE is configured not to initiate resource allocation for media according to 3GPP TS 24.167 [8G] and both UE and network are allowed to establish the secondary PDP contents, then the UE shall refrain from establishing the secondary PDP context(s) for media and from modifying existing PDP contexts for media until the UE considers that the network did not initiate resource allocation for the media.

If the UE receives indication within the SDP according to RFC 3524 [54] that media stream(s) belong to group(s), the media stream(s) shall be set up on separate PDP contexts according to the indication of grouping of media streams. The UE may freely group media streams to PDP context(s) in case no indication of grouping of media streams is received from the P-CSCF.

If the capabilities of the originating UE prevents it from establishment of additional PDP contexts according to the media grouping attributes given by the P-CSCF in accordance with RFC 3524 [54], the UE will not establish such grouping of media streams. Instead, the originating UE shall negotiate media parameters for the session according to RFC 3264 [27B].

If the capabilities of the terminating UE prevents it from establishment of additional PDP contexts according to the media grouping attributes given by the P-CSCF in accordance with RFC 3524 [54], the UE will not establish such grouping of media streams. Instead, the terminating UE shall the UE shall handle such SDP offers in accordance with RFC 3388 [53].

The UE can receive a media authorization token in the P-Media-Authorization header field from the P-CSCF according to RFC 3313 [31]. If a media authorization token is received in the P-Media-Authorization header field when a SIP session is initiated, the UE shall:

- either use existing PDP context(s) where another media authorization token is already in use and no indication of grouping of media streams is required; or
- establish separate PDP context(s) for the media; or
- use an existing PDP context where media authorization token is not in use and no indication of grouping of media streams is required.

When a UE modifies a PDP context to indicate a new media authorization token:

- either as a result of establishment of an additional SIP session; or
- modification of media streams for an ongoing SIP session;

the UE shall include all media authorization tokens and all flow identifiers for all ongoing SIP sessions that use this particular PDP context.

If a media authorization token is received in subsequent messages for the same SIP session, the UE shall:

- use the existing PDP context(s) for media;
- modify the existing PDP context(s) for media; or
- establish additional PDP context(s) for media.

If either background or interactive QoS class is needed for the media, then the UE does not need to use the authorization token even if it receives one. In this case the UE may reuse an existing PDP context and it does not need to request PDP context modification unless it needs to modify the QoS.

If existing PDP context(s) where another media authorization token is already in use is re-used for the media, or separate PDP context(s) is established for the media, the UE shall proceed as follows:

- when a SIP session is terminated, the media authorization token is no longer valid and the UE shall not include it in future GPRS session management messages. The UE shall send a MODIFY PDP CONTEXT REQUEST message updating the binding information by deleting the media authorization token and the corresponding flow identifiers that are no longer valid. If a SIP session is terminated and no other SIP sessions are using the PDP context, the UE shall either update the binding information as described above or deactivate the PDP context;
- the UE shall transparently pass the media authorization token received from the P-CSCF in a response to an INVITE request at originating setup or in the INVITE request at terminating setup to the GGSN. The UE shall signal it by inserting it within the Traffic Flow Template information element in the ACTIVATE SECONDARY PDP CONTEXT REQUEST message or the MODIFY PDP CONTEXT REQUEST message;
- to identify to the GGSN which flow(s) (identified by m-lines within the SDP) that are transferred within a particular PDP context, the UE shall set the flow identifier(s) within the Traffic Flow Template information element in the ACTIVATE SECONDARY PDP CONTEXT REQUEST message or the MODIFY PDP CONTEXT REQUEST message. Detailed description of how the flow identifiers are constructed is provided in 3GPP TS 29.207 [12];
- if the UE receives several media authorization tokens from the P-CSCF within the same SIP request or response, the first instance of the media authorization token shall be sent to the GGSN, and subsequent instances are discarded by the UE; and

- the UE shall not include the IM CN Subsystem Signalling Flag when a PDP context for media is established or modified.

The encoding of the media authorization token and the flow identifiers within the Traffic Flow Template information element is described in 3GPP TS 24.008 [8].

B.2.2.5.1B Activation or modification of PDP contexts for media by the GGSN

If the UE receives an activation request from the GGSN for a PDP context which is associated with the PDP context used for signalling, the UE shall, based on the information contained in the Traffic Flow Template information element, correlate the media PDP context with a currently ongoing SIP session establishment or SIP session modification.

If the UE receives a modification request from the GGSN for a PDP context that is used for one or more media streams in an ongoing SIP session, the UE shall:

1) modify the related PDP context in accordance with the request received from the GGSN.

B.2.2.5.2 Special requirements applying to forked responses

Since the UE does not know that forking has occurred until a second, provisional response arrives, the UE sets up the PDP context(s) as required by the initial response received. If a subsequent provisional response is received, different alternative actions may be performed depending on the requirements in the SDP answer:

1) the bearer requirements of the subsequent SDP can be accommodated by the existing PDP context(s). The UE performs no activation or modification of PDP contexts.

2) the subsequent SDP introduces different QoS requirements or additional IP flows. The UE modifies the existing PDP context(s), if necessary, according to subclause B.2.2.5.1A.

3) the subsequent SDP introduces one or more additional IP flows. The UE establishes additional PDP context(s) according to subclause B.2.2.5.1A.

NOTE 1: When several forked responses are received, the resources requested by the UE is are the "logical OR" of the resources indicated in the multiple responses to avoid allocation of unnecessary resources. The UE does not request more resources than proposed in the original INVITE request.

NOTE 2: When service-based local policy is applied, the UE receives the same authorization token for all forked requests/responses related to the same SIP session.

When a final answer is received for one of the early dialogues, the UE proceeds to set up the SIP session. The UE shall release all the unneeded radio/bearer resources. Therefore, upon the reception of the first final 200 (OK) response for the INVITE request (in addition to the procedures defined in RFC 3261 [26] subclause 13.2.2.4), the UE shall:

1) in case PDP context(s) were established or modified as a consequence of the INVITE request and forked provisional responses that are not related to the accepted 200 (OK) response, delete the PDP context(s) or modify the delete the PDP context(s) back to their original state.

B.2.2.5.3 Unsuccessful situations

One of the Go, Gq, Rx and Gx interface related error codes can be received by the UE in the ACTIVATE SECONDARY PDP CONTEXT REJECT message or the MODIFY PDP CONTEXT REJECT message. If the UE receives a Go, Gq, Rx and Gx interface related error code, the UE shall either terminate the session or retransmit the message up to three times. The Go, Gq, Rx and Gx interface related error codes are further specified in 3GPP TS 29.207 [12], 3GPP TS 29.209 [13A], 3GPP TS 29.214 [13D] and 3GPP TS 29.212 [13C].

B.2.2.6 Emergency service

No IP-CAN specific procedures for emergency registration have been defined for GPRS. However, when activating a PDP context to perform emergency registration, based on the conditions in subclause 5.1.6.1 of this specification, the UE can select an APN that results in selection of a GGSN located in the PLMN to which the UE is attached (see 3GPP TS 23.060 [4]). The procedures for PDP context activation and P-CSCF discovery, as described in subclause B.2.2.1 of this specification apply accordingly.

NOTE 1: The UE discovery of the local APN is not in the scope of this specification, but the UE can get information about such an APN e.g. via local configuration.

In order to find out whether the UE is attached to the home PLMN or to the visited PLMN, the UE shall compare the MCC and MNC values derived from its IMSI with the MCC and MNC of the PLMN the UE is attached to. If the MCC and MNC of the PLMN the UE is attached to do not match with the MCC and MNC derived from the IMSI, then for the purpose of emergency calls in the IM CN subsystem the UE shall consider to be attached to a VPLMN.

NOTE 2: In this respect an equivalent HPLMN, as defined in 3GPP TS 23.122 [4C] will be considered as a visited network.

The type of emergency service for an emergency number is derived from the settings of the emergency service category value (bits 1 to 5 of the emergency service category value as specified in subclause 10.5.4.33 of3GPP TS 24.008 [8]). Table B.2.2.6.1 below specifies mappings between a type of emergency service and an emergency service URN. The UE shall use the mapping to match an emergency service URN and a type of emergency service. If a dialled number is an emergency number but does not map to a type of emergency service the service URN shall be "urn:service:sos".

Table B.2.2.6.1: Mapping between type of emergency service and emergency service URN

Type of emergency service	Emergency service URN
Police	urn:service:sos.police
Ambulance	urn:service:sos.ambulance
Fire Brigade	urn:service:sos.fire
Marine Guard	urn:service:sos.marine
Mountain Rescue	urn:service:sos.mountain

If the IP-CAN did not provide a local emergency number that matches the dialled number (see subclause 5.1.6.1) and multiple types of emergency service can be derived for a dialled number from the information configured on the USIM then:

- if the UE is in the HPLMN, the UE shall map any one of these types of emergency service to an emergency service URN as specified in table B.2.2.6.1; and

- if the UE is in the VPLMN, the UE shall select "urn:service:sos".

If the IP-CAN provided a local emergency number that matches the dialled number (see subclause 5.1.6.1), and:

- if the UE can derive one or more types of emergency service from the information received from the IP-CAN for the dialled number and the UE cannot derive types of emergency service from the information configured on the USIM for the dialled number; or

- if the UE is able to derive identical types of emergency service from both the information received from the IP-CAN for the dialled number and from the information configured on the USIM for the dialled number,

then the UE shall map any one of these emergency service types to an emergency service URN as specified in table B.2.2.6.1.

NOTE 3: How the UE resolves clashes where an emergency number is associated with one or more different types of emergency service configured in the USIM and in information received from the access network, is implementation dependent.

B.2A Usage of SDP

B.2A.1 Impact on SDP offer / answer of activation or modification of PDP contexts for media by the network

If due to the activation of PDP context from the network the related SDP media description needs to be changed the UE shall update the related SDP information by sending a new SDP offer within a SIP request, which is sent over the existing SIP dialog,

If the UE receives a modification request from the network for a PDP context that is used for one or more media streams in an ongoing SIP session, the UE shall:

1) if, due to the modification of the PDP context, the related SDP media description need to be changed, update the related SDP information by sending a new SDP offer within a SIP request, that is sent over the existing SIP dialog, and respond to the PDP context modification request.

NOTE: The UE can decide to indicate additional media streams as well as additional or different codecs in the SDP offer than those used in the already ongoing session.

B.2A.2 Handling of SDP at the terminating UE when originating UE has resources available and IP-CAN performs network-initiated resource reservation for terminating UE

If the UE receives an SDP offer where the SDP offer includes all media streams for which the originating side indicated its local preconditions as met, if the precondition mechanism is supported by the terminating UE and the IP-CAN performs network-initiated resource reservation for the terminating UE and the available resources are not sufficient for the received offer the terminating UE shall indicate its local preconditions and provide the SDP answer to the originating side without waiting for resource reservation.

NOTE 1: If the resource reservation is controlled by the GPRS IP-CAN, the resource reservation request is initiated by the GGSN after the P-CSCF has authorised the respective IP flows and provided the QoS requirements over the Rx interface to the PCRF as described in 3GPP TS 29.214 [13D].

NOTE 2: During the PDP context activation procedure the UE and network negotiate whether the UE or the GPRS IP-CAN is responsible for the resource reservation applicable to all PDP contexts within the activated PDP address/APN pair as described in 3GPP TS 24.008 [8].

B.3 Application usage of SIP

B.3.1 Procedures at the UE

B.3.1.1 P-Access-Network-Info header field

The UE shall always include the P-Access-Network-Info header field where indicated in subclause 5.1.

B.3.1.2 Availability for calls

Not applicable.

B.3.2 Procedures at the P-CSCF

B.3.2.1 Determining network to which the originating user is attached

In order to determine from which network the request was originated the P-CSCF shall check the MCC and MNC fields received in the P-Access-Network-Info header field.

NOTE: The above check can be against more than one MNC code stored in the P-CSCF.

B.3.2.2 Location information handling

Void.

B.3.3 Procedures at the S-CSCF

B.3.3.1 Notification of AS about registration status

Not applicable

B.4 3GPP specific encoding for SIP header field extensions

B.4.1 Void

B.5 Use of circuit-switched domain

When an emergency call is to be set up over the CS domain, the UE shall attempt it according to the procedures described in 3GPP TS 24.008 [8].

Annex C (normative): UICC and USIM Aspects for access to the IM CN subsystem

C.1 Scope

This clause describes the UICC and USIM aspects for access to the IM CN subsystem. Additional requirements related to UICC usage for access to the IM CN subsystem are described in 3GPP TS 33.203 [19].

C.2 Derivation of IMS parameters from USIM

In case the UE is loaded with a UICC that contains a USIM but does not contain an ISIM, the UE shall:

- generate a private user identity;
- generate a temporary public user identity; and
- generate a home network domain name to address the SIP REGISTER request to.

All these three parameters are derived from the IMSI parameter in the USIM, according to the procedures described in 3GPP TS 23.003 [3]. Also in this case, the UE shall derive new values every time the UICC is changed, and shall discard existing values if the UICC is removed.

NOTE: If there is an ISIM and a USIM on a UICC, the ISIM is used for authentication to the IM CN subsystem, as described in 3GPP TS 33.203 [19]. See also subclause 5.1.1.1A.

C.3 ISIM Location in 3GPP Systems

For 3GPP systems, if ISIM is present, it is contained in UICC.

C.4 Update of IMS parameters on the UICC

3GPP TS 31.102 [15C] and 3GPP TS 31.103 [15B] specify the file structure and contents for the preconfigured parameters stored on the USIM and ISIM, respectively, necessary to initiate the registration to the IM CN subsystem. Any of these parameters can be updated via Data Download or a USAT application, as described in 3GPP TS 31.111 [15D]. If one ore more EFs are changed and a REFRESH command is issued by the UICC, then the UE reads the updated parameters from the UICC as specified for the REFRESH command in 3GPP TS 31.111 [15D].

In case of changes to EFs, the UE is not required to perform deregistration but it shall wait for the network-initated deregistration procedures to occur as described in subclause 5.4.1.5 unless the user initiates deregistration procedures as described in subclause 5.1.1.6. From this point onwards the normal initial registration procedures can occur.

Annex D (normative): IP-Connectivity Access Network specific concepts when using I-WLAN to access IM CN subsystem

D.1 Scope

The present annex defines IP-CAN specific requirements for a call control protocol for use in the IP Multimedia (IM) Core Network (CN) subsystem based on the Session Initiation Protocol (SIP), and the associated Session Description Protocol (SDP), where the IP-CAN is Wireless LAN Interworking (I-WLAN).

D.2 I-WLAN aspects when connected to the IM CN subsystem

D.2.1 Introduction

A WLAN UE accessing the IM CN subsystem, and the IM CN subsystem itself, utilise the services provided by I-WLAN to provide packet-mode communication between the WLAN UE and the IM CN subsystem.

Requirements for the WLAN UE on the use of these packet-mode services are specified in this clause. Requirements for the PDG in support of this communication are specified in 3GPP TS 29.161 [11C]. When using the I-WLAN, the IP-CAN bearer is provided by an I-WLAN tunnel.

D.2.2 Procedures at the WLAN UE

D.2.2.1 I-WLAN tunnel activation and P-CSCF discovery

Prior to communication with the IM CN subsystem, the WLAN UE shall:

a) Perform I-WLAN network selection i.e. gaining 3GPP Direct access as described in 3GPP TS 24.234 [8C] in the access dependent case;

b) Establish an IKE security association and an IPsec ESP security association (I-WLAN tunnel with the PDG according to the W-APN and PDG selection criteria described in 3GPP TS 24.234 [8C]. The IKE security association and IPsec ESP security association (I-WLAN tunnel) shall remain active throughout the period the WLAN UE is connected to the IM CN subsystem, i.e. from the initial registration and at least until the deregistration.;

   The WLAN UE may carry both signalling and media on an IPsec ESP security association.

c) Acquire a P-CSCF address(es).

   The method for P-CSCF discovery is:

   When using IPv4, employ the Dynamic Host Configuration Protocol (DHCP) RFC 2132 [20F], the DHCPv4 options for SIP servers RFC 3361 [35A], and RFC 3263 [27A] as described in subclause 9.2.1. When using IPv6, employ Dynamic Host Configuration Protocol for IPv6 (DHCPv6) RFC 3315 [40], the DHCPv6 options for SIP servers RFC 3319 [41] and the DHCP options for Domain Name Servers (DNS) RFC 3646 [56C] as described in subclause 9.2.1.

   In case several P-CSCF addresses or FQDNs are provided to the UE, the selection of P-CSCF address or FQDN shall be performed as indicated in RFC 3361 [35A] when using IPv4 or RFC 3319 [41] when using IPv6. If sufficient information for P-CSCF address selection is not available, selection of the P-CSCF address by the WLAN UE is implementation specific.

When using IPv4, the WLAN UE may request a DNS Server IPv4 address(es) via RFC 2132 [20F]. When using IPv6, the WLAN UE may request a DNS Server IPv6 address(es) via RFC 3315 [40] and RFC 3646 [56C].

D.2.2.1A Modification of a I-WLAN tunnel used for SIP signalling

Not applicable.

D.2.2.1B Re-establishment of the I-WLAN tunnel used for SIP signalling

Not applicable.

D.2.2.2 Void

D.2.2.3 Void

D.2.2.4 Void

D.2.2.5 I-WLAN tunnel procedures for media

D.2.2.5.1 General requirements

The WLAN UE can establish media streams that belong to different SIP sessions on the same I-WLAN tunnel.

During establishment of a session, the WLAN UE establishes data streams(s) for media related to the session. Such data stream(s) may result in activation of additional IPsec ESP security associations (I-WLAN tunnels).

If the WLAN UE receives indication within the SDP according to RFC 3524 [54] that media stream(s) belong to group(s), the media stream(s) shall be set up on separate IPSEC ESP security associations (I-WLAN tunnels) according to the indication of grouping of media streams. The WLAN UE may freely group media streams to IPsec ESP security association (I-WLAN tunnel(s)) in case no indication of grouping of media streams is received from the P-CSCF.

If the capabilities of the originating WLAN UE, or operator policy at the PDG prevents the originating WLAN UE from establishment of additional IPsec ESP security associations (I-WLAN tunnels) according to the media grouping attributes given by the P-CSCF in accordance with RFC 3524 [54], the WLAN UE will not establish such grouping of media streams. Instead, the originating WLAN UE shall negotiate media parameters for the session according to RFC 3264 [27B].

If the capabilities of the terminating WLAN UE or operator policy at the PDG prevents the originating WLAN UE from establishment of additional IPsec ESP security associations (I-WLAN tunnels) according to the media grouping attributes given by the P-CSCF in accordance with RFC 3524 [54], the WLAN UE will not establish such grouping of media streams. Instead, the terminating WLAN UE shall handle such SDP offers in accordance with RFC 3388 [53].

The UE can receive a media authorization token in the P-Media-Authorization header field from the P-CSCF according to RFC 3313 [31]. If a media authorization token is received in the P-Media-Authorization header field when a SIP session is initiated, the UE shall reuse the existing I-WLAN tunnel and ignore the media authorization token.

D.2.2.5.1A Activation or modification of I-WLAN tunnel for media by the UE

Not applicable.

D.2.2.5.1B Activation or modification of I-WLAN tunnel for media by the network

Not applicable.

D.2.2.5.2 Special requirements applying to forked responses

Since the UE is unable to perform bearer modification, forked responses place no special requirements on the UE.

D.2.2.5.3 Unsuccessful situations

Not applicable.

D.2.2.6 Emergency service

The details of network selection to select HPLMN or VPLMN are specified in 3GPP TS 24.234 [8C].

D.2A Usage of SDP

D.2A.1 Impact on SDP offer / answer of activation or modification of I-WLAN tunnel for media by the network

Not applicable.

D.2A.2 Handling of SDP at the terminating UE when originating UE has resources available and IP-CAN performs network-initiated resource reservation for terminating UE

Not applicable.

D.3 Application usage of SIP

D.3.1 Procedures at the UE

D.3.1.1 P-Access-Network-Info header field

The UE shall always include the P-Access-Network-Info header field where indicated in subclause 5.1.

D.3.1.2 Availability for calls

Not applicable.

D.3.2 Procedures at the P-CSCF

D.3.2.1 Determining network to which the originating user is attached

Editor's Note: Determining the originating network of the I-WLAN AP is FFS.

D.3.2.2 Location information handling

Void.

D.3.3 Procedures at the S-CSCF

D.3.3.1 Notification of AS about registration status

Not applicable

D.4 3GPP specific encoding for SIP header field extensions

Void.

D.5 Use of circuit-switched domain

Void.

Annex E (normative): IP-Connectivity Access Network specific concepts when using xDSL or Ethernet to access IM CN subsystem

E.1 Scope

The present annex defines IP-CAN specific requirements for a call control protocol for use in the IP Multimedia (IM) Core Network (CN) subsystem based on the Session Initiation Protocol (SIP), and the associated Session Description Protocol (SDP), where the IP-CAN is xDSL or Ethernet.

NOTE: Fixed-broadband access in this Annex refers to xDSL and Ethernet accesses.

E.2 Fixed broadband aspects when connected to the IM CN subsystem

E.2.1 Introduction

A UE accessing the IM CN subsystem, and the IM CN subsystem itself, utilise the services provided by the fixed-broadband access network to provide packet-mode communication between the UE and the IM CN subsystem.

Requirements for the IP Edge node, defined in ETSI ES 282 001 [138]in support of this communication are outside the scope of this document and specified elsewhere.

From the UEs perspective, it is assumed that one or more IP-CAN bearer(s) are provided, in the form of connection(s) managed by the layer 2 (e.g. DSL modem supporting the UE).

In the first instance, it is assumed that the IP-CAN bearer(s) is (are) statically provisioned between the UE and the IP Edge node, defined in ETSI ES 282 001 [138], according to the user's subscription.

It is out of the scope of the current Release to specify whether a single IP-CAN bearer is used to convey both signalling and media flows, or whether several PVC connections are used to isolate various types of IP flows (signalling flows, conversational media, non conversational media…).

The end-to-end characteristics of the fixed-broadband IP-CAN bearer depend on the type of access network, and on network configuration. The description of the network PVC termination (e.g., located in the DSLAM, in the BRAS…) is out of the scope of this annex.

E.2.2 Procedures at the UE

E.2.2.1 Activation and P-CSCF discovery

Fixed-broadband bearer(s) is (are) statically provisioned in the current Release.

Unless a static IP address is allocated to the UE, prior to communication with the IM CN subsystem, the UE shall perform a Network Attachment procedure depending on the used fixed-broadband access type. When using a fixed-broadband access, both IPv4 and IPv6 UEs may access the IM CN subsystem. The UE may request a DNS Server IPv4 address(es) via RFC 2132 [20F] or a DNS Server IPv6 address(es) via RFC 3315 [40].

When using IPv4, the UE may acquires a P-CSCF address(es) by using the DHCP (see RFC 2132 [20F]), the DHCPv4 options for SIP servers (see RFC 3361 [35A]), and RFC 3263 [27A].

In case the DHCP server provides several P-CSCF addresses or FQDNs to the UE, the UE shall select the P-CSCF address or FQDN as indicated in RFC 3361 [35A]. If sufficient information for P-CSCF address selection is not available, selection of the P-CSCF address by the UE is implementation specific.

When using IPv6, the UE may acquires a P-CSCF address(es) by using the DHCPv6 (see RFC 3315 [40] and RFC 3646 [56C]), the DHCPv6 options for SIP servers (see RFC 3319 [41]), and RFC 3263 [27H].

In case the DHCP server provides several P-CSCF addresses or FQDNs to the UE, the UE shall select the P-CSCF address or FQDN as indicated in RFC 3319 [41]. If sufficient information for P-CSCF address selection is not available, selection of the P-CSCF address by the UE is implementation specific.

E.2.2.1A Modification of a fixed-broadband connection used for SIP signalling

Not applicable.

E.2.2.1B Re-establishment of a fixed-broadband connection used for SIP signalling

Not applicable.

E.2.2.2 Void

E.2.2.3 Void

E.2.2.4 Void

E.2.2.5 Fixed-broadband bearer(s) for media

E.2.2.5.1 General requirements

The UE can establish media streams that belong to different SIP sessions on the same fixed-broadband bearer.

E.2.2.5.1A Activation or modification of fixed-broadband bearers for media by the UE

If the UE receives indication within the SDP according to RFC 3524 [54] that media stream(s) belong to group(s), and if several fixed-broadband bearers are available to the UE for the session, the media stream(s) may be sent on separate fixed-broadband bearers according to the indication of grouping. The UE may freely group media streams to fixed-broadband bearers in case no indication of grouping is received from the P-CSCF.

If the UE receives media grouping attributes in accordance with RFC 3524 [54] that it cannot provide within the available fixed-broadband bearer(s), then the UE shall handle such SDP offers in accordance with RFC 3388 [53].

The UE can receive a media authorization token in the P-Media-Authorization header field from the P-CSCF according to RFC 3313 [31]. If a media authorization token is received in the P-Media-Authorization header field when a SIP session is initiated, the UE shall reuse the existing fixed-broadband bearer(s) and ignore the media authorization token.

E.2.2.5.1B Activation or modification of fixed-broadband bearers for media by the network

Not applicable.

E.2.2.5.2 Special requirements applying to forked responses

Since the UE is unable to perform bearer modification, forked responses place no special requirements on the UE.

E.2.2.5.3 Unsuccessful situations

Not applicable.

E.2.2.6 Emergency service

If attached to network via fixed-broadband access technology, the UE shall always consider being attached to its home operator's network for the purpose of emergency calls.

NOTE: In fixed-broadband the UE is unable to receive any indication from the network, that would allow the UE to determine, whether it is currently attached to its home operator's network or to a different network, so the UE assumes itself always attached to the home operator's network when connected via fixed-broadband access technology.

E.2A Usage of SDP

E.2A.1 Impact on SDP offer / answer of activation or modification of xDSL bearer for media by the network

Not applicable.

E.2A.2 Handling of SDP at the terminating UE when originating UE has resources available and IP-CAN performs network-initiated resource reservation for terminating UE

Not applicable.

E.3 Application usage of SIP

E.3.1 Procedures at the UE

E.3.1.1 P-Access-Network-Info header field

The UE may, but need not, include the P-Access-Network-Info header field where indicated in subclause 5.1.

E.3.1.2 Availability for calls

Not applicable.

E.3.2 Procedures at the P-CSCF

E.3.2.1 Determining network to which the originating user is attached

In order to determine from which network the request was originated the P-CSCF shall check if the location information received in the network provided and/or UE provided "dsl-location" parameter in the P-Access-Network-Info header field(s) belongs to a location in the same country.

NOTE 1: If local policy does not require the insertion of P-Access-Network-Info header field in the P-CSCF even if it is missing in the received initial request, the P-CSCF can assume that the request is initiated by fixed broadband UE in the same country.

NOTE 2: If the location information in the network provided and UE provided "dsl-location" parameters (in a request that includes two P-Access-Network-Info header fields) is contradictory, or the two P-Access-Network-Info header fields indicate different access types the P-CSCF ignores either the network provided or the UE provided information according to operator policy.

E.3.2.2 Location information handling

Upon receipt of an initial request for a dialog or standalone transaction or an unknown method, the P-CSCF based on local policy may include a P-Access-Network-Info header field.The value of the dsl-location parameter shall be the value as received in the Location-Information header in the User-Data Answer command as specified in ETSI ES 283 035 [98].

NOTE: The way the P-CSCF deduce that the request comes from a UE connected through xDSL access is implementation dependent.

E.3.3 Procedures at the S-CSCF

E.3.3.1 Notification of AS about registration status

Not applicable

E.4 3GPP specific encoding for SIP header field extensions

Void.

E.5 Use of circuit-switched domain

There is CS domain in this access technology.

Annex F (normative): Additional procedures in support for hosted NAT

NOTE: This subclause describes the mechanism for support of the hosted NAT scenario. This does not preclude other mechanisms but they are out of the scope of this annex.

F.1 Scope

This annex describes the UE and P-CSCF procedures in support of hosted NAT. In this scenario, both the media flows and the SIP signalling both traverse a NA(P)T device located in the customer premises domain. The term "hosted NAT" is used to address this function.

When receiving an initial SIP REGISTER request without integrity protection, the P-CSCF can, determine whether to perform the hosted NAT procedures for the user identified by the REGISTER request by comparing the address information in the top-most SIP Via header field with the IP level address information from where the request was received. The P-CSCF will use the hosted NAT procedure only when the address information do not match.

NOTE: There is no need for the P-CSCF to resolve a domain name in the Via header field when UDP encapsulated tunnel mode for IPsec is used. The resolution of a domain name in the Via header field is not required by RFC 3261 [26].

In order to provide hosted NAT traversal for SIP REGISTER requests without integrity protection and the associated responses, the P-CSCF makes use of the "received" and "rport" header field parameters as described in RFC 3261 [26] and RFC 3581 [56A]. The hosted NAT traversal for protected SIP messages is provided by applying UDP encapsulation to IPSec packets in accordance with RFC 3948 [63A].

Alternativly to the procedures defined in subclause F.2 which are employed to support the hosted NAT scenario where the security solution is based on UDP encapsulated IPSec as defined in 3GPP TS 33.203 [19], subclause F.4 provides procedures for NAT traversal for security solutions that are not defined in 3GPP TS 33.203 [19]. Use of such security solutions is outside the scope of this document.

F.2 Application usage of SIP

F.2.1 UE usage of SIP

F.2.1.1 General

This subclause describes the UE SIP procedures for supporting hosted NAT scenarios. The description enhances the procedures specified in subclause 5.1.

The UE shall support the symmetric response routeing mechanism according to RFC 3581 [56A].

F.2.1.2 Registration and authentication

F.2.1.2.1 General

The text in subclause 5.1.1.1 applies without changes

F.2.1.2.1A Parameters contained in the ISIM

The text in subclause 5.1.1.1A applies without changes

F.2.1.2.1B Parameters provisioned to a UE without ISIM or USIM

The text in subclause 5.1.1.1B applies without changes.

F.2.1.2.2 Initial registration

The procedures described in subclause 5.1.1.2.1 apply with the additional procedures described in the present subclause.

NOTE 1: In accordance with the definitions given in subclause 3.1 the IP address acquired initially by the UE in a hosted NAT scenario is the UE private IP address.

On sending a REGISTER request, the UE shall populate the header fields as indicated in subclause 5.1.1.2.1 with the exceptions of subitems c) and d) which are modified as follows

The UE shall populate:

c) a Contact header field according to the following rules: if the REGISTER request is sent without integrity protection, the Contact header field shall be set to include SIP URI(s) containing the private IP address of the UE in the hostport parameter or FQDN. If the UE supports GRUU, the UE shall include a "+sip.instance" header field parameter containing the instance ID. If the REGISTER request is integrity protected, the UE shall include the public IP address or FQDNin the hostport parameter. The UE shall only use a FQDN in a protected REGISTER request, if it is ensured that the FQDN resolves to the public IP address of the NAT. If the UE supports GRUU, the UE shall include a "+sip.instance" header field parameter containing the instance ID. The UE shall include all supported ICSI values (coded as specified in subclause 7.2A.8.2) in a g.3gpp.icsi-ref media feature tag as defined in subclause 7.9.2 and RFC 3840 [62] for the IMS communication services it intends to use, and IARI values (coded as specified in subclause 7.2A.9.2), for the IMS applications it intends to use in a g.3gpp.iari-ref media feature tag as defined in subclause 7.9.3 and RFC 3840 [62];

NOTE 2: The UE will learn its public IP address from the "received" header field parameter in the topmost Via header field in the 401 (Unauthorized) response to the unprotected REGISTER request.

d) a Via header field according to the following rules: if the REGISTER request is sent without integrity protection, the Via header field shall be set to include the private IP address or FQDN of the UE in the sent-by field. If the REGISTER request is integrity protected, the UE shall include the public IP address or FQDN in the sent-by field. The UE shall only use a FQDN in a protected REGISTER request, if it is ensured that the FQDN resolves to the public IP address of the NAT. Unless the UE has been configured to not send keep-alives, it shall include a "keep" header field parameter with no value in the Via header field, in order to indicate support of sending keep-alives associated with, the registration, as described in RFC 6223 [143];

NOTE 3: If the UE specifies a FQDN in the host parameter in the Contact header field and in the sent-by field in the Via header field of an unprotected REGISTER request, this FQDN will not be subject to any processing by the P-CSCF or other entities within the IM CN subsystem. The means to ensure that the FQDN resolves to the public IP address of the NAT are outside of the scope of this specification. One option for resolving this is local configuration.

If IMS AKA is used as a security mechanism, on sending a REGISTER request, as defined in subclause 5.1.1.2.1, the UE shall additionally populate the header fields as defined in subclause 5.1.1.2.2, with the exceptions of subitems c), and d) which are modified as follows:

d) the Security-Client header field set to specify the security mechanism the UE supports, the IPsec layer algorithms the UE supports and the parameters needed for the security association setup. The UE shall support the setup of two pairs of security associations as defined in 3GPP TS 33.203 [19]. The syntax of the parameters needed for the security association setup is specified in Annex H of 3GPP TS 33.203 [19]. The UE shall support the "ipsec-3gpp" security mechanism, as specified in RFC 3329 [48]. The UE shall support the IPSec layer algorithms for integrity protection and for encryption as defined in 3GPP TS 33.203 [19], and shall announce support for them according to the procedures defined in RFC 3329 [48]. In addition to transport mode the UE shall support UDP encapsulated tunnel mode as per RFC 3948 [63A] and shall announce support for both modes as described in TS 33.203 [19];

When a 401 (Unauthorized) response to a REGISTER is received and this response is received without integrity protection, the procedures described in subclause 5.1.1.2.1 apply with the following additions:

The UE shall compare the values in the "received" header field parameter and "rport" header field parameter with the corresponding values in the sent-by parameter in the topmost Via header field to detect if the UE is behind a NAT. If the comparison indicates that the respective values are the same, the UE concludes that it is not behind a NAT.

- If the UE is not behind a NAT, the UE shall proceed with the procedures described in subclause 5.1 of the main body of this specification;

- If the UE is behind a NAT, the UE shall verify using the Security-Server header field that mode "UDP-enc-tun" is selected. If the verification succeeds the UE shall store the IP address contained in the "received" header field parameter as the UE public IP address. If the verification does not succeed the UE shall abort the registration.

In addition, when a 401 (Unauthorized) response to a REGISTER is received (with or without integrity protection) the UE shall behave as described in subclause F.2.1.2.5.

When the UE, that is behind a NAT, receives a 400 (Bad Request) response with 301 Warning header field indicating "incompatible network address format" to the unprotected REGISTER request, the UE shall randomly select new values for the protected server port and the protected client port, and perform new initiate registration procedure by sending an unprotected REGISTER request containing the new values in the Security-Client header field.

F.2.1.2.3 Initial subscription to the registration-state event package

The procedures described in subclause 5.1.1.3 apply with the additional procedures described in the present subclause.

On sending a SUBSCRIBE request, the UE shall populate the header fields as indicated in subclause 5.1.1.3 with the exception of subitem g) which is modified as follows

The UE shall populate:

g) a Contact header field set to contain the UE public IP address or FQDN. If IMS AKA is being used as a security mechanism the UE shall include the protected server port value as in the initial registration. The UE shall only use a FQDN, if it is ensured that the FQDN resolves to the public IP address of the NAT.

NOTE: The means to ensure that the FQDN resolves to the public IP address of the NAT are outside of the scope of this specification. One option for resolving this is local configuration.

F.2.1.2.4 User-initiated re-registration

The procedures described in subclause 5.1.1.4.1 apply with the additional procedures described in the present subclause.

On sending a REGISTER request that does not contain a challenge response, the UE shall populate the header fields as indicated in subclause 5.1.1.4.1 with the exception of subitems c) and d) which are modified as follows.

The UE shall populate:

c) a Contact header field set to include SIP URI(s) that contain(s) in the hostport parameter the public IP address of the UE or FQDN, and containing the instance ID of the UE in the "+sip.instance" header field parameter, if the UE supports GRUU. The UE shall only use a FQDN, if it is ensured that the FQDN resolves to the public IP address of the NAT. The UE shall include all supported ICSI values (coded as specified in subclause 7.2A.8.2) in a g.3gpp.icsi-ref media feature tag as defined in subclause 7.9.2 and RFC 3840 [62] for the IMS communication services it intends to use, and IARI values (coded as specified in subclause 7.2A.9.2), for the IMS applications it intends to use in a g.3gpp.iari-ref media feature tag as defined in subclause 7.9.3 and RFC 3840 [62];

d) a Via header field set to include the public IP address or FQDN of the UE in the sent-by field. The UE shall only use a FQDN, if it is ensured that the FQDN resolves to the public IP address of the NAT. For the TCP, the response is received on the TCP connection on which the request was sent. If the UE previously has previously negotiated sending of keep-alives associated with the registration, it shall include a "keep" header field parameter with no value in the Via header field, in order to indicate continous support to send keep-alives, as described in RFC 6223 [143];

NOTE 1: The means to ensure that the FQDN resolves to the public IP address of the NAT are outside of the scope of this specification. One option for resolving this is local configuration.

When the UE, that is behind a NAT, receives a 400 (Bad Request) response with 301 Warning header field indicating "incompatible network address format" to the REGISTER request that does not contain a challenge response, the UE shall randomly select a new value for the protected client port, and send the REGISTER request containing the new values in the Security-Client header field.

NOTE 2: The protected server port stays fixed for a UE until all public user identities of the UE have been de-registered.

F.2.1.2.5 Authentication

F.2.1.2.5.1 IMS AKA - general

The procedures of subclause 5.1.1.5.1 apply with with the additional procedures described in the present subclause.

On receiving a 401 (Unauthorized) response to the REGISTER request and the response is deemed to be valid, the UE shall behave as of subclause 5.1.1.5.1 with the exception of subitem 3) which is modified as follows.

The UE shall:

3) send another REGISTER request using the temporary set of security associations to protect the message. The header fields are populated as defined for the initial request (see subclause F.2.1.2.2), with the addition that the UE shall include an Authorization header field containing the private user identity and the authentication challenge response calculated by the UE using RES and other parameters, as described in RFC 3310 [49]. The UE shall also insert the Security-Client header field that is identical to the Security-Client header field that was included in the previous REGISTER request (i.e. the REGISTER request that was challenged with the received 401 (Unauthorized) response). The UE shall also insert the Security-Verify header field into the request, by mirroring in it the content of the Security-Server header field received in the 401 (Unauthorized) response. The UE shall set the Call-ID of the integrity protected REGISTER request which carries the authentication challenge response to the same value as the Call-ID of the 401 (Unauthorized) response which carried the challenge.

Whenever the 200 (OK) response is not received before the temporary SIP level lifetime of the temporary set of security associations expires or a 403 (Forbidden) response is received, the UE shall consider the registration to have failed. The UE shall delete the temporary set of security associations it was trying to establish, and use the old set of security associations. The UE should send an unprotected REGISTER request according to the procedure specified in subclause F.2.1.2.2 if the UE considers the old set of security associations to be no longer active at the P-CSCF.

F.2.1.2.5.2 Void

F.2.1.2.5.3 IMS AKA abnormal cases

The text in subclause 5.1.1.5.3 applies without changes.

F.2.1.2.5.4 SIP digest – general

Not applicable.

F.2.1.2.5.5 SIP digest – abnormal procedures

Not applicable.

F.2.1.2.5.6 SIP digest with TLS – general

Not applicable.

F.2.1.2.5.7 SIP digest with TLS – abnormal procedures

Not applicable.

F.2.1.2.5.8 Abnormal procedures for all security mechanisms

The text in subclause 5.1.1.5.8 applies without changes.

F.2.1.2.5A Network-initiated re-authentication

The text in subclause 5.1.1.5A applies without changes.

F.2.1.2.5B Change of IPv6 address due to privacy

The text in subclause 5.1.1.5B applies without changes.

F.2.1.2.6 User-initiated deregistration

The procedures of subclause 5.1.1.6.1 apply with with the additional procedures described in the present subclause.

On sending a REGISTER request, the UE shall populate the header fields as indicated in subclause 5.1.1.6 with the exception of subitems d) and e) which are modified as follows.

The UE shall populate:

c) a Contact header field set to either the value of "*" or SIP URI(s) that contain(s) in the hostport parameter the IP address of the UE or FQDN; and containing the instance ID of the UE in the "+sip.instance" header field parameter, if the UE supports GRUU. The UE shall only use a FQDN, if it is ensured that the FQDN resolves to the public IP address of the NAT;

d) a Via header field set to include the IP address or FQDN of the UE in the sent-by field. The UE shall only use a FQDN, if it is ensured that the FQDN resolves to the public IP address of the NAT;

NOTE 1: In case of hosted NAT traversal only the UE public IP addresses are bound to security associations.

NOTE 2: The means to ensure that the FQDN resolves to the public IP address of the NAT are outside of the scope of this specification. One option for resolving this is local configuration.

F.2.1.2.7 Network-initiated deregistration

The procedures of subclause 5.1.1.7 apply with with the additional procedures described in the present subclause.

Upon receipt of a NOTIFY request on the dialog which was generated during subscription to the reg event package as described in subclause 5.1.1.3, including one or more <registration> element(s) which were registered by this UE with:

- the state attribute set to "terminated" and the event attribute set to "rejected" or "deactivated"; or

- the state attribute set to "active" and the state attribute within the <contact> element belonging to this UE set to "terminated", and associated event attribute element to "rejected" or "deactivated";

the UE shall remove all registration details relating to these public user identities. In case of a "deactivated" event attribute, the UE shall start the initial registration procedure as described in subclause F.2.1.2.2. In case of a "rejected" event attribute, the UE shall release all dialogs related to those public user identities.

F.2.1.3 Subscription and notification

The text in subclause 5.1.2 applies without changes.

F.2.1.4 Generic procedures applicable to all methods excluding the REGISTER method

F.2.1.4.1 UE originating case

The procedures described in subclause 5.1.2A.1 apply with the additional procedures described in the present subclause.

When the UE sends any request, the requirements in subclause 5.1.2A.1 are replaced by the following requirements. The UE shall include:

- a Via header field set to include the public IP address of the UE or FQDN and the protected server port in the sent-by field. The UE shall only use a FQDN, if it is ensured that the FQDN resolves to the public IP address of the NAT; and if this is a request for a new dialog, and the request includes a Contact header field, then the UE should populate the Contact header field as follows:

  1) if a public GRUU value ("pub-gruu" header field parameter) has been saved associated with the public user identity to be used for this request, and the UE does not indicate privacy of the P-Asserted-Identity, then insert the public GRUU ("pub-gruu" header field parameter) value in the Contact header field as specified in RFC 5627 [93]; or

  2) if a temporary GRUU value ("temp-gruu" header field parameter) has been saved associated with the public user identity to be used for this request, and the UE does indicate privacy of the P-Asserted-Identity, then insert the temporary GRUU ("temp-gruu" header field parameter) value in the Contact header field as specified in RFC 5627 [93].

If this is a request within an existing dialog, and the request includes a Contact header field, and the contact address previously used in the dialog was a GRUU, then the UE should insert the previously used GRUU value in the Contact header field as specified in RFC 5627 [93].

If the UE did not insert a GRUU in the Contact header field, then the UE shall include the public IP address of the UE or FQDN and the protected server port in the hostport parameter in any Contact header field that is otherwise included. The UE shall only use a FQDN, if it is ensured that the FQDN resolves to the public IP address of the NAT.

NOTE: The means to ensure that the FQDN resolves to the public IP address of the NAT are outside of the scope of this specification. One option for resolving this is local configuration.

The UE shall discard any SIP response that is not integrity protected and is received from the P-CSCF outside of the registration and authentication procedures. The requirements on the UE within the registration and authentication procedures are defined in subclause F.2.1.2.4.

When a SIP transaction times out, i.e. timer B, timer F or timer H expires at the UE, the UE may behave as if timer F expired, as described in subclause F.2.1.2.3.

F.2.1.4.2 UE terminating case

The procedures described in subclause 5.1.2A.2 apply with the additional procedures described in the present subclause.

When the UE sends any response, the requirements in subclause 5.1.2A.1 are replaced by the following requirement.

If the response includes a Contact header field, and the response is not sent within an existing dialog, then the UE should populate the Contact header field as follows:

1) if a public GRUU value ("pub-gruu" header field parameter) has been saved associated with the public user identity from the P-Called-Party-ID header field, and the UE does not indicate privacy of the P-Asserted-Identity, then insert the public GRUU ("pub-gruu" header field parameter) value in the Contact header field as specified in RFC 5627 [93]; and

2) if a temporary GRUU value ("temp-gruu" header field parameter) has been saved associated with the public user identity from the P-Called-Party-ID header field, and the UE does indicate privacy of the P-Asserted-Identity, then the UE should insert the temporary GRUU ("temp-gruu" header field parameter) value in the Contact header field as specified in RFC 5627 [93].

If the UE did not insert a GRUU in the Contact header field, then the UE shall:

- include the public IP address of the UE or FQDN and the protected server port in the hostport parameter in any Contact header field that is otherwise included. The UE shall only use a FQDN, if it is ensured that the FQDN resolves to the public IP address of the NAT.

NOTE: The means to ensure that the FQDN resolves to the public IP address of the NAT are outside of the scope of this specification. One option for resolving this is local configuration.

The UE shall discard any SIP request that is not integrity protected and is received from the P-CSCF outside of the registration and authentication procedures. The requirements on the UE within the registration and authentication procedures are defined in subclause F.2.1.2.

F.2.2 P-CSCF usage of SIP

F.2.2.1 Introduction

This subclause describes the SIP procedures for supporting hosted NAT scenarios.

The description enhances the procedures specified in subclause 5.2.

The P-CSCF shall support the symmetric response routeing mechanism according to RFC 3581 [56A].

NOTE: Symmetric response routeing is used to support hosted NAT and applicable only to initial, unprotected REGISTER requests and corresponding responses.

F.2.2.2 Registration

The procedures described in subclause 5.2.2 apply with the additional procedures described in the present subclause.

When the P-CSCF receives a REGISTER request from the UE, the P-CSCF shall behave as of subclause 5.2.2.1.

If IMS AKA is the security mechanism, when the P-CSCF receives a REGISTER request from the UE, the P-CSCF shall perform the procedures of subclause 5.2.2.2 with the following exception to items 2) and 3):

2) in case the REGISTER request was received without integrity protection, then:

   a) check the existence of the Security-Client header field. If the Security-Client header field is not present, then the P-CSCF shall return a suitable 4xx response. If the Security-Client header field is present the P-CSCF shall:

      - in case the UE indicated support for "UDP-enc-tun" then remove and store it.

      - in case the UE does not indicate support for "UDP-enc-tun" then:

        - if the host portion of the sent-by field in the topmost Via header field contains an IP address that differs from the source address of the IP packet, silently drop the REGISTER;

        - otherwise continue with procedures as of subclause 5.2.2.

NOTE 1: If the UE does not indicate support for "UDP-enc-tun" and the P-CSCF detects that the UE is located behind a NAT device, then the P-CSCF can just drop the REGISTER to avoid unnecessary signalling traffic.

   b) if the host portion of the sent-by field in the topmost Via header field contains a FQDN, or if it contains an IP address that differs from the source address of the IP packet, the P-CSCF shall:

      - add a "received" header field parameter in accordance with the procedure defined in RFC 3581 [56A]. The P-CSCF shall also set the value of the "rport" header field parameter to the source port of the requestin accordance with the procedure defined in RFC 3581 [56A]; and

      - check that no any previously registered UE has either the same public IP address (allocated by the NAT and indicated in the Via header field) and the protected server port (specified in the Security-Client header field) or the same public IP address and the protected client port (specified in the Security-Client header field). If there is such UE, the P-CSCF shall return a 400 (Bad Request) response with 301 Warning header field indicating "incompatible network address format" to the unprotected REGISTER request. Otherwise, the P-CSCF shall forward the REGISTER request.

NOTE 2: If two UEs are behind the same NAT, the NAT may assign to them the same public IP address (but different NAT's port). Hence, the two respective UE must have different protected server port numbers, and different protected client port numbers.

3) in case the REGISTER request was received integrity protected, then the P-CSCF shall:

   a) check the security association which protected the request. If the security association is a temporary one, the P-CSCF shall:

      - in case the host parameter in the Contact address is in the form of a FQDN, ensure that the given FQDN will resolve (e.g., by reverse DNS lookup) to the IP address bound to the security association;

      - in case the P-CSCF has detected earlier that the UE is located behind a NAT, retrieve port_Uenc from the encapsulating UDP header of the packet received and complete configuration of the temporary set of security associations by configuring port_Uenc in each of the temporary security associations;

      - check whether the request contains a Security-Verify header field in addition to a Security-Client header field. If there are no such header fields, then the P-CSCF shall return a suitable 4xx response. If there are such header fields, then the P-CSCF shall compare the content of the Security-Verify header field with the content of the Security-Server header field sent earlier and the content of the Security-Client header field with the content of the Security-Client header field received in the challenged REGISTER. If those do not match, then there is a potential man-in-the-middle attack. The request should be rejected by sending a suitable 4xx response. If the contents match, the P-CSCF shall remove the Security-Verify and the Security-Client header field;

   b) if the security association the REGISTER request was received on, is an already established one, then the P-CSCF shall:

      - remove the Security-Verify header field if it is present;

      - check if the Security-Client header field containing new parameter values is present, and:

      - if this header field or any required parameter is missing, then the P-CSCF shall return a suitable 4xx response.

      - if this header field and the required parameters are present, then the P-CSCF shall check that no any previously registered UE has the same public IP address and the protected client port (specified in the Security-Client header field). If there is such UE, the P-CSCF shall return a 400 (Bad Request) response with 301 Warning header field indicating "incompatible network address format" to the REGISTER request. Otherwise, the P-CSCF shall remove and store the Security-Client header field before forwarding the request to the S-CSCF;

NOTE 3: When sending the protected REGISTER request to the P-CSCF, the UE will not modify the protected server port value, since the protected server port value stays fixed for a UE until all public user identities of the UE have been de-registered.

When the P-CSCF receives a 401 (Unauthorized) response to an unprotected REGISTER request and this response contains a "received" header field parameter and "rport" header field parameter in the Via header field associated with the UE and the UE indicated support for "UDP-enc-tun" IPsec mode, the P-CSCF shall:

1) delete any temporary set of security associations established towards the UE;

2) remove the "ck" and "ik" WWW-Authenticate header field parameters contained in the 401 (Unauthorized) response and bind the values to the proper private user identity and to the temporary set of security associations which will be setup as a result of this challenge. The P-CSCF shall forward the 401 (Unauthorized) response to the UE if and only if the "ck" and "ik" header field parameters have been removed;

3) insert a Security-Server header field in the response, containing the P-CSCF security list and the parameters needed for the security association setup, as specified in Annex H of 3GPP TS 33.203 [19]. The P-CSCF shall support the "ipsec-3gpp" security mechanism, as specified in RFC 3329 [48]. The P-CSCF shall support the IPSec layer algorithms for integrity protection and for encryption as defined in 3GPP TS 33.203 [19]. The P-CSCF shall indicate "UDP-enc-tun" as the only IPsec mode;

4) set up the temporary set of security associations with a temporary SIP level lifetime between the UE and the P-CSCF for the user identified with the private user identity. The P-CSCF shall select UDP encapsulated tunnel mode and shall leave the value for port-Uenc unspecified in each of the temporary security associations. For further details see 3GPP TS 33.203 [19] and RFC 3329 [48]. The P-CSCF shall set the temporary SIP level lifetime for the temporary set of security associations to the value of reg-await-auth timer; and

5) send the 401 (Unauthorized) response unprotected to the UE using the mechanisms described in RFC 3261 [26] and RFC 3581 [56A], i.e. in case UDP is used as transport protocol the P-CSCF shall send the response to the IP address indicated in the "received" header field parameter and to the port indicated in the "rport" header field parameter of the Via header field associated with the UE. In case UDP is used as transport protocol, the P-CSCF shall use the IP address and the port on which the REGISTER request was received as source IP address and the source port when sending the response back to the UE.

When the P-CSCF receives a 401 (Unauthorized) response to a protected REGISTER request and that REGISTER request was protected by an old set of security associations that use UDP encapsulated tunnel mode, the P-CSCF shall:

1) delete any temporary set of security associations established towards the UE;

2) remove the "ck" and "ik" WWW-Authenticate header field parameters contained in the 401 (Unauthorized) response and bind the values to the proper private user identity and to the temporary set of security associations which will be setup as a result of this challenge. The P-CSCF shall forward the 401 (Unauthorized) response to the UE if and only if the "ck" and "ik" header field parameters have been removed;

3) insert a Security-Server header field in the response, containing the P-CSCF security list and the parameters needed for the security association setup, as specified in Annex H of 3GPP TS 33.203 [19]. The P-CSCF shall support the "ipsec-3gpp" security mechanism, as specified in RFC 3329 [48]. The P-CSCF shall support the IPsec layer algorithms for integrity protection and encryption as defined in 3GPP TS 33.203 [19]. The P-CSCF shall indicate "UDP-enc-tun" as the IPsec mode;

4) set up the temporary set of security associations with a temporary SIP level lifetime between the UE and the P-CSCF for the user identified with the private user identity. The P-CSCF shall select UDP encapsulated tunnel mode and shall specify the same port_Uenc that was used in the old set of security associations. The P-CSCF shall set the temporary SIP level lifetime for the temporary set of security associations to the value of reg-await-auth timer; and

5) send the 401 (Unauthorized) response to the UE using the old set of security associations.

Otherwise, when the P-CSCF receives a 401 (Unauthorized) response to an unprotected REGISTER request and this response does not contain a "received" header field parameter and "rport" header field parameter or when the P-CSCF receives a 401 (Unauthorized) response to a protected REGISTER request and that REGISTER request was protected by an old set of security associations that do not use UDP encapsulated tunnel mode, the P-CSCF shall proceed as described in subclause 5.2.2.2.

F.2.3 S-CSCF usage of SIP

F.2.3.1 S-CSCF usage of SIP

F.2.3.1.1 Protected REGISTER with IMS AKA as a security mechanism

The procedures at the S-CSCF described in subclause 5.4.1.2.2 apply.

NOTE: When two UEs that are behind the same NAT register their contact addresses, the NAT may assign to them the same public IP address (but different NAT's ports). If these two UEs select the same protected server port number, and register via different P-CSCFs, then they will have the same contact addresses (i.e. same IP address and protected server port). However, any request targeted to either UE will be sent to the respective P-CSCF, hence not causing any ambiguity at the P-CSCF when forwarding the request via NAT.

F.3 Application usage of SDP

F.3.1 UE usage of SDP

The procedures as of subclause 6.1 apply.

F.3.2 P-CSCF usage of SDP

F.3.2.1 Introduction

Subclause F.3.2 describes the SDP related procedures performed by the P-CSCF in support of hosted NAT.

F.3.2.2 Receipt of an SDP offer

When the P-CSCF receives an SDP offer during session establishment, if this offer comes from a UE located behind a hosted NAT, the P-CSCF shall modify the SDP offer by replacing the IP address(es) and port number previously set in the SDP offer by the IP address(es) and port number(s) received from the IMS access gateway over the Iq interface.

F.3.2.3 Receipt of an SDP answer

When the P-CSCF receives any SDP answer to an SDP offer described in subclause F.3.2.2, if this answer comes from a UE located behind a hosted NAT, the P-CSCF shall modify the SDP answer by replacing the IP address(es) and port number previously set in the SDP answer by the IP address(es) and port number(s) received from the IMS access gateway over the Iq interface.

F.3.2.4 Change of media connection data

After the session is established, it is possible for both ends of the session to change the media connection data for the session. When the P-CSCF receives a SDP offer/answer coming from a UE located behind a hosted NAT with port number(s) or IP address(es) included, there are three different possibilities:

- IP address(es) or/and port number(s) have been added. In this case, the P-CSCF shall apply the procedures as described in subclause F.3.2.2 and subclause F.3.2.3 as appropriate for those additional IP address(es) or/and port number(s);

- IP address(es) and port number(s) have been reassigned to the end points. In this case, the P-CSCF shall apply the procedures as described in subclause F.3.2.2 and subclause F.3.2.3 as appropriate for those reassigned IP address(es) and port number(s);

NOTE: If necessary, the P-CSCF or IBCF will cause the IMS access gateway to release the resources related to the previously assigned IP address(es) and port number(s).

- no change has been made to the IP address(es) and port number(s). The P-CSCF shall apply procedures described in subclause F.3.2.2 using the previously stored IP address(es) and port number(s).

F.4 P-CSCF usage of SIP in case UDP encapsulated IPsec is not employed

F.4.1 Introduction

The subclause F.4 describes the SIP procedures for supporting hosted NAT scenarios in case UDP encapsulated IPsec is not employed. In these scenarios the procedures for NAT traversal must take into account that all SIP requests and responses are not protected by an IPsec security association. This subclause also assumes that the UE transmits the SIP messages from the same IP address and port on which the UE expects to receive SIP messages. In addition, the procedures described in the present clause apply when the registration procedure as described in RFC 5626 [92] is not employed.

F.4.2 Registration

The procedures described in subclause 5.2.2 apply with the additional procedures described in the present clause.

When the P-CSCF receives a REGISTER request from the UE, the P-CSCF shall add the "received" header field parameter to the Via header field set to the source IP address of the packet header in accordance with the procedure defined in RFC 3261 [26] and RFC 3581 [56A]. The P-CSCF shall also set the value of the "rport" header field parameter to the source port of the request, in accordance with the procedure defined in RFC 3581 [56A].

When the P-CSCF detects that the UE is behind a NAT, and the UE has indicated support of the keep-alive mechanism defined in RFC 6223 [143], the P-CSCF shall indicate to the UE that it supports the keep-alive mechanism.

If, upon receiving a REGISTER request from an unregistered user and the P-CSCF discovers that the UE is behind a NAT, the P-CSCF performs the following actions on the Contact header field depending on its content:

- if the Contact header field contains a contact address in the form of an IP address (NOTE), the P-CSCF shall save (for the duration of the registration) this IP address (i.e. the private IP address of the UE) and associated port number (i.e. the private port of the UE) and bind them to the source IP address (i.e. the public IP address of the NAT) and the source port number (i.e. the port number of the NAT) of the IP packet that contained the REGISTER request and forward the REQUEST request;

- if the Contact header field contains more than one contact addresses in the form of an IP address, the P-CSCF shall apply the above procedure to one of those contact addresses by choosing the one with the highest qvalue parameter) and delete any other contact addresses containing an IP address. If the P-CSCF was unable to choose a contact address based on the qvalue, the P-CSCF shall choose one based on local policy and delete any other contact addresses containing an IP address.

NOTE: When the host parameter in the Contact address is in the form of a FQDN, the P-CSCF will resolve the given FQDN (by DNS lookup) to the IP address of the UE. When including the FQDN in the Contact header field the UE insures that the FQDN resolves to the IP address that the UE uses to send the REGISTER request.

When the P-CSCF received a response to the above request, the P-CSCF shall forward the response to the UE using the mechanisms described in RFC 3581 [56A]. In case UDP is used, the P-CSCF shall send the response to the IP address indicated in the "received" header field parameter and to the port indicated in the "rport" header field parameter of the Via header field in the response. If the REGISTER request received from the UE was received over a TCP connection, the P-CSCF shall send the response to the UE over the same TCP connection over which the request was received. The P-CSCF shall transmit the IP packet (containing the response) from the same IP address and port on which the REGISTER request was received.

F.4.3 General treatment for all dialogs and standalone transactions excluding the REGISTER method

F.4.3.1 Introduction

The procedures described in subclause 5.2.6 apply with the additional procedures described in subclause F.4.3.

F.4.3.2 Request initiated by the UE

When the P-CSCF receives, from the UE that is behind a NAT, an initial request for a dialog or a request for a standalone transaction, the P-CSCF shall:

a) set the value of the "rport" header field parameter in the Via header field to the source port of the received IP packet that contained the request, and insert the "received" header field parameter in the Via header field containing the source IP address of the received IP packet (that contained the request), as defined in the RFC-3581 [56A];

b) if the request is a dialog-forming request that was received over UDP, bind the source IP address (i.e. the public IP address of the NAT) and associated source port number (i.e. the port number of the NAT) of the received IP packet (that contained the initial dialog-forming request) to:

   - the IP address (i.e. the private IP address of the UE) and associated port number (i.e. the private port of the UE) contained in the Contact header field of the received dialog-forming request, if the Contact header field contained an IP address and associated port number, and save the binding; or

- the saved IP address (i.e. the private IP address of the UE) and associated port number (i.e. the private port of the UE) contained in the Contact header field of the REGISTER request, if the Contact header field of the received dialog-forming request contained a GRUU, and save the binding; and

c) if the dialog-forming request was received over TCP connection, keep this TCP connection up during the entire duration of the dialog;

before forwarding the request, based on the topmost Route header field, in accordance with the procedures of RFC 3261 [26].

When the P-CSCF receives a response to the above request, the P-CSCF shall forward the response to the UE using the mechanisms described in RFC 3581 [56A]. In case UDP is used, the P-CSCF shall send the response to the IP address indicated in the "received" header field parameter and to the port indicated in the "rport" header field parameter of the Via header field of the response. If the dialog-forming request received from the UE was received over the TCP connection, the P-CSCF shall send the response to the UE over the same TCP connection over which the dialog-forming request was received. The P-CSCF shall transmit the IP packet (containing the response) from the same IP address and port on which the initial dialog-forming request was received.

For all subsequent requests belonging to the dialog, received from the UE, the P-CSCF shall insert the "received" header field parameter and set the value of the "rport" header field parameter in the Via header field as defined in the RFC 3581 [56A] and forward the request as described in RFC 3261 [26]. For all subsequent responses belonging to the dialog, destined or the UE, the P-CSCF shall forward the responses using the "received" header field parameter and set the value of the "rport" header field parameter in the Via header field of the response as defined in the RFC 3581 [56A].

For all subsequent requests belonging to the dialog and destined for the UE (that contains the private IP address and associated private port number in the Request-URI), the P-CSCF shall send the requests to the UE either:

- over the TCP connection that was established when the initial INVITE request was received; or

- use UDP. When sending the request using UDP, the P-CSCF shall insert the request in an IP packet, and send the IP packet to the saved IP address (i.e. the public IP address of the NAT) and associated port number (i.e. the port number of the NAT). The P-CSCF shall transmit the IP packet (containing the request) from the same IP address and port on which the REGISTER request was received.

NOTE: When inserting its SIP URI in the Record-Route header field of the dialog-forming request received from the UE, the P-CSCF may include a pointer in the user part of its SIP URI that points to the saved binding used to route the in-dialog requests to the UE. The Route header field of the in-dialog requests will contain the respective pointer in the user part of the P-CSCF"s SIP URI.

F.4.3.3 Request terminated by the UE

When the P-CSCF receives an initial request for a dialog or a request for a standalone transaction destined for the UE (it contains the private IP address and associated private port number in the Request-URI), the P-CSCF shall send the requests to the UE either:

- over the TCP connection, if available (e.g. TCP connection was established during the registration procedure); or

- use UDP. When sending the request using UDP, the P-CSCF shall insert the request in an IP packet, and send the IP packet to the saved IP address (i.e. the public IP address of the NAT) and associated port number (i.e. the port number of the NAT) that is bound to the private IP address and associated private port number indicated in the Request-URI and save during the registration procedure. The P-CSCF shall transmit the IP packet (containing the request) from the same IP address and port on which the REGISTER request was received.

For all subsequent requests belonging to the dialog that are received from the UE, the P-CSCF shall insert the "received" header field parameter and set the value of the "rport" header field parameter in the Via header field as defined in the RFC 3581 [56A] and forward the request as described in RFC 3261 [26]. For all subsequent responses belonging to the dialog, destined or the UE, the P-CSCF shall forward the responses using the "received" header field parameter and set the value of the "rport" header field parameter in the Via header field of the response as defined in the RFC 3581 [56A].

For all subsequent requests belonging to the dialog and destined for the UE (that contains the private IP address and associated private port number in the Request-URI), the P-CSCF shall send the requests to the UE either:

- over the TCP connection, if available; or

- use UDP. When sending the request using UDP, the P-CSCF shall insert the request in an IP packet, and send the IP packet to the saved IP address (i.e. the public IP address of the NAT) and associated port number (i.e. the port number of the NAT). The P-CSCF shall transmit the IP packet (containing the request) from the same IP address and port on which the REGISTER request was received.

NOTE: When inserting its SIP URI in the Record-Route header field in a response to the dialog-forming request received from the UE, the P-CSCF may include a pointer in the user part of its SIP URI that points to the saved binding used to route the in-dialog requests to the UE. The Route header field of the in-dialog requests will contain the respective pointer in the user part of the P-CSCF"s SIP URI.

F.5 NAT traversal for media flows

To allow the IMS access gateway to perform address latching, for a given UDP-based media stream, the UE shall use the same port number for sending and receiving packets.

To allow early media flows, the UE shall send keepalive messages for each UDP-based media stream as soon as an SDP offer or answer is received in order to allow the IMS access gateway to perform address latching before the call is established.

To keep NAT bindings and firewall pinholes open for the UDP-based media streams, and enable the IMS access gateway to perform address latching, the UE shall send keepalive messages for each media stream as defined in subclause K.5.2.1.

Annex G (normative): Additional procedures in support of NA(P)T and NA(P)T-PT controlled by the P-CSCF

NOTE: This subclause describes the mechanism for support of NA(P)T and NA(P)T-PT controlled by the P-CSCF scenario defined in 3GPP TS 23.228 [7]. This does not preclude other mechanisms but they are out of the scope of this annex.

G.1 Scope

This annex describes the P-CSCF procedures for supporting the scenario where IP address and/or port conversions occur at the IMS access gateway level in the media path between the UE and the backbone. Two types of address conversions are covered:

IP version interworking (NA(P)T-PT); and;

IP address/port translation (NA(P)T).

The annex assumes that signalling procedure take place over the Iq interface to enable the P-CSCF to request and retrieve the address bindings reserved in the transport plane.

G.2 P-CSCF usage of SDP

G.2.1 Introduction

The subclause G.2 describes the P-CSCF procedures for supporting IP address and/or port conversions in SDP that occur in the media path between the UE and the backbone.

NOTE: In the particular case of RTP flows, port conversions also apply to the associated RTCP flows.

G.2.2 Receipt of an SDP offer

When the P-CSCF receives any SDP offer during session establishment, the P-CSCF shall modify the SDP offer by replacing the IP address(es) and port number previously set in the SDP offer by the IP address(es) and port number(s) received from the IMS access gateway over the Iq interface.

G.2.3 Receipt of an SDP answer

When the P-CSCF receives any SDP answer to an SDP offer described in subclause G.2.3, the P-CSCF shall modify the SDP answer by replacing the IP address(es) and port number previously set in the SDP answer by the IP address(es) and port number(s) received from the IMS access gateway over the Iq interface.

The P-CSCF may receive multiple provisional responses with an SDP answer due to forking of a request before the first final answer is received. For each SDP answer received in such subsequent provisional responses, the P-CSCF shall apply the procedure in this subclause.

G.2.4 Change of media connection data

After the session is established, it is possible for both ends of the session to change the media connection data for the session. When the P-CSCF receives a SDP offer/answer where port number(s) or IP address(es) is/are included, there are three different possibilities:

IP address(es) or/and port number(s) have been added. In this case, the P-CSCF shall apply the procedures as described in subclause G.2.2 or subclause G.2.3 as appropriate for those additional IP address(es) or/and port number(s); or

IP address(es) and port number(s) have been reassigned to the end points. In this case, the P-CSCF shall apply the procedures as described in subclause G.2.2 or subclause G.2.3 as appropriate for those reassigned IP address(es) and port number(s); or

NOTE: If necessary, the P-CSCF or IBCF will cause the IMS access gateway to release the resources related to the previously assigned IP address(es) and port number(s).

no change has been made to the IP address(es) and port number(s). The P-CSCF shall apply procedures described in subclause G.2.2 using the previously stored IP address(es) and port number(s).

Annex H (normative): IP-Connectivity Access Network specific concepts when using DOCSIS to access IM CN subsystem

H.1 Scope

The present annex defines IP-CAN specific requirements for a call control protocol for use in the IP Multimedia (IM) Core Network (CN) subsystem based on the Session Initiation Protocol (SIP), and the associated Session Description Protocol (SDP), where the IP-CAN is a DOCSIS cable access network.

DOCSIS (Data Over Cable Service Interface Specification) is a term referring to the ITU-T Recommendation J112 [87] Annex B standard for cable modem systems.

H.2 DOCSIS aspects when connected to the IM CN subsystem

H.2.1 Introduction

A UE accessing the IM CN subsystem, and the IM CN subsystem itself, utilise the services provided by the DOCSIS cable access network to provide packet-mode communication between the UE and the IM CN subsystem.

From the perspective of the UE, the necessary IP-CAN bearer for signalling is transparently available to the UE.

The UE is not directly involved in requests for IP-CAN bearer(s) for media flow(s). The IM CN interacts with the PCRF in the DOCSIS IP-CAN to establish IP-CAN bearer(s) for media flow(s), on behalf of the UE.

H.2.2 Procedures at the UE

H.2.2.1 Activation and P-CSCF discovery

Prior to communication with the IM CN subsystem, the UE shall perform a Network Attachment procedure as defined in the CableLabs PacketCable specifications PKT-TR-ARCH-FRM [88]. When using DOCSIS, both IPv4 and IPv6 UEs may access the IM CN subsystem. The procedures for P-CSCF discovery defined in subclause 9.2.1 of this document apply.

H.2.2.1A Modification of IP-CAN used for SIP signalling

Not applicable.

H.2.2.1B Re-establishment of the IP-CAN used for SIP signalling

Not applicable.

H.2.2.2 Void

H.2.2.3 Void

H.2.2.4 Void

H.2.2.5 Handling of the IP-CAN for media

H.2.2.5.1 General requirements

The UE does not directly request resources for media flow(s).

H.2.2.5.1A Activation or modification of IP-CAN for media by the UE

Not applicable.

H.2.2.5.1B Activation or modification of IP-CAN for media by the network

Not applicable.

H.2.2.5.2 Special requirements applying to forked responses

The UE does not directly request resources for media flow(s). As a result there are no special UE requirements applying to forked responses.

H.2.2.5.3 Unsuccessful situations

Not applicable.

H.2.2.6 Emergency service

If attached to network via DOCSIS access technology, the UE shall always consider being attached to its home operator's network for the purpose of emergency calls.

NOTE: In DOCSIS the UE is unable to receive any indication from the network, that would allow the UE to determine, whether it is currently attached to its home operator's network or to a different network, so the UE assumes itself always attached to the home operator's network when connected via DOCSIS access technology.

H.2A Usage of SDP

H.2A.1 Impact on SDP offer / answer of activation or modification of IP-CAN for media by the network

Not applicable.

H.2A.2 Handling of SDP at the terminating UE when originating UE has resources available and IP-CAN performs network-initiated resource reservation for terminating UE

Not applicable.

H.3 Application usage of SIP

H.3.1 Procedures at the UE

H.3.1.1 P-Access-Network-Info header field

If the UE is aware of the access technology, the UE shall include the P-Access-Network-Info header field where indicated in subclause 5.1.

H.3.1.2 Availability for calls

Not applicable.

H.3.2 Procedures at the P-CSCF

H.3.2.1 Determining network to which the originating user is attached

If access type field in the P-Access-Network-Info header field indicated DOCSIS access the P-CSCF shall assume that the initial request for a dialog or standalone transaction or an unknown method destined for a PSAP is initiated in the same country.

NOTE 1: If local policy does not require the insertion of P-Access-Network-Info header field in the P-CSCF even if it is missing in the received initial request, the P-CSCF can assume that the request is initiated by fixed broadband UE in the same country.

NOTE 2: If the network provided and UE provided P-Access-Network-Info header fields indicate different access types the P-CSCF ignores the information in either the network provided or the UE provided P-Access-Network-Info header field according to operator policy.

H.3.2.2 Location information handling

Upon receipt of an initial request for a dialog or standalone transaction or an unknown method, the P-CSCF based on local policy may include a P-Access-Network-Info header field.

NOTE: The way the P-CSCF deduces that the request comes from a UE connected through DOCSIS access is implementation dependent.

H.3.3 Procedures at the S-CSCF

H.3.3.1 Notification of AS about registration status

Not applicable.

H.4 3GPP specific encoding for SIP header field extensions

Void.

H.5 Use of circuit-switched domain

There is CS domain in this access technologyVoid.

Annex I (normative): Additional routeing capabilities in support of transit traffic in IM CN subsystem

I.1 Scope

Operators may use the IM CN subsystem as a transit network to provide transit functionality for their own CS networks, enterprise networks, or other network operators.

As specified in 3GPP TS 23.228 [7] additional routeing functions might reside in a stand-alone entity or might be collocated with the functionality of an MGCF, a BGCF, an I-CSCF, an S-CSCF, or an IBCF.

When colocated with an I-CSCF, the additional routeing capabilities may be performed in advance of I-CSCF proecedures as specificed in subclause 5.3, or after I-CSCF procedures have failed to identify an S-CSCF supporting the user identified by the Request-URI.

When colocated with an MGCF, the generated requests can be routed to an I-CSCF or to possible targets of the routeing procedures defined in subclause I.2.

The BGCF procedures specified in subclause 5.6 are a subset of the more general routeing procedures provided in this annex.

NOTE: Depending on the host entity for the additional routeing functions, the functionality can be accessed as:

a) the last set of functions on the host before forwarding a request (e.g., on an MGCF, an S-CSCF or an IBCF);

b) the first set of functions performed by the host entity when receiving a request at the host entity's entry point (e.g., on a BGCF, I-CSCF or IBCF);

c) a specified point in the logic of the host (e.g., on the I-CSCF at failure to identify an S-CSCF for the Request-URI); or

d) a set of functions associated with a separate entry point (e.g., at a separate entry point associated with a BGCF, I-CSCF, IBCF or separate function).

I.2 Procedures

The additional routeing functionality, or associated functional entity, performing these additional routeing procedures should analyse the destination address, and determine whether to route to another network, directly, or via the IBCF, or to the BGCF, or the I-CSCF in its own network. This analysis may use public (e.g., DNS, ENUM) and/or private database lookups, and/or locally configured data and need not modify the Request-URI. In addition, and based upon local policy, the analysis may include the carrier identified by the "cic" tel-URI parameter of the Request-URI as part of the route determination.

For all SIP transactions identified:

- if priority is supported, as containing an authorised Resource-Priority header field, or, if such an option is supported, relating to a dialog which previously contained an authorised Resource-Priority header field;

the additional routeing functionality shall give priority over other transactions or dialogs. This allows special treatment of such transactions or dialogs.

NOTE 1: The special treatment can include filtering, higher priority processing, routeing, call gapping. The exact meaning of priority is not defined further in this document, but is left to national regulation and network configuration.

When provided as a separate function, the network element performing these functions need not Record-Route the INVITE request.

If the additional routeing functionality inserts its own Record-Route header field, then the additional routeing functionality may require the periodic refreshment of the session to avoid hung states. If the network element requires the session to be refreshed, the additional routeing functionality shall apply the procedures described in RFC 4028 [58] clause 8.

NOTE 2: Requesting the session to be refreshed requires support by at least one of the UEs. This functionality cannot automatically be granted, i.e. at least one of the involved UEs needs to support it.

When provided as a separate function, the network element performing these functions shall not apply the procedures of RFC 3323 [33] relating to privacy.

If overlap signalling using the multiple-INVITE method is supported as a network option, several INVITE requests with the same Call ID and same From header field (including "tag" header field parameter) can be received outside of an existing dialog. Such INVITE requests relate to the same call and the additional routeing function shall route such INVITE request received during a certain period of timeto the same next hop.

Annex J (normative): Void

Annex K (normative): Additional procedures in support of UE managed NAT traversal

K.1 Scope

This annex describes the UE, P-CSCF, and S-CSCF procedures in support of UE managed NAT traversal. In this scenario, both the media flows and the SIP signalling both traverse a NA(P)T device located in the customer premises domain. The term "hosted NAT" is used to address this function. This annex does not consider the case where the NAT is behind the P-CSCF as different NAT traversal procedures are necessary for this architectural scenario.

The procedures described in this subclause of this annex rely on the UE to manage the NAT traversal process. As part of the UE management process, the UE can learn whether it is behind a NAT or not, and choose whether the proceedures in this annex are applied or not.

The protection of SIP messages is provided by applying either UDP encapsulation to IPSec packets in accordance with RFC 3948 [63A] and as defined in 3GPP TS 33.203 [19] or by utilizing TLS as defined in 3GPP TS 33.203 [19].

NOTE 1: This annex describes the mechanism for support of UE managed NAT traversal scenario defined in 3GPP TS 23.228 [7]. This does not preclude other mechanisms but they are out of the scope of this annex.

NOTE 2: It is recognized that outbound can be useful for capabilities beyond NAT traversal (e.g. multiple registrations) however this annex does not consider such capabilities at this time. Such capabilites can require additional information elements in the REGISTER request so that the P-CSCF and S-CSCF can distinguish whether to apply procedures as of annex F or annex K.

K.2 Application usage of SIP

K.2.1 Procedures at the UE

K.2.1.1 General

This subclause describes the UE SIP procedures for supporting a UE managed hosted NAT traversal approach. The description enhances the procedures specified in subclause 5.1.

K.2.1.2 Registration and authentication

K.2.1.2.1 General

The text in subclause 5.1.1.1 applies without changes.

K.2.1.2.1A Parameters contained in the ISIM

The text in subclause 5.1.1.1A applies without changes.

K.2.1.2.1B Parameters provisioned to a UE without ISIM or USIM

The text in subclause 5.1.1.1B applies without changes.

K.2.1.2.2 Initial registration

K.2.1.2.2.1 General

The procedures described in subclause 5.1.1.2.1 apply with the additional procedures described in the present subclause.

NOTE 1: In accordance with the definitions given in subclause 3.1 the IP address acquired initially by the UE in a hosted NAT scenario is the UE private IP address.

On sending a REGISTER request, the UE shall populate the header fields as indicated in subitems a) through j) of subclause 5.1.1.2 with the exceptions of subitems c) and d) which are modified as follows.

The UE shall populate:

c) a Contact header field according to the following rules: the Contact header field shall be set to include SIP URI(s) containing the private IP address or FQDN of the UE in the hostport parameter. The UE shall also include an instance ID ("+sip.instance" header field parameter) and "reg-id" header field parameter as described in RFC 5626 [92]. The UE shall include all supported ICSI values (coded as specified in subclause 7.2A.8.2) in a g.3gpp.icsi-ref media feature tag as defined in subclause 7.9.2 and RFC 3840 [62] for the IMS communication services it intends to use, and IARI values (coded as specified in subclause 7.2A.9.2), for theIMS applications it intends to use in a g.3gpp.iari-ref media feature tag as defined in subclause 7.9.3 and RFC 3840 [62];

d) a Via header field set to include the private IP address or FQDN of the UE in the sent-by field. For TCP, the response is received on the TCP connection on which the request was sent. For UDP, the UE shall include the "rport" header field parameter as defined in RFC 3581 [56A].

NOTE 2: The UE will learn its public IP address from the "received" header field parameter in the topmost Via header field in the 401 (Unauthorized) response to the unprotected REGISTER request.

NOTE 3: If the UE specifies a FQDN in the hostport parameter in the Contact header field and in the sent-by field in the Via header field of an unprotected REGISTER request, this FQDN will not be subject to any processing by the P-CSCF or other IMS entities.

When a 401 (Unauthorized) response to a REGISTER request is received with integrity protection the UE shall behave as described in subclause K.2.1.2.5.

When a 401 (Unauthorized) response to a REGISTER request is received and this response is received without integrity protection, the procedures described in subclause 5.1.1.2 apply with the following additions:

The UE shall compare the values in the "received" header field parameter and "rport" header field parameter with the corresponding values in the sent-by parameter in the topmost Via header field to detect if the UE is behind a NAT. If the comparison indicates that the respective values are the same, the UE concludes that it is not behind a NAT.

- if the UE is not behind a NAT the UE shall proceed with the procedures described in subclause 5.1;

- if the UE is behind a NAT the UE shall verify using the Security-Server header field that either the mechanism-name "tls" or "ipsec-3gpp" and the mode "UDP-enc-tun" is selected. If the verification succeeds the UE shall behave as described in subclause K.2.1.2.5 and store the IP address contained in the "received" header field parameter as the UE's public IP address. If the verification does not succeed the UE shall abort the registration.

On receiving the 200 (OK) response to the REGISTER request, the procedures described in subclause 5.1.1.2 apply with the following additions:

The UE shall determine the P-CSCFs ability to support the keep-alive procedures as described in RFC 5626 [92] by checking whether the "outbound" option-tag is present in the Require header field:

- if no "outbound" option-tag is present, the UE may use some other explicit indication in order to find out whether the P-CSCF supports the outbound edge proxy functionality. Such indication may be acomplished either through UE local configuration means or the UE can examine the 200 (OK) response to its REGISTER request for Path header fields, and if such are present check whether the bottommost Path header field contains the "ob" SIP URI parameter. If the UE determines that the P-CSCF supports the outbound edge proxy functionality, the UE can use the keep-alive techniques defined in subclause K.2.1.5 and RFC 5626 [92] towards the P-CSCF; or

- if an "outbound" option-tag is present, the UE shall initiate keep-alive mechanisms as defined in subclause K.2.1.5 and RFC 5626 [92] towards the P-CSCF.

NOTE 4: Presence of the "outbound" option-tag in the Require header field indicates that both the P-CSCF and S-CSCF fully support the outbound procedures. The number of subsequent outbound registrations for the same private user identity but with a different reg-id value is based on operator policy.

K.2.1.2.2.2 Initial registration using IMS AKA

The procedures described in subclause 5.1.1.2.2 apply with the additional procedures described in the present subclause.

On sending a REGISTER request, the UE shall populate the header fields as indicated in subclause 5.1.1.2.2 with the exceptions of the subitems which are modified as follows:

c) additionally for the Via header field, for UDP, if the REGISTER request is protected by a security association, include the public IP address or FQDN and the protected server port value in the sent-by field. For TCP, if the REGISTER request is protected by a security association, the UE shall include the public IP address or FQDN;

d) the Security-Client header field set to specify the security mechanism the UE supports, the IPsec layer algorithms the UE supports and the parameters needed for the security association setup. The UE shall support the setup of two pairs of security associations as defined in 3GPP TS 33.203 [19]. The syntax of the parameters needed for the security association setup is specified in annex H of 3GPP TS 33.203 [19]. The UE shall support the "ipsec-3gpp" security mechanism, as specified in RFC 3329 [48]. The UE shall support the IPsec layer algorithms for integrity and confidentiality protection as defined in 3GPP TS 33.203 [19], and shall announce support for them according to the procedures defined in RFC 3329 [48]. In addition to transport mode, the UE shall support UDP encapsulated tunnel mode as per RFC 3948 [73A] and shall announce support for both modes as described in 3GPP TS 33.203 [19];

K.2.1.2.2.3 Initial registration using SIP digest without TLS

The procedures described in subclause 5.1.1.2.3 apply without modification.

K.2.1.2.2.4 Initial registration using SIP digest with TLS

The procedures described in subclause 5.1.1.2.4 apply without modification.

K.2.1.2.2.5 Initial registration using NASS-IMS bundled authentication

The procedures described in subclause 5.1.1.2.5 apply without modification.

K.2.1.2.3 Initial subscription to the registration-state event package

The procedures described in subclause 5.1.1.3 apply with the additional procedures described in the present subclause.

On sending a SUBSCRIBE request, the UE shall populate the header fields as indicated in subclause 5.1.1.3 with the exception of subitem g) and with the addition of subitem h) as follows

The UE shall populate:

g) a Contact header field set to include a SIP URI that contains in the hostport parameter the public IP address of the UE or FQDN, the protected server port value bound to the security association or TLS session, and its instance ID ("+sip.instance" header field parameter), along with an "ob" SIP URI parameter as described in RFC 5626 [92];

h) a Via header field according to the following rules:

- For UDP, the UE shall include the public IP address or FQDN and the protected server port value in the sent-by field. The UE shall also include the "rport" header field parameter as defined in RFC 3581 [56A]. The UE shall only use an FQDN, if it is ensured that the FQDN resolves to the public IP address of the NAT; or

- For TCP, the UE shall include the public IP address or FQDN of the UE in the sent-by field. The UE shall only use an FQDN, if it is ensured that the FQDN resolves to the public IP address of the NAT;

K.2.1.2.4 User-initiated re-registration

K.2.1.2.4.1 General

The procedures described in subclause 5.1.1.4 apply with the additional procedures described in the present subclause.

On sending a REGISTER request that does not contain a challenge response, the UE shall populate the header fields as indicated in subclause 5.1.1.4.1 with the exception of subitems c) and d) which are modified as follows.

The UE shall populate:

c) a Contact header field set to include SIP URI(s) that contain(s) in the hostport parameter the private IP address of the UE or FQDN, its instance ID ("+sip.instance" header field parameter) along with the same "reg-id" header field parameter used for the initial, successful, registration for the given P-CSCF public identity combination as described in RFC 5626 [92]. The UE shall include all supported ICSI values (coded as specified in subclause 7.2A.8.2) in a g.3gpp.icsi-ref media feature tag as defined in subclause 7.9.2 and RFC 3840 [62] for the IMS communication services it intends to use, and IARI values (coded as specified in subclause 7.2A.9.2), for the IMS applications it intends to use in a g.3gpp.iari-ref media feature tag as defined in subclause 7.9.3 and RFC 3840 [62]; and

d) a Via header field according to the following rules:

- For UDP, the UE shall include the public IP address or FQDN in the sent-by field. The UE shall also include the "rport" header field parameter as defined in RFC 3581 [56A]. The UE shall only use an FQDN, if it is ensured that the FQDN resolves to the public IP address of the NAT; or

- For TCP, the UE shall include the public IP address or FQDN of the UE in the sent-by field. The UE shall only use an FQDN, if it is ensured that the FQDN resolves to the public IP address of the NAT;

When the timer F expires at the UE, the UE shall:

1) stop processing of all ongoing dialogs and transactions associated with that, if any (i.e. no further SIP signalling will be sent by the UE on behalf of these transactions or dialogs); and

2) after releasing all IP-CAN bearers used for the transport of media according to the procedures in subclause 9.2.2, the UE shall follow the procedures in RFC 5626 [92] to form a new flow to replace the failed one. When registering to create a new flow to replace the failed one, procedures in subclause 5.1.1.2 apply.

NOTE: These actions may also be triggered as a result of the failure of a STUN keep-alive. It is an implementation option whether these actions are also triggered by other means than expiration of timer F, e.g., based on ICMP messages.

If failed registration attempts occur in the process of creating a new flow, the flow recovery procedures defined in RFC 5626 [92] shall apply.

K.2.1.2.4.2 IMS AKA as a security mechanism

The procedures described in subclause 5.1.1.4.2 apply without modification.

K.2.1.2.4.3 SIP Digest without TLS as a security mechanism

The procedures described in subclause 5.1.1.4.3 apply without modification.

K.2.1.2.4.4 SIP Digest with TLS as a security mechanism

The procedures described in subclause 5.1.1.4.4 apply without modification.

K.2.1.2.4.5 NASS-IMS bundled authentication as a security mechanism

The procedures described in subclause 5.1.1.4.5 apply without modification.

K.2.1.2.5 Authentication

K.2.1.2.5.1 IMS AKA – general

The procedures of subclause 5.1.1.5.1 apply with the additional procedures described in the present subclause.

On receiving a 401 (Unauthorized) response to the REGISTER request and the response is deemed to be valid and signalling security is to be used, the UE shall behave as of subclause 5.1.1.5.1 with the exception of subitem 3) which is modified as follows.

The UE shall:

3) send another REGISTER request using the temporary set of security associations to protect the message. The header fields are populated as defined for the initial registration (see subclause K.2.1.2.2), with the addition that the UE shall include an Authorization header field containing the private user identity and if the "algorithm" header field parameter is "AKAv1-MD5", the authentication challenge response shall be calculated by the UE using RES and other parameters, as described in RFC 3310 [49]. If the "algorithm" header field parameter is "MD5", the UE shall calculate SIP digest-response parameters as indicated in RFC 2617 [21] and shall build an Authorization header field based on these parameters. The UE shall also insert the Security-Client header field that is identical to the Security-Client header field that was included in the previous REGISTER request (i.e. the REGISTER request that was challenged with the received 401 (Unauthorized) response). The UE shall also insert the Security-Verify header field into the request, by mirroring in it the content of the Security-Server header field received in the 401 (Unauthorized) response. The UE shall set the Call-ID of the integrity-protected REGISTER request which carries the authentication challenge response to the same value as the Call-ID of the 401 (Unauthorized) response which carried the challenge.

For IPsec, if the 200 (OK) response is not received before the temporary SIP level lifetime of the temporary set of security associations expires or a 403 (Forbidden) response is received, the UE shall consider the registration to have failed. The UE shall delete the temporary set of security associations it was trying to establish, and use the old set of security associations. The UE should send an unprotected REGISTER request according to the procedure specified in subclause K.2.1.2.2 if the UE considers the old set of security associations to be no longer active at the P-CSCF.

K.2.1.2.5.2 Void

K.2.1.2.5.3 IMS AKA abnormal cases

The text in subclause 5.1.1.5.3 applies without changes.

K.2.1.2.5.4 SIP digest without TLS – general

The text in subclause 5.1.1.5.4 applies without changes.

K.2.1.2.5.5 SIP digest without TLS – abnormal procedures

The procedures of subclause 5.1.1.5.5 apply with the additional procedures described in the present subclause.

On receiving a 403 (Forbidden) response, the UE shall consider the registration to have failed. If performing SIP digest with TLS, the UE should send an initial REGISTER according to the procedure specified in subclause K.2.1.2.2 if the UE considers the TLS session to be no longer active at the P-CSCF.

K.2.1.2.5.6 SIP digest with TLS – general

The text in subclause 5.1.1.5.6 applies without changes.

K.2.1.2.5.7 SIP digest with TLS – abnormal procedures

The text in subclause 5.1.1.5.7 applies without changes.

K.2.1.2.5.8 NASS-IMS bundled authentication – general

The text in subclause 5.1.1.5.8 applies without changes.

K.2.1.2.5.9 NASS-IMS bundled authentication – abnormal procedures

The text in subclause 5.1.1.5.9 applies without changes.

K.2.1.2.5.10 Abnormal procedures for all security mechanisms

The text in subclause 5.1.1.5.10 applies without changes.

K.2.1.2.5A Network initiated re-authentication

The procedures of subclause 5.1.1.5A apply with the additional procedures described in the present subclause.

On starting the re-authentication procedure sending a REGISTER request that does not contain a challenge response, the UE shall behave as of subclause 5.1.1.5A with the exception of subitem 2) which is is modified as follows.

The UE shall:

2) start the re-authentication procedures at the appropriate time (as a result of the S-CSCF procedure described in subclause 5.4.1.6) by initiating a re-registration as described in subclause K.2.1.2.4, if required.

K.2.1.2.5B Change of IPv6 address due to privacy

The text in subclause 5.1.1.5B applies without changes.

K.2.1.2.6 User-initiated deregistration

K.2.1.2.6.1 General

The procedures of subclause 5.1.1.6.1 apply with the additional procedures described in the present subclause.

On sending a REGISTER request, the UE shall populate the header fields as indicated in subclause 5.1.1.6.1 with the exception of subitems c) and d) which are modified as follows.

The UE shall populate:

c) a Contact header field set to either the value of "*" or SIP URI(s) that contain(s) in the hostport parameter the IP address of the UE or FQDN, its instance ID ("+sip.instance" header field parameter) along with the same "reg-id" header field parameter used for the initial, successful, registration for the given P-CSCF public identity combination as described in RFC 5626 [92];. The UE shall only use a FQDN, if it is ensured that the FQDN resolves to the public IP address of the NAT;

d) a Via header field according to the following rules:

- For UDP, the UE shall include the public IP address or FQDN. The UE shall also include the "rport" header field parameter as defined in RFC 3581 [56A]. The UE shall only use an FQDN, if it is ensured that the FQDN resolves to the public IP address of the NAT; or

- For TCP, the UE shall include the public IP address or FQDN of the UE in the sent-by field. The UE shall only use an FQDN, if it is ensured that the FQDN resolves to the public IP address of the NAT;

NOTE: In case of hosted NAT traversal only the UE public IP addresses are bound to security associations or TLS session.

K.2.1.2.6.2 IMS AKA as a security mechanism

The text in subclause 5.1.1.6.2 applies without changes.

K.2.1.2.6.3 SIP digest as a security mechanism

The text in subclause 5.1.1.6.3 applies without changes.

K.2.1.2.6.4 SIP digest with TLS as a security mechanism

The text in subclause 5.1.1.6.4 applies without changes.

K.2.1.2.6.5 Initial registration using NASS-IMS bundled authentication

The text in subclause 5.1.1.6.5 applies without changes.

K.2.1.2.7 Network-initiated deregistration

The procedures of subclause 5.1.1.7 apply with the additional procedures described in the present subclause.

Upon receipt of a NOTIFY request on the dialog which was generated during subscription to the reg event package as described in subclause 5.1.1.3, including one or more <registration> element(s) which were registered by this UE with:

- the state attribute set to "terminated" and the event attribute set to "rejected" or "deactivated"; or
- the state attribute set to "active" and the state attribute within the <contact> element belonging to this UE set to "terminated", and associated event attribute element to "rejected" or "deactivated";

The UE shall remove all registration details relating to these public user identities. In case of a "deactivated" event attribute, the UE shall start the initial registration procedure as described in subclause K.2.1.2.2. In case of a "rejected" event attribute, the UE shall release all dialogs related to those public user identities.

K.2.1.3 Subscription and notification

The text in subclause 5.1.2 applies without changes.

K.2.1.4 Generic procedures applicable to all methods excluding the REGISTER method

K.2.1.4.1 UE-originating case

The procedures described in subclause 5.1.2A.1 apply with the additional procedures described in the present subclause.

When the UE sends any request, the requirements in subclause 5.1.2A.1 are extended by the following requirements. The UE shall include:

- a Via header field according to the following rules:
  - For UDP, the UE shall include the public IP address or FQDN and the protected server port value in the sent-by field. The UE shall also include the "rport" header field parameter as defined in RFC 3581 [56A]. The UE shall only use an FQDN, if it is ensured that the FQDN resolves to the public IP address of the NAT; or
  - For TCP, the UE shall include the public IP address or FQDN of the UE in the sent-by field. The UE shall only use an FQDN, if it is ensured that the FQDN resolves to the public IP address of the NAT; and
- if the request contains a Contact header field, include a Contact header field according to the following rules:
  - if this is a request for a new or existing dialog, and the UE did insert a GRUU in the Contact header field, then the UE shall also include its instance ID ("+sip.instance" header field parameter), and an "ob" SIP URI parameter as described in RFC 5626 [92]; or
  - if this is a request for a new or existing dialog, and the UE did not insert a GRUU in the Contact header field, then the UE shall include the public IP address of the UE or FQDN and the protected server port value bound to the security association or TLS session in the hostport parameter along with its instance ID ("+sip.instance" header field parameter), and an "ob" SIP URI parameter as described in RFC 5626 [92]. The UE shall only use a FQDN, if it is ensured that the FQDN resolves to the public IP address of the NAT.

NOTE: The means to ensure that the FQDN resolves to the public IP address of the NAT are outside of the scope of this specification. One option for resolving this is local configuration.

Where a security association or TLS session exists, the UE shall discard any SIP response that is not protected by the security association or TLS session and is received from the P-CSCF outside of the registration and authentication procedures. The requirements on the UE within the registration and authentication procedures are defined in subclause K.2.1.2.

When a SIP transaction times out, i.e. timer B, timer F or timer H expires at the UE, the UE may behave as if timer F expired, as described in subclause K.2.1.2.4.

K.2.1.4.2 UE-terminating case

The procedures described in subclause 5.1.2A.2 apply with the additional procedures described in the present subclause.

When the UE sends any response, the requirements in subclause 5.1.2A.2 are extended by the following requirement. If the UE did not include a GRUU in the Contact header field, then the UE shall:

- include the public IP address of the UE or FQDN and the protected server port value bound to the security association or TLS session in the hostport parameter in any Contact header field that is otherwise included. The UE shall only use a FQDN, if it is ensured that the FQDN resolves to the public IP address of the NAT.

The UE shall discard any SIP request that is not integrity protected and is received from the P-CSCF outside of the registration and authentication procedures. The requirements on the UE within the registration and authentication procedures are defined in subclause K.2.1.2.

K.2.1.5 Maintaining flows and detecting flow failures

STUN Binding Requests are used by the UE as a keep-alive mechanism to maintain NAT bindings for signalling flows over connectionless transport (for dialogs outside a registration as well as within a registration) as well as to determine whether a flow (as described in RFC 5626 [92]) is still valid (e.g. a NAT reboot could cause the transport parameters to change). As such, the UE acts as a STUN client and shall follow the requirements defined by RFC 5389 [100]. Further, when using UDP encapsulated IPsec, the keep-alive capabilities defined within should not be used.

CRLF as defined in RFC 5626 [92] is used by the UE as a keep-alive mechanism to maintain NAT bindings for signalling flows over connection oriented transports (for dialogs outside a registration as well as within a registration) as well as to determine whether a flow (as described in RFC 5626 [92]) is still valid (e.g. a NAT reboot could cause the transport parameters to change). As such, the UE shall follow the requirements defined by RFC 5626 [92].

If the UE determines that the flow to a given P-CSCF is no longer valid (the UE does not receive a STUN reply (or CRLF) or the reply indicates a new public IP Address) the UE shall consider the flow and any associated security associations invalid and perform the initial registration procedures defined in subclause K.2.1.2.2.

When a NAT is not present, it may not be desirable to send keep-alive requests (i.e. given battery considerations for wireless UEs). As such, if a UE can reliably determine that a NAT is not present (i.e. by comparing the "received" and "rport" header field parameters in the Via header field in the response to the initial un-protected REGISTER request with the locally assigned IP Address and Port) then the UE may not perform the keep-alive procedures.

K.2.1.6 Emergency services

K.2.1.6.1 General

In addition to the procedures in subclause 5.1.6.1, the following additional procedures apply. When receiving and sending requests unprotected, the UE shall transmit and receive all SIP messages using the same IP port.

K.2.1.6.2 Initial emergency registration

When a UE performs an initial emergency registration the UE shall perform the actions as specified in subclause K.2.1.2.2. The remaining procedures described in subclause 5.1.6.2 apply without modification.

K.2.1.6.2A New initial emergency registration

The text in subclause 5.1.6.2A applies without changes.

K.2.1.5A.3 Initial subscription to the registration-state event package

The text in subclause 5.1.6.3 applies without changes.

K.2.1.6.4 User-initiated emergency reregistration

The UE shall perform user-initiated emergency reregistration as specified in subclause K.2.1.2.4. The remaining procedures described in subclause 5.1.6.4 apply without modification.

K.2.1.6.5 Authentication

The UE shall perform the authentication procedures as specified in subclause K.2.1.2.5. The remaining procedures described in subclause 5.1.6.5 apply without modification.

K.2.1.6.6 User-initiated emergency deregistration

The text in subclause 5.1.6.6 applies without changes.

K.2.1.6.7 Network-initiated emergency deregistration

The text in subclause 5.1.6.7 applies without changes.

K.2.1.6.8 Emergency session setup

K.2.1.6.8.1 General

The text in subclause 5.1.6.8.1 applies without changes.

K.2.1.6.8.2 Emergency session set-up in case of no registration

The text in subclause 5.1.6.8.2 applies without changes.

K.2.1.6.8.3 Emergency session set-up with an emergency registration

After a successful initial emergency registration, the UE shall apply the procedures as specified in subclause K.2.1.4, subclause 5.1.3, and subclause 5.1.4. The remaining procedures described in subclause 5.1.6.8.3 apply without modification.

K.2.1.6.8.4 Emergency session set-up within a non-emergency registration

The UE shall apply the procedures as specified in subclause K.2.1.4, subclause 5.1.3, and subclause 5.1.4. The remaining procedures described in subclause 5.1.6.8.4 apply without modification.

K.2.1.6.9 Emergency session release

The text in subclause 5.1.6.9 applies without changes.

K.2.2 Procedures at the P-CSCF

K.2.2.1 Introduction

This subclause describes the SIP procedures for supporting hosted NAT scenarios.

The description enhances the procedures specified in subclause 5.2.

K.2.2.2 Registration

K.2.2.2.1 General

The procedures described in subclause 5.2.2.1 apply with the additional procedures described in the present subclause.

When the P-CSCF receives a REGISTER request from the UE, the P-CSCF shall behave as of subclause 5.2.2.1 with the exception of subitems 1) which is modified as follows.

The P-CSCF shall:

1) insert a Path header field in the request including an entry containing:

   - the SIP URI identifying the P-CSCF;

   - an indication that requests routed in this direction of the path (i.e. from the S-CSCF to the P-CSCF) are expected to be treated as for the mobile-terminating case. This indication may e.g. be in a parameter in the URI, a character string in the user part of the URI, or be a port number in the URI; and

   - an IMS flow token and the "ob" SIP URI parameter;

NOTE 1: The form of the IMS flow token is of local significance to the P-CSCF only and can thus be chosen freely by a P-CSCF implementation.

Additionally, the P-CSCF shall:

- process the Via header field according to the following rules:

  - If the host portion of the sent-by field in the topmost Via header field contains a FQDN, or if it contains an IP address that differs from the source address of the IP packet, the P-CSCF shall add a "received" header field parameter in accordance with the procedure defined in RFC 3581 [56A];

  - If the P-CSCF adds a "received" header field parameter and UDP is being used, the P-CSCF shall also add an "rport" header field parameter with the UEs protected server port;

before forwarding the request, based on the topmost Route header field, in accordance with the procedures of RFC 3261 [26].

K.2.2.2.2 IMS AKA as a security mechanism

The procedures described in subclause 5.2.2.2 apply with the additional procedures described in the present subclause.

When the P-CSCF receives a REGISTER request from the UE, the P-CSCF shall behave as in subclause 5.2.2.2 with the exception of subitems 2) and 3) which are is modified as follows.

2) in case the REGISTER request was received without protection, then:

   a) check the existence of the Security-Client header field. If the Security-Client header field is not present and signalling security is used, then the P-CSCF shall return a suitable 4xx response. If the Security-Client header field is present the P-CSCF shall:

      - in case the UE indicated support for "UDP-enc-tun" then remove and store it; or

      - in case the UE does not indicate support for "UDP-enc-tun" then:

        - if the host portion of the sent-by field in the topmost Via header field contains an IP address that differs from the source address of the IP packet, silently drop the REGISTER request;

      - otherwise continue with procedures as of subclause 5.2.2.2;

NOTE 2: If the UE does not indicate support for "UDP-enc-tun" and the P-CSCF detects that the UE is located behind a NAT device, then the P-CSCF can just drop the REGISTER request to avoid unnecessary signalling traffic.

3) in case the REGISTER request was received integrity protected, then the P-CSCF shall:

a) check the security association which protected the request. If IPsec is used and the security association is a temporary one the P-CSCF shall:

- in case the hostport parameter in the Contact address is in the form of a FQDN, ensure that the given FQDN will resolve (e.g., by reverse DNS lookup) to the IP address bound to the security association;

- in case the P-CSCF has detected earlier that the UE is located behind a NAT and IPsec is being used, retrieve port_Uenc from the encapsulating UDP header of the packet received and complete configuration of the temporary set of security associations by configuring port_Uenc in each of the temporary security associations;

- check whether the request contains a Security-Verify header field in addition to a Security-Client header field. If there are no such header fields, then the P-CSCF shall return a suitable 4xx response. If there are such header fields, then the P-CSCF shall compare the content of the Security-Verify header field with the content of the Security-Server header field sent earlier and the content of the Security-Client header field with the content of the Security-Client header field received in the challenged REGISTER request. If those do not match, then there is a potential man-in-the-middle attack. The request should be rejected by sending a suitable 4xx response. If the contents match, the P-CSCF shall remove the Security-Verify and the Security-Client header field;

When the P-CSCF receives a 401 (Unauthorized) response to an unprotected REGISTER request and the P-CSCF previously determined that the UE is behind a NAT and the UE indicated support for "UDP-enc-tun" IPsec mode, the P-CSCF shall:

1) delete any temporary set of security associations established towards the UE;

2) for IPsec, remove the "ck" and "ik" WWW-Authenticate header field parameters contained in the 401 (Unauthorized) response and bind the values to the proper private user identity and to the temporary set of security associations which will be setup as a result of this challenge. The P-CSCF shall forward the 401 (Unauthorized) response to the UE if and only if the "ck" and "ik" header field parameters have been removed;

3) insert a Security-Server header field in the response, containing the P-CSCF security list and the parameters needed.The P-CSCF shall support the setup of two pairs of security associations, as defined in 3GPP TS 33.203 [19]. The syntax of the parameters needed of the IPsec security association setup is specified in annex H of 3GPP TS 33.203 [19]. The P-CSCF shall support the "ipsec-3gpp" security mechanism, as specified in RFC 3329 [48]. The P-CSCF shall support the IPSec layer algorithms for integrity protection and for encryption as defined in 3GPP TS 33.203 [19]. The P-CSCF shall indicate "UDP-enc-tun" as the only IPsec mode.

4) set up the temporary set of security associations with a temporary SIP level lifetime between the UE and the P-CSCF for the user identified with the private user identity. The P-CSCF shall select UDP encapsulated tunnel mode and shall leave the value for port-Uenc unspecified in each of the temporary security associations. For further details see 3GPP TS 33.203 [19] and RFC 3329 [48]. The P-CSCF shall set the temporary SIP level lifetime for the temporary set of security associations to the value of reg-await-auth timer; and

5) send the 401 (Unauthorized) response unprotected to the UE using the mechanisms described in RFC 3261 [26] and RFC 3581 [56A], i.e. the P-CSCF shall send the response to the IP address indicated in the "received" header field parameter and, in case UDP is used, to the port indicated in the "rport" header field parameter (if present) of the Via header field associated with the UE. In case TCP is used as transport protocol, the P-CSCF shall use the port on which the REGISTER request was received as client port for sending the response back to the UE.

When the P-CSCF receives a 401 (Unauthorized) response to a protected REGISTER request and the P-CSCF previously determined that the UE is behind a NAT and that REGISTER request was protected by an old set of security associations that use UDP encapsulated tunnel mode, the P-CSCF shall:

1) delete any temporary set of security associations established towards the UE;

2) remove the "ck" and "ik" WWW-Authenticate header field parameters contained in the 401 (Unauthorized) response and bind the values to the proper private user identity and to the temporary set of security associations which will be setup as a result of this challenge. The P-CSCF shall forward the 401 (Unauthorized) response to the UE if and only if the "ck" and "ik" header field parameters have been removed;

3) insert a Security-Server header field in the response, containing the P-CSCF security list and the parameters needed for the security association setup, as specified in Annex H of 3GPP TS 33.203 [19]. The P-CSCF shall support the "ipsec-3gpp" security mechanism, as specified in RFC 3329 [48]. The P-CSCF shall support the IPsec layer algorithms for integrity protection and encryption as defined in 3GPP TS 33.203 [19]. The P-CSCF shall indicate "UDP-enc-tun" as the IPsec mode;

4) set up the temporary set of security associations with a temporary SIP level lifetime between the UE and the P-CSCF for the user identified with the private user identity. The P-CSCF shall select UDP encapsulated tunnel mode and shall specify the same port_Uenc that was used in the old set of security associations. The P-CSCF shall set the temporary SIP level lifetime for the temporary set of security associations to the value of reg-await-auth timer; and

5) send the 401 (Unauthorized) response to the UE using the old set of security associations and using the rules for sending responses as described in RFC 3261 [26] and RFC 3581 [56A], i.e. the P-CSCF shall send the response to the IP address indicated in the "received" header field parameter and to the port indicated in the "rport" header field parameter (if present) of the Via header field associated with the UE. Otherwise, when the P-CSCF receives a 401 (Unauthorized) response to an unprotected REGISTER request and this response does not contain a "received" header field parameter and "rport" header field parameter or when the P-CSCF receives a 401 (Unauthorized) response to a protected REGISTER request and that REGISTER request was protected by an old set of security associations that do not use UDP encapsulated tunnel mode, the P-CSCF shall proceed as described in subclause 5.2.2.2 of the main body of this specification.

K.2.2.2.3 SIP digest as a security mechanism

The text in subclause 5.2.2.3 applies without changes.

K.2.2.2.4 SIP digest with TLS as a security mechanism

The procedures described in subclause 5.2.2.4 apply with the additional procedures described in the present subclause.

When the P-CSCF receives a REGISTER request from the UE, the P-CSCF shall behave as in subclause 5.2.2.4 with the following additions.

- in case the REGISTER request was received without integrity protection, then:

  a) check the existence of the Security-Client header field. If the Security-Client header field is not present and signalling security is used, then the P-CSCF shall return a suitable 4xx response. If the Security-Client header field is present the P-CSCF shall:

     - in case the UE indicated support for "TLS" then remove and store it; or

     - in case the UE does not indicate support for "TLS" then:

       - if the host portion of the sent-by field in the topmost Via header field contains an IP address that differs from the source address of the IP packet, silently drop the REGISTER request;

     - otherwise continue with procedures as of subclause 5.2.2;

NOTE 2: If the UE does not indicate support for "TLS" and the P-CSCF detects that the UE is located behind a NAT device, then the P-CSCF can just drop the REGISTER request to avoid unnecessary signalling traffic.

- in case the REGISTER request was received integrity protected, then the P-CSCF shall:

  a) check the TLS session which protected the request. The P-CSCF shall:

     - in case the hostport parameter in the Contact address is in the form of a FQDN, ensure that the given FQDN will resolve (e.g., by reverse DNS lookup) to the IP address bound to the TLS session;

     - check whether the request contains a Security-Verify header field in addition to a Security-Client header field. If there are no such header fields, then the P-CSCF shall return a suitable 4xx response. If there are such header fields, then the P-CSCF shall compare the content of the Security-Verify header field with the content of the Security-Server header field sent earlier and the content of the Security-Client header field with the content of the Security-Client header field received in the challenged REGISTER request. If

those do not match, then there is a potential man-in-the-middle attack. The request should be rejected by sending a suitable 4xx response. If the contents match, the P-CSCF shall remove the Security-Verify and the Security-Client header field;

When the P-CSCF receives a 401 (Unauthorized) response to an unprotected REGISTER request and the P-CSCF previously determined that the UE is behind a NAT and the UE indicated support for "tls", the P-CSCF shall:

1) insert a Security-Server header field in the response, containing the P-CSCF security list and the parameters needed.The P-CSCF shall support the "tls" security mechanism, as specified in RFC 3329 [48]. If the P-CSCF supports TLS, the P-CSCF shall support TLS ciphersuites as described in 3GPP TS 33.203 [19]. The P-CSCF should use the q value to indicate a preference for TLS;

2) send the 401 (Unauthorized) response unprotected to the UE using the mechanisms described in RFC 3261 [26] and RFC 3581 [56A], i.e. the P-CSCF shall send the response to the IP address indicated in the "received" header field parameter and, in case UDP is used, to the port indicated in the "rport" header field parameter (if present) of the Via header field associated with the UE. In case TCP is used as transport protocol, the P-CSCF shall use the port on which the REGISTER request was received as client port for sending the response back to the UE.

K.2.2.2.5 NASS-IMS bundled authentication as a security mechanism

The text in subclause 5.2.2.5 applies without changes.

K.2.2.3 General treatment for all dialogs and standalone transactions excluding the REGISTER method

K.2.2.3.1 Requests initiated by the UE

K.2.2.3.1.1 General for all requests

The procedures described in subclause 5.2.6.3.1 apply with the additional procedures described in the present subclause.

When the P-CSCF receives from the UE a request method other then a REGISTER request, and a service route value list exits for the initiator of the request, the requirements are extended by the following requirements.

The P-CSCF shall:

- process the Via header field according to the following rules:
  - If the host portion of the sent-by field in the topmost Via header field contains a FQDN, or if it contains an IP address that differs from the source address of the IP packet, the P-CSCF shall add a "received" header field parameter in accordance with the procedure defined in RFC 3261 [26];
  - If the P-CSCF adds a "received" header field parameter and UDP is being used, the P-CSCF shall also add an "rport" header field parameter with the UEs protected server port;
- Before forwarding the request, based on the topmost Route header field, in accordance with the procedures of RFC 3261 [26], the P-CSCF shall ensure that all signalling during the lifetime of the dialogue is sent over the same IMS flow set as the dialogue initiating request.

NOTE: The suggested way to ensure all signalling is sent over the same IMS flow set is to form an IMS flow token in the same way that a P-CSCF would form this for the Path header field and insert this IMS flow token in the user portion of the URI used in the record route header field value.

K.2.2.3.1.2 General for all responses

The procedures in subclause 5.2.6.3.2 apply with the additional procedures described in the present subclause.

The P-CSCF shall forward the response to the UE using the mechanisms described in RFC 3261 [26] and RFC 3581 [56A], i.e. the P-CSCF shall send the response to the IP address indicated in the "received" header field parameter and, in case UDP is used, to the port indicated in the "rport" header field parameter (if present) of the Via

header field associated with the UE. In case TCP is used, the P-CSCF shall use the port on which the REGISTER request was received as client port for sending the response back to the UE.

K.2.2.3.1.2A Abnormal cases

The text in subclause 5.2.6.3.2A applies without changes.

K.2.2.3.1.3 Initial request for a dialog

The text in subclause 5.2.6.3.3 applies without changes.

K.2.2.3.1.4 Responses to an initial request for a dialog

The text in subclause 5.2.6.3.4 applies without changes.

K.2.2.3.1.5 Target refresh request for a dialog

The text in subclause 5.2.6.3.5 applies without changes.

K.2.2.3.1.6 Responses to a target refresh request for a dialog

The text in subclause 5.2.6.3.6 applies without changes.

K.2.2.3.1.7 Request for a standalone transaction

The text in subclause 5.2.6.3.7 applies without changes.

K.2.2.3.1.8 Responses to a request for a standalone transaction

The text in subclause 5.2.6.3.8 applies without changes.

K.2.2.3.1.9 Subsequent request other than a target refresh request

The text in subclause 5.2.6.3.9 applies without changes.

K.2.2.3.1.10 Responses to a subsequent request other than a target refresh request

Void

K.2.2.3.1.11 Request for an unkown method that does not relate to an existing dialog

The text in subclause 5.2.6.3.11 applies without changes.

K.2.2.3.1.12 Responses to a request for an unkown method that does not relate to an existing dialog

Void

K.2.2.3.2 Requests terminated by the UE

K.2.2.3.2.1 General for all requests

Void

K.2.2.3.2.2 General for all responses

Void

K.2.2.3.2.3 Initial request for a dialog

The procedures described in subclause 5.2.6.4.3 apply with the additional procedures described in the present subclause.

When the P-CSCF receives, destined for the UE, a request, the requirements are extended by the following requirements. The P-CSCF shall:

- forward the request to the terminating UE's server port over the appropriate flow within the denoted IMS flow set.

K.2.2.3.2.4 Responses to an initial request for a dialog

The text in subclause 5.2.6.4.4 applies without changes.

K.2.2.3.2.5 Target refresh request for a dialog

The procedures described in subclause 5.2.6.4.5 apply with the additional procedures described in the present subclause.

When the P-CSCF receives, destined for the UE, a request, the requirements are extended by the following requirements. The P-CSCF shall:

- forward the request to the terminating UE's server port over the appropriate flow within the denoted IMS flow set.

K.2.2.3.2.6 Responses to a target refresh request for a dialog

The text in subclause 5.2.6.4.6 applies without changes.

K.2.2.3.2.7 Request for a standalone transaction

The procedures described in subclause 5.2.6.4.7 apply with the additional procedures described in the present subclause.

When the P-CSCF receives, destined for the UE, a request, the requirements are extended by the following requirements. The P-CSCF shall:

- forward the request to the terminating UE's server port over the appropriate flow within the denoted IMS flow set.

K.2.2.3.2.8 Responses to a request for a standalone transaction

The text in subclause 5.2.6.4.8 applies without changes.

K.2.2.3.2.9 Subsequent request other than a target refresh request

The procedures described in subclause 5.2.6.4.9 apply with the additional procedures described in the present subclause.

When the P-CSCF receives, destined for the UE, a request, the requirements are extended by the following requirements. The P-CSCF shall:

- forward the request to the terminating UE's server port over the appropriate flow within the denoted IMS flow set.

K.2.2.3.2.10 Responses to a subsequent request other than a target refresh request

The text in subclause 5.2.6.4.10 applies without changes.

K.2.2.3.2.11 Request for an unknown method that does not relate to an existing dialog

Void

K.2.2.3.2.12 Responses to a request for an unknown method that does not relate to an existing dialog

Void

K.2.2.4 STUN server support

To support UE keep-alive procedures, the P-CSCF shall also support the requirements for a STUN server as defined by RFC 5389 [100]. The STUN server shall use the same signalling port that is used for SIP.

K.2.2.5 Emergency services

K.2.2.5.1 General

In addition to the procedures in subclause 5.2.10.1, the following additional procedures apply. When receiving and sending requests unprotected, the P-CSCF shall transmit and receive all SIP messages using the same IP Port.

K.2.2.5.2 General treatment for all dialogs and standalone transactions excluding the REGISTER method – from an unregistered user

If, upon receiving an initial request from an unregistered user, the P-CSCF discovers that the UE is behind a NAT, in addition to the procedures described in subclause 5.2.10.2, the P-CSCF shall apply the additional procedures described in the present subclause.

When the P-CSCF receives from the UE a request method other then a REGISTER request, and matches one of the emergency service identifiers in any of these lists, the P-CSCF shall:

- if the initial INVITE request was received over UDP, set the value of the "rport" header field parameter in the Via header field to the source port of the received IP packet that contained the initial INVITE request, and insert the "received" header field parameter in the Via header field containing the source IP address of the received IP packet (that contained the initial INVITE request), as defined in the RFC-3581 [56A];

- if the request is an emergency initial INVITE request, bind the source IP address (i.e. the public IP address of the NAT) and associated source port number (i.e. the port number of the NAT) of the received IP packet (that contained the initial INVITE request) to the IP address (i.e. the private IP address of the UE) and associated port number (i.e. the private port of the UE) contained in the Contact header field, and saves this binding; and

- if the initial INVITE request was received over TCP connection, keep this TCP connection up during the entire duration of the emergency call;

before forwarding the request, based on the topmost Route header field, in accordance with the procedures of RFC 3261 [26]. If the Contact header field contained an "ob" SIP URI parameter, the P-CSCF shall ensure that all signalling during the lifetime of the dialogue is sent over the same IMS flow set as the dialogue initiating request.

NOTE: The suggested way to ensure all signalling is sent over the same IMS flow set is to form an IMS flow token in the same way that a P-CSCF would form this for the Path header field and insert this IMS flow token in the user portion of the URI used in the Record-Route header field value.

When the P-CSCF receives a 1xx or 2xx response to the above request, the requirements are extended by the following requirements. The P-CSCF shall:

- forward the response to the UE using the mechanisms described in RFC 3581 [56A]. In case UDP is used, the P-CSCF shall send the response to the IP address indicated in the "received" header field parameter and to the port indicated in the "rport" header field parameter of the Via header field associated with the UE. If the request received from the UE was received over the TCP connection, the P-CSCF shall send the response to the UE over the same TCP connection over which the request was received. The P-CSCF shall transmit the IP packet (containing the response) from the same IP address and port on which the initial request was received.

For all subsequent requests, belonging to the emergency dialog, received from the UE, in addition to the procedures described in subclause 5.2.10.2, the P-CSCF shall:

- insert the "received" header field parameter in the Via header field containing the source IP address of the received IP packet that contained the request, as defined in the RFC 3581 [56A]. If UDP is being used, the P-CSCF shall also add an "rport" header field parameter with the UEs protected server port; and

- forward the request to the selected E-CSCF.

For all requests belonging to the emergency dialog and destined for the UE (that contain the private IP address and associated private port number in the Request-URI) in addition to the procedures described in subclause 5.2.10.2, the P-CSCF shall send the requests to the UE either:

- over the TCP connection that was established when the initial request was received, if available; or

- use UDP. When sending the request using UDP, the P-CSCF shall insert the request in an IP packet and send the IP packet to the saved IP address (i.e. the public IP address of the NAT) and associated port number (i.e. the port number of the NAT). The P-CSCF shall transmit the IP packet (containing the request) from the same IP address and port on which the initial INVITE request was received.

K.2.2.5.3 General treatment for all dialogs and standalone transactions excluding the REGISTER method after emergency registration

The procedures described in subclause 5.2.10.3 apply with the additional procedures described in the present subclause.

When the P-CSCF receives from the UE a request method other then a REGISTER request, and matches one of the emergency service identifiers in any of these lists, the requirements are extended by the following requirements:

- the P-CSCF shall follow the procedures described in subclause K.2.2.3.1 and subclause 5.2.7.2.

When the P-CSCF receives a 1xx or 2xx response to the above request, the requirements are extended by the following requirements. The P-CSCF shall:

- forward the response to the UE using the mechanisms described in RFC 3261 [26] and RFC 3581 [56A], i.e. the P-CSCF shall send the response to the IP address indicated in the "received" header field parameter and, in case UDP is used, to the port indicated in the "rport" header field parameter (if present) of the Via header field associated with the UE. In case TCP is used as transport protocol, the P-CSCF shall use the port on which the REGISTER request was received as client port for sending the response back to the UE.

K.2.2.5.4 General treatment for all dialogs and standalone transactions excluding the REGISTER method – non-emergency registration

The procedures described in subclause 5.2.10.4 apply with the additional procedures described in the present subclause.

When the P-CSCF receives from the UE a request method other then a REGISTER request, and matches one of the emergency service identifiers in any of these lists, the requirements are extended by the following requirements:

- the P-CSCF shall follow the procedures described in subclause K.2.2.3.1 and subclause 5.2.7.2.

When the P-CSCF receives a 1xx or 2xx response to the above request, the requirements are extended by the following requirements. The P-CSCF shall:

- forward the response to the UE using the mechanisms described in RFC 3261 [26] and RFC 3581 [56A], i.e. the P-CSCF shall send the response to the IP address indicated in the "received" header field parameter and, in case UDP is used, to the port indicated in the "rport" header field parameter (if present) of the Via header field associated with the UE. In case TCP is used as transport protocol, the P-CSCF shall use the port on which the REGISTER request was received as client port for sending the response back to the UE.

K.2.2.5.5 Abnormal cases

The text in subclause 5.2.10.5 applies without changes.

K.2.3 Procedures at the S-CSCF

K.2.3.1 Registration and authentication

K.2.3.1.1 Introduction

The procedures described in subclause 5.4.1.1 apply with the additional procedures described in the present subclause

K.2.3.2 Initial registration and user-initiated re-registration

K.2.3.2.1 Unprotected REGISTER

The procedures described in subclause 5.4.1.2.1 apply with the additional procedures described in the present subclause.

Upon receipt of a REGISTER request with the "integrity-protected" header field parameter in the Authorization header field set to "no", for a user identity linked to a private user identity that has a registered public user identity but with a new contact address, the S-CSCF shall follow the procedures described in subitem 1) and 2) which is modified as follows:

2) if the authentication has been successful and if the previous registration has not expired, the S-CSCF shall determine if the contact address contains a "reg-id" and "+sip.instance" header field parameters in the received Contact header field, and the first URI within the Path header field contains the "ob" SIP URI parameter. If the parameters are present, the S-CSCF shall follow the requirements defined in RFC 5626 [92]. If the parameters are not present, the S-CSCF shall perform the network initiated deregistration procedure only for the previous contact information as described in subclause 5.4.1.5.

K.2.3.2.2 Protected REGISTER with IMS AKA as a security mechanism

The text in subclause 5.4.1.2.2 applies without changes.

K.2.3.2.2A Protected REGISTER with SIP digest as a security mechanism

The text in subclause 5.4.1.2.2A applies without changes.

K.2.3.2.2B Protected REGISTER with SIP digest with TLS as a security mechanism

The text in subclause 5.4.1.2.2B applies without changes.

K.2.3.2.2C NASS-IMS bundled authentication as a security mechanism

The text in subclause 5.4.1.2.2C applies without changes.

K.2.3.2.2D Successful registration

The procedures described in subclause 5.4.1.2.2F apply with the additional procedures described in the present subclause.

If a 200 (OK) response is to be sent to a protected REGISTER request, the S-CSCF shall also include:

h) if the received REGISTER contained both a "reg-id" and "+sip.instance" header field parameters in the Contact header field, and the first URI within the Path header field contains the "ob" SIP URI parameter a Require header field with the "outbound" option-tag as described in RFC 5626 [92];

K.2.3.3 General treatment for all dialogs and standalone transactions excluding requests terminated by the S-CSCF

K.2.3.3.1 Determination of mobile-originated or mobile terminated case

The text in subclause 5.4.3.1 applies without changes.

K.2.3.3.2 Requests initiated by the served user

The text in subclause 5.4.3.2 applies without changes.

K.2.3.3.3 Requests terminated by the served user

The procedures described in subclause 5.4.3.3 apply with the additional procedures described in the present subclause.

When the S-CSCF receives, destined for a statically pre-configured PSI or a registered served user, an initial request for a dialog or a request for a standalone transaction, prior to forwarding the request, the S-CSCF shall follow all the procedures as describes with the exception of subitem 10) a) which is modified as follows:

10) in case there are no Route header fields in the request, the S-CSCF shall:

a) if there is more than one route in the target set determined in steps 8) and 9) above, the S-CSCF shall:

- if the fork directive in the Request-Disposition header field was set to "no-fork", the contact with the highest qvalue parameter shall be used when building the Request-URI. In case no qvalue parameters were provided, the S-CSCF shall decide locally what contact address to be used when building the Request-URI; otherwise

- fork the request or perform sequential search based on the relative preference indicated by the qvalue parameter of the Contact header field in the original REGISTER request, as described in RFC 3261 [26]. In case no qvalue parameters were provided, then the S-CSCF determine the contact address to be used when building the Request-URI as directed by the Request-Disposition header field as described in RFC 3841 [56B]. If the Request-Disposition header field is not present, the S-CSCF shall decide locally whether to fork or perform sequential search among the contact addresses;

- in case that no route is chosen, the S-CSCF shall return a 480 (Temporarily unavailable) response or another appropriate unsuccessful SIP response and terminate these procedures.

- Per the rules defined in RFC 5626 [92], the S-SCSF shall not populate the target set with more than one contact with the same AOR and instance ID at a time. If a request for a particular AOR and instance ID fails with a 430 response, the S-CSCF shall replace the failed branch with another target with the same AOR and instance-id, but a different reg-id;

- If two bindings have the same instance ID and reg-id, it should prefer the contact that was most recently updated;

K.2.4 Procedures at the IBCF

K.2.4.1 General

This subclause describes the IBCF procedures for supporting ICE RFC 5245 [99]. The description enhances the procedures specified in subclause 5.10.

K.2.4.2 IBCF as an exit point

K.2.4.2.1 Registration

The text in subclause 5.10.2.1 applies without changes.

K.2.4.2.1A General

The text in subclause 5.10.2.1A applies without changes.

K.2.4.2.2 Initial requests

The text in subclause 5.10.2.2 applies without changes.

K.2.4.2.3 Subsequent requests

The text in subclause 5.10.2.3 applies without changes.

K.2.4.2.4 IBCF-initiated call release

The text in subclause 5.10.2.4 applies without changes.

K.2.4.3 IBCF as an entry point

K.2.4.3.1 Registration

The text in subclause 5.10.3.1 applies without changes.

K.2.4.3.1A General

The text in subclause 5.10.2.4 applies without changes.

K.2.4.3.2 Initial requests

The text in subclause 5.10.3.2 applies without changes.

K.2.4.3.3 Subsequent requests

The text in subclause 5.10.3.3 applies without changes.

K.2.4.3.4 IBCF-initiated call release

The text in subclause 5.10.3.4 applies without changes.

K.2.4.4 THIG functionality in the IBCF

K.2.4.4.1 General

The text in subclause 5.10.4.1 applies without changes.

K.2.4.4.2 Encryption for network topology hiding

The text in subclause 5.10.4.2 applies without changes.

K.2.4.4.3 Decryption for network topology hiding

The text in subclause 5.10.4.3 applies without changes.

K.2.4.5 IMS-ALG functionality in the IBCF

The text in subclause 5.10.5 applies without changes.

K.2.4.6 Screening of SIP signalling

K.2.4.6.1 General

The text in subclause 5.10.6.1 applies without changes.

K.2.4.6.2 IBCF procedures for SIP header fields

The text in subclause 5.10.6.2 applies without changes.

K.2.4.6.3 IBCF procedures for SIP message bodies

The text in subclause 5.10.6.3 applies without changes.

K.3 Application usage of SDP

K.3.1 UE usage of SDP

The procedures as of subclause 6.1 apply.

K.3.2 P-CSCF usage of SDP

K.3.2.1 Introduction

Subclauses K.3.2.2 through K.3.2.4 describe the SDP related procedures performed by the P-CSCF in support of hosted NAT.

K.3.2.2 Receipt of an SDP offer

When the P-CSCF receives an SDP offer during session establishment, if this offer comes from a UE which does not support the procedures defined in subclause K.5.2.1 and is located behind a hosted NAT, the P-CSCF shall modify the SDP offer by replacing the IP Address(es) and port number(s) received in the SDP offer by the IP address(es) and port number(s) received from the IMS access gateway over the Iq interface.

NOTE: The P-CSCF can determine if the UE supports the ICE procedures covered in section K.5.2.1 by the presence of a=candidate attributes in the SDP.

When the P-CSCF receives an SDP offer during session establishment, if this offer comes from a UE which does support the procedures defined in subclause K.5.2.1 and is located behind a hosted NAT, the P-CSCF may choose to modify the SDP offer by replacing the IP Address(es) and port number(s) received in the SDP offer by the IP address(es) and port number(s) received from the IMS access gateway over the Iq interface.

K.3.2.3 Receipt of an SDP answer

When the P-CSCF receives any SDP answer to an SDP offer described in subclause K.5.2.1, if this answer comes from a UE which does not support the procedures defined in subclause K.5.2.2 and is located behind a hosted NAT, the P-CSCF shall modify the SDP answer by replacing the IP address(es) and port number(s) received in the SDP answer by the IP address(es) and port number(s) received from the IMS access gateway over the Iq interface.

NOTE: The P-CSCF can determine if the UE supports the ICE procedures covered in subclause K.5.2.1 by the presence of a=candidate attributes in the SDP.

When the P-CSCF receives any SDP answer to an SDP offer described in subclause K.5.2.1, if this answer comes from a UE which does support the procedures defined in subclause K.5.2.2 and is located behind a hosted NAT, the P-CSCF may choose to modify the SDP answer by replacing the IP address(es) and port number(s) received in the SDP answer by the IP address(es) and port number(s) received from the IMS access gateway over the Iq interface.

K.3.2.4 Change of media connection data

After the session is established, it is possible for both ends of the session to change the media connection data for the session. When the P-CSCF receives a SDP offer/answer coming from a UE located behind a hosted NAT with port number(s) or IP address(es) included, there are three different possibilities:

- IP address(es) or/and port number(s) have been added. In this case, the P-CSCF shall apply the procedures as described in subclause K.3.2.2 and subclause K.3.2.3 as appropriate for those additional IP address(es) or/and port number(s);

- IP address(es) and port number(s) have been reassigned to the end points. In this case, the P-CSCF shall apply the procedures as described in subclause K.3.2.2 and subclause K.3.2.3 as appropriate for those reassigned IP address(es) and port number(s);

NOTE: If necessary, the P-CSCF or IBCF will cause the IMS access gateway to release the resources related to the previously assigned IP address(es) and port number(s).

- no change has been made to the IP address(es) and port number(s). The P-CSCF shall apply procedures described in subclause K.3.2.2 using the previously stored IP address(es) and port number(s).

K.4 Void

K.5 Application usage of ICE

K.5.1 Introduction

The following subclauses describe the usage of the Interactive Connectivity Establishment (ICE) procedures as documented in RFC 5245 [99]

K.5.2 UE usage of ICE

K.5.2.1 General

NAT bindings also need to be kept alive for media. RFC 5245 [99] provides requirements for STUN based keepalive mechanisms. UEs that do not implement the ICE procedures as defined in RFC 5245 [99] should implement the keepalive procedures defined in RFC 5245 [99]. In the case where keepalives are required and the other end does not support ICE (such that STUN cannot be used for a keepalive) or the UE can not discover STUN or TURN servers to gather candidates, the UE shall send an empty (no payload) RTP packet with a payload type of 20 as a keepalive as long as the other end has not negotiated the use of this value. If this value has already been negotiated, then some other unused static payload type from table 5 of RFC 3551 [55A] shall be used. When sending an empty RTP packet, the UE shall continue using the sequence number (SSRC) and timestamp as the negotiated RTP steam.

K.5.2.2 Call initiation – UE-origination case

The UE should support the agent requirements for ICE as defined by RFC 5245 [99] when sending the initial INVITE request. RFC 5245 [99] provides procedures for:

1) Gathering candidate addresses for RTP and RTCP prior to sending the INVITE;

2) Encoding the candidate addresses in the SDP that is included with the INVITE;

3) Acting as a STUN server to receive binding requests from the remote client when it does connectivity checks;

4) Performing connectivity checks on received candidate addresses for RTP and RTCP;

5) Determining and possibly selecting a better active address based on the requirements in RFC 5245 [99];

6) Subsequent offer/answer exchanges; and

7) Sending media.

When supporting the ICE procedures, the UE shall also support the STUN agent requirements as described in RFC 5389 [100] in order to gather STUN addresses, the TURN client requirements as described in RFC 5766 [101] in order to gather TURN Server addresses and the STUN Server requirements defined in RFC 5245 [99] as well as the requirements for STUN Servers defined in RFC 5389 [100] for responding to connectivity checks.

RFC 5245 [99] provides an algorithm for determining the priority of a particular candidate. The following additional requirements are provided to the UE:

1) The type preference assigned for each type of candidate from least to highest should be: Relayed Transport Address, STUN address, local address; and

2) If the UE has a dual IPv4/IPv6 stack, IPv6 addresses may be assigned a higher local preference than IPv4 addresses based on the operator's policy.

RFC 5245 [99] provides guidance on choosing the in-use candidate and recommends that a UE choose relayed candidates as the in-use address. The following additional requirements are provided to the UE:

1) If a TURN server is available, the Relayed Transport Address should be used as the initial active transport address (i.e. as advertised in the m/c lines of the SDP); and

2) If a TURN server is not available, an address obtained via STUN should be used as the initial active transport address.

Regardless of whether the UE supports the above procedures, the UE shall, upon receipt of an SDP answer with candidate addresses, perform connectivity checks on the candidate addresses as described in RFC 5245 [99]. In order to perform connectivity checks, the UE shall act as a STUN client as defined in RFC 5389 [100]. Further, the UE shall also follow the procedures in RFC 5245 [99] when sending media.

K.5.2.3 Call termination – UE-termination case

The UE should support agent requirements for ICE as defined by RFC 5245 [99] when receiving an initial INVITE request. RFC 5245 [99] provides procedures for:

1) Gathering candidate addresses for RTP and RTCP prior to sending the answer as described in RFC 5245 [99];

2) Encoding the candidate addresses in the SDP answer as described in RFC 5245 [99];

3) Acting as a STUN server to receive binding requests from the remote client when it does connectivity checks;

4) Performing connectivity checks on received candidate addresses for RTP and RTCP;

5) Determining and possibly selecting a better active address based on the requirements in RFC 5245 [99];

6) Subsequent offer/answer exchanges; and

7) Sending media.

When supporting the ICE procedures, the UE shall also support the STUN agent requirements as described in RFC 5389 [100] in order to gather STUN addresses, the TURN client requirements as described in RFC 5766 [101] in order to gather TURN Server addresses and the STUN Server requirements defined in RFC 5245 [99] as well as the requirements for STUN Servers defined in RFC 5389 [100] for responding to connectivity checks.

RFC 5245 [99] provides an algorithm for determining the priority of a given candidate. The additional requirements for the UE:

1) The priority of candidate addresses from least to highest should be: Relayed Transport Address, STUN address, local address; and

2) If the UE has a dual IPv4/IPv6 stack, IPv6 addresses MAY be placed at a higher priority than IPV4 addresses based on the operator's policy.

RFC 5245 [99] provides guidance on choosing the in-use candidate and recommends that a UE choose relayed candidates as the in-use address. The following additional requirements are provided to the UE:

1) If a TURN server is available, the Relayed Transport Address should be used as the initial active transport address (i.e. as advertised in the m/c lines of the SDP); and

2) If a TURN server is not available, an address obtained via STUN should be used as the initial active transport address.

Regardless of whether the UE supports the above procedures, the UE shall, upon receipt of an SDP offer with candidate addresses, perform connectivity checks on the candidate addresses as described in RFC 5245 [99]. In order to perform connectivity checks, the UE shall act as a STUN client as defined in RFC 5389 [100]. Further, the UE shall also follow the procedures in RFC 5245 [99] when sending media.

When receiving an SDP offer which does not indicate support for ICE, the UE aborts the ICE procedures and reverts to RFC 3264 [27B] offer/answer procedures; per RFC 5245 [99]. However, if the terminating UE is behind a NA(P)T device this may result in the inability to pass media for the session as the terminating UE will respond with its locally assigned IP address which is unreachable. In order to ensure successful media exchange, the terminating UE shall provide either a STUN derived IP address and port or a TURN provided IP address and port in the m/c lines of the SDP answer. If the provided address and port is a TURN address and port, the policy charging and control framework will be unable to establish proper filter criteria as the address is that of the TURN server and not that of the UE or NAT in front of the UE; see RFC 5245 [99] subclause B.3 for further details. To rectify this issue, the terminating UE shall also include a candidate attribute as described in RFC 5245 [99] identifying the server reflexive IP address and port (i.e. the IP address and port on the public side of the NAT) used when a TURN provided address and port is provided in the m/c line of the SDP answer.

K.5.3 P-CSCF support of ICE

K.5.3.1 General

This subclause describes procedures of a P-CSCF to support ICE RFC 5245 [99].

If no IMS access gateway is inserted, a P-CSCF may transparently pass ICE related SDP attibutes to support ICE. The remaining procedures in subclause K.5.3 are only applicable if the P-CSCF is inserting an IMS access gateway on the media plane.

When the P-CSCFwith attached IMS access gateway receives SDP candidate information from the offerer the P-CSCF shall not forward the candidate information towards the answerer. When the P-CSCF receives SDP candidate information from the answerer the P-CSCF shall not forward the candidate information towards the offerer. The remaining procedures in subclause K.5.3.1 are optional.

NOTE 1: An P-CSCF that removes and/or does not provide ICE related SDP attributes (e.g. a=candidate) in the offer/answer exchange will cause the ICE procedures to be aborted and the address and port information in the m and c lines of the SDP offer will be used. If this address and port information contains the relayed candidate address of a STUN Relay server, as recommended by ICE, then an extra media relay server will be used for the session which is not necessary nor desirable.

The P-CSCF with attached IMS access gateway performs separate ICE procedures towards the offerer and the answerer. The usage of ICE is negotiated separately with the offerer and answerer, and ICE may be applied independently at either side. Furthermore, the P-CSCF may be configured to apply ICE procedures only towards one network side, e.g. towards the IM CN subsystem it belongs to.

NOTE 2: Since the P-CSCF is inserting an IMS access gateway, it can choose to provide the NAT traversal mechanism defined in Annex F towards the UE. In such case the P-CSCF will not provide ICE support towards the UE, but the P-CSCF can still provide ICE support towards the core network in scenarios where ICE is used in the core network, e.g. to support NAT traversal for other access networks with no deploied IMS access gateways.

Since the P-CSCF is not located behind a NAT, it does not request the IMS access gateway to generate keep-alive messages even when acting as a full ICE entity. The P-CSCF only requests the IMS access gateway to terminate and generate STUN messages used for the candidate selection procedures.

Since the P-CSCF is not located behind a NAT the P-CSCF shall only include host candidates in SDP offers and answers generated by the P-CSCF.

K.5.3.2 P-CSCF full ICE procedures for UDP based streams

K.5.3.2.1 General

This subclause describes the P-CSCF full ICE procedures for UDP based streams.

K.5.3.2.2 P-CSCF receiving SDP offer

When the P-CSCF receives an SDP offer including ICE candidate information, the P-CSCF shall send the candidate information for each UDP based stream received in the SDP offer towards the IMS access gateway. The P-CSCF shall request the IMS access gateway to reserve media- and STUN resources towards the offerer, based on the candidate information, in order to allow the IMS access gateway to perform the necessary connectivity checks per the ICE procedures.

If the offerer is acting as an ICE controller entity the P-CSCF shall act as an ICE controlled entity in the direction towards the offerer. If the offerer is acting as an ICE controlled entity the P-CSCF shall act as an ICE controller entity in the direction towards the offerer.

K.5.3.2.3 P-CSCF sending SDP offer

Prior to sending an SDP offer, the P-CSCF may choose to apply related ICE procedues, e.g. if it expects to interact with terminals applying procedures as described in subclause K.5.2, and if both the P-CSCF and IMS access gateway also support ICE procedures. To invoking these ICE procedures, the P-CSCF shall request the IMS access gateway to reserve media- and STUN resources towards the answerer for each UDP based media stream and include a host candidate attribute for each UDP based stream in the SDP offer, providing the reserved address and port at the IMS access gateway as destination.

The P-CSCF shall always act as an ICE controller entity towards the answerer.

NOTE: The host candidate address included by the P-CSCF in the generated SDP offer matches the c- and m line information for the associcated UDP stream in the SDP offer.

K.5.3.2.4 P-CSCF receiving SDP answer

When the P-CSCF receives an SDP answer including ICE candidate information, the P-CSCF shall send the candidate information for each UDP based stream received in the SDP answer towards the IMS access gateway.

The P-CSCF shall request the IMS access gateway to perform ICE candidate selection procedures towards the answerer. The P-CSCF shall request the IMS access gateway to inform the P-CSCF, for each UDP stream, which candidate pair has been selected towards the answerer, once the candidate selection procedure towards the answerer has finished.

If the IMS access gateway indicates to the P-CSCF that, for at least one UDP stream, the selected candidate pair does not match the c- and m- line address information for the associated UDP stream, exchanged between the P-CSCF and the answerer, and the P-CSCF acts an ICE controller entity towards the answerer, the P-CSCF shall send a new offer towards the answerer in order to allign the c- and m- lines address information with the chosen candidate pair for the associated UDP stream.

K.5.3.2.5 P-CSCF sending SDP answer

When the P-CSCF generates an SDP answer for an offer that included ICE candidate information, the P-CSCF shall request the IMS access gateway to reserve media- and STUN resources towards the offerer for each UDP based media stream and include an SDP host candidate attribute for each UDP based stream in the SDP answer, providing the reserved address and port at the IMS access gateway as destination.

The P-CSCF shall in the generated SDP answer include host candidate information which matches the c- and m line information for the associated UDP stream in the SDP answer.

The P-CSCF shall request the IMS access gateway to perform ICE candidate selection procedures towards the offerer. The P-CSCF shall request the IMS access gateway to inform the P-CSCF, for each UDP stream, which candidate pair has been selected towards the offerer, once the candidate selection procedure towards the answerer has finished.

If the IMS access gateway indicates to the P-CSCF that the selected candidate pair towards the offerer does not match the c- and m- line address information for the associated UDP stream, exchanged between the P-CSCF and the offerer, and the P-CSCF acts an ICE controller entity towards the offerer, the P-CSCF shall send an offer towards the offerer (which will now act as an answerer) in order to allign the c- and m- line address information with the chosen candidate pair for the associated UDP stream.

K.5.3.3 P-CSCF ICE lite procedures for UDP based streams

When the P-CSCF is using ICE lite procedures for UDP based streams, the P-CSCF procedures are identical as described in subclause K.5.3.2, with the following exceptions:

- The P-CSCF always acts as an ICE controlled entity towards the offerer and towards the answerer; and
- The P-CSCF requests the IMS access gateway to perform ICE lite candidate selection procedures, as defined in RFC 5245 [99].

K.5.3.4 ICE procedures for TCP based streams

K.5.3.4.1 General

The P-CSCF shall terminate ICE procedures for TCP based streams. Instead the P-CSCF will use the mechanism defined in RFC 4145 [83] for establishing TCP based streams, as defined in RFC 6544 [131].

An entity that supports ICE continues the ICE procedures for UDP based streams, even if no candidates are provided for TCP based streams.

NOTE: The P-CSCF ICE procedures for TCP based streams are identical no matter whether the P-CSCF uses full ICE or ICE lite procedures for UDP based streams.

K.5.3.4.2 P-CSCF receiving SDP offer

When the P-CSCF receives an SDP offer, the P-CSCF shall ignore the candidate attributes for TCP based streams. The P-CSCF shall not send the candidate information for TCP based streams towards the IMS access gateway.

K.5.3.4.3 P-CSCF sending SDP offer

When the P-CSCF generates an SDP offer the P-CSCF shall include an "actpass" setup attribute, as defined in RFC 4145 [83], for each TCP based stream, which will cause the answerer to initiate the TCP connections towards the IMS access gateway. The P-CSCF shall not include any candidate attributes for TCP based streams in the SDP offer.

K.5.3.4.4 P-CSCF receiving SDP answer

Since the P-CSCF does not include candidates in the SDP offer towards the answerer, there are no ICE specific procedures when the P-CSCF receives an SDP answer.

NOTE: If the SDP answer contains candidate attributes for TCP based streams, the P-CSCF simply discards the candidate attributes.

K.5.3.4.5 P-CSCF sending SDP answer

When the P-CSCF generates an SDP answer the P-CSCF shall include a "passive" setup attribute, as defined in RFC 4145 [83], for each TCP based stream, which will cause the offerer to initiate the TCP connections towards the IMS access gateway. The P-CSCF shall not include any candidate attributes for TCP based streams in the SDP answer.

K.5.4 ICE functionality in the IBCF

K.5.4.1 General

This subclause describes procedures of an IBCF to support ICE (RFC 5245 [99]).

If no TrGW is inserted, an IBCF may transparently pass ICE related SDP attibutes to support ICE. The remaining procedures in subclause K.5.4 are only applicable if the IBCF is inserting a TrGW on the media plane.

When the IBCF with attached TrGW receives SDP candidate information from the offerer the IBCF shall not forward the candidate information towards the answerer. When the IBCF receives SDP candidate information from the answerer the IBCF shall not forward the candidate information towards the offerer. The remaining procedures in subclause K.5.4.1 are optional.

NOTE: An IBCF that removes and/or does not provide ICE related SDP attributes (e.g. a=candidate) in the offer/answer exchange will cause the ICE procedures to be aborted and the address and port information in the m and c lines of the SDP offer will be used. If this address and port information contains the relayed candidate address of a STUN Relay server, as recommended by ICE, then an extra media relay server will be used for the session which is not necessary nor desirable.

The IBCF with attached TrGW performs separate ICE procedures towards the offerer and the answerer. The usage of ICE is negotiated separately with the offerer and answerer, and ICE may be applied independently at either side. Furthermore, the IBCF may be configured to apply ICE procedures only towards one network side, e.g. towards the IM CN subsystem it belongs to.

Since the IBCF is not located behind a NAT, it does not request the TrGW to generate keep-alive messages even when acting as a full ICE entity. The IBCF only requests the TrGW to terminate and generate STUN messages used for the candidate selection procedures.

Since the IBCF is not located behind a NAT the IBCF shall only include host candidates in SDP offers and answers generated by the IBCF.

K.5.4.2 IBCF full ICE procedures for UDP based streams

K.5.4.2.1 General

This subclause describes the IBCF full ICE procedures for UDP based streams.

K.5.4.2.2 IBCF receiving SDP offer

When the IBCF receives an SDP offer including ICE candidate information, the IBCF shall send the candidate information for each UDP based stream received in the SDP offer towards the TrGW. The IBCF shall request the TrGW to reserve media- and STUN resources towards the offerer, based on the candidate information, in order to allow the TrGW to perform the necessary connectivity checks per the ICE procedures.

If the offerer is acting as an ICE controller entity the IBCF shall act as an ICE controlled entity in the direction towards the offerer. If the offerer is acting as an ICE controlled entity the IBCF shall act as an ICE controller entity in the direction towards the offerer.

K.5.4.2.3 IBCF sending SDP offer

Prior to sending an SDP offer, the IBCF may choose to apply related ICE procedues, e.g. if it expects to interact with terminals applying procedures as described in subclause K.5.2, and if both the IBCF and TrGW also support ICE procedures. To invoking these ICE procedures, the IBCF shall request the TrGW to reserve media- and STUN resources towards the answerer for each UDP based media stream and include a host candidate attribute for each UDP based stream in the SDP offer, providing the reserved address and port at the TrGW as destination.

The IBCF shall always act as an ICE controller entity towards the answerer.

NOTE: The host candidate address included by the IBCF in the generated SDP offer matches the c- and m line information for the associcated UDP stream in the SDP offer.

K.5.4.2.4 IBCF receiving SDP answer

When the IBCF receives an SDP answer including ICE candidate information, the IBCF shall send the candidate information for each UDP based stream received in the SDP answer towards the TrGW.

The IBCF shall request the TrGW to perform ICE candidate selection procedures towards the answerer. The IBCF shall request the TrGW to inform the IBCF, for each UDP stream, which candidate pair has been selected towards the answerer, once the candidate selection procedure towards the answerer has finished.

If the TrGW indicates to the IBCF that, for at least one UDP stream, the selected candidate pair does not match the c- and m- line address information for the associated UDP stream, exchanged between the IBCF and the answerer, and the IBCF acts an ICE controller entity towards the answerer, the IBCF shall send a new offer towards the answerer in order to allign the c- and m- lines address information with the chosen candidate pair for the associated UDP stream.

K.5.4.2.5 IBCF sending SDP answer

When the IBCF generates an SDP answer for an offer that included ICE candidate information, the IBCF shall request the TrGW to reserve media- and STUN resources towards the offerer for each UDP based media stream and include an SDP host candidate attribute for each UDP based stream in the SDP answer, providing the reserved address and port at the TrGW as destination.

The IBCF shall in the generated SDP answer include host candidate information which matches the c- and m line information for the associated UDP stream in the SDP answer.

The IBCF shall request the TrGW to perform ICE candidate selection procedures towards the offerer. The IBCF shall request the TrGW to inform the IBCF, for each UDP stream, which candidate pair has been selected towards the offerer, once the candidate selection procedure towards the answerer has finished.

If the TrGW indicates to the IBCF that the selected candidate pair towards the offerer does not match the c- and m- line address information for the associated UDP stream, exchanged between the IBCF and the offerer, and the IBCF acts an ICE controller entity towards the offerer, the IBCF shall send an offer towards the offerer (which will now act as an answerer) in order to allign the c- and m- line address information with the chosen candidate pair for the associated UDP stream.

K.5.4.3 IBCF ICE lite procedures for UDP based streams

When the IBCF is using ICE lite procedures for UDP based streams, the IBCF procedures are identical as described in subclause K.5.4.2, with the following exceptions:

- The IBCF always acts as an ICE controlled entity towards the offerer and towards the answerer, and;
- The IBCF requests the TrGW to perform ICE lite candidate selection procedures, as defined in ICE

K.5.4.4 ICE procedures for TCP based streams

K.5.4.4.1 General

The IBCF shall terminate ICE procedures for TCP based streams. Instead the IBCF will use the mechanism defined in RFC 4145 [83] for establishing TCP based streams, as defined in RFC 6544 [131].

An entity that supports ICE continues the ICE procedures for UDP based streams, even if no candidates are provided for TCP based streams.

NOTE: The IBCF ICE procedures for TCP based streams are identical no matter whether the IBCF uses full ICE- or ICE lite- procedures for UDP based streams.

K.5.4.4.2 IBCF receiving SDP offer

When the IBCF receives an SDP offer, the IBCF shall ignore the candidate attributes for TCP based streams. The IBCF shall not send the candidate information for TCP based streams towards the TrGW.

K.5.4.4.3 IBCF sending SDP offer

When the IBCF generates an SDP offer the IBCF shall include an "actpass" setup attribute, as defined in RFC 4145 [83], for each TCP based stream, which will cause the answerer to initiate the TCP connections towards the TrGW. The IBCF shall not include any candidate attributes for TCP based streams in the SDP offer.

K.5.4.4.4 IBCF receiving SDP answer

Since the IBCF does not include candidates in the SDP offer towards the answerer, there are no ICE specific procedures when the IBCF receives an SDP answer.

NOTE: If the SDP answer contains candidate attributes for TCP based streams, the IBCF simply discards the candidate attributes.

K.5.4.4.5 IBCF sending SDP answer

When the IBCF generates an SDP answer the IBCF shall include a "passive" setup attribute, as defined in RFC 4145 [83], for each TCP based stream, which will cause the offerer to initiate the TCP connections towards the TrGW. The IBCF shall not include any candidate attributes for TCP based streams in the SDP answer.

Annex L (normative): IP-Connectivity Access Network specific concepts when using EPS to access IM CN subsystem

L.1 Scope

The present annex defines IP-CAN specific requirements for a call control protocol for use in the IP Multimedia (IM) Core Network (CN) subsystem based on the Session Initiation Protocol (SIP), and the associated Session Description Protocol (SDP), where the IP-CAN is Evolved Packet System (EPS).

L.2 EPS aspects when connected to the IM CN subsystem via E-UTRAN

L.2.1 Introduction

A UE accessing the IM CN subsystem, and the IM CN subsystem itself, utilise the services provided by EPS to provide packet-mode communication between the UE and the IM CN subsystem.

Requirements for the UE on the use of these packet-mode services are specified in this clause. Requirements for the P-GW in support of this communication are specified in 3GPP TS 29.061 [11], and 3GPP TS 29.212 [13B].

When using the EPS, each IP-CAN bearer is provided by an EPS bearer.

L.2.2 Procedures at the UE

L.2.2.1 EPS bearer context activation and P-CSCF discovery

Prior to communication with the IM CN subsystem, the UE shall:

a) if not attached for EPS services yet, perform a EPS attach procedure as specified in 3GPP TS 24.301 [8J];

b) ensure that a EPS bearer context used for SIP signalling according to the APN and P-GW selection criteria described in 3GPP TS 23.401 [7B], is available. This EPS bearer context shall remain active throughout the period the UE is connected to the IM CN subsystem, i.e. from the initial registration and at least until the deregistration. As a result, the EPS bearer context provides the UE with information that makes the UE able to construct an IPv4 or an IPv6 address;

NOTE 3: The default EPS bearer context can also be used for SIP signalling as well as any other EPS bearer context.

When the EPS bearer context establishment procedure for the SIP signalling is initiated by the UE:

I. if a default EPS bearer context is not available with the selected P-GW, the UE shall indicate to the network in the PDN CONNECTIVITY REQUEST that the request is for SIP signalling. If the request is authorized, the network establishes a bearer with the appropriate QCI as described in 3GPP TS 24.301 [8J]. The UE may also use this EPS bearer context for DNS and DHCP signalling;

II. if the default EPS bearer context is available with the selected P-GW, and is to be used for SIP signalling no additional steps are needed;

III. if the default EPS bearer context is available with the selected P-GW and an EPS bearer for SIP signalling with the correct QCI and TFT is to be established, the UE shall indicate to the network, by setting the IM CN Subsystem Signalling Flag in the Protocol Configuration Options information element in the BEARER

RESOURCE ALLOCATION REQUEST message, that the request is for SIP signalling. If the request is authorized, the network either establishes a new dedicated bearer or modifies an exisiting bearer with the appropriate QCI and TFT as described in 3GPP TS 24.301 [8J]. The general QoS negotiation mechanism is described in 3GPP TS 24.301 [8J].

NOTE 2: An EPS bearer with a QCI value other than the one for signalling can carry both IM CN subsystem signalling and media, in case the media does not need to be authorized by Policy and Charging control mechanisms as defined in 3GPP TS 29.212 [13B] and the media stream is not mandated by the P-CSCF to be carried in a separate EPS bearer.

c) acquire a P-CSCF address(es).

The methods for P-CSCF discovery are:

I. When using IPv4, employ the Dynamic Host Configuration Protocol (DHCP) RFC 2132 [20F], the DHCPv4 options for SIP servers RFC 3361 [35A], and RFC 3263 [27A] as described in subclause 9.2.1. When using IPv6, employ Dynamic Host Configuration Protocol for IPv6 (DHCPv6) RFC 3315 [40], the DHCPv6 options for SIP servers RFC 3319 [41] and DHCPv6 options for Domain Name Servers (DNS) RFC 3646 [56C] as described in subclause 9.2.1.

II. Transfer P-CSCF address(es) within the EPS bearer context activation procedure.

The UE shall indicate the request for a P-CSCF address to the network within the Protocol Configuration Options information element of the PDN CONNECTIVITY REQUEST message or BEARER RESOURCE ALLOCATION REQUEST message.

If the network provides the UE with a list of P-CSCF IPv4 or IPv6 addresses in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message or ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST message, the UE shall assume that the list is prioritised with the first address within the Protocol Configuration Options information element as the P-CSCF address with the highest priority.

III. The UE selects a P-CSCF from the list (see 3GPP TS 31.103 [15B]) stored in the ISIM.

IV. The UE selects a P-CSCF from the list in IMS management object.

The UE shall use method IV to select a P-CSCF, if

- a P-CSCF is to be discovered in the home network;
- the UE is roaming; and
- the IMS management object contains the P-CSCF list.

The UE shall use method III to select the P-CSCF, if:

- a P-CSCF is to be discovered in the home network;
- the UE is roaming;
- either the UE does not contain the IMS management object, or the UE contains the IMS management object but the IMS management object does not contain the P-CSCF list; and
- the ISIM residing in the UICC supports the P-CSCF list.

The UE can freely select method I or II for P-CSCF discovery, if:

- the UE is in the home network; or
- the UE is roaming and the P-CSCF is to be discovered in the visited network.

In case method I is selected and several P-CSCF addresses or FQDNs are provided to the UE, the selection of P-CSCF address or FQDN shall be performed as indicated in RFC 3361 [35A] when using IPv4 or RFC 3319 [41] when using IPv6. If sufficient information for P-CSCF address selection is not available, selection of the P-CSCF address by the UE is implementation specific.

NOTE 3: The UE decides whether the P-CSCF is to be discovered in the serving network or in the home network based on local configuration, e.g. whether the application on the UE is permitted to use local breakout.

If the UE is designed to use I above, but receives P-CSCF address(es) according to II, then the UE shall either ignore the received address(es), or use the address(es) in accordance with II, and not proceed with the DHCP request according to I.

When using IPv4, the UE may request a DNS Server IPv4 address(es) via RFC 2132 [20F] or by the Protocol Configuration Options information element when activating a EPS bearer context according to 3GPP TS 24.301 [8J].

When using IPv6, the UE may request a DNS Server IPv6 address(es) via RFC 3315 [40] and RFC 3646 [56C] or by the Protocol Configuration Options information element when activating a EPS bearer context according to 3GPP TS 24.301 [8J].

The encoding of the request and response for IPv4 or IPv6 address(es) for DNS server(s) and list of P-CSCF address(es) within the Protocol Configuration Options information element is described in 3GPP TS 24.301 [8J].

L.2.2.1A Modification of a EPS bearer context used for SIP signalling

The EPS bearer context shall not be modified from being used exclusively for SIP signalling to a general purpose EPS bearer. After the establishment of an EPS bearer context used for SIP signalling, the UE shall not set the IM CN Subsystem Signalling Flag in the Protocol Configuration Options information element of any subsequent BEARER RESOURCE MODIFICATION REQUEST message for that APN. The UE shall ignore the IM CN Subsystem Signalling Flag if received from the network in the Protocol Configuration Options information element.

After the establishment of a EPS bearer context used for SIP signalling, the UE shall not indicate the request for a P-CSCF address to the network within the Protocol Configuration Options information element of any subsequent BEARER RESOURCE MODIFICATION REQUEST message for that APN. The UE shall ignore P-CSCF address(es) if received from the network in the Protocol Configuration Options information element.

L.2.2.1B Re-establishment of the EPS bearer context for SIP signalling

If the UE registered a public user identity with an IP address allocated for the APN of the EPS bearer context used for SIP signalling, the EPS bearer context used for SIP signalling is deactivated as result of signalling from the network and:

i) if the UE is required to perform an initial registration according to subclause L.3.1.2;

ii) if the signalling from the network results in requiring the UE to initiate activation of the PDN connection of the EPS bearer context used for SIP signalling; or

iii) if the UE needs to continue having a public user identity registered with an IP address allocated for the APN;

the UE shall:

A) if the non-access stratum is performing the UE requested PDN connectivity procedure and the EPS bearer context activation procedure(s) for the APN triggered as result of the signalling from the network, wait until the UE requested PDN connectivity procedure and the EPS bearer context activation procedure(s) for the APN finish; and

B) perform the procedures in subclause L.2.2.1, bullets a), b) and c).

If none of the bullets i), ii) and iii) of this subclause evaluate to true, or the procedures in bullet B) of this subclause were unable to ensure that the EPS bearer context used for SIP signalling is available or were unable to acquire any P-CSCF address(es):

1) if the SIP signalling was carried over a dedicated EPS bearer context, the UE shall release all resources established as a result of SIP signalling by sending to the network either:

   a) a BEARER RESOURCE MODIFICATION REQUEST message, if there are EPS bearer contexts to this PDN that are not related SIP sessions; or

   b) a PDN DISCONNECT REQUEST message if all the EPS bearer contexts to this PDN are related to SIP sessions.

NOTE: If the SIP signalling was carried over the default EPS bearer context, all the resources established as a result of SIP signalling are released without any explicit NAS signalling.

If the default EPS bearer context of the PDN connection of the EPS bearer context used for SIP signalling was deactivated at the start of this subclause, and the procedures in bullet B) of this subclause ensured that the EPS bearer context used for SIP signalling is available and acquired the P-CSCF address(es), the UE shall perform a new initial registration according to subclause 5.1.1.2.

L.2.2.2 Session management procedures

The existing procedures for session management as described in 3GPP TS 24.301 [8J] shall apply while the UE is connected to the IM CN subsystem.

L.2.2.3 Mobility management procedures

The existing procedures for mobility management as described in 3GPP TS 24.301 [8J] shall apply while the UE is connected to the IM CN subsystem.

L.2.2.4 Cell selection and lack of coverage

The existing mechanisms and criteria for cell selection as described in 3GPP TS 36.304 [19B] shall apply while the UE is connected to the IM CN subsystem.

L.2.2.5 EPS bearer contexts for media

L.2.2.5.1 General requirements

NOTE 1: In EPS, the UE cannot control whether media streams belonging to different SIP sessions are established on the same EPS bearer context or not. During establishment of a session, the UE establishes data streams(s) for media related to the session. Such data stream(s) can result in activation of additional EPS bearer context(s). Either the UE or the network can request for resource allocations for media, but the establishment and modification of the EPS bearer is controlled by the network as described in 3GPP TS 24.301 [8J].

NOTE 2: When the UE wishes to allocate bandwidth for RTP and RTCP, the UE uses the rules as those outlined in 3GPP TS 29.213 [13C].

If the resource allocation is initiated by the UE, the UE starts reserving resources whenever it has sufficient information about the media streams, and used codecs available as specified in 3GPP TS 24.301 [8J].

NOTE 3: If the resource reservation requests are initiated by the EPS IP CAN, then the bearer establishment is initiated by the network after the P-CSCF has authorised the respective IP flows and provided the QoS requirements over the Rx interface to the PCRF as described in 3GPP TS 29.214 [13D].

L.2.2.5.1A Activation or modification of EPS bearer contexts for media by the UE

If the UE is configured not to initiate resource allocation for media according to 3GPP TS 24.167 [8G], then the UE shall refrain from requesting additional EPS bearer context(s) for media until the UE considers that the network did not initiate resource allocation for the media.

L.2.2.5.1B Activation or modification of EPS bearer contexts for media by the network

If the UE receives an activation request from the network for a EPS bearer context which is associated with the EPS bearer context used for signalling, the UE shall, based on the information contained in the Traffic Flow Template information element, correlate the media EPS bearer context with a currently ongoing SIP session establishment or SIP session modification.

If the UE receives a modification request from the network for a EPS bearer context that is used for one or more media streams in an ongoing SIP session, the UE shall:

1) modify the related EPS bearer context in accordance with the request received from the network.

L.2.2.5.2 Special requirements applying to forked responses

Since the UE does not know that forking has occurred until a second, provisional response arrives, the UE requests resource allocation as required by the initial response received. If a subsequent provisional response is received, different alternative actions may be performed depending on the requirements in the SDP answer:

1) the bearer requirements of the subsequent SDP can be accommodated by the existing resources requested. The UE performs no further resource requests.

2) the subsequent SDP introduces different QoS requirements or additional IP flows. The UE requests further resource allocation according to subclause L.2.2.5.1.

3) the subsequent SDP introduces one or more additional IP flows. The UE requests further resource allocation according to subclause L.2.2.5.1.

NOTE: When several forked responses are received, the resources requested by the UE are the "logical OR" of the resources indicated in the multiple responses to avoid allocation of unnecessary resources. The UE does not request more resources than proposed in the original INVITE request.

When a final answer is received for one of the early dialogues, the UE proceeds to set up the SIP session. The UE shall release all the unneeded IP-CAN resources. Therefore, upon the reception of the first final 200 (OK) response for the INVITE request (in addition to the procedures defined in RFC 3261 [26] subclause 13.2.2.4), the UE shall:

1) in case resources were established or modified as a consequence of the INVITE request and forked provisional responses that are not related to the accepted 200 (OK) response, send release request to release the unneeded resources.

L.2.2.5.3 Unsuccessful situations

One of the Rx and Gx interface related error codes can be received by the UE in either the PDN CONNECTIVITY REJECT message, the BEARER RESOURCE MODIFICATION REJECT message, or the BEARER RESOURCE ALLOCATION REJECT message. If the UE receives a Rx and Gx interface related error code, the UE shall either terminate the session or retransmit the message up to three times. The Rx and Gx interface related error codes are further specified in 3GPP TS 29.214 [13D] and 3GPP TS 29.212 [13B].

L.2.2.6 Emergency service

Emergency service is not supported in EPS.

L.2A Usage of SDP

L.2A.1 Impact on SDP offer / answer of activation or modification of EPS bearer context for media by the network

If, due to the activation of EPS bearer context from the network the related SDP media description needs to be changed, the UE shall update the related SDP information by sending a new SDP offer within a SIP request, which is sent over the existing SIP dialog,

If the UE receives a modification request from the network for a EPS bearer context that is used for one or more media streams in an ongoing SIP session, the UE shall:

1) if, due to the modification of the EPS bearer context, the related SDP media description need to be changed, update the related SDP information by sending a new SDP offer within a SIP request, that is sent over the existing SIP dialog, and respond to the EPS bearer context modification request.

NOTE: The UE can decide to indicate additional media streams as well as additional or different codecs in the SDP offer than those used in the already ongoing session.

L.2A.2 Handling of SDP at the terminating UE when originating UE has resources available and IP-CAN performs network-initiated resource reservation for terminating UE

If the UE receives an SDP offer where the SDP offer includes all media streams for which the originating side indicated its local preconditions as met, if the precondition mechanism is supported by the terminating UE and the IP-CAN performs network-initiated resource reservation for the terminating UE and the available resources are not sufficient for the received offer, the terminating UE shall indicate its local preconditions and provide the SDP answer to the originating side without waiting for resource reservation.

NOTE: If the resource reservation is controlled by the EPS IP-CAN, the resource reservation request is initiated by the network after the P-CSCF has authorised the respective IP flows and provided the QoS requirements over the Rx interface to the PCRF as described in 3GPP TS 29.214 [13D].

L.3 Application usage of SIP

L.3.1 Procedures at the UE

L.3.1.1 P-Access-Network-Info header field

The UE shall always include the P-Access-Network-Info header field where indicated in subclause 5.1.

L.3.1.2 Availability for calls

A UE shall perform an initial registration as specified in subclause 5.1.1.2, if all the following conditions are met:

1) if the UE is operating in one of the following modes of operation (see 3GPP TS 24.301 [8J]):

   a) PS mode 1;

   b) CS/PS mode 1 and the UE is attached for EPS-Services only;

2) if the UE is capable of receiving any (but not necessarily all) of the media types which the CS domain supports, such that the media type can also be used when accessing the IM CN subsystem using the current IP-CAN;

3) if the media type of item 2 is an "audio" media type, and the UE supports codecs suitable for (conversational) speech;

4) if the UE determines that its contact has not been bound to a public user identity using the IP-CAN, such that the contact is expected to be used for the delivery of incoming requests in the IM CN subsystem relating to the media of item 2 and item 3;

5) if the IMSVoPS indicator, provided by the lower layers (see 3GPP TS 24.301 [8J]), indicates voice is supported; and

6) if the procedures to perform the initial registration are enabled (see 3GPP TS 24.305 [8T]).

NOTE: Regardless of any of the above conditions, a UE might attempt to register with the IM CN subsystem at any time.

L.3.2 Procedures at the P-CSCF

L.3.2.1 Determining network to which the originating user is attached

If the P-CSCF is configured to handle emergency requests, in order to determine from which network the request was originated the P-CSCF shall check the MCC and MNC fields received in the P-Access-Network-Info header field.

NOTE: The above check can be against more than one MNC code stored in the P-CSCF.

L.3.2.2 Location information handling

Void.

L.3.3 Procedures at the S-CSCF

L.3.3.1 Notification of AS about registration status

Not applicable.

L.4 3GPP specific encoding for SIP header field extensions

L.4.1 Void

L.5 Use of circuit-switched domain

There is no CS domain in this access technology.

Annex M (normative): IP-Connectivity Access Network specific concepts when using cdma2000® packet data subsystem to access IM CN subsystem

M.1 Scope

This annex defines IP-CAN specific requirements for call control protocol for use in the IM CN subsystem based on the Session Initiation Protocol (SIP), and the associated Session Description Protocol (SDP), where the IP-CAN is the cdma2000® packet data subsystem. It also defines procedures for invoking CS domain services.

M.2 cdma2000® packet data subsystem aspects when connected to the IM CN subsystem

M.2.1 Introduction

A UE accessing the IM CN subsystem, and the IM CN subsystem itself, utilise the services provided by the cdma2000® packet data subsystem to provide packet-mode communication between the UE and the IM CN subsystem.

Requirements for the UE on the use of these packet-mode services are specified in this subclause. Requirements for the IP-CAN bearer control point (i.e. the point where the UE has attached itself to the cdma2000® packet data subsystem) support of this communication are specified in 3GPP2 X.S0011-C [127].

M.2.2 Procedures at the UE

M.2.2.1 Establishment of IP-CAN bearer and P-CSCF discovery

Prior to communication with the IM CN subsystem, the UE shall:

a) establish a connection with the cdma2000® wireless IP network specified in 3GPP2 X.S0011-C [127]. Upon establishment a connection with the cdma2000® wireless IP network, the UE can have an IPv4 address only, an IPv6 address only, or both IPv4 and IPv6 addresses simultaneously;

b) ensure that an IP-CAN bearer used for SIP signalling is available. This IP-CAN bearer shall remain active throughout the period the UE is connected to the IM CN subsystem, i.e. from the initial registration and at least until the last deregistration.

   The UE shall choose one of the following options when performing establishment of this IP-CAN bearer:

   I. A dedicated IP-CAN bearer for SIP signalling:

      The UE shall indicate to the IP-CAN bearer control point that this is an IP-CAN bearer intended to carry IM CN subsystem-related signalling only. The UE may also use this IP-CAN bearer for DNS and DHCP access.

   II. A general-purpose IP-CAN bearer:

      The UE may decide to use a general-purpose IP-CAN bearer to carry IM CN subsystem-related signalling. The UE may carry both signalling and media on the general-purpose IP-CAN bearer;

c) discover a P-CSCF.

The methods for P-CSCF discovery are:

I. Use DHCP mechanism

II Retrieve the list of P-CSCF address(es) stored in the IMC

III Obtain the list of P-CSCF address(es) from the IMS management object

The UE can freely select method I, II, or III for P-CSCF discovery. If DHCP is used, the following procedures apply:

Upon establishing an IP-CAN bearer, the UE may use the Dynamic Host Configuration Protocol (DHCP) specified in RFC 2131 [40A] or Dynamic Host Configuration Protocol for IPv6 (DHCPv6) specified in RFC 3315 [40] to discover the P-CSCF.

Prior to accessing the DHCP server, the UE will have obtained an IP address via means other than DHCP and DHCPv6, see 3GPP2 X.S0011-C [127]. Hence, if the UE uses DHCP or DHCPv6 for P-CSCF discovery, the UE shall only request the configuration information from the DHCP server through a single request and reply exchanged with the DHCP server.

If the UE uses DHCP for P-CSCF discovery and the UE is unaware of the address of the DHCP server, the UE shall send the DHCPINFORM using the limited broadcast IP address (i.e., 255.255.255.255) and UDP port 67. If the UE knows the IP address of the DHCP server, the UE shall send the DHCPINFORM to the DHCP server"s unicast IP address and UDP port 67. The DHCP server shall send the DHCPACK on the IP address specified in the Client IP Address field of the DHCPINFORM. The DHCP server may include, in the DHCPACK, the SIP Server DHCP Option specified in RFC 3361 [35A], which carries either a list of IPv4 address(es) of the P-CSCF(s) or a list of DNS fully qualified domain name(s) that can be mapped to one or more P-CSCF(s). If the UE uses DHCPv6 for P-CSCF discovery and the UE is unaware of the address of the DHCP Server, the UE shall send an Information Request using the IPv6 multicast address FF02::1:2 and the UDP port 547. If the UE knows the IP address of the DHCPv6 server, the UE shall send the Information Request message to the DHCPv6 server"s unicast IP address and UDP port 547. In the Information Request, the UE may request either one or both the SIP Servers Domain Name List option and the SIP Servers IPv6 Address List option specified in RFC 3319 [41]. The DHCP server shall send the Reply to the IP address specified in the Information Request. The DHCP server may include in the Reply either one or both the SIP Servers Domain Name List option and the SIP Servers IPv6 Address List option, as requested by the UE.

In case several P-CSCF's IP addresses or domain names are provided to the UE, the UE shall perform P-CSCF selection according to RFC 3361 [35A] or RFC 3319 [41]. The UE shall perform the procedure for the resolution of domain name according to RFC 3263 [27A].

M.2.2.1AModification of IP-CAN used for SIP signalling

Not applicable.

M.2.2.1BRe-establishment of the IP-CAN used for SIP signalling

Not applicable.

M.2.2.2 Void

M.2.2.3 IP-CAN bearer control point support of DHCP based P-CSCF discovery

The IP-CAN bearer control point, or Home Agent in case of Mobile IP with reverse tunneling, may forward the packet to one or more local DHCP servers, or relay the packet to a specific DHCP server. The IP-CAN bearer control point, or Home Agent in case of Mobile IP with reverse tunnelling, shall not forward the DHCPINFORM (or Information-Request) to any UE.

NOTE 1: For forwarding the DHCPINFORM or Information-Request, the IP-CAN bearer control point, or Home Agent in case of Mobile IP with reverse tunnelling, does not change the destination IP address of the packet.

NOTE 2: For relaying the DHCPINFORM or Information-Request, the IP-CAN bearer control point, or Home Agent in case of Mobile IP with reverse tunnelling inserts a DHCP server"s IP address in the destination IP address field of the packet.

M.2.2.4 Void

M.2.2.5 Handling of the IP-CAN for media

M.2.2.5.1 General requirements

Not applicable.

M.2.2.5.1A Activation or modification of IP-CAN for media by the UE

Not applicable.

M.2.2.5.1B Activation or modification of IP-CAN for media by the network

Not applicable.

M.2.2.5.2 Special requirements applying to forked responses

Not applicable.

M.2.2.5.3 Unsuccessful situations

Not applicable.

M.2.2.6 Emergency service

When establishing an HRPD session to perform emergency registration, the UE shall follow the procedures defined in 3GPP2 X.S0060 [86B].

To determine whether the HRPD UE is attached to the home network or to the visited network, the UE shall compare the Carrier ID values obtained per 3GPP2 X.S0060 [86B]. If the Carrier ID of the network the UE is attached to does not match with the provisioned Carrier ID, then for the purpose of emergency calls in the IM CN subsystem the UE shall consider to be attached to a visited network.

NOTE: For 3GPP2-1X and 3GPP2-UMB, no IP-CAN specific support is provided in the current release. No carrier identification is provided for 3GPP2-1X or 3GPP2-UMB in the P-Access-Network-Info header field, and thus there is no IMS specific procedure for identifying that the UE is in the home network.

M.2A Usage of SDP

M.2A.1 Impact on SDP offer / answer of activation or modification of IP-CAN for media by the network

Not applicable.

M.2A.2 Handling of SDP at the terminating UE when originating UE has resources available and IP-CAN performs network-initiated resource reservation for terminating UE

Not applicable.

M.3 Application usage of SIP

M.3.1 Procedures at the UE

M.3.1.1 P-Access-Network-Info header field

The UE shall always include the P-Access-Network-Info header field where indicated in subclause 5.1.

M.3.1.2 Availability for calls

Not applicable.

M.3.2 Procedures at the P-CSCF

M.3.2.1 Detecting requests destined for a PSAP

For an HRPD UE, after the initial request for a dialog or standalone transaction or an unknown method is determined to be destined for a PSAP the P-CSCF shall compare the Carrier ID field received in the P-Access-Network-Info header field against a list of supported Carrier IDs to determine if the call is routable ..

NOTE: For 3GPP2-1X and 3GPP2-UMB, no IP-CAN specific support is provided in the current release. No carrier identification is provided for 3GPP2-1X or 3GPP2-UMB in the P-Access-Network-Info header field, and thus there is no IMS specific procedure for identifying that the UE is in the home network.

M.3.2.2 Location information handling

Void

M.3.3 Procedures at the S-CSCF

M.3.3.1 Notification of AS about registration status

The procedures described in subclause 5.4.1.7 apply with the additional procedures described in the present subclause:

1) in case the original received REGISTER request contained a Timestamp header field, the S-CSCF shall insert a Timestamp header field with the value of the Timestamp header field from the original received REGISTER request.

M.4 3GPP specific encoding for SIP header field extensions

M.4.1 Void

M.5 Use of circuit switched domain

When an emergency call is to be set up over the CS domain, the UE shall attempt it according to the procedures described in 3GPP2 C.S0005-D [85].

Annex N (Normative): Functions to support overlap signalling

N.1 Scope

This annex defines the procedures performed by network entities within the IM CN subsystem to support overlap signalling.

The support of overlap signalling within the IM CN subsystem is optional, and is depended on the network policy.

N.2 Digit collection function

N.2.1 General

The digit collection function is invoked if an entity requires additional digits for a decision where to route a INVITE request.

NOTE 1: The digit collection function is only applicable for the in-dialog method of overlap signalling. Further information about digit collection is provided in subclause 4.9.3.3.

The digit collection function may interact with a routeing database, to reach this decision. The digit collection function shall be performed by an entity acting as a B2BUA. The digit collection function requires the ability to recognise incomplete numbers. The digit collection function may be implemented in different network nodes depending on the operator's deployment strategy (e.g. AS, IBCF).

NOTE 2: An HSS does not support the recognition of incomplete numbers. A routeing database being queried by ENUM also does not support the recognition of incomplete numbers.

NOTE 3: A private routeing database to support the recognition of incomplete numbers e.g. for transit calls or ported numbers can be used.

N.2.2 Collection of digits

N.2.2.1 Initial INVITE request

Upon receiving an initial INVITE request carrying an SDP offer, the digit collection function shall:

1) if the request contains enough digits to forward the request, forward the request towards it"s destination;

2) if the digit collection function chooses to collect additional digits in INFO requests, in order to forward the request, and the sender of the INVITE request has indicated support of reliable responses, store the received digits and send a reliable 183 (Session Progress) provisional response in order to establish an early dialog with the sender of the INVITE request. The response shall not contain an SDP answer; or

3) if it is determined that the en-bloc will not be able to forward the request even if additional digits are received,, send a 404 (Not Found) response.

Upon receiving an initial INVITE request without an SDP offer, the digit collection function shall:

1) if the request contains enough digits to forward the request, forward the request towards it"s destination; or

2) send a 404 (Not Found) response.

NOTE 1: If the initial INVITE request does not contain an SDP offer, a reliable 18x provisional response generated by the en-bloc conversion function would have to contain an SDP offer. In this case digit collection needs to be performed by the originating SIP entity (e.g. MGCF).

When the digit collection function sends the reliable 183 (Session Progress) provisional response, in order to establish an early dialog with the sender of the INVITE request, the digit collection function shall start a digit collection timer. If the timer expires, the digit collection function shall terminate the call setup by sending a sending a 484 (Address Incomplete) response towards the sender of the INVITE request.

NOTE 2: The digit collection timer is similar to the protection timer used in PSTN/ISDN. The timer value range is between 5 and 15 seconds, and the default value is 10 seconds.

N.2.2.2 Collection of additional digits

Upon receiving an INFO request carrying additional digits, and if an early dialog towards the destination of the initial INVITE request for the call does not exist, the digit collection function shall:

1) send a 200 (OK) response to the INFO request;

2) add the received digits to the previously stored digits for the call;

3) restart the digit collection timer; and

4) check if enough digits have been received in order to forward the initial INVITE request.

When enough digits for the call have been received in order to forward the initial INVITE request, the digit collection function shall add all stored digits to the request URI and forward the request towards its destination and stop the digit collection timer.

Upon receiving an INFO request carrying additional digits, and the initial INVITE request has been forwarded towards its destination, but an early dialog towards the destination of the initial INVITE request for the call does not exist, the digit collection function shall:

1) send a 200 (OK) response to the INFO request; and

2) add the received digits to the previously stored, but yet not forwarded, digits for the call;

When the digit collection function receives a provisional response from the destination of the initial INVITE request, and the digit collection function has received additional digits in INFO requests, the digit collection shall generate and send an INFO request towards the destination of the initial INVITE request. The Request-URI shall contain all digits which have been received and stored since the initial INVITE request was forwarded.

Upon receiving an INFO request carrying additional digits, and if an early dialog towards the destination of the initial INVITE request for the call does exist, the digit collection function shall forward the INFO request on the early dialog towards the destination of the initial SIP INVITE request.

Upon receiving an INFO request carrying additional digits, and if a 180 (Ringing) or a 200 (OK) response to the initial INVITE request for the call has been received, or the digit collection function has received some other indication that enough digits have been forwarded in order for the INVITE request to reach the terminating SIP user, the digit collection function shall, based on operator policy:

1) send a 200 (OK) response to the INFO request and not forward the INFO request; or

2) forward the INFO request on the early dialog towards the destination of the initial SIP INVITE request.

N.2.2.3 Handling of 404 (Not Found) / 484 (Address Incomplete) responses

Upon receiving a 404/484 response to the initial INVITE request, the digit collection function shall acknowledge the response and shall start the digit collection timer. The digit collection function shall not forward the response towards the sender of the INVITE request.

NOTE: If the digit collection function has received a 404/484 response, it will send a new initial INVITE request when it has received additional digits as described above, in order to establish an early dialog towards the destination of the INVITE request. The digit collection timer will re-start if an INFO request with additional digits is received. At timer expiry, the digit collection function will terminate the call as described above

N.2.3 Forwarding of SIP messages by the digit collection function

Apart from 404/484 responses to the initial INVITE request, and INFO requests carrying additional digits received after a 180 (Ringing) or a 200 (OK) response to the initial INVITE request has been received, the digit collection function shall forward all SIP messages. When forwarding SIP messages, the digit collection function shall modify the SIP messages to comply with SIP procedures on both call legs as specified below:

1) The digit collection function will receive a "tag" To header field parameter value from the receiver of the initial INVITE request, which is different from the "tag" To header field parameter value that the digit collection function inserted in the 183 (Session Progress) response that it sent when it received the initial INVITE request. The digit collection function shall modify the "tag" header field parameter value accordingly when forwarding mid-dialog SIP messages.

2) The digit collection function will return a Contact header field in the initial 183 (Session Progress) provisional response to the originating side, which contains a SIP-URI of the digit collection function. The contact information is used in the Request-URI of subsequent mid-dialog SIP requests sent by the originating side, until the digit collection function has received, and forwarded to the originating side, a 183 (Session Progress) provisional response from the destination of the INVITE request. If the Request-URI of the received mid-dialog SIP request contains the SIP-URI of the digit collection function, and the digit collection function forwards the request, the digit collection function shall modify the Request-URI before forwarding the SIP request.

3) The digit collection function will return the Record-Route header fields, which it received in the initial INVITE request, in the initial 183 (Session Progress) provisional response to the originating side. The information is used in the Route header fields of subsequent mid-dialog SIP requests sent by the originating side, until the digit collection function has received, and forwarded to the originating side, a 183 (Session Progress) provisional response from the destination of the INVITE request. If the Route header fields of the received mid-dialog SIP request are based on the Record-Route headers fields which the digit collection function returned in the initial 183 (Session Progress) provisional response, and the digit collection function forwards the request, the digit collection function shall modify the Route header fields before forwarding the SIP request.

N.3 En-bloc conversion function

N.3.1 General

The en-bloc conversion function may be performed in an entity acting as B2BUA. The en-bloc conversion function may be implemented in different network nodes depending on the operator's deployment strategy (e.g. AS, IBCF).

If the initial INVITE request is to be forwarded towards a network, or towards a network entity, that does not support overlap signalling, the en-bloc conversion function shall determine the end of address signalling.

The following methods can be used to determine the end of the address signalling:

1) the maximum number of digits used in a national numbering plan has been received;

2) number analysis, e.g. using a provisioned dial plan, is used to determinte that the complete number of digits has been received; or

3) an inter digit timer expires, and the minimum number of digits required for routeing the call have been received. The timer is started when the initial INVITE request is received, and re-started every time new digit(s) are received.

NOTE: The inter digit timer is similar to the protection timer used in PSTN/ISDN. The timer value range is between 5 and 15 seconds, and the default value is 10 seconds.

The procedures for collecting additional digits are described in subclauses N.3.2 and N.3.3. When end of address signalling has been determined, the en-bloc conversion function shall generate an INVITE request, add all digits to the request and forwards the request towards its destination.

N.3.2 Multiple-INVITE method

Upon reception of an INVITE request, the en-bloc conversion function shall:

1) if an inter digit timer is running for a previously received INVITE request with the same Call-ID and From header, and

   a) if the number of digits within that previous INVITE request is below the number of digits received in the new INVITE request (or as an equivalent test if the CseqID of the previous INVITE request is below the CseqID of the new INVITE request), stop the inter-digit timer for that previous INVITE request and send a 484 (Address Incomplete) response for it; and

   b) if the number of digits with the previous INVITE request is above or equal to the number of digits received in the new INVITE request (or as an equivalent test if the CseqID of the previous INVITE request is below the CseqID of the new INVITE request), send a 484 (Address Incomplete) response for the new INVITE request; and

2) if the en-bloc conversion function determines that the number received in the INVITE request is complete, forward the INVITE request; and

3) if the en-bloc conversion function determines that it will not be able to forward the request even if additional digits are received, send a 404 (Not Found) response; and

4) if the en-bloc conversion function chooses to collect additional digits, store the INVITE request and start an inter-digit timer to wait for possible INVITE requests with the same Call ID and From header.

When the inter-digit timer expires the en-bloc conversion function shall:

1) if it determines that the number received in the stored INVITE request is incomplete (e. g. by number analysis), terminate the call setup by sending a sending a 484 (Address Incomplete) response towards the sender of the INVITE request; and

2) if it does not determines that the number received in the last INVITE request is incomplete, forward the corresponding stored INVITE request to the next hop.

After forwarding an INVITE request, the en-bloc conversion function shall apply SIP proxy procedures for all subsequent SIP messages within the corresponding dialogue, unless other functionality not related to en-bloc conversion allocated in the same physical norde requires a different behaviour.

N.3.3 In-dialog method

Upon receiving an initial INVITE request carrying an SDP offer, the en-bloc conversion function shall:

1) if it determines that the request contains a complete number, forward the request towards it"s destination;

2) if the en-bloc conversion function chooses to collect additional digits in INFO requests before forwarding the request, and the sender of the INVITE request has indicated support of reliable responses, store the received digits, send a reliable 183 (Session Progress) provisional response without an SDP answer in order to establish an early dialog with the sender of the INVITE request, and start an inter digit timer; or

3) if the en-bloc conversion function determines that it will not be able to forward the request even if additional digits are received, send a 404 (Not Found) response.

Upon receiving an initial INVITE request without an SDP offer, the en-bloc conversion function shall:

1) if it is determined that the request contains a complete number, forward the request towards it"s destination; or

2) send a 404 (Not Found) response.

NOTE: If the initial INVITE request does not contain an SDP offer, a reliable 18x provisional response generated by the en-bloc conversion function would have to contain an SDP offer. The en-bloc conversion function for the in-dialog method specified here does not support en-bloc conversion for calls with an initial INVITE request that does not contain an SDP offer in the present release. However, en-bloc conversion for an initial INVITE request that does not contain an SDP offer can be performed by the originating SIP entity (e.g. MGCF).

Upon receiving an INFO request carrying additional digits, and an early dialog towards the destination of the initial SIP INVITE request for the call has not been created, the en-bloc conversion function shall:

1) send a 200 (OK) response to the INFO request;

2) add the received digits to the previously stored digits for the call;

3) re-start the inter digit timer; and

4) check if it can determine that a complete number for the call has been received.

When the en-bloc conversion function determines that a complete number for the call has been received, it shall add all stored digits to the initial INVITE request and forward the request towards its destination and stop the inter digit timer.

When the inter-digit timer expires the en-bloc conversion function shall

1) if it determines that the number so far is incomplete (e. g. by number analysis), terminate the call setup by sending a sending a 484 (Address Incomplete) response towards the sender of the INVITE request; or

2) if it does not determines that the number received in the last INVITE request is incomplete, forward the INVITE request to the next hop, including all received digits.

Upon receiving an INFO request carrying additional digits, if the en-bloc conversion function has forwarded the initial INVITE request towards its destination, the en-bloc conversion function shall send a 200 (OK) response to the INFO request and not forward the INFO request.

Apart from INFO requests carrying additional digits received after the initial INVITE request has been forwarded, the en-bloc conversion function shall forward all SIP messages.

The en bloc conversion function will receive a "tag" To header field parameter value from the receiver of the initial INVITE request, which is different from the "tag" To header field parameter value that the digit collection function inserted in the 183 (Session Progress) response that it sent when it received the initial INVITE request. The digit collection function shall modify the "tag" To header field parameter value accordingly when forwarding in-dialog SIP messages.

Annex O (normative): IP-Connectivity Access Network specific concepts when using the EPC via cdma2000® HRPD to access IM CN subsystem

O.1 Scope

The present annex defines IP-CAN specific requirements for a call control protocol for use in the IP Multimedia (IM) Core Network (CN) subsystem based on the Session Initiation Protocol (SIP), and the associated Session Description Protocol (SDP), where the IP-CAN is the Evolved Packet Core (EPC) via a cdma2000® HRPD access network.

O.2 IP-CAN aspects when connected to the IM CN subsystem

O.2.1 Introduction

A UE accessing the IM CN subsystem, and the IM CN subsystem itself, utilise the services provided by the EPC and cdma2000® HRPD access network as specified by 3GPP2 X.S0057 [86C] to provide packet-mode communication between the UE and the IM CN subsystem.

Requirements for the UE on the use of these packet-mode services are specified in this clause. Requirements for the P-GW in support of this communication are specified in 3GPP TS 29.061 [11] and 3GPP TS 29.212 [13B].

Requirements for the use of the EPC via packet cdma2000® HRPD as an IP-CAN are specified in 3GPP2 X.P0057 [86C].

O.2.2 Procedures at the UE

O.2.2.1 IP-CAN bearer context activation and P-CSCF discovery

Prior to communication with the IM CN subsystem, the UE shall:

a) establish a connection with the the IP-CAN via the cdma2000® HRPD wireless IP network specified in 3GPP2 X.S0057 [86C]. Upon establishing a connection with the cdma2000® eHRPD wireless IP network, the UE can have an IPv4 address only, an IPv6 address only, or both IPv4 and IPv6 addresses simultaneously;

b) ensure that a IP-CAN bearer context used for SIP signalling is available, according to the APN and P-GW selection criteria described in 3GPP TS 23.402 [7E]. This IP-CAN bearer context shall remain active throughout the period the UE is connected to the IM CN subsystem, i.e. from the initial registration and at least until the deregistration;

NOTE 1: Any IP-CAN bearer can carry both IM CN subsystem signalling and media if the media does not need to be authorized by Policy and Charging control mechanisms as defined in 3GPP TS 29.212 [13B], and the media stream is not mandated by the P-CSCF to be carried in a separate IP-CAN bearer.

NOTE 2: IP-CAN PDN connection and bearer management procedures are specified in 3GPP2 X.S0057 [86C].

c) acquire a P-CSCF address(es).

The methods for P-CSCF discovery are:

I. Use DHCP mechanism

II Retrieve the list of P-CSCF address(es) stored in the IMC

III Obtain the list of P-CSCFaddress(es) from the IMS management object

IV. Transfer P-CSCF address(es) within the IP-CAN bearer context activation procedure.

The UE shall indicate the request for a P-CSCF address to the network within the Protocol Configuration Options information element of the during PDN connectivity establishment as specified in 3GPP2 X.S0057 [86C].

If the network provides the UE with a list of P-CSCF IPv4 or IPv6 addresses, the UE shall assume that the list is prioritised with the first address within the Protocol Configuration Options information element as the P-CSCF address with the highest priority.

The UE can freely select method I, II, III, or IV for P-CSCF discovery. If DHCP is used, the following procedures apply:

Upon establishing an IP-CAN bearer , the UE may use the Dynamic Host Configuration Protocol (DHCP) specified in RFC 2131 [40A] or Dynamic Host Configuration Protocol for IPv6 (DHCPv6) specified in RFC 3315 [40] to discover the P-CSCF.

Prior to accessing the DHCP server, the UE will have obtained an IP address via means other than DHCP and DHCPv6. Hence, if the UE uses DHCP or DHCPv6 for P-CSCF discovery, the UE shall only request the configuration information from the DHCP server through a single request and reply exchanged with the DHCP server.

If the UE uses DHCP for P-CSCF discovery and the UE is unaware of the address of the DHCP server, the UE shall send the DHCPINFORM using the limited broadcast IP address (i.e., 255.255.255.255) and UDP port 67. If the UE knows the IP address of the DHCP server, the UE shall send the DHCPINFORM to the DHCP server"s unicast IP address and UDP port 67. The DHCP server shall send the DHCPACK on the IP address specified in the Client IP Address field of the DHCPINFORM. The DHCP server may include, in the DHCPACK, the SIP Server DHCP Option specified in RFC 3361 [35A], which carries either a list of IPv4 address(es) of the P-CSCF(s) or a list of DNS fully qualified domain name(s) that can be mapped to one or more P-CSCF(s). If the UE uses DHCPv6 for P-CSCF discovery and the UE is unaware of the address of the DHCP Server, the UE shall send an Information Request using the IPv6 multicast address FF02::1:2 and the UDP port 547. If the UE knows the IP address of the DHCPv6 server, the UE shall send the Information Request message to the DHCPv6 server"s unicast IP address and UDP port 547. In the Information Request, the UE may request either one or both the SIP Servers Domain Name List option and the SIP Servers IPv6 Address List option specified in RFC 3319 [41]. The DHCP server shall send the Reply to the IP address specified in the Information Request. The DHCP server may include in the Reply either one or both the SIP Servers Domain Name List option and the SIP Servers IPv6 Address List option, as requested by the UE.

In case several P-CSCF's IP addresses or domain names are provided to the UE, the UE shall perform P-CSCF selection according to RFC 3361 [35A] or RFC 3319 [41]. The UE shall perform the procedure for the resolution of domain name according to RFC 3263 [27A].

O.2.2.1A Modification of an IP-CAN bearer context used for SIP signalling

The UE shall not modify the IP-CAN bearer from being used exclusively for SIP signalling to a general purpose IP-CAN bearer and vice versa.

After the establishment of a SIP bearer context used for SIP signalling, the UE shall not indicate the request for a P-CSCF address to the network when requesting an IP-CAN bearer modification for that APN. The UE shall ignore P-CSCF address(es) if received from the network as part of the bearer modification procedure.

O.2.2.1B Re-establishment of the IP-CAN bearer context for SIP signalling

If the IP-CAN bearer context for SIP signalling is lost and cannot be re-established:

a. if the SIP signalling was carried over a dedicated IP-CAN bearer, the UE shall release all resources established as a result of SIP signalling by either:

- requesting an IP-CAN bearer modification if there are IP-CAN bearers to this PDN that are not related SIP sessions; or
- initiating disconnection of the PDN connection if all the bearers to this PDN are related to SIP sessions.

NOTE: If the SIP signalling was carried over the default IP-CAN bearer, all the resources established as a result of SIP signalling are released.

O.2.2.2 Session management procedures

The existing procedures for session management as described in 3GPP2 X.S0057 [86C] shall apply while the UE is connected to the IM CN subsystem.

O.2.2.3 Mobility management procedures

The existing procedures for mobility management as described in 3GPP2 X.S0057 [86C] shall apply while the UE is connected to the IM CN subsystem.

O.2.2.4 Cell selection and lack of coverage

The existing mechanisms and criteria for cell selection as described in 3GPP2 C.S0014-C [86D] shall apply while the UE is connected to the IM CN subsystem.

O.2.2.5 IP-CAN bearer contexts for media

O.2.2.5.1 General requirements

NOTE 1: The UE cannot control whether media streams belonging to different SIP sessions are established on the same IP-CAN bearer context or not. During establishment of a session, the UE establishes data streams(s) for media related to the session. Such data stream(s) can result in activation of additional IP-CAN bearer context(s). Either the UE or the network can request for resource allocations for media, but the establishment and modification of the IP-CAN bearer is controlled by the network as described in 3GPP2 X.S0057 [86C].

NOTE 2: When the UE wishes to allocate bandwidth for RTP and RTCP, the rules as outlined in 3GPP TS 29.213 [13C] apply. Application of QoS to when using an EPC IP-CAN with cdma2000® HRPD is described in 3GPP2 X.S0057 [86C].

O.2.2.5.1A Activation or modification of IP-CAN bearer contexts for media by the UE

No additional clarifications are needed for the use of the EPC via cdma2000® HRPD as an IP-CAN.

O.2.2.5.1B Activation or modification of IP-CAN bearer contexts for media by the network

If the UE receives an activation request from the network for an IP-CAN bearer context which is associated with the IP-CAN bearer context used for signalling, the UE shall, based on the information contained in the Traffic Flow Template provided by the network, correlate the media IP-CAN bearer context with a currently ongoing SIP session establishment or SIP session modification.

If the UE receives a modification request from the network for an IP-CAN bearer context that is used for one or more media streams in an ongoing SIP session, the UE shall modify the related IP-CAN bearer context in accordance with the request received from the network.

O.2.2.5.2 Special requirements applying to forked responses

Since the UE does not know that forking has occurred until a second, provisional response arrives, the UE requests resource allocation as required by the initial response received. If a subsequent provisional response is received, different alternative actions may be performed depending on the requirements in the SDP answer:

1) the bearer requirements of the subsequent SDP can be accommodated by the existing resources requested. The UE performs no further resource requests.

2) the subsequent SDP introduces different QoS requirements or additional IP flows. The UE requests further resource allocation according to subclause O.2.2.5.1.

3) the subsequent SDP introduces one or more additional IP flows. The UE requests further resource allocation according to subclause O.2.2.5.1.

NOTE: When several forked responses are received, the resources requested by the UE are the "logical OR" of the resources indicated in the multiple responses to avoid allocation of unnecessary resources. The UE does not request more resources than proposed in the original INVITE request.

When a final answer is received for one of the early dialogues, the UE proceeds to set up the SIP session. The UE shall release all the unneeded IP-CAN resources. Therefore, upon the reception of the first final 200 (OK) response for the INVITE request (in addition to the procedures defined in RFC 3261 [26] subclause 13.2.2.4), the UE shall:

1) in case resources were established or modified as a consequence of the INVITE request and forked provisional responses that are not related to the accepted 200 (OK) response, send release request to release the unneeded resources.

O.2.2.5.3 Unsuccessful situations

Not applicable.

O.2.2.6 Emergency service

Emergency services is not supported when the IP-CAN is the EPC via a cdma2000® HRPD access network.

O.2A Usage of SDP

O.2A.1 Impact on SDP offer / answer of activation or modification of IP-CAN bearer context for media by the network

If, due to the activation of an IP-CAN bearer context from the network the related SDP media description needs to be changed the UE shall update the related SDP information by sending a new SDP offer within a SIP request, which is sent over the existing SIP dialog,

If the UE receives a modification request from the network for an IP-CAN bearer context that is used for one or more media streams in an ongoing SIP session, the UE shall:

1) if, due to the modification of the IP-CAN bearer context, the related SDP media description need to be changed, update the related SDP information by sending a new SDP offer within a SIP request, that is sent over the existing SIP dialog, and respond to the IP-CAN bearer context modification request.

NOTE: The UE can decide to indicate additional media streams as well as additional or different codecs in the SDP offer than those used in the already ongoing session.

O.2A.2 Handling of SDP at the terminating UE when originating UE has resources available and IP-CAN performs network-initiated resource reservation for terminating UE

If the UE receives an SDP offer where the SDP offer includes all media streams for which the originating side indicated its local preconditions as met, if the precondition mechanism is supported by the terminating UE and the IP-CAN performs network-initiated resource reservation for the terminating UE and the available resources are not sufficient for the received offer the terminating UE shall indicate its local preconditions and provide the SDP answer to the originating side without waiting for resource reservation.

NOTE: If the resource reservation is controlled by the network, the resource reservation request is initiated by the network after the P-CSCF has authorised the respective IP flows and provided the QoS requirements over the Rx interface to the PCRF as described in 3GPP TS 29.214 [13D].

O.3 Application usage of SIP

O.3.1 Procedures at the UE

O.3.1.1 P-Access-Network-Info header field

The UE shall always include the P-Access-Network-Info header field where indicated in subclause 5.1.

O.3.1.2 Availability for calls

Not applicable.

O.3.2 Procedures at the P-CSCF

O.3.2.1 Detecting requests destined for a PSAP

The P-CSCF handling is as defined in subclause M.3.2.

NOTE: Emergency call support for the EPC IP-CAN is not specified in this release. A common P-Access-Network-Info header field value is used for both cdma2000® HRPD based IP-CANs (i.e. HRPD access specified by 3GPP2 X.S0011-C [127], and HRPD access as specified by 3GPP2 X.S0057 [86C]). The result of this is that in both cases the handling in the P-CSCF must be identical. If an operator deploys an IM CN subsystem with both cdma2000® HRPD based IP-CANs, the P-CSCF has no means of distinguishing one from the other. The emergency call handling for the EPC IP-CAN using cdma2000® HRPD access as specified by 3GPP2 X.S0057 [86C] is out of scope for this release of this specification, and therefore all identified emergency calls with a P-Access-Network-Info header field value of "3GPP2-1X-HRPD" will be handled with a 380 (Alternative Service) response when HRPD IP-CAN emergency support is not active.

O.3.2.2 Location information handling

Void.

O.3.3 Procedures at the S-CSCF

The S-CSCF handling is as defined in subclause M.3.3.

O.4 3GPP specific encoding for SIP header field extensions

O.4.1 Void

O.5 Use of circuit-switched domain

There is no CS domain in this access technology.

Annex P (informative): Change history

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
					Version 0.0.0 Editor's internal draft			
					Version 0.0.1 Editor's internal draft			
					Version 0.0.2 Editor's internal draft			
		N1-001060			Version 0.0.3 Submitted to CN1 SIP adhoc #1			
19/10/00		N1-001109			Version 0.0.4 Reflecting results of initial CN1 discussion			
19/10/00		N1-001115			Version 0.0.5 Reflecting output of CN1 SIP adhoc#1 discussion			
09/11/00					Version 0.0.6 Revision to include latest template and styles			
		N1-010092			Version 0.0.7 Reflecting updates of some IETF drafts			
14/02/01		N1-010269			Version 0.0.8 Revision to include temporary annex B incorporating valuable source material			
18/03/01		N1-010378 rev			Version 0.1.0 incorporating results of CN1 discussion at CN1 #16			
12/04/01		N1-010737			Version 0.2.0 incorporating results of CN1 discussions at SIP adhoc #4			
11/06/01		N1-010935			Version 0.3.0 incorporating results of CN1 discussions at CN1 #16			
23/07/01		N1-011103			Version 0.4.0 incorporating results of CN1 discussions at CN1 #18 (agreed documents N1-011028, N1-011050, N1-011055, N1-011056)			
12/09/01		N1-011385			Version 0.5.0 incorporating results of CN1 discussions at CN1 #19 (agreed documents N1-011109, N1-011152, N1-011195, N1-011312, N1-011319, N1-011343)			
04/10/01		N1-011470			Version 0.6.0 incorporating results of CN1 discussions at CN1 #19bis (agreed documents N1-011346, N1-011373, N1-011389, N1-011390, N1-011392, N1-011393, N1-011394, N1-011408, N1-011410, N1-011426)			
19/10/01		N1-011643			Version 0.7.0 incorporating results of CN1 discussions at CN1 #20 (agreed documents N1-011477, N1-011479, N1-011498, N1-011523, N1-011548, N1-011585, N1-011586, N1-011592, N1-011611, N1-011629)			
16/11/01		N1-011821			Version 0.8.0 incorporating results of CN1 discussions at CN1 #20bis (agreed documents N1-011685, N1-011690, N1-011741, N1-011743, N1-011759, N1-011760, N1-011761, N1-011765c, N1-011767, N1-011769, N1-011770, N1-011771, N1-011774, N1-011777, N1-011779, N1-011780) N1-011712 was agreed but determined to have no impact on the specification at this time.			
30/11/01		N1-020010			Version 1.0.0 incorporating results of CN1 discussions at CN1 #21 (agreed documents N1-011828, N1-011829, N1-011836, N1-011899 [revision marks not used on moved text - additional change from chairman's report incorporated], implementation of subclause 3.1 editor's note based on discussion of N1-011900 [chairman's report], N1-011905, N1-011984, N1-011985, N1-011986, N1-011988, N1-011989, N1-012012 [excluding points 2 and 16], N1-012013, N1-012014 [excluding point 1], N1-012015, N1-012021, N1-012022, N1-012025, N1-012031, N1-012045, N1-012056, N1-012057) CN1 agreed for presentation for information to CN plenary.			
18/01/02		N1-020189			Version 1.1.0 incorporating results of CN1 discussions at CN1 SIP ad-hoc (agreed documents N1-020015, N1-020053, N1-020064, N1-020101, N1-020123, N1-020124, N1-020142, N1-020146, N1-020147, N1-020148, N1-020151,			

Change history								
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**	**WG doc**
					N1-020157, N1-020159, N1-020165). Also N1-012000 (agreed at previous meeting) required, subclause 5.2.6 to be deleted and this change has been enacted			
01/02/02		N1-020459			Version 1.2.0 incorporating results of CN1 discussions at CN1 #22 (agreed documents N1-020198, N1-020396, N1-020398, N1-020399, N1-020408, N1-020417, N1-020418, N1-020419, N1-020421, N1-020422, N1-020436, N1-020437, N1-020449)			
01/02/02		N1-020569			Version 1.2.1 issues to correct cut and paste error in incorporation of Annex B into main document. Affected subclause 5.1.1.3. Change to clause 7 title that was incorrectly applied to subclause 7.2 also corrected.			
22/02/02					Advanced to version 2.0.0 based on agreement of N1-020515. Version 2.0.0 incorporating results of CN1 discussions at CN1 #22bis (agreed documents N1-020466, N1-020468, N1-020469, N1-020472, N1-020473, N1-020500, N1-020504, N1-020507, N1-020511, N1-020512, N1-020521, N1-020583, N1-020584, N1-020602, N1-020603, N1-020604, N1-020611, N1-020612, N1-020613, N1-020614, N1-020615, N1-020617, N1-020623, N1-020624, N1-020625, N1-020626, N1-020627, N1-020642, N1-020643, N1-020646, N1-020649, N1-020656, N1-020659, N1-020668, N1-020669, N1-020670, N1-020671). In addition N1-020409, agreed at CN1#22 but missed from the previous version, was also implemented. References have been resequenced.			
02/03/02					Editorial clean-up by ETSI/MCC.	2.0.0	2.0.1	
11/03/02	TSG CN#15	NP-020049			The draft was approved, and 3GPP TS 24.229 was then to be issued in Rel-5 under formal change control.	2.0.1	5.0.0	
2002-06	NP-16	NP-020230	004	1	S-CSCF Actions on Authentication Failure	5.0.0	5.1.0	N1-020903
2002-06	NP-16	NP-020230	005	2	Disallow Parallel Registrations	5.0.0	5.1.0	N1-020959
2002-06	NP-16	NP-020230	007	1	Hiding	5.0.0	5.1.0	N1-020910
2002-06	NP-16	NP-020312	008	8	Support for services for unregistered users	5.0.0	5.1.0	
2002-06			009	1	Not implemented nor implementable. In the meeting report CN1#24 under doc N1-021513 it is shown that CR095r2 supercedes 009r1 if 095r2 was to be approved in CN#16 (but unfortunately 009r1 was also approved in the the CN#16 draft minutes).			N1-020921
2002-06	NP-16	NP-020231	019		MGCF procedure clarification	5.0.0	5.1.0	N1-020788
2002-06	NP-16	NP-020231	020	2	MGCF procedure error cases	5.0.0	5.1.0	N1-020960
2002-06	NP-16	NP-020231	022	1	Abbreviations clean up	5.0.0	5.1.0	N1-020949
2002-06	NP-16	NP-020231	023		Clarification of SIP usage outside IM CN subsystem	5.0.0	5.1.0	N1-020792
2002-06	NP-16	NP-020314	024	3	Replacement of COMET by UPDATE	5.0.0	5.1.0	
2002-06	NP-16	NP-020231	025	3	Incorporation of current RFC numbers	5.0.0	5.1.0	N1-021091
2002-06	NP-16	NP-020231	026	1	Clarification of B2BUA usage in roles	5.0.0	5.1.0	N1-020941
2002-06	NP-16	NP-020231	028	4	Determination of MO / MT requests in I-CSCF(THIG)	5.0.0	5.1.0	N1-021248
2002-06	NP-16	NP-020231	030	2	P-CSCF release of an existing session	5.0.0	5.1.0	N1-021006
2002-06	NP-16	NP-020232	031	1	S-CSCF release of an existing session	5.0.0	5.1.0	N1-020939
2002-06	NP-16	NP-020232	033	3	SDP procedure at the UE	5.0.0	5.1.0	N1-020971

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2002-06	NP-16	NP-020232	035	1	AS Procedures corrections	5.0.0	5.1.0	N1-020934
2002-06	NP-16	NP-020232	036	8	Corrections to SIP Compression	5.0.0	5.1.0	N1-021499
2002-06	NP-16	NP-020232	037	1	Enhancement of S-CSCF and I-CSCF Routing Procedures for interworking with external networks	5.0.0	5.1.0	N1-020928
2002-06	NP-16	NP-020232	041	2	Delivery of IMS security parameters from S-CSCF to the P-CSCF by using proprietary auth-param	5.0.0	5.1.0	N1-021003
2002-06	NP-16	NP-020232	045		Cleanup of request / response terminology - clause 5	5.0.0	5.1.0	N1-020835
2002-06	NP-16	NP-020232	046		Cleanup of request / response terminology - clause 6	5.0.0	5.1.0	N1-020836
2002-06	NP-16	NP-020232	047	2	Simplification of profile tables	5.0.0	5.1.0	N1-021059
2002-06	NP-16	NP-020232	049		Forking options	5.0.0	5.1.0	N1-020839
2002-06	NP-16	NP-020315	050	1	Media-Authorization header corrections	5.0.0	5.1.0	
2002-06	NP-16	NP-020233	051	1	Clause 5.4 editorials (S-CSCF)	5.0.0	5.1.0	N1-020950
2002-06	NP-16	NP-020233	053	2	Integrity protection signalling from the P-CSCF to the S-CSCF	5.0.0	5.1.0	N1-021007
2002-06	NP-16	NP-020233	054		Representing IM CN subsystem functional entities in profile table roles	5.0.0	5.1.0	N1-020847
2002-06	NP-16	NP-020233	055		Clause 4 editorials	5.0.0	5.1.0	N1-020848
2002-06	NP-16	NP-020233	056		Clause 5.8 editorials (MRFC)	5.0.0	5.1.0	N1-020849
2002-06	NP-16	NP-020233	057	1	Annex A editorials, including precondition additions	5.0.0	5.1.0	N1-021001
2002-06	NP-16	NP-020233	058	2	Representing the registrar as a UA	5.0.0	5.1.0	N1-021054
2002-06	NP-16	NP-020233	059		Additional definitions	5.0.0	5.1.0	N1-020852
2002-06	NP-16	NP-020312	060	11	Restructuring of S-CSCF Registration Sections	5.0.0	5.1.0	
2002-06	NP-16	NP-020234	061	2	Determination of MOC / MTC at P-CSCF and S-CSCF	5.0.0	5.1.0	N1-021060
2002-06	NP-16	NP-020234	062		Correction to the terminating procedures	5.0.0	5.1.0	N1-020927
2002-06	NP-16	NP-020234	063		Loose Routing for Network Initiated Call Release Procedures	5.0.0	5.1.0	N1-020940
2002-06	NP-16	NP-020234	064		Incorporation of previously agreed corrections to clause 5.2.5.2 (N1-020416)	5.0.0	5.1.0	N1-021004
2002-06	NP-16	NP-020234	065		Clause 7.2 editorial corrections	5.0.0	5.1.0	N1-021005
2002-06	NP-16	NP-020234	067	2	S-CSCF routing of MO calls	5.0.0	5.1.0	N1-021097
2002-06	NP-16	NP-020234	068	1	I-CSCF routeing of dialog requests	5.0.0	5.1.0	N1-021078
2002-06	NP-16	NP-020234	069	2	Definition of the Tokanised-by parameter	5.0.0	5.1.0	N1-021096
2002-06	NP-16	NP-020235	070	3	SDP procedures at UE	5.0.0	5.1.0	N1-021453
2002-06	NP-16	NP-020235	073	2	Updates to the procedures involving the iFCs, following the Oulu iFC changes	5.0.0	5.1.0	N1-021440
2002-06	NP-16	NP-020235	074	1	Addition of DHCPv6 references to 24.229	5.0.0	5.1.0	N1-021086
2002-06	NP-16	NP-020235	075	1	Clarification to URL and address assignments	5.0.0	5.1.0	N1-021083
2002-06	NP-16	NP-020235	079	3	Downloading the implicitely registered public user identities from the S-CSCF to P-CSCF	5.0.0	5.1.0	N1-021510
2002-06	NP-16	NP-020235	080	3	Clarification of GPRS aspects	5.0.0	5.1.0	N1-021486
2002-06	NP-16	NP-020235	081	2	Introduction of Subscription Locator Function Interrogation at I-CSCF in 24.229	5.0.0	5.1.0	N1-021469
2002-06	NP-16	NP-020235	082	1	Introduction of Visited_Network_ID p-header	5.0.0	5.1.0	N1-021433
2002-06	NP-16	NP-020236	084	1	MRFC register addresses	5.0.0	5.1.0	N1-021434

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2002-06	NP-16	NP-020236	085	1	MRFC INVITE interface editor's notes	5.0.0	5.1.0	N1-021470
2002-06	NP-16	NP-020236	086	1	MRFC OPTIONS interface editor's notes	5.0.0	5.1.0	N1-021471
2002-06	NP-16	NP-020236	087		MRFC PRACK & INFO editor's notes	5.0.0	5.1.0	N1-021159
2002-06	NP-16	NP-020236	088	1	MGCF OPTIONS interface editor's notes	5.0.0	5.1.0	N1-021472
2002-06	NP-16	NP-020236	089		MGCF reINVITE editor's notes	5.0.0	5.1.0	N1-021161
2002-06	NP-16	NP-020237	090		3PCC AS editor's notes	5.0.0	5.1.0	N1-021162
2002-06	NP-16	NP-020237	091		AS acting as terminating UA editor's notes	5.0.0	5.1.0	N1-021163
2002-06	NP-16	NP-020237	092	1	AS acting as originating UA editor's notes	5.0.0	5.1.0	N1-021466
2002-06	NP-16	NP-020237	093	2	Charging overview clause	5.0.0	5.1.0	N1-021512
2002-06	NP-16	NP-020237	094	1	Procedures for original-dialog-id P-header	5.0.0	5.1.0	N1-021456
2002-06	NP-16	NP-020237	095	2	Procedures for charging-vector P-header	5.0.0	5.1.0	N1-021513
2002-06	NP-16	NP-020237	096	1	Procedures for charging-function-addresses P-header	5.0.0	5.1.0	N1-021458
2002-06	NP-16	NP-020237	097	1	SDP types	5.0.0	5.1.0	N1-021467
2002-06	NP-16	NP-020237	100		Removal of State from profile tables	5.0.0	5.1.0	N1-021173
2002-06	NP-16	NP-020238	101		Editor's note cleanup - clause 3	5.0.0	5.1.0	N1-021174
2002-06	NP-16	NP-020238	102		Editor's note cleanup - clause 4	5.0.0	5.1.0	N1-021175
2002-06	NP-16	NP-020238	103		Editor's note cleanup - clause 5.1 and deletion of void subclauses	5.0.0	5.1.0	N1-021176
2002-06	NP-16	NP-020238	104	1	Editor's note cleanup - clause 5.2 and deletion of void subclauses	5.0.0	5.1.0	N1-021487
2002-06	NP-16	NP-020238	105		Editor's note cleanup - clause 5.3	5.0.0	5.1.0	N1-021178
2002-06	NP-16	NP-020238	106		Editor's note cleanup - clause 5.4 and deletion of void subclauses	5.0.0	5.1.0	N1-021179
2002-06	NP-16	NP-020238	107		Editor's note cleanup - clause 5.5 and deletion of void subclauses	5.0.0	5.1.0	N1-021180
2002-06	NP-16	NP-020238	110		Editor's note cleanup - clause 6	5.0.0	5.1.0	N1-021183
2002-06	NP-16	NP-020238	111		Editor's note cleanup - clause 9	5.0.0	5.1.0	N1-021184
2002-06	NP-16	NP-020239	113	1	SIP Default Timers	5.0.0	5.1.0	N1-021465
2002-06	NP-16	NP-020239	114	1	Correction of the subscription to the registration event package	5.0.0	5.1.0	N1-021436
2002-06	NP-16	NP-020239	115	1	Support for ISIMless UICC	5.0.0	5.1.0	N1-021441
2002-06	NP-16	NP-020239	119	1	SIP procedures at UE	5.0.0	5.1.0	N1-021452
2002-06	NP-16	NP-020239	121	2	New requirements in the P-CSCF	5.0.0	5.1.0	N1-021509
2002-06	NP-16	NP-020239	122		SDP procedures at MGCF	5.0.0	5.1.0	N1-021264
2002-06	NP-16	NP-020239	124	1	S-CSCF allocation	5.0.0	5.1.0	N1-021443
2002-06	NP-16	NP-020240	129	1	Introduction of P-Access-Network-Info header	5.0.0	5.1.0	N1-021498
2002-06	NP-16	NP-020240	130	2	Usage of Path and P-Service Route	5.0.0	5.1.0	N1-021508
2002-06	NP-16	NP-020240	133		Removal of Referred-By header from specification	5.0.0	5.1.0	N1-021354
2002-06	NP-16	NP-020240	134		Handling of Record-Route header in profile tables	5.0.0	5.1.0	N1-021357
2002-06	NP-16	NP-020312	135	1	Asserted identities and privacy	5.0.0	5.1.0	
2002-06	NP-16	NP-020240	136		Removal of caller preferences from specification	5.0.0	5.1.0	N1-021359

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2002-06	NP-16	NP-020240	137		Substitution of REFER references	5.0.0	5.1.0	N1-021360
2002-06	NP-16	NP-020240	138		Removal of session timer from specification	5.0.0	5.1.0	N1-021361
2002-09	NP-17	NP-020489	141	2	Adding MESSAGE to 24.229	5.1.0	5.2.0	
2002-09	NP-17	NP-020375	142		Public user identity to use for third party register	5.1.0	5.2.0	N1-021563
2002-09	NP-17	NP-020375	143	1	Replace P-Original-Dialog-ID header with unique data in Route header	5.1.0	5.2.0	N1-021797
2002-09	NP-17	NP-020375	145		Synchronize text with latest I-D for P-headers for charging	5.1.0	5.2.0	N1-021569
2002-09	NP-17	NP-020488	146	2	Service profiles and implicitly registered public user identities	5.1.0	5.2.0	
2002-09	NP-17	NP-020376	147		S-CSCF decides when to include	5.1.0	5.2.0	N1-021571
2002-09	NP-17	NP-020376	148		Clean up XML in clause 7.6	5.1.0	5.2.0	N1-021572
2002-09	NP-17	NP-020376	149		Fix clause 5.2.7.4 header	5.1.0	5.2.0	N1-021573
2002-09	NP-17	NP-020376	150		Removal of forward reference to non P-CSCF procedures	5.1.0	5.2.0	N1-021589
2002-09	NP-17	NP-020376	151		Deregistration of public user identities	5.1.0	5.2.0	N1-021590
2002-09	NP-17	NP-020376	152		Reauthentication trigger via other means	5.1.0	5.2.0	N1-021591
2002-09	NP-17	NP-020487	153	3	Registration with integrity protection	5.1.0	5.2.0	
2002-09	NP-17	NP-020485	154	2	Explicit listing of need to route response messages	5.1.0	5.2.0	
2002-09	NP-17	NP-020377	157	1	Include IP address in ICID	5.1.0	5.2.0	N1-021816
2002-09	NP-17	NP-020377	158		Reference updates	5.1.0	5.2.0	N1-021604
2002-09	NP-17	NP-020377	159		Abbreviation updates	5.1.0	5.2.0	N1-021605
2002-09	NP-17	NP-020377	163	1	Clarifications of allocation of IP address	5.1.0	5.2.0	N1-021817
2002-09	NP-17	NP-020377	171	1	Verifications at the P-CSCF for subsequent request	5.1.0	5.2.0	N1-021802
2002-09	NP-17	NP-020377	174	1	Clarification of IMS signalling flag	5.1.0	5.2.0	N1-021781
2002-09	NP-17	NP-020377	176	1	Definition of a general-purpose PDP context for IMS	5.1.0	5.2.0	N1-021783
2002-09	NP-17	NP-020372	177	2	Request for DNS IPv6 server address	5.1.0	5.2.0	N1-021833
2002-09	NP-17	NP-020378	178		Error cases for PDP context modification	5.1.0	5.2.0	N1-021679
2002-09	NP-17	NP-020378	183	1	Incorporation of draft-ietf-sip-sec-agree-04.txt	5.1.0	5.2.0	N1-021791
2002-09	NP-17	NP-020378	185	1	User Initiated De-registration	5.1.0	5.2.0	N1-021787
2002-09	NP-17	NP-020378	186	1	Mobile initiated de-registration	5.1.0	5.2.0	N1-021788
2002-09	NP-17	NP-020378	187	1	CallID of REGISTER requests	5.1.0	5.2.0	N1-021786
2002-09	NP-17	NP-020378	188	1	Correction to the I-CSCF routing procedures	5.1.0	5.2.0	N1-021803
2002-09	NP-17	NP-020378	189	1	Registration procedures at P-CSCF	5.1.0	5.2.0	N1-021793
2002-09	NP-17	NP-020378	192	1	Corrections related to the P-Access-Network-Info header	5.1.0	5.2.0	N1-021827
2002-09	NP-17	NP-020378	194	1	Chapter to decribe the registration event	5.1.0	5.2.0	N1-021794
2002-09	NP-17	NP-020484	196		Definition of abbreviation IMS	5.1.0	5.2.0	
2002-12	NP-18	NP-020558	140	4	Support of non-IMS forking	5.2.0	5.3.0	N1-022446
2002-12	NP-18	NP-020565	144	2	Identification of supported IETF drafts within this release	5.2.0	5.3.0	N1-022114

Change history								
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**	**WG doc**
2002-12	NP-18	NP-020558	161	3	Clarifications and editorials to SIP profile	5.2.0	5.3.0	N1-022412
2002-12	NP-18	NP-020558	175	5	Clarifications of the binding and media grouping	5.2.0	5.3.0	N1-022494
2002-12	NP-18	NP-020558	179	2	Support of originating requests from Application Servers	5.2.0	5.3.0	N1-022106
2002-12	NP-18	NP-020558	197		Wrong references in 4.1	5.2.0	5.3.0	N1-021902
2002-12	NP-18	NP-020558	198		Alignment of the MGCF procedures to RFC 3312	5.2.0	5.3.0	N1-021903
2002-12	NP-18	NP-020558	199	1	Service Route Header and Path Header interactions	5.2.0	5.3.0	N1-022080
2002-12	NP-18	NP-020558	202		Addition of clause 6 though clause 9 references to conformance clause	5.2.0	5.3.0	N1-021919
2002-12	NP-18	NP-020558	203	1	URL and address assignments	5.2.0	5.3.0	N1-022115
2002-12	NP-18	NP-020559	204	3	Fix gprs-charging-info definition and descriptions	5.2.0	5.3.0	N1-022426
2002-12	NP-18	NP-020559	206		Alignment of the SDP attributes related to QoS integration with IETF	5.2.0	5.3.0	N1-021930
2002-12	NP-18	NP-020559	207	1	Update of the 3GPP-generated SIP P- headers document references	5.2.0	5.3.0	N1-022116
2002-12	NP-18	NP-020559	208	1	Handling of INVITE requests that do not contain SDP	5.2.0	5.3.0	N1-022098
2002-12	NP-18	NP-020559	209	2	UE Registration	5.2.0	5.3.0	N1-022471
2002-12	NP-18	NP-020559	211	1	Usage of private user identity during registration	5.2.0	5.3.0	N1-022083
2002-12	NP-18	NP-020559	212	1	P-CSCF subscription to the users registration-state event	5.2.0	5.3.0	N1-022084
2002-12	NP-18	NP-020559	213	2	Handling of MT call by the P-CSCF	5.2.0	5.3.0	N1-022154
2002-12	NP-18	NP-020559	215		P-CSCF acting as a UA	5.2.0	5.3.0	N1-021939
2002-12	NP-18	NP-020559	216	1	S-CSCF handling of protected registrations	5.2.0	5.3.0	N1-022085
2002-12	NP-18	NP-020560	217	1	S-CSCF handling of subscription to the users registration-state event	5.2.0	5.3.0	N1-022086
2002-12	NP-18	NP-020560	218	1	Determination of MO or MT in I-CSCF	5.2.0	5.3.0	N1-022102
2002-12	NP-18	NP-020560	220		Definition of the NAI and RTCP abbreviations	5.2.0	5.3.0	N1-021944
2002-12	NP-18	NP-020560	222	4	Go related error codes in the UE	5.2.0	5.3.0	N1-022495
2002-12	NP-18	NP-020560	223	1	Clarifications on CCF/ECF addresses	5.2.0	5.3.0	N1-022120
2002-12	NP-18	NP-020560	225	2	Clarifications on dedicated PDP Context for IMS signalling	5.2.0	5.3.0	N1-022156
2002-12	NP-18	NP-020560	228	3	Clarifications on the use of charging correlation information	5.2.0	5.3.0	N1-022425
2002-12	NP-18	NP-020560	232	1	Expires information in REGISTER response	5.2.0	5.3.0	N1-022095
2002-12	NP-18	NP-020560	235	2	Indication of successful establishment of Dedicated Signalling PDP context to the UE	5.2.0	5.3.0	N1-022129
2002-12	NP-18	NP-020560	237		P-CSCF sending 100 (Trying) Response for reINVITE	5.2.0	5.3.0	N1-021998
2002-12	NP-18	NP-020561	239	1	Correction on P-Asserted-Id, P-Preferred-Id, Remote-Party-ID	5.2.0	5.3.0	N1-022100
2002-12	NP-18	NP-020561	240	1	Clarifications to subclause 9.2.5	5.2.0	5.3.0	N1-022137

Change history								
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**	**WG doc**
2002-12	NP-18	NP-020561	242		ENUM translation	5.2.0	5.3.0	N1-022020
2002-12	NP-18	NP-020561	243	1	AS routing	5.2.0	5.3.0	N1-022107
2002-12	NP-18	NP-020561	245	1	Warning header	5.2.0	5.3.0	N1-022108
2002-12	NP-18	NP-020561	246	3	S-CSCF procedure tidyup	5.2.0	5.3.0	N1-022497
2002-12	NP-18	NP-020561	247	1	P-CSCF procedure tidyup	5.2.0	5.3.0	N1-022125
2002-12	NP-18	NP-020561	248	2	UE procedure tidyup	5.2.0	5.3.0	N1-022472
2002-12	NP-18	NP-020561	249	3	MESSAGE corrections part 1	5.2.0	5.3.0	N1-022455
2002-12	NP-18	NP-020561	250	2	MESSAGE corrections part 2	5.2.0	5.3.0	N1-022456
2002-12	NP-18	NP-020562	251	2	Security association clarifications	5.2.0	5.3.0	N1-022440
2002-12	NP-18	NP-020562	252	1	The use of security association by the UE	5.2.0	5.3.0	N1-022433
2002-12	NP-18	NP-020562	253	1	UE integrity protected re-registration	5.2.0	5.3.0	N1-022434
2002-12	NP-18	NP-020562	255	3	Handling of default public user identities by the P-CSCF	5.2.0	5.3.0	N1-022496
2002-12	NP-18	NP-020562	263		Fixing ioi descriptions	5.2.0	5.3.0	N1-022266
2002-12	NP-18	NP-020562	264	1	Fix descriptions for ECF/CCF addresses	5.2.0	5.3.0	N1-022447
2002-12	NP-18	NP-020562	266	2	Alignment with draft-ietf-sipping-reg-event-00 and clarification on network initiated deregistration	5.2.0	5.3.0	N1-022493
2002-12	NP-18	NP-020563	267	1	Correction to network initiated re-authentication procedure	5.2.0	5.3.0	N1-022449
2002-12	NP-18	NP-020563	268	1	Registration Expires Timer Default Setting	5.2.0	5.3.0	N1-022439
2002-12	NP-18	NP-020563	269	1	Clarification on Sh interface for charging purposes	5.2.0	5.3.0	N1-022465
2002-12	NP-18	NP-020563	270	2	Clarifications on the scope	5.2.0	5.3.0	N1-022500
2002-12	NP-18	NP-020563	273	1	Add charging info for SUBSCRIBE	5.2.0	5.3.0	N1-022467
2002-12	NP-18	NP-020563	274	1	Profile revisions for RFC 3261 headers	5.2.0	5.3.0	N1-022413
2002-12	NP-18	NP-020563	275		Consistency changes for SDP procedures at MGCF	5.2.0	5.3.0	N1-022345
2002-12	NP-18	NP-020563	276		Proxy support of PRACK	5.2.0	5.3.0	N1-022350
2002-12	NP-18	NP-020563	277		Clarification of transparent handling of parameters in profile	5.2.0	5.3.0	N1-022351
2002-12	NP-18	NP-020564	279	1	Meaning of refresh request	5.2.0	5.3.0	N1-022444
2002-12	NP-18	NP-020564	280		Removal of Caller Preferences dependency	5.2.0	5.3.0	N1-022362
2002-12	NP-18	NP-020564	281	1	P-Access-Network-Info clarifications	5.2.0	5.3.0	N1-022445
2002-12	NP-18	NP-020564	282		Clarification on use of the From header by the UE	5.2.0	5.3.0	N1-022370
2002-12	NP-18	NP-020634	283	2	Support of comp=sigcomp parameter	5.2.0	5.3.0	
2002-12	NP-18	NP-020668	284	4	SDP media policy rejection	5.2.0	5.3.0	
2002-12	NP-18	NP-020567	285	1	Fallback for compression failure	5.2.0	5.3.0	N1-022481
2002-12	NP-18	NP-020564	287	1	SA related procedures	5.2.0	5.3.0	N1-022459

Change history								
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**	**WG doc**
2002-12	NP-18	NP-020568	290	1	Emergency Service correction	5.2.0	5.3.0	N1-022461
2002-12	NP-18	NP-020663	278	4	P-CSCF does not strip away headers	5.2.0	5.3.0	N1-022499
2002-12	NP-18	NP-020557	289		PCF to PDF	5.2.0	5.3.0	N1-022387
2003-03	NP-19	NP-030049	291		Minor correction and consistency changes to general part of profile	5.3.0	5.4.0	N1-030012
2003-03	NP-19	NP-030049	292		SIP profile minor correction and consistency changes	5.3.0	5.4.0	N1-030013
2003-03	NP-19	NP-030049	293	1	Network asserted identity procedure corrections for the UE	5.3.0	5.4.0	N1-030261
2003-03	NP-19	NP-030049	294	1	Asserted identity inclusion in SIP profile	5.3.0	5.4.0	N1-030300
2003-03	NP-19	NP-030049	296		Profile references relating to registration	5.3.0	5.4.0	N1-030023
2003-03	NP-19	NP-030049	297	2	Reference corrections	5.3.0	5.4.0	N1-030301
2003-03	NP-19	NP-030050	300	1	488 message with a subset of allowed media parameters	5.3.0	5.4.0	N1-030245
2003-03	NP-19	NP-030050	301	1	Handling of Emergency Numbers in P-CSCF	5.3.0	5.4.0	N1-030239
2003-03	NP-19	NP-030050	302	2	Correction of the registration state event package	5.3.0	5.4.0	N1-030268
2003-03	NP-19	NP-030050	305	2	User initiated de-registration at P-CSCF	5.3.0	5.4.0	N1-030295
2003-03	NP-19	NP-030050	306	2	Network-initiated deregistration at UE, P-CSCF, and S-CSCF	5.3.0	5.4.0	N1-030296
2003-03	NP-19	NP-030050	307	2	UE deregistration during established dialogs	5.3.0	5.4.0	N1-030297
2003-03	NP-19	NP-030050	308	2	S-CSCF handling of deregistration during established dialogs	5.3.0	5.4.0	N1-030298
2003-03	NP-19	NP-030050	309	1	S-CSCF handling of established dialogs upon deregistration	5.3.0	5.4.0	N1-030233
2003-03	NP-19	NP-030050	310	2	S-CSCF handling of established dialogs upon registration-lifetime expiration	5.3.0	5.4.0	N1-030299
2003-03	NP-19	NP-030051	311	1	P-CSCF handling of established dialogs upon registration-lifetime expiration	5.3.0	5.4.0	N1-030235
2003-03	NP-19	NP-030051	312	1	Correction of Authentication procedure	5.3.0	5.4.0	N1-030240
2003-03	NP-19	NP-030051	313		Mixed Path header and Service-Route operation	5.3.0	5.4.0	N1-030127
2003-03	NP-19	NP-030051	315	2	Clarifications on updating the authorization token	5.3.0	5.4.0	N1-030255
2003-03	NP-19	NP-030051	318	2	Consideration of P-CSCF/PDF	5.3.0	5.4.0	N1-030307
2003-03	NP-19	NP-030051	319	2	Clarification on GPRS charging information	5.3.0	5.4.0	N1-030308
2003-03	NP-19	NP-030051	323	1	P-Access-Network-Info procedure corrections for the UE	5.3.0	5.4.0	N1-030250
2003-03	NP-19	NP-030051	324	1	P-Access-Network-Info procedure corrections for the S-CSCF	5.3.0	5.4.0	N1-030251
2003-03	NP-19	NP-030051	326	1	Updating user agent related profile tables	5.3.0	5.4.0	N1-030260
2003-03	NP-19	NP-030052	327	2	Cleanup and clarification to the registration and authentication procedure	5.3.0	5.4.0	N1-030282
2003-03	NP-19	NP-030052	328	1	Corrections to the reg event package	5.3.0	5.4.0	N1-030230
2003-03	NP-19	NP-030052	330	2	Clarifications for setting up separate PDP contexts in case of SBLP	5.3.0	5.4.0	N1-030288

Change history								
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**	**WG doc**
2003-03	NP-19	NP-030052	331	2	Handling of the P-Media-Autohorization header	5.3.0	5.4.0	N1-030289
2003-03	NP-19	NP-030052	333	3	Removal of P-Asserted-Identity from clause 7 of 24.229	5.3.0	5.4.0	N1-030310
2003-03	NP-19	NP-030052	334		P-CSCF general procedure corrections	5.3.0	5.4.0	N1-030182
2003-03	NP-19	NP-030052	335	2	Usage of Contact in UE's registration procedure	5.3.0	5.4.0	N1-030281
2003-03	NP-19	NP-030052	337		Usage of P-Asserted-Identity for responses	5.3.0	5.4.0	N1-030193
2003-03	NP-19	NP-030052	339	2	Authorization for registration event package	5.3.0	5.4.0	N1-030285
2003-03	NP-19	NP-030052	341	1	P-CSCF subscription to reg event	5.3.0	5.4.0	N1-030284
2003-06	NP-20	NP-030275	295	4	Security agreement inclusion in SIP profile	5.4.0	5.5.0	N1-030939
2003-06	NP-20	NP-030275	322	5	3GPP P-header inclusion in SIP profile	5.4.0	5.5.0	N1-030938
2003-06	NP-20	NP-030275	332	5	Change of IP address for the UE	5.4.0	5.5.0	N1-030923
2003-06	NP-20	NP-030275	342		Removal of the requirement for UE re-authentication initiated by HSS	5.4.0	5.5.0	N1-030349
2003-06	NP-20	NP-030275	343	2	UE behaviour on reception of 420 (Bad Extension) message	5.4.0	5.5.0	N1-030552
2003-06	NP-20	NP-030275	347	2	Handling of DTMF	5.4.0	5.5.0	N1-030551
2003-06	NP-20	NP-030276	348	1	Format of Tel URL in P-Asserted-Id	5.4.0	5.5.0	N1-030510
2003-06	NP-20	NP-030276	349		Delete Note on header stripping/SDP manipulation	5.4.0	5.5.0	N1-030387
2003-06	NP-20	NP-030276	354	1	Clarifications on using DNS procedures	5.4.0	5.5.0	N1-030520
2003-06	NP-20	NP-030276	356	4	Addition of procedures at the AS for SDP	5.4.0	5.5.0	N1-030942
2003-06	NP-20	NP-030276	357	1	Usage of P-Associated-URI	5.4.0	5.5.0	N1-030499
2003-06	NP-20	NP-030276	359	1	Network-initiated deregistration at UE and P-CSCF	5.4.0	5.5.0	N1-030501
2003-06	NP-20	NP-030276	360	2	Barred identities	5.4.0	5.5.0	N1-030550
2003-06	NP-20	NP-030276	365	1	PDP contex subject to SBLP cannot be reused by other IMS sessions	5.4.0	5.5.0	N1-030513
2003-06	NP-20	NP-030276	368	1	User authentication failure cleanups	5.4.0	5.5.0	N1-030506
2003-06	NP-20	NP-030277	369	3	S-CSCF behavior correction to enable call forwarding	5.4.0	5.5.0	N1-030931
2003-06	NP-20	NP-030277	370	1	SUBSCRIBE request information stored at the P-CSCF and S-CSCF	5.4.0	5.5.0	N1-030521
2003-06	NP-20	NP-030277	371	1	Profile Tables - Transparency	5.4.0	5.5.0	N1-030858
2003-06	NP-20	NP-030277	375	1	Profile Tables - Major Capability Corrections	5.4.0	5.5.0	N1-030860
2003-06	NP-20	NP-030277	376	2	Profile Tables - Deletion of Elements not used in 24.229	5.4.0	5.5.0	N1-030921
2003-06	NP-20	NP-030277	377	1	Use of the QoS parameter 'signalling information' for a signalling PDP context	5.4.0	5.5.0	N1-030840
2003-06	NP-20	NP-030277	378	2	Deregistration of a PUID (not the last one)	5.4.0	5.5.0	N1-030919
2003-06	NP-20	NP-030277	379	2	'Last registered public user identity' terminology change	5.4.0	5.5.0	N1-030920
2003-06	NP-20	NP-030277	380	1	Check Integrity Protection for P-Access-Network-	5.4.0	5.5.0	N1-030881

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
					Info header			

Change history								
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**	**WG doc**
2003-06	NP-20	NP-030278	381	1	PCSCF setting of Integrity protection indicator and checking of Security Verify header	5.4.0	5.5.0	N1-030882
2003-06	NP-20	NP-030278	383	1	Consistent treatment of register and de-register	5.4.0	5.5.0	N1-030884
2003-06	NP-20	NP-030278	384	1	Optionality of sending CK is removed	5.4.0	5.5.0	N1-030885
2003-06	NP-20	NP-030278	385	1	Addition of note and Correction of References regarding security associations and registration	5.4.0	5.5.0	N1-030886
2003-06	NP-20	NP-030278	387	1	Subscription/Registration refresh time	5.4.0	5.5.0	N1-030887
2003-06	NP-20	NP-030278	388	1	Corrections to use of IK	5.4.0	5.5.0	N1-030863
2003-06	NP-20	NP-030278	390		Mobile-originating case at UE	5.4.0	5.5.0	N1-030647
2003-06	NP-20	NP-030278	394	2	Re-authentication procedure.	5.4.0	5.5.0	N1-030917
2003-06	NP-20	NP-030278	395		Replacement of SIP URL with SIP URI	5.4.0	5.5.0	N1-030652
2003-06	NP-20	NP-030279	397	2	Notification about registration state	5.4.0	5.5.0	N1-030926
2003-06	NP-20	NP-030279	402	1	Handling of P-Asserted ID in MGCF	5.4.0	5.5.0	N1-030848
2003-06	NP-20	NP-030279	404	1	S-CSCF initiated release of calls to circiut switched network	5.4.0	5.5.0	N1-030873
2003-06	NP-20	NP-030279	405	2	Supported Integrity algorithms	5.4.0	5.5.0	N1-030927
2003-06	NP-20	NP-030279	407	1	RFC 3524, Single Reservation Flows	5.4.0	5.5.0	N1-030851
2003-06	NP-20	NP-030279	410	1	Clarification of the S-CSCF's handling of the P-access-network-info header	5.4.0	5.5.0	N1-030868
2003-06	NP-20	NP-030279	411	2	Port numbers in the RR header entries	5.4.0	5.5.0	N1-030941
2003-06	NP-20	NP-030279	412	2	Registration abnormal cases	5.4.0	5.5.0	N1-030928
2003-06	NP-20	NP-030280	415		Minor correction to section 5.4.5.1.2	5.4.0	5.5.0	N1-030720
2003-06	NP-20	NP-030280	417	1	Introduction of RTCP bandwidth	5.4.0	5.5.0	N1-030872
2003-06	NP-20	NP-030280	418	1	Registratin Event - Shortend	5.4.0	5.5.0	N1-030844
2003-06	NP-20	NP-030280	419	1	HSS / S-CSCF text relating to user deregistration	5.4.0	5.5.0	N1-030845
2003-06	NP-20	NP-030280	421		Handling of unknown methods at the P-CSCF	5.4.0	5.5.0	N1-030743
2003-06	NP-20	NP-030280	422	1	Definitions and abbreviations update	5.4.0	5.5.0	N1-030870
2003-06	NP-20	NP-030280	423		Removal of hanging paragraph	5.4.0	5.5.0	N1-030752
2003-06	NP-20	NP-030280	424		Access network charging information	5.4.0	5.5.0	N1-030753
2003-06	NP-20	NP-030280	425	1	UE procedure tidyup	5.4.0	5.5.0	N1-030871
2003-06	NP-20	NP-030281	426		P-CSCF procedure tidyup	5.4.0	5.5.0	N1-030755
2003-06	NP-20	NP-030281	427		I-CSCF procedure tidyup	5.4.0	5.5.0	N1-030756
2003-06	NP-20	NP-030281	428		S-CSCF procedure tidyup	5.4.0	5.5.0	N1-030757
2003-06	NP-20	NP-030281	429		BGCF procedure tidyup	5.4.0	5.5.0	N1-030758
2003-06	NP-20	NP-030281	430		AS procedure tidyup	5.4.0	5.5.0	N1-030759
2003-06	NP-20	NP-030281	431		MRFC procedure tidyup	5.4.0	5.5.0	N1-030760
2003-06	NP-20	NP-030281	434	1	SDP procedure tidyup	5.4.0	5.5.0	N1-030852
2003-06	NP-20	NP-030281	438	2	Profile Tables – Further Corrections	5.4.0	5.5.0	N1-030935

Change history								
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**	**WG doc**
2003-06	NP-20	NP-030281	439	3	AS's subscription for the registration state event package	5.4.0	5.5.0	N1-030940
2003-06	NP-20	NP-030281	440		Temporary Public User Identity in re- and de-REGISTER requests	5.4.0	5.5.0	N1-030792
2003-09	NP-21	NP-030412	444	2	All non-REGISTER requests must be integrity protected	5.5.0	5.6.0	N1-031328
2003-09	NP-21	NP-030412	445		Download of all service profiles linked to PUID being registered and implicitly registered	5.5.0	5.6.0	N1-031010
2003-09	NP-21	NP-030412	448	3	Authentication at UE	5.5.0	5.6.0	N1-031326
2003-09	NP-21	NP-030412	449	1	Nework authentication failure at the UE	5.5.0	5.6.0	N1-031242
2003-09	NP-21	NP-030412	451	3	Handling of security association	5.5.0	5.6.0	N1-031327
2003-09	NP-21	NP-030412	452	1	Re-authentication timer at S-CSCF	5.5.0	5.6.0	N1-031274
2003-09	NP-21	NP-030412	455	2	Authentication failure at S-CSCF	5.5.0	5.6.0	N1-031285
2003-09	NP-21	NP-030413	456	2	Subscription termination sent by the S-CSCF	5.5.0	5.6.0	N1-031276
2003-09	NP-21	NP-030413	457		Subscription termination at the P-CSCF	5.5.0	5.6.0	N1-031032
2003-09	NP-21	NP-030413	458		Network -initiated deregistration at P-CSCF	5.5.0	5.6.0	N1-031033
2003-09	NP-21	NP-030349	459	2	Notification about registration status at AS	5.5.0	5.6.0	
2003-09	NP-21	NP-030413	461	1	Service profile	5.5.0	5.6.0	N1-031233
2003-09	NP-21	NP-030413	466	1	Requirements on Preconditions	5.5.0	5.6.0	N1-031246
2003-09	NP-21	NP-030413	467	1	Call forwarding cleanup	5.5.0	5.6.0	N1-031238
2003-09	NP-21	NP-030413	468		Update of references	5.5.0	5.6.0	N1-031094
2003-09	NP-21	NP-030414	470	1	Adding P-Asserted-Identity headers to NE initiated subscriptions	5.5.0	5.6.0	N1-031314
2003-09	NP-21	NP-030414	479	1	Replace USIM by ISIM for user identity storage	5.5.0	5.6.0	N1-031247
2003-09	NP-21	NP-030414	481	1	24.229 R5 CR: Corrections to Profile Tables	5.5.0	5.6.0	N1-031248
2003-09	NP-21	NP-030414	482		24.229 R5 CR: Setting of SUBSCRIBE exipiration time	5.5.0	5.6.0	N1-031140
2003-09	NP-21	NP-030414	483	3	24.229 R5 CR: Alignment of IMS Compression with RFC 3486	5.5.0	5.6.0	N1-031335
2003-09	NP-21	NP-030418	465	1	Alignment with TS for policy control over Gq interface	5.6.0	6.0.0	N1-031267
2003-09	NP-21	NP-030418	472	1	I-CSCF procedures for openness	5.6.0	6.0.0	N1-031304
2003-09	NP-21	NP-030433	473	3	Registration from multiple terminals and forking	5.6.0	6.0.0	
2003-09	NP-21	NP-030419	480	3	Access Independent IMS	5.6.0	6.0.0	N1-031333
2003-12	NP-22	NP-030482	487	1	Registration amendments in profile	6.0.0	6.1.0	N1-031627
2003-12	NP-22	NP-030482	489		Privacy considerations for the UE	6.0.0	6.1.0	N1-031351
2003-12	NP-22	NP-030476	493		INVITE dialog amendments in profile	6.0.0	6.1.0	N1-031359
2003-12	NP-22	NP-030482	494		Correction of I-CSCF handling of multiple private user identities with same public user identity	6.0.0	6.1.0	N1-031375
2003-12	NP-22	NP-030476	496	1	P-Asserted-Identity in SUBSCRIBE requests	6.0.0	6.1.0	N1-031632
2003-12	NP-22	NP-030482	497		Addition of reference to Gq interface	6.0.0	6.1.0	N1-031378

Change history								
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**	**WG doc**
2003-12	NP-22	NP-030476	503	2	Update of HSS information at deregistration	6.0.0	6.1.0	N1-031720
2003-12	NP-22	NP-030482	507		Unavailable definitions	6.0.0	6.1.0	N1-031392
2003-12	NP-22	NP-030476	509		Reference corrections	6.0.0	6.1.0	N1-031394
2003-12	NP-22	NP-030484	510	1	UICC related changes for IMS commonality and interoperability	6.0.0	6.1.0	N1-031682
2003-12	NP-22	NP-030484	511		Interoperability and commonality; definition of scope	6.0.0	6.1.0	N1-031427
2003-12	NP-22	NP-030484	512		Interoperability and commonality; addition of terminology	6.0.0	6.1.0	N1-031428
2003-12	NP-22	NP-030484	513		Interoperability and commonality; media grouping	6.0.0	6.1.0	N1-031429
2003-12	NP-22	NP-030484	515		Interoperability and commonality; charging information	6.0.0	6.1.0	N1-031431
2003-12	NP-22	NP-030482	518	1	Profile support of RFC 3326: The Reason Header Field for the Session Initiation Protocol	6.0.0	6.1.0	N1-031681
2003-12	NP-22	NP-030482	519		Profile support of RFC 3581: An Extension to the Session Initiation Protocol (SIP) for Symmetric Response Routing	6.0.0	6.1.0	N1-031439
2003-12	NP-22	NP-030484	522	1	Clause 9 restructuring	6.0.0	6.1.0	N1-031684
2003-12	NP-22	NP-030477	524	2	Correct use of RAND during re-synchronisation failures	6.0.0	6.1.0	N1-031712
2003-12	NP-22	NP-030478	526	1	Correction to description or RES/XRES usage	6.0.0	6.1.0	N1-031617
2003-12	NP-22	NP-030483	529		Corrections on charging specification number	6.0.0	6.1.0	N1-031469
2003-12	NP-22	NP-030581	531	3	Corrections on ICID for REGISTER	6.0.0	6.1.0	
2003-12	NP-22	NP-030478	543	1	Correction of user initiated re-registration	6.0.0	6.1.0	N1-031619
2003-12	NP-22	NP-030483	551	1	IMS trust domain in Rel 6	6.0.0	6.1.0	N1-031622
2003-12	NP-22	NP-030478	556	1	P-CSCF and UE handling of Security Associations	6.0.0	6.1.0	N1-031624
2003-12	NP-22	NP-030483	560	2	SDP offer handling in SIP responses in S-CSCF and P-CSCF	6.0.0	6.1.0	N1-031727
2003-12	NP-22	NP-030483	564	1	SIP compression	6.0.0	6.1.0	N1-031705
2003-12	NP-22	NP-030478	566		Sending challenge	6.0.0	6.1.0	N1-031580
2003-12	NP-22	NP-030480	568	2	Reg-await-auth timer value	6.0.0	6.1.0	N1-031716
2003-12	NP-22	NP-030480	571	1	Network initiated deregistration	6.0.0	6.1.0	N1-031707
2003-12	NP-22	NP-030483	572		Text harmonisation with 3GPP2	6.0.0	6.1.0	N1-031589
2003-12	NP-22	NP-030483	573	1	Procedures in the absence of UICC	6.0.0	6.1.0	N1-031680
2003-12	NP-22	NP-030483	575	1	P-Access-Network-Info changes	6.0.0	6.1.0	N1-031683
2004-03	NP-23	NP-040027	488	3	Completion of major capabilities table in respect of privacy	6.1.0	6.2.0	N1-040406
2004-03	NP-23	NP-040027	499	5	P-CSCF integrity protection	6.1.0	6.2.0	N1-040500
2004-03	NP-23	NP-040032	578	1	UE requesting no-fork	6.1.0	6.2.0	N1-040184
2004-03	NP-23	NP-040032	579	1	Inclusion of caller preferences into profile	6.1.0	6.2.0	N1-040284
2004-03	NP-23	NP-040027	586	1	Network-initiated re-authentication	6.1.0	6.2.0	N1-040391

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2004-03	NP-23	NP-040032	588	1	Re-authentication - Abnormal cases	6.1.0	6.2.0	N1-040393
2004-03	NP-23	NP-040027	592	1	Integrity protected correction	6.1.0	6.2.0	N1-040398
2004-03	NP-23	NP-040032	596	1	Sec-agree parameter in "Proxy-Require" header	6.1.0	6.2.0	N1-040400
2004-03	NP-23	NP-040027	600	2	Handling of record-route in target refresh and subsequent request	6.1.0	6.2.0	N1-040481
2004-03	NP-23	NP-040035	603		Cleanup for IP-CAN and GPRS	6.1.0	6.2.0	N1-040304
2004-03	NP-23	NP-040032	604		Forking in S-CSCF	6.1.0	6.2.0	N1-040325
2004-03	NP-23	NP-040108	605	3	Determination of S-CSCF role	6.1.0	6.2.0	
2004-03	NP-23	NP-040134	608	3	Unprotected deregistration	6.1.0	6.2.0	
2004-03	NP-23	NP-040029	610		Sending authentication challenge	6.1.0	6.2.0	N1-040331
2004-03	NP-23	NP-040033	613		Reference to PDF operation	6.1.0	6.2.0	N1-040334
2004-03	NP-23	NP-040029	615	1	Support of MESSAGE (Profile Tables)	6.1.0	6.2.0	N1-040466
2004-03	NP-23	NP-040033	616	2	Introduction of PSI Routing to 24.229	6.1.0	6.2.0	N1-040487
2004-03	NP-23	NP-040033	617	1	P-CSCF Re-selection	6.1.0	6.2.0	N1-040463
2004-03	NP-23	NP-040033	618		I-CSCF does not re-select S-CSCF during re-registration	6.1.0	6.2.0	N1-040344
2004-03	NP-23	NP-040033	620	1	Handling of media authorization token due to messaging	6.1.0	6.2.0	N1-040430
2004-06	NP-24	NP-040191	621	2	Forking requests terminating at the served user	6.2.0	6.3.0	N1-040739
2004-06	NP-24	NP-040191	624	1	Abbreviations	6.2.0	6.3.0	N1-040691
2004-06	NP-24	NP-040191	625	5	Removal of restriction for multiple SIP sessions on a single PDP context	6.2.0	6.3.0	N1-041053
2004-06	NP-24	NP-040191	626	3	Record route in S-CSCF	6.2.0	6.3.0	N1-041061
2004-06	NP-24	NP-040189	627	3	Correction of reception of media authorization token	6.2.0	6.3.0	N1-040994
2004-06	NP-24	NP-040191	628	3	Introduction of PSI Routing to 24.229	6.2.0	6.3.0	N1-041059
2004-06	NP-24	NP-040198	629	2	Addition of PRESNC material	6.2.0	6.3.0	N1-040996
2004-06	NP-24	NP-040189	631	1	Missing statements regarding P-Charging-Function-Addresses header	6.2.0	6.3.0	N1-040987
2004-06	NP-24	NP-040191	634	1	Multiple registrations	6.2.0	6.3.0	N1-041054
2004-06	NP-24	NP-040192	635	1	Network-initiated deregistration	6.2.0	6.3.0	N1-041055
2004-06	NP-24	NP-040192	636		Network-initiated re-authentication	6.2.0	6.3.0	N1-040778
2004-06	NP-24	NP-040192	637	1	Mobile-initiated deregistration	6.2.0	6.3.0	N1-041056
2004-06	NP-24	NP-040192	638	1	Notification about registration state	6.2.0	6.3.0	N1-041057
2004-06	NP-24	NP-040189	642	3	Syntax of the extension to the P-Charging-Vector header field	6.2.0	6.3.0	N1-041100
2004-06	NP-24	NP-040192	643	2	Session Timer	6.2.0	6.3.0	N1-041095
2004-06	NP-24	NP-040193	644	3	Session initiation without preconditions	6.2.0	6.3.0	N1-041096
2004-06	NP-24	NP-040192	645	1	IMS Conferencing: Inclusion of Profile Tables to TS 24.229	6.2.0	6.3.0	N1-041015

Change history								
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**	**WG doc**
2004-06	NP-24	NP-040189	649	1	Revisions due to published version of draft-ietf-sipping-reg-event	6.2.0	6.3.0	N1-040992
2004-06	NP-24	NP-040198	652		Creation of separate event package table for UA role	6.2.0	6.3.0	N1-041066
2004-09	NP-25	NP-040380	658		Correction of User identity verification at the AS	6.3.0	6.4.0	N1-041344
2004-09	NP-25	NP-040381	666	1	NOTIFY requests	6.3.0	6.4.0	N1-041586
2004-09	NP-25	NP-040381	654	4	Callee capabilities and Registration	6.3.0	6.4.0	N1-041315
2004-09	NP-25	NP-040381	668	2	Network deregistration	6.3.0	6.4.0	N1-041614
2004-09	NP-25	NP-040381	682	1	SDP parameters received by the S-CSCF and the P-CSCF in the 200 OK message	6.3.0	6.4.0	N1-041592
2004-09	NP-25	NP-040381	661	1	Call Release	6.3.0	6.4.0	N1-041589
2004-09	NP-25	NP-040381	659		Multiple public ID registration	6.3.0	6.4.0	N1-041350
2004-09	NP-25	NP-040381	660		Standalone transactions	6.3.0	6.4.0	N1-041351
2004-09	NP-25	NP-040381	663		Unprotected REGISTER	6.3.0	6.4.0	N1-041354
2004-09	NP-25	NP-040381	662	1	Session timer	6.3.0	6.4.0	N1-041590
2004-09	NP-25	NP-040381	665		Contact in SUBSCRIBE request	6.3.0	6.4.0	N1-041372
2004-09	NP-25	NP-040381	650	2	Support of draft-ietf-sip-replaces	6.3.0	6.4.0	N1-041391
2004-09	NP-25	NP-040381	657	1	Support of draft-ietf-sip-join	6.3.0	6.4.0	N1-041393
2004-09	NP-25	NP-040381	656	1	Support of draft-ietf-sip-referredby	6.3.0	6.4.0	N1-041263
2004-09	NP-25	NP-040381	678		Support of TLS	6.3.0	6.4.0	N1-041462
2004-09	NP-25	NP-040381	688	2	Filtering of the P-Access-Network-Info header by the S-CSCF and privacy rules	6.3.0	6.4.0	N1-041641
2004-09	NP-25	NP-040382	692	2	Ipv6 IPv4 interworking	6.3.0	6.4.0	N1-041630
2004-09	NP-25	NP-040383	689	2	Addition of session set-up not requiring preconditions and reliable transport of provisional responses.	6.3.0	6.4.0	N1-041632
2004-09	NP-25	NP-040385	697		Missing value for the event attribute within the <contact> element of NOTIFY body	6.3.0	6.4.0	N1-041540
2004-09	NP-25	NP-040385	698		HSS initiated deregistration	6.3.0	6.4.0	N1-041549
2004-09	NP-25	NP-040385	673		Syntax correction for the P-Charging-Vector header	6.3.0	6.4.0	N1-041434
2004-09	NP-25	NP-040385	699	1	Network initiated deregistration upon UE roaming and registration to a new network	6.3.0	6.4.0	N1-041629
2004-12	NP-26	NP-040506	651	4	Downloading the user profile based on User-Data-Request-Type	6.4.0	6.5.0	N1-042031
2004-12	NP-26	NP-040506	703	2	SDP Encryption	6.4.0	6.5.0	N1-042095
2004-12	NP-26	NP-040506	704	1	RTCP streams	6.4.0	6.5.0	N1-042019
2004-12	NP-26	NP-040506	709		Contact in 200(OK) response	6.4.0	6.5.0	N1-041725
2004-12	NP-26	NP-040506	710	1	P-Access-Network-Info header	6.4.0	6.5.0	N1-042020
2004-12	NP-26	NP-040506	711	1	P-Called-Party-ID header	6.4.0	6.5.0	N1-041954
2004-12	NP-26	NP-040506	713	1	IMS-ALG routing	6.4.0	6.5.0	N1-042021

Change history								
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**	**WG doc**
2004-12	NP-26	NP-040506	714	1	Public User Identity	6.4.0	6.5.0	N1-042022
2004-12	NP-26	NP-040506	715	1	"Pres" and "im" URIs	6.4.0	6.5.0	N1-042023
2004-12	NP-26	NP-040502	723	1	Correction Term IOI handling	6.4.0	6.5.0	N1-041956
2004-12	NP-26	NP-040502	725	1	Request handling in S-CSCF originating case	6.4.0	6.5.0	N1-041958
2004-12	NP-26	NP-040502	727	1	Request handling in S-CSCF - terminating case	6.4.0	6.5.0	N1-041960
2004-12	NP-26	NP-040506	728		SBLP and non-realtime PDP contexts	6.4.0	6.5.0	N1-041797
2004-12	NP-26	NP-040590	730	2	Reference updates	6.4.0	6.5.0	N1-042085
2004-12	NP-26	NP-040590	733	3	Support for extended SigComp	6.4.0	6.5.0	N1-042117
2004-12	NP-26	NP-040590	734	2	Correction to subclause 5.1.3 of TS 24,229	6.4.0	6.5.0	N1-042120
2004-12	NP-26	NP-040590	735	1	Correction to subclause 5.1.4.1.2.3 of TS 24,.229	6.4.0	6.5.0	N1-042084
2004-12	NP-26	NP-040502	738	1	Population of Via header when using REGISTER method	6.4.0	6.5.0	N1-041962
2004-12	NP-26	NP-040590	739		Tel-URI related reference updates	6.4.0	6.5.0	N1-041869
2004-12	NP-26	NP-040590	741	1	Throttling	6.4.0	6.5.0	N1-042086
2004-12	NP-26	NP-040590	742		Editorial correction resulting from CR665	6.4.0	6.5.0	N1-041881
2004-12	NP-26	NP-040590	743		Unprotected REGISTER corrections	6.4.0	6.5.0	N1-041882
2004-12	NP-26	NP-040590	744	1	Corrections to receiving SDP offer in 200 (OK) response	6.4.0	6.5.0	N1-042087
2004-12	NP-26	NP-040590	745	1	Privacy corrections	6.4.0	6.5.0	N1-042085
2004-12	NP-26	NP-040590	747	2	Syntax of the P-Charging-Vector	6.4.0	6.5.0	N1-042105
2004-12	NP-26	NP-040590	752	2	Unavailability of the access-network-charging-info when the session is established without SBLP	6.4.0	6.5.0	N1-042106
2004-12	NP-26	NP-040590	753	1	SIP messages carrying the access-network-charging-info for sessions without preconditions	6.4.0	6.5.0	N1-042089
2004-12	NP-26	NP-040590	755	1	Network-initiated deregistration for multiple UEs sharing the same user public identity and for the old contact information of a roaming UE registered in a new network	6.4.0	6.5.0	N1-042090
2004-12	NP-26	NP-040502	765	1	Interaction between S-CSCF and HSS in Network initiated deregistration procedure	6.4.0	6.5.0	N1-041966
2004-12	NP-26	NP-040502	768	1	Downloading of user profile	6.4.0	6.5.0	N1-042103
2005-01					Fix Word problem	6.5.0	6.5.1	
2005-03	NP-27	NP-050069	839		Filter criteria matching and generation of third-party REGISTER request for network-initiated deregistration	5.11.1	5.12.0	N1-050220
2005-03	NP-27	NP-050069	785		Deregistration effect on active sessions	6.5.1	6.6.0	N1-050052
2005-03	NP-27	NP-050069	784		Deregistration effect on active sessions	5.11.1	5.12.0	N1-050051
2005-03	NP-27	NP-050069	809	1	IOI storage at MGCF	5.11.1	5.12.0	N1-050295
2005-03	NP-27	NP-050069	840		Filter criteria matching and generation of third-party REGISTER request for network-initiated deregistration	6.5.1	6.6.0	N1-050221
2005-03	NP-27	NP-050069	806	1	Use of original dialog identifier at AS	6.5.1	6.6.0	N1-050292

Change history								
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**	**WG doc**
2005-03	NP-27	NP-050069	807	2	Checking Request-URI for terminating requests at the S-CSCF	5.11.1	5.12.0	N1-050401
2005-03	NP-27	NP-050069	805	1	Use of original dialog identifier at AS	5.11.1	5.12.0	N1-050291
2005-03	NP-27	NP-050069	808	2	Checking Request-URI for terminating requests at the S-CSCF	6.5.1	6.6.0	N1-050402
2005-03	NP-27	NP-050069	810	1	IOI storage at MGCF	6.5.1	6.6.0	N1-050296
2005-03	NP-27	NP-050073	794		RFC 3966	6.5.1	6.6.0	N1-050080
2005-03	NP-27	NP-050073	848	1	Removal of I-CSCF normative requirement on Cx interface	6.5.1	6.6.0	N1-050299
2005-03	NP-27	NP-050073	841		Filtering of the P-Access-Network-Info header by the S-CSCF and privacy rules	6.5.1	6.6.0	N1-050225
2005-03	NP-27	NP-050073	817		Editorial corrections	6.5.1	6.6.0	N1-050129
2005-03	NP-27	NP-050073	786	1	Cleanups resulting from CR changes for last version	6.5.1	6.6.0	N1-050324
2005-03	NP-27	NP-050073	821	1	Handling topmost Route header at the P-CSCF	6.5.1	6.6.0	N1-050297
2005-03	NP-27	NP-050073	790		Registration - Abnormal Case	6.5.1	6.6.0	N1-050076
2005-03	NP-27	NP-050074	832	1	Corrections to the tables for "PUBLISH"	6.5.1	6.6.0	N1-050341
2005-03	NP-27	NP-050074	822	1	Corrections to the UE tables for "major capabilities"	6.5.1	6.6.0	N1-050332
2005-03	NP-27	NP-050074	825	1	Corrections to the UE tables for "ACK"	6.5.1	6.6.0	N1-050334
2005-03	NP-27	NP-050074	826	1	Corrections to the tables for "CANCEL"	6.5.1	6.6.0	N1-050335
2005-03	NP-27	NP-050074	827	1	Corrections to the tables for "INVITE"	6.5.1	6.6.0	N1-050336
2005-03	NP-27	NP-050074	828	1	Corrections to the tables for "MESSAGE"	6.5.1	6.6.0	N1-050337
2005-03	NP-27	NP-050074	829	1	Corrections to the tables for "NOTIFY"	6.5.1	6.6.0	N1-050338
2005-03	NP-27	NP-050074	830	1	Corrections to the tables for "OPTIONS"	6.5.1	6.6.0	N1-050339
2005-03	NP-27	NP-050074	834	1	Corrections to the tables for "REGISTER"	6.5.1	6.6.0	N1-050343
2005-03	NP-27	NP-050074	831	1	Corrections to the tables for "PRACK"	6.5.1	6.6.0	N1-050340
2005-03	NP-27	NP-050074	833	1	Corrections to the tables for "REFER"	6.5.1	6.6.0	N1-050342
2005-03	NP-27	NP-050074	835	1	Corrections to the tables for "SUBSCRIBE"	6.5.1	6.6.0	N1-050344
2005-03	NP-27	NP-050074	836	1	Corrections to the tables for "UPDATE"	6.5.1	6.6.0	N1-050345
2005-03	NP-27	NP-050074	837	1	Corrections to the tables for SDP	6.5.1	6.6.0	N1-050346
2005-03	NP-27	NP-050074	824	1	Removal of the UE table for 'status codes'	6.5.1	6.6.0	N1-050351
2005-03	NP-27	NP-050074	823	1	Corrections to the tables for "BYE"	6.5.1	6.6.0	N1-050333
2005-03	NP-27	NP-050075	846	2	Correction to the Registration procedure	6.5.1	6.6.0	N1-050413
2005-03	NP-27	NP-050075	850	1	Addition of IMS-ALF to profile tables	6.5.1	6.6.0	N1-050348
2005-03	NP-27	NP-050075	851	2	Press and im URIs in incoming requests	6.5.1	6.6.0	N1-050395
2005-03	NP-27	NP-050075	788	1	MO - Calls to IPv4 SIP terminals	6.5.1	6.6.0	N1-050387
2005-03	NP-27	NP-050075	818	3	Corrections to subclause 5.5 in TS 24.229	6.5.1	6.6.0	N1-050414
2005-03	NP-27	NP-050075	801	3	Default handling associated with the trigger at the S-CSCF	6.5.1	6.6.0	N1-050418

Change history								
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**	**WG doc**
2005-03	NP-27	NP-050075	803	4	Default handling associated with the trigger for third party registration	6.5.1	6.6.0	N1-050421
2005-03	NP-27	NP-050078	795	1	Sip-profile package in major capabilities	6.5.1	6.6.0	N1-050306
2005-03	NP-27	NP-050127	849	2	Corrections to addition of session set-up not requiring preconditions and reliable transport of provisional responses	6.5.1	6.6.0	
2005-06	CP-28	CP-050059	879		Correction Reg-Await-Auth Timer	6.6.0	6.7.0	C1-050522
2005-06	CP-28	CP-050059	881		Security Association in P-CSCF	6.6.0	6.7.0	C1-050524
2005-06	CP-28	CP-050059	871	1	Port 5060	6.6.0	6.7.0	C1-050674
2005-06	CP-28	CP-050059	891	2	SIP headers storage for P-CSCF initiated session release	6.6.0	6.7.0	C1-050777
2005-06	CP-28	CP-050059	921	1	Correction of error in the specification of the extension to Authorization header	6.6.0	6.7.0	C1-050689
2005-06	CP-28	CP-050059	886	2	Handling of P-Associated URI header	6.6.0	6.7.0	C1-050783
2005-06	CP-28	CP-050059	907	2	Clarification to the procedures at the I-CSCF	6.6.0	6.7.0	C1-050785
2005-06	CP-28	CP-050061	894	1	Re-registration failure	6.6.0	6.7.0	C1-050709
2005-06	CP-28	CP-050061	892		Completion of status-code tables in SIP profile	6.6.0	6.7.0	C1-050571
2005-06	CP-28	CP-050061	865	1	Unsubscribe by P-CSCF	6.6.0	6.7.0	C1-050671
2005-06	CP-28	CP-050061	866	1	Protected initial registration	6.6.0	6.7.0	C1-050708
2005-06	CP-28	CP-050061	916	1	Clarify that S-CSCF shall support Supported and Require headers	6.6.0	6.7.0	C1-050684
2005-06	CP-28	CP-050061	862		Shared public user identities	6.6.0	6.7.0	C1-050599
2005-06	CP-28	CP-050061	860	1	P-CSCF - routing of REGISTER requests	6.6.0	6.7.0	C1-050701
2005-06	CP-28	CP-050061	870	1	Correction of table A.104A	6.6.0	6.7.0	C1-050711
2005-06	CP-28	CP-050061	887	1	Contact address in REGISTER response	6.6.0	6.7.0	C1-050716
2005-06	CP-28	CP-050061	890	1	P-CSCF Record-Route processing for target refresh requests/responses	6.6.0	6.7.0	C1-050717
2005-06	CP-28	CP-050061	893	1	AS originated requests on behalf of PSI	6.6.0	6.7.0	C1-050719
2005-06	CP-28	CP-050061	896	1	Routing PSI at terminating side	6.6.0	6.7.0	C1-050720
2005-06	CP-28	CP-050061	856	2	Notification about registration state	6.6.0	6.7.0	C1-050789
2005-06	CP-28	CP-050061	861	3	Registration failure at UE	6.6.0	6.7.0	C1-050790
2005-06	CP-28	CP-050061	899	2	Correction of the references for the integration of resource management procedures	6.6.0	6.7.0	C1-050791
2005-06	CP-28	CP-050061	902	2	Clarification on P-CSCF-intiated call release	6.6.0	6.7.0	C1-050792
2005-06	CP-28	CP-050061	863	3	Error handling in UE in case of RFC 3524	6.6.0	6.7.0	C1-050793
2005-06	CP-28	CP-050061	895	3	UE registration failure because the selected S-CSCF is unreachable	6.6.0	6.7.0	C1-050802
2005-06	CP-28	CP-050061	787	6	MT- SDP offer with IPv4 address.	6.6.0	6.7.0	C1-050794
2005-06	CP-28	CP-050061	858	1	S-CSCF redirecting	6.6.0	6.7.0	C1-050700
2005-06	CP-28	CP-050064	872	2	I-WLAN information for IMS	6.6.0	6.7.0	C1-050729
2005-06	CP-28	CP-050074	901		MWI RFC3842	6.6.0	7.0.0	C1-050600

Change history								
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**	**WG doc**
2005-06	CP-28	CP-050075	905	1	3xx response and non-SDP bodies handking by proxies	6.6.0	7.0.0	C1-050775
2005-09	CP-29	CP-050346	986		Modifications to 24.229 to allow multiple IPsec security association per IKE_Security association	7.0.0	7.1.0	
2005-09	CP-29	CP-050355	930	1	Correction Profile Table A.119	7.0.0	7.1.0	C1-051061
2005-09	CP-29	CP-050355	946		Public User identity in 3rd party REG	7.0.0	7.1.0	C1-050906
2005-09	CP-29	CP-050355	957	1	Removal of Access Network Charging Information by the S-CSCF	7.0.0	7.1.0	C1-051081
2005-09	CP-29	CP-050355	965		Optional ccf	7.0.0	7.1.0	C1-050986
2005-09	CP-29	CP-050355	969	1	Contact header in REGISTER requests	7.0.0	7.1.0	C1-051177
2005-09	CP-29	CP-050359	932		SigComp-Corrections	7.0.0	7.1.0	C1-050877
2005-09	CP-29	CP-050359	962	1	IETF reference corrections	7.0.0	7.1.0	C1-051074
2005-09	CP-29	CP-050359	968	1	AS procedure correction	7.0.0	7.1.0	C1-051085
2005-09	CP-29	CP-050367	924		Incorporation of draft-ietf-sip-history	7.0.0	7.1.0	C1-050838
2005-09	CP-29	CP-050367	938		Contact header	7.0.0	7.1.0	C1-050887
2005-09	CP-29	CP-050367	939	1	Reason header - loss of radio coverage	7.0.0	7.1.0	C1-051158
2005-09	CP-29	CP-050367	947	3	Changes to TS 24.229 to ease interworking with non precondition terminals	7.0.0	7.1.0	C1-051213
2005-09	CP-29	CP-050367	958	2	Contents of P-Associated-URI header in 200 (OK) response to REGISTER	7.0.0	7.1.0	C1-051206
2005-09	CP-29	CP-050367	960	3	Consideration on 3rd Party Service Provider in Trust Domain	7.0.0	7.1.0	C1-051208
2005-09	CP-29	CP-050367	971	1	Correction of requirement to insert P-Asserted-Identity header	7.0.0	7.1.0	C1-051166
2005-09	CP-29	CP-050368	950	3	privacy and trust rules for History header	7.0.0	7.1.0	C1-051199
2005-10					missing word in subclause 5.4.1.2.2, bullet 10b) is added by MCC	7.1.0	7.1.1	
2005-12	CP-30	CP-050538	1049		Replace 'originated' with 'terminated'	7.1.1	7.2.0	C1-051479
2005-12	CP-30	CP-050538	1046	2	Mobile originating call related requests	7.1.1	7.2.0	C1-051668
2005-12	CP-30	CP-050538	1012	1	Correction to section 5.4.3.2 t of TS 24.229	7.1.1	7.2.0	C1-051563
2005-12	CP-30	CP-050538	1026		Handling of P-Charging-Function-Adress	7.1.1	7.2.0	C1-051424
2005-12	CP-30	CP-050538	1071		Correction Syntax P-Charging Vector	7.1.1	7.2.0	C1-051508
2005-12	CP-30	CP-050541	1002	1	Modification to the definition of Security Association	7.1.1	7.2.0	C1-051576
2005-12	CP-30	CP-050542	0982	3	Access Type of P-Access-Network-Info header	7.1.1	7.2.0	C1-051675
2005-12	CP-30	CP-050542	1059		Replace 'served' by 'Originating' UE	7.1.1	7.2.0	C1-051489
2005-12	CP-30	CP-050542	1017		Correction to subclause 5.7.5.1. of TS 24229	7.1.1	7.2.0	C1-051382
2005-12	CP-30	CP-050542	1073	2	Short Session Setup in IMS	7.1.1	7.2.0	C1-051656
2005-12	CP-30	CP-050542	1054		Adjusting section reference in section 6.3	7.1.1	7.2.0	C1-051484
2005-12	CP-30	CP-050542	1029	1	B2B UA AS handling	7.1.1	7.2.0	C1-041597
2005-12	CP-30	CP-050542	1062	2	Correction to 3rd party registration procedures	7.1.1	7.2.0	C1-051672

Change history								
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**	**WG doc**
					for SESSION_TERMINATED default handling			
2005-12	CP-30	CP-050542	0994		cdma2000	7.1.1	7.2.0	C1-051336
2005-12	CP-30	CP-050542	1043		Correction of a reference in some tables in Appendix A	7.1.1	7.2.0	C1-051473
2005-12	CP-30	CP-050542	1005	2	Refreshes of SUBSCRIBE to reg-event (Fix for Rel 7)	7.1.1	7.2.0	C1-051670
2005-12	CP-30	CP-050542	1065	1	Charging terms correction	7.1.1	7.2.0	C1-051618
2005-12	CP-30	CP-050548	1081		Change of originating and terminating terminal terminology	7.1.1	7.2.0	C1-051535
2005-12	CP-30	CP-050548	1069	2	IBCF	7.1.1	7.2.0	C1-051587
2005-12	CP-30	CP-050550	1055		Editorial Changes	7.1.1	7.2.0	C1-051485
2005-12	CP-30	CP-050550	0996	1	UE initiated deregistration	7.1.1	7.2.0	C1-051649
2005-12	CP-30	CP-050550	1027	1	Mobile originated Request for unregistered user	7.1.1	7.2.0	C1-051653
2005-12	CP-30	CP-050550	0990	1	Authentication related Clarification	7.1.1	7.2.0	C1-051560
2005-12	CP-30	CP-050550	1019	2	Receipt of SIP URI with user equal phone at I-CSCF	7.1.1	7.2.0	C1-051671
2005-12	CP-30	CP-050550	0995	2	Default public user ID	7.1.1	7.2.0	C1-051691
2005-12	CP-30	CP-050550	0997	1	P-Preferred-Identity header	7.1.1	7.2.0	C1-051650
2005-12	CP-30	CP-050550	1082	1	P-CSCF discovery	7.1.1	7.2.0	C1-051681
2005-12	CP-30	CP-050677	1085	2	Incorporating of TR 24.819 fixed broadband access impacts into TS 24.229	7.1.1	7.2.0	
2006-03	CP-31	CP-060106	1187	-	Removal of Warning header non-compliance with RFC 3261	7.2.0	7.3.0	C1-060328
2006-03	CP-31	CP-060106	1117	1	IMS AKA - SQN resync clarifications	7.2.0	7.3.0	C1-060453
2006-03	CP-31	CP-060106	1114	1	IMS AKA - content of initial authentication header	7.2.0	7.3.0	C1-060450
2006-03	CP-31	CP-060106	1204	-	Syntax and operation for Security-Client, Security-Server and Security-Verify headers	7.2.0	7.3.0	C1-060387
2006-03	CP-31	CP-060107	1148	1	UE processing 305 (Use Proxy)	7.2.0	7.3.0	C1-060507
2006-03	CP-31	CP-060107	1164	1	Clarifications on P-CSCF discovery	7.2.0	7.3.0	C1-060459
2006-03	CP-31	CP-060107	1161	1	DHCPv6 options for Domain Name Servers	7.2.0	7.3.0	C1-060456
2006-03	CP-31	CP-060110	1136	1	SDP answer	7.2.0	7.3.0	C1-060472
2006-03	CP-31	CP-060110	1206	-	Inclusion of Ma reference point	7.2.0	7.3.0	C1-060392
2006-03	CP-31	CP-060110	1134	-	Preconditions required	7.2.0	7.3.0	C1-060192
2006-03	CP-31	CP-060110	1156	1	Tables Change in Appendix A	7.2.0	7.3.0	C1-060478
2006-03	CP-31	CP-060110	1132	1	P-Asserted-Identity	7.2.0	7.3.0	C1-060476
2006-03	CP-31	CP-060111	1219	-	Reference Update of TS24.229, Rel7	7.2.0	7.3.0	C1-060483
2006-03	CP-31	CP-060111	1119	2	IMS Short Session Setup - Clarifications	7.2.0	7.3.0	C1-060595
2006-03	CP-31	CP-060111	1189	3	Definition of principles for IOI exchange and storage	7.2.0	7.3.0	C1-060610
2006-03	CP-31	CP-060111	1129	2	Tel URI	7.2.0	7.3.0	C1-060593

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2006-03	CP-31	CP-060117	1210	1	Coding of P-Access-Network-Info header for 3GPP2 IMS	7.2.0	7.3.0	C1-060494
2006-03	CP-31	CP-060118	1103	1	Editor"s Note on xDSL bearer	7.2.0	7.3.0	C1-060119
2006-03	CP-31	CP-060118	1095	1	Reference to new annexes on NAT	7.2.0	7.3.0	C1-060116
2006-03	CP-31	CP-060118	1101	-	Replaces header in Profile Tables	7.2.0	7.3.0	C1-060051
2006-03	CP-31	CP-060118	1093	2	P-Access-Network-Info header absence for emergency call detection	7.2.0	7.3.0	C1-060339
2006-03	CP-31	CP-060118	1196	1	correction for the procedure of changing media data	7.2.0	7.3.0	C1-060518
2006-03	CP-31	CP-060118	1197	1	Editorial Changes	7.2.0	7.3.0	C1-060519
2006-03	CP-31	CP-060118	1092	3	Optionality of P-Access-Network-Info header	7.2.0	7.3.0	C1-060338
2006-03	CP-31	CP-060118	1086	1	Addition of TISPAN supported internet-drafts	7.2.0	7.3.0	C1-060337
2006-03	CP-31	CP-060118	1089	1	IBCF corrections	7.2.0	7.3.0	C1-060110
2006-03	CP-31	CP-060118	1106	4	Completion of IBCF routing procedures	7.2.0	7.3.0	C1-060498
2006-03	CP-31	CP-060118	1088	4	IBCF enhancements	7.2.0	7.3.0	C1-060603
2006-03	CP-31	CP-060119	1177	1	PacketCable Extensions to P-Charging-Vector header	7.2.0	7.3.0	C1-060512
2006-03	CP-31	CP-060120	1098	4	Emergency service S-CSCF impact	7.2.0	7.3.0	C1-060601
2006-03	CP-31	CP-060120	1097	5	Emergency service - P-CSCF impact	7.2.0	7.3.0	C1-060600
2006-03	CP-31	CP-060120	1099	5	Emergency service - E-CSCF impact	7.2.0	7.3.0	C1-060599
2006-03	CP-31	CP-060120	1096	5	Emergency service - UE impact	7.2.0	7.3.0	C1-060602
2006-03	CP-31	CP-060121	1183	-	Transfer of Text from the Combinational Services TR 24.879 to TS 24.229	7.2.0	7.3.0	C1-060311
2006-03	CP-31	CP-060124	1138	2	Session termination by P-CSCF	7.2.0	7.3.0	C1-060605
2006-03	CP-31	CP-060124	1157	3	Support for RFC 4145	7.2.0	7.3.0	C1-060621
2006-03	CP-31	CP-060124	1184	3	Registration of multiple PUIs - CR	7.2.0	7.3.0	C1-060608
2006-03	CP-31	CP-060124	1137	1	Session termination by S-CSCF	7.2.0	7.3.0	C1-060533
2006-03	CP-31	CP-060124	1152	1	Editorial Changes	7.2.0	7.3.0	C1-060539
2006-03	CP-31	CP-060124	1107	1	Reference Update of TS24.229	7.2.0	7.3.0	C1-060123
2006-03	CP-31	CP-060124	1125	-	Pre-loaded Route header	7.2.0	7.3.0	C1-060183
2006-03	CP-31	CP-060142	1226	1	Transport of HSS address from I-CSCF to S-CSCF	7.2.0	7.3.0	-
2006-03	CP-31	CP-060153	1222	2	Mandationof RFC 4320 fixes for issues found with the Session Initiation Protocol's (SIP) Non-INVITE Transactions	7.2.0	7.3.0	-
2006-03	CP-31	CP-060176	1225	2	Support of call forwarding at the S-CSCF	7.2.0	7.3.0	-
2006-06	CP-32	CP-060232	1290	2	Realm Parameter Handling	7.3.0	7.4.0	
2006-06	CP-32	CP-060249	1242	3	SDP answer	7.3.0	7.4.0	
2006-06	CP-32	CP-060262	1309	2	Hiding correction	7.3.0	7.4.0	C1-061115
2006-06	CP-32	CP-060262	1306	2	3rd-party registration	7.3.0	7.4.0	C1-061098

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2006-06	CP-32	CP-060262	1303	1	One private identity one contact	7.3.0	7.4.0	C1-061095
2006-06	CP-32	CP-060264	1274	2	Re-authentication during deregistration	7.3.0	7.4.0	C1-061113
2006-06	CP-32	CP-060265	1312		I-CSCF registration procedure correction	7.3.0	7.4.0	C1-060829
2006-06	CP-32	CP-060266	1265	1	IOI overview	7.3.0	7.4.0	C1-060997
2006-06	CP-32	CP-060266	1271	1	Introduction of signalling encryption	7.3.0	7.4.0	C1-060999
2006-06	CP-32	CP-060266	1348		UE behavior after timer F expiry	7.3.0	7.4.0	C1-060897
2006-06	CP-32	CP-060266	1236	2	P-Asserted-ID	7.3.0	7.4.0	C1-061119
2006-06	CP-32	CP-060266	1238	1	Via header in the initial registration	7.3.0	7.4.0	C1-060975
2006-06	CP-32	CP-060266	1327	1	Incorrect requirement on I-CSCF	7.3.0	7.4.0	C1-061079
2006-06	CP-32	CP-060270	1247	1	Emergency PUID	7.3.0	7.4.0	C1-061054
2006-06	CP-32	CP-060270	1266	1	Inclusion of draft-ietf-ecrit-service-urn	7.3.0	7.4.0	C1-061009
2006-06	CP-32	CP-060270	1229		Emergency service S-CSCF impact	7.3.0	7.4.0	C1-060642
2006-06	CP-32	CP-060270	1360		Inclusion of E-CSCF in subclause 3.1 and subclause 4.1	7.3.0	7.4.0	C1-060923
2006-06	CP-32	CP-060270	1249	2	Emergency call release	7.3.0	7.4.0	C1-061121
2006-06	CP-32	CP-060270	1338	1	Adding RDF in E-CSCF procedure	7.3.0	7.4.0	C1-061060
2006-06	CP-32	CP-060270	1358	1	Priority handling for emergency calls at the E-CSCF	7.3.0	7.4.0	C1-061017
2006-06	CP-32	CP-060270	1357	1	Priority handling for emergency calls at the S-CSCF	7.3.0	7.4.0	C1-061015
2006-06	CP-32	CP-060270	1356	1	Priority handling for emergency calls at the P-CSCF	7.3.0	7.4.0	C1-061013
2006-06	CP-32	CP-060270	1354		Inclusion of session timer procedures at the E-CSCF	7.3.0	7.4.0	C1-060917
2006-06	CP-32	CP-060270	1340	2	TEL URI associated with emergency IMPU	7.3.0	7.4.0	C1-061120
2006-06	CP-32	CP-060270	1337	1	Getting local emergency numbers	7.3.0	7.4.0	C1-061010
2006-06	CP-32	CP-060270	1336	1	Some corrections in IMS emergency calls	7.3.0	7.4.0	C1-061059
2006-06	CP-32	CP-060271	1258	1	UDP encapsulation of IPSec	7.3.0	7.4.0	C1-061019
2006-06	CP-32	CP-060271	1318	1	Extensions to P-Access-Network-Info header for DOCSIS Access	7.3.0	7.4.0	C1-061025
2006-06	CP-32	CP-060271	1317	2	PRACK	7.3.0	7.4.0	C1-061026
2006-06	CP-32	CP-060271	1267	1	IBCF corrections	7.3.0	7.4.0	C1-061022
2006-06	CP-32	CP-060271	1259	1	IBCF initiated call release	7.3.0	7.4.0	C1-061021
2006-06	CP-32	CP-060271	1345	1	Correction of the reference document	7.3.0	7.4.0	C1-061082
2006-06	CP-32	CP-060274	1234	1	Final NOTIFY	7.3.0	7.4.0	C1-060989
2006-06	CP-32	CP-060274	1255		Full notification	7.3.0	7.4.0	C1-060686
2006-06	CP-32	CP-060274	1260		Reg event package parameters in notification	7.3.0	7.4.0	C1-060704
2006-06	CP-32	CP-060274	1261		Subscription refreshing	7.3.0	7.4.0	C1-060705
2006-06	CP-32	CP-060274	1217	2	Definition of B2BUA	7.3.0	7.4.0	C1-061074

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2006-06	CP-32	CP-060274	1277	1	Usage of associated public user identities	7.3.0	7.4.0	C1-060964
2006-06	CP-32	CP-060274	1321		Verification by I-CSCF of trust domain origin for incoming requests	7.3.0	7.4.0	C1-060844
2006-06	CP-32	CP-060274	1322		Miscellaneous Correction	7.3.0	7.4.0	C1-060845
2006-06	CP-32	CP-060274	1328	1	Resilience to registration and authentication errors	7.3.0	7.4.0	C1-061080
2006-06	CP-32	CP-060274	1335	1	The Correction on the description for the information of registration status	7.3.0	7.4.0	C1-060986
2006-06	CP-32	CP-060274	1361		Reference updates	7.3.0	7.4.0	C1-060924
2006-06	CP-32	CP-060283	1366		Emergency service – UE impact	7.3.0	7.4.0	
2006-06	CP-32	CP-060284	1367		Emergency service- E-CSCF impact	7.3.0	7.4.0	
2006-06	CP-32	CP-060335	1232	3	Handling of P-Charging-Addresses	7.3.0	7.4.0	
2006-06	CP-32	CP-060345	1365	1	Registration of several unrelated public user identities	7.3.0	7.4.0	
2006-06	CP-32	CP-060352	1228	4	Emergency service P-CSCF-impact	7.3.0	7.4.0	C1-061134
2006-09	CP-33	CP-060452	1461	1	Correction of Realm Parameter Handling for S-CSCF procedures	7.4.0	7.5.0	C1-061732
2006-09	CP-33	CP-060452	1467		SDP reference revision	7.4.0	7.5.0	C1-061657
2006-09	CP-33	CP-060452	1475	2	"Response" value in unprotected Register requests	7.4.0	7.5.0	C1-061845
2006-09	CP-33	CP-060463	1351	3	Treatment of emergency requests other than INVITE requests at the P-CSCF	7.4.0	7.5.0	C1-061357
2006-09	CP-33	CP-060463	1352	3	Treatment of emergency requests other than INVITE requests at the E-CSCF	7.4.0	7.5.0	C1-061358
2006-09	CP-33	CP-060463	1369	1	UE emergency deregistration	7.4.0	7.5.0	C1-061304
2006-09	CP-33	CP-060463	1370	1	Emergency subscription	7.4.0	7.5.0	C1-061305
2006-09	CP-33	CP-060463	1371	1	P-CSCF emergency subscription	7.4.0	7.5.0	C1-061306
2006-09	CP-33	CP-060463	1373	2	S-CSCF emergency registration	7.4.0	7.5.0	C1-061350
2006-09	CP-33	CP-060463	1374	2	Handling of Emergency registration in S-CSCF	7.4.0	7.5.0	C1-061349
2006-09	CP-33	CP-060463	1375	2	Handling of emergency registration at the UE	7.4.0	7.5.0	C1-061351
2006-09	CP-33	CP-060463	1379	4	Location handling E-CSCF	7.4.0	7.5.0	C1-061913
2006-09	CP-33	CP-060463	1380	1	Clarification of Emergency Session Setup without prior IMS Registration	7.4.0	7.5.0	C1-061311
2006-09	CP-33	CP-060463	1381	1	Clarifications to subclause 5.1.6.1	7.4.0	7.5.0	C1-061313
2006-09	CP-33	CP-060463	1383	1	Non-INVITE requests	7.4.0	7.5.0	C1-061314
2006-09	CP-33	CP-060463	1384	2	IP-CAN for emergency calls	7.4.0	7.5.0	C1-061355
2006-09	CP-33	CP-060463	1390	1	Adoption of terminology from draft-ietf-ecrit-requirements	7.4.0	7.5.0	C1-061315
2006-09	CP-33	CP-060463	1391	3	Minor corrections to EMC1 text from previous CRs	7.4.0	7.5.0	C1-061367
2006-09	CP-33	CP-060463	1414	2	Handling of loacation information at E-CSCF	7.4.0	7.5.0	C1-061860
2006-09	CP-33	CP-060463	1440	2	P-Asserted-Identity in P-CSCF handling	7.4.0	7.5.0	C1-061861

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2006-09	CP-33	CP-060463	1443	4	Handling of PSAP address mapping result at E-CSCF	7.4.0	7.5.0	C1-061919
2006-09	CP-33	CP-060465	1413	1	Miscellaneous Corrections in Annex F	7.4.0	7.5.0	C1-061826
2006-09	CP-33	CP-060465	1420	1	Transit IMS	7.4.0	7.5.0	C1-061827
2006-09	CP-33	CP-060465	1425	1	P-CSCF procedures for session release when QoS resources are unavailable	7.4.0	7.5.0	C1-061830
2006-09	CP-33	CP-060465	1427	1	Make SDP bandwidth modifiers optional for standard RTCP usage	7.4.0	7.5.0	C1-061832
2006-09	CP-33	CP-060465	1430	3	Addition of the cpc parameter to TS24.229	7.4.0	7.5.0	C1-061882
2006-09	CP-33	CP-060466	1385	4	Introduction of GRUU in 24.229	7.4.0	7.5.0	C1-061858
2006-09	CP-33	CP-060466	1386	5	S-SCSF procedures to support GRUU	7.4.0	7.5.0	C1-061915
2006-09	CP-33	CP-060468	1405		Original dialog identifier	7.4.0	7.5.0	C1-061408
2006-09	CP-33	CP-060468	1406		No-fork	7.4.0	7.5.0	C1-061409
2006-09	CP-33	CP-060468	1409		Connection addres - zero	7.4.0	7.5.0	C1-061412
2006-09	CP-33	CP-060468	1415		Reference for populating the "Anonymous" From header	7.4.0	7.5.0	C1-061439
2006-09	CP-33	CP-060468	1439	1	Usage of P-Associated-URI	7.4.0	7.5.0	C1-061759
2006-09	CP-33	CP-060468	1450		Clarification of network initiated deregistration to match reginfo format	7.4.0	7.5.0	C1-061585
2006-09	CP-33	CP-060468	1456	2	Authentication between UA and UA	7.4.0	7.5.0	C1-061851
2006-09	CP-33	CP-060468	1457	2	Treatment by S-CSCF of profile changes for registered PUIs	7.4.0	7.5.0	C1-061853
2006-09	CP-33	CP-060468	1458	1	Completionof RFC 4320 fixes for 100 Trying responses Non-INVITE Transactions RFC 4320 fixes for 100 Trying responses Non-INVITE Transactions tration	7.4.0	7.5.0	C1-061765
2006-09	CP-33	CP-060468	1463		Correction to S-CSCF procedures for UE-originated requests	7.4.0	7.5.0	C1-061646
2006-09	CP-33	CP-060468	1464	1	SCTP transport	7.4.0	7.5.0	C1-061766
2006-09	CP-33	CP-060504	1257	4	SDP usage at MGCF	7.4.0	7.5.0	C1-061847
2006-09	CP-33	CP-060504	1417	1	Type 3 orig-ioi in I-CSCF	7.4.0	7.5.0	C1-061744
2006-09	CP-33	CP-060504	1469		SDP corrections	7.4.0	7.5.0	C1-061659
2006-09	CP-33	CP-060504	1471		SDP completion	7.4.0	7.5.0	C1-061661
2006-09	CP-33	CP-060504	1478	1	Updates to Profile Tables UE Major Capabilities	7.4.0	7.5.0	C1-061754
2006-09	CP-33	CP-060504	1481		Removal of Editor's notes in 24.229, rel-6	7.4.0	7.5.0	C1-061745
2006-09	CP-33	CP-060504	1483		Final codec selection	7.4.0	7.5.0	C1-061850
2006-09	CP-33	CP-060526	1418	3	Originating requests on behalf of an unregistered user	7.4.0	7.5.0	C1-061758
2006-09					Version 7.5.1 created by MCC to correct styles	7.5.0	7.5.1	
2006-12	CP-34	CP-060655	1502	-	RFC reference update	7.5.1	7.6.0	C1-061977
2006-12	CP-34	CP-060655	1506	-	SDP group attribute correction	7.5.1	7.6.0	C1-061981
2006-12	CP-34	CP-060655	1504	1	Addressing editor's notes relating to trust	7.5.1	7.6.0	C1-062304

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
					domains			
2006-12	CP-34	CP-060655	1546	-	Join header correction	7.5.1	7.6.0	C1-062205
2006-12	CP-34	CP-060655	1508	2	Processing the successful response at S-CSCF	7.5.1	7.6.0	C1-062434
2006-12	CP-34	CP-060655	1449	2	Correction of S-CSCF construction and UE interpretation of registration event notification	7.5.1	7.6.0	C1-062317
2006-12	CP-34	CP-060655	1514	1	Removal of more Editor's notes in 24.229, rel-6	7.5.1	7.6.0	C1-062310
2006-12	CP-34	CP-060659	1491	2	Location handling for emergency	7.5.1	7.6.0	C1-062437
2006-12	CP-34	CP-060659	1521	1	Location information for IMS emergency	7.5.1	7.6.0	C1-062293
2006-12	CP-34	CP-060659	1529	2	Emergency re-registration due to mobility	7.5.1	7.6.0	C1-062436
2006-12	CP-34	CP-060659	1515	1	Removal of Editor's notes on emergency call in clause 4	7.5.1	7.6.0	C1-062292
2006-12	CP-34	CP-060659	1484	1	Corrections to emergency call procedures for P-Asserted-Identity header	7.5.1	7.6.0	C1-062289
2006-12	CP-34	CP-060659	1543	-	Next hop is the BGCF	7.5.1	7.6.0	C1-062181
2006-12	CP-34	CP-060659	1536	-	Editorial corrections to emergency call text	7.5.1	7.6.0	C1-062142
2006-12	CP-34	CP-060659	1542	1	minor correction to EMC of UE and PCSCF	7.5.1	7.6.0	C1-062299
2006-12	CP-34	CP-060659	1490	2	Emergency call on existing registration	7.5.1	7.6.0	C1-062435
2006-12	CP-34	CP-060660	1486	2	Introduction of communication service concept in TS 24229	7.5.1	7.6.0	C1-062451
2006-12	CP-34	CP-060662	1494	1	Tel URI translation	7.5.1	7.6.0	C1-062325
2006-12	CP-34	CP-060662	1523	1	I-CSCF procedure	7.5.1	7.6.0	C1-062333
2006-12	CP-34	CP-060662	1544	-	Clarification of UEs initial SDP offer	7.5.1	7.6.0	C1-062189
2006-12	CP-34	CP-060662	1493	1	Alias URI	7.5.1	7.6.0	C1-062324
2006-12	CP-34	CP-060662	1525	1	Clarification of iFC execution for UE-terminated requests at S-CSCF	7.5.1	7.6.0	C1-062334
2006-12	CP-34	CP-060662	1533	1	SIP response code to unknown method	7.5.1	7.6.0	C1-062336
2006-12	CP-34	CP-060662	1537	-	Originating requests on behalf of an unregistered user	7.5.1	7.6.0	C1-062143
2006-12	CP-34	CP-060662	1538	-	Treatment by S-CSCF of profile changes for registered PUIs	7.5.1	7.6.0	C1-062144
2006-12	CP-34	CP-060662	1547	-	Corrections to Profile table for RFC 4320 compliance	7.5.1	7.6.0	C1-062210
2006-12	CP-34	CP-060662	1539	-	Miscellaneous editorial corrections	7.5.1	7.6.0	C1-062145
2006-12	CP-34	CP-060662	1509	1	No-forking at AS	7.5.1	7.6.0	C1-062329
2006-12	CP-34	CP-060662	1528	2	P-Visited-Network-ID on ISC interface	7.5.1	7.6.0	C1-062442
2006-12	CP-34	CP-060662	1487	1	Introduction of P-Profile Key in TS 24.229	7.5.1	7.6.0	C1-062322
2006-12	CP-34	CP-060662	1522	1	Local numbering	7.5.1	7.6.0	C1-062338
2006-12	CP-34	CP-060662	1495	2	BGCF procedures	7.5.1	7.6.0	C1-062440
2006-12	CP-34	CP-060662	1498	2	AS acting as PSI	7.5.1	7.6.0	C1-062441
2006-12	CP-34	CP-060662	1524	-	Clarification of the URI in UE-terminating requests at the P-CSCF	7.5.1	7.6.0	C1-062061

Change history								
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**	**WG doc**
2006-12	CP-34	CP-060662	1549	1	Core Network Service Authorizatrion	7.5.1	7.6.0	C1-062339
2006-12	CP-34	CP-060663	1527	3	Align with GRUU IETF draft 11	7.5.1	7.6.0	C1-062512
2006-12	CP-34	CP-060663	1496	1	I-CSCF processing GRUU	7.5.1	7.6.0	C1-062340
2006-12	CP-34	CP-060663	1497	1	S-CSCF processing GRUU	7.5.1	7.6.0	C1-062341
2006-12	CP-34	CP-060663	1422	3	GRUU processing by non-UE User Agents	7.5.1	7.6.0	C1-062343
2006-12	CP-34	CP-060667	1426	3	Allowing an asserted display name to be conveyed with a Public Identity	7.5.1	7.6.0	C1-062427
2006-12	CP-34	CP-060667	1429	4	Update to NAT Traversal procedures in support of Outbound and ICE	7.5.1	7.6.0	C1-062515
2006-12	CP-34	CP-060667	1540	2	Annex I (Transit IMS) improvements	7.5.1	7.6.0	C1-062516
2007-03	CP-35	CP-070130	1566	-	Session Establishment Interworking with Rel-5 UEs	7.6.0	7.7.0	C1-070052
2007-03	CP-35	CP-070130	1638	-	Inclusion of draft-ietf-sip-uri-list-message in SIP profile	7.6.0	7.7.0	C1-070266
2007-03	CP-35	CP-070130	1619	-	Clarifications on resource reservation	7.6.0	7.7.0	C1-070180
2007-03	CP-35	CP-070130	1621	1	Routeing B2BUA handling of Replaces header	7.6.0	7.7.0	C1-070439
2007-03	CP-35	CP-070132	1609	-	Establishing an emergency session	7.6.0	7.7.0	C1-070147
2007-03	CP-35	CP-070132	1575	-	Deletion of editors note in subclause 5.1.6.5	7.6.0	7.7.0	C1-070068
2007-03	CP-35	CP-070132	1639	-	Identification of emergency calls	7.6.0	7.7.0	C1-070276
2007-03	CP-35	CP-070132	1593	1	Limitation on Emergency Registration	7.6.0	7.7.0	C1-070424
2007-03	CP-35	CP-070132	1586	1	Tidyup UE clause	7.6.0	7.7.0	C1-070418
2007-03	CP-35	CP-070132	1654	1	Double reference removal	7.6.0	7.7.0	C1-070381
2007-03	CP-35	CP-070132	1605	1	Emergency PUID	7.6.0	7.7.0	C1-070419
2007-03	CP-35	CP-070132	1569	1	Handling of parallel emergency registration	7.6.0	7.7.0	C1-070413
2007-03	CP-35	CP-070132	1574	1	Deletion of editors note in subclause 5.1.6.2	7.6.0	7.7.0	C1-070414
2007-03	CP-35	CP-070132	1568	1	Connecting to an Emergency APN	7.6.0	7.7.0	C1-070409
2007-03	CP-35	CP-070132	1581	1	Deletion of Editor' s notes in 5.2.10	7.6.0	7.7.0	C1-070416
2007-03	CP-35	CP-070132	1641	-	Correction of service-urn	7.6.0	7.7.0	C1-070278
2007-03	CP-35	CP-070132	1589	-	Correction of CR#1484r1 implementation error (subclause 5.1.6.8.3)	7.6.0	7.7.0	C1-070111
2007-03	CP-35	CP-070132	1610	-	Emergency session-no registration	7.6.0	7.7.0	C1-070148
2007-03	CP-35	CP-070134	1612	2	Emergency treatment at P-CSCF	7.6.0	7.7.0	C1-070563
2007-03	CP-35	CP-070134	1635	1	Remove the term ESRP	7.6.0	7.7.0	C1-070430
2007-03	CP-35	CP-070134	1607	2	Emergency call at P-CSCF	7.6.0	7.7.0	C1-070443
2007-03	CP-35	CP-070134	1632	1	Backward compatibility for using 380 response	7.6.0	7.7.0	C1-070429
2007-03	CP-35	CP-070134	1653	3	Location for emergency	7.6.0	7.7.0	C1-070618
2007-03	CP-35	CP-070134	1626	1	Handling of re-registration when user redial emergency number	7.6.0	7.7.0	C1-070426
2007-03	CP-35	CP-070134	1582	2	Deletion of editors notes in 5.11 and 5.4.8	7.6.0	7.7.0	C1-070615

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2007-03	CP-35	CP-070134	1567	3	Home Network Indication for Emergency Calls	7.6.0	7.7.0	C1-070640
2007-03	CP-35	CP-070134	1631	2	Correction to emergency call procedure with non-emergency registration for P-Asserted-Identity header	7.6.0	7.7.0	C1-070617
2007-03	CP-35	CP-070137	1634	1	Profile definition for CSI application server	7.6.0	7.7.0	C1-070469
2007-03	CP-35	CP-070138	1660	1	Format of dsl-location	7.6.0	7.7.0	C1-070552
2007-03	CP-35	CP-070138	1595	1	Deletion of EN's in clause 5.10	7.6.0	7.7.0	C1-070547
2007-03	CP-35	CP-070138	1594	-	Deletion of EN's in Annex G	7.6.0	7.7.0	C1-070132
2007-03	CP-35	CP-070139	1613	2	Annex K NAT Traversal Procedural and References Updates	7.6.0	7.7.0	C1-070626
2007-03	CP-35	CP-070139	1617	1	Routing of SIP URI "user=phone" when domain doesn't own target user	7.6.0	7.7.0	C1-070551
2007-03	CP-35	CP-070139	1614	1	Annex A updates for Annex K NAT Traversal Procedurals	7.6.0	7.7.0	C1-070550
2007-03	CP-35	CP-070140	1598	1	Forked MESSAGE request	7.6.0	7.7.0	C1-070451
2007-03	CP-35	CP-070140	1558	1	Removal of notes for screening functionality	7.6.0	7.7.0	C1-070441
2007-03	CP-35	CP-070140	1556	1	Handling of special characters in the local service number	7.6.0	7.7.0	C1-070458
2007-03	CP-35	CP-070140	1655	2	Forwarding a request by transit functions in the S-CSCF	7.6.0	7.7.0	C1-070586
2007-03	CP-35	CP-070140	1587	1	Terminating case in S-CSCF	7.6.0	7.7.0	C1-070449
2007-03	CP-35	CP-070140	1559	-	Completion of SIP timers functionality	7.6.0	7.7.0	C1-070039
2007-03	CP-35	CP-070140	1588	1	P-User-Database	7.6.0	7.7.0	C1-070450
2007-03	CP-35	CP-070140	1560	1	Removal of notes for SIGCOMP functionality	7.6.0	7.7.0	C1-070442
2007-03	CP-35	CP-070140	1557	-	Removal of normative statements in NOTEs	7.6.0	7.7.0	C1-070037
2007-03	CP-35	CP-070140	1604	1	Forwarding P-Charging-Vector outside the home network	7.6.0	7.7.0	C1-070453
2007-03	CP-35	CP-070140	1555	1	Removal of Editor's notes for message bodies	7.6.0	7.7.0	C1-070440
2007-03	CP-35	CP-070140	1652	-	Correction for local numbers	7.6.0	7.7.0	C1-070341
2007-03	CP-35	CP-070140	1601	-	Tel URI translation	7.6.0	7.7.0	C1-070139
2007-03	CP-35	CP-070140	1646	1	Align definition of Alias URI with the description in 23.228	7.6.0	7.7.0	C1-070455
2007-03	CP-35	CP-070140	1600	2	Dual IP addresses	7.6.0	7.7.0	C1-070584
2007-03	CP-35	CP-070142	1642	-	SIP extensions covering URI-lists	7.6.0	7.7.0	C1-070279
2007-03	CP-35	CP-070148	1564	1	Network Initiated / Modified Media PDP Contexts	7.6.0	7.7.0	C1-070447
2007-03	CP-35	CP-070149	1643	-	SDP usage in association with BFCP (additions to SDP profile)	7.6.0	7.7.0	C1-070282
2007-03	CP-35	CP-070151	1648	2	S-CSCF inserts P-Called-Party-ID before forwarding request towards served user	7.6.0	7.7.0	C1-070588
2007-03	CP-35	CP-070151	1597	1	Instance ID	7.6.0	7.7.0	C1-070461
2007-03	CP-35	CP-070151	1615	1	Signalling Public User Identity to AS when request URI is Temp-GRUU	7.6.0	7.7.0	C1-070463

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2007-03	CP-35	CP-070214	1640	3	Location conveyance revisions	7.6.0	7.7.0	
2007-03	CP-35	CP-070242	1576	3	Deletion of editors notes in subclauses 5.1.6.8.2, 5.1.6.8.3, 5.1.6.8.4	7.6.0	7.7.0	
2007-03	CP-35	CP-070252	1658	4	Profile for IBCF	7.6.0	7.7.0	
2007-03	CP-35	CP-070254	1580	3	PCC introduction to TS 24.229	7.6.0	7.7.0	
2007-03	CP-35	CP-070255	1630	3	Corrections for the handling of target refresh requests at the S-CSCF	7.6.0	7.7.0	
2007-03	CP-35	CP-070271	1623	5	Further alignment with phonebcp draft	7.6.0	7.7.0	
2007-06	CP-36	CP-070370	1749	1	Correction of coding rules of P-Access-Network-Info header	7.7.0	7.8.0	C1-071435
2007-06	CP-36	CP-070370	1689	2	Inclusion of "addressing an amplification vulnerability in session initiation protocol forking proxies" (draft-ietf-sip-fork-loop-fix) in the SIP profile	7.7.0	7.8.0	C1-071409
2007-06	CP-36	CP-070373	1666	2	Protocol between E-CSCF and LRF	7.7.0	7.8.0	C1-071040
2007-06	CP-36	CP-070373	1690	-	Further alignment with phonebcp draft	7.7.0	7.8.0	C1-070779
2007-06	CP-36	CP-070373	1763	1	Emergency registration clarification	7.7.0	7.8.0	C1-071441
2007-06	CP-36	CP-070373	1665	1	Definition of identities used for emergency call	7.7.0	7.8.0	C1-070957
2007-06	CP-36	CP-070374	1714	1	Alignment of layout of access technology specific annexes	7.7.0	7.8.0	C1-071032
2007-06	CP-36	CP-070374	1715	1	GPRS IP-CAN change of normative requirement out of scope to informative	7.7.0	7.8.0	C1-071033
2007-06	CP-36	CP-070374	1732	2	Clarification on iFC execution	7.7.0	7.8.0	C1-071460
2007-06	CP-36	CP-070374	1721	1	UE un-subscribing to reg-event	7.7.0	7.8.0	C1-071419
2007-06	CP-36	CP-070374	1722	-	MO Record-Route at P-CSCF	7.7.0	7.8.0	C1-071051
2007-06	CP-36	CP-070374	1723	1	MT Record-Route at P-CSCF	7.7.0	7.8.0	C1-071420
2007-06	CP-36	CP-070374	1727	1	Double registration	7.7.0	7.8.0	C1-071422
2007-06	CP-36	CP-070374	1730	1	Inclusion of new mandatory elements of SigComp	7.7.0	7.8.0	C1-071423
2007-06	CP-36	CP-070374	1731	1	Use of a presence specific dictionary in SigComp	7.7.0	7.8.0	C1-071424
2007-06	CP-36	CP-070374	1720	1	Registration and deregistration	7.7.0	7.8.0	C1-071418
2007-06	CP-36	CP-070374	1746	1	Correction to P-CSCF procedures for cancellation of a session currently being established	7.7.0	7.8.0	C1-071431
2007-06	CP-36	CP-070374	1762	1	Originating a terminating request in an AS	7.7.0	7.8.0	C1-071433
2007-06	CP-36	CP-070374	1769	2	Clarification to Original Dialog Identifier	7.7.0	7.8.0	C1-071463
2007-06	CP-36	CP-070374	1761	-	Local numbering clarification	7.7.0	7.8.0	C1-071196
2007-06	CP-36	CP-070374	1760	1	PANI related corrections	7.7.0	7.8.0	C1-071437
2007-06	CP-36	CP-070374	1743	1	The precondition mechanism may be required in subsequent SDP offer/answer exchanges	7.7.0	7.8.0	C1-071430
2007-06	CP-36	CP-070374	1772	-	Minor miscellaneous clean-up	7.7.0	7.8.0	C1-071231
2007-06	CP-36	CP-070374	1739	1	P-CSCF processing of P-Early-Media	7.7.0	7.8.0	C1-071428

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2007-06	CP-36	CP-070374	1738	3	Originating UE sending of P-Early-Media	7.7.0	7.8.0	C1-071462
2007-06	CP-36	CP-070374	1737	2	Originating UE processing of P-Early-Media	7.7.0	7.8.0	C1-071461
2007-06	CP-36	CP-070375	1692	-	Profile support for a session initiation protocol event package and data format for various settings in support for the push-to-talk over cellular service (RFC4354)	7.7.0	7.8.0	C1-070781
2007-06	CP-36	CP-070375	1562	4	Completion of Phone-context parameter in rel-7	7.7.0	7.8.0	C1-071009
2007-06	CP-36	CP-070375	1700	-	Translation of non-international format numbers	7.7.0	7.8.0	C1-070810
2007-06	CP-36	CP-070375	1680	-	Outgoing Request URI=pres or IM URI processing clarification and misc clean-up	7.7.0	7.8.0	C1-070705
2007-06	CP-36	CP-070375	1691	1	Profile support for the P-Answer-State header extension to the session initiation protocol for the open mobile alliance push to talk over cellular (draft-allen-sipping-poc-p-answer-state-header)	7.7.0	7.8.0	C1-070987
2007-06	CP-36	CP-070375	1678	1	Qvalue	7.7.0	7.8.0	C1-070984
2007-06	CP-36	CP-070375	1704	-	Minor miscellaneous clean-up	7.7.0	7.8.0	C1-070824
2007-06	CP-36	CP-070375	1703	-	Filter criteria evaluation when the AS changes the P-Asserted-Identity	7.7.0	7.8.0	C1-070823
2007-06	CP-36	CP-070378	1718	1	Addition to network initiated PDP context	7.7.0	7.8.0	C1-071346
2007-06	CP-36	CP-070380	1679	-	Cleanup of Signalling Public GRUU to AS	7.7.0	7.8.0	C1-070704
2007-06	CP-36	CP-070380	1663	-	Provide GRUU functionality in case of hosted NAT	7.7.0	7.8.0	C1-070663
2007-06	CP-36	CP-070380	1756	1	GRUU Alignment with stage 2	7.7.0	7.8.0	C1-071456
2007-06	CP-36	CP-070380	1686	2	Alternate GRUU for AS acting on behalf of Public User Identity	7.7.0	7.8.0	C1-071010
2007-06	CP-36	CP-070380	1713	2	Cleanup of GRUU	7.7.0	7.8.0	C1-071238
2007-06	CP-36	CP-070380	1766	1	Management of GRUU	7.7.0	7.8.0	C1-071457
2007-06	CP-36	CP-070380	1711	2	Use of GRUU for Emergency Sessions	7.7.0	7.8.0	C1-071458
2007-06	CP-36	CP-070383	1773	-	IMS Communication Service ID registration	7.7.0	7.8.0	C1-071234
2007-06	CP-36	CP-070383	1645	6	IMS Communication Service ID 24.229	7.7.0	7.8.0	C1-071475
2007-06	CP-36	CP-070388	1735	2	Correction on the handlng of CPC parameter regarding trust domain	7.7.0	7.8.0	C1-071464
2007-06	CP-36	CP-070388	1662	-	Tidyup open issues from FBI work item	7.7.0	7.8.0	C1-070662
2007-06	CP-36	CP-070388	1596	5	Update to NAT Traversal procedures in support of Outbound and ICE	7.7.0	7.8.0	C1-071400
2007-06	CP-36	CP-070388	1740	1	IBCF processing of P-Early-Media	7.7.0	7.8.0	C1-071404
2007-06	CP-36	CP-070388	1742	1	IBCF Path header	7.7.0	7.8.0	C1-071405
2007-06	CP-36	CP-070436	1696	3	Endorsement of P-Early-Media header draft	7.7.0	7.8.0	
2007-06	CP-36	CP-070447	1698	3	Report of new transit scenario documented in stage 2	7.7.0	7.8.0	-
2007-06	CP-36	CP-070450	1771	3	THIG processing correction to ensure conformity to RFC 3261	7.7.0	7.8.0	-
2007-06	CP-36	CP-070496	1717	4	PCC impact	7.7.0	7.8.0	-

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2007-06	CP-36	CP-070393	1751	1	Resource-Priority header and trust domains	7.7.0	8.0.0	C1-071446
2007-06	CP-36	CP-070393	1695	2	Inclusion policy for Resource-Priority header in support of multimedia priority service	7.7.0	8.0.0	C1-071443
2007-06	CP-36	CP-070393	1694	2	Inclusion of "communications resource priority for the session initiation protocol" (RFC4412) in the SIP profile	7.7.0	8.0.0	C1-071444
2007-06	CP-36	CP-070393	1693	1	Inclusion of "extending the session initiation protocol Reason header for preemption events" (RFC4411) in the SIP profile	7.7.0	8.0.0	C1-070918
2007-06	CP-36	CP-070396	1682	2	IMS Enhancements to Support Number Portability (NP) for Cable Networks	7.7.0	8.0.0	C1-070994
2007-06	CP-36	CP-070396	1681	4	Enhancements to Support Preferred Circuit Carrier Access and Dial-Around for Cable Networks	7.7.0	8.0.0	C1-071294
2007-09	CP-37	CP-070578	1945		Correction of the Authorization Header in the Profile Table	8.0.0	8.1.0	C1-072085
2007-09	CP-37	CP-070578	1811		Integrity param in De- and ReREGISTER	8.0.0	8.1.0	C1-071573
2007-09	CP-37	CP-070579	1905	2	Clarification of DTD	8.0.0	8.1.0	C1-072150
2007-09	CP-37	CP-070580	1795	2	Unprotected registration at UE	8.0.0	8.1.0	C1-072153
2007-09	CP-37	CP-070580	1876		IETF reference updates	8.0.0	8.1.0	C1-071772
2007-09	CP-37	CP-070580	1924	1	P-Access-Network-Info header clarification	8.0.0	8.1.0	C1-072042
2007-09	CP-37	CP-070580	1922	1	Optional rport parameter in UE	8.0.0	8.1.0	C1-072039
2007-09	CP-37	CP-070580	1797	1	Unprotected registration at S-CSCF	8.0.0	8.1.0	C1-072052
2007-09	CP-37	CP-070584	1866		Emergency Registration without eAPN	8.0.0	8.1.0	C1-071728
2007-09	CP-37	CP-070585	1878		IETF reference updates relating to emergency call feature	8.0.0	8.1.0	C1-071776
2007-09	CP-37	CP-070585	1892	1	Correction of emergency procedures unregistered user case	8.0.0	8.1.0	C1-072018
2007-09	CP-37	CP-070585	1894		Emergency registration timer in visited network	8.0.0	8.1.0	C1-071808
2007-09	CP-37	CP-070585	1927		Contents of From header when initiating an emergency session within a emergency registration	8.0.0	8.1.0	C1-071874
2007-09	CP-37	CP-070586	1861	1	Correction for the URNs of IMS Communication Service Identifier and IMS Application Reference Identifier	8.0.0	8.1.0	C1-071956
2007-09	CP-37	CP-070586	1909	2	Completing UE ICSI/IARI procedures	8.0.0	8.1.0	C1-072162
2007-09	CP-37	CP-070586	1842	1	S-CSCF option to add P-Asserted-Service in UE-originated case	8.0.0	8.1.0	C1-071952
2007-09	CP-37	CP-070586	1911	2	Completing S-CSCF ICSI/IARI procedures	8.0.0	8.1.0	C1-072164
2007-09	CP-37	CP-070586	1826	1	Cleanup of text related to contact header dealing with ICSI	8.0.0	8.1.0	C1-071942
2007-09	CP-37	CP-070586	1838	2	Description of the ICSI as an assigned identifier	8.0.0	8.1.0	C1-072159
2007-09	CP-37	CP-070586	1929	1	ICSI Alignments with reqs 2, 3 and 11	8.0.0	8.1.0	C1-071947
2007-09	CP-37	CP-070586	1942	1	UE usage of ServideID received from the network	8.0.0	8.1.0	C1-072181

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2007-09	CP-37	CP-070586	1840		Correction of application server handling of ICSI and IARI values	8.0.0	8.1.0	C1-071676
2007-09	CP-37	CP-070590	1807	3	Trust Domain in IMS	8.0.0	8.1.0	C1-072185
2007-09	CP-37	CP-070590	1799	1	Unprotected registration at P-CSCF	8.0.0	8.1.0	C1-072054
2007-09	CP-37	CP-070590	1793	1	Protected registration	8.0.0	8.1.0	C1-072046
2007-09	CP-37	CP-070590	1804	1	No multiple simultanous Registration	8.0.0	8.1.0	C1-072056
2007-09	CP-37	CP-070590	1864	1	Corrections of tables in Annex A	8.0.0	8.1.0	C1-072065
2007-09	CP-37	CP-070590	1879	1	Essential corrections to P-Early-Media header procedures	8.0.0	8.1.0	C1-072062
2007-09	CP-37	CP-070590	1881		IETF SigComp reference updates	8.0.0	8.1.0	C1-071779
2007-09	CP-37	CP-070590	1934		SIP related reference update	8.0.0	8.1.0	C1-071888
2007-09	CP-37	CP-070590	1913	1	Removal of IBCF Route Headers Editors Note	8.0.0	8.1.0	C1-072073
2007-09	CP-37	CP-070590	1854	1	Clarification on P-Profile-Key	8.0.0	8.1.0	C1-072063
2007-09	CP-37	CP-070592	1817		Resolve FFS for AS-GRUU	8.0.0	8.1.0	C1-071581
2007-09	CP-37	CP-070596	1885	2	Update Emergency NAT Traversal Procedures Annex K	8.0.0	8.1.0	C1-072078
2007-09	CP-37	CP-070596	1883	1	Update GRUU NAT Traversal Procedures Annex-K	8.0.0	8.1.0	C1-071926
2007-09	CP-37	CP-070600	1750	3	Resource-Priority and priority	7.8.0	8.1.0	C1-072132
2007-09	CP-37	CP-070600	1919	2	Addition of MGCF for optional support of Resource-Priority	8.0.0	8.1.0	C1-072184
2007-09	CP-37	CP-070601	1815	2	Updates to Annex K in support of SIP Digest and TLS procedures	8.0.0	8.1.0	C1-072137
2007-09	CP-37	CP-070601	1812	4	UE Digest and TLS Procedures	8.0.0	8.1.0	C1-072172
2007-09	CP-37	CP-070601	1814	4	S-CSCF Digest and TLS Procedures	8.0.0	8.1.0	C1-072174
2007-09	CP-37	CP-070601	1813	4	P-CSCF Digest and TLS Procedures	8.0.0	8.1.0	C1-072173
2007-09	CP-37	CP-070603	1847	1	Cleanup of SigComp dictionary support	8.0.0	8.1.0	C1-072144
2007-09	CP-37	CP-070603	1896	1	S-CSCF procedure corrections	8.0.0	8.1.0	C1-072089
2007-09	CP-37	CP-070603	1935		Restructuring of subclause 5.2.6 (General treatment for all dialogs and standalone transactions excluding the REGISTER method) of the P-CSCF	8.0.0	8.1.0	C1-071891
2007-09	CP-37	CP-070603	1788	2	Request-URI in registration	8.0.0	8.1.0	C1-072154
2007-09	CP-37	CP-070670	1907	3	Definition of feature tag for IARI/ICSI	8.0.0	8.1.0	C1-072006
2007-09	CP-37	CP-070674	1791	2	Emergency registration	8.0.0	8.1.0	C1-072016
2007-09	CP-37	CP-070676	1851	4	P-CSCF behaviour upon loss of SIP signalling transport	8.0.0	8.1.0	C1-072178
2007-09	CP-37	CP-070691	1926	5	UE setting of IARI	8.0.0	8.1.0	C1-072166
2007-12	CP-38	CP-070735	2077	1	Update P-Early-Media Reference	8.1.0	8.2.0	C1-072750
2007-12	CP-38	CP-070785	2065		Authenticating with AKAv1-MD5	8.1.0	8.2.0	C1-072533
2007-12	CP-38	CP-070785	2115		Proxy profile corrections	8.1.0	8.2.0	C1-072922

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2007-12	CP-38	CP-070785	2111		Corrections to RFC 3329 entries in profile	8.1.0	8.2.0	C1-072918
2007-12	CP-38	CP-070785	2041	1	Corrections for re-authenticating user	8.1.0	8.2.0	C1-072553
2007-12	CP-38	CP-070785	2049	3	Introduction of versioning and conventions	8.1.0	8.2.0	C1-072989
2007-12	CP-38	CP-070788	2028	1	Coverage of access technology specific text	8.1.0	8.2.0	C1-072746
2007-12	CP-38	CP-070788	2017	2	Action on missing "integrity-protected" parameter	8.1.0	8.2.0	C1-073179
2007-12	CP-38	CP-070788	2035	1	MGCF does not act as a proxy	8.1.0	8.2.0	C1-072565
2007-12	CP-38	CP-070788	2070	1	Correction to subclause 7.2A.5.2.2	8.1.0	8.2.0	C1-073052
2007-12	CP-38	CP-070791	1999	1	380 at normal call setup	8.1.0	8.2.0	C1-072670
2007-12	CP-38	CP-070791	2062	2	Miscellaneous EMC1 corrections	8.1.0	8.2.0	C1-072748
2007-12	CP-38	CP-070791	2120		Introductory text for emergency service	8.1.0	8.2.0	C1-072930
2007-12	CP-38	CP-070794	1990		Correct sub-section references in Annex-K	8.1.0	8.2.0	C1-072295
2007-12	CP-38	CP-070794	2023		Correction of outbound and ice option tag support in profile tables	8.1.0	8.2.0	C1-072383
2007-12	CP-38	CP-070795	1986	1	Align with draft-gruu-reg-ev-09	8.1.0	8.2.0	C1-072752
2007-12	CP-38	CP-070795	2043	1	Addition of GRUU to emergency set-up when registration exists	8.1.0	8.2.0	C1-072599
2007-12	CP-38	CP-070799	2067	1	P-CSCF Releases/Rejects session due to PCRF responses	8.1.0	8.2.0	C1-073067
2007-12	CP-38	CP-070805	2053	2	Terminating UE ICSI procedures	8.1.0	8.2.0	C1-072708
2007-12	CP-38	CP-070805	2021	1	Correction to digest and TLS Procedures for Annex K	8.1.0	8.2.0	C1-072508
2007-12	CP-38	CP-070805	1951	1	Correction to the examples for ICSI and IARI values	8.1.0	8.2.0	C1-072490
2007-12	CP-38	CP-070805	2014	2	Encoding of ICSI and IARI within the g.ims.app_ref feature tag	8.1.0	8.2.0	C1-072704
2007-12	CP-38	CP-070805	2051	1	Multiple IARI/ICSI values in g.ims.app_ref feature tag	8.1.0	8.2.0	C1-072512
2007-12	CP-38	CP-070805	1969	1	One ICSI value per P-Preferred-Service header	8.0.0	8.2.0	C1-072496
2007-12	CP-38	CP-070805	1963	1	Change of name for feature tag g.ims.app_ref	8.0.0	8.2.0	C1-072492
2007-12	CP-38	CP-070806	2008	2	Handling of invalid and unauthorized media based on Communication Service Identifiers	8.1.0	8.2.0	C1-072702
2007-12	CP-38	CP-070806	2092	2	S-CSCF Processing of P-Preferred-Service and P-Asserted-Service	8.1.0	8.2.0	C1-073204
2007-12	CP-38	CP-070806	2107	2	The received list of ICSIs from the Network	8.1.0	8.2.0	C1-073206
2007-12	CP-38	CP-070806	2088		ICSI in Annex F	8.1.0	8.2.0	C1-072841
2007-12	CP-38	CP-070806	2019	2	Miscellaneous service identifier corrections	8.1.0	8.2.0	C1-073106
2007-12	CP-38	CP-070806	1965	3	Minor corrections to P-Preferred and P-Asserted Service headers	8.1.0	8.2.0	C1-073102
2007-12	CP-38	CP-070806	1976	2	Correction to S-CSCF handling of IMS communication service	8.1.0	8.2.0	C1-072700
2007-12	CP-38	CP-070807	2005	1	No SIPS	8.1.0	8.2.0	C1-072593
2007-12	CP-38	CP-070807	1961	1	Route header verification at P-CSCF	8.1.0	8.2.0	C1-072587

Change history								
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**	**WG doc**
2007-12	CP-38	CP-070807	1955	1	Update of the reference for P-Profile-Key Private Header (P-Header)	8.1.0	8.2.0	C1-072487
2007-12	CP-38	CP-070807	2012		Reference alignment	8.1.0	8.2.0	C1-072364
2007-12	CP-38	CP-070807	2037	1	AS does not subscribe to reg-event package when user is unregistered	8.1.0	8.2.0	C1-072597
2007-12	CP-38	CP-070807	2045	2	Correction of mutually exclusive ICSI and GRUU	8.1.0	8.2.0	C1-072706
2007-12	CP-38	CP-070807	2055		Update of P-Answer-State header draft Reference	8.1.0	8.2.0	C1-072446
2007-12	CP-38	CP-070808	2057	2	Clarification of UE handling of the P-Early-Media header.	8.1.0	8.2.0	C1-072723
2007-12	CP-38	CP-070808	2100	1	Access Network Info for I-WLAN	8.1.0	8.2.0	C1-073075
2007-12	CP-38	CP-070808	2003	2	Service Profile Change	8.1.0	8.2.0	C1-072718
2007-12	CP-38	CP-070808	1957	4	Correction to the IBCF subsection in relation with trusted domain	8.1.0	8.2.0	C1-072687
2007-12	CP-38	CP-070808	2072	2	Correction to procedure when registration timer times out	8.1.0	8.2.0	C1-073173
2007-12	CP-38	CP-070808	2103	1	Access Network Info for 3GPP2/UMB	8.1.0	8.2.0	C1-073057
2007-12	CP-38	CP-070810	2081	3	Correction of multiple Contact headers in abnormal case	8.1.0	8.2.0	C1-073226
2007-12	CP-38	CP-070810	2117	1	Miscellaneous editorial corrections (part 3)	8.1.0	8.2.0	C1-073165
2007-12	CP-38	CP-070810	1932	4	Incorporation of draft-ietf-consent-framework	8.1.0	8.2.0	C1-073166
2007-12	CP-38	CP-070810	2098	1	Superfluous requirements for removing charging information at terminating P-CSCF	8.1.0	8.2.0	C1-073164
2007-12	CP-38	CP-070810	1974	1	Synchronization When Service Profile Being Modified	8.1.0	8.2.0	C1-072661
2007-12	CP-38	CP-070810	2029	3	Miscellaneous editorial corrections	8.1.0	8.2.0	C1-072764
2007-12	CP-38	CP-070810	2059	3	Miscellaneous editorial corrections (part 2)	8.1.0	8.2.0	C1-073162
2007-12	CP-38	CP-070811	2078	1	Clarification on interconnect functionalities	8.1.0	8.2.0	C1-073163
2007-12	CP-38	CP-070812	2086	1	Semantics for values in "integrity-protected" field	8.1.0	8.2.0	C1-073112
2007-12	CP-38	CP-070812	2060	3	Public user identity and private user identity derivation in UEs without UICC	8.1.0	8.2.0	C1-073201
2007-12	CP-38	CP-070812	2006	1	Digest Support in Profile Tables	8.1.0	8.2.0	C1-072623
2007-12	CP-38	CP-070812	2026	1	Security-related references and definitions	8.1.0	8.2.0	C1-072761
2007-12	CP-38	CP-070812	2025	3	Introduction to security mechanisms	8.1.0	8.2.0	C1-073175
2007-12	CP-38	CP-070812	1982	6	Updates to integrity protection for digest and TLS	8.1.0	8.2.0	C1-073202
2007-12	CP-38	CP-070814	2085	4	Addition of SIP header to support UUS1	8.1.0	8.2.0	C1-073208
2007-12	CP-38	CP-070816	2024	5	Integration of text for digest and TLS plus digest into the main body of the specification	8.1.0	8.2.0	C1-073200
2007-12	CP-38	CP-070864	1953	5	Clarifications on NW-init and resource reservation	8.1.0	8.2.0	C1-073069
2007-12	CP-38	CP-070875	1997	4	Corrections for emergency procedures	8.1.0	8.2.0	C1-072991
2008-03	CP-39	CP-080120	2174		Reference correction for RFC 4244	8.2.0	8.3.0	C1-080147

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2008-03	CP-39	CP-080120	2149		Handling of the reason header in requests at the MGCF	8.2.0	8.3.0	C1-080045
2008-03	CP-39	CP-080120	2162	1	Correction on handling of P-Charging-Vector at IBCF	8.2.0	8.3.0	C1-080515
2008-03	CP-39	CP-080120	2181	1	Correction of Alias	8.2.0	8.3.0	C1-080517
2008-03	CP-39	CP-080120	2176		SDP with precondition	8.2.0	8.3.0	C1-080149
2008-03	CP-39	CP-080126	2201	2	Handling of Service ID in interworking cases	8.2.0	8.3.0	C1-080630
2008-03	CP-39	CP-080126	2155	2	Clarification on the use of IARI in the contact header	8.2.0	8.3.0	C1-080635
2008-03	CP-39	CP-080126	2183	2	UE behaviour when no ICSI is contained in the Accept-Contact header	8.2.0	8.3.0	C1-080531
2008-03	CP-39	CP-080130	2143	1	Procedure at S-CSCF	8.2.0	8.3.0	C1-080600
2008-03	CP-39	CP-080130	2144		Empty RES	8.2.0	8.3.0	C1-080009
2008-03	CP-39	CP-080130	2145	1	Alias URI	8.2.0	8.3.0	C1-080601
2008-03	CP-39	CP-080130	2146	2	Notification at S-CSCF	8.2.0	8.3.0	C1-080631
2008-03	CP-39	CP-080130	2156	1	Correction of example of IARI coding	8.2.0	8.3.0	C1-080526
2008-03	CP-39	CP-080130	2160	1	Correction on the value used for P-Preferred-Identity header at UE	8.2.0	8.3.0	C1-080513
2008-03	CP-39	CP-080130	2170	1	Correction to user initiated mergency re-registration	8.2.0	8.3.0	C1-080405
2008-03	CP-39	CP-080130	2187	1	IPv4 and IPv6 support	8.2.0	8.3.0	C1-080609
2008-03	CP-39	CP-080130	2188	4	P-CSCF awareness for 3GPP accesses	8.2.0	8.3.0	C1-080658
2008-03	CP-39	CP-080130	2196	2	Annex K: ICE procedures for the IBCF	8.2.0	8.3.0	C1-080643
2008-03	CP-39	CP-080131	2192	1	Completion of CIC and DAI requirements for MGCF	8.2.0	8.3.0	C1-080472
2008-03	CP-39	CP-080132	2163	1	Miscelanous Corrections on SIP Digest	8.2.0	8.3.0	C1-080473
2008-03	CP-39	CP-080132	2189	1	Enhancements to security introduction text	8.2.0	8.3.0	C1-080474
2008-03	CP-39	CP-080134	2190	1	Inclusion of NASS bundled authentication	8.2.0	8.3.0	C1-080518
2008-03	CP-39	CP-080139	2164	1	SIP XML addition for support of transit specific content	8.2.0	8.3.0	C1-080533
2008-03	CP-39	CP-080140	2138	2	IP-CAN procedure for cdma2000	8.2.0	8.3.0	C1-080411
2008-03	CP-39	CP-080140	2141	2	P-CSCF interface to IP-CAN	8.2.0	8.3.0	C1-080413
2008-03	CP-39	CP-080140	2140	2	Access-network-charging-info for cdma2000 access	8.2.0	8.3.0	C1-080412
2008-03	CP-39	CP-080141	2197	1	Wildcarded Public User Identity: P-CSCF impact	8.2.0	8.3.0	C1-080612
2008-03	CP-39	CP-080141	2198	2	Wildcarded Public User Identity: S-CSCF impact	8.2.0	8.3.0	C1-080644
2008-03	CP-39	CP-080199	2147	4	NAT traversal	8.2.0	8.3.0	
2008-03	CP-39	CP-080201	2151	5	Handling of the reason header in responses	8.2.0	8.3.0	
2008-06	CP-40	CP-080338	2288	1	Correction to de-registration procedure when registration expirated	8.3.0	8.4.0	C1-081936
2008-06	CP-40	CP-080340	2215	-	Revision of references to documents from IETF ECRIT working group	8.3.0	8.4.0	C1-080854

Change history								
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**	**WG doc**
2008-06	CP-40	CP-080341	2243	1	Correction to P-CSCF session release procedures	8.3.0	8.4.0	C1-081336
2008-06	CP-40	CP-080341	2275	2	Addition of AVPF support	8.3.0	8.4.0	C1-082022
2008-06	CP-40	CP-080341	2258	1	Correction on identifiers distinguishing the dialog	8.3.0	8.4.0	C1-081338
2008-06	CP-40	CP-080341	2238	1	Removal of reason header annex	8.3.0	8.4.0	C1-081334
2008-06	CP-40	CP-080341	2217	-	Revision of references to documents from IETF	8.3.0	8.4.0	C1-080858
2008-06	CP-40	CP-080341	2277	1	Addition of the SDP Capability Negotiaion mechanism	8.3.0	8.4.0	C1-081932
2008-06	CP-40	CP-080343	2158	6	Handling of SDP at the terminating UE	8.3.0	8.4.0	C1-082050
2008-06	CP-40	CP-080344	2290	-	Correction of GRUU references	8.3.0	8.4.0	C1-081799
2008-06	CP-40	CP-080349	2236	-	Revision of references to documents from IETF SIP working group	8.3.0	8.4.0	C1-080860
2008-06	CP-40	CP-080353	2203	1	Emergency calls - NAT traversal at UE	8.3.0	8.4.0	C1-081228
2008-06	CP-40	CP-080353	2204	1	NAT traversal for emergency calls at P-CSCF	8.3.0	8.4.0	C1-081229
2008-06	CP-40	CP-080353	2220	1	PANI header text revision	8.3.0	8.4.0	C1-081346
2008-06	CP-40	CP-080353	2225	1	Addition of 802.11n to P-Access-Network-Info header	8.3.0	8.4.0	C1-081348
2008-06	CP-40	CP-080353	2205	3	"im" URI	8.3.0	8.4.0	C1-081411
2008-06	CP-40	CP-080353	2254	2	Annex K: Moving of IBCF ICE procedures	8.3.0	8.4.0	C1-081469
2008-06	CP-40	CP-080353	2168	9	Correction of 3GPP IM CN subsystem XML handling	8.3.0	8.4.0	C1-081481
2008-06	CP-40	CP-080353	2221	1	Media transcoding control functionality in IBCF	8.3.0	8.4.0	C1-081347
2008-06	CP-40	CP-080353	2219	1	PANI header coding	8.3.0	8.4.0	C1-081345
2008-06	CP-40	CP-080353	2209	1	Alias URI	8.3.0	8.4.0	C1-081343
2008-06	CP-40	CP-080353	2136	7	3GPP IM CN subsystem XML Schema version	8.3.0	8.4.0	C1-081480
2008-06	CP-40	CP-080353	2255	3	Annex K: ICE procedures for the P-CSCF	8.3.0	8.4.0	C1-081470
2008-06	CP-40	CP-080354	2284	2	SDP Enhancements to support resource allocation	8.3.0	8.4.0	C1-082045
2008-06	CP-40	CP-080354	2218	2	B2BUA AS influence of filter criteria evaluation	8.3.0	8.4.0	C1-082033
2008-06	CP-40	CP-080354	2263	1	Multiple contact addresses	8.3.0	8.4.0	C1-082041
2008-06	CP-40	CP-080354	2280	-	Annex A : SIP Record-Route header table correction	8.3.0	8.4.0	C1-081605
2008-06	CP-40	CP-080354	2206	2	"rport" and "received" parameters at P-CSCF	8.3.0	8.4.0	C1-081871
2008-06	CP-40	CP-080354	2282	1	Display Name in Reg Event	8.3.0	8.4.0	C1-082027
2008-06	CP-40	CP-080354	2285	-	Update IETF draft reference	8.3.0	8.4.0	C1-081701
2008-06	CP-40	CP-080354	2207	2	UE handling the "rport" parameter	8.3.0	8.4.0	C1-081872
2008-06	CP-40	CP-080355	2234	4	Annex K alignment with main body and cleanup	8.3.0	8.4.0	C1-082043
2008-06	CP-40	CP-080355	2291	1	Determining when to invoke SIP Digest procedures in S-CSCF	8.3.0	8.4.0	C1-081944
2008-06	CP-40	CP-080355	2269	1	Cleanup of SIP Digest/TLS procedures	8.3.0	8.4.0	C1-081942

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2008-06	CP-40	CP-080359	2260	2	P-CSCF: Aligning P-Profile-Key behaviour for Wildcarded public user identities with Wildcarded PSI	8.3.0	8.4.0	C1-081476
2008-06	CP-40	CP-080359	2212	4	Dial string handling	8.3.0	8.4.0	C1-082110
2008-06	CP-40	CP-080359	2261	2	Trustdomain: Adding P-Profile-Key header to the trustdomain	8.3.0	8.4.0	C1-081477
2008-06	CP-40	CP-080359	2239	1	Trust domain changes for identity headers for business communication	8.3.0	8.4.0	C1-081206
2008-06	CP-40	CP-080359	2259	2	I-CSCF: Aligning P-Profile-Key behaviour for Wildcarded public user identities with Wildcarded PSI procedures	8.3.0	8.4.0	C1-081475
2008-06	CP-40	CP-080359	2232	2	Delivering Request-URI to UE managing several terminals	8.3.0	8.4.0	C1-081474
2008-06	CP-40	CP-080359	2262	-	Private network indication annex A changes	8.3.0	8.4.0	C1-081210
2008-06	CP-40	CP-080359	2240	3	Handling of private network indication	8.3.0	8.4.0	C1-081953
2008-06	CP-40	CP-080360	2273	1	Event package usage for Message Waiting Indication (MWI) service	8.3.0	8.4.0	C1-081901
2008-06	CP-40	CP-080360	2226	3	XML-support of transit specific content Tables	8.3.0	8.4.0	C1-081905
2008-06	CP-40	CP-080364	2222	3	Depth of IMS service level trace	8.3.0	8.4.0	C1-081955
2008-06	CP-40	CP-080366	2252	1	Emergency CS call set up procedures for non-3GPP systems	8.3.0	8.4.0	C1-081465
2008-06	CP-40	CP-080366	2268	1	Different IP addresses	8.3.0	8.4.0	C1-081945
2008-06	CP-40	CP-080366	2251	1	Remove specific codec requirement	8.3.0	8.4.0	C1-081464
2008-06	CP-40	CP-080400	2208	2	"rport" parameter	8.3.0	8.4.0	-
2008-06	CP-40	CP-080402	2296	-	IARI and ICSI in different feature tags	8.3.0	8.4.0	-
2008-06	CP-40	CP-080417	2211	5	Call forwarding in IMS	8.3.0	8.4.0	-
2008-06					Editorial change done by MCC	8.4.0	8.4.1	
2008-09	CP-41	CP-080643	2177	7	Allow Multiple Registrations in Rel 8 by using Outbound	8.4.1	8.5.0	
2008-09	CP-41	CP-080539	2178	6	Add Timestamp in Register Request	8.4.1	8.5.0	C1-082810
2008-09	CP-41	CP-080527	2297	1	Cleanup of P-CSCF procedures for inclusion of "tls-yes" and "tls-pending"	8.4.1	8.5.0	C1-082623
2008-09	CP-41	CP-080538	2298	1	Introduction of GIBA (Early IMS) procedures	8.4.1	8.5.0	C1-082657
2008-09	CP-41	CP-080527	2299	1	Add reference to draft-dotson-sip-mutual-auth	8.4.1	8.5.0	C1-082621
2008-09	CP-41	CP-080523	2301	1	Correction of DHCP reference	8.4.1	8.5.0	C1-082620
2008-09	CP-41	CP-080523	2302		Reference correction	8.4.1	8.5.0	C1-082142
2008-09	CP-41	CP-080515	2306	1	Annex A: Correction of SDP connection information	8.4.1	8.5.0	C1-082611
2008-09	CP-41	CP-080523	2308	1	Backward compability issue with P-Access-Network-Info ABNF extension	8.4.1	8.5.0	C1-082625
2008-09	CP-41	CP-080517	2314		Addition of AVPF support and SDP capability negotiation mechanism	8.4.1	8.5.0	C1-082268
2008-09	CP-41	CP-080520	2316		Profile corrections for outbound	8.4.1	8.5.0	C1-082270

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2008-09	CP-41	CP-080531	2319		Support of Direct Ethernet access as IP-CAN	8.4.1	8.5.0	C1-082324
2008-09	CP-41	CP-080520	2323	1	Update Outbound Reference	8.4.1	8.5.0	C1-082626
2008-09	CP-41	CP-080523	2325	2	Error Response for Different S-CSCF Assignment	8.4.1	8.5.0	C1-082770
2008-09	CP-41	CP-080527	2328	1	Annex K Technical Corrections	8.4.1	8.5.0	C1-082622
2008-09	CP-41	CP-080528	2329	1	Adding P-Debug-ID to SIP Profile Tables	8.4.1	8.5.0	C1-082752
2008-09	CP-41	CP-080528	2330	2	Subscribing to the debug event package	8.4.1	8.5.0	C1-082781
2008-09	CP-41	CP-080522	2331	4	EPS as IP-CAN	8.4.1	8.5.0	C1-083637
2008-09	CP-41	CP-080523	2333	2	Alignment of IP-CAN specific annexes	8.4.1	8.5.0	C1-082778
2008-09	CP-41	CP-080516	2336		Emergency PUID	8.4.1	8.5.0	C1-082864
2008-09	CP-41	CP-080667	2340	3	Initial emergency registration	8.4.1	8.5.0	
2008-09	CP-41	CP-080516	2342	2	Emergency session set-up	8.4.1	8.5.0	C1-083532
2008-09	CP-41	CP-080516	2344	1	P-CSCF handling of emergency sessions	8.4.1	8.5.0	C1-083391
2008-09	CP-41	CP-080516	2346	3	S-CSCF handling of emergency registration	8.4.1	8.5.0	C1-083534
2008-09	CP-41	CP-080523	2347	1	Informative Explanation and Corrections of Profile Tables	8.4.1	8.5.0	C1-083353
2008-09	CP-41	CP-080523	2350	1	More than one contact address per UE	8.4.1	8.5.0	C1-083351
2008-09	CP-41	CP-080528	2351	1	IMS Trace for entities not on the path of the register request	8.4.1	8.5.0	C1-083383
2008-09	CP-41	CP-080528	2352	1	Start and stop procedures for IMS trace	8.4.1	8.5.0	C1-083384
2008-09	CP-41	CP-080636	2353	1	Align emergency session handling outside a security association or TLS session	8.4.1	8.5.0	
2008-09	CP-41	CP-080637	2354	3	Addressing privacy requirement	8.4.1	8.5.0	
2008-09	CP-41	CP-080523	2359	2	SDP Offer	8.4.1	8.5.0	C1-083398
2008-09	CP-41	CP-080515	2362		SDP referencing error for IBCF (IMS-ALG)	8.4.1	8.5.0	C1-082927
2008-09	CP-41	CP-080523	2363	2	Addition of draft-ietf-sip-199-00	8.4.1	8.5.0	C1-083399
2008-09	CP-41	CP-080523	2365	1	Usage of draft-holmberg-sip-keep-01 for emergency session	8.4.1	8.5.0	C1-083395
2008-09	CP-41	CP-080537	2366	1	Mediactrl and netann specifications	8.4.1	8.5.0	C1-083363
2008-09	CP-41	CP-080536	2369	1	S-CSCF and AS procedures with Enhanced Filter Criteria	8.4.1	8.5.0	C1-083501
2008-09	CP-41	CP-080617	2371	2	Correct handling for <reason> element	8.4.1	8.5.0	
2008-09	CP-41	CP-080539	2375		Modification of ci-3gpp2 parameter	8.4.1	8.5.0	C1-083200
2008-09	CP-41	CP-080668	2377	3	Alignment of usage of terms ISIM and ISIM Application	8.4.1	8.5.0	
2008-09	CP-41	CP-080524	2378	1	Introduction additional methods of P-CSCF discovery to support IMS Local Breakout	8.4.1	8.5.0	C1-083400
2008-09	CP-41	CP-080515	2381		Alignment with current version of draft-ietf-sip-fork-loop-fix	8.4.1	8.5.0	C1-083246
2008-09	CP-41	CP-080522	2386	1	Relationship to IP-CAN	8.4.1	8.5.0	C1-083424
2008-09					Editorial change done by MCC	8.5.0	8.5.1	

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2008-12	CP-42	CP-080942	2324	9	Introduction of IMC in support of common IMS	8.5.1	8.6.0	-
2008-12	CP-42	CP-080847	2327	5	SDP Enhancements to support resource allocation	8.5.1	8.6.0	C1-084937
2008-12	CP-42	CP-080840	2332	3	Additional changes for private network indication	8.5.1	8.6.0	C1-084441
2008-12	CP-42	CP-080847	2358	7	Prevent DDOS attack on PSAP	8.5.1	8.6.0	C1-085454
2008-12	CP-42	CP-080840	2383	1	Modifications to private network indication in profile	8.5.1	8.6.0	C1-084080
2008-12	CP-42	CP-080847	2388	3	Annex A fixes regarding draft-ietf-sip-199	8.5.1	8.6.0	C1-085202
2008-12	CP-42	CP-080847	2389	1	Annex A fixes regarding draft-holmberg-sip-keep	8.5.1	8.6.0	C1-084278
2008-12	CP-42	CP-080847	2394	-	Correction on setting P-Served-User	8.5.1	8.6.0	C1-083694
2008-12	CP-42	CP-080847	2396	1	Clarification on ICSI and IARI	8.5.1	8.6.0	C1-084203
2008-12	CP-42	CP-080847	2402	2	Interface identifier	8.5.1	8.6.0	C1-085204
2008-12	CP-42	CP-080844	2403	2	UE subscription to reg-evet	8.5.1	8.6.0	C1-084420
2008-12	CP-42	CP-080844	2405	3	UE - multiple contacts registration	8.5.1	8.6.0	C1-085205
2008-12	CP-42	CP-080844	2406	1	UE - multiple contacts authentication and deregistration	8.5.1	8.6.0	C1-084282
2008-12	CP-42	CP-080844	2407	1	UE using multiple contacts	8.5.1	8.6.0	C1-084283
2008-12	CP-42	CP-080845	2408	4	Introduction of additional methods of P-CSCF discovery for EPS to support IMS Local Breakout	8.5.1	8.6.0	C1-085206
2008-12	CP-42	CP-080956	2409	5	UE procedures when multiple P-CSCF discovery procedures are supported	8.5.1	8.6.0	-
2008-12	CP-42	CP-080854	2411	1	Cr addition to section 4	8.5.1	8.6.0	C1-084230
2008-12	CP-42	CP-080854	2412	2	Netann, mediactrl text improvements	8.5.1	8.6.0	C1-084434
2008-12	CP-42	CP-080854	2413	2	Media control for charging, delegation	8.5.1	8.6.0	C1-085256
2008-12	CP-42	CP-080847	2421	-	Trademark CDMA terminology	8.5.1	8.6.0	C1-083983
2008-12	CP-42	CP-080843	2423	2	Aligning initial INVITE request usage of Accept header field and profile tables	8.5.1	8.6.0	C1-084438
2008-12	CP-42	CP-080858	2424	1	Clarification of security-verify for TLS	8.5.1	8.6.0	C1-084234
2008-12	CP-42	CP-080840	2425	2	Setting of the Phone-contex paramater when IP-CAN is Ethernet	8.5.1	8.6.0	C1-085201
2008-12	CP-42	CP-080847	2427	-	P-CSCF call release upon reception of indication that no ressource is available.	8.5.1	8.6.0	C1-084024
2008-12	CP-42	CP-080847	2428	2	Removing of the cpc parameter by the terminating S-CSCF removes CPC	8.5.1	8.6.0	C1-084435
2008-12	CP-42	CP-080844	2430	2	Clarification of abnormal case for deregistration	8.5.1	8.6.0	C1-085158
2008-12	CP-42	CP-080847	2431	-	P-CSCF handling of 'integrity-protected'	8.5.1	8.6.0	C1-084048
2008-12	CP-42	CP-080839	2432	2	Registration Procedure for ICS	8.5.1	8.6.0	C1-085200
2008-12	CP-42	CP-080870	2434	1	SMSIP related changes for the profile tables	8.5.1	8.6.0	C1-084202
2008-12	CP-42	CP-080853	2435	1	Adding roles defined for service level interworking for messaging to the profile table	8.5.1	8.6.0	C1-084270
2008-12	CP-42	CP-080840	2436	-	Downloading of information to the P-CSCF	8.5.1	8.6.0	C1-084082

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2008-12	CP-42	CP-080835	2440	2	Adding reference to Internet Draft on sos URI parameter for emergency calls	8.5.1	8.6.0	C1-085260
2008-12	CP-42	CP-080857	2441	-	Update reference for DAI Parameter for the "tel" URI	8.5.1	8.6.0	C1-084120
2008-12	CP-42	CP-080847	2442	3	Inclusion of draft-ietf-sip-body-handling in the profile tables	8.5.1	8.6.0	C1-085209
2008-12	CP-42	CP-080856	2443	3	Deterministic Routeing for overlap signalling	8.5.1	8.6.0	C1-085239
2008-12	CP-42	CP-080840	2444	1	Allowing P-Asserted Identity from an UE	8.5.1	8.6.0	C1-085254
2008-12	CP-42	CP-080835	2446	-	Emergency call	8.5.1	8.6.0	C1-084649
2008-12	CP-42	CP-080843	2448	1	Deregistration in 200 (OK)	8.5.1	8.6.0	C1-085435
2008-12	CP-42	CP-080939	2449	2	Revision of 24.229-2449r1 (C1-085416)	8.5.1	8.6.0	-
2008-12	CP-42	CP-080844	2450	2	Usage of outbound in call setup	8.5.1	8.6.0	C1-085450
2008-12	CP-42	CP-080844	2451	-	Multiple registrations at P-CSCF	8.5.1	8.6.0	C1-084655
2008-12	CP-42	CP-080940	2452	2	Revision of 24.229-2452r1 (C1-085418)	8.5.1	8.6.0	-
2008-12	CP-42	CP-080844	2454	1	Multiple registrations at S-CSCF	8.5.1	8.6.0	C1-085419
2008-12	CP-42	CP-080869	2456	-	Correction of ICSI and IARI feature tag name	8.5.1	8.6.0	C1-084689
2008-12	CP-42	CP-080862	2457	2	Inclusion and Modification of Resource-Priority header at P-CSCF	8.5.1	8.6.0	C1-085451
2008-12	CP-42	CP-080854	2458	1	Media control related profile table updates	8.5.1	8.6.0	C1-085255
2008-12	CP-42	CP-080854	2459	1	Mediactrl reference updates	8.5.1	8.6.0	C1-085257
2008-12	CP-42	CP-080839	2460	2	Instance ID definition	8.5.1	8.6.0	C1-085459
2008-12	CP-42	CP-080844	2462	2	GRUU and Multilple registration	8.5.1	8.6.0	C1-085468
2008-12	CP-42	CP-080959	2464	4	Overlap signalling procedures	8.5.1	8.6.0	-
2008-12	CP-42	CP-080841	2469	-	Reference updates (release 6 ietf dependencies)	8.5.1	8.6.0	C1-084898
2008-12	CP-42	CP-080843	2471	-	Reference updates (release 7 ietf dependencies)	8.5.1	8.6.0	C1-084903
2008-12	CP-42	CP-080858	2472	1	No domain field for SIP digest	8.5.1	8.6.0	C1-085261
2008-12	CP-42	CP-080858	2473	1	Digest Authentication of Non-Register requests	8.5.1	8.6.0	C1-085262
2008-12	CP-42	CP-080855	2477	1	Minor corrections to configuration of entities for trace	8.5.1	8.6.0	C1-085128
2008-12	CP-42	CP-080843	2479	-	Inclusion of missing RFC 3351 reference	8.5.1	8.6.0	C1-085011
2008-12	CP-42	CP-080847	2480	2	Documentation of INFO within the IM CN subsystem	8.5.1	8.6.0	C1-085424
2008-12	CP-42	CP-080847	2481	-	Removal of TrGw normative requirements from IBCF	8.5.1	8.6.0	C1-085015
2008-12	CP-42	CP-080847	2482	-	Editorial consistency and best practice	8.5.1	8.6.0	C1-085016
2008-12	CP-42	CP-080965	2483	3	Updates to profile tables to include ICS additions	8.5.1	8.6.0	-
2008-12	CP-42	CP-080849	2484	-	Cleanup of various GIBA Editor's notes	8.5.1	8.6.0	C1-085025
2008-12	CP-42	CP-080853	2485	1	Addition of cpim/message and message/imdn+xml	8.5.1	8.6.0	C1-085291
2008-12	CP-42	CP-080847	2494	3	Documenting RFC 5373	8.5.1	8.6.0	C1-085483

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2008-12	CP-42	CP-080873	2495	1	S-CSCF and AS procedures with Enhanced Filter Criteria	8.5.1	8.6.0	C1-085292
2008-12	CP-42	CP-080847	2498	2	Call release by the P-CSCF upon resource reservation faillure	8.5.1	8.6.0	C1-085467
2008-12	CP-42	CP-080847	2499	1	Hosted NAT traversal for media flows	8.5.1	8.6.0	C1-085430
2008-12	CP-42	CP-080846	2501	1	Reference updates (release 8 ietf dependencies)	8.5.1	8.6.0	C1-085426
2008-12	CP-42	CP-080847	2502	-	Corrections to security overview	8.5.1	8.6.0	C1-085093
2008-12	CP-42	CP-080847	2505	-	Identification of public user identity in absence of Authorization header	8.5.1	8.6.0	C1-085131
2008-12	CP-42				Editorial cleanup by ETSI EditHelp! and MCC	8.5.1	8.6.0	
2009-03	CP-43	CP-090134	2438	7	Correction of non UE detectable emergency call procedures	8.6.0	8.7.0	C1-091088
2009-03	CP-43	CP-090121	2507		Correction of URN-value for Service Identifiers	8.6.0	8.7.0	C1-090012
2009-03	CP-43	CP-090134	2508	1	Re-selection of S-CSCF during Terminating and Originating Procedures	8.6.0	8.7.0	C1-090991
2009-03	CP-43	CP-090146	2509	2	Re-selection of S-CSCF during Terminating and Originating Procedures when restoration is supported.	8.6.0	8.7.0	C1-091066
2009-03	CP-43	CP-090245	2510	4	Returning an error to trigger a new registration when IMS restoration is supported	8.6.0	8.7.0	-
2009-03	CP-43	CP-090225	2511	4	Re-selection of S-CSCF during Re-registration when IMS restoration is supported	8.6.0	8.7.0	-
2009-03	CP-43	CP-090134	2514	1	Outbound with IMS AKA	8.6.0	8.7.0	C1-090992
2009-03	CP-43	CP-090134	2515	2	Registration procedure at the S-CSCF	8.6.0	8.7.0	C1-091041
2009-03	CP-43	CP-090134	2516	3	P-CSCFprocessing 200 (OK)	8.6.0	8.7.0	C1-091085
2009-03	CP-43	CP-090134	2517	4	Multiple de-registrations	8.6.0	8.7.0	C1-091111
2009-03	CP-43	CP-090134	2519	1	Instance-ID in INVITE	8.6.0	8.7.0	C1-090997
2009-03	CP-43	CP-090134	2520		Multiple contact addresses	8.6.0	8.7.0	C1-090042
2009-03	CP-43	CP-090130	2524	3	Support for eHRPD	8.6.0	8.7.0	C1-091381
2009-03	CP-43	CP-090155	2525	1	Adding the role of The Early Session Disposition Type	8.6.0	8.7.0	C1-090950
2009-03	CP-43	CP-090134	2527		Cleanup inclusion of draft-ietf-sip-body-handling in the profile tables	8.6.0	8.7.0	C1-090201
2009-03	CP-43	CP-090116	2529	2	Aligning with draft-ietf-sip-location-conveyance-12	8.6.0	8.7.0	C1-091040
2009-03	CP-43	CP-090134	2530	1	Addressing privacy requirement for emergency calls	8.6.0	8.7.0	C1-090999
2009-03	CP-43	CP-090116	2532	1	Correcting condition for using indicating use of emergency registration	8.6.0	8.7.0	C1-090959
2009-03	CP-43	CP-090224	2534	3	Overlap signalling en-bloc conversion procedures	8.6.0	8.7.0	-
2009-03	CP-43	CP-090209	2535	3	Overlap signalling digit collection procedures	8.6.0	8.7.0	-
2009-03	CP-43	CP-090134	2537	1	Correction of registration duration value	8.6.0	8.7.0	C1-091024
2009-03	CP-43	CP-090127	2540	1	Corrections to E-UTRAN specific aspects	8.6.0	8.7.0	C1-090850

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2009-03	CP-43	CP-090134	2541		Miscellaneous corrections to annex B	8.6.0	8.7.0	C1-090377
2009-03	CP-43	CP-090142	2543	1	Miscellaneous corrections to Annex M	8.6.0	8.7.0	C1-090985
2009-03	CP-43	CP-090142	2544	1	Phone-context parameter value for cdma2000®	8.6.0	8.7.0	C1-090986
2009-03	CP-43	CP-090142	2545	1	Common IMS for MGW and MRF	8.6.0	8.7.0	C1-090987
2009-03	CP-43	CP-090134	2546	4	Deterministic behaviour for Call Forwarding	8.6.0	8.7.0	C1-091122
2009-03	CP-43	CP-090136	2547	1	Overlap Corrections	8.6.0	8.7.0	C1-090962
2009-03	CP-43	CP-090116	2550	1	Alignment of emergency indication with draft-patel-ecrit-sos-parameter-03	8.6.0	8.7.0	C1-090968
2009-03	CP-43	CP-090272	2553	3	Use of multiple access technologies in IMS	8.6.0	8.7.0	-
2009-03	CP-43	CP-090134	2555		Alignment of authentication parameter terminology	8.6.0	8.7.0	C1-090534
2009-03	CP-43	CP-090134	2556		Use of access-class and access-type constructs in the P-Access-Network-Info header field	8.6.0	8.7.0	C1-090535
2009-03	CP-43	CP-090134	2558		P-Served-User header field corrections (profile)	8.6.0	8.7.0	C1-090537
2009-03	CP-43	CP-090134	2560		Editorial consistency and best practice	8.6.0	8.7.0	C1-090539
2009-03	CP-43	CP-090141	2561	1	Removal of redundant NASS bundled authentication text for S-CSCF	8.6.0	8.7.0	C1-090969
2009-03	CP-43	CP-090150	2564	1	Emergency call handling for CS media	8.6.0	8.7.0	C1-090908
2009-03	CP-43	CP-090118	2574	2	Correction to Annex A / SIP extensions for media authorization	8.6.0	8.7.0	C1-091120
2009-03	CP-43	CP-090275	2578	4	Correction to Annex A /P-Access-Network-Info	8.6.0	8.7.0	-
2009-03	CP-43	CP-090134	2579	2	Correction to Annex A /P-User-Database header	8.6.0	8.7.0	C1-091084
2009-03	CP-43	CP-090134	2582	2	Routeing B2BUA transparency	8.6.0	8.7.0	C1-091078
2009-03	CP-43	CP-090134	2583	1	Call release by P-CSCF- Editorial correction	8.6.0	8.7.0	C1-091013
2009-03	CP-43	CP-090118	2584	1	References correction	8.6.0	8.7.0	C1-091014
2009-03	CP-43	CP-090142	2595	1	Corrections for cdma2000® HRPD Emergency Services	8.6.0	8.7.0	C1-090988
2009-03	CP-43	CP-090127	2596		Corrections to EPS as IMS access technology Annex	8.6.0	8.7.0	C1-090685
2009-03	CP-43	CP-090135	2597	1	Update of references to SIP debug internet drafts	8.6.0	8.7.0	C1-090970
2009-03	CP-43	CP-090159	2598	1	Handling of provisioned mode of the resource allocation used for IMS media	8.6.0	8.7.0	C1-091069
2009-03	CP-43	CP-090237	2601	2	Reference correction	8.6.0	8.7.0	C1-091115
2009-06	CP-44	CP-090428	2518	5	Flow- token in the Record-Route	8.7.0	8.8.0	C1-091475
2009-06	CP-44	CP-090398	2539	8	Mechanism for UE to identify a SIP URI that has an associated tel URI	8.7.0	8.8.0	C1-092241
2009-06	CP-44	CP-090428	2557	3	Application server usage of P-Served-User header field	8.7.0	8.8.0	C1-092077
2009-06	CP-44	CP-090399	2605	2	P-CSCF releasing a dialog	8.7.0	8.8.0	C1-092084
2009-06	CP-44	CP-090399	2607	2	S-CSCF releasing a dialog	8.7.0	8.8.0	C1-092086
2009-06	CP-44	CP-090428	2608	2	GRUU translation	8.7.0	8.8.0	C1-092087

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2009-06	CP-44	CP-090428	2610	1	Correct backwards emergency notification procedure	8.7.0	8.8.0	C1-092072
2009-06	CP-44	CP-090428	2611		Correction of implementation error of CR2537r1	8.7.0	8.8.0	C1-091494
2009-06	CP-44	CP-090428	2612	1	BGCF routing	8.7.0	8.8.0	C1-092074
2009-06	CP-44	CP-090403	2614		Correction of 3GPP URN link	8.7.0	8.8.0	C1-091504
2009-06	CP-44	CP-090428	2616	2	RFC 2833 substituted by RFC 4733	8.7.0	8.8.0	C1-092050
2009-06	CP-44	CP-090428	2617		Call Forwarding Leftover	8.7.0	8.8.0	C1-091510
2009-06	CP-44	CP-090415	2618	1	Correction Identity handling for NGCN	8.7.0	8.8.0	C1-091974
2009-06	CP-44	CP-090419	2619		Reference Update draft-ietf-mmusic-sdp-cs	8.7.0	8.8.0	C1-091513
2009-06	CP-44	CP-090428	2620	1	RFC reference fix	8.7.0	8.8.0	C1-092075
2009-06	CP-44	CP-090428	2625	1	Deterministic XML schema	8.7.0	8.8.0	C1-092204
2009-06	CP-44	CP-090398	2634		Emergency call treatment of P-Preferred-Identity header field in profile	8.7.0	8.8.0	C1-091649
2009-06	CP-44	CP-090405	2635	1	Subdivision of digit collection text	8.7.0	8.8.0	C1-091967
2009-06	CP-44	CP-090428	2636		Editorial changes	8.7.0	8.8.0	C1-091655
2009-06	CP-44	CP-090398	2639	1	Correcting emergency registration support and access type	8.7.0	8.8.0	C1-092003
2009-06	CP-44	CP-090397	2645	1	Correction to Annex A /Caller preferences directives	8.7.0	8.8.0	C1-092079
2009-06	CP-44	CP-090428	2657	2	Alignment of Cx reference point procedures withTS 29.228 procedures	8.7.0	8.8.0	C1-092211
2009-06	CP-44	CP-090415	2658	2	Correction to GRUU procedures to ensure that sessions using UE assigned Public GRUUs don"t fail	8.7.0	8.8.0	C1-092219
2009-06	CP-44	CP-090428	2659		Removing obsolete Editor's Note	8.7.0	8.8.0	C1-091854
2009-06	CP-44	CP-090428	2660	1	Correction of instance ID related Editor's Note and text	8.7.0	8.8.0	C1-092076
2009-06	CP-44	CP-090398	2662		Version update for "sos" URI parameter Internet Draft	8.7.0	8.8.0	C1-091857
2009-06	CP-44	CP-090428	2663		Contact Header in PUBLISH method	8.7.0	8.8.0	C1-091879
2009-06	CP-44	CP-090428	2666		Removing non-essential and incorrect statement regarding ordering of codec formats in the SDP offer	8.7.0	8.8.0	C1-092114
2009-06	CP-44	CP-090400	2667	1	Correction to Annex A /P-User-Database	8.7.0	8.8.0	C1-092209
2009-09	CP-45	CP-090644	2624	3	Inconsistency between text and XML schema	8.8.0	8.9.0	C1-093708
2009-09	CP-45	CP-090650	2626	1	Confusing text in L.2.2.5.1A	8.8.0	8.9.0	C1-092400
2009-09	CP-45	CP-090658	2629	5	Emergency call handling in P-CSCF and UE	8.8.0	8.9.0	C1-093069
2009-09	CP-45	CP-090664	2669	3	No P-P-I from NGCN	8.8.0	8.9.0	C1-093789
2009-09	CP-45	CP-090660	2670	2	No Proxy-Authentication-Info header	8.8.0	8.9.0	C1-093720
2009-09	CP-45	CP-090649	2678	1	TISPAN IBCF review comment fixes	8.8.0	8.9.0	C1-092901
2009-09	CP-45	CP-090657	2681	1	Contact port in non REGISTER request with AKA	8.8.0	8.9.0	C1-092985
2009-09	CP-45	CP-090664	2685	3	Connection of complex UEs to IMS	8.8.0	8.9.0	C1-093738

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2009-09	CP-45	CP-090649	2688	1	Calling party category (cpc)	8.8.0	8.9.0	C1-092905
2009-09	CP-45	CP-090658	2692	1	Correction of BGCF procedures	8.8.0	8.9.0	C1-092988
2009-09	CP-45	CP-090667	2696	1	Correcting preventing of DDOS attack on registrar	8.8.0	8.9.0	C1-092952
2009-09	CP-45	CP-090657	2699		Correcting mismatch in conditions for non-UE detectable emergency call	8.8.0	8.9.0	C1-092493
2009-09	CP-45	CP-090659	2701	1	The 'comp' parameter	8.8.0	8.9.0	C1-093701
2009-09	CP-45	CP-090659	2703		Routing procedure	8.8.0	8.9.0	C1-092500
2009-09	CP-45	CP-090664	2705		UE as an externally attached network	8.8.0	8.9.0	C1-092502
2009-09	CP-45	CP-090659	2707	2	Support for keep-alive mechanism	8.8.0	8.9.0	C1-093038
2009-09	CP-45	CP-090724	2709	2	Require with the option-tag "outbound"	8.8.0	8.9.0	
2009-09	CP-45	CP-090658	2711	1	Outbound support	8.8.0	8.9.0	C1-092993
2009-09	CP-45	CP-090657	2717	2	Contact header in registration	8.8.0	8.9.0	C1-093703
2009-09	CP-45	CP-090659	2719	1	S-CSCF not supporting Outbound registration	8.8.0	8.9.0	C1-093001
2009-09	CP-45	CP-090648	2721	2	NAT traversal without outbound	8.8.0	8.9.0	C1-093040
2009-09	CP-45	CP-090651	2723		Duplicate subclauses in Annex O	8.8.0	8.9.0	C1-092529
2009-09	CP-45	CP-090664	2726	2	P-CSCF handling alignments for priviledged senders	8.8.0	8.9.0	C1-093485
2009-09	CP-45	CP-090664	2728	1	P-CSCF handling for NCGN as regular UE	8.8.0	8.9.0	C1-092931
2009-09	CP-45	CP-090664	2730	5	S-CSCF handling alignments for NGCN	8.8.0	8.9.0	C1-093909
2009-09	CP-45	CP-090667	2736	1	How the P-CSCF forwards the request to the next hop excluding the REGISTER method.	8.8.0	8.9.0	C1-093005
2009-09	CP-45	CP-090664	2740	2	Use of GRUU by UEs that perform the functions of an external attached network	8.8.0	8.9.0	C1-093904
2009-09	CP-45	CP-090658	2742		Correction of alignment of Cx reference point procedures withTS 29.228 procedures	8.8.0	8.9.0	C1-092657
2009-09	CP-45	CP-090659	2744		Reference update for draft-montemurro-gsma-imei-urn	8.8.0	8.9.0	C1-092659
2009-09	CP-45	CP-090657	2749		Annex K: Registration reference correction	8.8.0	8.9.0	C1-092665
2009-09	CP-45	CP-090658	2751	2	Keep-alives for emergency calls	8.8.0	8.9.0	C1-093042
2009-09	CP-45	CP-090649	2754	1	P-CSCF forwarding request towards entry point	8.8.0	8.9.0	C1-092909
2009-09	CP-45	CP-090659	2758	1	Re-INVITE for precondition status indication	8.8.0	8.9.0	C1-093010
2009-09	CP-45	CP-090658	2760	1	Digest URI verification fix	8.8.0	8.9.0	C1-093033
2009-09	CP-45	CP-090658	2763		Correction of table condition: AoC roles	8.8.0	8.9.0	C1-092679
2009-09	CP-45	CP-090657	2765	4	Aligning IANA registration of MIME type "application/3gpp-ims+xml"	8.8.0	8.9.0	C1-093940
2009-09	CP-45	CP-090645	2788		IOI Handling	8.8.0	8.9.0	C1-093265
2009-09	CP-45	CP-090671	2790	1	Invalid Registration	8.8.0	8.9.0	C1-093744
2009-09	CP-45	CP-090665	2792	1	IBCF and P-Asserted-Identity	8.8.0	8.9.0	C1-093782
2009-09	CP-45	CP-090657	2796	1	Correct the preconditions for NBA mechanism	8.8.0	8.9.0	C1-093759

Change history								
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**	**WG doc**
2009-09	CP-45	CP-090657	2802	1	Adding RFC 3890 and maximum packet rate to SDP profile tables	8.8.0	8.9.0	C1-093761
2009-09	CP-45	CP-090679	2805	2	Correcting duplicate mentioning of 802.3y	8.8.0	8.9.0	C1-093913
2009-09	CP-45	CP-090647	2812		Update of reference to I-D for sos URI parameter and miscellaneous reference corrections	8.8.0	8.9.0	C1-093573
2009-09	CP-45	CP-090659	2814	2	Use of ports for SIP between UE and P-CSCF	8.8.0	8.9.0	C1-093907
2009-09	CP-45	CP-090659	2816	1	Profile table correction on the support of security mechanism	8.8.0	8.9.0	C1-093765
2009-09	CP-45	CP-090657	2826	1	Clarification on identity usage for NBA	8.8.0	8.9.0	C1-093768
2009-09	CP-45	CP-090664	2828		Describe the right behaviour of the IBCF	8.8.0	8.9.0	C1-093609
2009-12	CP-46	CP-090890	2838		Inclusion of draft-ietf-sipcore-invfix	8.9.0	8.10.0	C1-094119
2009-12	CP-46	CP-090890	2842	1	Inclusion of draft-ietf-sip-ipv6-abnf-fix	8.9.0	8.10.0	C1-094530
2009-12	CP-46	CP-090891	2846		Change of ua-profile package to xcap-diff package	8.9.0	8.10.0	C1-094130
2009-12	CP-46	CP-090892	2849		Release 7 IETF reference updates for emergency call	8.9.0	8.10.0	C1-094133
2009-12	CP-46	CP-090920	2857		Update of draft-ietf-sip-body-handling reference to RFC 5621	8.9.0	8.10.0	C1-094214
2009-12	CP-46	CP-091015	2874	5	Alignment of 24.229 with draft-ietf-sipcore-info-events	8.9.0	8.10.0	-
2009-12	CP-46	CP-090890	2884		Annex A / c and m paramters in media description in SDP	8.9.0	8.10.0	C1-094381
2009-12	CP-46	CP-090890	2888		Annex A / User-Agent in PUBLISH responses	8.9.0	8.10.0	C1-094386
2009-12	CP-46	CP-090893	2904		Updating of outbound and related references	8.9.0	8.10.0	C1-094825
2009-12	CP-46	CP-090894	2907		Updating of GRUU references	8.9.0	8.10.0	C1-094831
2009-12	CP-46	CP-090892	2911		Removal of outstanding Editor's notes for EMC1	8.9.0	8.10.0	C1-095485
2009-12	CP-46	CP-090896	2913		Removal of outstanding Editor's note for ServID	8.9.0	8.10.0	C1-094854
2009-12	CP-46	CP-090903	2915		Removal of outstanding Editor's note for Overlap	8.9.0	8.10.0	C1-094856
2009-12	CP-46	CP-090902	2919	1	Removal of outstanding Editor's notes on PANI	8.9.0	8.10.0	C1-095601
2009-12	CP-46	CP-090902	2931		Handling of Route by the I-CSCF	8.9.0	8.10.0	C1-094954
2009-12	CP-46	CP-090902	2933		Annex A/ P-Charging-Vector	8.9.0	8.10.0	C1-095605
2009-12	CP-46	CP-090902	2935	2	REGISTERs for Keeping NAT binding /Annex F	8.9.0	8.10.0	C1-095702
2009-12	CP-46	CP-090902	2945		Correction of profile table on the role for UE	8.9.0	8.10.0	C1-094996
2009-12	CP-46	CP-090895	2953	2	Correct Phone-Context parameter coding	8.9.0	8.10.0	C1-095687
2009-12	CP-46	CP-090892	2963		Alignment of 24.229 with draft-patel-ecrit-sos-parameter-07	8.9.0	8.10.0	C1-095068
2009-12	CP-46	CP-090892	2966	1	Removal of editor's note in 5.4.8.2 – use of "sos" in GRUU	8.9.0	8.10.0	C1-095488
2009-12	CP-46	CP-090982	2969	2	Update to annex J based on draft-patel-dispatch-cpc-oli-parameter	8.9.0	8.10.0	-
2010-03	CP-47	CP-100131	2641	5	Correcting handling of emergency session requests made by unregistered users	8.10.0	8.11.0	C1-101128

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2010-03	CP-47	CP-100110	2929	4	Handling of Request-URI with tel URI and sip URI containing user=phone by the S-CSCF	8.10.0	8.11.0	C1-100992
2010-03	CP-47	CP-100104	2957	4	Emergency session with P-CSCF in visited network	8.10.0	8.11.0	C1-100719
2010-03	CP-47	CP-100110	2989	1	IETF reference updates (IMSProtoc2 related)	8.10.0	8.11.0	C1-100209
2010-03	CP-47	CP-100124	2991	3	Support of draft-ietf-mmusic-sdp-media-capabilities	8.10.0	8.11.0	C1-101150
2010-03	CP-47	CP-100109	3016		Resolution of editor's notes related to PRIOR	8.10.0	8.11.0	C1-100207
2010-03	CP-47	CP-100230	3018	1	Removal of editor's notes relating to learning of trust domain boundaries and information saved during registration	8.10.0	8.11.0	-
2010-03	CP-47	CP-100110	3027		Removal of editor"s note: 199 (Early Dialog Terminated) option-tag	8.10.0	8.11.0	C1-100365
2010-03	CP-47	CP-100110	3029		Removal of editor"s note: Annex K keep-alive mechanism	8.10.0	8.11.0	C1-100367
2010-03	CP-47	CP-100111	3030		Removal of editor"s note: Annex K NAT traversal	8.10.0	8.11.0	C1-100368
2010-03	CP-47	CP-100107	3034		Closure of SAES related editor's notes	8.10.0	8.11.0	C1-100418
2010-03	CP-47	CP-100117	3036		Addressing editor's notes relating to NASS bundled authentication	8.10.0	8.11.0	C1-100420
2010-03	CP-47	CP-100110	3038		Removal of editor's notes relating to emergency call	8.10.0	8.11.0	C1-100422
2010-03	CP-47	CP-100114	3041	2	Legacy INFO usage: Addition of MCID and Overlap	8.10.0	8.11.0	C1-100989
2010-03	CP-47	CP-100110	3042		Removal of outstanding Editor's note on IOI	8.10.0	8.11.0	C1-100435
2010-03	CP-47	CP-100107	3044	1	Incorrect NAS message in Annex L	8.10.0	8.11.0	C1-100864
2010-03	CP-47	CP-100122	3052		Incorrect trigger in I-CSCF for restoration procedures	8.10.0	8.11.0	C1-100461
2010-03	CP-47	CP-100110	3058	1	Inclusion of draft alert-urns for INVITE Responses	8.10.0	8.11.0	C1-100953
2010-03	CP-47	CP-100119	3062		Reference update of draft-ietf-mediactrl-vxml	8.10.0	8.11.0	C1-100517
2010-03	CP-47	CP-100118	3064	1	Address the UUS related Editor's Note	8.10.0	8.11.0	C1-100985
2010-03	CP-47	CP-100110	3068	1	Correcting missing reference	8.10.0	8.11.0	C1-100990
2010-03	CP-47	CP-100105	3074	1	Annex A/ Fixing of missing status support in Tables	8.10.0	8.11.0	C1-100980
2010-03	CP-47	CP-100105	3077		Annex A/ P-Media-Authorization support	8.10.0	8.11.0	C1-100664
2010-03	CP-47	CP-100105	3080		Annex A / integration of resource management and SIP	8.10.0	8.11.0	C1-100668
2010-03	CP-47	CP-100110	3085		New version of IETF draft-yu-tel-dai	8.10.0	8.11.0	C1-100683
2010-03	CP-47	CP-100110	3091		Abnormal Digest procedures fix	8.10.0	8.11.0	C1-100691
2010-03	CP-47	CP-100128	3093		IMDN reference update	8.10.0	8.11.0	C1-100693
2010-03	CP-47	CP-100110	3100		Correct authentication and registration referencing for emergency registration	8.10.0	8.11.0	C1-100804
2010-03	CP-47	CP-100107	3102		P-Access-Network-Info correction for LTE	8.10.0	8.11.0	C1-100807
2010-03	CP-47	CP-100104	3105		Update reference for draft-patel-ecrit-sos-	8.10.0	8.11.0	C1-100810

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
					parameter			
2010-03	CP-47	CP-100112	3109		Clean up editor's notes on subscription to debug event package	8.10.0	8.11.0	C1-100984
2010-03	CP-47	CP-100215	3032	2	Updating of SAES related references	8.10.0	8.11.0	-
2010-06	CP-48	CP-100346	3120		Wrong requirements for ICS MSC in profile tables	8.11.0	8.12.0	C1-101398
2010-06	CP-48	CP-100337	3128		Reference updates	8.11.0	8.12.0	C1-101471
2010-06	CP-48	CP-100340	3141		RFC4694 for IBCF	8.11.0	8.12.0	C1-101813
2010-06	CP-48	CP-100340	3150	1	Use of P-Served-User header field in user location procedure	8.11.0	8.12.0	C1-101811
2010-06	CP-48	CP-100340	3154	2	IBCF and Content-Disposition	8.11.0	8.12.0	C1-102030
2010-06	CP-48	CP-100351	3157	1	Addition of MSRP SDP a=path attribute	8.11.0	8.12.0	C1-101819
2010-09	CP-49	CP-100496	2977	13	Mandate registeration with IMS in order to receive audio/voice services	8.12.0	8.13.0	C1-103534
2010-09	CP-49	CP-100481	3186	1	Home network check for (E)UTRAN access	8.12.0	8.13.0	C1-102804
2010-09	CP-49	CP-100482	3194	1	Updates to references pertaining to Internet Drafts for tel URI parameters	8.12.0	8.13.0	C1-102674
2010-09	CP-49	CP-100486	3207	1	Keep-alive corrections	8.12.0	8.13.0	C1-102622
2010-09	CP-49	CP-100486	3212	1	Wildcarded identity AVP correction	8.12.0	8.13.0	C1-102683
2010-09	CP-49	CP-100486	3215		Subclause reference correction	8.12.0	8.13.0	C1-102490
2010-09	CP-49	CP-100483	3219		draft-rosenberg-sip-app-media-tag has now been published as RFC 5688	8.12.0	8.13.0	C1-102530
2010-09	CP-49	CP-100500	3223	3	Initial registration for GPRS-IMS at S-CSCF	8.12.0	8.13.0	C1-102846
2010-09	CP-49	CP-100487	3224		Updates to references pertaining to Internet Drafts for tel URI parameters	8.12.0	8.13.0	C1-102677
2010-09	CP-49	CP-100481	3241	2	Detecting valid emergency identifiers	8.12.0	8.13.0	C1-103540
2010-09	CP-49	CP-100481	3254	2	Correction of Stage 3 misalignment with Stage 1 and Stage 2 on use of SIP 380 response.	8.12.0	8.13.0	C1-103387
2010-09	CP-49	CP-100486	3259	1	Correct Contact header field value for response to non-UE detectable emergency call	8.12.0	8.13.0	C1-103506
2010-09	CP-49	CP-100486	3262		Ensuring PSAP receives correctly formatted request	8.12.0	8.13.0	C1-103566
2010-12	CP-50	CP-100728	3264	1	Outbound reregistration at P-CSCF	8.13.0	8.14.0	C1-104304
2010-12	CP-50	CP-100728	3265	1	Protected AKA registration at S-CSCF	8.13.0	8.14.0	C1-104195
2010-12	CP-50	CP-100728	3268	1	Protected Digest registration at S-CSCF	8.13.0	8.14.0	C1-104198
2010-12	CP-50	CP-100728	3271	2	Unprotected registration at S-CSCF	8.13.0	8.14.0	C1-104368
2010-12	CP-50	CP-100728	3279	1	Update reference	8.13.0	8.14.0	C1-104308
2010-12	CP-50	CP-100725	3283		Correcting mixed references in IBCF	8.13.0	8.14.0	C1-103759
2010-12	CP-50	CP-100728	3286	3	Conference and IBCF IMS-ALG and removal of an Editor's note.	8.13.0	8.14.0	C1-105069
2010-12	CP-50	CP-100735	3289		Correcting errors in S-CSCF restoration procedures	8.13.0	8.14.0	C1-103771

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2010-12	CP-50	CP-100728	3299	1	Incorrect sequence of steps in P-CSCF	8.13.0	8.14.0	C1-104314
2010-12	CP-50	CP-100723	3302	1	Emergency registration and normal registration	8.13.0	8.14.0	C1-104181
2010-12	CP-50	CP-100738	3312	1	Updating IMEI URN draft reference	8.13.0	8.14.0	C1-104326
2010-12	CP-50	CP-100721	3317		IETF reference updates	8.13.0	8.14.0	C1-103919
2010-12	CP-50	CP-100722	3322		IETF reference updates	8.13.0	8.14.0	C1-103924
2010-12	CP-50	CP-100726	3326		IETF reference updates	8.13.0	8.14.0	C1-103934
2010-12	CP-50	CP-100728	3329	2	IETF reference updates	8.13.0	8.14.0	C1-104335
2010-12	CP-50	CP-100728	3332		EN removal: Retry-After Header field value in 503 response	8.13.0	8.14.0	C1-103953
2010-12	CP-50	CP-100728	3335	1	EN removal: UE IP version support indication	8.13.0	8.14.0	C1-104317
2010-12	CP-50	CP-100728	3338		EN removal: Network inserted codecs	8.13.0	8.14.0	C1-103959
2010-12	CP-50	CP-100723	3342	1	Further modifications required to SIP 380 response to remove new requirements.	8.13.0	8.14.0	C1-104185
2010-12	CP-50	CP-100733	3346		Handling of editor's note relating to private network traffic breakout and breakin	8.13.0	8.14.0	C1-103982
2010-12	CP-50	CP-100726	3352	2	Inclusion of file transfer attributes	8.13.0	8.14.0	C1-104984
2010-12	CP-50	CP-100728	3359	1	AKA registration at S-CSCF	8.13.0	8.14.0	C1-104989
2010-12	CP-50	CP-100728	3362	2	Autentication already performed	8.13.0	8.14.0	C1-105201
2010-12	CP-50	CP-100728	3365	1	Digest registration at S-CSCF	8.13.0	8.14.0	C1-104995
2010-12	CP-50	CP-100728	3368	1	Bundle registration	8.13.0	8.14.0	C1-104998
2010-12	CP-50	CP-100720	3375	1	Codec and DTMF correction	8.13.0	8.14.0	C1-104978
2010-12	CP-50	CP-100728	3378		Definition: multiple registrations	8.13.0	8.14.0	C1-104533
2010-12	CP-50	CP-100869	3381	1	Reference update: draft-ietf-sipcore-199	8.13.0	8.14.0	-
2010-12	CP-50	CP-100724	3385		Reference update: draft-ietf-sipcore-keep	8.13.0	8.14.0	C1-104545
2010-12	CP-50	CP-100728	3391	1	Handling of the isfocus media feature tag in P-CSCF	8.13.0	8.14.0	C1-105001
2010-12	CP-50	CP-100728	3395	1	'ob' parameter in case of no registration	8.13.0	8.14.0	C1-105004
2010-12	CP-50	CP-100723	3398	1	Detecting valid emergency identifiers	8.13.0	8.14.0	C1-104981
2010-12	CP-50	CP-100728	3399	2	Addition of Target-Dialog header and capability in Annex A	8.13.0	8.14.0	C1-105072
2010-12	CP-50	CP-100727	3418		Update of IETF reference	8.13.0	8.14.0	C1-103840
2010-12	CP-50	CP-100725	3422		Correction of the usage for type 3 IOI	8.13.0	8.14.0	C1-105049
2011-03	CP-51	CP-110164	3430	1	UE initiated deregistration	8.14.0	8.15.0	C1-110579
2011-03	CP-51	CP-110158	3443	1	Correct P-CSCF handling of requests for emergency services with Route header fields	8.14.0	8.15.0	C1-110565
2011-03	CP-51	CP-110166	3451	2	New Reference for Alert-URN	8.14.0	8.15.0	C1-111347
2011-03	CP-51	CP-110164	3459	1	Reference update: draft-ietf-mmusic-ice-tcp	8.14.0	8.15.0	C1-110576
2011-03	CP-51	CP-110164	3462	1	Reference update: RFC 6086	8.14.0	8.15.0	C1-110587
2011-03	CP-51	CP-110159	3466		Reference update: draft-ietf-sipcore-keep	8.14.0	8.15.0	C1-110265

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2011-03	CP-51	CP-110164	3469	3	P-CSCF Path SIP URI and IMS flow token correction	8.14.0	8.15.0	C1-111281
2011-03	CP-51	CP-110159	3477	3	Removal of reference CPC and OLI Internet Draft	8.14.0	8.15.0	C1-111327
2011-03	CP-51	CP-110158	3481	2	Specifying "sos" URI parameter in 24.229	8.14.0	8.15.0	C1-111085
2011-03	CP-51	CP-110164	3487		New registration	8.14.0	8.15.0	C1-110840
2011-03	CP-51	CP-110164	3493		S-CSCF Service-Route SIP URI	8.14.0	8.15.0	C1-111272
2011-03	CP-51	CP-110164	3499		Reference update and procedure correction: 199	8.14.0	8.15.0	C1-111275
2011-03	CP-51	CP-110160	3505		MGCF procedure corrections related to SIP preconditions	8.14.0	8.15.0	C1-111257
2011-03	CP-51	CP-110164	3508		Erroneous row reference in Table A.50A	8.14.0	8.15.0	C1-110998
2011-03	CP-51	CP-110164	3512	1	Correction reference	8.14.0	8.15.0	C1-111278
2011-03	CP-51	CP-110162	3525		Contact header clarification	8.14.0	8.15.0	C1-111237
2011-03	CP-51	CP-110161	3528	1	Update to IMS registration procedures due to USAT initiated Refresh for ISIM/USIM EFs	8.14.0	8.15.0	C1-111509
2011-06	CP-52	CP-110450	3530	1	Reference update: 199	8.15.0	8.16.0	C1-112022
2011-06	CP-52	CP-110445	3534	1	Reference update: RFC 6223	8.15.0	8.16.0	C1-112011
2011-06	CP-52	CP-110450	3537		Annex A: RFC 6086 reference corrections	8.15.0	8.16.0	C1-111554
2011-06	CP-52	CP-110450	3546	1	Service-Route at the UE	8.15.0	8.16.0	C1-112038
2011-06	CP-52	CP-110450	3549	1	Service-Route at the P-CSCF	8.15.0	8.16.0	C1-112041
2011-06	CP-52	CP-110450	3552	2	Service-Route at the S-CSCF	8.15.0	8.16.0	C1-112225
2011-06	CP-52	CP-110450	3555	1	Path header field at the S-CSCF	8.15.0	8.16.0	C1-112047
2011-06	CP-52	CP-110450	3558	1	S-CSCF releasing the dialogs	8.15.0	8.16.0	C1-112050
2011-06	CP-52	CP-110450	3561	1	NOTIFY request	8.15.0	8.16.0	C1-112026
2011-06	CP-52	CP-110450	3564	1	Network Initiated deregistration at S-CSCF	8.15.0	8.16.0	C1-112029
2011-06	CP-52	CP-110450	3567	2	Network Initiated deregistration at P-CSCF	8.15.0	8.16.0	C1-112221
2011-06	CP-52	CP-110450	3570	1	Network Initiated deregistration at UE	8.15.0	8.16.0	C1-112035
2011-06	CP-52	CP-110448	3576	1	P-Access-Network-Info: ABNF correction	8.15.0	8.16.0	C1-112002
2011-06	CP-52	CP-110454	3587		Modifications to Resource Priority Namespaces in Annex A	8.15.0	8.16.0	C1-111776
2011-06	CP-52	CP-110447	3589	1	Fraud prevention for deregistration for ICS	8.15.0	8.16.0	C1-112059
2011-06	CP-52	CP-110447	3597	1	Updating IMEI URN draft reference	8.15.0	8.16.0	C1-112056
2011-06	CP-52	CP-110451	3603	1	Removal of dial around indicator	8.15.0	8.16.0	C1-112233
2011-06	CP-52	CP-110519	3609	3	Removal of repetition of IOI header field parameters	8.15.0	8.16.0	-
2011-09	CP-53	CP-110654	3630	3	Correcting errors in S-CSCF restoration procedure	8.16.0	8.17.0	C1-113581
2011-09	CP-53	CP-110656	3638	2	P-Profile-Key header field corrections in I-CSCF	8.16.0	8.17.0	C1-112912
2011-09	CP-53	CP-110704	3662	3	Additional IOI correction for SIP responses	8.16.0	8.17.0	-
2011-09	CP-53	CP-110653	3666	1	Replacement of draft-garcia-mmusic-sdp-misc-cap with draft-garcia-mmusic-sdp-miscellaneous-	8.16.0	8.17.0	C1-113291

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
					caps			
2011-09	CP-53	CP-110651	3680	1	Emergency call – correction of requests covered at the P-CSCF	8.16.0	8.17.0	C1-112829
2011-09	CP-53	CP-110658	3684		IETF reference update	8.16.0	8.17.0	C1-112644
2011-09	CP-53	CP-110648	3697		"P-Visited-Network-ID" correction	8.16.0	8.17.0	C1-113001
2011-09	CP-53	CP-110656	3716		Adding Call-Info to SUBSCRIBE in annex A	8.16.0	8.17.0	C1-113526
2011-09	CP-53	CP-110653	3727		Updating IMEI URN draft reference	8.16.0	8.17.0	C1-113284
2011-09	CP-53	CP-110661	3755		Deletion of Editor's Note in 24.229 on NASS error message (Rel-8)	8.16.0	8.17.0	C1-113385
2011-12	CP-54	CP-110852	3768	2	Emergency session handling correction	8.17.0	8.18.0	C1-114453
2011-12	CP-54	CP-110852	3787	4	P-CSCF behaviour for emergency calls when failure occurs	8.17.0	8.18.0	C1-115359
2011-12	CP-54	CP-110855	3798	2	Use of RegEvent to transport WildCarded Identity	8.17.0	8.18.0	C1-114399
2011-12	CP-54	CP-110856	3824	1	Incorrect reference to RFC 5261	8.17.0	8.18.0	C1-115006
2011-12	CP-54	CP-110863	3829	3	Alignment of AVP/AVPF and SDPCapNeg support with MTSI deployements	8.17.0	8.18.0	C1-115242
2011-12	CP-54	CP-110861	3837		Inclusion of media feature tag ASN.1 identifiers	8.17.0	8.18.0	C1-114591
2011-12	CP-54	CP-110850	3847	2	Reference update: Reason header in SIP responses	8.17.0	8.18.0	C1-115271
2012-01					Correction of formatting in tables of annex A	8.18.0	8.18.1	
2012-03	CP-55	CP-120098	3958	1	Including E-UTRAN access types in P-Access-Network-Info header field	8.18.1	8.19.0	C1-110584
2012-03	CP-55	CP-120092	3954	1	Updating references to IMEI URN and XML body handling drafts	8.18.1	8.19.0	C1-110580
2012-03	CP-55	CP-110162	3841	3	Updating of UUS references	8.18.1	8.19.0	-
2012-03	CP-55	CP-120096	3897		Corrections on the conditions of MSRP SDP a=path attribute	8.18.1	8.19.0	C1-110111
2012-03	CP-55	CP-120093	3913	1	Geo-Redundancy Registration	8.18.1	8.19.0	C1-110553
2012-03	CP-55	CP-120090	3925	1	Location Conveyance: Reference update	8.18.1	8.19.0	C1-110559
2012-06	CP-56	CP-120289	3980		Correction on SDP Profile Status	8.19.0	8.20.0	C1-121039
2012-06	CP-56	CP-120286	3986		GRUU: S-CSCF URI matching	8.19.0	8.20.0	C1-121051
2012-06	CP-56	CP-120284	3990	1	Reference update: draft-salud-alert-info-urns	8.19.0	8.20.0	C1-121413
2012-06	CP-56	CP-120286	4022	1	Correcting contradictory statements regarding GRUU handling by IBCF	8.19.0	8.20.0	C1-121408
2012-06	CP-56	CP-120295	4042		Updating of UUS references	8.19.0	8.20.0	C1-121941
2012-06	CP-56	CP-120292	4046		IETF reference update (mixer-control)	8.19.0	8.20.0	C1-121945
2012-06	CP-56	CP-120290	4056	1	Correction on profile of REFER request	8.19.0	8.20.0	C1-122266
2012-06	CP-56	CP-120290	4071		Handling of EN relating to granularity of access class	8.19.0	8.20.0	C1-122086
2012-09	CP-57	CP-120566	4081	4	Emergency sub-service type handling	8.20.0	8.21.0	C1-123413
2012-09	CP-57	CP-120569	4091	1	Correction of SDP Profile about RFC 4145	8.20.0	8.21.0	C1-123101

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2012-09	CP-57	CP-120569	4111	1	Correct handling of PPR in S-CSCF	8.20.0	8.21.0	C1-123106
2012-09	CP-57	CP-120570	4134	1	Reference update: draft-ietf-mmusic-ice-tcp	8.20.0	8.21.0	C1-123127
2012-09	CP-57	CP-120570	4169	1	P-CSCF handling UE port along with IP address during registration	8.20.0	8.21.0	C1-123417
2012-12	CP-58	CP-120779	4190	3	IMS debug removal of feature	8.21.0	8.22.0	C1-124918
2012-12	CP-58	CP-120773	4216	3	Correction of emergency sub-service type handling	8.21.0	8.22.0	C1-124248
2012-12	CP-58	CP-120777	4225	1	Correction of 3GPP IM CN subsystem XML handling	8.21.0	8.22.0	C1-123969
2012-12	CP-58	CP-120776	4231		Table A.162, item 61 referencing incorrect document	8.21.0	8.22.0	C1-123666
2012-12	CP-58	CP-120780	4270	2	Correction to integrity-protected usage in S-CSCF	8.21.0	8.22.0	C1-124147
2012-12	CP-58	CP-120775	4282	3	Updating IMEI URN draft reference	8.21.0	8.22.0	C1-125003
2012-12	CP-58	CP-120780	4302		Correction on integrity-protected handling in S-CSCF	8.21.0	8.22.0	C1-124525
2013-03	CP-59	CP-130094	4488		Correction of subclause reference in dialstring related procedures	8.22.0	8.23.0	C1-130736
2013-03	CP-59	CP-130093	4493		IBCF don't change the dialog-ID	8.22.0	8.23.0	C1-130552
2013-06	CP-60	CP-130227	4452	4	Not reachable for SIP signalling due to unclear requirement on re-establishment of the SIP signalling bearer	8.23.0	8.24.0	C1-131406
2013-06	CP-60	CP-130222	4495	3	Updating MMUSIC draft references for ICS User Agent and SCC Application Server	8.23.0	8.24.0	C1-132288
2013-06	CP-60	CP-130220	4559	3	Correcting inconsistent requirements for R-URI emergency URN use	8.23.0	8.24.0	C1-131728
2013-06	CP-60	CP-130220	4581	3	Prevent receipt of normal call at the UE while it is attached for emergency services only	8.23.0	8.24.0	C1-132623
2013-06	CP-60	CP-130225	4605	2	Consolidation of DTMF info package definition in 3GPP TS 24.229	8.23.0	8.24.0	C1-132576
2013-09	CP-61	CP-130481	4612	1	Updating IMEI URN draft reference	8.24.0	8.25.0	C1-133248
2013-09	CP-61	CP-130483	4630		Reference update of draft-vanelburg-dispatch-private-network-ind	8.24.0	8.25.0	C1-132757
2013-12	CP-62	CP-130722	4673	1	Reference update of draft-vanelburg-dispatch-private-network-ind	8.25.0	8.26.0	C1-134196
2013-12	CP-62	CP-130721	4688	1	Reference update: RFC 7006 (draft-ietf-mmusic-sdp-miscellaneous-caps)	8.25.0	8.26.0	C1-134206
2013-12	CP-62	CP-130720	4737		Reference Update: draft-ietf-salud-alert-info-urns	8.25.0	8.26.0	C1-134533
2013-12	CP-62	CP-130721	4763		Updating IMEI URN draft reference	8.25.0	8.26.0	C1-134984
2014-03	CP-63	CP-140115	4792		Reference update of draft-vanelburg-dispatch-private-network-ind	8.26.0	8.27.0	C1-140048
2014-03	CP-63	CP-140115	4798	1	Correcting P-Private-Network-Indication descriptions in response	8.26.0	8.27.0	C1-140467
2014-03	CP-63	CP-140117	4810		Removing of the left IMS debug feature parts	8.26.0	8.27.0	C1-140143
2014-03	CP-63	CP-140114	4819	1	Updating IMEI URN draft reference	8.26.0	8.27.0	C1-140496

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	WG doc
2014-03	CP-63	CP-140113	4826	2	Allocating a GRUU when the explictly registered IMPU is barred	8.26.0	8.27.0	C1-140689
2014-03	CP-63	CP-140113	4848	1	Generation of Public GRUU	8.26.0	8.27.0	C1-140695
2014-06	CP-64	CP-140296	4861	3	Corrections for voice centric UE to continue being reachable for IMS voice when P-CSCF serving the UE stops being available	8.27.0	8.28.0	C1-141551
2014-06	CP-64	CP-140295	4890	1	Reference update of draft-vanelburg-dispatch-private-network-ind	8.27.0	8.28.0	C1-141802
2014-06	CP-64	CP-140294	4909	1	GRUU validation	8.27.0	8.28.0	C1-141363
2014-06	CP-64	CP-140296	4915	2	Clarification of payload type usage for telephony-events	8.27.0	8.28.0	C1-141625
2014-06	CP-64	CP-140292	4963	2	URI matching for terminating requests	8.27.0	8.28.0	C1-142437
2014-06	CP-64	CP-140294	4971	1	Updating CS-SDP draft reference to RFC 7195	8.27.0	8.28.0	C1-142237
2014-06	CP-64	CP-140291	4904		Syntax for OLI is incorrect	8.27.0	8.28.0	C1-141031
2014-09	CP-65	CP-140634	4945	3	Resolving interoperability problems caused by insufficiently documented UE precondition handling - alternative A	8.28.0	8.29.0	C1-143292
2014-09	CP-65	CP-140633	5008	1	Updating IMEI URN draft reference to RFC 7254	8.28.0	8.29.0	C1-143081
2014-12	CP-66	CP-140816	5070	1	Reference update from draft-vanelburg-dispatch-private-network-ind to RFC 7316	8.29.0	8.30.0	C1-143961
2015-03	CP-67	CP-150050	5179		Reference update for UUSIW	8.30.0	8.31.0	C1-150105
2015-03	CP-67	CP-150044	5210	2	Correction of P-Charging-Vector access-network-charging-info syntax – Alt 2	8.30.0	8.31.0	C1-150691
2015-03	CP-67	CP-150044	5216	1	Handling of P-Charging-Function-Addresses	8.30.0	8.31.0	C1-150535
2015-06	CP-68	CP-150287	5265	1	Reference Update: RFC7462 (alert-info urns)	8.31.0	8.32.0	C1-151395
2015-06	CP-68	CP-150289	5308	1	Removing THIG on Path and Service-Route header fields	8.31.0	8.32.0	C1-151414
2015-06	CP-68	CP-150289	5374	1	Content-Disposition for pidf+xml message bodies	8.31.0	8.32.0	C1-152156
2015-12	CP-70	CP-150677	5517		Call modification: UE shall not indicate the requirement for the precondition mechanism by using the Require header field mechanism.	8.32.0	8.33.0	C1-154229
2016-03	CP-71	CP-160064	5543	2	MGCF call initiation: removing posibility for using require header field in preconditions	8.33.0	8.34.0	C1-160482

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2016-09	CT#73	CP-160483	5656	1	F	P-CSCF includes access-network-charging-info in reliable response	8.35.0
2016-09	CT#73	CP-160483	5679	1	F	Correction on support of P-Asserted-Identity header	8.35.0
2016-12	CT#74	CP-160708	5686	2	F	Correction on support of P-Asserted-Service header	8.36.0

History

Document history		
V8.1.0	January 2008	Publication
V8.2.0	January 2008	Publication
V8.3.0	April 2008	Publication
V8.4.1	July 2008	Publication
V8.5.0	October 2008	Publication
V8.5.1	January 2009	Publication
V8.6.0	January 2009	Publication
V8.7.0	March 2009	Publication
V8.8.0	July 2009	Publication
V8.9.0	October 2009	Publication
V8.10.0	February 2010	Publication
V8.11.0	April 2010	Publication
V8.12.0	July 2010	Publication
V8.13.0	October 2010	Publication
V8.14.0	March 2011	Publication
V8.15.0	May 2011	Publication
V8.16.0	July 2011	Publication
V8.17.0	November 2011	Publication
V8.18.1	January 2012	Publication
V8.19.0	March 2012	Publication
V8.20.0	July 2012	Publication
V8.21.0	November 2012	Publication
V8.22.0	January 2013	Publication
V8.23.0	April 2013	Publication
V8.24.0	July 2013	Publication
V8.25.0	October 2013	Publication
V8.26.0	January 2014	Publication
V8.27.0	April 2014	Publication
V8.28.0	July 2014	Publication
V8.29.0	October 2014	Publication
V8.30.0	February 2015	Publication
V8.31.0	April 2015	Publication

V8.32.0	July 2015	Publication
V8.33.0	January 2016	Publication
V8.34.0	May 2016	Publication
V8.35.0	October 2016	Publication
V8.36.0	January 2017	Publication