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Presentation of Specification to TSG or WG

Presentation to:	**TSG SA Meeting #28**
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Abstract of document:

The present document provides architectural details to combine CS and IMS services for using them in parallel between the same two users. The document provides a description of how capabilities and identities are exchanged to enable the combination of CS and IMS services between the same two users.

The present document includes the following capabilities that enable the combination of CS and IMS services:

- Radio capability exchange.

- SIP based UE terminal capability exchange.

- MSISDN number exchange in SIP.

- Establishing an IMS session in parallel to an ongoing CS call between the same two users.

- Establishing a CS call in parallel to an ongoing IMS session between the same two users.

The individual CS call or IMS service that are combined are described in 24.008 and 23.228 respectively.
The TS is considered to be at least 80% complete and is presented for approval.

Changes since last presentation to TSG SA Meeting #27
- Section 7.3: Registration of UE Capabilities related to CS-Voice and CS-Video

- Introduction of a IMS media setup that requires resource reservation

- Significant editorial changes for clarification purposes.

Outstanding Issues:
1. Current Radio Environment information: What type of information and the benefit of exchanging this information need to be further motivated before it can be inserted in the current specification. The resolution of this issue waits upon a response to LS sent to RAN2 and GERAN.

2. Requirement added on the support of multiple devices in relation to cache information on a UE; some issues still need to be discussed around this.

Contentious Issues:
none identified

3GPP TS 23.279 V2.0.0 (2005-05)

Technical Specification

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Contents

Foreword

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

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

Version x.y.z

where:

x   the first digit:

1   presented to TSG for information;

2   presented to TSG for approval;

3   or greater indicates TSG approved document under change control.

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

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

Introduction

The combination of CS and IMS services (CSI) is the parallel operation of a CS service and an IMS session between the same two users. It does not require a specific subscription and a specific charging correlation.

1 Scope

The present document provides architectural details to combine CS and IMS services for using them in parallel between the same two users. The document provides a detailed description of how capabilities and identities are exchanged to enable the combination of CS and IMS services between the same two users.

The present document includes the following capabilities that enable the combination of CS and IMS services:

- Radio capability exchange.

- SIP based UE terminal capability exchange.

- MSISDN number exchange in SIP.

- Establishing anIMS session in parallel to an ongoing CS call between the same two users.

- Establishing a CS call in parallel to an ongoing IMS session between the same two users.

The individual CS call or IMS service that are combined are described in their respective specifications.

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 23.228: "IP Multimedia Subsystem (IMS); Stage 2".

[3]   3GPP TS 23.081: "Line Identification supplementary services; Stage 2".

[4]   3GPP TS 23.221: "Architectural Requirements".

[5]   3GPP TS 23.002: "Network Architecture".

[6]   3GPP TS 24.008: "Mobile radio interface Layer 3 specification; Core network protocols; Stage 3".

[7]   3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[8]   3GPP TS 23.082: "Call Forwarding (CF) supplementary services; Stage 2".

[9]   3GPP TS 23.083: "Call Waiting (CW) and Call Hold (HOLD) supplementary services; Stage 2".

[10]   3GPP TS 23.060: "General Packet Radio Service (GPRS); Service description; Stage 2".

[11]   3GPP TS 23.088: "Call Barring (CB) Supplementary Service; Stage 2".

[12]   3GPP TS 23.091: "Explicit Call Transfer (ECT) Supplementary Service; Stage 2".

[13]   3GPP TS 22.279: "Combined CS Calls and IMS Sessions; Stage 1".

[14]   3GPP TS 22.115: "Service Aspects; Charging and Billing".

3 Abbreviations

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

AS	Application Server
CSI	Combination of CS and IMS services
DTM	Dual Transfer Mode
IAM	Initial Address Message
CON	Connect Message
MRFC	Media Resource Function; Control part
MRFP	Media Resource Function; Physical Part
MSRP	Message Session Relay Protocol
RAT	Radio Access Technology
RTP	Real-time Transfer Protocol

4 Overall Requirements

4.1 General Description

The "combination of CS and IMS services" (CSI) is essentially a combination of existing CS and IMS services, i.e. mechanisms and procedures for the IMS part of the CSI session apply according to TS 23.228 [2].

The UE presents the CS call and IMS session within one context to the user. To facilitate this, the following capabilities shall be provided:

1. Exchange of information related to the current radio environment.

2. Exchange of terminal capability information.

3. Addition of an IMS session to an ongoing CS call

4. Addition of a CS call to an ongoing IMS session.

4.2 Service Requirements

The service requirements of combining IMS and CS services are described in TS 22.279 [13].

5 Architectural Requirements

5.1 Architectural Requirements

The following general requirements are applicable to CSI:

- The solution is applicable to GERAN and UTRAN;

- A CSI capable UE requires DTM capability (in case of GERAN access) and MultiRAB capability (in case of UTRAN access);

- IMS networks and IMS UEs without CSI support should not be impacted;

- CS core, PS core, xRAN are not to be impacted. Conclusively, changes should be restricted to the IMS elements and the UEs that support CSI for IMS;

- Procedures connecting the IMS to the CS domain, to the PSTN and to other SIP networks, including other IMS networks should remain unchanged;

- CS only UEs and PS only UEs are not to be impacted;

- CSI capable UE provides capabilities to associate the corresponding peer-to-peer CS and IMS communication to present it within one context for the user. The IMS communication may be peer-to-peer session or session unrelated communication, e.g. IMS immediate messaging;

- The quality of the CS call (e.g. voice quality, setup delay, handover, etc.) shall not be impacted from a user perception point of view regardless of whether the CS call is combined with an IMS session or not;

- The use of CSI requires that the UE is CS attached and IMS registered;

- The solution shall be transparent for the end-user;

- Existing security mechanisms for CS and IMS shall be re-used;

- For the user scenario of initiating simultaneous CS call and IMS session, an IMS session can be setup first followed by adding a CS call to the IMS session using the call-flow of Section 8.4, or a CS call can be setup first followed by adding the IMS session to the CS call using the call-flow of Section 8.3;

- For network efficiency, the capability detection functionality requires the terminal to cache information about the other terminals' capabilities;

- Functionality is required to handle remote parties who use more than one device (e.g. with the same MSISDN or the same public user ID).

5.2 Session Scenarios

The generic architectural requirements, as described in TS 23.221 [4], are applicable, and specifically

- The architectural solution shall support handover scenarios, including inter-system handover;

- The architectural solution shall support roaming scenarios with home GGSN ("IMS with GPRS roaming");

- The architectural solution shall support roaming scenarios with visited GGSN ("IMS roaming");

- The architectural solution shall be compatible with the IMS home control paradigm;

- The architectural solution shall consider future evolution to support interworking with conversational IMS services, which use PS bearers;

- The architectural solution shall consider future evolution to support migration towards conversational IMS services, which use PS bearers.

5.3 UE Logic

A CSI-capable UE shall have logic to trigger the capability and identity exchange required for simultaneous communication on the CS and IMS domains. Further, the logic shall be able to co-ordinate current activities in the UE , the user preferences, whether support for simultaneous CS and PS access is available and available IMS enablers in such a way, that only those services/enablers are offered to a user, which can be used simultaneously. This logic shall function in such a way that it makes the simultaneous usage of the CS and IMS domains for the media flows as transparent as possible for the user.

6 Architecture

The figure below shows a high level E2E architecture of a simultaneous IMS session and CS call between two end-users belonging to the same operator.
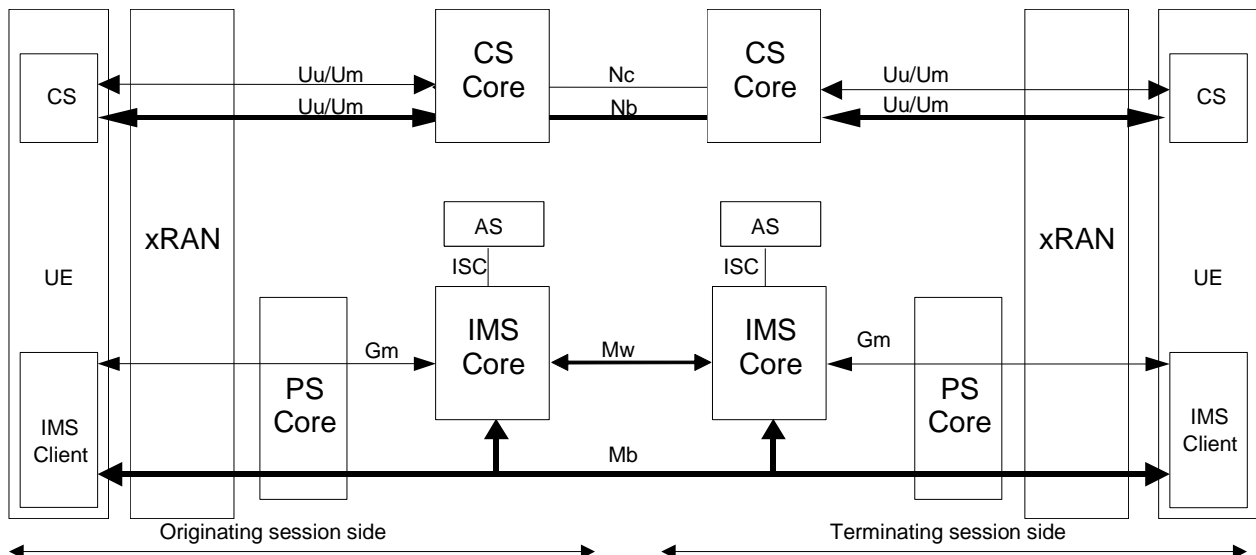
Figure 6-1: High level architecture

NOTE 1: No specific IMS user plane handling capabilities that are required to support CSI have been identified, i.e. regular IMS user plane handling applies.

- UE
  The UE needs to support simultaneous CS and PS domain access i.e. GERAN DTM and/or UTRAN multiRAB capabilities. Additionally, the UE should support the capability exchange mechanism outlined in Section 7, and the capability to present the CS call and IMS session within the same context to the user.

- xRAN
   The Radio Access Network is not impacted by Combinational Services. However, for CSI to function, for GERAN access DTM is required, for UTRAN multiRAB is required

- PS Core
  The Packet Switched Core network remains unchanged.

NOTE 2: For CSI to function, the PS core needs to support IMS.

- CS Core
  The CS Core Network remains unchanged. The CS core network contains MSC/VLR, HLR, and possibly other logical elements according to the 3GPP specifications TS 23.002 [5], TS 24.008 [6] and TS 29.002 [7].

- IMS Core
  The IMS routes the SIP signalling between the UE (A) and UE (B). In addition, the IMS provides the session control and supports UE capability exchange mechanism for the support of CSI. The IMS core includes the HSS, the CSCFs, and other logical elements like MRFC, MRFP, MGCF, or Messaging AS, according to 3GPP specifications TS 23.228 [2].

- AS
  The means of using an AS is identical to its usage in IMS. The AS may be utilised to handle the control of the IMS specific aspects of a CSI session, for example service-based charging, as described in TS 22.115 [14]. If service-based charging mechanisms like charging based on the content of a multimedia message, the message type or the number of sent and/or received messages are required, then the AS should be involved. The AS may also provide support for time- and/or volume based charging, see TS 23.228 [2] for a more detailed description.

7 Capability Exchange

7.1 General

It is highly advantageous if the set of services that can be supported between two endpoints is known to the endpoints when (or shortly after) communication is established. This information can be used to provide an indication to the user of the services that are available for a particular user-to-user communication session. This can encourage use of

available services and avoid invocation of unavailable services, thereby avoiding customer dissatisfaction and unnecessary resource and bearer establishment attempts.

Two types of capability information are described: information about the current radio environment, and UE capability information.

7.2 Capability Information

7.2.1 Information about the current radio environment

The purpose of the information about the current radio environment is to use it as input to the UE's and/or the user's decision whether to initiate further CSI procedures (e.g. whether to start UE capability exchange, or an IMS session, etc.).

> Editor's Note: The information could include:
> - Simultaneous CS and PS capability, taking both UE and current RAN environment into account
> - Whether the UE is capable of supporting CS Video in the current RAN environment
> - Additional information e.g. whether the above should be divided into UE and RAN capabilities
>
> Editor's Note: What type of information and the benefit of exchanging this information need to be further motivated before it can be inserted in the current specification. The resolution of this issue waits upon a response to LS sent to RAN2

7.2.2 UE Capability Information

The UE capability information provides input to determine the set of services that can be successfully invoked between two users.

It shall be possible to exchange the UE capabilities described below in this subclause. Note that the exchange of these capabilities is subject to the availability of the information and privacy control.

- IMS Media types which can be supported as IMS media streams (i.e. media component definitions of IMS sessions).

- Media format parameters for supported IMS media types (codecs, media file formats etc.).

- MSISDN and preferred SIP URI for the UE sending the UE capability information.

Additionally, it shall be possible for the UE to use IMS to exchange capability information about:

- CS video telephony capability;

- CS voice capability;

- MMS version supported;

- Support for other IMS based capabilities or services e.g. PoC.

The UE capability information is exchanged between the calling party and the called party. The UE may cache the retrieved capabilities for a certain amount of time, and may refresh its cache in a periodic manner.

> NOTE: due to varying radio environments (e.g. DTM/non-DTM, etc…) a UE capability exchange has the best success rate when performed outside of any other service, i.e. when no other CS/PS/IMS service is currently invoked.

The information flows for exchanging UE capabilities are shown in subclause 8.2.

7.3   Registering UE Capability Information

During registration, a UE may register its capability information using SIP User Agent capability registration mechanism specified in RFC 3840 and endorsed by TS 23.228 [2]. To facilitate the operation of CSI, it shall be possible for the UE to register at least the following UE capabilities:

-    CS video telephony capability;

-    CS voice capability.

Registration of these UE capabilities could help the core IMS network in routing SIP messages to appropriate UE device when the caller indicates preference for these capabilities in the a SIP message using mechanism specified in RFC 3841 and endorsed by TS 23.228 [2].

8   Information Flows

8.1   Exchange of Capability Information at CS Call Setup

It shall be possible for the UE to perform end-to-end information exchange about current radio environment during CS call setup. The current radio environment information exchange procedure shall include the information as outlined in subclause 7.2.1.

NOTE: There will exist UEs, which do not support the radio environment exchange procedure, but do support parallel CS calls and IMS sessions, e.g. Rel-5 IMS-capable UMTS UEs. Thus lack of an answer in the radio capability exchange procedure does not mean that the remote UE cannot handle a parallel IMS session or the SIP based capability exchange.

The sequence diagram in figure 8-1 outlines the exchange of information about the current radio environment, at CS call setup. The diagram shows only an example of actual messages that can be used to transport this information. For this procedure to be successful, the network must handle the radio capability information transparently.
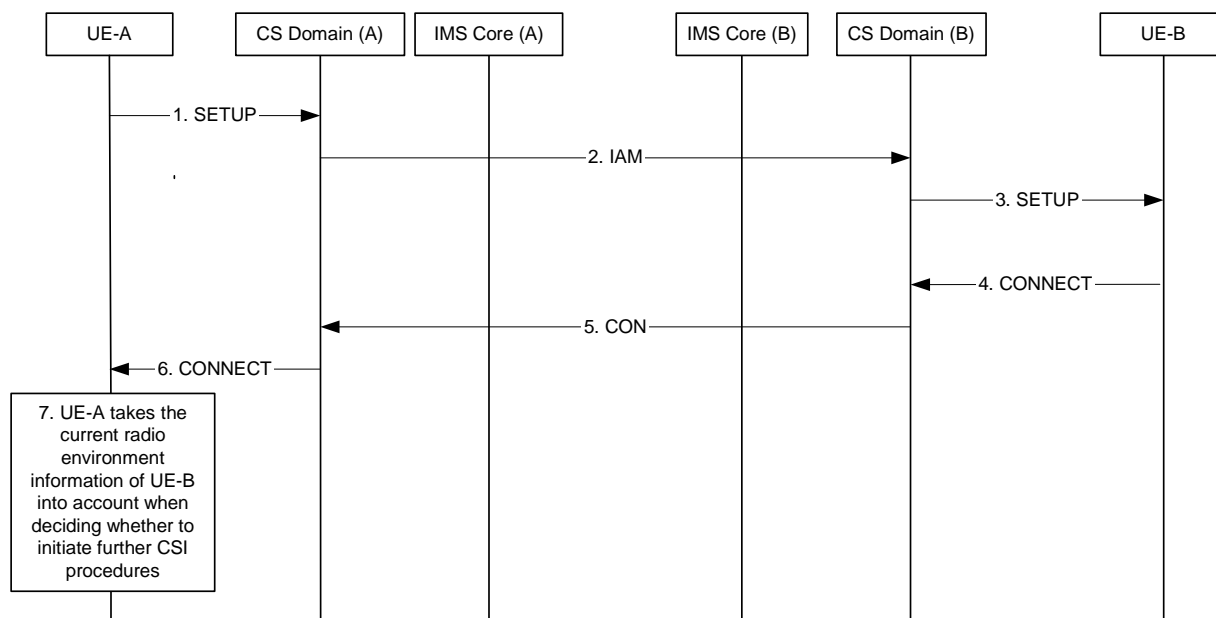

Figure 8-1: Exchange of current radio environment information "at" CS call setup

1)   The UE-A initiates a CS call by sending a SETUP message towards UE-B, including the current radio environment information.

2)   The CS domain of the originating network sends an IAM message including the current radio environment information of UE-A to the CS domain of the terminating network.

3)   The CS domain of the terminating network sends a SETUP message IAM including the current radio environment information of UE-A to the UE-B.

4)   The UE-B stores the current radio environment information of UE-A and sends the current radio environment information of UE-B in the response that sets up the CS call, in this case the CONNECT message.

5)   The CS domain of the terminating network sends a CON message including the current radio environment information of UE-B to the CS domain of the originating network.

6)   The CS domain of the originating network sends an CONNECT message including the current radio environment information of UE-B to the UE-A.

7)   The UE-A takes the current radio environment information of UE-B into account when deciding what service options to present to the user and/or whether to initiate a UE capability information exchange, see subclause 8.2.

8.2   Exchange of UE Capability Information

This Section outlines the exchange of UE related capability information using the SIP OPTIONS procedure to minimize the amount of network signalling and resource usage as well as the number of failed SIP INVITE requests. It also allows an up-to-date indication to the user which capabilities he could add to the ongoing call. Note that UE capability information exchange at IMS session initiation is specified in subclause 8.4.

It shall be possible for a UE to request the OPTIONS request to be sent to any other registered UE. In case there is an ongoing CS call between UE-A and UE-B, it should be possible to provide a higher probability that the UE capability exchange is routed to the UE-B.

Editor's Note: The feasibility from a stage 3 perspective of the requirement above paragraph needs to be evaluated by 3GPP CT1. The resolution of this issue awaits the results of an outstanding LS sent to CT1.

As the SIP OPTIONS request include both the IMS Public User Identity in the form of an SIP URI and the MSISDN the procedure enables both UE-A and UE-B to correlate the IMS session with the CS call and within one context inform the user what capabilities the user is able to use.

NOTE: If the UICC is not provisioned with the MSISDN the UE may get it during the IMS registration as an associated identity.

The execution of this SIP OPTIONS request procedure is recommended when UE-A's cache does not contain up-to-date information for UE-B.
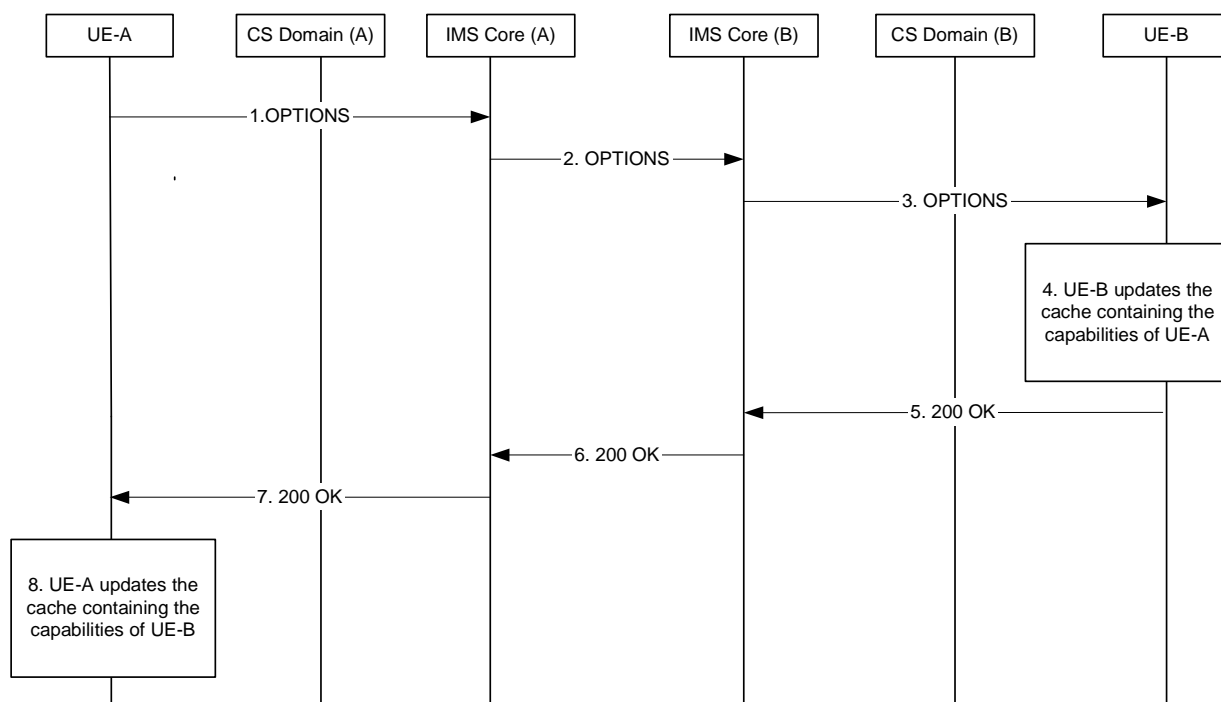

Figure 8-2: Exchange of UE capability information

1) UE-A sends an SIP OPTIONS request towards UE-B preferably using a SIP URI of UE-B, or a TEL URI, if no valid SIP URI is available. Subject to privacy controls, in UE-A the SIP OPTIONS request shall contain MSISDN of UE-A, if available, and contains the information outlined in subclause 7.2.2.

2) The IMS Core (A) performs the normal security procedures and forwards the SIP OPTIONS request towards IMS Core (B). If the destination address is in the format of a TEL URI, IMS Core (A) performs MSISDN to SIP URI translation as per subclause 4.3.5 in TS 23.228 [2], before forwarding the OPTIONS request to IMS Core (B).

   The IMS Core (A) should add the MSISDN of UE-A to the OPTIONS request, if not included by UE-A.

3) The IMS Core (B) forwards the SIP OPTIONS request to UE-B. If privacy is requested, IMS Core (B) shall remove the MSISDN of UE-A.

4) The UE-B caches the UE-A capability information if received and, if not already available, stores the address information of UE-A.

5) The UE-B sends a 200 OK that , subject to UE-B's privacy settings contain the information outlined in subclause 7.2.2.

6) The IMS Core (B) forwards the 200 OK to IMS Core (A).

   The IMS Core (B) should add the MSISDN of UE-B to the 200 OK, if not included by UE-B.

7) The IMS Core (A) forwards the 200 OK to UEA-A. If privacy is requested, IMS Core (A) shall remove the MSISDN of UE-B.

8) The UE-A caches the UE capability information received and if not already available stores the address information of UE-B.

For the capability exchange procedure to work properly UE-B should send an SIP OPTIONS request towards UE-A, in the following two situations and if the following conditions are met:

1. An OPTIONS or INVITE request is received from UE-A, and

   - The OPTIONS or INVITE request received from UE-A did not include any UE capability information, and

   - The cache of UE-B does not contain up-to-date information for UE-A;

2. UE-B is in a CS call, and

   - UE-B has not received the OPTIONS request from UE-A within a certain time period after the CS call setup, and

   - The cache of UE-B does not contain up-to-date information for UE-A, and

   - If received, the current radio environment information indicates that UE-A is capable of operating in class A mode of operation or UE-A has not received enough information to give an appropriate indication.

8.3 User adds an IMS service to an ongoing CS Call

8.3.1 IMS session set up without media requiring resource reservation

The following sequence diagram shows an IMS service being added to an ongoing CS call when the CSI capabilities of UE-B have not previously been cached by UE-A and are therefore exchanged after CS call setup,

NOTE 1: The SIP session may setup any service based on IMS and normal requirements as per TS 23.228 [2] apply.
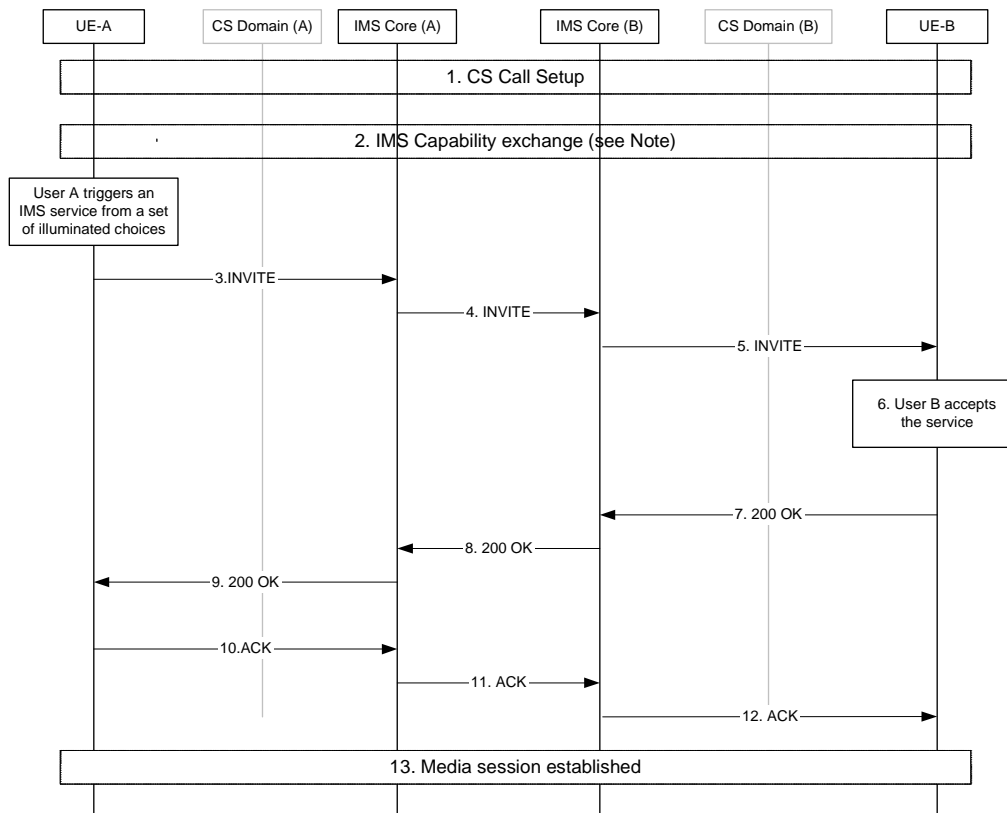
Figure 8.3-1: User adds an IMS session to an ongoing CS call

1) A CS call is setup as per subclause 8.1.

2) The UE-A should initiate an IMS capability exchange as described in section 8.2. If UE-B does not receive any IMS capability exchange from UE-A within a certain time limit the UE-B should initiate the IMS capability exchange, if required.

NOTE 2: This step is only needed when UE-A does not have the UE-B IMS capabilities cached and vice versa.

NOTE 3: The IMS Capability exchange will also include the correlation between the MSISDN and the SIP URI.

3) The UE-A shall send the SIP INVITE request to the IMS Core along the signalling path established during registration.

4) The IMS Core (A) forwards the INVITE request to IMS Core (B).

5) The IMS Core (B) forwards the INVITE request to UE-B.

6) The UE-B shall associate the INVITE with the ongoing CS call by using the MSISDN and SIP URI, obtained through the IMS Capability exchange procedure.

7) The UE-B invokes the correct application, which associates the SIP session with the ongoing call by matching the identities used in the CS call and the SIP session. The UE-B then sends a 200 OK.

8) The IMS Core (B) forwards the 200 OK to IMS Core (A).

9) The IMS Core (A) forwards the 200 OK to UE-A.

10) The UE-A acknowledges the 200 OK.

11) The IMS Core (A) forwards the acknowledgement to IMS Core (B).

12) The IMS Core (B) forwards the acknowledgement to UE-B.

13) Media as per the session setup is sent between the two UEs.

8.3.2 IMS session set- up with media requiring resource reservation

If preconditions are used for the IMS session setup then flows according to 23.228 shall be applied.

For an IMS session setup it shall also be possible to set the media to inactive in the INVITE (SDP offer) in order to activate the media once resource reservation has been performed, as illustrated in the use case below.

In addition to the call set-up procedure defined in sections 5.6.1 and 5.7.1 the following sequence diagram shows an IMS service being added to an ongoing CS call when the CSI capabilities of UE-B have not previously been cached by UE-A and are therefore exchanged after CS call setup,
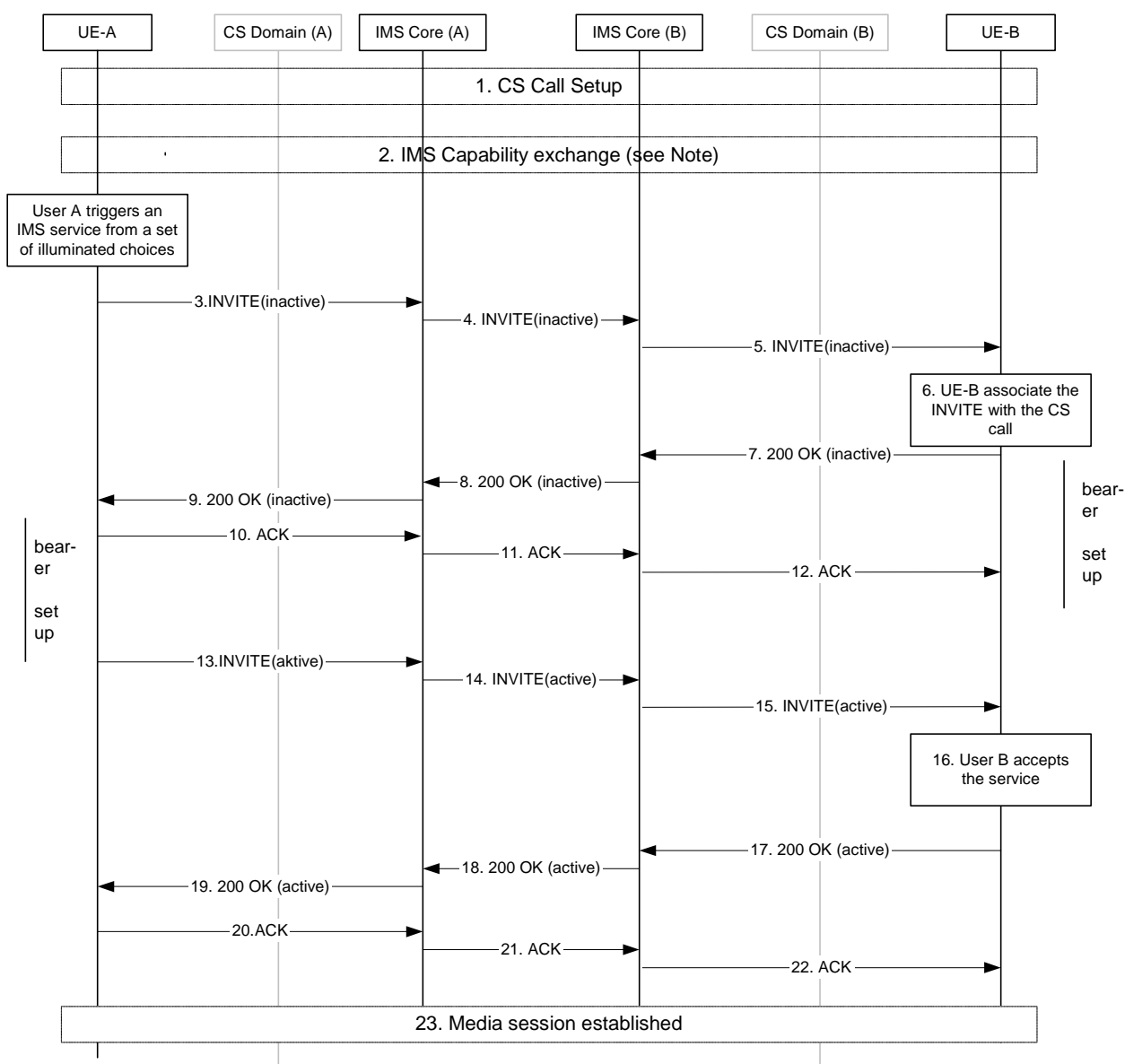

Figure 8.3-2: User adds an IMS session to an ongoing CS call

1) A CS call is setup as per subclause 8.1.

2) The UE-A should initiate an IMS capability exchange as described in section 8.2. If UE-B does not receive any IMS capability exchange from UE-A within a certain time limit the UE-B should initiate the IMS capability exchange, if required.

NOTE 1: This step is only needed when UE-A does not have the UE-B IMS capabilities cached and vice versa.

NOTE 2: The IMS Capability exchange will also include the correlation between the MSISDN and the SIP URI.

3) The UE-A shall send the SIP INVITE request with the media components marked "inactive" to the IMS Core along the signalling path established during registration.

4) The IMS Core (A) forwards the INVITE request to IMS Core (B).

5) The IMS Core (B) forwards the INVITE request to UE-B.

6) The UE-B shall associate the INVITE with the ongoing CS call by using the MSISDN and SIP URI, obtained through the IMS Capability exchange procedure. If required, UE-B immediately initiates IP-CAN bearer setup. No alerting of user B needs to be carried out.

7) The UE-B directly sends a 200 OK with the media components marked 'inactive'.

8) The IMS Core (B) forwards the 200 OK to IMS Core (A).

9) The IMS Core (A) forwards the 200 OK to UE-A.

10) The UE-A initiates IP-CAN bearer setup for the media and acknowledges the 200 OK.

11) The IMS Core (A) forwards the acknowledgement to IMS Core (B).

12) The IMS Core (B) forwards the acknowledgement to UE-B.

13) The UE-A shall send the SIP INVITE request with the media components marked "active" to the IMS core when the IP-CAN bearer is established on UE-A access.

14) The IMS Core (A) forwards the INVITE request to IMS Core (B).

15) The IMS Core (B) forwards the INVITE request to UE-B.

16) The UE-B shall perform necessary service action to receive/send user plane media.

17) The UE-B shall send 200 OK with the media components marked 'active' when the IP-CAN bearer is setup and the UE is ready to receive media.

18) The IMS Core (B) forwards the 200 OK to IMS Core (A).

19) The IMS Core (A) forwards the 200 OK to UE-A.

20) The UE-A acknowledges the 200 OK.

21) The IMS Core (A) forwards the acknowledgement to IMS Core (B).

22) The IMS Core (B) forwards the acknowledgement to UE-B.

23) User plane connection is established.

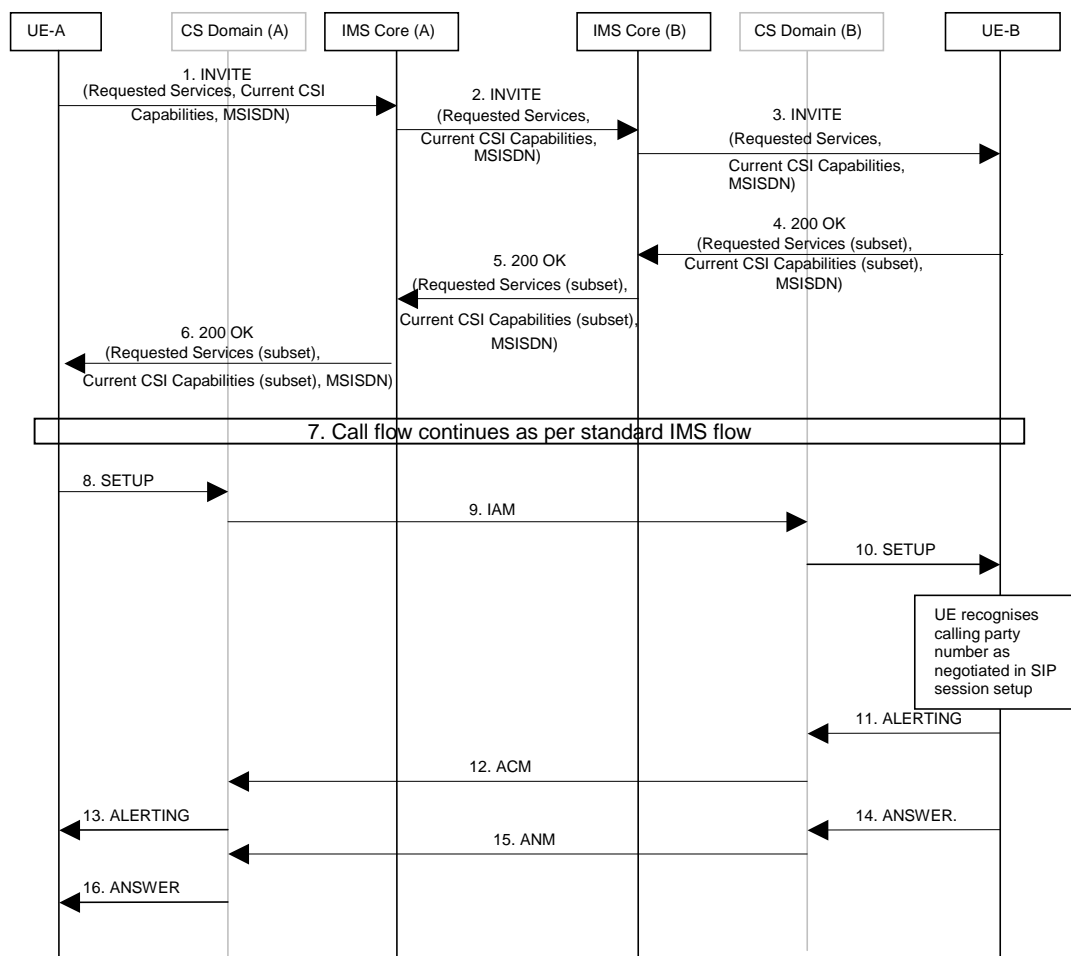## 8.4 User adds a CS call to an ongoing IMS session

Figure 8.4-1: User adds a CS call to an ongoing IMS Session

1) The UE-A sends the SIP INVITE request to the IMS Core (A) using the address obtained during registration.

 The SIP INVITE may contain CSI specific information including MSISDN and current CSI capabilities (UE and Radio capabilities) in addition to the standard information for the desired IMS service.

2) The IMS-Core (A) forwards the SIP INVITE request to the IMS Core (B)

3) The IMS-Core (B) forwards the SIP INVITE request to UE-B.

4) The UE-B sends a 200 OK.

5) The IMS Core (B) forwards the 200 OK to IMS Core (A).

6) The IMS Core (A) forwards the 200 OK to UE-A.

7) The IMS flow continues as standard.

8) The UE-A initiates a CS call by sending a SETUP message towards UE-B.

9) The CS domain of the originating network sends an IAM message to the CS domain of the terminating network.

10) The CS domain of the terminating network sends a SETUP message IAM of UE-A to the UE-B.

 UE-B recognises the calling party number as negotiated in SIP session setup.

11) The UE-B sends ALERTING message to UE-A.

12) The CS domain of the terminating network sends an ACM message to the CS domain of the originating network.

13) The CS domain of the originating network sends an ALERTING message to the UE-A.

14) The UE-B sends ANSWER message to UE-A.

15) The CS domain of the terminating network sends an ANM message to the CS domain of the originating network.

16) The CS domain of the originating network sends an ANSWER message to the UE-A.

9 Interaction with Supplementary Services

9.1 General

CS supplementary services apply to the CS component of the CSI call only. The present clause describes how best to configure and utilize CS Supplementary Services in the context of CSI.

> NOTE: The CS supplementary services are defined in TS 23.081 [3] (Line Identification), TS 23.082 [8] (Call Forwarding), TS 23.083 [9] (Call Waiting and Hold), TS 23.088 [11] (Barring) and TS 23.091 [12] (Explicit Call Transfer).

9.2 Line Identification

9.2.1 Calling Line Identity Presentation (CLIP)

It is beneficial to utilize CLIP in the context of CSI.

1) The called party uses the CLI of the calling party to correlate an incoming SIP INVITE with the CS call.

2) When the called party wishes to establish an IMS session with the calling party in the context of the CS call, the called party uses the CLI of the calling party to derive the destination URI of the IMS session. The UE may use the CLI as TEL URL or may use the CLI to derive a SIP URI.

9.2.2 Calling Line Identification Restriction (CLIR)

If the calling party is subscribed to the automatic suppression of the presentation of her CLI, then it must be anticipated that the network must also automatically suppress her "IMS CLI", and, that her UE shall not reveal her CLI to other parties without her explicit permission. This can be achieved by either:

a) The network operator refuses to give an IMS subscription to her.

b) Appropriate mechanism for the HSS to control the removal of "CLI" based on subscription information.

> NOTE: Point B is related to an IETF privacy mechanism and is identified as a generic IMS issue, not one specifically related to CSI. As this causes subscriber information to be sent around more than usual, it will be worked on as a generic IMS issue within 3GPP.

The calling party may also wish to use CLIR on a "per call" basis. In this case, the UE shall not include any CLI information in any OPTIONS data exchange linked to the CS call.

There are several mechanisms that can be imagined for the UEs to swap static terminal information as a background task, e.g., outside of CS calls and 'user initiated' IMS sessions. Because the E.164/identity information may need to be restricted from transmission to certain destinations, the UE shall ensure that the user's permission is obtained before such sensitive information is transmitted.

Given that CLIP is highly desirable and useful for CSI, it is accepted that the use of CLIR causes significant degradation to the overall user experience in case of CSI.

9.2.3 Connected Line Identification Presentation (COLP)

It is beneficial to utilize COLP in the context of CSI:

1) The calling party uses the COL of the connected party to correlate an incoming SIP INVITE with the CS call.

2) When the calling party wishes to establish an IMS session with the connected party, the calling party uses the COL of the called party as the destination URI of the IMS session. The UE may use the COL as TEL URL or may use the COL to derive a SIP URI.

> NOTE: The availability of the COL may be affected by Call Forwarding GSM supplementary service, regulations and network services such as IN.

9.2.4 Connected Line Identification Restriction (COLR)

If the presentation of her COL is suppressed by means of a subscription or on a per call basis, then automatic combination of the IMS session and the CS call is unavailable. Note that user can still manually combine the CS call and the IMS session.

9.3 Call Forwarding

When a call is subject to CS call forwarding, the calling party is notified that the call has been forwarded. When the user would like to establish an IMS session that is to be automatically combined with this call then the user initiates the IMS session to the forwarded-to user.

Call forwarding may result in the restriction of the presentation of the COL, depending on subscriber option settings.

9.4 Call Offering

9.4.1 Explicit Call Transfer (ECT)

At the moment that the subscriber invokes ECT, she may have an IMS session ongoing with one of the two parties. It is up to the user whether to keep this IMS session when ECT is invoked.

9.5 Call Completion

9.5.1 Call Waiting (CW) and Call Hold (CH)

When a subscriber (calling or called) is engaged in a CS call and a second call is offered to her (Call Waiting), an IMS session may be ongoing between that subscriber and her speech partner of the ongoing call. The offering of the second call (i.e. the alerting) does not affect the ongoing IMS session.

When a subscriber (calling or called) receives a CS call when already engaged in another CS call, then she may act as follows.

a) Reject the incoming call. This action does not affect the IMS session of the active call.

b) Release the first CS call and answer the second CS call. The user may decide whether to keep the IMS session that was established in the context of the first CS call. The user may also decide to establish a new IMS session to be combined with the second CS call.

c) Invoke Call Hold. The first call is placed on hold and the second call is answered. The following options apply to the IMS session for the first call:

> Option I: The IMS session is retained, but the sending and receiving of streaming data is suspended.

> Option II: The IMS session is retained and the sending and receiving of non real-time data continues.

Similar principles apply to the case where A-party places an ongoing call on hold and establishes a second CS call.

9.6 Call Barring

If a CS call is barred, then IMS sessions in the context of the CS call are not applicable.

If an IMS session is active and the user intends to establish a CS call, then Call Barring categories apply.

10 Other considerations

10.1 Handover

- Handover from DTM GERAN or UTRAN to non-DTM GERAN
  If, during a simultaneous IMS session and CS call between two end-users, one of the end-users makes an intersystem handover into a non-DTM GERAN access, in this case the data traffic on the PDP contexts are handled as per procedures described in TS 23.060 [10]. The impacts and handling of the PDP contexts on the IMS are FFS.

- Handover from non-DTM GERAN to DTM GERAN or UTRAN
  When a UE is participating in a CS call and not able to operate in Class A mode of operation, the UE cannot perform IMS capability exchange procedures. When the UE is again able to operate in Class A mode of operation, the UE can perform the IMS capability exchange procedures during the CS call, if required according to procedures outlined in sections 7 and 8.

Annex A:
Change history

Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
2005-01					Skeleton of the new TS	-	0.0.0
2005-01					Comments from the SA2#44 added Section descriptions transformed into editor's notes Subclause 6.1 and 6.2 of Section 6 removed Section 8 headings modified	0.0.0	0.0.1
2005-02					Text for sections 1, 4-10 added based on contributions: - S2-050439 (section 1), - S2-050450 (section 4), - S2-050451 (section 5), - S2-050452 (section 6), - S2-050453 (section 7), - S2-050511 (section 7.2.1), - S2-050456 (section 8.1-8.2), - S2-050512 (section 8.3), - S2-050459 (section 9), - S2-050460 (section 10) and - S2-050461 (section 8.4). Sections 2-3 (References and Abbreviations) added Section 4.2 added based on contents of Tdoc S2-050510 (LS to SA1)	0.0.1	0.1.0
2005-02					Spec number included (i.e. 23.279) Incorrect implementation of S2-050453 corrected (bullet points included into the editor's note.	0.1.0	0.1.1
2005-03					Presented to Plenary for information	0.1.1	1.0.0
2005-04					Agreed Tdocs implemented. In section 4.2 "Service Requirements" list of service requirements replaced by a reference to TS 22.279. Two new references to TS 22.279 and 22.115 added One editor's note on SIP OPTIONS forking added	1.0.0	1.1.0
2005-05					Agreed Tdocs implemented: S2-051327 (Ericsson – Associating a CS call with a SIP session that does not establish dialogs) S2-051329 (Nokia – Clarifications on text for CT1's understanding) S2-051081 (Ericsson – Usage of Media set to "inactive") S2-051343 (Motorola – Registration of UE capabilities) S2-051299 (Vodafone – Corrections to flow diagrams) S2-051347 (Ericsson – Capability Exchange) S2-051432 (Vodafone – Multiple Devices)	1.1.0	1.2.0
2005-05	SA#28	SP-050344	-	-	Updated editorially by MCC for presentation to TSG SA for approval.	1.2.0	2.0.0