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Technical Specification

**Digital cellular telecommunications system (Phase 2+);
Universal Mobile Telecommunications System (UMTS);
Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN);
Multimedia Telephony with PSTN/ISDN simulation services
(3GPP TS 22.273 version 7.0.0 Release 7)**

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Foreword

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Contents

Foreword

This Technical Specification (TS) was been produced by ETSI Technical Committee Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN) and originally published as ETSI TS 181 002 [5]. It was transferred to the 3rd Generation Partnership Project (3GPP) in September 2007.

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

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- 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.
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Introduction

TISPAN NGN bases the provision of real-time communication services on the 3GPP specified IMS. This is a flexible tool that can provide a wide range of service interactions between terminals and networks. Multimedia Telephony with PSTN/ISDN Simulation Services provides a specific use of the generic capabilities of the IMS. The goal of the present document is to provide requirements to investigate the capabilities of the IMS.

A key role of the Multimedia Telephony with PSTN/ISDN Simulation Services is to provide PSTN/ISDN service simulation and thereby provide opportunities for Network Operators to smooth the transition from a PSTN/ISDN to the new NGN services available using the IMS. Therefore, the specific services and interactions described in the present document are to a large extent based on supplementary services already deployed within PSTN/ISDN networks. The IMS should be able to provide all of these services in a similar manner, although the identical interactions between the user and terminal and the terminal and the network is not required. The present document can therefore be used as the requirements for a "gap analysis" of the features and capabilities provided by the IMS that are required to deploy similar services to PSTN/ISDN supplementary services.

The IMS is an inherently multimedia service control platform. Therefore Multimedia Telephony with PSTN/ISDN Simulation Services, whilst drawing on the existing service features in the PSTN/ISDN, is not limited to voice. The capability, for example, to divert requested communications under certain circumstances is seen as a useful tool for users, regardless of the media used (voice, video, etc.). The Services and Capabilities provided by a TISPAN NGN are described in TS 181 005 [1].

The requirements for services, described in the present document, also take account of the interactions required between interconnected networks - both between NGN and the interconnection of NGN with legacy networks.

The aim of the present document is to assist network operators and service providers to deploy NGN multimedia services step by step to their users.

1 Scope

The present document defines the requirements for multimedia telephony services which may be supported by a TISPAN NGN. These requirements form the basis for the definition of network capabilities.

An important aspect of the Multimedia Telephony with PSTN/ISDN Simulation service is to provide PSTN/ISDN like services. Nevertheless the requirements are independent of the media that is used during the communication.

The present document covers part of the transition from PSTN/ISDN to an NGN. Interconnection between the existing networks and a TISPAN NGN is also covered.

The present document only provides requirements for services using IMS. Services provided by a TISPAN NGN to support legacy terminals and interfaces (PSTN/ISDN emulation) are defined in existing PSTN/ISDN documents. Requirements for PSTN/ISDN Emulation are out the scope of the present document and are described in other documents.

New NGN services are out the scope of the present document and are described in other documents. The applicability of PSTN/ISDN simulation services to services other than Multimedia Telephony (e.g. instant messaging) is not defined. Some PSTN/ISDN simulation services (for example communication waiting) are clearly not applicable to some real-time communication services.

The requirements in the present document are described from the user point of view to assist in the transition of phone services to IP multimedia services with a similar behaviour. The requirements do not take into account capabilities of existing protocols. The evolution or modifications to these protocols are beyond 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] ETSI TS 181 005: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Services and Capabilities Requirements".

[2] ETSI TR 180 000: " Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Terminology".

[3] ITU-T Recommendation I.210: "Principles of telecommunication services supported by an ISDN and the means to describe them".

[4] ETSI TS 102 424: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Requirements of the NGN network to support Emergency Communication from Citizen to Authority".

[5] ETSI TS 181 002 v.1.1.1: " Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Multimedia Telephony with PSTN/ISDN simulation services".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions given in TR 180 000 [2] and the following apply:

call: See ITU-T Recommendation Q.9 (see Bibliography), definition 2201.

call establishment; connection establishment: See ITU-T Recommendation Q.9 (see bibliography), definition 2207.

callback: see TS 102 424 [4].

connection: See ITU-T Recommendation Q.9 (see bibliography), definition 0011.

NOTE: In the present document, the term is taken to include a bearer and its associated control signalling.

communication: transfer of information between two or more users, entities, processes or nodes according to some agreed conventions

NOTE: See ITU-T Recommendation I.112 modified (see bibliography).

emergency call: see TS 102 424 [4].

identity information: includes all the information (e.g. RFC 2806/RFC2396/E.164) identifying a user, including asserted public identities (network generated) and/or unasserted (user generated) public identities

incoming (communication): communication incoming to the user side of the interface

interface: See ITU-T Recommendation Q.9 (see bibliography), definition 4001.

IP multimedia application: See TR 180 000 [2].

originating party: See TR 180 000 [2].

outgoing (communication): communication outgoing from the user side of the interface

PSAP: see TS 102 424 [4].

PSTN/ISDN Emulation: See TR 180 000 [2].

PSTN/ISDN Simulation: See TR 180 000 [2].

terminating party: See TR 180 000 [2].

3.2 Abbreviations

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

ACR	Anonymous Communication Rejection
AOC-C	Advice Of Charge - Charging
AOC-D	Advice Of Charge - During call
AOC-E	Advice Of Charge - at the End of the call
AOC-I	Advice Of Charge - Information
AOC-S	Advice Of Charge - charging information at call Set-up time
CB	Communication session Barring
CCBS	Completion of Communication sessions to Busy Subscriber
CD	Communication Deflection
CDIV	Communication DIVersion
CFB	Communication Forwarding Busy
CFNL	Communication Forwarding on Not Logged-in
CFNR	Communication Forwarding No Reply
CFU	Communication Forwarding Unconditional

COLP	COnnected Line identification Presentation
COLR	COnnected Line identification Restriction
CONF	CONFerence
CS	Circuit Switched
CW	Communication Waiting
ECT	Explicit Communication Transfer
HOLD	Communication HOLD
ICB	Incoming Communications Barring
IMS	IP Multimedia Subsystem
IP	Internet Protocol
ISDN	Integrated Service Data Network
MCID	Malicious Call IDentification
MWI	Message Waiting Indication
NGN	Next Generation Network
OCB	Outgoing Communications Barring
OIP	Originating Identification Presentation
OIR	Originating Identification presentation Restriction
PLMN	Public Land Mobile Network
PSAP	Public Safety Answer Point
PSTN	Public Switch Telephone Network
TIP	Terminating Identification Presentation
TIR	Terminating Identification Restriction

4 Service Description

From the human user point of view, Multimedia Telephony with PSTN/ISDN simulation services, provides a suite of service that are, in most aspects, the same as those already existing in the PSTN/ISDN. The services described are not limited to voice media as in PSTN/ISDN, but generally applicable regardless of the media used (voice, video, etc.).

In addition to the capabilities to establish a bi-directional point-to-point communication between two parties, a selected number of PSTN/ISDN Simulation services, corresponding to perceived popular PSTN/ISDN supplementary services are included in the present document. PSTN/ISDN simulation services are described from a user's perspective and are similar or almost identical to the corresponding supplementary service in PSTN/ISDN.

However, from a functionality distribution perspective, the present document places no particular requirements on the functionality distribution between network and terminals. Further, it is perceived that the need to preserve the split of functionality provided for supplementary services in an ISDN or PSTN is not a requirement in an NGN.

5 Service requirements

5.1 Mandatory requirements

5.1.1 General

Communication sessions in an NGN may provide the ability for users to invoke multimedia telephony applications to send and receive multimedia (including voice and data) communications.

The requirements, in the context of the present document, refers to the Multimedia Telephony with PSTN/ISDN Simulation Services as a complete set. If the complete set is not offered, then for reasons of compatibility, the mandatory services shall be provided as part of any multimedia telephony with PSTN/ISDN simulation service offering.

There is no mandatory requirement to offer Multimedia Telephony with PSTN/ISDN Simulation Services in a particular network deployment.

The multimedia telephony services shall support interworking with existing fixed and mobile voice and IP data networks, including PSTN, ISDN, Mobile and Internet.

Multimedia telephony communications between NGN IMS users and users in PSTN/PLMN-CS networks shall be supported. When a multimedia telephony session originates or terminates in a circuit-switched network (telephony call), the CS telephony network user should not detect a difference from that of a communication between two CS telephony network users in terms of aspects such as the delay to set-up communications and the total permissible delay in transporting speech between the end users. The multimedia telephony with PSTN/ISDN Simulation service does not necessarily have to support all services offered by the CS telephony network. Services not interoperated across the different network types shall be declined in a graceful and consistent manner.

5.1.2 Logged-in

The term "Logged-in" corresponds to an identity registered in the network as being able to receive and initiate communications. A user is considered "not-logged in" when the identity is not currently registered in the network.

Registration and authentication procedures shall be provided as described in TS 181 005 [1].

5.1.3 IP multimedia application subscription

There is no requirement to support standardized subscription mechanisms for multimedia telephony and PSTN/ISDN simulation applications.

Multimedia telephony and PSTN/ISDN Simulation applications may require to be provisioned and configured by users and operators. There are no requirements on the network capabilities to support provisioning and configuration for specific IP multimedia applications.

NOTE: The standardized service capabilities, personalized Internet web pages and evolving IP mechanisms may be used to allow user (self) provisioning, configuration and enabling of IP multimedia applications.

5.1.4 Capability negotiation

Capability negotiation is part of a basic multimedia communications service and shall be provided as described in TS 181 005 [1] (clause 5.2.5).

5.1.5 Invoking PSTN/ISDN Simulation services

The user shall be able to invoke one or more PSTN/ISDN simulation services as part of session establishment, and during an established session.

5.1.5.1 Identification of entities

The requirements for identification of entities shall be provided as described in TS 181 005 [1].

5.1.5.2 Emergency communications

Emergency communications requirements shall be provided as described in TS 181 005 [1].

5.1.6 Handling of an incoming session (by the terminating party)

The specific requirements for the multimedia telephony with PSTN/ISDN simulation service shall be provided as described in clause 5.2.1.1 of TS 181 005 [1].

5.1.7 Handling of an ongoing session

The specific requirements for the Multimedia Telephony with PSTN/ISDN simulation service shall be provided as described in clause 5.2.1.2 of TS 181 005 [1].

5.1.8 Outgoing communications

5.1.8.1 Anonymous communication session

A session is considered anonymous when a user receiving an incoming session cannot identify the originating party.

Anonymous communication sessions shall be handled as described in TS 181 005 [1].

5.1.9 Incoming communications

5.1.9.1 Busy state

The requirements for busy state are provided in TS 181 005, clause 4.2.2.6 [1].

6 Quality of Service

The requirements for the provision of Quality of Service shall be provided as described in TS 181 005 [1].

7 Interworking considerations

7.1 Interworking with existing PSTN / ISDN networks

An NGN shall support the interoperability of the multimedia telephony services with PSTN/ISDN services and vice-versa. This includes interworking PSTN/ISDN supplementary services with the services defined in the present document and vice-versa. The scope of this interworking may result in a limited service capability.

7.2 Interworking with other IMS

An NGN shall support the interoperability of the simulation services defined in the present document with other NGN if the services are supported by both NGN.

7.3 Interworking with emulation services

An NGN shall support the interoperability of the multimedia telephony with PSTN/ISDN Simulation Services with the services provided by the NGN PSTN/ISDN Emulation subsystems where both are deployed. The scope of this interworking may result in the same limited service capability as interworking with an existing PSTN/ISDN network.

8 PSTN/ISDN simulation services

8.1 General

This clause provides the description of the PSTN/ISDN simulation services.

For each PSTN/ISDN simulation service, the following is provided:

- a short service definition;
- a description of the normal operation with successful outcome.

And when applicable also:

- a description of exceptional operation or unsuccessful outcome;
- descriptions on interaction with other PSTN/ISDN simulation services; and
- consideration for Interworking with the PSTN/ISDN.

In general if a simulation service is not mentioned within the interaction clause then there is no impact.

Services have been split into 3 categories:

- Mandatory services: selected services that must form the basis of any set of services considered to be mimicking the PSTN/ISDN services. These are considered to meet the requirements of regulation concerning the processing of personal data and the protection of privacy in the electronic communications sector.
- Recommended services: selected services that offer service providers with a transition from PSTN/ISDN to NGN.
- Optional services: other services.

8.2 Mandatory services

8.2.1 Originating Identification Presentation (OIP)

8.2.1.1 Definition

The OIP simulation service provides the terminating party with the Identity of the originating party.

The requirements for Presentation of session originating party identity shall be handled as described in TS 181 005 [1].

8.2.1.2 Service interactions with other PSTN/ISDN simulation services (NGN)

8.2.1.2.1 Identification services

8.2.1.2.1.1 Originating Identification Restriction (OIR)

The requirements for the interactions between presenting and withholding the originating party's identity shall be as described in TS 181 005 [1].

8.2.1.2.2 Diversion services

8.2.1.2.2.1 Communication Forwarding Unconditional (CFU)

When a communication has been forwarded and the forwarded-to party has been provided with the OIP simulation service, the forwarded-to party shall receive the identity information of the original originating party, if this originating party has not subscribed to or invoked the OIR simulation service.

8.2.1.2.2.2 Communication Forwarding Busy (CFB)

When a communication has been forwarded and the forwarded-to party has been provided with the OIP simulation service, the forwarded-to party shall receive the identity information of the original originating party, if this originating party has not subscribed to or invoked the OIR simulation service.

8.2.1.2.2.3 Communication Forwarding No Reply (CFNR)

When a communication has been forwarded and the forwarded-to party has been provided with the OIP simulation service, the forwarded-to party shall receive the identity information of the original originating party, if this originating party has not subscribed to or invoked the OIR simulation service.

8.2.1.2.2.4 Communication Forwarding on Not Logged-in (CFNL)

When a communication has been forwarded and the forwarded-to party has been provided with the OIP simulation service, the forwarded-to party shall receive the identity information of the original originating party, if this originating party has not subscribed to or invoked the OIR simulation service.

8.2.1.2.2.5 Communication Deflection (CD)

When a communication has been deflected and the deflected-to party has been provided with the OIP simulation service, the deflected-to party shall receive the identity information of the original originating party, if this originating party has not subscribed to or invoked the OIR simulation service.

8.2.1.2.2.6 Communication Forwarding on Subscriber Not Reachable (CFNRc)

When a communication has been forwarded and the forwarded-to party has been provided with the OIP simulation service, the forwarded-to party shall receive the identity information of the original originating party, if this originating party has not subscribed to or invoked the OIR simulation service.

8.2.1.2.3 Communication Waiting (CW)

If a party has the OIP service active and is notified that an incoming communication is waiting, then this party shall receive the identity information of the originating party, if this originating party has not subscribed to or invoked the OIR simulation service.

8.2.1.3 Interoperability with PSTN/ISDN Networks

The NGN shall support the interoperability of the OIP service with PSTN/ISDN Supplementary Service CLIP and vice-versa. The scope of this interworking may result in a limited service capability (only E.164 numbers can be used in the PSTN/ISDN).

8.2.2 Originating Identification Restriction (OIR)

8.2.2.1 Definition

The Originating Identification Restriction (OIR) simulation service enables the originating party to withhold the presentation of its asserted identity information to the terminating party.

The requirements for withholding the originators identity shall be as described in TS 181 005 [1]. Those requirements also allow certain terminating party to override the restriction (override capability).

8.2.2.2 Service interactions with other PSTN/ISDN simulation services (NGN)

8.2.2.2.1 Identification services

8.2.2.2.1.1 Originating Identification Presentation (OIP)

The requirements for the interactions between presenting and withholding the originating parties identity shall be as described in TS 181 005 [1].

8.2.2.2.2 Diversion services

8.2.2.2.2.1 Communication Forwarding Unconditional (CFU)

When the OIR simulation service has been invoked, the originating party's identity information shall not be presented to the forwarded-to party unless the forwarded-to party has an override capability.

8.2.2.2.2 Communication Forwarding Busy (CFB)

Same as for CFU.

8.2.2.2.3 Communication Forwarding No Reply (CFNR)

Same as for CFU.

8.2.2.2.4 Communication Forwarding on Not Logged-in (CFNL)

Same as for CFU.

8.2.2.2.5 Communication Deflection (CD)

Same as for CFU.

8.2.2.2.6 Communication Forwarding on Subscriber Not Reachable (CFNRc)

Same as for CFU.

8.2.2.3 Explicit Communication Transfer (ECT)

An originating party's restriction requirements from the original communication shall be used in order to restrict the presentation of that party's identity to any party in a transferred communication.

8.2.2.3 Interoperability with PSTN/ISDN Networks

An NGN shall support the interoperability of OIR service with the PSTN/ISDN Supplementary Service CLIR and vice-versa. The scope of this interworking may result in a limited service capability. The Originating Identity Restriction information shall be conveyed from an NGN to a PSTN/ISDN and vice-versa. The network to which the called/terminating party is connected to is responsible to handle this service.

In case of limited interoperability the restriction, OIR/CLIR shall have precedence.

8.2.3 Terminating Identification Presentation (TIP)

8.2.3.1 Definition

The TIP simulation service provides the originating party with the asserted identity of the terminating party. The requirements for the presentation of the terminating identity shall be as described in TS 181 005 [1].

8.2.3.2 Service interactions with other ISDN/PSTN simulation services (NGN)

8.2.3.2.1 Identification services

8.2.3.2.1.1 Terminating identification presentation restriction

The requirements for the interactions between presenting and withholding the terminating party's identity shall be as described in TS 181 005 [1].

8.2.3.2.2 Diversion services

If forwarding party B chooses to restrict the presentation of the forwarded-to party C's identity, the originating party A shall not receive the terminating party C's identity irrespective of whether the terminating party C has TIR activated or not.

8.2.3.3 Interoperability with PSTN/ISDN Networks

The NGN shall support the interoperability of the TIP services with PSTN/ISDN Supplementary Service COLP and vice-versa. The scope of this interworking may result in a limited service capability.

8.2.4 Terminating Identification Restriction (TIR)

8.2.4.1 Definition

The Terminating Identification Restriction (TIR) enables the terminating party to withhold presentation of its asserted identity information to the originating party.

The requirements for withholding the terminating party's identity are described in TS 181 005 [1]. Those requirements also allow certain originating parties to override the restriction (override capability).

This service description is based on the service description described in ETS 300 095 (see bibliography).

8.2.4.2 Service interactions with other PSTN/ISDN simulation services (NGN)

8.2.4.2.1 Identification services

8.2.4.2.1.1 Terminating Identification Presentation (TIP)

The requirements for the interactions between presenting and withholding the terminating party's identity shall be as described in TS 181 005 [1].

8.2.4.3 Interoperability with PSTN/ISDN Networks

The NGN shall support the interoperability of the TIR services with PSTN/ISDN Supplementary Services and vice-versa. The scope of this interworking may result in a limited service capability.

In case of limited interoperability the restriction, TIR/COLR shall have precedence.

8.2.5 Malicious Communication IDentification (MCID)

8.2.5.1 Definition

The MCID simulation service enables an incoming communication to be identified and registered.

The requirements for the MCID shall be as described in clause 5.6.3 of TS 181 005 [1].

8.2.5.2 Service interactions with other PSTN/ISDN simulation services (NGN)

8.2.5.2.1 Diversion Services

The MCID simulation service can be invoked for a diverted communication. In addition to the normal operation of the MCID simulation service, the identity of the first diverting party shall be registered and, as a network option, the last diverting party can be registered.

8.2.5.2.1.1 Communication Forwarding No Reply (CFNR)

If the terminating party has activated CFNR, once forwarding has taken place, the forwarding party cannot invoke the MCID simulation service.

8.2.5.2.1.2 Communication Deflection (CD)

If the terminating party has activated communication deflection, once deflection has taken place, the deflecting party cannot invoke the MCID simulation service.

8.2.5.2.2 Explicit Communication Transfer (ECT)

The transferring party cannot invoke the malicious communication identification simulation service on a communication after transfer of that communication has been successfully invoked.

If after a transfer has been completed, the transferred-to party successfully invokes the malicious communication identification simulation service, then the network shall register the identities of all parties involved.

8.2.5.3 Interoperability with PSTN/ISDN Networks

The MCID service shall interoperate for all communications from a PSTN/ISDN to an NGN and vice-versa. The registered information shall be stored in the invoking party's network and may also be stored in the malicious party's network.

8.2.6 Anonymous Communication Rejection (ACR)

8.2.6.1 Definition

The Anonymous Communications Rejection (ACR) simulation service allows the terminating party to reject incoming communications from originating parties that cannot be identified.

The requirements for ACR shall be as described in TS 181 005 [1].

This service description is based on the service description described in EN 301 798 (see bibliography).

8.2.6.2 Service interactions with other PSTN/ISDN simulation services (NGN)

8.2.6.2.1 Identification Services

8.2.6.2.1.1 Originating Identification Presentation (OIP)

No impact, i.e. neither simulation service shall affect the operation of the other simulation service.

8.2.6.2.1.2 Originating Identification Restriction (OIR)

If the terminating party has activated the ACR simulation service, then the OIR simulation service causes the execution of the ACR simulation service in accordance with the procedures in clause 8.2.6.1.

If the terminating party has the override capability according to the OIR simulation service, then the ACR simulation service shall not apply.

8.2.6.2.2 Diversion Services

NOTE: The precedence that ACR takes over the communication diversion services does not exclude the use of forwarding functionality in the ACR functionality itself. As an example: forwarding of anonymous communications (e.g. to a voice mailbox), as part of the ACR functionality is possible.

If the diverted-to user has activated the ACR simulation service, then the ACR simulation service shall take precedence over the communication diversion simulation service i.e. the communication shall be rejected according to the ACR simulation service.

8.2.6.2.2.1 Communication Forwarding Unconditional (CFU)

If the forwarding party has activated the ACR simulation service, then the ACR simulation service shall take precedence over the communication forwarding unconditional simulation service i.e. the communication shall be rejected according to the ACR simulation service.

8.2.6.2.2.2 Communication Forwarding Busy (CFB)

If the forwarding party has activated the ACR simulation service, then the ACR simulation service shall take precedence over the communication forwarding busy supplementary service i.e. the communication shall be rejected according to the ACR simulation service.

8.2.6.2.2.3 Communication Forwarding No Reply (CFNR)

If the forwarding party has activated the ACR simulation service:

- no impact, i.e. neither simulation service shall affect the operation of the other simulation service.

NOTE: If the originating party has restricted its identity due to the OIR simulation service the communication will not be presented.

8.2.6.2.2.4 Communication Forwarding on Not Logged-in (CFNL)

If the forwarding party has activated the ACR simulation service, then the ACR simulation service shall take precedence over the communication forwarding unconditional simulation service i.e. the communication shall be rejected according to the ACR simulation service.

8.2.6.2.2.5 Communication Forwarding on Subscriber Not Reachable (CFNRc)

If the forwarding party has activated the ACR simulation service, then the ACR simulation service shall take precedence over the communication forwarding on subscriber not reachable supplementary service i.e. the communication shall be rejected according to the ACR simulation service.

8.2.6.2.3 Communication Waiting (CW)

If the terminating party has activated the ACR simulation service, then the ACR simulation service shall take precedence over the Communication Waiting simulation service. The ACR simulation service can be activated while a communication is waiting without changing the state of the waiting communication session.

8.2.6.2.4 Completion of Communications to Busy Subscriber (CCBS)

NOTE: A CCBS recall (from the network to the originating party) resulting from the completion of communications to busy subscribers shall not be rejected due to the application of the ACR simulation service.

Assuming the originating party connects to the terminating party and the terminating party activates the ACR simulation service (or has activated the ACR simulation service), two cases are possible:

a) The ACR simulation service was activated by the terminating party before the originating party originates a communication:

   - No impact, i.e. neither simulation service shall affect the operation of the other simulation service.

NOTE: If the originating party has restricted its identity due to the OIR simulation service and if the terminating party is busy, the originating party will receive no busy indication, and the completion of communications to busy subscriber simulation service will not apply. Instead the communication session attempt shall be rejected according to the normal procedures of the ACR simulation service.

b) The ACR simulation service is activated by the terminating party after the originating party has activated the completion of communications to busy subscriber simulation service on the terminating party:

   - If the terminating party activates the ACR simulation service after the originating party has activated the completion of communications to busy subscriber simulation service on the terminating party, then the communication resulting from the completion of communications to busy subscriber simulation service shall be rejected if the originating party has restricted its identity due to the OIR simulation service.

8.2.6.3 Interoperability with PSTN/ISDN

The NGN shall support the interoperability of the ACR services with PSTN/ISDN Supplementary Service ACR and vice-versa. The scope of this interworking may result in a limited service capability.

8.3 Recommended services

8.3.1 Communication DIVersion (CDIV)

8.3.1.1 Definition

The following Communication DIVersion simulation services are defined:

- Communication Forwarding Unconditional (CFU).
- Communication Forwarding on Busy (CFB).
- Communication Forwarding on No Reply (CFNR).
- Communication Forwarding on Not Logged in (CFNL).
- Communication Deflection (CD).
- Communication Forwarding on Subscriber Not Reachable (CFNRc).

For all communications diversion simulation services, a service provider option of notification of diversion may be provided to the originating party. This service provider option may also include support for the invoking user to suppress the notification.

The use of any of the diversion services or a call identified as a callback to an emergency call, by a user that is not the PSAP, shall be precluded.

Communication Forwarding Unconditional (CFU)

The CFU service enables a user to have the network redirect all communications to another user. The CFU service may operate on all communication, or just those associated with specified services. The user's ability to originate communications is unaffected by the CFU simulation service. After the CFU service has been activated, communications are forwarded independent of the status of the user.

As a service provider option, a subscription option can be provided to enable the user to receive an indication that the CFU service has been activated. This indication may be provided when the user originates a communication if the CFU service has been activated for the user's identity and for the service requested for the communication.

The maximum number of diversions permitted for each communication is a service provider option. The service provider shall define the upper limit of diversions. When counting the number of diversions, all types of diversion are included.

This service description is based on the service description described in ETS 300 200 (see bibliography).

Communication Forwarding on Busy (CFB)

The CFB service enables an user to have the network redirect communications, which would otherwise be regarded as busy, to another user. The CFB service may operate on all communications, or just those associated with specified services. The user's ability to originate communications is unaffected by the CFB simulation service.

As a service provider option, a subscription option can be provided to enable the user to receive an indication that the CFB service has been activated. This indication may be provided when the user originates a communication if the CFB service has been activated for the user and for the service requested for the communication.

The maximum number of diversions permitted for each communication is a service provider option. The service provider shall define the upper limit of diversions. When counting the number of diversions, all types of diversion are included.

This service description is based on the service description described in EN 300 199 (see bibliography).

Communication Forwarding on no Reply (CFNR)

The CFNR service enables an user to have the network redirect communications, when the communication request is not responded to within a defined period of time, to another user. The CFNR service may operate on all communications, or just those associated with specified services. The user's ability to originate communications is unaffected by the CFNR simulation service.

The CFNR service can only be invoked by the network after the communication has been offered to the user and an indication that the user has been informed of the communication request.

As a service provider option, a subscription option can be provided to enable the user to receive an indication that the CFNR service has been activated. This indication may be provided when the user originates a communication if the CFNR service has been activated for the user and for the service requested for the communication.

The maximum number of diversions permitted for each communication is a service provider option. The service provider shall define the upper limit of diversions. When counting the number of diversions, all types of diversion are included.

This service description is based on the service description described in EN 300 201 (see bibliography).

Communication Forwarding on Not Logged-in (CFNL)

The Communication Forwarding on Not Logged-in (CFNL) service enables a user to redirect incoming communications, when the user is not currently registered (logged-in), to another user. The CFNL service may operate on all communications, or just those associated with specified services.

As a service provider option, a subscription option can be provided to enable the user to receive an indication that the CFNL service has been activated. This indication may be provided when the user next registers (logs in). An indication may also be provided as part of de-registration (log out).

The maximum number of diversions permitted for each communication is a service provider option. The service provider shall define the upper limit of diversions. When counting the number of diversions, all types of diversion are included.

Communication Deflection (CD)

The CD service enables the user to respond to an incoming communication by requesting redirection of that communication to another user. The CD service can only be invoked before the communication is established by the user, i.e. in response to the offered communication, or during the period that the user is being informed of the communication. The user's ability to originate communications is unaffected by the CD simulation service.

The maximum number of diversions permitted for each communication is a service provider option. The service provider shall define the upper limit of diversions. When counting the number of diversions, all types of diversion are included.

This service description is based on the service description described in ETS 300 202 (see bibliography).

Communication Forwarding on Subscriber Not Reachable (CFNRc)

The CFNRc service enables an user to have the network redirect all incoming communications, when the user is not reachable (e.g. there is no IP connectivity to the user''s terminal), to another user. The CFNRc service may operate on all communications, or just those associated with specified services. The user's ability to originate communications is unaffected by the CFNRc simulation service.

As a service provider option, a subscription option can be provided to enable the user to receive an indication that the CFNRc service has been activated. This indication may be provided when the user originates a communication if the CFNRc service has been activated for the user and for the service requested for the communication.

The maximum number of diversions permitted for each communication is a service provider option. The service provider shall define the upper limit of diversions. When counting the number of diversions, all types of diversion are included.

8.3.1.2 Service interactions with other PSTN/ISDN simulation services (NGN)

8.3.1.2.1 Identification services

8.3.1.2.1.1 Originating Identification Presentation (OIP)

When a communication has been diverted and the diverted-to party has been provided with the originating identification presentation simulation service, the diverted-to party shall receive the identity of the originating party, if this originating party has not subscribed to or invoked the originating identification restriction simulation service.

8.3.1.2.1.2 Originating Identification Restriction (OIR)

When the originating identification restriction simulation service has been invoked, the originating party's identity shall not be presented to the diverted-to party unless the diverted-to party has an override capability.

8.3.1.2.1.3 Terminating Identification Presentation (TIP)

When a communication has been diverted and the originating party has been provided with the terminating identification presentation simulation service, the originating party shall receive the identity of the diverted-to party, unless the diverting user has selected the option to suppress the notification of diversion.

8.3.1.2.1.4 Terminating Identification Restriction (TIR)

If the diverting party or the diverted-to party has invoked the Terminating Identification Restriction simulation service, then the diverted-to party's identity shall not be provided to the originating party unless the originating party has override capability.

8.3.1.2.2 Malicious Communication IDentification (MCID)

See clause 8.2.5.2.1.

8.3.1.2.3 Anonymous Communication Rejection (ACR)

See clause 8.2.6.2.2.

8.3.1.2.4 Diversion services

8.3.1.2.4.1 Communication Forwarding Unconditional (CFU)

Communication Forwarding Unconditional (CFU): Not applicable.

Communication Forwarding on Busy subscriber (CFB): Invocation of the communication forwarding unconditional simulation service shall take precedence over the CFB simulation service.

Communication Forwarding No Reply (CFNR): Invocation of the communication forwarding unconditional simulation service shall take precedence over the CFNR simulation service.

Communication Forwarding on Not Logged-in (CFNL): Invocation of the communication forwarding unconditional simulation service shall take precedence over the CFNL simulation service.

Communication Deflection (CD): Invocation of the communication forwarding unconditional simulation service shall take precedence over the CD simulation service.

Communication Forwarding on Subscriber Not Reachable (CFNRc): Invocation of the communication forwarding unconditional simulation service shall take precedence over the CFNRc simulation service.

8.3.1.2.4.2 Communication Forwarding Busy (CFB)

Communication Forwarding Unconditional (CFU): Invocation of the CFU simulation service shall take precedence over the communication forwarding busy simulation service.

Communication Forwarding on Busy subscriber (CFB): Not applicable.

Communication Forwarding No Reply (CFNR): No impact, i.e. neither simulation service shall affect the operation of the other simulation service.

Communication Forwarding on Not Logged-in (CFNL): No impact, i.e. neither simulation service shall affect the operation of the other simulation service.

Communication Deflection (CD): If the terminating party is not network determined user busy, then the CD simulation service or the communication forwarding busy simulation service can be invoked, depending on the response from the terminating party.

Communication Forwarding on Subscriber Not Reachable (CFNRc): If the terminating party is network determined busy, then CFB shall take precedence over CFNRc. Otherwise, if the terminating party is not network determined user busy, then there is no impact, i.e. neither supplementary service shall affect the operation of the other supplementary service.

8.3.1.2.4.3 Communication Forwarding No Reply (CFNR)

Communication Forwarding Unconditional (CFU): Invocation of the CFU simulation service shall take precedence over the communication forwarding no reply simulation service.

Communication Forwarding on Busy subscriber (CFB): No impact, i.e. neither simulation service shall affect the operation of the other simulation service.

Communication Forwarding No Reply (CFNR): Not applicable.

Communication Forwarding on Not Logged-in (CFNL): No impact, i.e. neither simulation service shall affect the operation of the other simulation service.

Communication Deflection (CD): No impact, i.e. neither simulation service shall affect the operation of the other simulation service.

NOTE: If the network indicates the arrival of an incoming communication to the terminating party, then the CD simulation service, or the communication forwarding no reply simulation service can be invoked, depending on the response, or lack of response, from the terminating party.

Communication Forwarding on Subscriber Not Reachable (CFNRc): No impact, i.e. neither simulation service shall affect the operation of the other simulation service.

8.3.1.2.4.4 Communication Forwarding on Not Logged-in (CFNL)

Communication Forwarding Unconditional (CFU): Invocation of the communication forwarding unconditional simulation service shall take precedence over the CFNL simulation service.

Communication Forwarding on Busy subscriber (CFB): No impact, i.e. neither simulation service shall affect the operation of the other simulation service.

Communication Forwarding No Reply (CFNR): No impact, i.e. neither simulation service shall affect the operation of the other simulation service.

Communication Forwarding on Not Logged-in (CFNL): Not applicable.

Communication Deflection (CD): No impact, i.e. neither simulation service shall affect the operation of the other simulation service.

Communication Forwarding on Subscriber Not Reachable (CFNRc): No impact, i.e. neither simulation service shall affect the operation of the other simulation service.

8.3.1.2.4.5 Communication Deflection (CD)

Communication Forwarding Unconditional (CFU): Invocation of the CFU simulation service shall take precedence over the communication deflection simulation service.

Communication Forwarding on Busy subscriber (CFB): If the terminating party is not network determined user busy, then the communication deflection simulation service or the CFB simulation service can be invoked, depending on the response from the terminating party.

Communication Forwarding No Reply (CFNR): No impact, i.e. neither simulation service shall affect the operation of the other simulation service.

NOTE: If the network indicates the arrival of an incoming communication to the terminating party, then the communication deflection simulation service, or the CFNR simulation service can be invoked, depending on the response, or lack of response, from the terminating party.

Communication Forwarding on Not Logged-in (CFNL): No impact, i.e. neither simulation service shall affect the operation of the other simulation service.

Communication Deflection (CD): Not applicable**.**

Communication Forwarding on Subscriber Not Reachable (CFNRc): No impact, i.e. neither simulation service shall affect the operation of the other simulation service.

8.3.1.2.4.4 Communication Forwarding on Subscriber Not Reachable (CFNRc)Not Logged-in (CFNL)

Communication Forwarding Unconditional (CFU): Invocation of the communication forwarding unconditional simulation service shall take precedence over the CFNRc simulation service.

Communication Forwarding on Busy subscriber (CFB): If the terminating party is network determined busy, then CFB shall take precedence over CFNRc. Otherwise, if the terminating party is not network determined user busy, then there is no impact, i.e. neither supplementary service shall affect the operation of the other supplementary service.

Communication Forwarding No Reply (CFNR): No impact, i.e. neither simulation service shall affect the operation of the other simulation service.

Communication Forwarding on Not Logged-in (CFNL): No impact, i.e. neither simulation service shall affect the operation of the other simulation service.

Communication Deflection (CD): No impact, i.e. neither simulation service shall affect the operation of the other simulation service.

Communication Forwarding on Subscriber Not Reachable (CFNRc): Not applicable.

8.3.1.2.5 Communication Waiting (CW)

Communication Forwarding Unconditional (CFU): CW has no impact on CFU. The communication will be forwarded without regard to the terminating party's state. A forwarded-to party may have communication waiting service and this will be activated if busy.

A forwarded communication can result in the communication waiting simulation service.

Communication Forwarding on Busy (CFB): CW cannot co-exist with CFB. Service Provider options to prevent both services being active at the same time include:

- One service cannot be activated while the other service is active.
- CFB has priority over CW (i.e. the CW never occurs).
- CW has priority over CFB (i.e. CFB never occurs).

Communication Forwarding on No Reply (CFNR): If terminating party has activated the CFNR simulation service, then a waiting communication shall still be offered. If the CFNR timer expires before an answer is received then the CFNR simulation service shall be invoked and the communication shall be forwarded and communication waiting ceased.

A forwarded communication can result in the communication waiting simulation service.

Communication Forwarding on Not Logged-in (CFNL): No impact.

NOTE: If a party with an active communication waiting logs out, the all active and offered communication would be released.

Communication Deflection (CD): When receiving the communication waiting indication, terminating party can invoke the CD simulation service. A deflected communication can result in the communication waiting simulation service.

Communication Forwarding on Subscriber Not Reachable (CFNRc): No impact, i.e. neither simulation service shall affect the operation of the other simulation service.

8.3.1.2.6 Communication Barring (CB)

8.3.1.2.6.1 Outgoing communication barring-fixed

If the outgoing communication barring-fixed simulation service has already been activated, a request to activate any CDIV simulation service shall be rejected if the user's communication to the diverted-to user would be barred by the outgoing communication barring-fixed simulation service.

If the CDIV simulation service was activated before the activation of the outgoing communication barring-fixed simulation service, the CDIV simulation service shall not be affected.

8.3.1.2.6.2 Outgoing communication barring-user controlled

If the outgoing communication barring-user controlled simulation service has already been activated, a request to activate any CDIV simulation service shall be rejected if the user's communication to the diverted-to user would be barred by the outgoing communication barring-user controlled simulation service.

If the CDIV simulation service was activated before the activation of the outgoing communication barring-user controlled simulation service, the CDIV simulation service shall not be affected.

8.3.1.2.7 Completion of Communications to Busy Subscriber (CCBS)

CCBS recalls shall never be diverted. They shall be provided to the original originating party.

CCBS can not be activated on a diverted communication.

8.3.1.2.8 Advice Of Charge (AOC)

8.3.1.2.8.1 Charging information at the End of the communication (AOC-E)

Originating party:

No impact, i.e. neither simulation service shall affect the operation of the other simulation service.

Forwarding party:

When a communication is forwarded and the forwarding party is charged for the forwarded part of the communication, then as a network option, the charging information can be transferred to the forwarding user when the communication is terminated provided that the served user has subscribed to the advice of charge: charging information at the end of the communication simulation service with the value of the subscription option set to "for all communications automatically".

8.3.1.3 Interoperability with PSTN/ISDN

The NGN shall support the interoperability of the CDIV service with PSTN/ISDN Supplementary Service CF and vice-versa. The scope of this interworking may result in a limited service capability. The CLI information of the originating party as well as further CLI information (first redirected address, last redirected address) may be provided to the final called party, if the PSTN/ISDN allows this.

8.3.2 Communication Waiting (CW)

8.3.2.1 Definition

The Communication Waiting (CW) service enables a terminating party to be informed at the time that a new communication is requested, and that no resources are available for that incoming communication.

The user has then the choice of accepting, rejecting or ignoring the incoming communication.

The maximum number of calls that may be waiting is a service provider option.

If the current number of calls waiting is equal to the maximum, then any new attempted incoming communication request shall be rejected with a busy cause.

This service description is based on the service description described in ETS 300 139 and ETS 300 056 (see bibliography).

In the presence of another call at the destination user where the incoming call is identified as a callback to an emergency call, then either the communication request shall be presented, or use shall be the CW service.

8.3.2.2 Service interactions with other PSTN/ISDN simulation services (NGN)

8.3.2.2.1 Anonymous Communication Rejection (ACR)

If the terminating party has activated the ACR simulation service, then the ACR simulation service shall take precedence over the Communication Waiting simulation service. The ACR simulation service can be activated while a communication is waiting without changing the state of the waiting communication session.

8.3.2.2.2 Diversion services

The interactions between Communication Waiting and Communication Diversion services are described in clause 8.3.1.2.5 of the present document.

8.3.2.2.3 Completion of Communications to Busy Subscriber (CCBS)

If a subscriber to the completion of communications to busy subscriber simulation service places a communication to a terminating party who has subscribed to the CW simulation service, and the terminating party is provided the communication waiting indication, then invocation of completion of communications to busy subscriber simulation service cannot occur.

8.3.2.3 Interoperability with PSTN/ISDN

No special requirement.

8.3.3 Communication HOLD (HOLD)

8.3.3.1 Definition

The communication HOLD simulation service enables a user to suspend media within a session, and resume that media at a later time.

Each party in a communication can hold and retrieve the communication independently from the other party. This also applies when a communication involves more than two parties (e.g. CONF).

This service description is based on the service description described in TS 122 228, clause 7.7.2 (see bibliography).

The use of HOLD on an emergency call, or a call identified as a callback to an emergency call, by a user that is not the PSAP, shall be precluded.

8.3.3.2 Service interactions with other PSTN/ISDN simulation services (NGN)

None.

8.3.3.3 Interoperability with PSTN/ISDN

The NGN shall support the interoperability of the HOLD service with PSTN/ISDN Supplementary Service HOLD and vice-versa. The scope of this interworking may result in a limited service capability.

8.3.4 Communication Barring (CB)

8.3.4.1 Definition

The group of Communication Restriction Services includes two simulation services:

- Outgoing Communications Barring (OCB).

This service makes allows a user to bar certain categories of outgoing communications. The network shall provide the capability for a user to select a set of categories (e.g. identities or range of identities) for barring. The type of barring is chosen by the user at provision time, and shall be valid for all outgoing communications. The network shall provide the capability for the user to bar outgoing communications based on user defined identities or identity ranges. Barring of an outgoing communication for a specific identity, a number of specific identities, or a range of identities shall be dependent on an entry in a SOCB identity list held in the network. This list shall either a "black list" or "white list". A "black list" shall contain the identities or identity ranges to be barred by the network for outgoing communications. A "white list" shall contain the identities or identity ranges that shall be allowed by the network for outgoing communications, i.e. all identities not in the "white list" shall be barred.

The ability of the served user to receive communications and to originate emergency communications shall be unaffected by OCB.

This service description is based on the service description described in EN 301 082 and EN 301 084 (see bibliography).

- Incoming Communications Barring (ICB).

This service allows a user to bar certain categories of incoming communications. The service also allows the user to have the barring of incoming calls activated always or only during certain conditions. The network shall provide the capability for a user to select from a set of categories (e.g. identities or range of identities) for barring. The type of barring is chosen by the user at provision time and may be valid for all incoming communications, or be limited to a specific service group or certain conditions (e.g. when the user is roaming).

The ability of the served user to set-up outgoing communications shall be unaffected by ICB.

The use of ICB, or a call identified as a callback to an emergency call, by a user that is not the PSAP, shall be precluded.

8.3.4.2 Service interactions with other PSTN/ISDN simulation services (NGN)

8.3.4.2.1 Diversion services

8.3.4.2.1.1 Communication Forwarding Unconditional (CFU)

If the OCB simulation service has already been activated, a request to activate the communication forwarding unconditional simulation service shall be rejected if the user's communication to the forwarded-to user would be barred by the OCB simulation service at the time of the activation attempt of the communication forwarding simulation service.

If the communication forwarding unconditional simulation service was activated before the activation of the OCB simulation service, the OCB simulation service can still be activated. When the two services have already been activated, a request to invoke the communication forwarding unconditional simulation service shall be rejected if the forwarding party's communication to the forwarded-to party would be barred by the OCB simulation service at the time of the invocation attempt of the communication forwarding unconditional simulation service..

8.3.4.2.1.2 Communication Forwarding Busy (CFB)

If the OCB simulation service has already been activated, a request to activate the communication forwarding busy simulation service shall be rejected if the forwarding party's communication to the forwarded-to party would be barred by the OCB simulation service at the time of the activation attempt of the communication forwarding simulation service.

If the communication forwarding busy simulation service was activated before the activation of the OCB simulation service, the OCB simulation service can still be activated. When the two services have already been activated, a request to invoke the communication forwarding busy simulation service shall be rejected if the forwarding party's communication to the forwarded-to party would be barred by the OCB simulation service at the time of the invocation attempt of the communication forwarding busy simulation service.

8.3.4.2.1.3 Communication Forwarding No Reply (CFNR)

If the OCB simulation service has already been activated, a request to activate the communication forwarding no reply simulation service shall be rejected if the forwarding party's communication to the forwarded-to party would be barred by the OCB simulation service at the time of the activation attempt of the communication forwarding simulation service.

If the communication forwarding no reply simulation service was activated before the activation of the OCB simulation service, the OCB simulation service can still be activated. When the two services have already been activated, a request to invoke the communication forwarding no reply simulation service shall be rejected if the forwarding party's communication to the forwarded-to party would be barred by the OCB simulation service at the time of the invocation attempt of the communication forwarding no reply simulation service.

8.3.4.2.1.4 Communication Forwarding on Not Logged-in (CFNL)

If the OCB simulation service has already been activated, a request to activate the communication forwarding no registration simulation service shall be rejected if the forwarding party's communication to the forwarded-to party would be barred by the OCB simulation service at the time of the activation attempt of the communication forwarding simulation service.

If the communication forwarding on Not Logged-in simulation service was activated before the activation of the OCB simulation service, the OCB simulation service can still be activated. When the two services have already been activated, a request to invoke the communication forwarding on Not Logged-in simulation service shall be rejected if the forwarding party's communication to the forwarded-to party would be barred by the OCB simulation service at the time of the invocation attempt of the communication forwarding on Not Logged-in simulation service.

8.3.4.2.1.5 Communication Deflection (CD)

If the OCB simulation service has been activated, a request to invoke the communication deflection simulation service shall be rejected if the deflecting party's communication to the deflected-to party would be barred by the OCB simulation service at the time of the invocation attempt of the communication deflection simulation service.

8.3.4.3 Interoperability with PSTN/ISDN

The NGN shall support the interoperability of the CB service with PSTN/ISDN Supplementary Service CB and vice-versa. The scope of this interworking may result in a limited service capability.

8.3.5 Completion of Communications to Busy Subscriber (CCBS)

8.3.5.1 Definition

The CCBS simulation service enables originating party, encountering a busy terminating party, to have the communication completed without having to make a new communication attempt when the terminating party becomes free.

When originating party requests the CCBS simulation service, the network will monitor for terminating party becoming free.

When terminating party becomes free then the network will wait a short time in order to allow the resources to be re-used for originating a communication. If the resources are not re-used by terminating party within this time, then the network will automatically inform originating party that terminating party has become free. Originating party can generate the CCBS communication to terminating party.

When originating party accepts the CCBS recall, then the network will automatically generate a CCBS communication to terminating party.

NOTE: A simulation service provided to terminating party which prevents the registration of CCBS requests is outside the scope of the present document.

During CCBS recall, information shall be provided which indicates it is a CCBS recall. The information provided in the original communication attempt shall be included in the CCBS recall.

This service description is based on the service description described in EN 300 357 (see bibliography).

8.3.5.2 Service interactions with other PSTN/ISDN simulation services (NGN)

8.3.5.2.1 Identification services

8.3.5.2.2 Anonymous Communication Rejection (ACR)

A CCBS recall (from the network to the originating party) resulting from the completion of communications to busy subscribers shall not be rejected due to the application of the ACR simulation service.

Assume the originating party connects to the terminating party and the terminating party activates the ACR simulation service or has activated the ACR simulation service:

- The ACR simulation service is activated by the terminating party after the originating party has activated the completion of communications to busy subscriber simulation service on the terminating party:
  - If the terminating party activates the ACR simulation service after the originating party has activated the completion of communications to busy subscriber simulation service on the terminating party, then the communication resulting from the completion of communications to busy subscriber simulation service shall be rejected if the originating party has restricted its identity due to the OIR simulation service.

8.3.5.2.3 Communication DIVersion (CDIV)

CCBS recalls shall never be diverted. They shall be provided to the original originating party.

CCBS can not be activated on a diverted communication.

8.3.5.2.4 Communication Waiting (CW)

NOTE: For a waiting communication, terminating party is not considered as busy.

If the Communication Waiting indication cannot be provided at the terminating party, originating party will receive busy indication and can invoke the CCBS simulation service to terminating party.

CCBS requests in the terminating party's CCBS queue shall only be processed if there are no communications waiting.

8.3.5.2.5 Communication HOLD (HOLD)

No impact, i.e. neither simulation service shall affect the operation of the other simulation service.

NOTE 1: When receiving a CCBS communication indication, originating party may invoke the communication hold simulation service in order to make interface resources available for the establishment of the CCBS communication.

NOTE 2: When originating party is busy or CCBS busy and is notified that terminating party is free, invocation of the communication hold simulation service will not result in the CCBS communication being established.

8.3.5.2.6 Communication Barring (CB)

Originating party calls terminating party who is busy, and then party invokes CCBS. Originating party invokes OCB before the CCBS has time out or terminating party becomes free, then the CCBS communication may be rejected due to the OCB invocation.

8.3.5.2.7 Completion of Communications to Busy Subscriber (CCBS)

A user can be both an "originating party" and a "terminating party" simultaneously, i.e. that user can have activated the CCBS simulation service and have CCBS requests outstanding whilst at the same time that user can be the destination of CCBS requests from other users.

If a user receives a CCBS recall while that terminating party's CCBS queue is being processed, then the CCBS recall shall take priority over the handling of the terminating party's CCBS queue. The handling of CCBS requests activated by this user shall have priority over the handling of CCBS requests activated by other users on this user.

If one of the user's CCBS requests matures as a result, then the user shall be provided a CCBS recall or notification. The terminating party idle guard timer, if running, shall be cancelled.

8.3.5.2.8 Advice Of Charge services (AOC)

Charging information can be provided for the original communication, and for the resulting CCBS communication.

8.3.5.3 Interoperability with PSTN/ISDN

The NGN shall support the interoperability of the CCBS service with PSTN/ISDN Supplementary Service CCBS and vice-versa. The scope of this interworking may result in a limited service capability.

8.3.6 Message Waiting Indication (MWI)

8.3.6.1 Definition

The MWI simulation service enables the network, upon the request of a controlling user to indicate to the receiving user, that there is at least one message waiting. The indication is sent to the receiving user when a message is deposited. Optionally, the network may send an indication to the user that there are no more unread message in the mail box. This indication may be send when the last unread message is read.

NOTE: As an example, a voice message is stored by the network for a particular user. The network then provides the MWI to the user to indicate there is a message for retrieval. Having received this indication, the receiving user can subsequently access the mail box, to listen to the message.

The means by which the receiving user accesses and manages the mail box voice message service are outside the scope of the present document.

This service description is based on the service description described in EN 300 650 (see bibliography).

8.3.6.2 Service interactions with other services (NGN)

8.3.6.2.1 Diversion services

8.3.6.2.1.1 Communication Forwarding Unconditional (CFU)

The MWI shall never be diverted.

8.3.6.2.1.2 Communication Forwarding Busy (CFB)

Same as CFU.

8.3.6.2.1.3 Communication Forwarding No Reply (CFNR)

Same as CFU.

8.3.6.2.1.4 Communication Forwarding on Not Logged-in (CFNL)

The MWI shall never be diverted. The indication shall be provided to the owning identity on re-registering.

8.3.6.3 Interoperability with PSTN/ISDN

There is no interoperability with PSTN/ISDN because MWI is a local service.

8.4 Optional services

8.4.1 CONFerence (CONF)

8.4.1.1 Definition

The CONF simulation service enables a user to participate in and control a simultaneous communication involving a number of users.

When the CONF simulation service is invoked, conference resources are allocated to the served user.

Once a conference is active, users can join and leave a conference, and remote users can be added to or removed from the conference.

Conference participants can request to be informed of these actions.

This service description is based on the service description described in ETS 300 183 and ETS 300 164 (see bibliography).

The use of CONF on an emergency call, or a call identified as a callback to an emergency call, by a user that is not the PSAP, shall be precluded. Users shall support the use of CONF on an emergency call, or a call identified as a callback to an emergency call, by the remote party, i.e. the PSAP.

8.4.1.2 Service interactions with other PSTN/ISDN simulation services (NGN)

8.4.1.2.1 Diversion services

No impact, i.e. neither simulation service shall affect the operation of the other simulation service.

8.4.1.2.2 CONFerence (CONF)

A user can be involved as the conference controller separately in more than one conference. However, the user cannot add any conference to another conference.

8.4.1.2.3 Advice Of Charge services (AOC)

No impact, i.e. neither simulation service shall affect the operation of the other simulation service. Communication diversion.

NOTE: every communication within the CONF service may be charged according to the normal communication procedures. Special arrangements (e.g. conference initiator may be charged for other parties' communications in the conference) are out of scope of the present specification.

8.4.1.3 Interoperability with PSTN/ISDN

The NGN shall support the interoperability of the CONF service with PSTN/ISDN Supplementary Service CONF and vice-versa. The scope of this interworking may result in a limited service capability.

8.4.2 Advice Of Charge (AOC)

8.4.2.1 Definition

AOC is a group of simulation services as follows:

- Advice Of Charge: charging information at communication Set-up time (AOC-S);

The advice of charge at communication set-up simulation service provides the user with information about the charging rates at the time of communication establishment or during the communication in the case of charging rates changes. The charge information provided relates to the charges incurred on the network to which the served user is attached.

This service description is based on the service description described in ETS 300 178 (see bibliography) for AoC-S on a permanent mode.

- Advice Of Charge: charging information During the communication (AOC-D);

The advice of charge during the communication simulation service enables the user to receive information on the recorded charges for a communication during the active phase of the call. The provided charging information relates may be exchanged between different operator domain if those operators have interconnect agreements to do so.

This service description is based on the service description described in ETS 300 179 (see bibliography) for AoC-S on a permanent mode.

- Advice Of Charge: charging information at the End of the communication (AOC-E)

The advice of charge at end of communication simulation service provides the user with charging information for a communication when the communication is terminated. Dependent on the option chosen at the time of subscription, the information can be sent for all communications, or on a per communication basis. The charge information provided relates to the charges incurred on the network to which the served user is attached.

This service description is based on the service description described in ETS 300 180 (see bibliography) for AoC-S on a permanent mode.

8.4.2.2 Service interactions with other PSTN/ISDN simulation services (NGN)

8.4.2.2.1 Diversion services

Originating party:

No impact, i.e. neither simulation service shall affect the operation of the other simulation service.

Forwarding party:

When a communication is forwarded and the forwarding party is charged for the forwarded part of the communication, then as a network option, the charging information can be transferred to the forwarding user when the communication is terminated.

8.4.2.2.2 Completion of Communications to Busy Subscriber (CCBS)

Charging information shall be provided for the original communication, and for the resulting CCBS communication.

8.4.2.2.3 CONFerence (CONF)

No impact, i.e. neither simulation service shall affect the operation of the other simulation service.

8.4.2.3 Interoperability with PSTN/ISDN

The NGN shall support the interoperability of the AOC service with PSTN/ISDN Supplementary Services and vice-versa. The scope of this interworking may result in a limited service capability.

8.4.3 Explicit Communication Transfer (ECT)

8.4.3.1 Definition

The ECT simulation service enables a transferring party A to transform two of that party's communications (e.g. an active communication and a communication on hold, to parties B and C), each of which can be an incoming communication or an outgoing communication, into a new communication between party B and party C.

Prior to transfer, the media session shall have been established on the communication between transferring party A and party B. On the communication between transferring party A and party C, either the media session shall have been established prior to transfer, or, as a service provider option, transfer can occur while the communication to party C is requested or being established (i.e. the media session has not yet been established).

The minimum requirement for Release 1 should be to perform an "immediate" communication transfer for an incoming communication, without waiting on a response from party C. The service should be applicable independent of whether party B and party C are NGN users or not.

This service description is based on the service description described in ETS 300 367 (see bibliography).

This service description is based on the service description described in ITU-T Recommendation I.256.3 (see bibliography).

The use of ECT on an emergency call, or a call identified as a callback to an emergency call, by a user that is not the PSAP, shall be precluded. Users shall support the use of ECT on an emergency call, or a call identified as a callback to an emergency call, by the remote party, i.e. the PSAP.

8.4.3.2 Service interactions with other PSTN/ISDN simulation services (NGN)

8.4.3.2.1 Identification services

8.4.3.2.1.1 Terminating Identification Restriction (TIR)

A terminating party's restriction requirements from the original communication shall be used in order to restrict the presentation of that party's identity to the other user in a transferred communication.

NOTE: If the media flow(s) is established on the communication to party C after transfer, the presentation of the identity of party C shall be restricted according to party C's Terminating identification restriction simulation service (i.e. as for the normal operation of the Terminating identification restriction simulation service).

8.4.3.2.2 Communication Barring (CB)

In case the transferring party A has outgoing call barring active towards party C, transferring party As request for call transfer of party B to party C shall also be barred, if it occurs in relation to the establishment of the communication to C.

8.4.3.2.3 CONFerence (CONF)

The conference controller cannot transfer the conference to another party.

NOTE: Conferees can invoke the ECT simulation service in order to transfer their connection to the conference to another party after that connection has been established.

8.4.3.2.4 Advice Of Charge (AOC)

8.4.3.2.4.1 Advice Of Charge at communication Set-up (AOC-S)

When party A transfers a communication, AOC-S shall be considered as completed.

For party B and party C, no impact, i.e. neither simulation service shall affect the operation of the other simulation service.

8.4.3.2.4.2 Advice Of Charge During the communication (AOC-D)

When party A transfers a communication and has activated AOC-D, the charge up to that time shall be sent as a subtotal charge for that communication. The AOC-D simulation service shall then be considered as completed.

NOTE: If party A had activated the AOC-D, then party A will receive information separately for both of the communications.

For party B and party C, no impact, i.e. neither simulation service shall affect the operation of the other simulation service.

8.4.3.2.4.3 Advice Of Charge at the End of a communication (AOC-E)

If a party A is charged for the transferred part of the communication and has activated the AOC-E, then either:

a) the charging information shall be sent to party A when the transferred communication is terminated; or

b) when the communications are transferred, party A shall be informed that charging information is not available. The AOC-E shall then be considered as completed.

For party B and party C, no impact, i.e. neither simulation service shall affect the operation of the other simulation service.

8.4.3.2.5 Explicit Communication Transfer (ECT)

The ECT simulation service can be invoked simultaneously by any of the parties on an active communication, but this is not regarded as a normal situation. The network shall not explicitly prevent this occurring.

Therefore, both parties (party A and party B) in a normal communication, who have each subscribed to the ECT simulation service, can simultaneously transfer the communication. That is, if party A and party B are involved in a communication on which the connection has been established, party A can transfer the communication to party C and party B can transfer the communication to another party.

NOTE: Mechanisms which prevent the ECT simulation service from resulting in a connection which contains no parties able to terminate the communication may result in rejection of simultaneous requests to invoke the ECT simulation service by the parties involved in the communication.

8.4.3.3 Interoperability with PSTN/ISDN

No restrictions.

8.4.4 Reverse charging

8.4.4.1 Definition

The reverse charging at communication set up time simulation service allows the terminating party to be charged for the entire communication. Only usage based charges can be applied to the terminating party. The service shall be requested by the originating party at communication set up time. The terminating party must receive an explicit indication of a reverse charge communication request.

This service description is based on the service description described in ITU-T Recommendation I.256.3 (see bibliography).

8.4.4.2 Service interactions with other PSTN/ISDN simulation services (NGN)

None.

8.4.4.3 Interoperability with PSTN/ISDN

The NGN shall support the interoperability of Reverse Charging with the PSTN/ISDN and vice-versa.

8.5 Concepts associated with supplementary services

Provision, Withdrawal, Registration, Erasure, Activation, Deactivation and Invocation shall be as defined in ITU-T Recommendation I.210 [3].

8.6 Use of authorization option in relation to supplementary services

8.6.1 Definition

Some supplementary services (e.g. communication session barring) can be offered to a user with the subscription option of authorization to control the service. When this option is selected, every action (related to that supplementary service), such as registration, erasure, activation or deactivation is performed by the user with concurrent authentication.

8.6.2 Description

When the subscription option authorized control of a supplementary service is provided, authentication handling is supported by the network.

8.6.3 Management - normal procedures and successful outcome

8.6.3.1 Provision of authorization

Each supplementary service which requires authorization to control this service may be offered with the subscription option authorized control of the supplementary service. The values of this option may be:

- user authentication;
- by the service provider.

8.6.3.2 Withdrawal of authorization

Authorization may be withdrawn for administrative reasons or due to subscription modification.

8.6.3.3 Authentication requirements

The network shall provide, and allow the user to maintain, the authentication credentials.

Annex A (informative): General terminal guidelines

A.1 Service state indication

It is considered useful to indicate to the user the current state, notably the activated state of those services which can lead to communications not being offered. For example, an active CFU results in no communication being presented.

Generally speaking any "not usual" state of a service should be indicated on the terminal: CFU activated, CW deactivated, OIR in permanent mode activated, etc.

In the case of services which can be remotely controlled from another terminal or a server, the terminal should receive this information from the network.

Annex B (informative): Service interactions table

Table B.1 summarizes the service interactions between pairs of PSTN/ISDN simulation services, as identified in clause 8.

Each case of the table represents the scenario where services on the horizontal row heading are invoked when services on the vertical column heading are already active.

The case is filled with one of three possible options: character "Y " indicates interaction has been identified between the corresponding service pair and described in the present document, character "N" indicates no interaction has been identified and no information is provided in the present document, grey colour filling is for scenarios which are not applicable.

Table B.1: Identified service interactions between pairs of PSTN/ISDN simulation services

	OIP	OIR	TIP	TIR	MCID	ACR	CFU	CFB	CFNR	CFNL	CD	CFNR	CW	HOLD	CB	CCBS	MWI	CONF	AOC	ECT	RC
Originating Identification Presentation (OIP)		Y	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N
Originating Identification Restriction (OIR)	N		N	N	N	N	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	Y	N
Terminating Identification Presentation (TIP)	N	N		Y	N	N	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N
Terminating Identification Restriction (TIR)	N	N	Y		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Malicious Communication Identification (MCID)	N	N	N	N		N	N	N	Y	N	Y	Y	N	N	N	N	N	N	N	Y	N
Anonymous Communication Rejection (ACR)	Y	Y	N	N	N		Y	Y	Y	Y	N	Y	N	N	N	Y	N	N	N	N	N
Communication Forwarding Unconditional (CFU)	Y	Y	Y	Y	N	Y		Y	Y	Y	Y	Y	N	N	Y	Y	N	N	Y	N	N
Communication Forwarding Busy (CFB)	Y	Y	Y	Y	N	Y	Y		N	N	Y	Y	(see note)	N	Y	Y	N	N	Y	N	N
Communication Forwarding No Reply (CFNR)	Y	Y	Y	Y	Y	Y	Y	N		N	N	N	Y	N	Y	Y	N	N	Y	N	N
Communication Forwarding on Not Logged-In (CFNL)	Y	Y	Y	Y	N	Y	Y	N	N		N	N	N	N	Y	Y	N	N	Y	N	N
Communication Deflection (CD)	Y	Y	Y	Y	Y	Y	Y	Y	N	N		N	Y	N	Y	Y	N	N	Y	N	N
Communication Forwarding on Subscriber Not Reachable (CFNRc)	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N		Y	N	Y	Y	N	N	N	N	N
Communication Waiting (CW)	N	N	N	N	N	Y	N	(see note)	Y	N	Y	Y		N	N	Y	N	N	N	N	N
Communication Hold (HOLD)	N	N	N	N	N	N	N	N	N	N	N	N	N		N	N	N	N	N	N	N
Communication Barring (CB)	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	N	N		N	N	N	N	N	N
Completion of Communications to Busy Subscriber (CCBS)	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		N	N	Y	N	N
Message Waiting Indication (MWI)	N	N	N	N	N	N	Y	Y	Y	Y	N	Y	N	N	N	N		N	N	N	N
Conference (CONF)	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		Y	N	N
Advice of Charge (AOC)	N	N	N	N	N	N	Y	Y	Y	Y	Y	N	N	N	N	N	N	Y		N	N

	OIP	OIR	TIP	TIR	MCID	ACR	CFU	CFB	CFNR	CFNL	CD	CFNR	CW	HOLD	CB	CCBS	MWI	CONF	AOC	ECT	RC
Explicit Communication Transfer (ECT)	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	Y	N	N	Y	Y	Y	N
Reverse Charging (RC)	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	

Annex C (informative): Bibliography

- ETSI ETS 300 200: "Integrated Services Digital Network (ISDN); Call Forwarding Unconditional (CFU) supplementary service; Service description".
- ETSI EN 300 199 (V1.2.1): "Integrated Services Digital Network (ISDN); Call Forwarding Busy (CFB) supplementary service; Service description".
- ETSI EN 300 201 (V1.2.1): "Integrated Services Digital Network (ISDN); Call Forwarding No Reply (CFNR) supplementary service; Service description".
- ETSI ETS 300 202: "Integrated Services Digital Network (ISDN); Call Deflection (CD) supplementary service; Service description".
- ETSI ETS 300 056: "Integrated Services Digital Network (ISDN); Call Waiting (CW) supplementary service; Service description".
- ETSI ETS 300 139: "Integrated Services Digital Network (ISDN); Call Hold (HOLD) supplementary service; Service description".
- ETSI ETS 300 183: "Integrated Services Digital Network (ISDN); Conference call, add-on (CONF) supplementary service; Service description".
- ETSI ETS 300 164: "Integrated Services Digital Network (ISDN); Meet-Me Conference (MMC) supplementary service; Service description".
- ETSI EN 300 357 (V1.2.1): "Integrated Services Digital Network (ISDN); Completion of Calls to Busy Subscriber (CCBS) supplementary service; Service description".
- ETSI ETS 300 178: "Integrated Services Digital Network (ISDN); Advice of Charge: charging information at call set-up time (AOC-S) supplementary service; Service description".
- ETSI ETS 300 179: "Integrated Services Digital Network (ISDN); Advice of Charge: charging information during the call (AOC-D) supplementary service; Service description".
- ETSI ETS 300 180: "Integrated Services Digital Network (ISDN); Advice of Charge: charging information at the end of the call (AOC-E) supplementary service; Service description".
- ETSI EN 300 650 (V1.2.1): "Integrated Services Digital Network (ISDN); Message Waiting Indication (MWI) supplementary service; Service description".
- ETSI EN 301 798 (V1.1.1): "Services and Protocols for Advanced Networks (SPAN);Anonymous Call Rejection (ACR) Supplementary Service; Service description".
- ETSI EN 301 082 (V2.1.1): "Integrated Services Digital Network (ISDN); Outgoing Call Barring-Fixed (OCB-F) supplementary service; Service description".
- ETSI EN 301 084 (V2.1.1): "Integrated Services Digital Network (ISDN); Outgoing Call Barring-User Controlled (OCB-UC) supplementary service; Service description".
- ITU-T Recommendation Q.1290: "Glossary of terms used in the definition of intelligent network".
- ITU-T Recommendation I.140: "Attribute technique for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".
- ETSI TS 122 228 (V6.7.0): "Digital cellular telecommunications system (Phase 2+);Universal Mobile Telecommunications System (UMTS);Service requirements for the Internet Protocol (IP) multimedia core network subsystem (IMS);Stage 1 (3GPP TS 22.228 Release 6)".
- ETSI ETS 300 094 V2.1.1 (2000-06): "Integrated Services Digital Network (ISDN); Connected Line Identification Presentation (COLP); supplementary service; Service description".

- ETSI EN 300 367 V1.2.1 (1998-10): "Integrated Services Digital Network (ISDN);Explicit Call Transfer (ECT) supplementary service; Service description".
- ITU-T Recommendation I.256.3 (08/92): "Integrated Services Digital Network (ISDN); general structure and service capabilities; Reverse Charging".
- ITU-T Recommendation I.112 (03/93): "Integrated services digital network ISDN; Vocabulary of terms for ISDNs)."

Annex D (informative): Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
2006-03					ETSI publication: **TS 181 002**		1.1.1
2006-09					Release 1 maintenance. Tispan#11bis output.	1.1.1	1.2.1
2006-10					Release 1 maintenance. Integration of CRs from Tispan#11 meeting.	1.2.1	1.2.2
2006-12					Output from Tispan#12bis	1.2.2	1.2.4
2007-01					Latest draft (in line with 12bTD199r1 contribution)	1.2.4	1.2.6
2007-01					Output from Tispan#12ter	1.2.6	1.2.7
2007-03					Input for Tispan#13bis with the integration of the CR-003 related to the contribution 12tTD289r1 Agreed output from TISPAN#14bis	1.2.7	1.2.8
2007-09	SP-37	SP-070568			Endorsement as 3GPP TS		
2007-11	SP-38	SP-070894			Conversion to 3GPP format	ETSI TS 181 002 1.2.8	3GPP TS 22.273 2.0.0
2007-12	SP-38	SP-070894			Raised to v.7.0.0 following SA#38 approval	2.0.0	7.0.0

History

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