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Technical Specification

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IP Multimedia Subsystem (IMS) service continuity
(3GPP TS 23.237 version 8.1.0 Release 8)**



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Foreword

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Introduction

IMS based services can be provided with use of PS bearers and CS bearers for the media. When using CS bearer for media transport of IMS sessions, interworking solutions for IMS Centralized Services as specified in TS 23.292 [5] are used. ICS allows IMS sessions using CS bearers to be treated as standard IMS sessions for the purpose of IMS Service Continuity. ICS defines signalling mechanisms between the UE and IMS for transport of information as needed for service continuity when using CS access for media transport.

Both IMS Centralized Services and IMS Service Continuity specify functions which are provided by a SIP application server.

1 Scope

The present document specifies the architectural requirements and procedures for delivery of IMS Service Continuity.

TS 23.206 [3] is migrated to this specification.

The scope of the specification includes:

- PS-CS service continuity using IMS Centralized Services (see TS 23.292 [5]);
- PS-PS service continuity;
- PS-PS service continuity in conjunction with PS-CS service continuity;
- Adding and/or removing media flows to support service.

The solution is restricted to service continuity using IMS procedures, i.e. mobility mechanisms on the IP-CAN level are not within the scope of this specification.

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".
- [2] 3GPP TS 22.258: "Service requirements for the AIPN".
- [3] 3GPP TS 23.206: "Voice Call Continuity between CS and IMS".
- [4] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".
- [5] 3GPP TS 23.292: "IP Multimedia Subsystem (IMS) centralized services; Stage 2".
- [6] ITU-T Recommendation E.164: "The international public telecommunication numbering plan".
- [7] OMA-ERELED-DM-V1_2-20060602-C: "Enabler Release Definition for OMA Device Management, Candidate Version 1.2".
- [8] RFC 3261 (June 2002): "SIP: Session Initiation Protocol".
- [9] 3GPP TS 22.101: "Service aspects; Service principles".
- [10] 3GPP TS 23.216: "Single Radio Voice Call Continuity (SRVCC); Stage 2".
- [11] 3GPP TS 33.102: "3G security; Security architecture".
- [12] 3GPP TS 33.203: "Access security for IP-based services".
- [13] 3GPP TS 23.218: "IP Multimedia (IM) session handling; IM call model; Stage 2".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions in TR 21.905 [1] and the following apply.

Access Leg: This is the call control leg between the UE and the SCC AS; also see TS 23.292 [5] for the definition of Access Leg for IMS sessions which use the CS media.

Access Transfer: Transfer at the IMS-level of one or more media paths of an ongoing IMS session on one UE between PS to CS access; or transfer at the IMS-level of both the signalling and the media path of an ongoing IMS session on a UE between different IP-CANs.

IMS Service Continuity: A service of the IMS which supports the use of Session Transfer mechanisms to maintain service continuity in the event of terminal mobility and/or mobility between terminals for the case when such events are not hidden from the IMS session layer and thus service continuity could not otherwise be maintained.

Inter-UE Transfer: Transfer at the IMS-level of all or some of the media components and associated signalling between UEs under the control of the same user.

NOTE 1: The transfer of all media components and the control signalling from one device to another is also known as Session Mobility as defined in TS 22.258 [2].

NOTE 2: Inter-UE Transfer is not specified as part of the present release.

Local Operating Environment Information: This is a set of parameters, which can include access network(s) conditions and other parameters implementation specific, which describe the local environment in which the UE is operating.

Remote Leg: This is the call control leg between the SCC AS and the remote party from the subscriber's perspective; also see TS 23.292 [5] for the definition of Remote Leg for IMS sessions which use the CS media.

Session Transfer: Transfer at the IMS-level of one or more of the session signalling paths and/or associated media paths of an ongoing IMS session while maintaining service continuity. Session Transfer incorporates Access Transfer and / or Inter-UE Transfer.

Session Transfer Identifier (STI): An identifier used by the UE to request the SCC AS to perform Session Transfer.

Session Transfer Number (STN): A public telecommunication number, as defined by ITU-T Recommendation E.164 [6] used by the UE to request the SCC AS to perform Session Transfer from PS to CS access.

Session Transfer Number for SR-VCC (STN-SR): A STN used for Single Radio VCC procedures as specified in TS 23.216 [10]. STN-SR is configured for the subscriber at the time of SR-VCC service provisioning.

Source Access Leg: The Access Leg that exists in the transferred-out access before executing Access Transfer procedures.

Target Access Leg: The Access Leg that is established in the transferred-in access during Access Transfer procedures.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

VCC	Voice Call Continuity
3pcc	3rd party call control
iFC	Initial Filter Criteria
IMRN	IP Multimedia Routing Number.
SC	Service Continuity
SCC AS	Service Centralization and Continuity Application Server
SR-VCC	Single Radio VCC

STI	Session Transfer Identifier
STN	Session Transfer Number
STN-SR	Session Transfer Number - Single Radio

4 High level principles and architectural requirements

4.1 Basic Assumptions

- The UE may be capable of transmitting and receiving simultaneously in multiple Access Networks or may be capable of transmitting and receiving in only one Access Network at a time.
- If a UE has an ongoing multimedia session over an IP-CAN and moves to a different IP-CAN but its contact address and its serving P-CSCF remain the same, then there is no need to activate any IMS Service Continuity mechanisms to transfer its multimedia session. The UE may update the session (e.g. remove media not supported by the target IP-CAN) based on the normal IMS procedures specified in TS 23.228 [4].

4.1.1 PS-CS Service Continuity

The following assumptions apply for PS-CS service continuity:

- Functions of IMS Centralized Services and IMS Service Continuity are collocated in a single application server in this release. Not all functions are always required.
- IMS Centralized Services specifies functions and procedures for use of CS bearer for the media of the IMS sessions.
- For networks supporting the Gm and/or the I1 reference points of ICS, see TS 23.292 [5], the Gm and/or the I1 reference point are/is used for communication of required information if needed for enablement of PS-CS service continuity of IMS multi-media sessions.
- For networks not supporting the Gm or the I1 reference points of ICS, PS-CS service continuity is only possible when the UE is active in a single speech session i.e. support of Session Transfers with more than one sessions or with non voice media is not provided.
- When using the CS bearer for the media of the IMS session(s), multiple sessions can exist, but only one active session can be transferred over the CS bearer; one or more inactive sessions can be transferred.
- PS-CS service continuity with UE-based conferencing is not specified in this release.

4.2 Architectural Requirements

- It shall be possible to perform multimedia session transfer in both EPC and non-EPC Networks.
- It shall be possible to provide IMS Service Continuity when the user is moving between 3GPP access systems.
- It shall be possible to provide IMS Service Continuity when the user is moving between 3GPP and non-3GPP access systems.
- It shall be possible to provide IMS Service Continuity when the user is moving between non-3GPP access systems.
- It shall be possible to provide IMS Service Continuity between an Access Network that supports real-time media on the CS domain and non-real-time media on the PS domain, and an IP-CAN that supports transport of all media types.
- The service disruption when session transfer occurs shall be minimized.
- There shall be no impact on the radio and transport layers and on the PS core network.
- UEs that do not support the functionality described in this specification shall not be impacted.

- All media within a multimedia session or a subset of media within a multimedia session could be subject to session transfer procedures. If it is not possible or not desired (e.g. due to user preferences and/or operator policies) to transfer all media, then part of the media components shall be transferred (if possible) and the remaining component(s) will be released or kept in the transferred out access.
- It shall be possible for the UE to add or remove one or more media components to/from an ongoing multimedia session that it controls during Access Transfer.
- It shall be possible to register a Public User Identity with multiple contact addresses (at the same or via separate UEs) via IMS registration procedures as defined in TS 23.228 [4], clause 5.2.1. The number of allowed simultaneous registrations is defined by home operator policy.
- It shall be possible to perform correlation of charging data from different access networks when service continuity between these networks is performed.
- It shall be possible to provide IMS Service Continuity when the P-CSCF changes.
- It shall be possible for the UE to use IMS mechanisms to transfer its ongoing multimedia sessions to a target Access Network without requiring any new functionality on the remote party.
- It shall be possible for the UE to initiate a Session Transfer procedure based on session transfer policy provided by the network which may include restrictions of session transfer.
- It shall be possible for the SCC AS to update the Session Transfer policy in the UE.
- The UE shall be IMS registered before invoking any Session Transfer procedures.
- The filter criteria shall contain a condition that a 3rd-party registration is performed via the ISC interface for the SCC AS.

4.3 Service Continuity

4.3.1 Session Transfer concepts

4.3.1.1 General

When an UE is active in an IMS session, the Session Transfer procedures provide service continuity between Access Networks.

The initial and all subsequent Session Transfer procedures are initiated by the UE and are executed and controlled by the same SCC AS.

The SCC AS generates charging information for all Session Transfers for an IMS session for the purpose of billing and charging.

Initiation of Session Transfer procedures for ongoing multimedia session may be based on the operator Session Transfer policy received from the SCC AS.

The UE sends information required by the SCC AS in order to execute Session Transfer procedures.

4.3.1.2 Access Transfer concepts

4.3.1.2.1 General Access Transfer concepts

IMS sessions from and to an UE are anchored at the SCC AS in the home IMS to provide service continuity for the user during transition between two Access Networks. Sessions are anchored at the SCC AS in the home IMS, based on iFC. A 3pcc (3rd party call control) function is employed at the SCC AS to facilitate inter-Access Network mobility through the use of Access Transfers between the two Access Networks. Access Transfers may be enabled in one or both directions as per network configuration requirements. The SCC AS has the capability to perform Access Transfers for a UE's sessions multiple times.

4.3.1.2.2 Access Transfer (PS – CS) concepts

IMS sessions established in CS or PS Access Networks are anchored at the SCC AS. IMS sessions using CS bearer are established at session setup or upon Access Transfer using procedures specified in TS 23.292 [5].

PS-CS Access Transfer shall be provided according to the requirements specified in clause 22.3, Service Continuity, of TS 22.101 [9].

When using a UE that does not have, or that is unable to use, ICS capabilities as specified in TS 23.292 [5], Access Transfer of an active speech-only session shall be provided when transferring voice media bearer between CS and PS access.

When using a UE that is able to use ICS capabilities as specified in TS 23.292 [5], Access Transfer of one active session and zero or more inactive sessions shall be provided using the Gm or the I1 reference point of ICS to transport required information, as specified in TS 23.292 [5], when transferring media bearer between CS and PS access.

4.3.2 Regulatory aspects

IMS Session Transfer for emergency session is not supported in this release.

4.3.3 Information used for IMS Service Continuity

The following information may be provided between SCC AS and the UE.

Depending on the IMS Service Continuity scenario, the Session Transfer request may contain the following:

- session transfer indicator to indicate that this new session is for session transfer;
- details about the access and the media components being transferred / kept / released;
- optionally, an IMS Communication Service Identifier defined in TS 23.228 [4];
- which session is required to be replaced or updated;
- whether to merge the session(s).

The above addressed information are carried in various SIP/SDP and CS call control messages (specified in the applicable information flows), which provides the necessary details to enable IMS Service Continuity.. The SCC AS and the UE analyzes included information and determine if and how a Session Transfer operation needs to be performed.

5 Architecture model and reference points

5.1 Overview

IMS Service Continuity is a home network based IMS application which provides intra-device transfers of one or more components of IMS multi media sessions across different Access Networks.

5.2 Reference Architecture

IMS Service Continuity requires a Service Centralization and Continuity (SCC) AS, which is an Application Server as described in TS 23.228 [4], and a UE with SC capabilities. For the support of IMS sessions with CS media, refer to the reference architecture in TS 23.292 [5], clause 5.2; the functions of ICS and SC are specified as optional functions co-located in the SCC AS in this release.

OMA Device Management [7] is used between the SCC AS and the UE for provisioning of operator policy for Session Transfer.

5.3 Functional Entities

5.3.1 SCC AS

The SCC AS provides IMS-based mechanisms for enabling service continuity of multimedia sessions.

For IMS Service Continuity, the SCC AS implements the following functionalities:

- **Session Transfer:** The SCC AS uses the ISC reference point towards the S-CSCF for execution of the Session Transfer. The SCC AS performs the following for enablement and execution of Session Transfers between different Access Networks:
 - It analyzes the set of information required for Session Transfer as described in the procedure section and decides which Session Transfer scenario should be executed; it rejects the Session Transfer request if it is not aligned with the operator policy.
 - It executes the transfer of the IMS session between different accesses networks.
 - It implements 3rd Party Call Control (3pcc) upon session establishment.
 - It provides Session Transfer specific charging data.
 - It decides based on analysis of the various service continuity related input factors whether to update provisioned operator policy for Session Transfer.
 - It generates and updates operator Session Transfer policy by sending operator policy to the UE via OMA DM [7] including the priority between the operator policy and user preferences that could be used also to initiate Session Transfer procedure for ongoing sessions.
- **Terminating Access Domain Selection (T-ADS):** In addition to T-ADS specified in TS 23.292 [5], the SCC AS may for a terminating session select more than one contact amongst registered contacts for the SC User and split the session into sessions directed to the selected contacts.
- **Handling of multiple media components:** The SCC AS provides functionality to combine and/or split media components over one or more Access Networks as needed for Session Transfers, or upon request by the UE to add media components over more Access Networks during the setup of a session, or upon request by the UE to add and/or delete media components over one or more Access Networks to existing sessions.

When handling media components of an IMS session, the SCC AS takes into account the services associated with the session.

5.3.2 IMS Service Continuity UE

For IMS Service Continuity the UE provides the following functions:

- Stores and applies operator policy for Session Transfer.
- Initiates Session Transfer procedure based on trigger criteria including the current operator policy, user preferences and the Local Operating Environment Information, providing the necessary details for conducting a Session Transfer operation to the SCC AS.

5.4 Signalling and bearer paths for IMS Service Continuity

5.4.1 General

The SCC AS is inserted in the signalling path of all the IMS user's sessions; the SCC AS behaves as a SIP-AS as described in TS 23.228 [4] to set up a 3pcc to control the bearer path of the session for enablement and execution of Session Transfer.

5.4.2 Sessions with PS media

Figure 5.4.2-1 shows 3pcc at the SCC AS, for enablement and execution of Session Transfers, when the media for the Access Leg is established via IP-CAN.

The figure is for illustration of the 3pcc at the SCC AS and its use for Session Transfer, hence it only shows the signalling and bearer components relevant to the enablement and execution of Session Transfers.

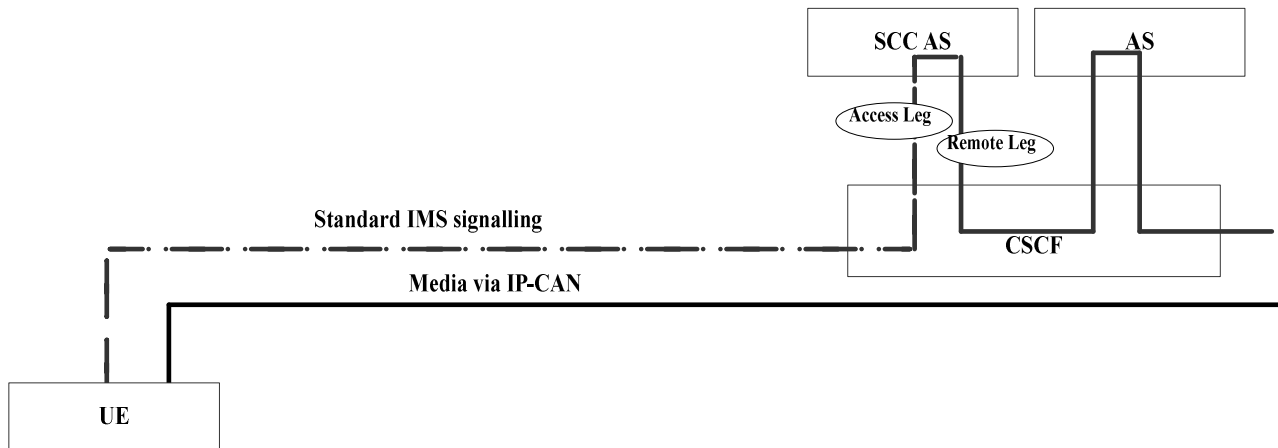


Figure 5.4.2-1: Signalling and bearer paths for sessions with PS media

5.4.3 Sessions with CS media

For details of signalling and bearer paths when the media for the Access Leg is established via the CS access, see TS 23.292 [5], clause 7.1.1. For illustration of 3pcc at the SCC AS, for enablement and execution of Session Transfers, with use of the Gm reference point, the I1 reference point, and when not using Gm or I1 for service control signalling respectively, refer to figures 7.1.1-1, 7.1.1-2 and 7.1.2-1, in TS 23.292 [5], clause 7.1.

6 Procedures and flows

NOTE: Some of the following figures contain a box labelled CS/IMS Intermediate Nodes. This is abstraction for CS/IMS functional elements that exist between the UE and the SCC AS which could include amongst others MSC Server enhanced for ICS, MSC Server enhanced for SRVCC or an MGCF and an MSC Server not enhanced for ICS.

6.1 Registration

Whenever the UE acquires IP connectivity via an IP-CAN, the UE registers in the IMS as defined in TS 23.228 [4]. The S-CSCF follows the procedures defined in TS 23.218 [13] for performing 3rd party registration towards the SCC AS.

When using CS access for media, the UE may be registered in IMS as specified in TS 23.292 [5].

6.2 Origination and Termination

6.2.1 Origination

6.2.1.1 Origination Procedures

UE initiated multimedia sessions are anchored at the SCC AS in order to enable IMS Service Continuity. Originating iFC for the SC subscriber results in routing of the session to the SCC AS in the home IMS network, where the SCC AS uses 3rd party call control as per TS 23.228 [4] to initiate a session to the remote party on behalf of the subscriber.

The SCC AS shall be the first Application Server of any Application Servers that need to remain in the path of the call after Session Origination.

6.2.1.2 Originating sessions that use CS media

The UE originates sessions that use CS media by following the procedures specified in TS 23.292 [5], clause 7.3.2 Originating sessions that use CS media.

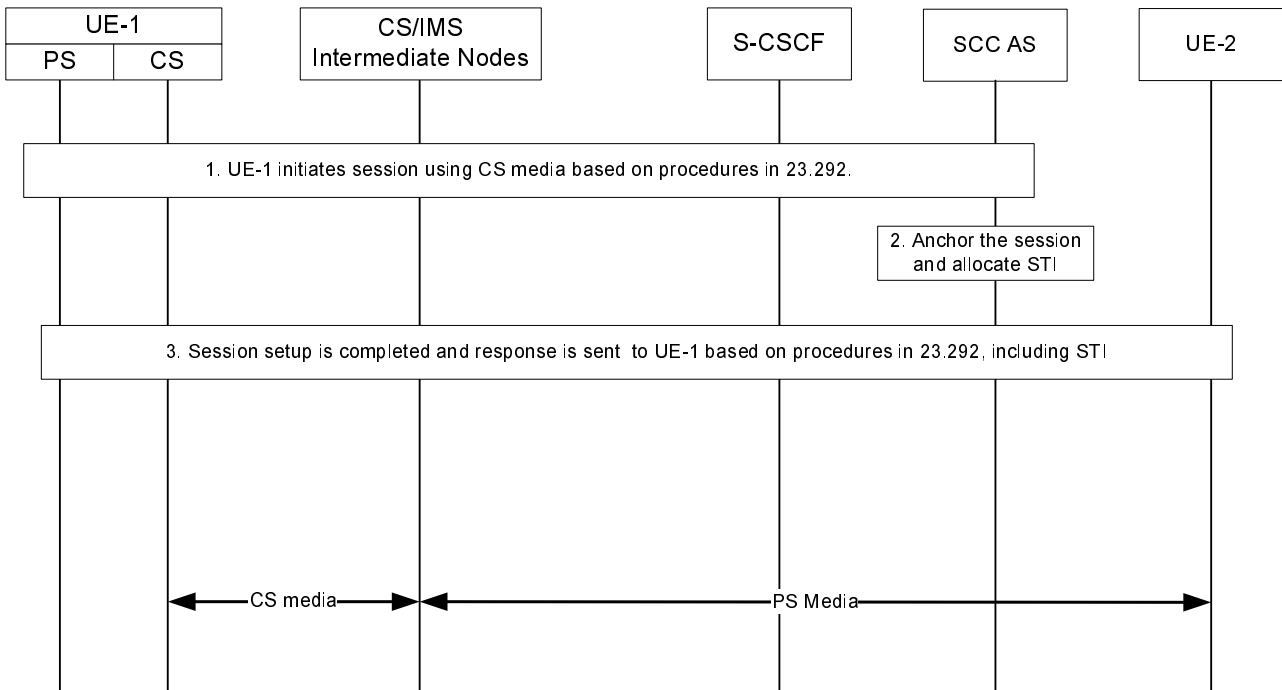


Figure 6.2.1.2-1: Originating session that uses CS media

1. UE-1 initiates a multimedia session to UE-2 and makes use of CS media. UE-1 sends the request to the SCC AS following the procedures specified in TS 23.292 [5], clause 7.3.2 Originating sessions that use CS media, for setting up CS bearer, anchoring the session at the SCC AS, merging multiples legs if necessary, and forwarding the combined session request to UE-2.
2. The SCC AS anchors the session, allocates STI and transports it to UE, if necessary and as specified in TS 23.292 [5] clause 7.3.2.2 ICS UE Originating sessions using CS media, for the anchored session.
3. The SCC AS completes session setup to UE-2 and sends response to UE-1 based on the procedures specified in TS 23.292 [5]. The STI, if allocated, is included in the response.

The session is set up with CS media. The session may also include PS media.

6.2.1.3 Originating sessions that use only PS media

Existing Mobile Origination procedures described in TS 23.228 [4] are used to establish a session.

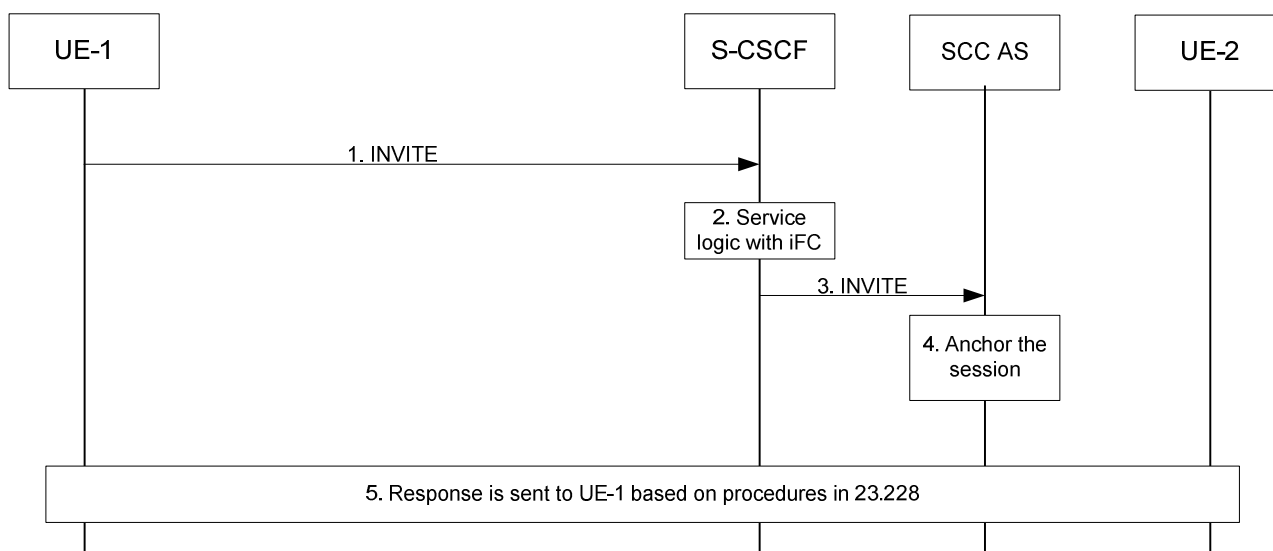


Figure 6.2.1.3-1: Originating session that uses only PS media

1. UE-1 initiates a multimedia session to UE-2 from IMS domain and uses only PS media. The request is forwarded to S-CSCF following normal IMS session set up procedures.
- 2~3. The service logic with iFC causes the request to be forwarded to the SCC AS for anchoring the sessions to enable Session Transfer.
4. The SCC AS anchors the session. An STI is assigned for the anchored session.
5. The SCC AS completes the session setup to UE-2 and sends response to UE-1.

6.2.2 Termination

6.2.2.1 Termination Procedures

Multimedia sessions to the SC subscribers in IMS or the CS domain are anchored at the SCC AS to enable IMS Service Continuity. The execution of terminating iFC results in routing of the sessions to the SCC AS in the home IMS network, where the SCC AS uses 3rd party call control as per TS 23.228 [4] to terminate the session to the SC subscriber. The sessions may be delivered to the UE via the PS or CS access.

The SCC AS shall be the last Application Server of any Application Servers that need to remain in the path of the call after Session Termination.

6.2.2.2 Terminating sessions that use CS media

The procedures specified in TS 23.292 [5], clause 7.4.2 Terminating sessions that use CS media shall be followed to terminate sessions that use CS media to the SC subscriber.

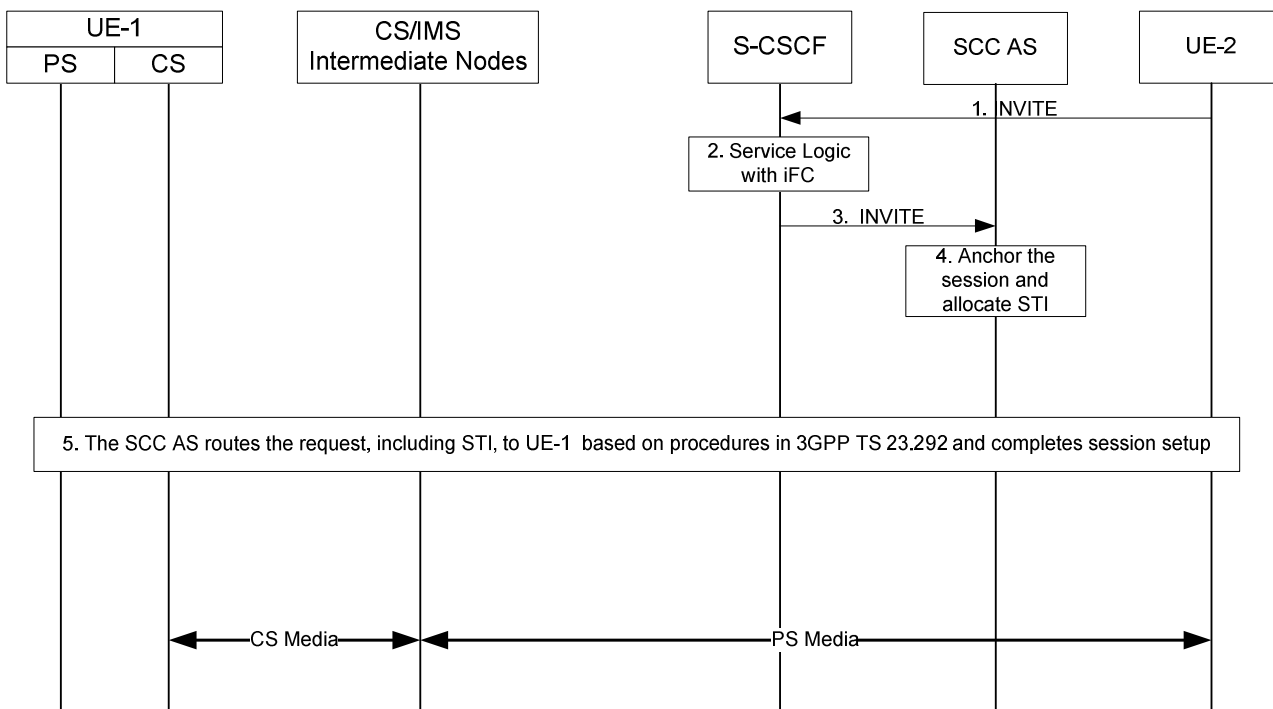


Figure 6.2.2.2-1: Terminating session that uses CS media

1. A request is received at S-CSCF serving UE-1 following standard IMS session set up procedures.
- 2 ~ 3. The service logic with iFC causes the request to be forwarded to the SCC AS so that the session is anchored for enabling Session Transfer.
4. The SCC AS anchors the incoming session and allocates STI, if necessary, for this session.
5. The SCC AS forwards the request to UE-1 based on the procedures specified in TS 23.292 [5], clause 7.4.2.2 ICS UE Terminating sessions that use CS media, for setting up CS bearer, splitting the media if necessary. The SCC AS includes the STI, if available, when forwarding the session request to UE-1.

The session is set up with CS media. The session may also include PS media.

6.2.2.3 Terminating sessions that use only PS media

Existing Mobile Termination procedures described in TS 23.228 [4] are used to establish a session towards a SC subscriber.

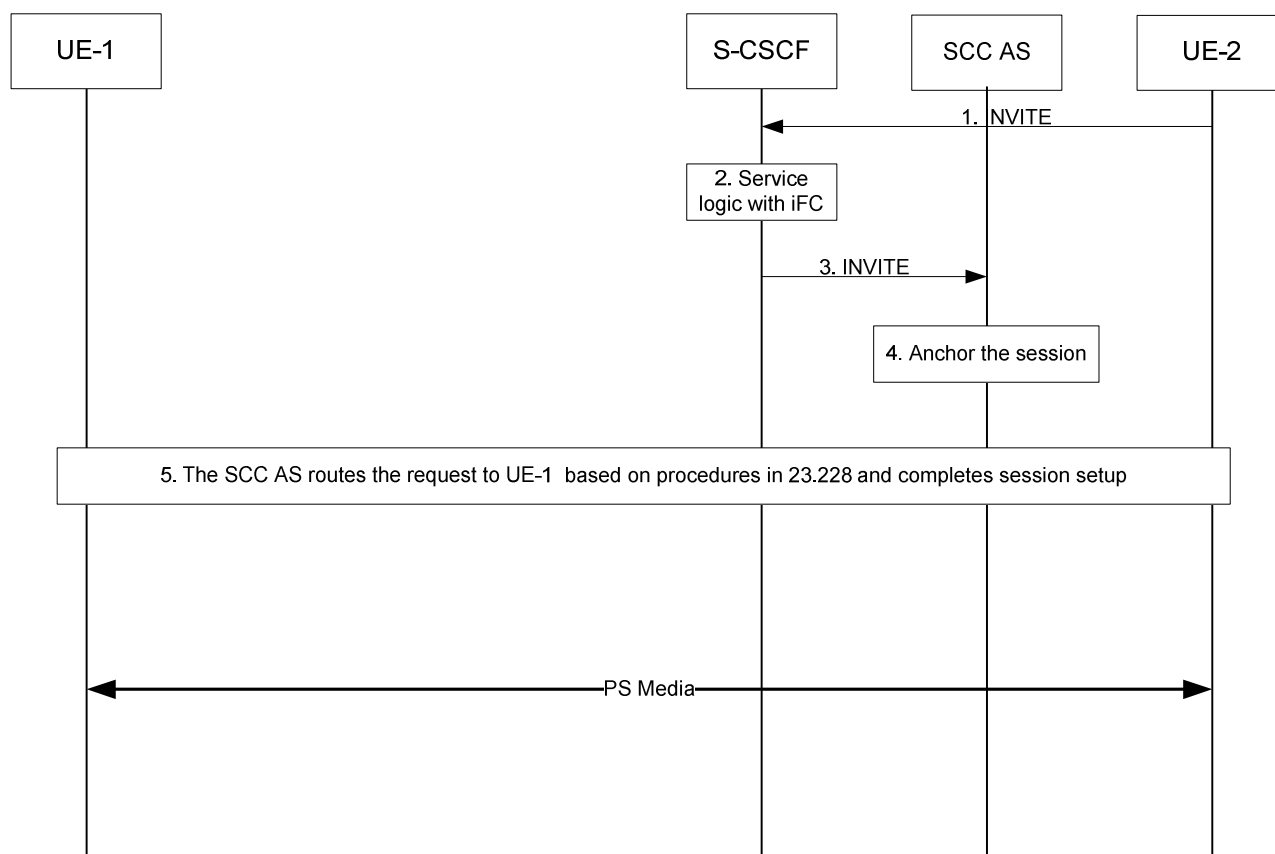


Figure 6.2.2.3-1: Terminating session that uses only PS media

1. The request is received at S-CSCF following normal IMS session set up procedures.
- 2 ~ 3. The service logic with iFC causes the request to be forwarded to the SCC AS so that the session can be anchored for potential session transfer.
4. The SCC AS anchors the session. An STI is assigned for the anchored session.
5. The SCC AS determines that the session is terminated to UE-1 with PS media only and routes the request to UE-1.

6.3 Session Transfer

6.3.1 Session Transfer Procedure

6.3.1.1 Introduction

Session Transfer procedures enable service continuity between Access Networks. All Session Transfer procedures associated with a session, including initial and subsequent transfers, are executed and controlled in the user's home IMS network by the SCC AS upon the UE's request.

The STN and STI are used during the execution of Session Transfers. The STN and STI are stored in the UE.

6.3.1.2 Access Transfer Procedures

When the UE determines that Access Transfer is desirable and possible, a registration in IMS is performed by the UE via the transferring-in Access Network if the user is not already registered via that network. A new Access Leg is established by the UE toward the SCC AS. Signalling and bearer resources are allocated in the transferring-in Access Network and the user's sessions are transferred from the transferring-out Access Network. The SCC AS executes Access Transfer procedures. Resources in the transferring-out Access Network are subsequently released.

Based on UE and Access Network capabilities, the UE may also maintain some of the media components in the transferring-out Access Network while transferring the other media components to the transferring-in Access Network.

6.3.1.3 Enablement of Session Transfer procedures

A 3pcc (3rd party call control) function is employed to anchor IMS sessions at the SCC AS upon session establishment for enablement of Session Transfer. The SCC AS is invoked as part of originating or terminating iFC execution at the subscriber's S-CSCF. The SCC AS inserts itself in the signalling path of the SC subscriber's IMS sessions by implementing a 3pcc (3rd party call control) function. For an originating IMS session, the SCC AS terminates an Access Leg from the user and establishes a Remote Leg toward the remote end. For a terminating IMS session, the SCC AS terminates a Remote Leg from the remote end and establishes an Access Leg toward the user. The SCC AS subsequently coordinates the session control signalling exchange between the Access Leg and the Remote Leg associated with the anchored IMS session.

For 3pcc at the SCC AS when the Access Leg is established with CS media, refer to clause 5.4.3. For 3pcc at the SCC AS when the Access Leg is established with media over IP-CAN to illustrate its use as preparation for Access Transfer procedures, refer to clause 5.4.2.

An STI and STN for Access Transfer between CS and PS access shall be statically configured on the UE regardless of its ICS capabilities.

If the Gm or I1 reference point is used for the originating or terminating session, an STI is dynamically assigned for the Access Leg. An STI shall also be dynamically assigned for each new Access Leg established during session transfer.

NOTE: The dynamically assigned STI needs to be different from the STI and STN statically configured on the UE.

The statically configured STI shall be used for CS to PS Access Transfers only when no dynamically assigned STI was provided to the UE.

The STN is used for PS to CS Access Transfers when no Gm or I1 reference point is available.

6.3.1.4 Execution of Session Transfer procedures

Upon detection of conditions requiring Session Transfer, the UE establishes a Target Access Leg with the SCC AS via the transferred-in Access Network to request Session Transfer to the transferred-in Access Network. When the UE initiates a Session Transfer request, it includes the Session Transfer Identifier and/or the STN.

The SCC AS executes the Session Transfer procedure by replacing the Source Access Leg currently communicating to the Remote Leg with the Target Access Leg. If no media is retained in the transferred-out access, the Source Access Leg is released as specified in clause 6.3.1.6. If the UE chooses to retain some media in the transferred-out access, the Source Access Leg is updated to indicate which media is retained in the transferred-out access. If such update is not done, the SCC AS releases the Source Access Leg as specified in clause 6.3.1.6 and updates the Remote Leg if necessary. When the switch of the Source Access Leg to the Target Access Leg is executed, the Remote Leg is also updated in order to forward the user plane data to the transferred-in Access Network.

6.3.1.5 Remote Leg Update

Upon receiving a request for execution of Session Transfer, the SCC AS performs the Remote Leg Update by switching the Access Leg communicating with the Remote Leg from transferring-out access to transferring-in access.

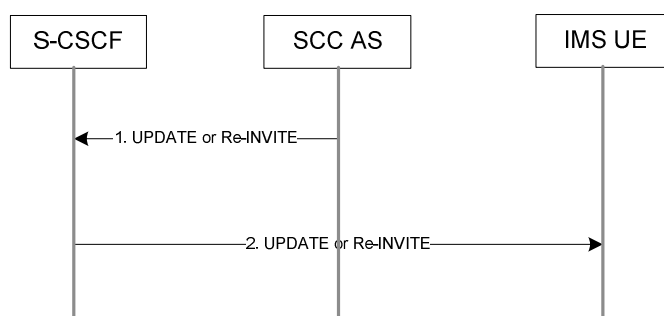


Figure 6.3.1.5-1: Remote Leg Update

The remote end in figure 6.3.1.5-1 represents a UE supporting terminations per TS 23.228 [4] (i.e. including NI-T).

- 1-2. The SCC AS updates the Remote Leg by communicating the SDP of the Access Leg established in the transferring-in access to the remote end via the user's S-CSCF. Remote Leg Update happens according to SIP session modification procedures (see RFC 3261 [8]).

The remote end in figure 6.3.1.5-2 represents an MGCF for CS/PSTN Remote Party.

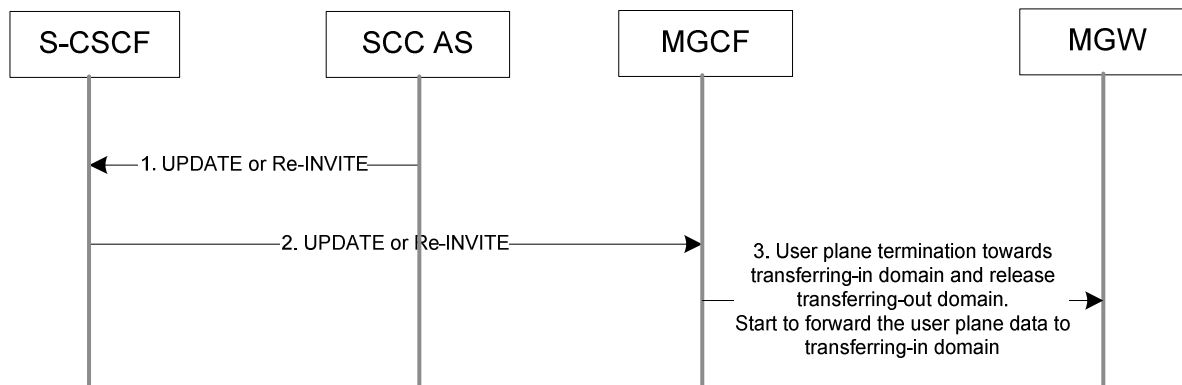


Figure 6.3.1.5-2: Remote Leg Update

- 1-2. These steps are the same procedures described in figure 6.3.1.5-1.
3. MGCF instructs MGW to update a termination towards the access leg of the transferred in domain to the context, and to release the termination for the access leg of the transferred out domain from the context.

6.3.1.6 Source Access Leg Release

When the session modification procedures complete, the Source Access Leg Release is executed by initiating a session release. This is done for the Source Access Leg using the AS/UE session release procedures per TS 23.228 [4]. The SC UE and the SCC AS shall initiate the Session Release procedure when the switch to the transferred-in Access Network is complete.

6.3.2 Session Transfer Information flows

6.3.2.1 PS – CS Access Transfer

6.3.2.1.1 PS – CS Access Transfer: PS to CS

Figure 6.3.2.1.1-1 PS – CS Access Transfer: PS to CS, provides an information flow for Access Transfer of an IMS session in PS to CS direction. The flow requires that the user is active in an IMS originating or terminating session using PS media at the time of initiation of Access Transfer to CS.

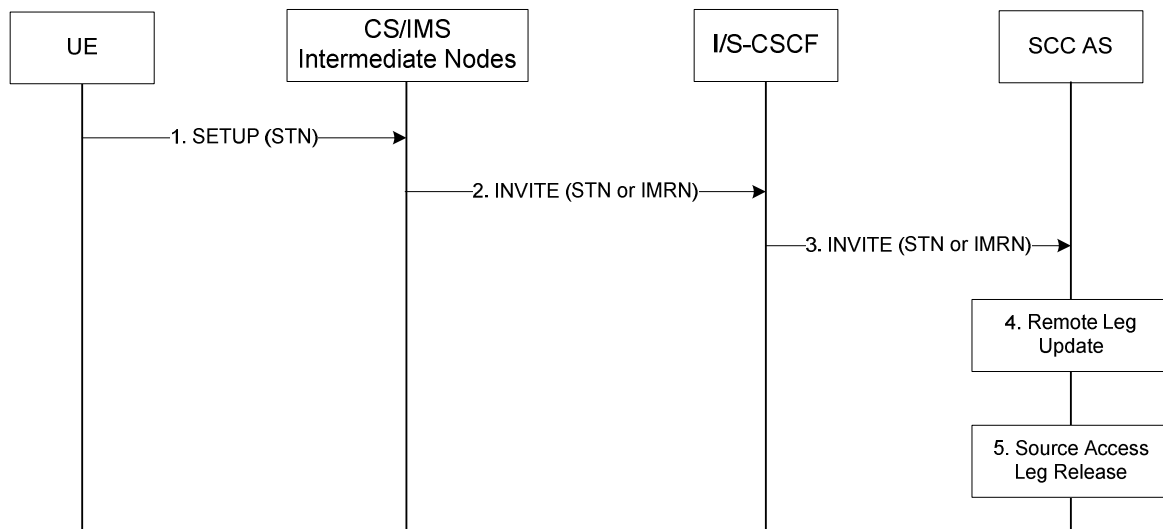


Figure 6.3.2.1.1-1: PS – CS Access Transfer: PS to CS

1. If the user is not attached to the CS domain at the time when the UE determines a need for Access Transfer to CS, the UE performs a CS Attach as specified in TS 23.292 [5], clause 7.2.1. It subsequently originates a session that uses CS media using the STN to establish an Access Leg via the CS access and requests Access Transfer of the IMS session to CS access using the procedures described in TS 23.292 [5], clause 7.3.2 Originating Sessions that use CS media.
2. Standard procedures as specified in TS 23.292 [5], clause 7.3.2 Originating Sessions that use CS media are used in CS and IMS intermediate nodes which results in routing of the INVITE with the STN or an IMRN to the I/S-CSCF; see TS 23.292 [5] for IMRN.
3. Standard procedures are used at I/S-CSCF for routing of the INVITE to the SCC AS.
4. The SCC AS completes the establishment of the Access Leg via the CS access. The SCC AS performs the Access Transfer by updating the Remote Leg with the connection information of the newly established Access Leg using the Remote Leg Update procedure as specified in clause 6.3.1.5. The SCC AS completes the session setup towards UE according to procedures defined in TS 23.228 [4].
5. The Source Access Leg (which is the Access Leg previously established over PS access) is released as specified in clause 6.3.1.6

NOTE: Steps 4 and 5 consist of a sequence of messages, some of which may occur in parallel.

6.3.2.1.2 PS – CS Access Transfer: CS to PS

Figure 6.3.2.1.2-1 PS – CS Access Transfer: CS to PS, provides an information flow for Access Transfer of an IMS session in the CS to PS direction. The flow requires that the user is active in an IMS originating or terminating session that uses CS media at the time of initiation of Access Transfer to PS.

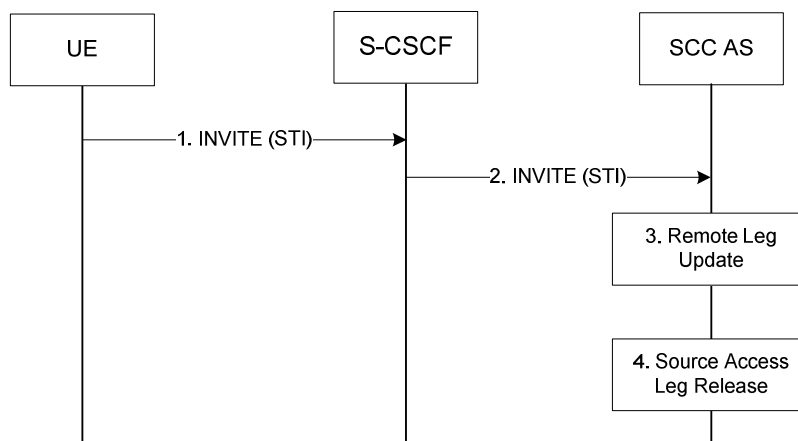


Figure 6.3.2.1.2-1: PS – CS Access Transfer: CS to PS

1. When the UE determines a need for Access Transfer, the UE initiates registration with IMS (if not already registered in IMS) as specified in clause 6.1. It subsequently initiates an IMS originated session toward the SCC AS using a STI to establish an Access Leg via PS access and request Access Transfer of the IMS session that is using CS media to PS access. Please refer to clause 6.2.1 - IMS Originating Sessions for details on IMS origination procedure.
2. Standard procedures are used at S-CSCF for routing of the INVITE to the SCC AS.
3. The SCC AS performs the Access Transfer by updating the Remote Leg with connection information of the newly established Access Leg (see the Remote Leg Update procedure, clause 6.3.1.5). The SCC AS completes the establishment of the Access Leg according to procedures defined in TS 23.228 [4].
4. The source Access Leg which is the Access leg previously established over CS is subsequently released (see clause 6.3.1.6).

NOTE: Steps 3 and 4 consist of a sequence of messages, some of which may occur in parallel.

6.3.2.1.3 Subsequent Access Transfers

Procedures for subsequent Access Transfers to CS and PS access are the same as procedures for initial Access Transfers specified in clause 6.3.2.1.1 for PS to CS access and clause 6.3.2.1.2 for CS to PS access.

6.3.2.1.4 PS – CS Access Transfer: PS to CS – Single Radio

Figure 6.3.2.1.4-1 PS-CS: PS to CS – Single Radio, provides an information flow for Access Transfer of media of an IMS session in PS to CS direction for Access Transfers within 3GPP access networks as specified in TS 23.216 [10].

The flow requires that the user is active in an IMS originating or terminating session; procedures and capabilities specified in TS 23.216 [10], clause 6.2.1 are used for the switching of access networks at the transport layer.

NOTE 1: See TS 23.216 [10] for initiation of handover of only one voice PS bearer at EPC.

NOTE 2: The UE capable of procedures as specified in TS 23.216 [10] does not need to support session and access transfer procedures as specified in clauses 6.3.2.1.1 and 6.3.2.3 to support PS to CS Access Transfer.

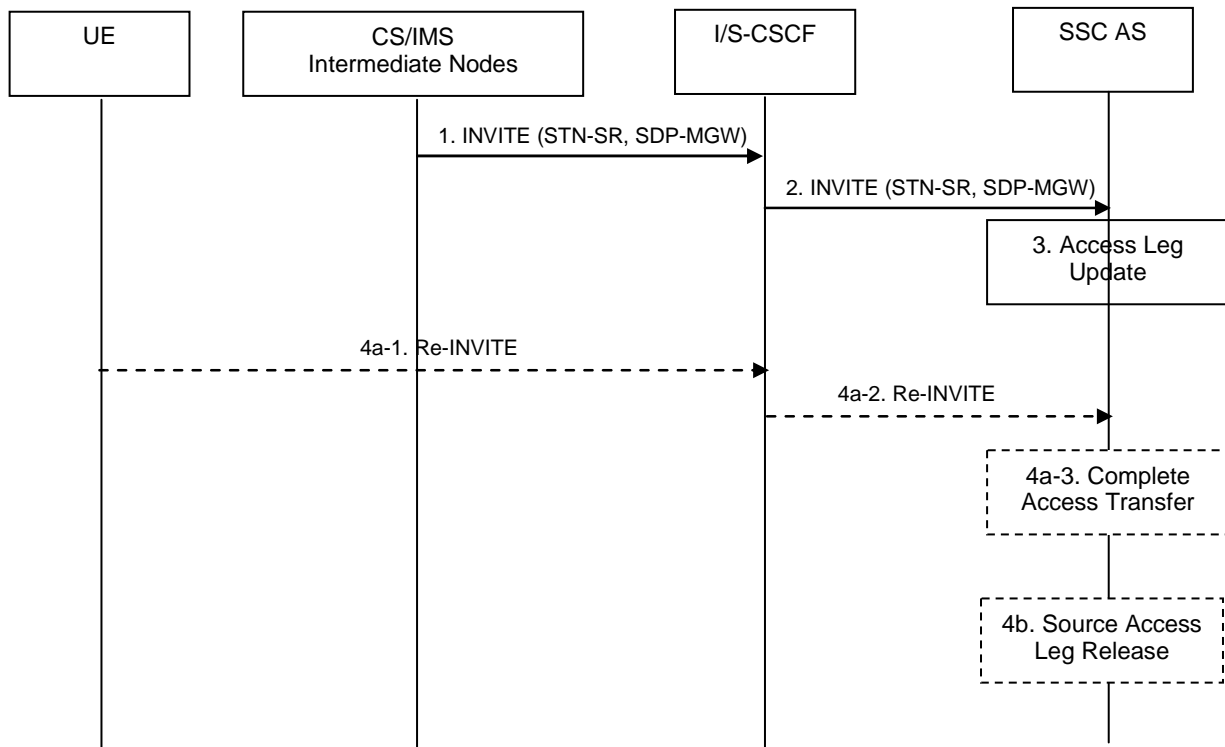


Figure 6.3.2.1.4-1: PS-CS: PS to CS – Single Radio

1. Procedures specified in TS 23.216 [10], clause 6.2.2.1 result in an INVITE to be sent with an STN-SR indicating use of Single Radio VCC procedures for Access Transfer to CS access.
2. Standard procedures are used at S-CSCF for routing of the INVITE to the SCC AS.
3. The SCC AS uses the STN-SR to determine that Access Transfer using Single Radio VCC is requested. The SCC AS proceeds with the Access Transfer of the recently added active session with bi-directional speech for the UE by updating the Remote Leg with the media description and other information using the Remote Leg Update procedure as specified in clause 6.3.1.5.
- 4a. If the Gm reference point is not retained upon PS handover procedure, or if there was no other non-voice media in the IMS session than the voice which was transferred to the target access, then the Source Access Leg is released as specified in clause 6.3.1.6.
- 4b. If the Gm reference point is retained upon PS handover procedure then
 - 4b-1. The UE sends a Re-INVITE via the PS access to update the remaining non-voice media associated with the recently added active session.
 - 4b-2. Standard procedures are used at S-CSCF for routing of the INVITE to the SCC AS.
 - 4b-3. The SCC AS processes the Re-INVITE and updates the Remote Leg if needed.

NOTE: Some or all of the steps between steps 3 and 4b may consist of a sequence of messages, some of which may occur in parallel.

6.3.2.2 PS – PS Access Transfer

NOTE: If a PS-PS session transfer occurs and there is a change in IP address, TCP-based media connections using transferring-out access will break. Recovery procedures from broken TCP connections are application specific.

6.3.2.2.1 PS-PS Access Transfer with full media transfer

UE-1 is attached to one IP-CAN and it registers to the S-CSCF. UE-1 and UE-2 establishes an active multimedia session via this IP-CAN. After changing to a new IP-CAN, obtaining new signalling and media addresses, and completing the Access Transfer procedures, UE-1 continues the multimedia session with UE-2 on the new IP-CAN.

NOTE: This scenario requires the UE and IMS network to support simultaneous multiple registrations and requires the UE to support connection to both IP-CAN networks.

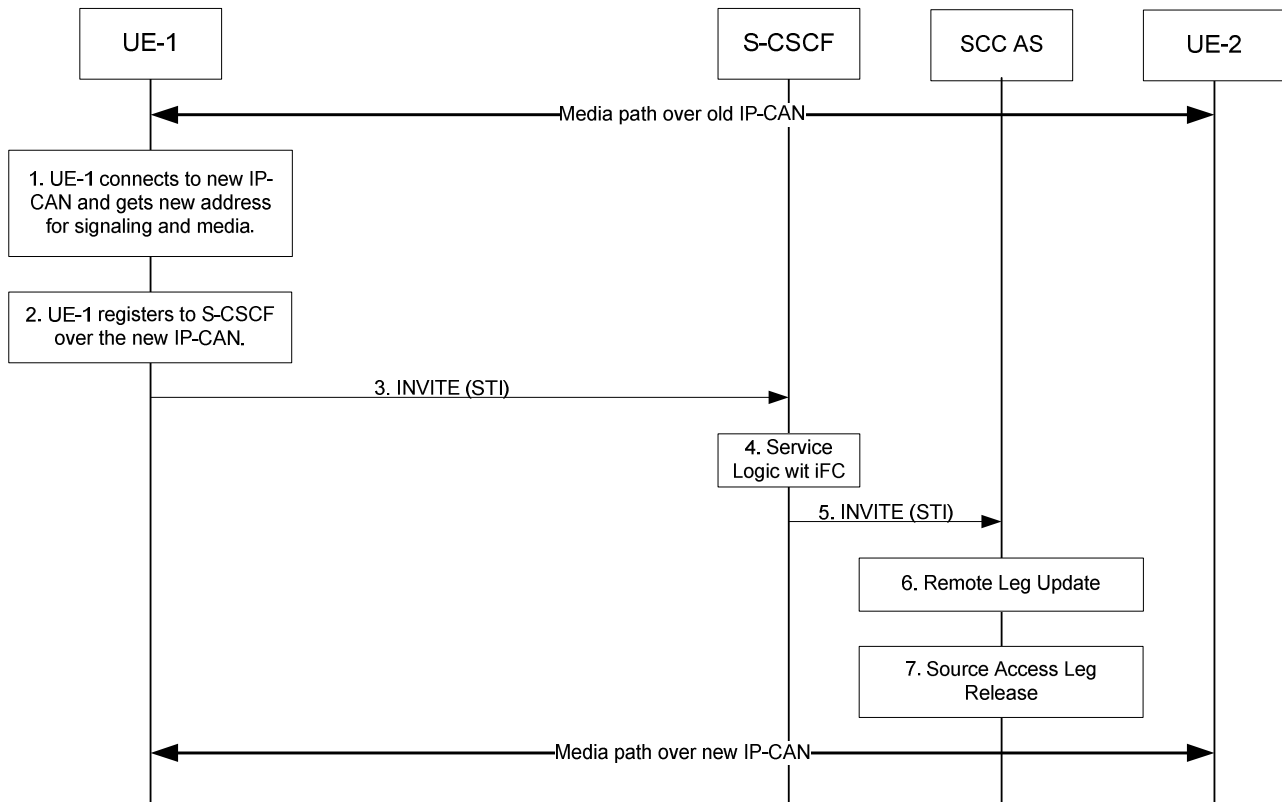


Figure 6.3.2.2.1-1: Information flow for PS-PS Access Transfer

1. UE-1 connects to a new IP-CAN and receives new IP address(es). UE-1 decides to perform PS to PS Access Transfer based on SC policy information.
2. UE-1 registers to S-CSCF over the new IP-CAN. This registration may go through the same P-CSCF or a different P-CSCF.
- 3 ~ 5. UE-1 sends an INVITE message on the new IP-CAN towards the SCC AS. The INVITE message is targeted to the STI identifying the session to be transferred. The INVITE message also indicates the SCC AS to perform Access Transfer with full media transfer.
6. The SCC AS identifies the session based on STI and updates the session over the remote access leg (see clause 6.3.1.5).
7. The SCC AS completes session setup with UE-1 on the new access leg and releases old session based on the standard IMS procedures.

6.3.2.2.2 PS-PS Access Transfer with partial media transfer

UE-1 is on an active multimedia session with UE-2 via one IP-CAN. After changing to a new IP-CAN, obtaining new signalling and media addresses, and completing the Access Transfer procedures, UE-1 transfers part of the multimedia session with UE-2 to the new IP-CAN and keep the remaining part on the original IP-CAN. UE-1 is attached to both the new and old IP-CANs after the Access Transfer procedures. The call flow is the same as shown in clause 6.3.2.2.1. The only difference is that in Step 3, the INVITE needs to indicate that the request is for a partial transfer and instead of

releasing the old session in step 7, the UE updates session information over the old access leg. In this case, the INVITE message sent in step 3 shall indicate the media components which need to be transferred to the new IP-CAN.

NOTE: This scenario requires the UE and IMS network to support simultaneous multiple registrations and requires the UE to support connection to both IP-CAN networks.

6.3.2.3 PS - PS in conjunction with PS - CS Access Transfer

6.3.2.3.1 PS - PS in conjunction with PS - CS Access Transfer: PS to CS for UEs not using ICS capabilities

It is required that the UE has a single ongoing IMS session containing speech and other media with the remote end.

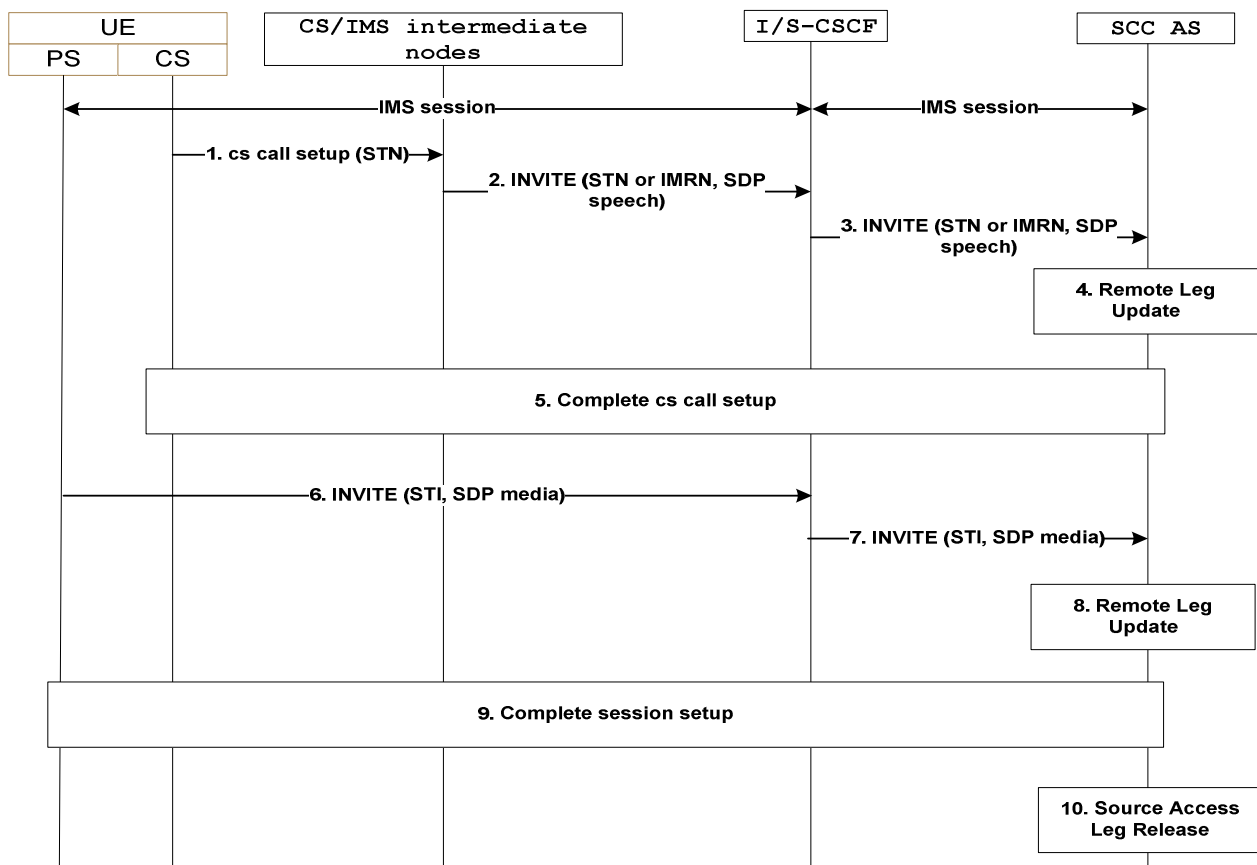


Figure 6.3.2.3.1-1: PS-PS in conjunction with PS-CS Access Transfer: PS to CS

1. When the UE determines a need for Access Transfer, the UE attaches to CS (if not already attached). It subsequently initiates the PS–CS Access Transfer by sending a CS call setup including the STN to establish the Access Leg via the CS access. A static STN preconfigured to the UE is used.
2. An INVITE is routed to the S-CSCF.
3. An INVITE is routed to the SCC AS.
4. The SCC AS performs the Remote Leg update by using procedures defined in clause 6.3.1.5. The SCC AS updates the speech media in the session towards the Remote Leg.
5. The SCC AS completes the session setup towards UE according to procedures defined in TS 23.228 [4].
6. The UE initiates registration with IMS via the new PS access (if not already registered) as specified in clause 6.1. It subsequently initiates the PS–PS Access Transfer by sending an INVITE including the SDP for the non speech

media and STI to establish the Access Leg via the PS access. A dynamic STI allocated at the time of IMS session creation is used.

7. An INVITE is routed to the SCC AS.
8. The SCC AS identifies the session to be transferred using the STI. The SCC AS performs the Remote Leg update by using procedures defined in clause 6.3.1.5. The SCC AS updates the non speech media in the session towards the Remote Leg.
9. The SCC AS completes the session setup towards UE according to procedures defined in TS 23.228 [4].
10. Source Access Leg Release is performed according to the procedures defined in clause 6.3.1.6.

NOTE: Steps 1-5 can be performed in reversed order with steps 6-8.

6.3.2.3.2 PS - PS in conjunction with PS - CS Access Transfer: CS to PS for UEs not using ICS capabilities

It is required that the UE has an ongoing CS call and a related IMS session with the remote end.

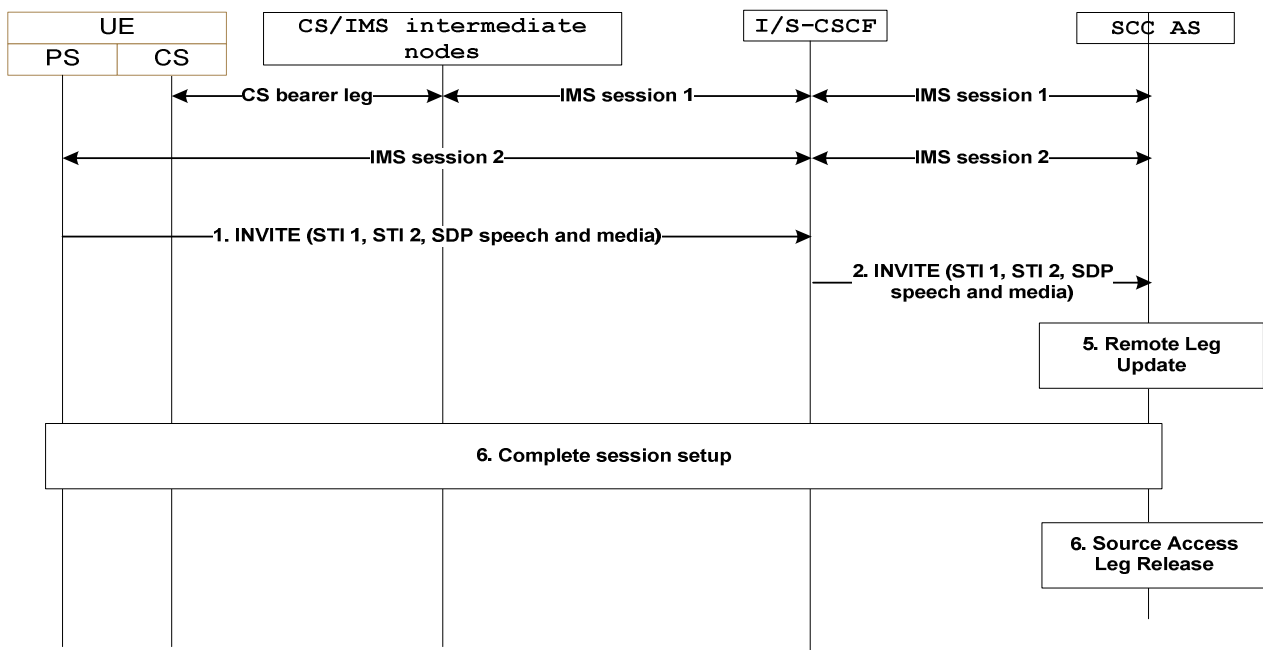


Figure 6.3.2.3.2-1: PS-PS in conjunction with PS-CS Access transfer: CS to PS

1. When the UE determines a need for Access Transfer, the UE initiates registration with IMS via the new PS access (if not already registered) as specified in clause 6.1. It subsequently initiates the CS-PS Access Transfer by sending an INVITE including the SDP for speech and media, STI-1 and STI-2 to establish the Access Leg via the PS access. For STI-1 a static STI preconfigured to the UE is used. For STI-2 a dynamic STI allocated at the time of IMS session creation is used. STI-1 and STI-2 are never the same.
2. Standard procedures are used at S-CSCF for routing of the INVITE to the SCC AS.
3. The SCC AS identifies the session to be transferred using the STI-1 and STI-2. The SCC AS responds with a 200 OK.
4. The S-CSCF forwards the response to the UE.
5. The SCC AS performs the Remote Leg Update by using procedures defined in clause 6.3.1.5. The SCC AS updates the combined session towards the Remote Leg.
6. The SCC AS completes the session setup towards UE-1 according to procedures defined in TS 23.228 [4].

7. Source Access Leg Release is performed according to the procedures defined in clause 6.3.1.6.

6.3.2.3.3 PS – PS in conjunction with PS - CS Access Transfer: PS to CS for UEs with ICS capabilities - Using Gm reference point

Figure 6.3.2.3.3-1 PS-PS in conjunction with PS–CS Access Transfer: PS to CS for UEs with ICS capabilities, provides an information flow for Access Transfer of real time media of an IMS session in PS to CS direction and zero or more non real time media in PS to PS direction. The UE may choose to retain some of the non real time media in the original PS access.

The flow requires that the user is active in an IMS originating or terminating session; the Gm reference point of ICS is used for control of IMS sessions that use CS media.

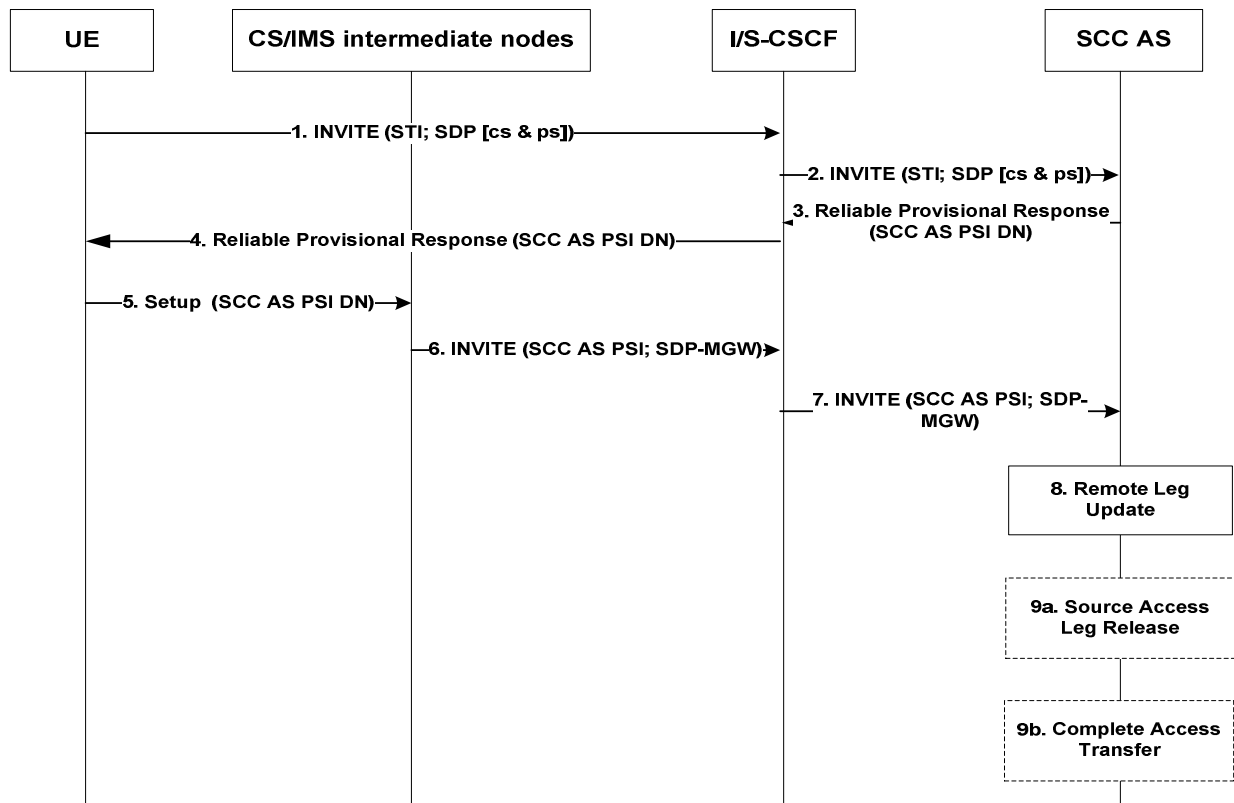


Figure 6.3.2.3.3-1: PS-PS in conjunction with PS-CS Access transfer: PS to CS for UEs with ICS capabilities

1. When the UE determines a need for Access Transfer, the UE initiates registration with IMS via the new PS access (if not already registered) as specified in clause 6.1. It subsequently initiates the "Originations with CS media using the Gm reference point" procedure as specified in TS 23.292 [5], clause 7.3.2.2.4 by sending an INVITE including the STI to establish the Access Leg via the PS access. The INVITE also includes an indication for use of CS bearer for real time media; and description of non real time media if any non real media is present at the time of initiation of Access Transfer.
2. Standard procedures are used at S-CSCF for routing of the INVITE to the SCC AS.
3. The SCC AS identifies the session to be transferred using the STI and the media components, and continues the "Originations with CS media using the Gm reference point" procedure for completion of the setup of CS media for the Access Leg by allocating a SCC AS PSI DN and sending it in a reliable provisional response to the S-CSCF; see TS 23.292 [5] for SCC AS PSI DN.
4. The S-CSCF forwards the provisional response (containing the SCC AS PSI DN) to the UE.
5. The UE continues the "Originations with CS media using the Gm reference point" procedure by sending a Setup message including the SCC AS PSI DN to establish the CS media for the Access Leg.

6. The "Originations with CS media using Gm reference point procedure" is used at the CS and IMS intermediate nodes, resulting in routing of an INVITE to the I/S-CSCF.
7. The I/S-CSCF extends the INVITE with the SCC AS PSI and SDP of the MGW as part of the "Originations with CS media using the Gm reference point" procedure.
8. The SCC AS uses the SCC AS PSI to correlate the incoming session via the CS access with the Access Transfer request previously received via the PS access.

The SCC AS completes the establishment of the Access Leg by combining the description of the media established via the CS access with the description of the media established via the PS access for the signalling associated with the Access Leg.

The SCC AS performs the Access Transfer by updating the Remote Leg with the media description and other information of the newly established Access Leg using the Remote Leg Update procedure as specified in clause 6.3.1.5.

- 9a. If the UE transfers all the media to the new PS access, the Source Access Leg (which is the Access Leg previously established over PS access) is released as specified in clause 6.3.1.6.
- 9b. If the UE chooses to retain some media in the original PS access, the SCC AS processes the INVITE to complete the access transfer procedure. The Source Access Leg is not released in this case.

NOTE: Steps 8 and 9 consist of a sequence of messages, some of which may occur in parallel.

6.3.2.3.4 PS - PS in conjunction with PS - CS Access Transfer: CS to PS for UEs with ICS capabilities - Using Gm reference point

The information flow for Access Transfer of real time media of an IMS session in CS to PS direction, and zero or more non real time media in PS to PS direction is the same as the information flow for PS-CS Access Transfer: CS to PS access, as specified in clause 6.3.2.1.2.

The flow requires that the user is active in an IMS originating or terminating session; the Gm reference point of ICS is used for control of IMS sessions that use CS media; and a unique STI is associated with each session.

6.3.2.3.5 PS – PS in conjunction with PS – CS Access Transfer: Active/Held sessions - Using Gm reference point

Figure 6.3.2.3.5-1 PS-PS in conjunction with PS-CS Access Transfer: Active/Held sessions, provides an information flow for Access Transfer of real time media of one active and one or more held sessions between PS and CS, any of which may have zero or more non real time media which is transferred within the PS access.

The flow requires that the user is active in IMS originating and/or terminating sessions; the Gm reference point of ICS is used for control of IMS sessions that use CS media; and a unique STI is associated with each session.

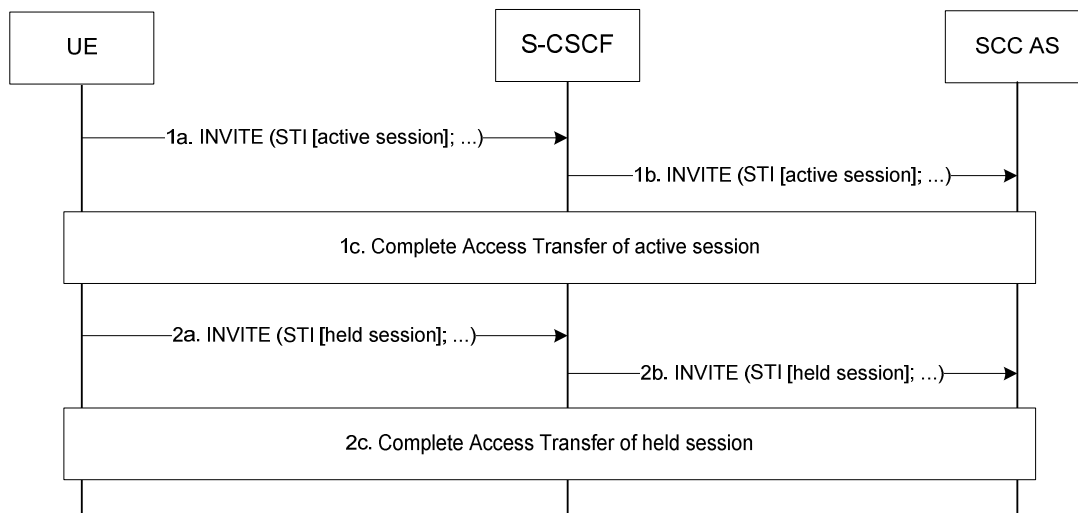


Figure 6.3.2.3.5-1: PS-PS in conjunction with PS-CS Access transfer: Active/Held sessions

1a, 1b. When the UE determines a need for Access Transfer, the UE initiates the Access Transfer of the active session as specified in clause 6.3.2.3.3 PS-PS in conjunction with PS-CS Access Transfer: PS to CS for UEs with ICS capabilities, or clause 6.3.2.3.4 PS-PS in conjunction with PS-CS Access Transfer: CS to PS for UEs with ICS capabilities, based on the direction of the Access Transfer of the real time media. The STI of the active session is used by SCC AS to identify the active session.

1c. The UE and the SCC AS complete the Access Transfer of the active session.

2a, 2b. The UE initiates the Access Transfer of the first held session using the same procedures as identified in steps 1a, 1b and 1c with a difference that for transfer to CS access, the CS media is not established for the held session; the media established upon the transfer of the currently active session is reused for the held session when it is resumed. The STI of the held session is used by SCC AS to identify the active session.

2c. The UE and the SCC AS complete the Access Transfer of the held session.

Steps 2a, 2b and 2c are repeated for the remaining held sessions.

NOTE: Steps 1c and 2c consist of a sequence of messages, which may occur in parallel.

6.3.2.3.6 PS – PS in conjunction with PS – CS Access Transfer: Explicit Communication Transfer - Using Gm reference point

The information flow for PS-PS in conjunction with PS-CS Access Transfer: Explicit Communication Transfer is the same as the information flow in clause 6.3.2.3.5 PS-PS in conjunction with PS-CS Access Transfer: Active/held sessions.

The flow requires that the user is active in IMS originating and/or terminating sessions with the Explicit Communication Transfer service; the Gm reference point of ICS is used for control of IMS sessions that use CS media; and a unique STI is associated with each session.

6.3.2.3.7 PS – PS in conjunction with PS – CS Access Transfer: Conferencing - Using Gm reference point

The information flows for PS-PS in conjunction with PS-CS Access Transfer: Conferencing in PS to CS and CS to PS directions, are the same as the information flows in clause 6.3.2.3.3 PS-PS in conjunction with PS-CS Access Transfer: PS to CS for UEs with ICS capabilities, and clause 6.3.2.3.4 PS-PS in conjunction with PS-CS Access Transfer: CS to PS for UEs with ICS capabilities respectively.

The flow requires that the user is active in IMS originating and/or terminating sessions with the Conferencing service; the Gm reference point of ICS is used for control of IMS sessions that use CS media.

6.3.2.3.8 PS – PS in conjunction with PS – CS Access Transfer: PS to CS – using I1 reference point

Figure 6.3.2.3.8-1 PS–CS in conjunction with PS–CS Access Transfer: PS to CS access – using I1 reference point, provides an information flow for Access Transfer of real time media of an IMS session in PS to CS direction.

The flow requires that the user is active in an IMS originating or terminating session; the I1 reference point of ICS is used for control of IMS sessions that use CS media; and a unique STI is associated with each session.

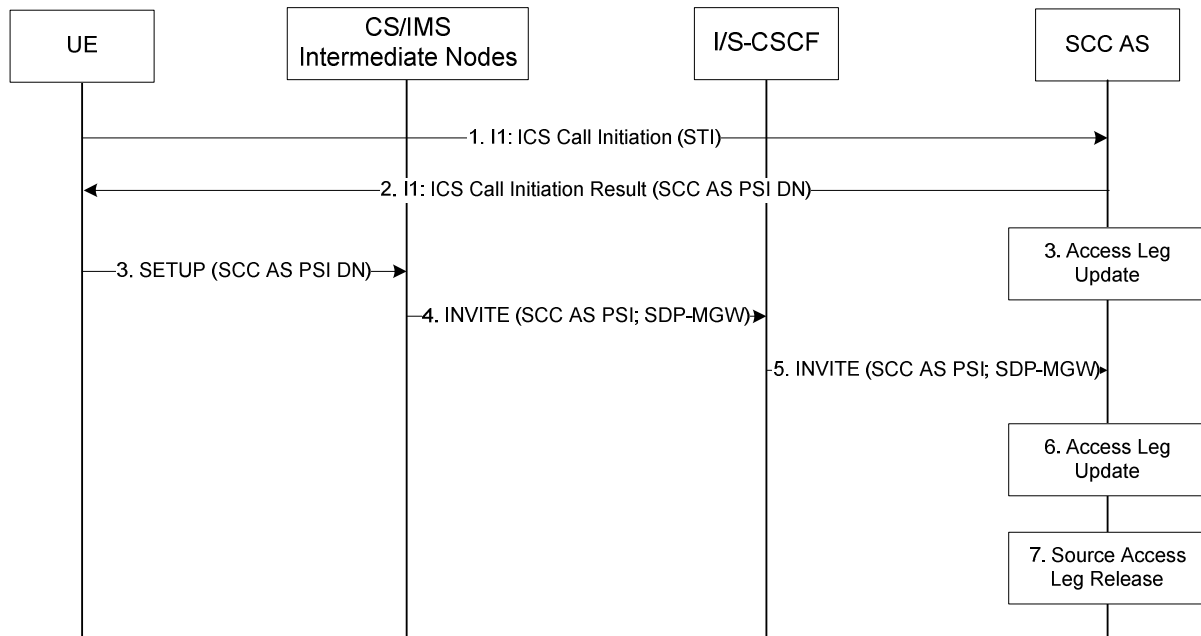


Figure 6.3.2.3.8-1 PS–CS in conjunction with PS–CS Access Transfer: PS to CS access – using I1 reference point

1. When the UE determines a need for Access Transfer, the UE initiates registration with IMS via the new PS access (if not already registered) as specified in clause 6.1. It subsequently initiates the "Originations to a SIP URI" procedure as specified in TS 23.292 [5], clause 7.3.2.2.2.1 by sending an I1, ICS Call Initiation including the STI to establish the Access Leg via the PS access.
2. The SCC AS identifies the session to be transferred using the STI, and continues the "Originations to a SIP URI" procedure for completion of the setup of CS media for the Access Leg by allocating a SCC AS PSI DN and sending it in an I1, ICS Call Initiation Result; see TS 23.292 [5] for SCC AS PSI DN.
3. The UE continues the "Originations to a SIP URI" procedure by sending a Setup message including the SCC AS PSI DN to establish the CS media for the Access Leg.
4. The "Originations to a SIP URI" procedure is used at the CS and IMS intermediate nodes, resulting in routing of an INVITE with the SCC AS PSI to the I/S-CSCF.
5. The I/S-CSCF forwards the INVITE with the SCC AS PSI and SDP of the MGW as part of the "Originations with CS media using the Gm reference point" procedure.
6. The SCC AS uses the SCC AS PSI to correlate the CS bearer control signalling request received via the CS access with the Access Transfer request previously received via the PS access.

The SCC AS completes the establishment of the Access Leg by combining the description of the media established via the CS access with the description of the media established via the PS access for the signalling associated with the Access Leg.

The SCC AS performs the Access Transfer by updating the Remote Leg with the media description and other information of the newly established Access Leg using the Remote Leg Update procedure as specified in clause 6.3.5.

7. The Source Access Leg (which is the Access Leg previously established over PS access) is released as specified in clause 6.3.6.

NOTE: Steps 6 and 7 consist of a sequence of messages, some of which may occur in parallel.

6.3.2.3.9 PS - PS in conjunction with PS - CS Access Transfer: CS to PS - using I1 reference point

The information flow for Access Transfer of real time media of an IMS session in CS to PS direction when the I1 reference point is used for service control of sessions that use CS media, is the same as the information flow PS–CS Access Transfer: CS to PS access, as specified in clause 6.3.2.1.2.

The flow requires that the user is active in an IMS originating or terminating session; the I1 reference point of ICS is used for control of IMS sessions that use CS media; and a unique STI is associated with each session.

6.3.2.3.10 PS - PS in conjunction with PS - CS Access Transfer: PS to CS for Active/Held sessions - using I1 reference point

Figure 6.3.2.3.10-1 PS – PS in conjunction with PS – CS Access Transfer: PS to CS for Active/Held sessions – using I1 reference point, provides an information flow for Access Transfer of real time media of one active and one or more held sessions from PS to CS when the I1 reference point is used for service control of sessions that use CS media.

The flow requires that the user is active in IMS originating and/or terminating sessions; the I1 reference point of ICS is used for control of IMS sessions that use CS media; and a unique STI is associated with each session.

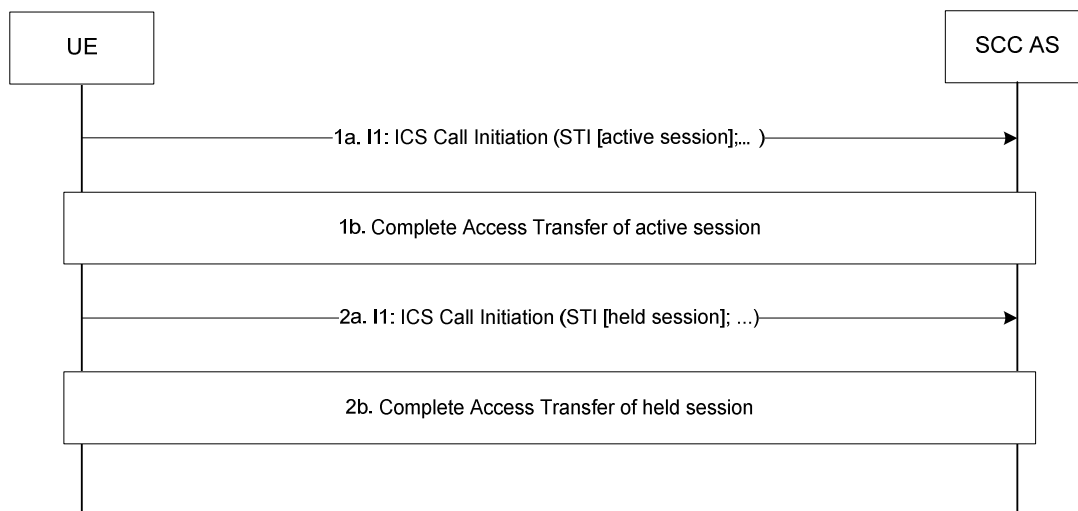


Figure 6.3.2.3.10-1: PS – PS in conjunction with PS – CS Access Transfer: PS to CS for Active/Held sessions – using I1 reference point

- 1a. When the UE determines a need for Access Transfer, the UE initiates the Access Transfer of the active session as specified in clause 6.3.2.3.8 PS – PS in conjunction with PS – CS Access Transfer: PS to CS – using I1 reference point. The STI of the active session is used by SCC AS to identify the active session.
- 1b. The UE and the SCC AS complete the Access Transfer of the active session.
- 2a. The UE initiates the Access Transfer of the first held session using the same procedures as identified in steps 1a, and 1b with a difference that the CS media is not established for the held session; the media path established upon transfer of the currently active session is reused for the held session when it is resumed. The STI of the held session is used by SCC AS to identify the held session.
- 2b. The UE and the SCC AS complete the Access Transfer of the held session.

Steps 2a and 2b are repeated for the remaining held sessions.

NOTE: Steps 1b and 2b consist of a sequence of messages, which may occur in parallel.

6.3.2.3.11 PS - PS in conjunction with PS - CS Access Transfer: CS to PS for Active/Held sessions - using I1 reference point

Figure 6.3.2.3.11-1 PS – PS in conjunction with PS – CS Access Transfer: CS to PS for Active/Held sessions – using I1 reference point, provides an information flow for Access Transfer of real time media of one active and one or more held sessions from CS to PS when the I1 reference point is used for service control of sessions that use CS media.

The flow requires that the user is active in IMS originating and/or terminating sessions; the I1 reference point of ICS is used for control of IMS sessions that use CS media; and a unique STI is associated with each session.

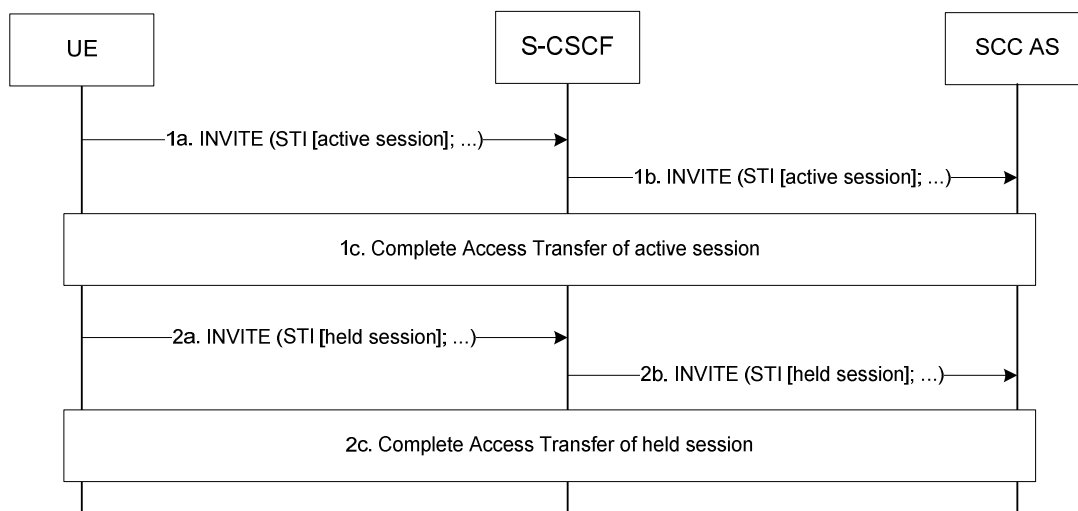


Figure 6.3.2.3.11-1: PS – PS in conjunction with PS – CS Access Transfer: CS to PS for Active/Held sessions – using I1 reference point

1a, 1b. When the UE determines a need for Access Transfer, the UE initiates the Access Transfer of the active session as specified in clause 6.3.2.3.9 PS – PS in conjunction with PS – CS Access Transfer: CS to PS – using I1 reference point. The STI of the active session is used by SCC AS to identify the active session.

1c. The UE and the SCC AS complete the Access Transfer of the active session.

2a, 2b. The UE initiates the Access Transfer of the first held session using the same procedures as identified in steps 1a, 1b and 1c. The STI of the held session is used by SCC AS to identify the held session.

2c. The UE and the SCC AS complete the Access Transfer of the held session.

Steps 2a, 2b and 2c are repeated for the remaining held sessions.

NOTE: Steps 1c and 2c consist of a sequence of messages, which may occur in parallel.

6.3.3 Media Adding/Deleting

6.3.3.1 Local End Initiation case: Adding new PS media to existing CS session

The call flow in figure 6.3.3.1-1 presents a scenario where UE-1 adds PS media component(s) (e.g. video) to an existing multimedia session that only contains CS media. As a post condition the UE-1 has an ongoing CS call and a related IMS session with the remote end.

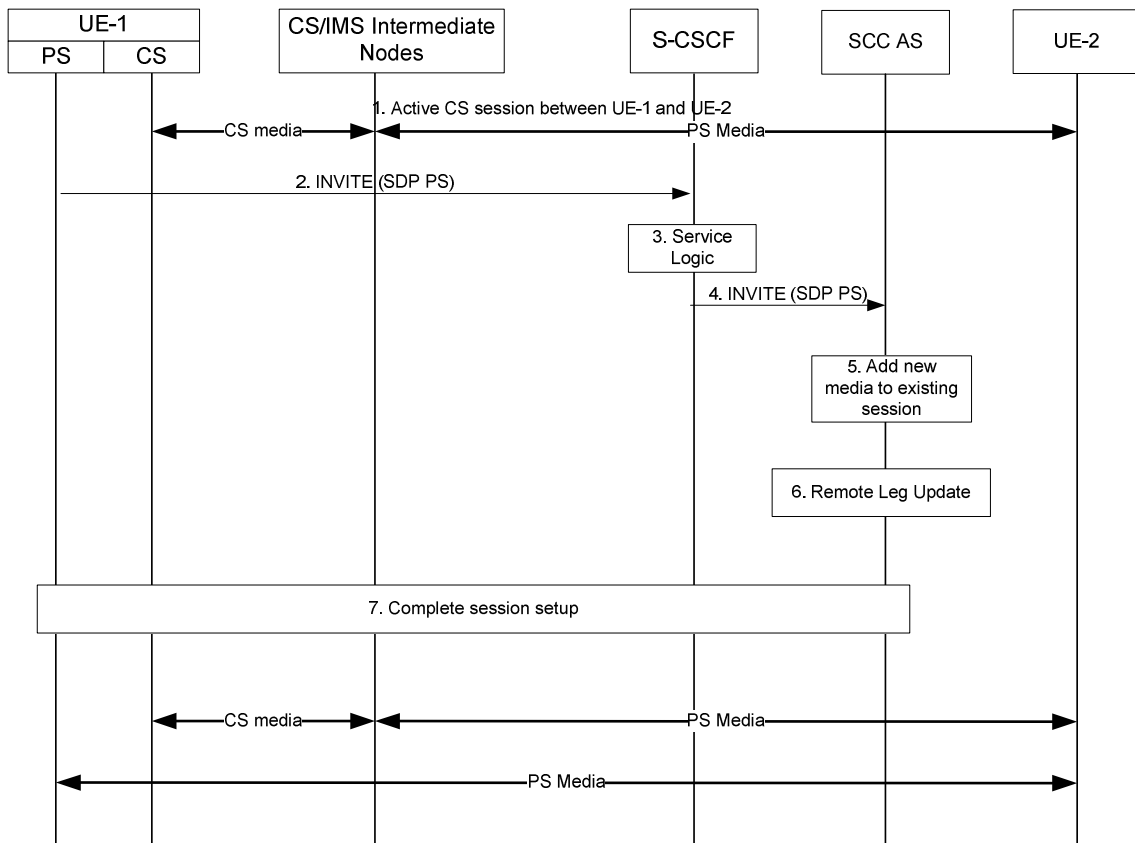


Figure 6.3.3.1-1: Local End Initiation case: Adding new PS media to existing CS session

1. A multimedia session between UE-1 and UE-2 is established as either originated or terminated session with CS media as described in TS 23.292 [5] clauses 7.3.2.1 and 7.4.2.1, respectively i.e. UE-1 is not using the ICS capability and therefore not using the Gm reference point during the session establishment.
2. UE-1 requests to add one or more PS media component(s) to the existing CS Call by sending an INVITE containing description of the new PS media towards SCC AS to establish a new Access Leg. UE-1 provides description of the new media and the information necessary for the SCC AS to identify the existing session.
3. The S-CSCF executes any service logic as appropriate.
4. The S-CSCF sends the INVITE to the SCC AS.
5. The SCC AS determines that the INVITE is related to an existing session using the information provided by UE-1 and decides to add the new media to the session.

NOTE: If SCC AS decides that the request is not related to an existing session, it handles the INVITE as a new session as described in clause 6.2.1.3 Session origination using PS media only.

6. The SCC AS performs the Remote Leg Update using procedures defined in clause 6.3.1.5.
7. The SCC AS completes the session setup towards UE-1 according to procedures defined in TS 23.228 [4].

6.3.3.2 Local End Initiation case: Incorporating existing CS media in new IMS Session and Gm Service Control

The call flow in figure 6.3.3.2-1 presents a scenario where UE-1 adds PS media component(s) (e.g. video) and Gm Service Control Signalling to an existing multimedia session that only contains CS media. Following this scenario the session is controlled using ICS capability.

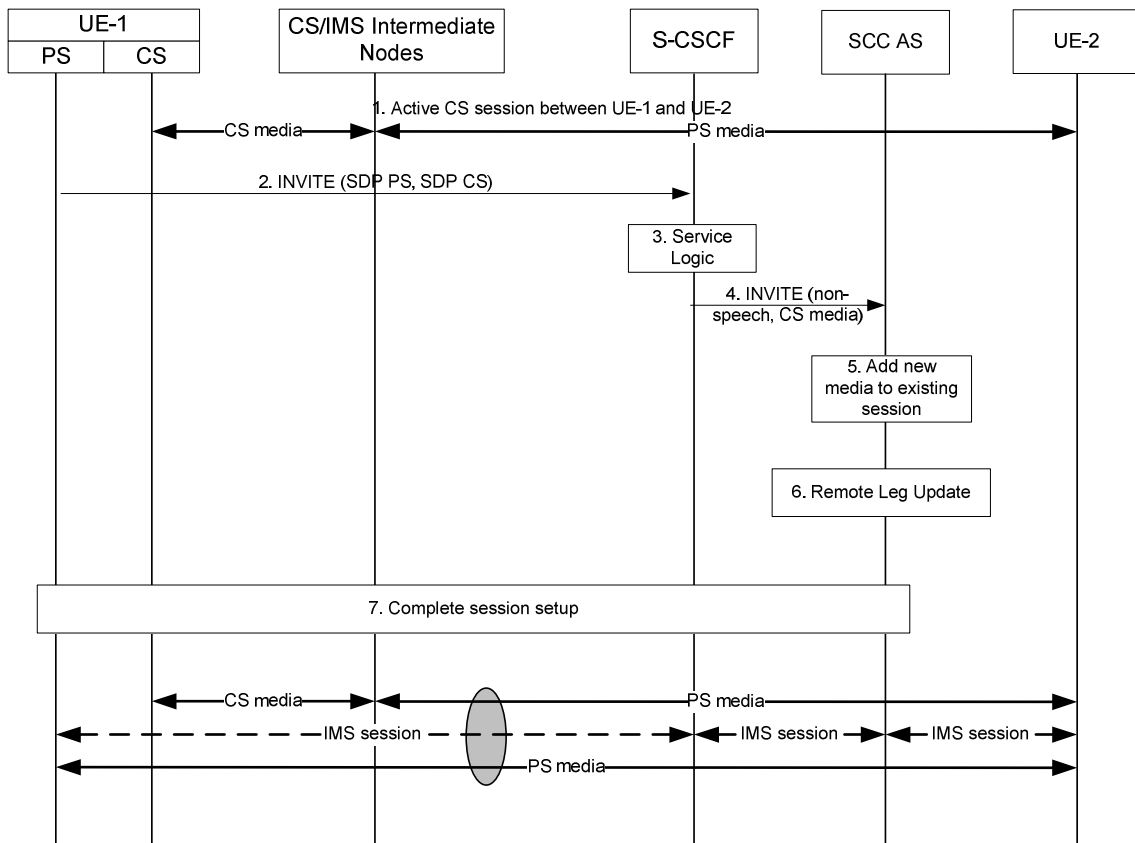


Figure 6.3.3.2-1: Local End Initiation case: Incorporating existing CS media in new IMS Session and Gm Service Control

1. A multimedia session between UE-1 and UE-2 is established as either originated or terminated session with CS media as described in TS 23.292 [5] clauses 7.3.2.1 and 7.4.2.1, respectively i.e. UE-1 is not using the ICS capability and therefore not using the Gm reference point during the session establishment.
2. UE-1 requests to add one or more PS media component(s) and to control the CS media using ICS capabilities by an INVITE towards SCC AS to establish a new session. The request contains the description of the new PS media and indicates that control of the existing CS media is transferred to the new session. UE-1 provides information necessary for the SCC AS to identify the existing session and to request addition of the media to the existing session.
3. The S-CSCF executes any service logic as appropriate.
4. The S-CSCF sends the INVITE to the SCC AS.
5. The SCC AS determines that the INVITE is related to an existing session using the information provided by UE-1 and adds the new media to the session.
6. The SCC AS performs the Remote Leg update using procedures defined in clause 6.3.1.5.
7. The SCC AS completes the session setup towards UE-1 according to procedures defined in TS 23.228 [4].

6.3.3.3 Local End Initiation case: Adding PS media to IMS session with CS media

The call flow in figure 6.3.3.3-1 presents a scenario where UE-1 adds PS media component(s) (e.g. video) to an existing multimedia session that contains CS media and is controlled using ICS capability.

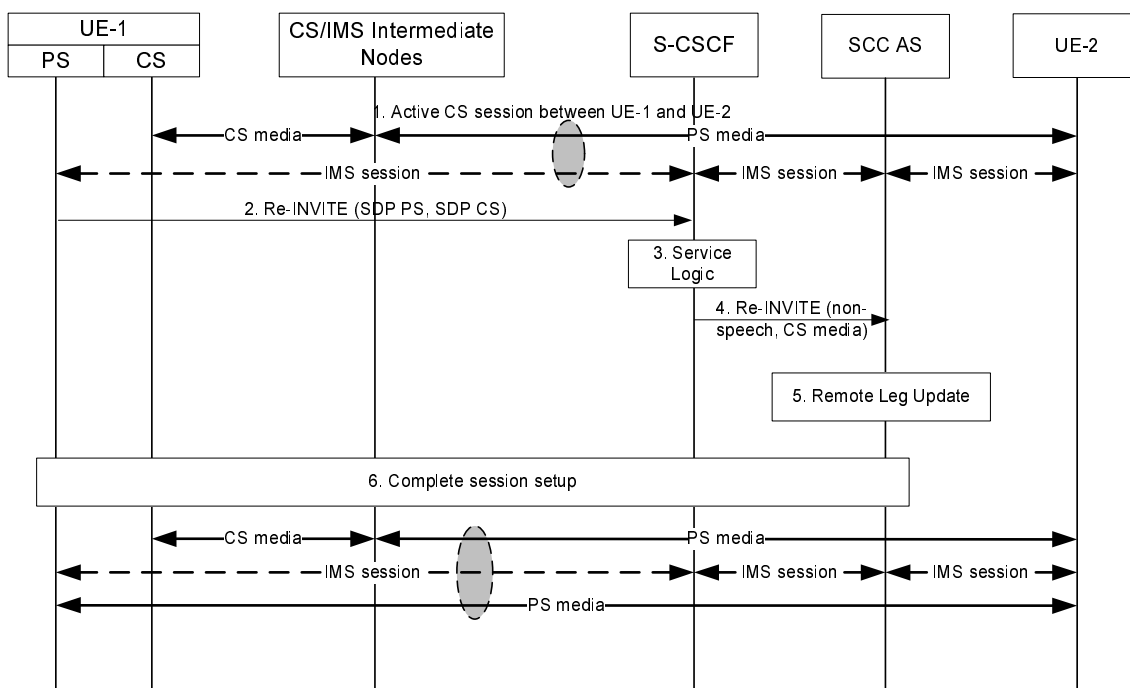


Figure 6.3.3.3-1: Local End Initiation case: Adding PS media to IMS session with CS media

1. An IMS session between UE-1 and UE-2 is established as either originated or terminated session with CS media as described in TS 23.292 [5] clauses 7.3.2.2.4 and 7.4.2.2.2.2, respectively i.e. UE-1 is using the ICS capability and therefore the Gm reference point during the session establishment.
2. UE-1 initiates a request to add the PS media to the existing IMS session.
3. The S-CSCF executes any service logic as appropriate.
4. The S-CSCF sends the INVITE to the SCC AS.
5. The SCC AS performs the Remote Leg Update using procedures defined in clause 6.3.1.5.
6. The SCC AS completes the session setup towards UE-1 according to procedures defined in TS 23.228 [4].

6.3.3.4 Remote End Initiation case: Adding new PS media to existing CS session

The call flow in figure 6.3.3.4-1 presents a scenario where UE-1 has an existing CS session with UE-2 and UE-2 adds new media to the session and the new media is delivered via PS access towards UE-1.

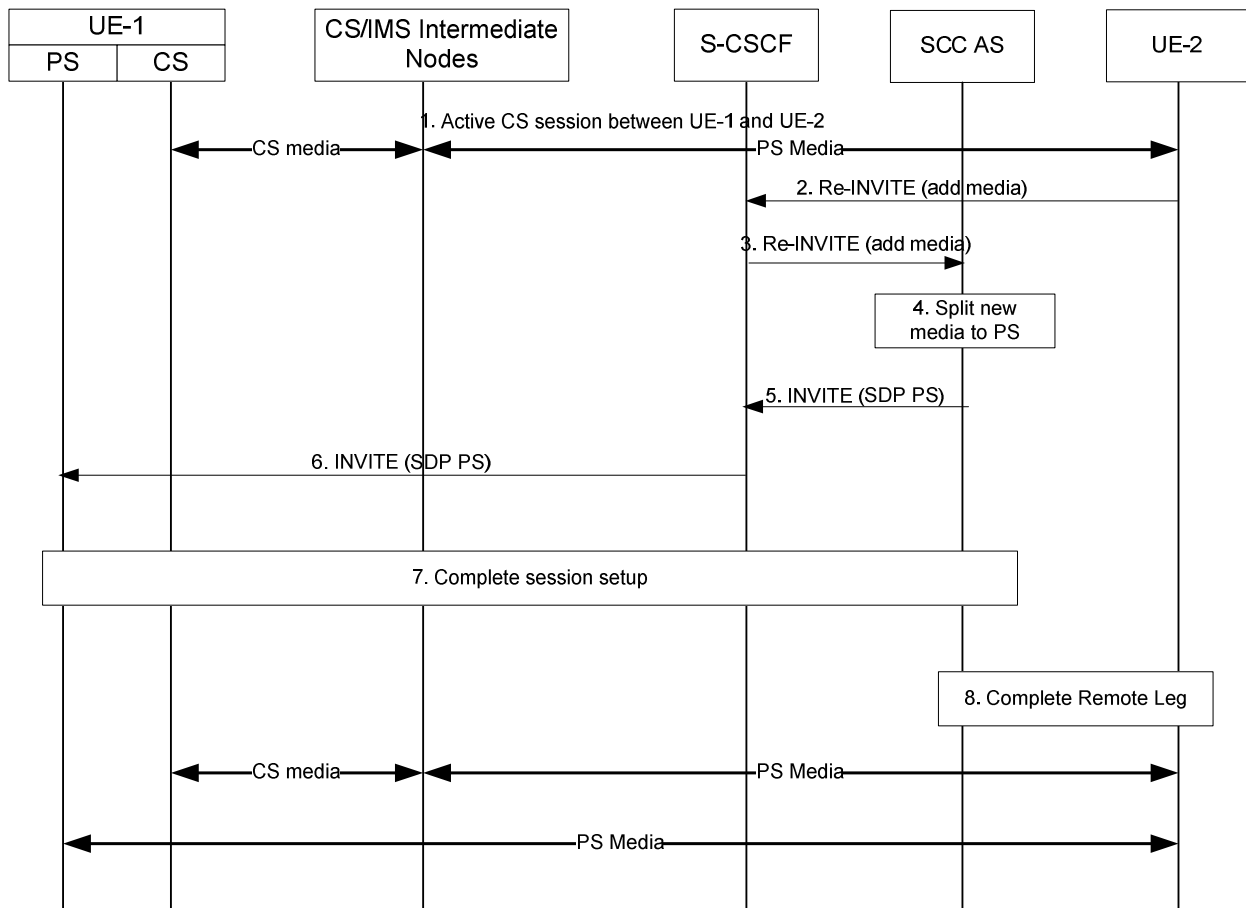


Figure 6.3.3.4-1: Remote End Initiation case: Adding new PS media to existing CS session

1. A CS session between UE-1 and UE-2 is established as either originated or terminated session with CS media as described in TS 23.292 [5] clauses 7.3.2.1 and 7.4.2.1, respectively, i.e. UE-1 is not using the ICS capability and therefore not using the Gm reference point during the session establishment.
2. S-CSCF receives a request from UE-2 to add new PS media (e.g. video) to the existing session.
3. S-CSCF forwards the request to SCC AS, which is anchored on the session path.
4. The T-ADS function in the SCC AS decides that the new media is delivered to UE-1 via PS access and therefore splits the session.
- 5-6. SCC AS initiates a new session towards UE-1. The request includes the new PS media. The SCC AS includes enough information within the session request to allow UE-1 to correlate this new session with the existing CS session.
7. UE-1 accepts the new session and completes the session setup via PS access.
8. The SCC AS completes the Remote Leg towards UE-2 according to procedures defined in TS 23.228 [4].

6.3.3.5 Remote End Initiation case: Incorporating existing CS media in new IMS Session and Gm Service Control

The call flow in figure 6.3.3.5-1 presents a scenario where UE-1 has an existing CS session with UE-2 and UE-2 adds new media to the session. The new media is delivered via PS access towards UE-1 and Gm Service Control Signalling is added. Following this scenario the session is controlled using ICS capability.

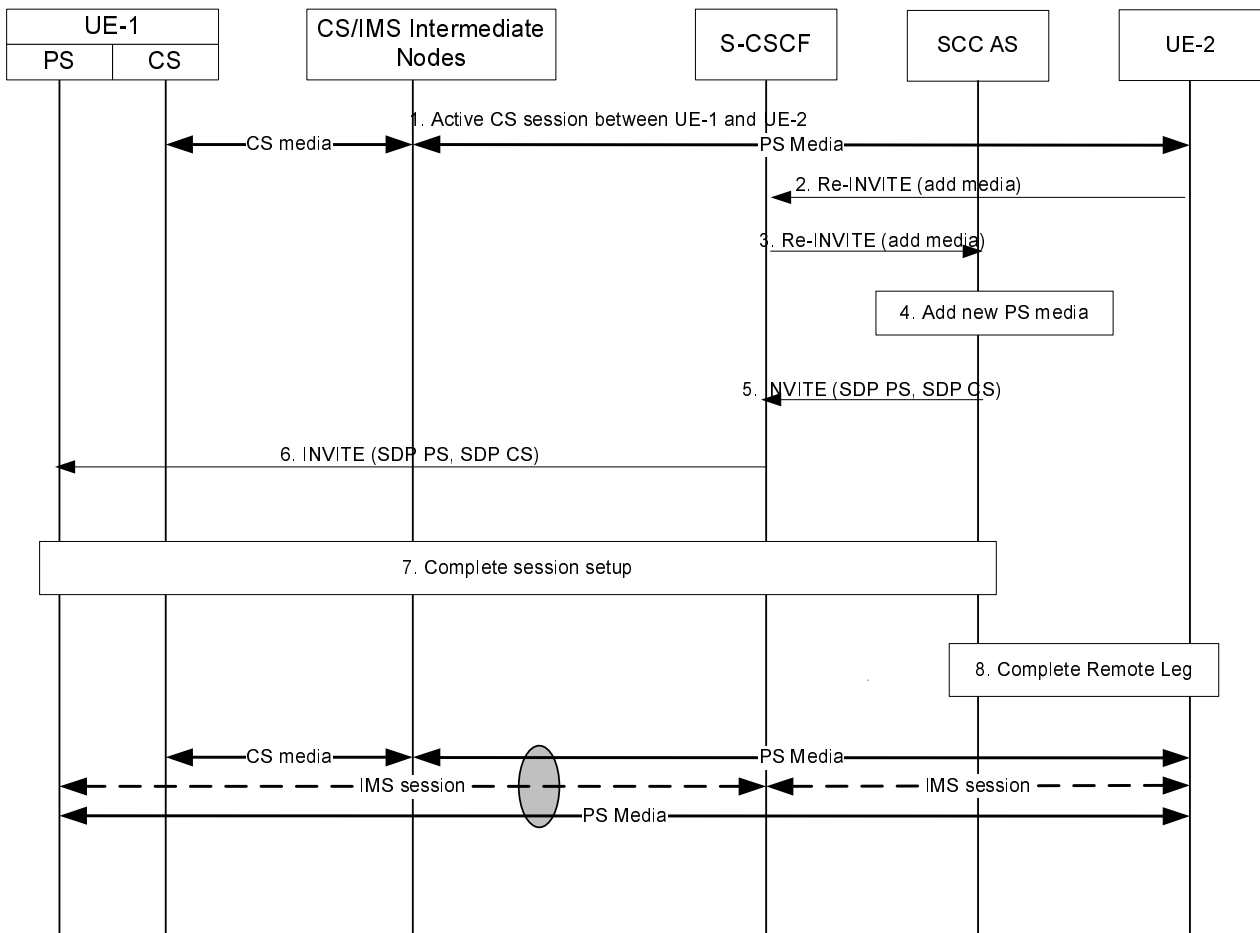


Figure 6.3.3.5-1: Remote End Initiation case: Incorporating existing CS media in new IMS Session and Gm Service Control

1. A CS session between UE-1 and UE-2 is established as either originated or terminated session with CS media as described in TS 23.292 [5] sections 7.3.2.1 and 7.4.2.1, respectively i.e. UE-1 is not using the ICS capability and therefore not using the Gm reference point during the session establishment.
2. S-CSCF receives a request from UE-2 to add new PS media (e.g. video) to the existing session.
3. S-CSCF forwards the request to SCC AS, which is anchored on the session path.
4. The T-ADS function in the SCC AS decides that the new media is delivered to UE-1 via PS access and therefore initiates a new session using the Gm reference point using ICS capabilities as specified in TS 23.292 [5]. SCC AS decides to establish the Gm Service Control Signalling together with the media addition using the ICS capability.
- 5-6. SCC AS initiates a new session towards UE-1. The request includes the new PS media and indicates that the existing CS media is moved to and controlled over this session.
7. UE-1 accepts the new session and completes the session setup via PS access.
8. The SCC AS completes the Remote Leg towards UE-2 according to procedures defined in TS 23.228 [4].

6.3.3.6 Remote End Initiation case: adding PS media to IMS session with CS media

The call flow in figure 6.3.3.6-1 presents a scenario where UE-1 has an existing session that contains CS media and Gm Service Control Signalling with UE-2 and UE-2 adds new media to the session. The new media is delivered together with the Gm Service Control Signalling towards UE-1.

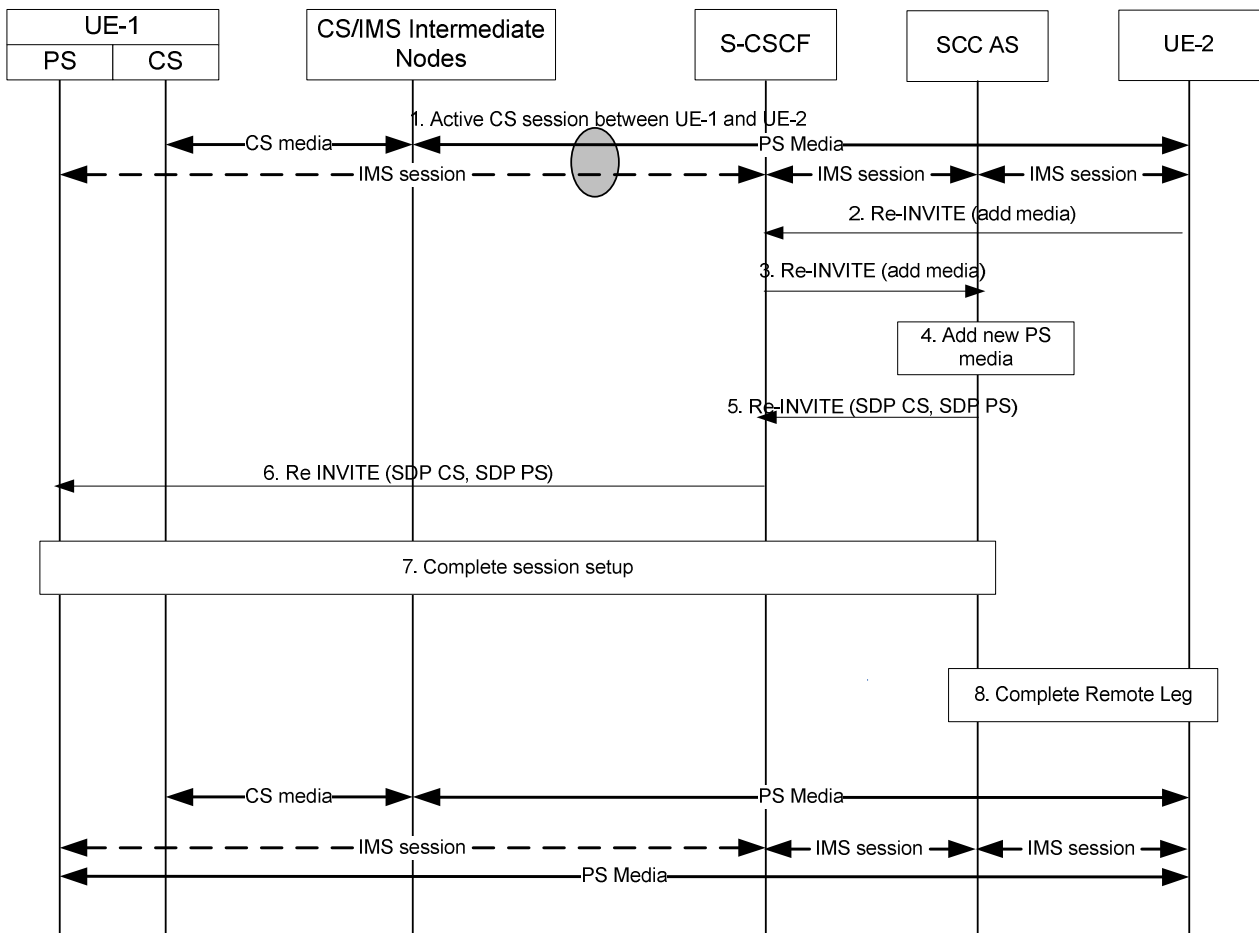


Figure 6.3.3.6-1: Remote End Initiation case: adding PS media to IMS session with CS media

1. A CS session between UE-1 and UE-2 is established as either originated or terminated session with CS media as described in TS 23.292 [5] clauses 7.3.2.2.4 and 7.4.2.2.2.2, respectively i.e. UE-1 is using the ICS capability and therefore the Gm reference point during the session establishment.
2. S-CSCF receives a request from UE-2 to add new PS media (e.g. video) to the existing session.
3. S-CSCF forwards the request to SCC AS, which is anchored on the session path.
4. The T-ADS function in the SCC AS decides that the new media is delivered to UE-1 via PS access. The SCC decides to add the PS media to the existing Service Control Signalling that is established via Gm.
- 5-6. SCC AS initiates a request to add the PS media to the existing Service Control Signalling Path towards UE-2.
7. UE-1 accepts the new session and completes the session setup via PS access.
8. The SCC AS completes the Remote Leg towards UE-2 according to procedures defined in TS 23.228 [4].

6.3.3.7 Local End Initiation case – Removing media from split CS and PS sessions

It is required that the UE-1 has a CS call and IMS multimedia session with the remote end in a manner that more than one sessions are presented to UE-2 as one IMS session by the SCC AS; for example the UE performs an Access Transfer for part of the media streams from PS to CS and the remaining media streams are kept within PS access.

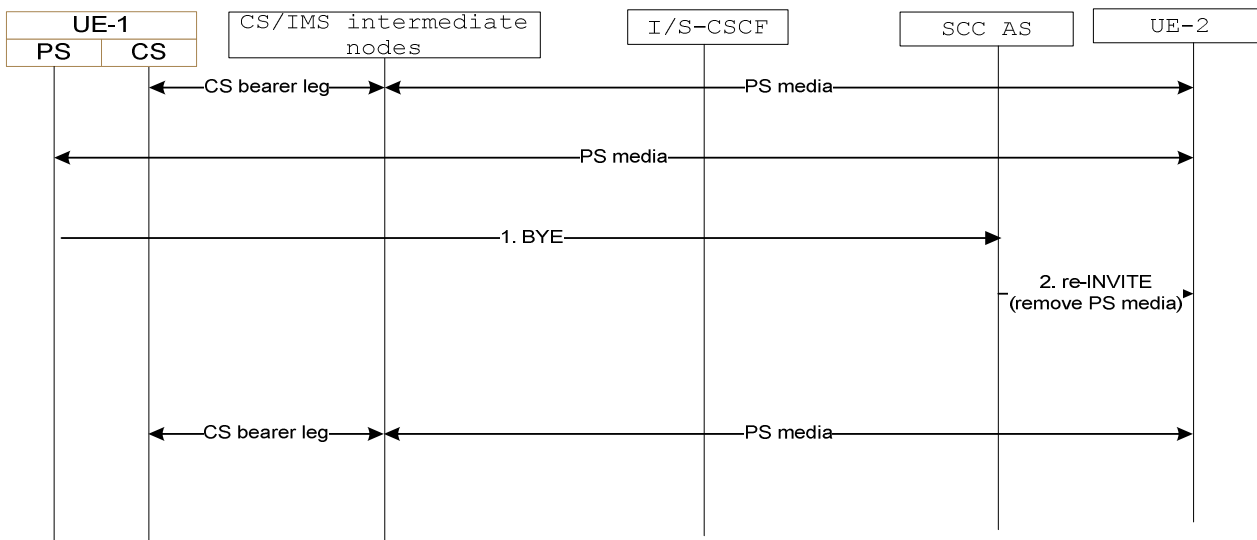


Figure 6.3.3.7-1: Local End Initiation case – Removing media from split CS and PS sessions

1. UE-1 uses standard IMS procedures defined in TS 23.228 [4] to remove one or more PS media from the session.
2. SCC AS sends a re-INVITE to UE-2 to remove the associated PS media from the session. The SCC AS terminates the Source Access Leg as defined in 6.3.1.6.

6.3.3.8 Remote End Initiation case – Removing media from split CS and PS sessions

It is required that the UE-1 has a CS call and IMS multimedia session with the remote end in a manner that more than one sessions are presented to UE-2 as one IMS session by the SCC AS; for example the UE performs an Access Transfer for part of the media streams from PS to CS and the remaining media streams are kept within PS access.

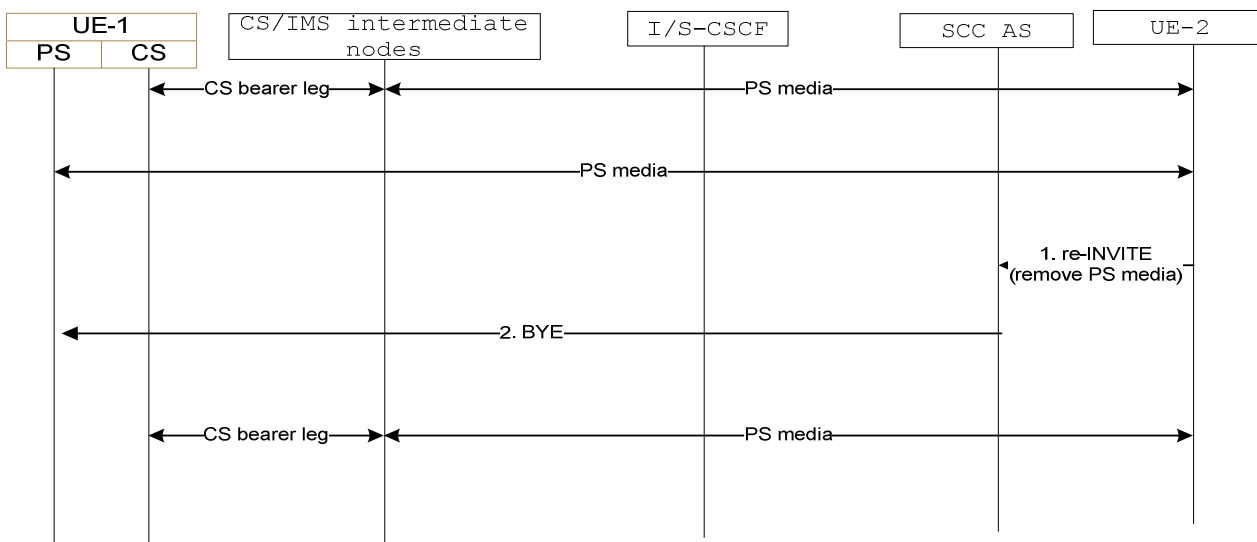


Figure 6.3.3.8-1: Remote End Initiation case – Removing media from split CS and PS sessions

1. UE-2 uses standard IMS procedures defined in TS 23.228 [4] to remove one or more PS media from the session.
2. SCC AS identifies the session from UE-2 as being split into two legs to UE-1. It determines the appropriate Access Leg over which to send the updated session information from UE-2. Since there is only a single PS media associated with the session, the SCC AS terminates the Access Leg associated with the PS media.

6.3.3.9 Local End Initiation case: Adding new PS media to existing PS session

This clause covers the scenario where UE 1 adds PS media component(s) (e.g. video) over a new IP-CAN, IP-CAN2, to an existing multimedia session that uses PS media over IP-CAN1. As a post condition the UE 1 has an ongoing multimedia session with the remote end.

The call flow is the same as in figure 6.3.3.3-1 except that both the original media and the added media are on PS accesses and no CS intermediate nodes are involved.

6.3.3.10 Remote End Initiation case: Adding new PS media to existing PS session

This clause covers the scenario where UE 1 has an existing PS session with UE 2 using PS media over IP-CAN1 and UE 2 adds new media to the session and the new media is delivered using PS media over IP-CAN2 towards UE-1.

The call flow is the same as in figure 6.3.3.4-1 except that both the original media and the added media are on PS accesses and no CS intermediate nodes are involved.

6.3.3.11 Local End Initiation case: Removing media from split PS sessions

This clause covers the scenario where local end UE-1 removes media from split PS sessions. As a precondition, UE-1 has an IMS multimedia session with the remote end. As a post-condition, UE-1 removes the PS session over one IP-CAN and continues IMS multimedia session with the remote end over the other IP-CAN.

The call flow is the same as in figure 6.3.3.7-1 except that all the media components are on PS accesses and no CS intermediate nodes are involved.

6.3.3.12 Remote End Initiation case: Removing media from split PS sessions

This clause cover the scenario where remote end UE-2 removes media from split PS sessions. As a precondition, UE-1 has an IMS multimedia session with the remote end. As a post-condition, the PS session over one IP-CAN is removed and UE-1 continues IMS multimedia session with the remote end over the other IP-CAN.

The call flow is the same as in figure 6.3.3.8-1 except that all the media components are on PS accesses and no CS intermediate nodes are involved.

6.3.4 Operator Policy and User Preferences

Operator Policy is provisioned in the network by the operator, and should be communicated to the UE during initial provisioning or via OMA Device Management [7]. Operator policy should be communicated to the UE, via OMA Device Management, whenever the policy is updated by the operator.

Operator policy shall indicate:

- whether session transfer between given access networks is restricted (in a single direction or in both directions);
- for each supported type of media or group of media types a list of preferred access networks (ordered according to operator policy) to be used by the UE with SC capabilities for session transfer, when those access networks become available and session transfer is possible;
- whether the UE with SC capabilities shall/should/may start transferring media components to target access networks when they become available and session transfer is possible;
- whether to keep or drop non transferable media components in the case of partial session transfer.

User preferences may indicate for example:

- preferred access

The UE shall take in account operator policy, user preferences and the Local Operating Environment Information when deciding which access to use for outgoing calls or before considering initiating Session Transfer.

NOTE: User preferences are not transferred to the network.

7 Security

7.1 General

There are no impacts on existing security mechanisms for the CS Domain or for IMS as a result of Session Transfers.

7.2 Access security for CS Domain

TS 33.102 [11] describes the Security Architecture for GSM and UMTS subscribers, SC places no additional requirements upon the CS domain security than those already in the detailed access specific specification e.g., above those described in TS 33.102 [11].

7.3 Access security for IMS

TS 33.203 [12] specifies the security features and mechanisms for secure access to the IM subsystem (IMS). SC places no additional requirements upon the IMS above those described in TS 33.203 [12].

8 Charging

8.1 Charging strategy

To ensure the completeness and correctness of charging during Session Transfer procedure, and to avoid possible double billing in IMS and CS, the following strategy should be applied:

- Provide cohesive charging records with a complete service continuity history for the whole duration of a SC subscriber multimedia session by the SCC AS.
- For cases of CS origination and CS termination, correlate the charging records generated in CS and IMS for the subscriber multimedia session, to avoid double billing to the subscriber.
- Treat the charging records generated in the transferring-in access network for the call(s)/session(s) established during the Session Transfer as subsequent Access Legs, and therefore do not impact the direction of the initial call(s)/session(s) for the purpose of charging.
- Keep the start of charging in the transferring-in access network align with the stop of charging in the transferring-out access network, to avoid double billing to the subscriber during the Session Transfer.

For SC online charging, the following strategies shall be ensured:

- Completeness and correctness of charging;
- Avoid possible double billing in IMS and CS domains.

To avoid online charging correlation in IMS and CS domain, the SC online charging should be performed only in IMS, i.e. prepaid service logic in CS domain should not be invoked for anchored CS origination/termination call and subsequent CS origination call established for performing Session Transfer. In addition, the SCC AS should report information related to the initial multimedia session establishment as well as the information related to the Session Transfer procedure to OCS for correct credit control purpose.

8.2 Accounting strategy

To assist in performing the settlement between operators, the following strategy shall be applied:

- Provide cohesive charging records with a complete service continuity history for the whole duration of a SC subscriber multimedia session by the SCC AS.

- Use the charging records for subsequent Access Legs generated in CS/IMS domain and the charging records generated in MGCF performing CS-IMS interworking, taking the complete service continuity history described above as reference, to perform the settlement between the providers of CS domain and IMS.
- Use the access network information in IMS charging records, taking the complete service continuity history described above as reference, to perform the settlement between the providers of IP-CAN and IMS Core.

Annex A: Change history

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Cat	Subject/Comment	Old	New
2008-06	-	-	-	-	-	MCC Editorial update after TSG Approval to version 8.0.0 (Rel-8)	1.0.0	8.0.0
2008-09	SP-41	SP-080575	0001	2	F	Third party registration at SCC AS	8.0.0	8.1.0
2008-09	SP-41	SP-080575	0002	1	F	Clarifications when remote end adds new PS media to CS session	8.0.0	8.1.0
2008-09	SP-41	SP-080575	0003	2	F	Add or remove PS media in PS session	8.0.0	8.1.0
2008-09	SP-41	SP-080575	0004	4	F	Corrections on STI assignment conditions	8.0.0	8.1.0
2008-09	SP-41	SP-080575	0005	2	F	Overall corrections for TS 23.237 v8.0.0	8.0.0	8.1.0
2008-09	SP-41	SP-080575	0006	3	F	Overall corrections related to operator policy and user preferences descriptions consistency for TS 23.237 v8.0.0	8.0.0	8.1.0
2008-09	SP-41	SP-080575	0008	1	F	Clarifications to clauses describing establishment of session that use CS media.	8.0.0	8.1.0
2008-09	SP-41	SP-080575	0009	1	F	Add definitions for Source Access Leg and Target Access Leg	8.0.0	8.1.0
2008-09	SP-41	SP-080575	0010	2	F	Align the terminology regarding Remote Leg	8.0.0	8.1.0
2008-09	SP-41	SP-080575	0013	4	F	Correct STN in the information flow in clause 6.3.2.3.1	8.0.0	8.1.0
2008-09	SP-41	SP-080575	0014	3	F	Correction of SRVCC in 23.237	8.0.0	8.1.0
2008-09	SP-41	SP-080575	0015	1	F	Removal of UE-UE transfer text	8.0.0	8.1.0
2008-09	SP-41	SP-080575	0016	-	F	Correction of requirement on session transfer	8.0.0	8.1.0
2008-09	SP-41	SP-080575	0017	1	F	General corrections of 23.237	8.0.0	8.1.0
2008-09	SP-41	SP-080570	0019	-	F	STI and STN definition correction	8.0.0	8.1.0
2008-09	SP-41	SP-080575	0020	-	F	Remove text related to CS-video from 3GPP TS 23.237	8.0.0	8.1.0
2008-09	SP-41	SP-080570	0027	-	F	Clarification of 23.237 - replacement of the terms "precondition" and "preconditions"	8.0.0	8.1.0
2008-09	SP-41	SP-080576	0029	2	F	UE and SCC AS handling of remaining media	8.0.0	8.1.0
2008-09	SP-41	SP-080576	0030	-	F	Remove UE awareness of merge	8.0.0	8.1.0
2008-09	SP-41	SP-080576	0033	2	F	Operator policy	8.0.0	8.1.0
2008-09	SP-41	SP-080576	0035	1	F	General cleanups to 23.237	8.0.0	8.1.0
2008-09	SP-41	SP-080576	0036	1	F	Minor clarification to scenarios within information flows	8.0.0	8.1.0
2008-09	SP-41	SP-080576	0037	2	F	Minor STI usage clarification	8.0.0	8.1.0
2008-09	SP-41	SP-080576	0038	1	F	Fixed the scope clause to include addition/deletion of media flows	8.0.0	8.1.0
2008-09	SP-41	SP-080576	0040	1	F	Remove unused abbreviations	8.0.0	8.1.0
2008-09	SP-41	SP-080576	0042	2	F	Clean up of incorrect terms used in the specification	8.0.0	8.1.0
2008-09	SP-41	SP-080576	0045	1	F	Clarification of the session that is transferred for SR-VCC	8.0.0	8.1.0

History

Document history		
V8.0.0	November 2008	Publication
V8.1.0	November 2008	Publication