Technical Specification Group Services and System Aspects Meeting #27, 14 - 17 March 2005,Tokyo, Japan **TSGS#27(05)0118**

Source:	**TSG SA WG2**
Title:	**Cover Sheet for TS 23.279, Version 1.0.0**
Agenda item:	**7.2.3**
Document for:	**INFORMATION**

3GPP TSG-SA WG2 Meeting #44. **S2-050527**

Budapest, Hungary. 26th Jan. - 2nd Feb. 2005.

Source:	**Rapporteur TS 23.279**
Agenda item:	**7.1**
Document for:	**APPROVAL**

Presentation of Specification to TSG or WG

Presentation to:	**TSG SA Meeting #27**
Document for presentation:	**TS 23.279, Version 1.0.0**
Presented for:	**Information**

Abstract of document:

The TS 23.279 provides the architectural details for using a CS call in association with an IMS session. The document provides a detailed description of how CS and IMS services can be combined so as to offer IMS services (real-time media + non-real-time media).

Status of the study:

TS 23.279 is sufficiently mature to be presented “for information” to SA #27. The TS 23.279 describes the following capabilities:

- Radio capability exchange.
- SIP based terminal capability exchange.
- E.164 number exchange in SIP.
- Adding IMS session to an ongoing CS call.
- Adding a CS call to an ongoing IMS session.

Outstanding Issues:

- The consistency between the list of service requirements and the stage-2 solution needs to be reviewed;
- The support for content based charging, and media policies needs to be studied;
- Some further clarifications are needed on the radio capability and UE Capability information exchange;
- Need for an explicit CSI service indication is for further study.
- The technical realization of appropriate mechanism for the HSS to control the removal of "CLI" based on subscription information needs to be studied.

Contentious Issues:

None are currently identified.

3GPP TS 23.279 V1.0.0 (2005-02)

Technical Specification

3rd Generation Partnership Project;
Technical Specification Group Services and System Aspects;
Combining CS and IMS services;
Stage 2;
(Release 7)

Keywords
<keyword[, keyword]>

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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

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Introduction

This clause is optional. If it exists, it is always the second unnumbered clause.

1 Scope

The present document provides architectural details for using a CS call in association with an IMS session. The document provides a detailed description of how CS and IMS services can be combined so as to offer IMS services (real-time media + non-real-time media).

The present document includes the following capabilities

- Radio capability exchange.
- SIP based terminal capability exchange.
- E.164 number exchange in SIP.
- Adding IMS session to an ongoing CS call.
- Adding a CS call to an ongoing IMS session.

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"

3 Abbreviations

3.1 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. requirements and prerequisites for IMS apply according to TS 23.228 [2]. It is a solution where the UE presents the CS and IMS services within one context to the user. The CSI solution shall provide the following:

1. The solution shall support the exchange of radio capabilities.
2. The solution shall support the exchange of terminal capabilities.
3. The solution shall support adding IMS media components to an ongoing CS call
4. The solution shall support adding a CS call to an ongoing IMS session.

Editor's Note: Adding CS call towards an ongoing IMS session requires MSISDN numbers

4.2 Service Requirements

Editor's Note: List of service requirements that are evaluated as supported by the current status of the current draft.

It shall be possible to add an IMS session to a CS speech call, thereby creating a combinational call.

It shall be possible to add a CS speech call to an IMS session, thereby creating a combinational session.

It shall be possible for the CSI capable UEs to have the information, prior to initiating a combinational service, regarding the type of capabilities, which are jointly supported by both UEs, without user intervention.

The detection of the capabilities of the recipient terminal shall ensure that information is updated in case of change of terminal.

When the user A sends a multimedia content to a user B, the user B can accept or reject the multimedia content (confirmation from the receiving party is needed) and vice versa.

A combinational service shall enable both unidirectional and bi-directional exchange of PS data within the context of the IMS session.

CS call hold: In an ongoing combinational service, when the user decides to place the circuit switched call on hold, the user should be able to decide whether the IMS session of the combinational service should be suspended. If the IMS session is suspended it may be resumed once the circuit switched call is resumed

CS call waiting: In an ongoing combinational service, the user should be able to receive an indication and provided with the option to switch between one call and the new incoming call. The IMS session should continue during the alerting of the subscriber and the user may decide to put the IMS session on hold when switching to the new CS.

Calling line identity restriction: Existing CLIR rules apply, even if this results in the called party being unable to establish a combinational call.

Connected line identity restriction: Existing COLR rules apply, even if this results in the called party being unable to establish a combinational call.

Call forwarding unconditional, subscriber busy, no reply, not reachable: It should be possible to add IMS components to a CS call that has been forwarded, subject to the capability of recipient UE.

It shall be possible to receive an SMS while engaged in a combinational service.

The charging information shall continue to be produced for any remaining multimedia components or the CS call when a multimedia component or the CS call drops during the communication between the two parties.

It shall be possible to establish a combinational call between two users within the same PLMN or within different PLMNs.

It shall be possible to establish a combinational call between two users camped on identical or different RATs.

It shall be possible to establish a combinational call when roaming, assuming the visited operator supports GPRS roaming.

The user (A or B party) shall only need to know one address in order to establish the combinational service.

The combinational service should not place additional provisioning requirement on the operator.

Editor's Note: List of service requirements that are evaluated as not (yet) supported by the current status of the current draft. Upon approval of the draft TS this list shall be removed.

An IMS capable UE that also supports CS service should also be CSI capable.

IMS shall interoperate with CSI capable UE.

It shall be possible to provide charging information on the CS call and IMS session for correlation purposes in order to allow off-line charging.

An operator should have the mechanism to inhibit the capability check, or at least indicate to UE that it should not be performed. During a CS call it shall be possible to request establishment of the IMS session whether the invited UE is IMS registered or not. The invited user shall be able to accept or reject the IMS registration request.

IMS session hold: In an ongoing combinational service, the user may decide to suspend the IMS session. When this service is invoked the user should be able to decide whether the CS call of the combinational service should also be put on hold.

IMS session waiting: In an ongoing combinational service, the user should be able to receive an alert of an incoming IMS session towards his UE. Subject to the capability of the UE, the user should be provided with the option to switch between the ongoing session and the new incoming one, or accept the new one in parallel with the existing one. The CS call of the combinational service should continue during the alerting of the subscriber and the user may decide to put the CS call on hold when switching to the new IMS session.

Identity restriction: Existing Session Originator Identity Presentation Suppression rules apply to IMS components, even if this results in the called party being unable to establish a combinational session.

Identity presentation: Existing Session Originator Identity Presentation rules apply to IMS components.

The home operator should be able to correlate charged media components and CS call in order to introduce dedicated charging schemes, e.g. discounts. This applies to on-line charging as well as off-line charging.

5 Architectural Requirements

5.1 Architectural Requirements

The following general requirements are to be applied to the combinational services:

- 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 to 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.
- Protocols 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 bind the corresponding CS and IMS sessions for the user.
- 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 CS services in association with an IMS session for a UE 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.

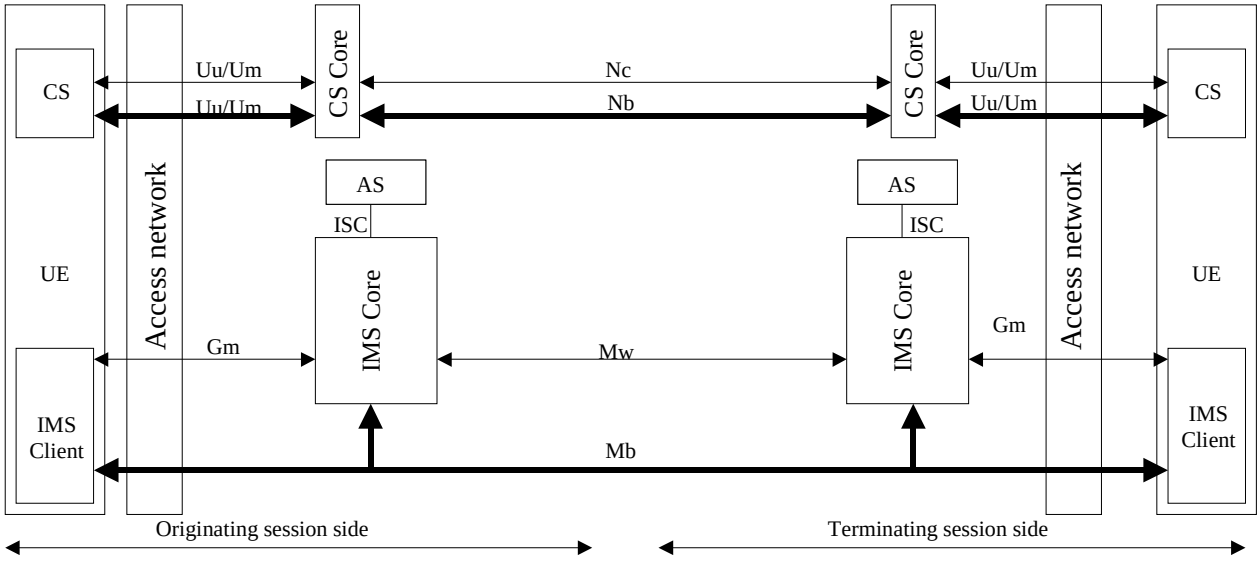
5.2 Session Scenarios

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.

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.



Note: No specific IMS user plane handling capabilities that are required to support CSI have been identified, i.e. regular IMS user plane handling is assumed to apply.

- UE
  The UE needs to support simultaneous CS and PS domain access i.e. DTM and/or UTRAN multiRAB capabilities and in addition the UE should support combinational service client software e.g. including the capability to present the usage of CS and PS domain within the same context to the user.

- Access network
  Radio: The Radio access Network is not impacted by the Combinational Services. The GERAN and UTRAN radio access technologies should be supported. It is assumed that DTM and/or UTRAN multiRAB is supported.

  Packet: The packet switched network remains unchanged, although it should support the 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], 24.008 [6] and 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 detection mechanism for the support of CSI. The IMS core includes the HSS; CSCF and possible other logical elements like MRFC, MRFP, MGCF, or Messaging AS, according to 3GPP specifications TS 23.228 [2].

  Editor's note: The functionality to be provided by the IMS core to support CSI e.g. provide media policies based on e.g. the size of the message allowed to be sent, collection charging information based on media actions (e.g. number of pictures transferred) is for further study.

- AS
  The AS may be utilised to handle the control of the IMS aspects of a CSI session, for example service-specific charging.

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 additional services that are available. 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.

7.2.2 UE Capability Information

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

Release 5 specifications already provide the capability for UEs to use IMS to exchange information about:

- 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

Editor's Note: Additionally, in order to cater for CSI the UE capability information below would be useful, but require further standardisation and is FFS.

- Combinational Service indication
- CS voice call capability
- CS video telephony capability
- MMS capabilities

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.

8 Information Flows

8.1 Exchange of Capability Information at CS Call Setup

If supported, the following end-to-end information exchange about current radio environment shall be used during CS call setup. The current radio environment information exchange procedure shall include the information as outlined in subclause 7.1.

Note: There will exist UEs, which do not support the current 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 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.

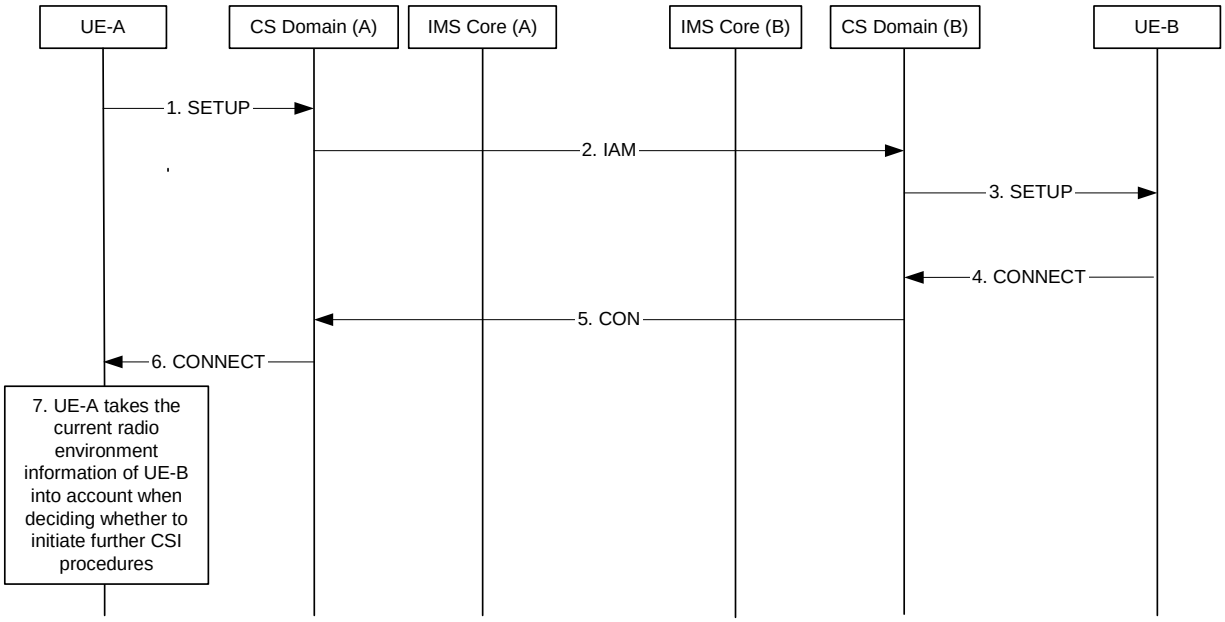


Figure 8-1: Exchange of current radio environment information "at" CS call setup

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 options to present to the user and/or whether to initiate a UE capability information exchange, see subclause 8.2.

8.2 Exchange of Capability Information at IMS session setup

The following sequence diagram outlines the exchange of UE related capability and user preference information. The use of the SIP OPTIONS request minimizes 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.

As the SIP OPTIONS request include both the IMS Public User Identity in the form of an SIP URI and the MSISDN for the associated CS call 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.

Note: The execution of this SIP OPTIONS request procedure has the best success rate when performed outside of any other service, i.e. when no other CS/PS/IMS service is currently invoked.

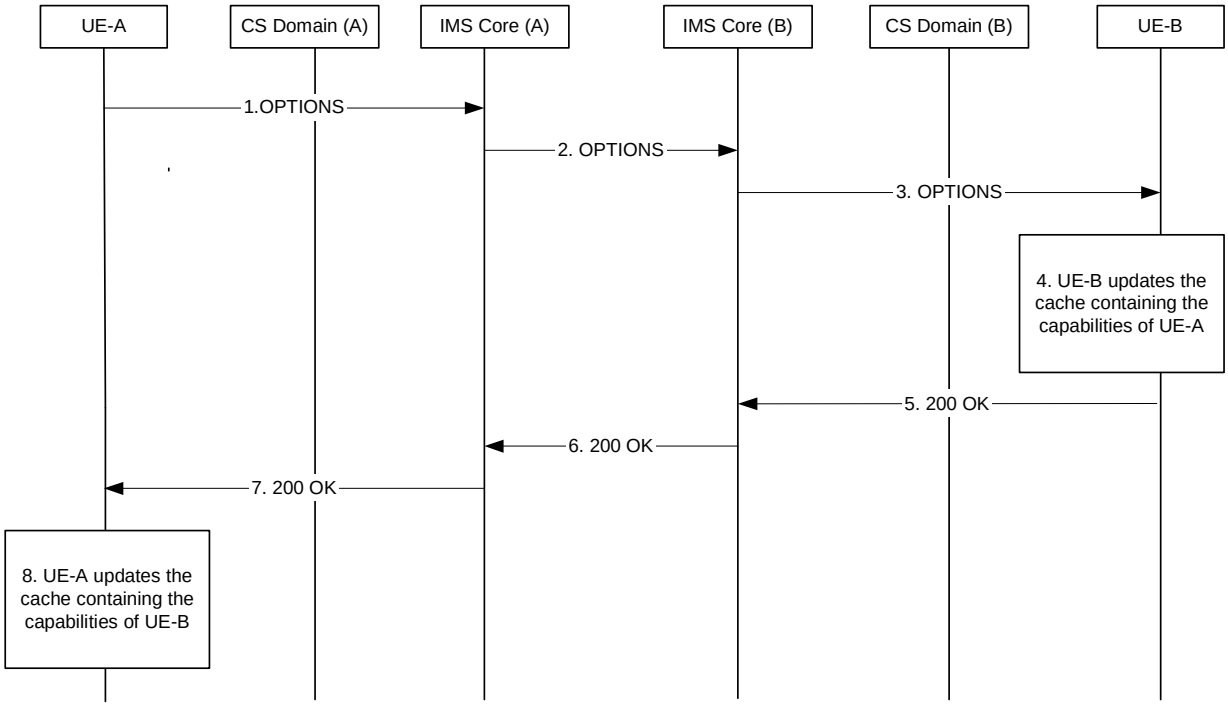


Figure 8-2: Exchange of UE capability information

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. The SIP OPTIONS request contains information as 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).

Editor's Note: The behaviour of the network when the UE (A) does not include the MSISDN is FFS.

3) The IMS Core (B) forwards the SIP OPTIONS request to UEA-B

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

5) The UE-B sends a 200 OK that contain information as outlined in subclause 7.2.2.

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

Editor's Note: The behaviour of the network when the UE (B) does not include the MSISDN is FFS.

7) The IMS Core (A) forwards the 200 OK to UEA-A.

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

UE-B should send an SIP OPTIONS request towards UE-A if:

- UE-B after a CS call setup and an additional time has not received an SIP OPTIONS request from UE-A, 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

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: The SIP session may setup any service based on IMS and normal requirements as per TS 23.228 [2] apply.

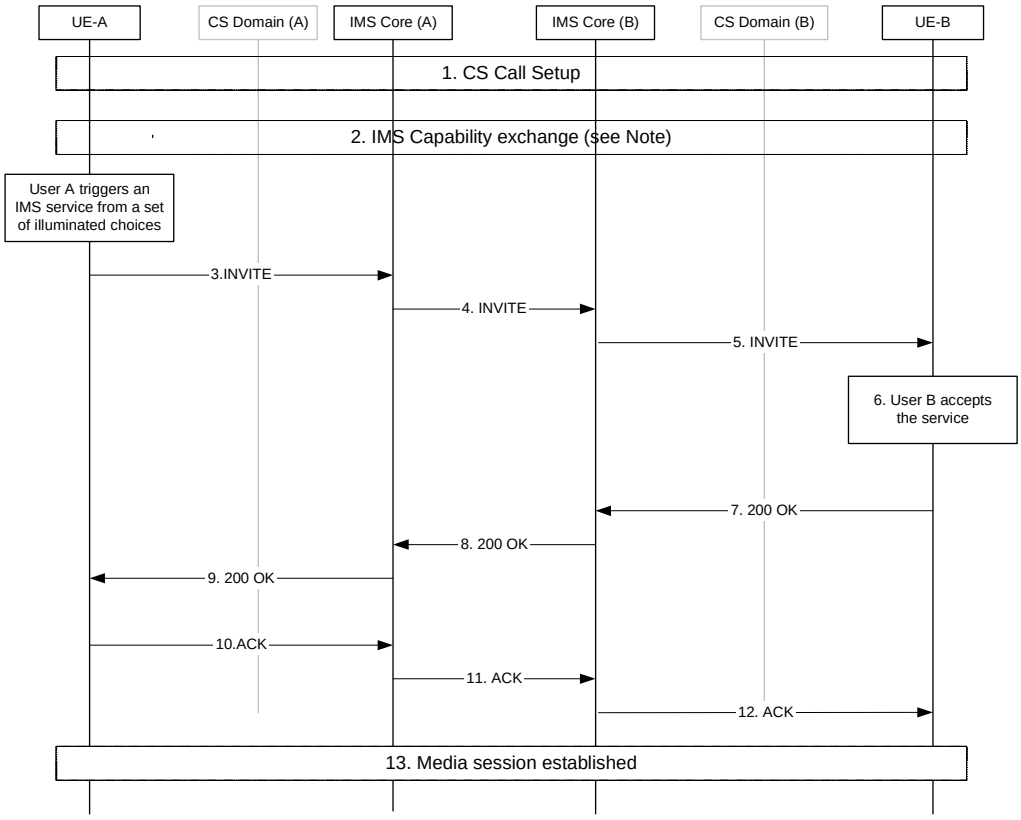


Figure 8.3-1: User adds an IMS session to an ongoing CS call

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

Note: 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.

Editor's note: It is FFS if a CSI identifier should also be added to the SIP INVITE method, e.g. to use it to invoke a CSI enabled application at the called party, and/or to invoke a CSI specific Application Server to ensure, for example content based charging, selection of correct media session profiles, etc.

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.

8.4 User adds a CS call to an ongoing IMS session

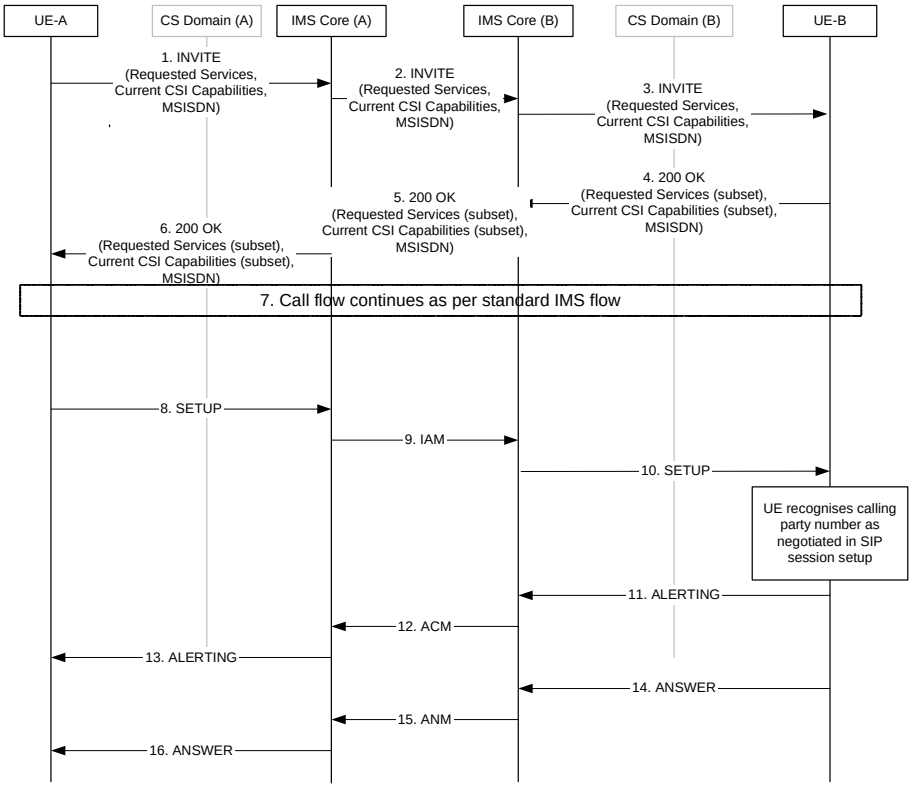


Figure 8.4-1: User adds a CS call to an ongoing IMS Session

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

9.3.1. 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.

9.3.2 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.

Editor's note: The technical realization of b) is FFS

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. If the IMS session is kept, it is a user decision whether it is to be combined with the second CS call in the UE. 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

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*