Technical Specification Group Services and System Aspects***TSGS#15(02)0136***

Meeting #15, Jeju-do, Korea, 5-14 March 2002

Source: **TSG SA WG2**
Title: **CRs on 23.228 v.5.3.0**
Agenda Item: **7.2.3**

The following Change Requests (CRs) have been approved by TSG SA WG2 and are requested to be approved by TSG SA plenary #15.
Note: the source of all these CRs is now S2, even if the name of the originating company(ies) is still reflected on the cover page of all the attached CRs.

S2 Tdoc #	Title	Spec	CR #	cat	Rel	WI
S2-020043	IMS Session Procedure Errors	23.228	086	F	5	IMS-CCR
S2-020177	Introduction of an IMS bearer reference point	23.228	115	F	5	IMS
S2-020294	Clarifications to text on handling of the PDP contexts in case of Iu release or RAB release	23.228	120r2	F	5	IMS-CCR
S2-020273	Corrections to codec negotiation	23.228	121r1	F	5	IMS-CCR
S2-020250	Interaction between QoS and session signalling	23.228	122r1	F	5	IMS-CCR
S2-020293	Requirement to register Public Id before usage	23.228	127r2	F	5	IMS-CCR
S2-020817	Corrections to List of Symbols	23.228	129r1	D	5	IMS-CCR
S2-020785	Authorization of QoS Resources	23.228	130r1	F	5	IMS-CCR
S2-020808	S-CSCF change	23.228	131r1	B	5	IMS-CCR
S2-020488	P-CSCF discovery	23.228	133	F	5	IMS-CCR
S2-020865	Number of media components per PDP Context	23.228	134r2	B	5	IMS-CCR
S2-020819	Registration Parameter Corrections	23.228	135r1	F	5	IMS-CCR
S2-020843	Removal of Editor's Notes	23.228	136r1	F	5	IMS-CCR
S2-020806	Clarification on Sh interface definition	23.228	137r1	C	5	IMS-CCR
S2-020810	Extend support of information transfer between SIP end points	23.228	138	C	5	IMS-CCR
S2-020907	Clean-up of MT Unregistered procedures	23.228	139r1	F	5	IMS-CCR
S2-020919	IP privacy requires re-registration	23.228	141r2	F	5	IMS-CCR
S2-020784	Corrections for Section 5.4.7 Interaction between QoS and session signalling	23.228	144	F	5	IMS-CCR
S2-020674	Corrections on P-CSCF initiated session release after loss of radio coverage	23.228	147	F	5	IMS-CCR
S2-020862	Use of R99 USIM for IMS	23.228	148r1	C	5	IMS-CCR
S2-020839	Provision of 'VPLMN provided	23.228	149r1	C	5	IMS-

	services' in IMS					CCR
S2-020842rev1	Corrections to P-CSCF's functions	23.228	150	F	5	IMS-CCR
S2-020878	Removal of Sr Interface for R5	23.228	151	F	5	IMS-CCR
S2-013049	SLF query on UE invite	23.228	067r3	B	5	IMS-CCR

Note: CR 115 in S2-020177 is approved at S2 conditionally to the fact that CR 078 to 23.002 in S2-020176 is approved.

CR-Form-v3

CHANGE REQUEST

| ⌘ | **23.228** CR **067** | ⌘ | rev **3~~1~~** | ⌘ | Current version: | **5.2.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title: ⌘	SLF query on UE invite	
Source: ⌘	SK Telecom	
Work item code: ⌘	IMS-CCR	***Date:*** ⌘ 31.10.2001
Category: ⌘	**B**	***Release:*** ⌘ REL-5

Use one of the following categories:	*Use one of the following releases:*
F *(essential correction)*	*2 (GSM Phase 2)*
A *(corresponds to a correction in an earlier release)*	*R96 (Release 1996)*
B *(Addition of feature),*	*R97 (Release 1997)*
C *(Functional modification of feature)*	*R98 (Release 1998)*
D *(Editorial modification)*	*R99 (Release 1999)*
Detailed explanations of the above categories can	*REL-4 (Release 4)*
be found in 3GPP TR 21.900.	*REL-5 (Release 5)*

Reason for change: ⌘	In case of the MT call procedures to unregistered IMS subscriber that has services related to unregistered state, the S-CSCF that receives an INVITE request should query SLF for the location of the subscriber's data.
Summary of change: ⌘	Addition of the SLF Query procedure initiated by S-CSCF on INVITE request to the section 5.~~12.1~~8.3
Consequences if not approved: ⌘	SLF Query procedure initiated by S-CSCF on INVITE request is missing

Clauses affected: ⌘	Sections 5.8.3
Other specs affected: ⌘	☐ Other core specifications ⌘
	☐ Test specifications
	☐ O&M Specifications
Other comments: ⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at:

http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory

name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

5.12   Mobile Terminating call procedures to unregistered IMS subscriber

This section describes information flows for the procedures of Mobile Terminating call flows for unregistered IMS subscriber. The detection of unregistered subscriber is done in HSS and if subscriber has services related to unregistration state, a S-CSCF is selected for the subscriber. S-CSCF performs whatever further actions are appropriate for the call attempt to the unregistered IMS subscriber.

5.12.1   Mobile Terminating call procedures to unregistered IMS subscriber that has services related to unregistered state

In Figure 5.xx below the subscriber is unregistered for IMS and HSS responds back to I-CSCF with an indication that I-CSCF should select S-CSCF for this MT call to the unregistered subscriber. Before S-CSCF selection, I-CSCF shall query HSS for the information related to the required S-CSCF capabilities. I-CSCF selects a S-CSCF to perform service control and I-CSCF routes the call further to the selected destination. S-CSCF has to download subscriber's profile from HSS before it performs service control and any further actions in the call attempt. The service implemented by this information flow could be e.g. "Call Forward Unconditional."

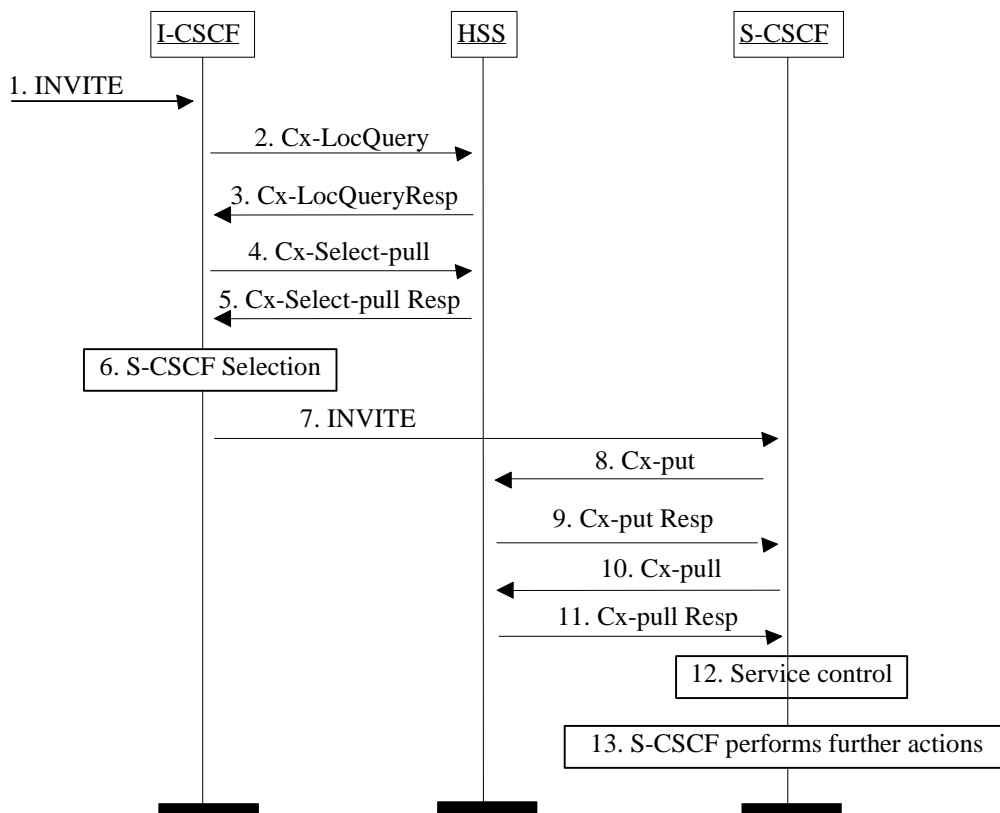This is shown by the information flow in Figure 5.43:

Figure 5.43: Mobile Terminating call procedures to unregistered IMS subscriber that has services related to unregistered state

1. I-CSCF receives an INVITE message.

2. I-CSCF queries the HSS for current location information.

3. HSS either responds with an indication that the subscriber is unregistered for IMS and I-CSCF should select a S-CSCF for the subscriber or provides the I-CSCF with the previously allocated S-CSCF name.

4. If the I-CSCF has not been provided with the location of the S-CSCF, the I-CSCF may send Cx-Select-Pull (unregistered, subscriber identity) to the HSS to request the information related to the required S-CSCF capabilities which shall be input into the S-CSCF selection function. This query is optional.

5. The HSS shall send Cx-Select-Pull Resp (required S-CSCF capabilities) to the I-CSCF.

6. If the I-CSCF has not be provided with the location of the S-CSCF, the I-CSCF selects a S-CSCF for the subscriber.

7. I-CSCF forwards the INVITE request to the S-CSCF.

8. The S-CSCF sends Cx-Put (subscriber identity, S-CSCF name) to the HSS. When multiple and separately addressable HSSs have been deployed by the network operator, then the S-CSCF needs to query the SLF to resolve the HSS. The HSS stores the S-CSCF name for that subscriber. This will result in all terminating traffic for that subscriber being routed to this particular S-CSCF until the registration period expires or the subscriber attaches to the network.

9. The HSS shall send Cx-Put Resp to the I-CSCF to acknowledge the sending of Cx-Put.

10. The S-CSCF shall send the Cx-Pull information flow (subscriber identity) towards the HSS in order to be able to download the relevant information of the subscriber profile to the S-CSCF

11. The HSS shall return the information flow Cx-Pull Resp (user information) to the S-CSCF. The S-CSCF shall store it for that indicated user.

12. S-CSCF performs whatever service control is appropriate for this call attempt.

13. S-CSCF performs whatever further actions are appropriate for this call attempt.

The S-CSCF may deregister the user at any time (e.g. according to operator network engineering requirements) by issuing a Cx-Put2 (subscriber identity, clear S-CSCF name) clearing the S-CSCF name stored in the HSS. If S-CSCF name stored by the HSS does not match the name of the S-CSCF that originated the Cx-Put2 then the HSS will acknowledge the clearing request but take no further action.

Should the subscriber register at another S-CSCF during the register expiry time then the registration from the new S-CSCF will take precedence, overwriting the previous S-CSCF name stored in the HSS.

CR-Form-v4

CHANGE REQUEST

| ⌘ | **23.228** CR **086** | ⌘ rev | **-** | ⌘ | Current version: | **5.3.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network ☐   Core Network **X**

Title: ⌘	Session flow procedure errors	
Source: ⌘	Lucent Technologies	
Work item code: ⌘	IMS-CCR	***Date:*** ⌘ 14.01.2002
Category: ⌘	**F**	***Release:*** ⌘ REL-5

Use one of the following categories:	*Use one of the following releases:*
F *(correction)*	*2 (GSM Phase 2)*
A *(corresponds to a correction in an earlier release)*	*R96 (Release 1996)*
B *(addition of feature),*	*R97 (Release 1997)*
C *(functional modification of feature)*	*R98 (Release 1998)*
D *(editorial modification)*	*R99 (Release 1999)*
Detailed explanations of the above categories can	*REL-4 (Release 4)*
be found in 3GPP <u>TR 21.900</u>.	*REL-5 (Release 5)*

Reason for change: ⌘	There are errors in the session flow procedures. Not all combinations shown are possible and some possible combinations are missing.
Summary of change: ⌘	Certain combinations of session flows are deleted, others are added.
Consequences if not approved: ⌘	The session flow procedures will be in error.

Clauses affected: ⌘	Sections 5.4.10, 5.5.1, 5.5.2, 5.5.3 and 5.5.4		
Other specs affected: ⌘	☐ Other core specifications	⌘	
	☐ Test specifications		
	☐ O&M Specifications		
Other comments: ⌘			

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

---------------------First Change---------------------

5.4.10   Overview of session flow procedures

This section contains the overview description and list of individual procedures for the end-to-end session flows.

For an IP Multi-Media Subsystem session, the session flow procedures are shown in the following diagram.
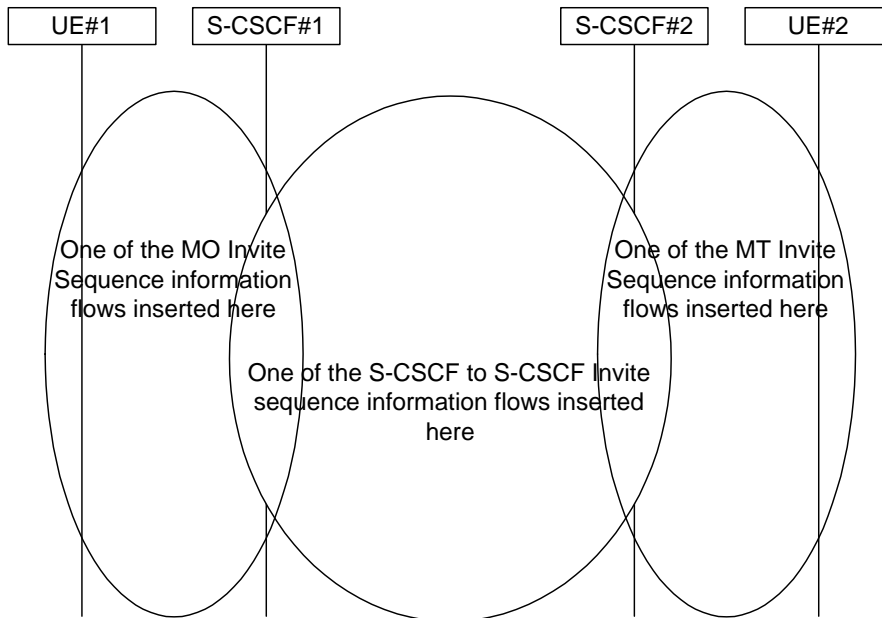
Figure 5.9: Overview of Session Flow Sections

The following procedures are defined:

For the origination sequence:

- (MO#1) Mobile origination, roaming

- (MO#2) Mobile origination, home

- (PSTN-O) PSTN origination

For the termination sequence:

- (MT#1) Mobile termination, roaming

- (MT#2) Mobile termination, home

- (MT#3) Mobile termination, CS Domain roaming

- (PSTN-T) PSTN termination

For Serving-CSCF/MGCF-to-Serving-CSCF/MGCF sequences:

- (S-S#1) Session origination and termination are served by different network operators,

- (S-S#2) Session origination and termination are served by the same operator.

- (S-S#3) Session origination with PSTN termination in the same network as the S-CSCF.

- (S-S#4) Session origination with PSTN termination in a different network to the S-CSCF

For example, for a non-roaming subscriber initiating a session to another non-roaming subscriber, each a subscriber of the same network operator, it is possible to construct a complete end-to-end session flow from the following procedures:

- (MO#2) Mobile origination, home

- (S-S#2) Single network operator,

- (MT#2) Mobile termination, home

An informative example of this session flow is given in Annex B.1

There are a large number of end-to-end session flows defined by these procedures. They are built from combinations of origination, serving to serving, and termination procedures, as determined from the following table. For each row of the table, any one of the listed origination procedures can be combined with any one of the serving-serving procedures, which can be combined with any one of the termination procedures. In addition, several of the procedures give alternatives for network configuration hiding (the number of such alternatives is shown in parentheses).

Table 5.2: Combinations of session procedures

Origination Procedure (pick one)	Serving-CSCF-to-Serving-CSCF Procedure (pick one)	Termination Procedure (pick one)
MO#1 Mobile origination, roaming, home control of services (2).

MO#2 Mobile origination, located in home service area.

PSTN-O   PSTN origination. | S-S#1 Different network operators performing origination and termination, with home control of termination (2).

S-S#2 Single network operator performing origination and termination, with home control of termination. | MT#1 Mobile termination, roaming, home control of services(2).

MT#2 Mobile termination, located in home service area.

MT#3 Mobile termination, CS Domain roaming.

~~PSTN-T   PSTN termination.~~ |
| MO#1 Mobile origination, roaming, home control of services (2).

MO#2 Mobile origination, located in home service area.

~~PSTN-O   PSTN origination.~~ | S-S#3 PSTN termination in the same network as the S-CSCF.

S-S#4 PSTN termination in different network than the S-CSCF | PSTN-T   PSTN termination. |

----------------------Next Change----------------------

5.5.1   (S-S#1) Different network operators performing origination and termination

The Serving-CSCF handling session origination performs an analysis of the destination address, and determines that it belongs to a subscriber of a different operator. The request is therefore forwarded (optionally through an an I-CSCF(THIG) within the originating operator's network) to a well-known entry point in the destination operator's network, the I-CSCF. The I-CSCF queries the HSS for current location information, and finds the subscriber either located in the home service area, or roaming. The I-CSCF therefore forwards the request to the S-CSCF serving the destination subscriber.

Origination sequences that share this common S-S procedure are:

MO#1   Mobile origination, roaming. The "Originating Network" of S-S#1 is therefore a visited network.

MO#2   Mobile origination, home. The "Originating Network" of S-S#1 is therefore the home network.

PSTN-O   PSTN origination. The "Originating Network" of S-S#1 is the home network. The element labeled S-CSCF#1 is the MGCF of the PSTN-O procedure.

Termination sequences that share this common S-S procedure are:

MT#1   Mobile termination, roaming. The "Terminating Network" of S-S#1 is a visited network.

MT#2   Mobile termination, located in home service area. The "Terminating Network" of S-S#1 is the home network.

MT#3   Mobile termination, CS Domain roaming. The "Terminating Network" of S-S#1 is a CS domain network.

---------------------Next Change---------------------

5.5.2 (S-S#2) Single network operator performing origination and termination

The Serving-CSCF handling session origination performs an analysis of the destination address, and determines that it belongs to a subscriber of the same operator. The request is therefore forwarded to a local I-CSCF. The I-CSCF queries the HSS for current location information, and finds the subscriber either located in the home service area, or roaming. The I-CSCF therefore forwards the request to the S-CSCF serving the destination subscriber.

Origination sequences that share this common S-S procedure are:

MO#1   Mobile origination, roaming,. The "Originating Network" of S-S#2 is therefore a visited network.

MO#2   Mobile origination, home. The "Originating Network" of S-S#2 is therefore the home network.

PSTN-O   PSTN origination. The "Originating Network" of S-S#2 is the home network. The element labelled S-CSCF#1 is the MGCF of the PSTN-O procedure.

Termination sequences that share this common S-S procedure are:

MT#1   Mobile termination, roaming, . The "Terminating Network" of S-S#2 is a visited network.

MT#2   Mobile termination, home. The "Terminating Network" of S-S#2 is the home network.

MT#3   Mobile termination, CS Domain roaming. The "Terminating Network" of S-S#2 is a CS domain network.

---------------------Next Change---------------------

5.5.3 (S-S#3) Session origination with PSTN termination in the same network as the S-CSCF.

The Serving-CSCF handling session origination performs an analysis of the destination address, and determines, with support of applications or other databases, that the session is destined to the PSTN. The request is therefore forwarded to a local BGCF. The BGCF determines that the MGCF should be in the same network, and selects a MGCF in that network. The request is then forwarded to the MGCF.

Origination sequences that share this common S-S procedure are:

MO#1   Mobile origination, roaming. The "Originating Network" of S-S#3 is therefore a visited network.

MO#2   Mobile origination, located in home service area. The "Originating Network" of S-S#3 is therefore the home network.

~~PSTN-O PSTN origination. The "Originating Network" of S-S#3 is the home network. The element labelled S-CSCF#1 is the MGCF of the PSTN-O procedure.~~

Termination sequences that share this common S-S procedure are:

PSTN-T PSTN termination. This occurs when the MGCF is selected to be in the same network as the S-CSCF.

---------------------Next Change---------------------

5.5.4   (S-S#4) Session origination with PSTN termination in a different network from the S-CSCF.

The Serving-CSCF handling session origination performs an analysis of the destination address, and determines, with support of applications or other databases, that the session is destined to the PSTN. The request is therefore forwarded to a local BGCF. The BGCF determines that the PSTN interworking should occur in another network, and forwards this to a BGCF in the interworking network. The BGCF then selects a MGCF in that network. The request is then forwarded to the MGCF.

Origination sequences that share this common S-S procedure are:

MO#1   Mobile origination, roaming. The "Originating Network" of S-S#4 is therefore a visited network.

MO#2   Mobile origination, located in home service area. The "Originating Network" of S-S#4 is therefore the home network.

~~PSTN-O PSTN origination. The "Originating Network" of S-S#4 is the home network. The element labelled S-CSCF#1 is the MGCF of the PSTN-O procedure.~~

Termination sequences that share this common S-S procedure are:

PSTN-T PSTN termination. This occurs when the MGCF is selected to be in the same network as the S-CSCF.

CR-Form-v4

CHANGE REQUEST

| ⌘ | **23.228** CR **115** | ⌘ | ev | **-** | ⌘ | Current version: | **5.2.0** | ⌘ |

For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.

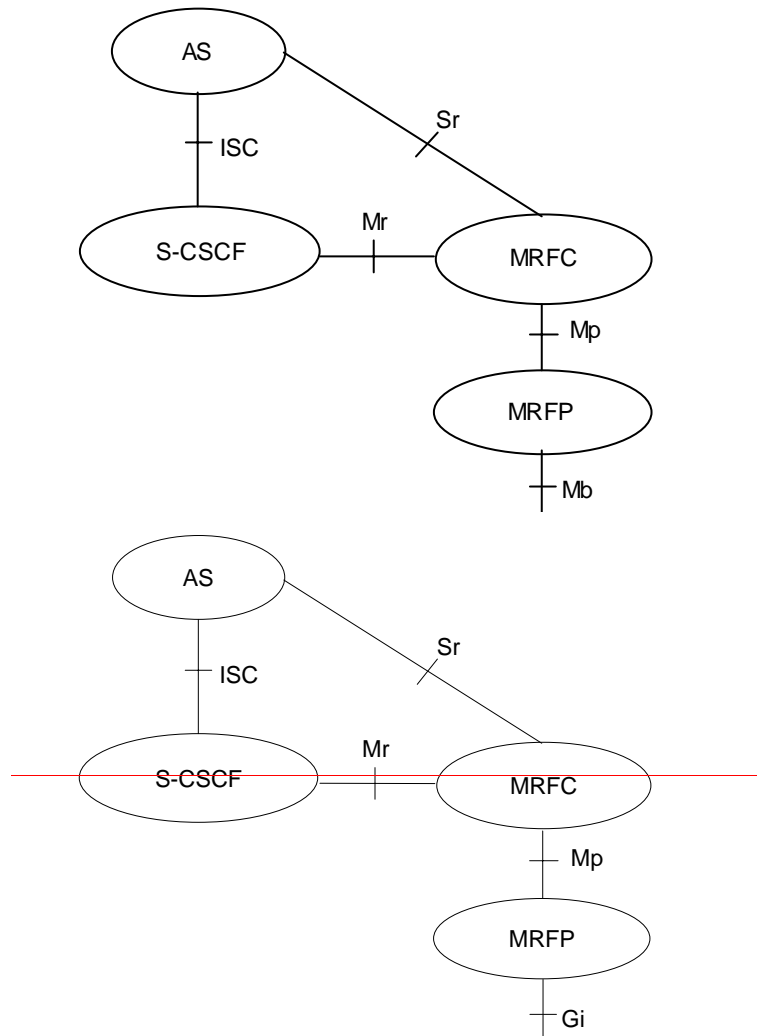**Proposed change affects:** ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network ☐   Core Network **X**

Title:	⌘	Introduction of an IMS bearer reference point

Source:	⌘	Siemens AG

Work item code:	⌘	IMS-CCR	*Date:* ⌘	2001-11-19

Category:	⌘	**F**	*Release:* ⌘	

Use <u>one</u> of the following categories:
F (correction)
A (corresponds to a correction in an earlier release)
B (addition of feature),
C (functional modification of feature)
D (editorial modification)
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use <u>one</u> of the following releases:
2   (GSM Phase 2)
R96   (Release 1996)
R97   (Release 1997)
R98   (Release 1998)
R99   (Release 1999)
REL-4   (Release 4)
REL-5   (Release 5)

Reason for change:	⌘	Alignment with the changes made in 23.002. Replacing the Gi reference point by the Mb reference point for IMS bearer.

Summary of change:	⌘	Introduction of an IMS bearer reference point Mb

Consequences if not approved:	⌘	Confusion because of various possible protocol stacks if Gi is used for packet bearer services and for IMS specific services/functionality.

Clauses affected:	⌘	4.7

Other specs affected:	⌘	☐ Other core specifications	⌘	
		☐ Test specifications		
		☐ O&M Specifications		

Other comments:	⌘	

4.7 Multimedia Resource Function

The architecture concerning the Multimedia Resource Function is presented in Figure 4.5a below.

Figure 4.5a: Architecture of MRF

The MRF is split into Multimedia Resource Function Controller (MRFC) and Multimedia Resource Function Processor (MRFP).

Tasks of the MRFC are the following:

- Control the media stream resources in the MRFP.

- Interpret information coming from an AS and S-CSCF (e.g session identifier) and control MRFP accordingly.

- Generate of CDRs.

Tasks of the MRFP are the following:

- Control of the Bbearers on the Mb reference pointcontrol on the Gi interface.

- Provide resources to be controlled by the MRFC.

- Mixing of incoming media streams (e.g for multiple parties).

- Media stream source (for multimedia announcements).

- Media stream processing (e.g. audio transcoding, media analysis).

Tasks of an Application Server with regards to MRF are e.g. the following:

- Conference booking and provide booking information (e.g. start time, duration, list of participants) to the MRFC.

- Provide a floor control mechanism, by which end users (e.g. participants, chairman) can influence floor and provide information to the MRFC on how incoming media streams should be mixed and distributed accordingly.

The protocol used for the Mr reference point is SIP (as defined by RFC 2543, other relevant RFC's, and additional enhancements introduced to support 3GPP´s needs).

The Mp reference point allows an MRFC to control media stream resources provided by an MRF.

The Mp reference point has the following properties:
- Full compliance with the H.248 standard.

- Open architecture where extensions (packages) definition work on the interface may be carried out.

The details and functionality, if any, of the Sr interface are for further study.

CR-Form-v5

CHANGE REQUEST

| ⌘ | **23.228** CR **122** | ⌘ **rev** | **1** | ⌘ | Current version: | **5.3.0** | ⌘ |

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Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title: ⌘	Interaction between QoS and session signalling	
Source: ⌘	Nokia	
Work item code: ⌘	IMS-CCR	***Date:*** ⌘ 09.01.2002
Category: ⌘	**F**	***Release:*** ⌘ REL-5

Use *one* of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can
be found in 3GPP <u>TR 21.900</u>.

Use *one* of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change: ⌘	Indication of PDP Context modification procedure which is used in TS 23.207 is not adequately addressed in TS 23.228.
	It has been already decided that the 'Push'-type of interface is not used for the purpose of the initial authorisation of QoS resources. Instead the pull operation shall be used. This issue is not corrected in TS 23.228.
Summary of change: ⌘	The indication of PDP Context modification is added and the 'Push'-type of interface is removed from the initial authorisation of QoS resources procedure.
Consequences if not approved: ⌘	Inconsistent specifications.

Clauses affected: ⌘	5.4.7
Other specs affected: ⌘	☐ Other core specifications ⌘
	☐ Test specifications
	☐ O&M Specifications
Other comments: ⌘	

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

5.4.7 Interaction between QoS and session signalling

At PDP context setup the user shall have access to either GPRS without service-based local policy, or GPRS with service-based local policy. It is operator choice whether to offer both or only one of these alternatives for accessing the IM Subsystem.

For the GPRS without service-based local policy case, the bearer is established according to the user's subscription, local operator's IP bearer resource based policy, local operator's admission control function and GPRS roaming agreements. The establishment of the PDP context bearer shall use the PDP context activation procedure specified in TS 23.060.

For the GPRS with service-based local policy case, Service-Based Local Policy decisions (e.g., authorisation and control) are also applied to the bearer.

The description in this subsection is applicable for the case when service-based local policy is employed.

The GGSN contains a Policy Enforcement Function (PEF) that has the capability of policing packet flow into the IP network, and restricting the set of IP destinations that may be reached from/through a PDP context according to a packet classifier. This service-based policy 'gate' function has an external control interface that allows it to be selectively 'opened' or 'closed' on the basis of IP destination address and port. When open, the gate allows packets to pass through (to the destination specified in the classifier) and when closed, no packets are allowed to pass through. The control is performed by a PCF, which is a logical entity of the P-CSCF. (Note: If the PCF is implemented in a separate physical node, the interface between the PCF and the P-CSCF is not standardised).

There are ~~five~~ six interactions between the PCF and the Policy Enforcement Function (PEF), located within the GGSN:

1. Authorise UMTS and IP resources. This establishes the 'gate' described above.

2. Approval of QoS commit for resources authorised in (1), e.g. 'open' the 'gate'.

3. Removal of QoS commit for resources authorised in (1), e.g. 'close' the 'gate'.

4. Revoke authorisation for UMTS and IP resources

5. Indicate from the GGSN to the PCF of PDP Context release.

6. Indicate from the GGSN to the PCF of PDP Context Modification.

There are two interactions between the UE and the GGSN:

1. Allocate the UMTS resources and IP resources (i.e. beyond the GGSN), within the previous authorisation

2. Release UMTS and IP resources

These requirements and functional description of these interactions are explained further in the following sections. The complete specification of the interface between the Policy Control Function and the Policy Enforcement Function, and between the UE and the GGSN, are contained in TS 23.207.

5.4.7.1 Authorise UMTS and IP QoS Resources

The GGSN serves as the Policy Enforcement Point that implements the policy decisions for performing admission control and authorising the UMTS and IP BS QoS Resource request, and policing IP flows entering the external IP network.

Authorisation of UMTS and IP QoS Resources shall be required for access to the IP Multimedia Subsystem. The GGSN shall determine the need for authorisation, possibly based on provisioning and/or based on the APN of the PDP context.

The authorisation shall be made prior to the allocation request from the UE. This authorisation shall be 'Pulled' from the PCF by the GGSN when the allocation request is received from the UEThis authorisation may be given to the GGSN from the PCF via a 'Push'-type of interface, or may be 'Pulled' from the PCF by the GGSN when the allocation request is received from the UE. The authorisation shall include binding information, which shall also be provided by the UE to the GGSN in the allocation request, which enables accurate matching of requests and authorisations. This binding information may be an authorisation token assigned by the PCF, possibly in consultation with the GGSN, and may contain information that identifies its generator. The authorisation shall include limits on IP packet flows, and may include restrictions on IP destination address and port. These restrictions may take the form of a flowspec and filterspec, as defined in RFC2205. The P-CSCF(PCF) shall use the SDP contained in the SIP signaling to calculate the proper authorisation, as defined in TS 23.207. The authorisation shall be expressed in terms of the IP resources to be authorised.

Authorisation may contain information used by the network operator to correlate usage records generated by the GPRS system with those generated by the IP Multi-Media Subsystem. Such a correlation identifier, if included in the authorisation, shall be provided to the GPRS elements that generate such usage records.

Authorisation information, combined with the QoS allocation request from the UE, shall be sufficient for the GGSN to initiate an RSVP exchange with the remote endpoint of the IP packet flow.

5.4.7.2   Approval of QoS commit

The PCF makes policy decisions and provides an indication to the GGSNabout committing the allocated QoS resources for per-session authorisations.

The GGSN enforces the policy decisions. The GGSN may restrict any use of the UMTS resources prior to this indication from the PCF. The GGSN shall restrict any use of the IP resources prior to this indication from the PCF. Based on local policy, UMTS and/or IP resources may be committed at the time they are authorised by the PCF.

5.4.7.3   Removal of QoS commit

The PCF makes policy decisions and provides an indication to the GGSN about revoking commitment for the allocated QoS resources for per-session authorisations.

The GGSN enforces the policy decisions. The GGSN may restrict any use of the UMTS resources after this indication from the PCF. The GGSN shall restrict any use of the IP resources after this indication from the PCF.

5.4.7.4   Revoke authorisation for UMTS and IP Resources

At IP multimedia session release, the UE should deactivate the PDP context(s) used for the IP multimedia session. In various cases, such as loss of signal from the mobile, the UE will be unable to perform this release itself. The Policy Control Function provides indication to the GGSN when the resources previous authorised, and possibly allocated by the UE, are to be released. The GGSN may differentiate charging before and after the IP multimedia session release, or may deactivate the PDP context used for the IP multimedia session. The latter ensures that the PDP context can not be used for other traffic than the IP multimedia session. The functions in the PS domain due to the IP multimedia session release are operator specific and are configured in the GGSN.

5.4.7.5 Indication of PDP Context release

Any release of a PDP Context that was established based on authorisation from the PCF shall be reported to the PCF by the GGSN.

~~In the particular case of PDP Context termination due to signal fade or loss of power at the UE, t~~This indication may be used by the PCF to initiate a session release towards the remote endpoint.

5.4.7. X Indication of PDP Context modification

When a PDP Context is modified such that the requested QoS falls outside of the limits that were authorized at PDP context activation (or last modification) or such that the maximum bit rate (downlink and uplink) is downgraded to 0 kbit/s then the GGSN shall report this to the PCF.

This indication may be used by the PCF to initiate a session release towards the remote endpoint.

5.4.7.6 Allocate UMTS and IP Resources

Allocation of QoS resources shall be initiated by the UE, and shall take place only after successful authorisation by subscription or by the PCF. The UE calculates its QoS resource needs from the SDP contained in the SIP signaling.

Allocation requests from the UE shall contain the binding information provided to the UE in the SIP signaling. The use of this binding information enables the GGSN to correctly match the allocation request to the corresponding authorisation. When a UE combines multiple media flows onto a single PDP context, all of the binding information related to those media flows shall be provided in the context activation/modification request.

The request for UMTS QoS resources may be signaled independently from the request for IP QoS resources by the UE. At the UMTS BS Level, the PDP Context activation shall be used for QoS signaling. At the IP BS Level, RSVP may be used for QoS signaling.

With a request for UMTS QoS resources, the GGSN shall verify the request is less than the sum of the authorised IP resources (within the error tolerance of the conversion mechanism) for all of the combined media flows. With a request for IP QoS resources, the GGSN shall verify the request is less than the authorised IP resources.

5.4.7.7 Release UMTS and IP Resources

Release of QoS resources shall be initiated by the UE, or is performed by the SGSN/GGSN e.g. due to the Revoke authorisation for UMTS and IP Resources procedure.~~if it determines the UE is unable to communicate (e.g. signal fade or loss of power).~~.

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CR-Form-v5

CHANGE REQUEST

| ⌘ | **23.228** CR **121** | ⌘ rev | **-1** | ⌘ | Current version: | **5.2.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘   (U)SIM ☐   ME/UE **X**   Radio Access Network ☐   Core Network ☐

Title:	⌘	Corrections to codec negotiation
Source:	⌘	Nokia
Work item code: ⌘	IMS-CCR	*Date:* ⌘ 09.01.2002

Category:	⌘	**F**		*Release:* ⌘ REL-5

Use <u>one</u> of the following categories:
   F *(correction)*
   A *(corresponds to a correction in an earlier release)*
   B *(addition of feature),*
   C *(functional modification of feature)*
   D *(editorial modification)*
Detailed explanations of the above categories can
be found in 3GPP <u>TR 21.900</u>.

Use <u>one</u> of the following releases:
   2   *(GSM Phase 2)*
   R96   *(Release 1996)*
   R97   *(Release 1997)*
   R98   *(Release 1998)*
   R99   *(Release 1999)*
   REL-4 *(Release 4)*
   REL-5 *(Release 5)*

Reason for change: ⌘	Different wording is used when referring to what codecs the session initiator includes an SDP in the SIP INVITE message.
Summary of change: ⌘	The sequence diagram explanations are changed to reflect ~~what is said in beginning of section 5.11.3.1. I.e. the wording "it is capable" and "it is wishes" are changed to "is willing".~~that the inserted codec(s) shall reflect the UE#1's terminal capabilities and user preferences for the session.
Consequences if not approved: ⌘	Inconsistent UE implementations.

Clauses affected:	⌘	5.11.3.1, 5.11.3.3

Other specs affected:	⌘	**X**	Other core specifications	⌘	24.228
		☐	Test specifications		
		☐	O&M Specifications		

Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:
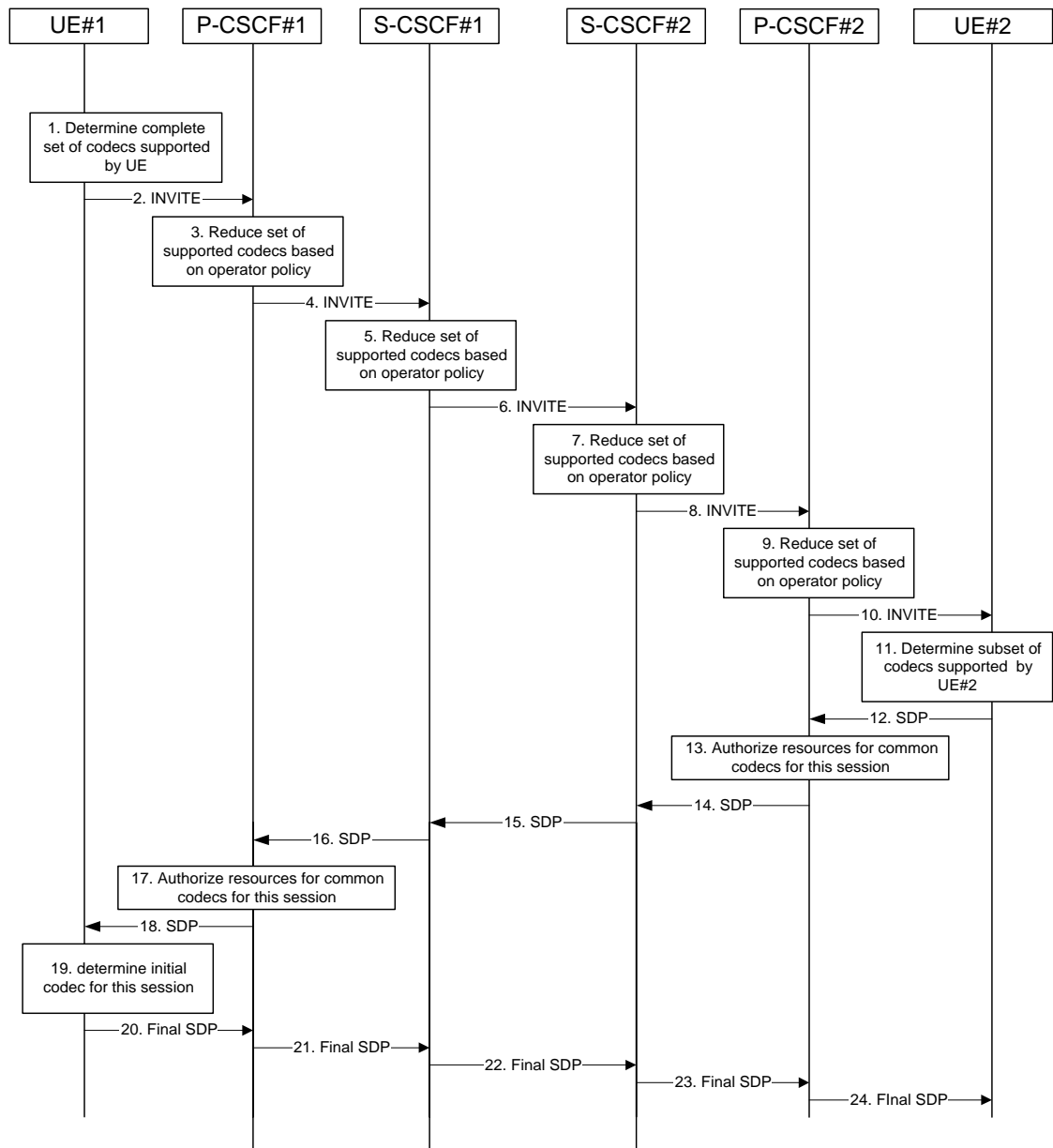
1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

5.11.3.1 Codec negotiation during initial session establishment

Initial session establishment in the IM CN subsystem must determine a common codec (or set of common codecs for multi-media sessions) that will be used for the session. This is done through an end-to-end message exchange to determine the complete set of common codecs, then the decision is made by the session initiator as to the initial set of media flows.

The session initiator includes an SDP in the SIP INVITE message that lists every codec that the originator is willing to support for this session. When the message arrives at the destination endpoint, it responds with the subset that it is also willing to support for the session. Media authorisation is performed for this common subset. The session initiator, upon receiving the common subset, determines the codec (or set of codecs) to be used initially.

Once the session is established, the procedures of section 5.11.3.2 may be used by either endpoint to change to a different codec that was included in the initial common list, and for which no additional resources are required for media transport. The procedures of section 5.11.3.3 may be used by either endpoint to propose additional codecs, to receive additional authorisation for QoS resources, or to change to a different codec that requires resources beyond those allocated to the session.

Figure 5.30: Codec negotiation during initial session establishment

The detailed procedure is as follows:

1. <u>UE#1 inserts the codec(s) to a SDP payload. The inserted codec(s) shall reflect the UE#1's terminal capabilities and user preferences for the session.</u><s>UE#1 determines the complete set of codecs that it is capable</s> <u>willing to</u><s>of supporting for this session</s>. It builds a SDP containing bandwidth requirements and characteristics of each, and assigns local port numbers for each possible media flow. Multiple media flows may be offered, and for each media flow (m= line in SDP), there may be multiple codec choices offered.

*** NEXT MODIFIED SECTION ***

5.11.3.3 Codec or media flow change requiring new resources and/or authorisation

After the multi-media session is established, it is possible for either endpoint to change the set of media flows or codec for a media flow. If the change requires additional resources beyond those previously reserved, then it is necessary to perform the resource reservation and bearer establishment procedures. If the reservation request fails for whatever reason, the original multi-media session remains in progress.
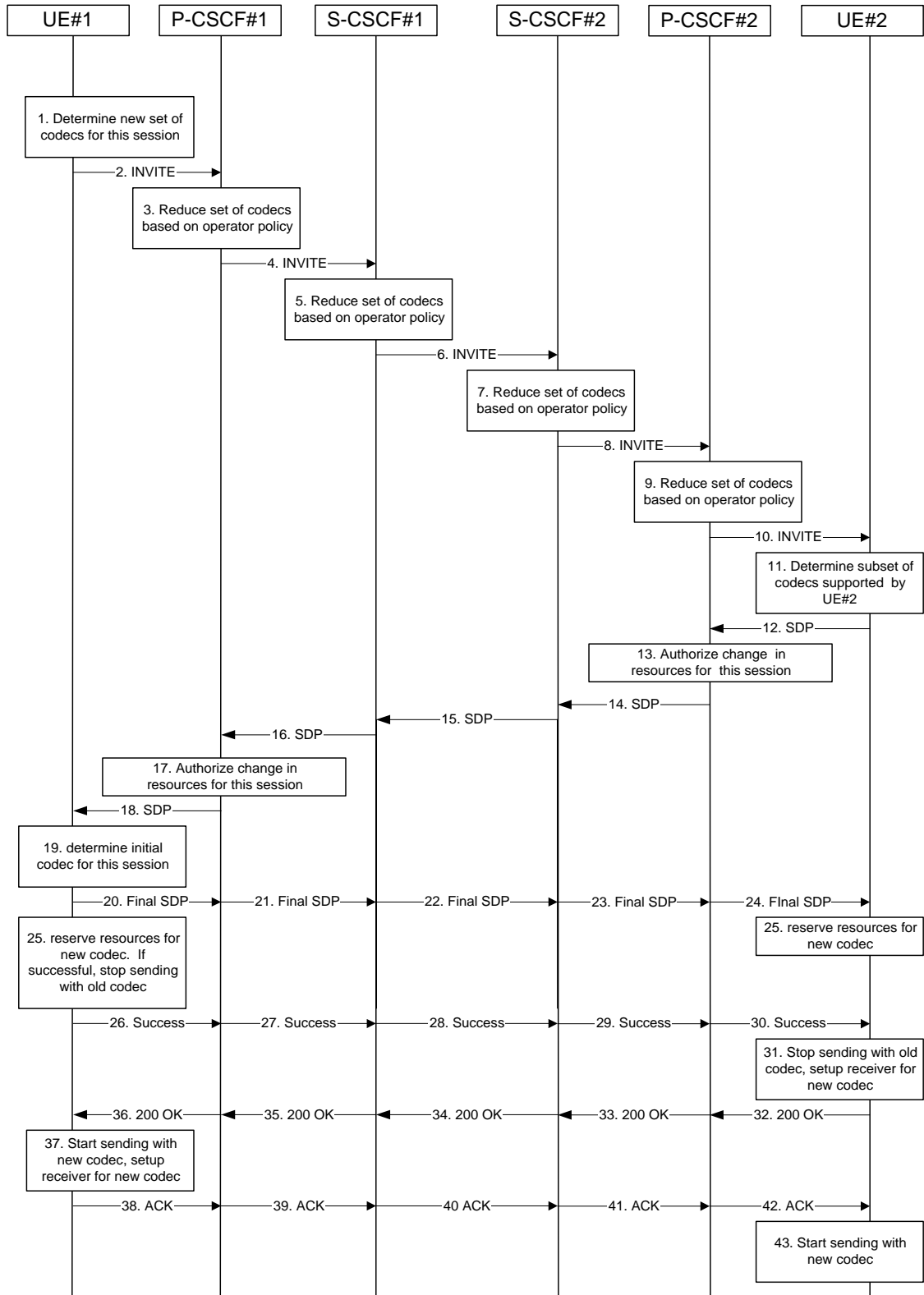
Figure 5.32: Codec or media flow change - new reservation

The detailed procedure is as follows:

1. UE#1 inserts ~~determines~~ the revised set of codecs to a SDP payload. The inserted codec(s) shall reflect the UE#1's terminal capabilities and user preferences for the session. ~~that it is willingwishes to support for this session.~~ It builds a SDP containing bandwidth requirements and characteristics of each, and assigns local port numbers for each possible media flow. Multiple media flows may be offered, and for each media flow (m= line in SDP), there may be multiple codec choices offered.

CR-Form-v4

CHANGE REQUEST

⌘   **23.228 CR 127**   ⌘   ev **2-**   ⌘   Current version: **5.3.0**   ⌘

For **HELP** *on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘   (U)SIM ☐   ME/UE **X**   Radio Access Network ☐   Core Network **X**

Title: ⌘	Requirement to register Public Id before usage	
Source: ⌘	Ericsson, Nokia, Siemens	
Work item code: ⌘	IMS-CCR	*Date:* ⌘ 2002-01-18
Category: ⌘ **F**		*Release:* ⌘ REL-5

Use <u>one</u> of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can
be found in 3GPP <u>TR 21.900</u>.

Use <u>one</u> of the following releases:
2   *(GSM Phase 2)*
R96   *(Release 1996)*
R97   *(Release 1997)*
R98   *(Release 1998)*
R99   *(Release 1999)*
REL-4   *(Release 4)*
REL-5   *(Release 5)*

Reason for change: ⌘	Currently 23.228 is not clear on how to handle the case when a Public User Id is registered and another Public User Id is not registered.

In Liaison S2-010404 S3 asks the following question:

"SA3 understands that multiple public identities can exist for a single private identity, and that the private identity will be used as the basis for authentication. Can a call be terminated towards a public identity that is not currently registered, if an associated public identity for that subscriber *IS* registered?"

And N1 answers in Liaison S2-012710 with the following:

"We understand that multiple some public user identities can be aliaises for other public user identities, and these would not normally be separately registered. Also, some emergency calls can be made from terminals that are not registered. We assume that SA2 will provide further information on these cases."

The TS 23.228 includes the following :

- A S-CSCF needs to be allocated for a UE for the UE to be able to access IMS services

- A S-CSCF is allocated during the registration

- Multiple Public User identities can be associated with a Service Profile. If a Public User Id is registered then all Public User identities associated via the Service Profile could also be registered implicitly, as N1 noted and S2 approved in S2-012997.

However, the TS 23.228 do not explicitly state whether the UE will be able to use any additional Public User Id that is not registered. From the flows in the TS it is clear that S-CSCF shall be able to apply some service control to both originating and terminating sessions, i.e. the S-CSCF needs to know what kind of service control that shall apply to every specific session. Therefore relevant information from the Service Profile (named subscriber profile in the registration flows) applicable for each Public User Id needs to be

		downloaded to the S-CSCF, which is done during the registration of the Public User Id.
Summary of change: ⌘		Added a requirement clarifying that the Public User identities needs to be registered before they can be used for IMS services.
Consequences if not approved:	⌘	Inconsistent IMS service behaviour

Clauses affected:	⌘	4.3.3.2
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:

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1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

4.3.3.2   Public user identities

Every IM CN subsystem subscriber shall have one or more public user identities [8]. The public user identity/identities are used by any user for requesting communications to other users. For example, this might be included on a business card.

- Both telecom numbering and Internet naming schemes can be used to address users depending on the Public User identities that the users have.

- The public user identity/identities shall take the form of SIP URL (as defined in RFC2543 [12] and RFC2396 [13]) or E.164 numbers.

- ─At least one Public User Identity shall be securely stored on the USIM (it shall not be possible for the UE to modify the Public User Identity), but it is not required that all additional Public User Identities be stored on the USIM.

- A Public User Identity shall be registered either explicitly or implicitly before the identity can be used to originate IMS sessions and IMS session unrelated procedures.

- A Public User Identity shall be registered either explicitly or implicitly before terminating IMS sessions and terminating IMS session unrelated procedures can be delivered to the UE of the user that the Public User Identity belongs to. Subscriber-specific services for unregistered users may nevertheless be executed as described in chapter 5.12.

- It shall be possible to register globally (i.e. through one single UE request) a subscriber that has more than one public identity via a mechanism within the IP multimedia CN subsystem (e.g. by using a Service Profile). This shall not preclude the user from registering individually some of his/her public identities if needed.

- Public User Identitys are not authenticated by the network during registration.

- Public User Identities may be used to identify the user's information within the HSS (for example during mobile terminated session set-up).

4.3.3.3   Routing of SIP signalling within the IP multimedia subsystem

CR-Form-v3

CHANGE REQUEST

⌘ **23.228** CR **120** ⌘ rev **2** ⌘ Current version: **5.3.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network **X**

Title: ⌘	Clarifications to text on handling of the PDP contexts in case of Iu release or RAB release	
Source: ⌘	Nortel Networks	
Work item code: ⌘	IMS-CCR	**Date:** ⌘ January 2002
Category: ⌘	**F**	**Release:** ⌘ REL-5

Use <u>one</u> of the following categories:
F (essential correction)
A (corresponds to a correction in an earlier release)
B (Addition of feature),
C (Functional modification of feature)
D (Editorial modification)
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use <u>one</u> of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change: ⌘	- The text in 23.228 doesn't cover what happens in case the Radio Bearer/RAB used for signalling, is lost. - Loss of radio coverage has been clarified for conversational and streaming, but not for interactive and background. - Where authorization of resources is involved, the PCF has a role to play. - When the PCF was involved in the authorization of a bearer, it needs to be instructed of any changes by the GPRS system.
Summary of change: ⌘	- Addition of PCF where authorisation is involved - Addition of text for loss of radio when traffic class is interactive or background, or traffic sub-class is signalling - Rewording of text to mandate informing the PCF when it was involved previously
Consequences if not approved: ⌘	Text remains unclear on cases for loss of coverage for SIP signalling, on cases where the bearer is interactive or background, and on involvement of PCF.

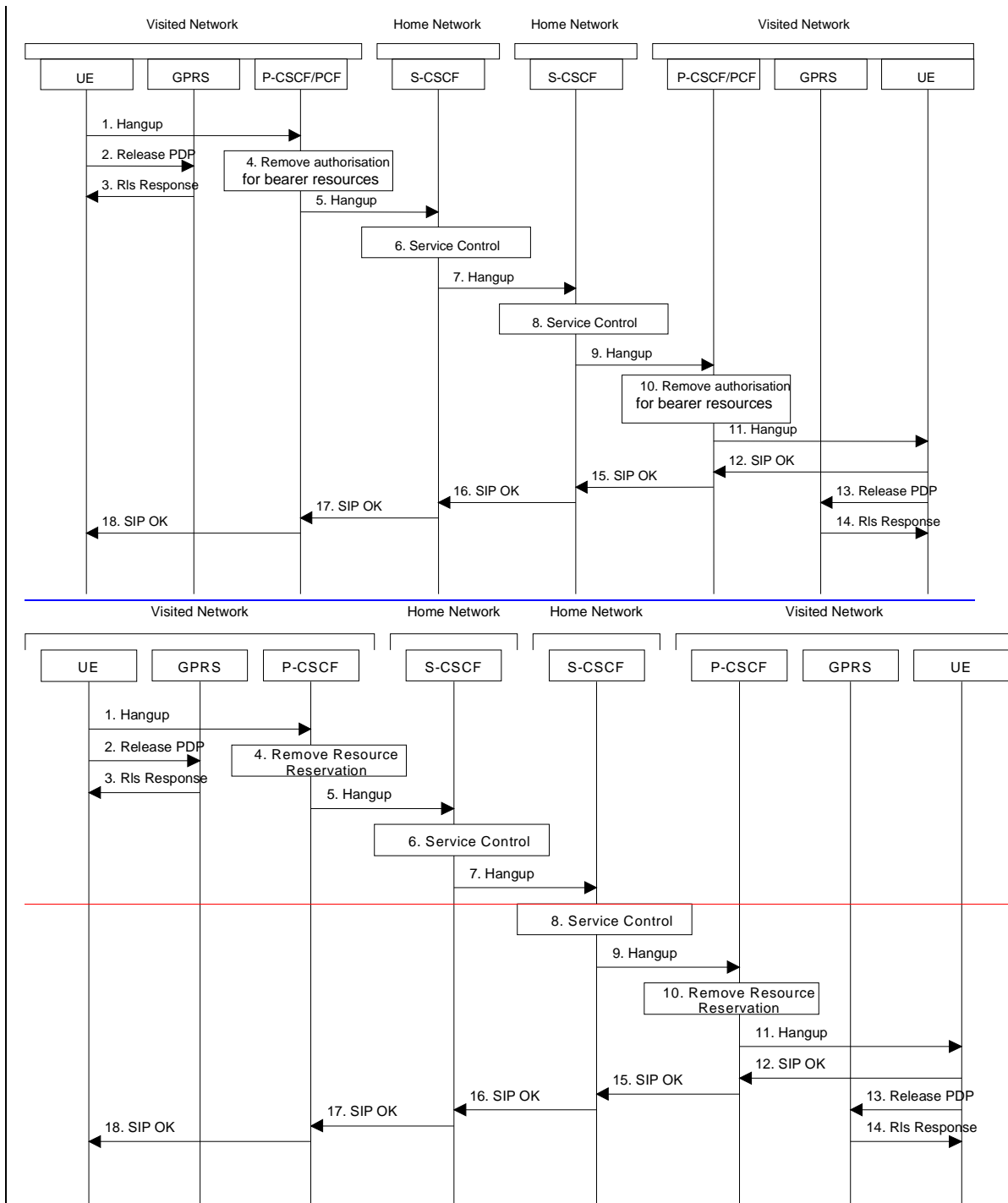|	
Clauses affected: ⌘	5.10.3.0, 5.10.3.1, 5.10.3.1.1, 5.10.3.1.2
Other specs affected: ⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications

| *Other comments:* | ⌘ | |

5.10.1   Mobile terminal initiated session release

The following flow shows a mobile terminal initiated IM CN subsystem application (SIP) session release. It is assumed that the session is active and that the bearer was established directly between the two visited networks (the visited networks could be the Home network in either or both cases).

Figure 5.22: Mobile initiated session release

1. One mobile party hangs up, which generates a message (Bye message in SIP) from the UE to the P-CSCF.

2. Steps 2 and 3 may take place before or after Step 1 and in parallel with Step 4. The UE initiates the release of the bearer PDP context. The GPRS subsystem releases the PDP context. The IP network

resources that had been reserved for the message receive path to the mobile for this session are now released. This is initiated from the GGSN. If RSVP was used to allocated resources, then the appropriate release messages for that protocol would invoked here.

3. The GPRS subsystem responds to the UE.

4. The P-CSCF/PCF removes the authorisation for resources that had previously been issued for this endpoint for this session. This step will also result in a release indication to the GPRS subsystem to confirm that the IP bearers associated with the session have been deleted

5. The P-CSCF sends a hangup to the S-CSCF of the releasing party.

6. The S-CSCF performs whatever service control procedures are appropriate for this ending session.

7. The S-CSCF of the releasing party forwards the Hangup to the S-CSCF of the other party.

8. The S-CSCF performs whatever service control procedures are appropriate for this ending session.

9. The S-CSCF of the other party forwards the Hangup on to the P-CSCF.

10. The P-CSCF/PCF removes the authorisation for resources that had previously been issued for this endpoint for this session. This step also results in a release indication to the GPRS subsystem to confirm that the IP bearers associated with the UE#2 session have been deleted.

11. The P-CSCF forwards the Hangup on to the UE.

12. The mobile responds with an acknowledgement, the SIP OK message (number 200), that is sent back to the P-CSCF.

13. Steps 13 and 14 may be done in parallel with step 12. The Mobile initiates the release of the bearer PDP context.

14. The GPRS subsystem releases the PDP context. The IP network resources that were reserved for the message receive path to the mobile for this session are now released. This is initiated from the GGSN. If RSVP was used to allocated resources, then the appropriate release messages for that protocol would invoked here.

15. The SIP OK message is sent to the S-CSCF.

16. The S-CSCF of the other party forwards the OK to the S-CSCF of the releasing.

17. The S-CSCF of the releasing party forwards the OK to the P-CSCF of the releasing.

18. The P-CSCF of the releasing party forwards the OK to the UE.

5.10.2   PSTN initiated session release

The following flow shows a PSTN terminal initiated IM CN subsystem application (SIP) session release. It is assumed that the session is active and that the bearer was established to the PSTN from the Home Network (the visited network could be the Home network in this case).
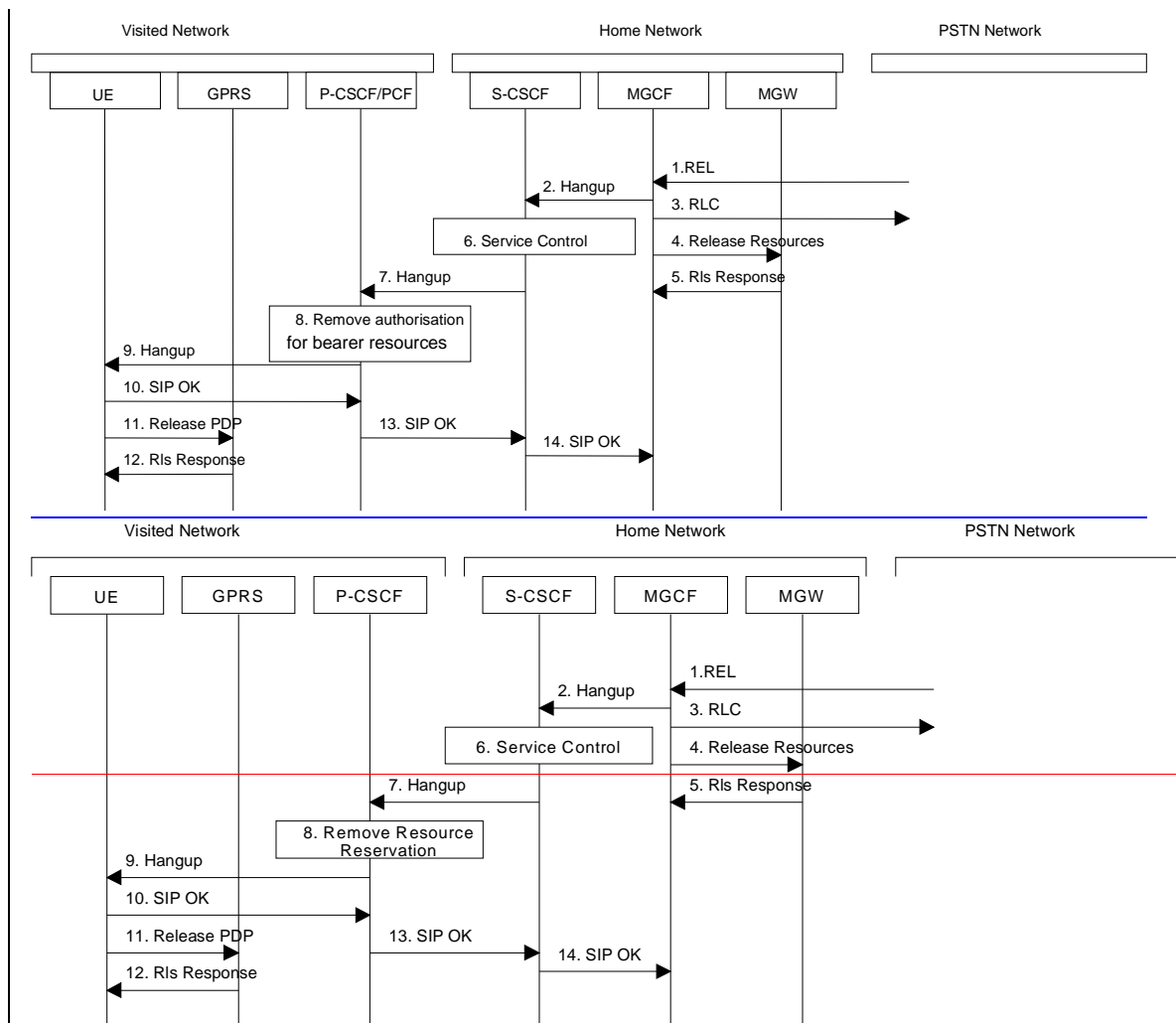
Figure 5.23: PSTN initiated session release

1. PSTN party hangs up, which generates an ISUP REL message to the MGCF.

2. The MGCF sends a Hangup (Bye message in SIP) to the S-CSCF to notify the mobile that the far end party has disconnected.

3. Step 3 may be done in parallel with Step 2. Depending on the GSTN network type Step 3 may need to wait until after step 14. The MGCF notes the reception of the REL and acknowledges it with an RLC. This is consistent with the ISUP protocol.

4. The MGCF requests the MGW to release the vocoder and ISUP trunk using the H.248/MEGACO Transaction Request (subtract). This also results in disconnecting the two parties in the H.248 context. The IP network resources that were reserved for the message receive path to the PSTN for this session are now released. This is initiated from the MGW. If RSVP was used to allocated resources, then the appropriate release messages for that protocol would be invoked here.

5. The MGW sends an acknowledgement to the MGCF upon completion of step 6.

6. The S-CSCF performs whatever service control procedures are appropriate for this ending session.

7. The S-CSCF forwards the Hangup to the P-CSCF.

8. The P-CSCF/PCF removes the authorisation for resources that had previously been issued for this endpoint for this session. This step also results in a release indication to the GPRS subsystem to confirm that the IP bearers associated with the UE#2 session have been deleted.

9. The P-CSCF forwards the Hangup to the UE.

10. The mobile responds with an acknowledgement, the SIP OK message (number 200), which is sent back to the P-CSCF.

11. Steps 11and 12 may be done in parallel with step 10. The Mobile initiates the release of the bearer PDP context.

12. The GPRS subsystem releases the PDP context. The IP network resources that had been reserved for the message receive path to the mobile for this session are now released. This is initiated from the GGSN. If RSVP was used to allocated resources, then the appropriate release messages for that protocol would invoked here.

13. The SIP OK message is sent to the S-CSCF.

14. The S-CSCF forwards the message to the MGCF.

5.10.3 Network initiated session release

5.10.3.0 Deletion of PDP context used to transport IMS SIP signalling

It is possible that the GPRS subsystem deletes the PDP context used to transport IMS SIP signalling (e.g. due to routing area update, overload situations).
In this case the UE shall initiate a procedure to re-establish a PDP context to transport IMS SIP signalling. If re-establishement fails then the UE shall de-activate all other associated PDP context(s).

5.10.3.1 Network initiated session release - P-CSCF initiated

The following flows show a Network initiated IM CN subsystem application (SIP) session release. It is assumed that the session is active and that the bearer was established directly between the two visited networks (the visited networks could be the Home network in either or both cases).
A bearer is removed e.g. triggered by a mobile power down, due to a previous loss of coverage, or accidental/malicious removal, etc. In this case the 'Indication of PDP Context Release' procedure will be performed (see 3GPP TS 23.207). The flow for this case is shown in Figure 5.24.
In the event of loss of coverage, 3G TS 23.060 defines the Iu or RAB Release procedures. In case of PDP context with streaming or conversational class the maximum bitrate of the GTP tunnel between SGSN and GGSN is modified to 0 kbit/s. This is indicated to the P-CSCF / PCF by performing the 'PDP Context Modification' procedure (see 3GPP TS 23.207) as shown in Figure 5.25. For loss of coverage in case of other PDP contexts (background or interactive traffic class), the PDP context is preserved with no modifications.

Other network initiated session release scenarios are of course possible. In particular such scenarios initiated in the home network for administrative reasons might begin with an S-CSCF.

5.10.3.1.1 Network initiated session release - P-CSCF initiated - removal of PDP context
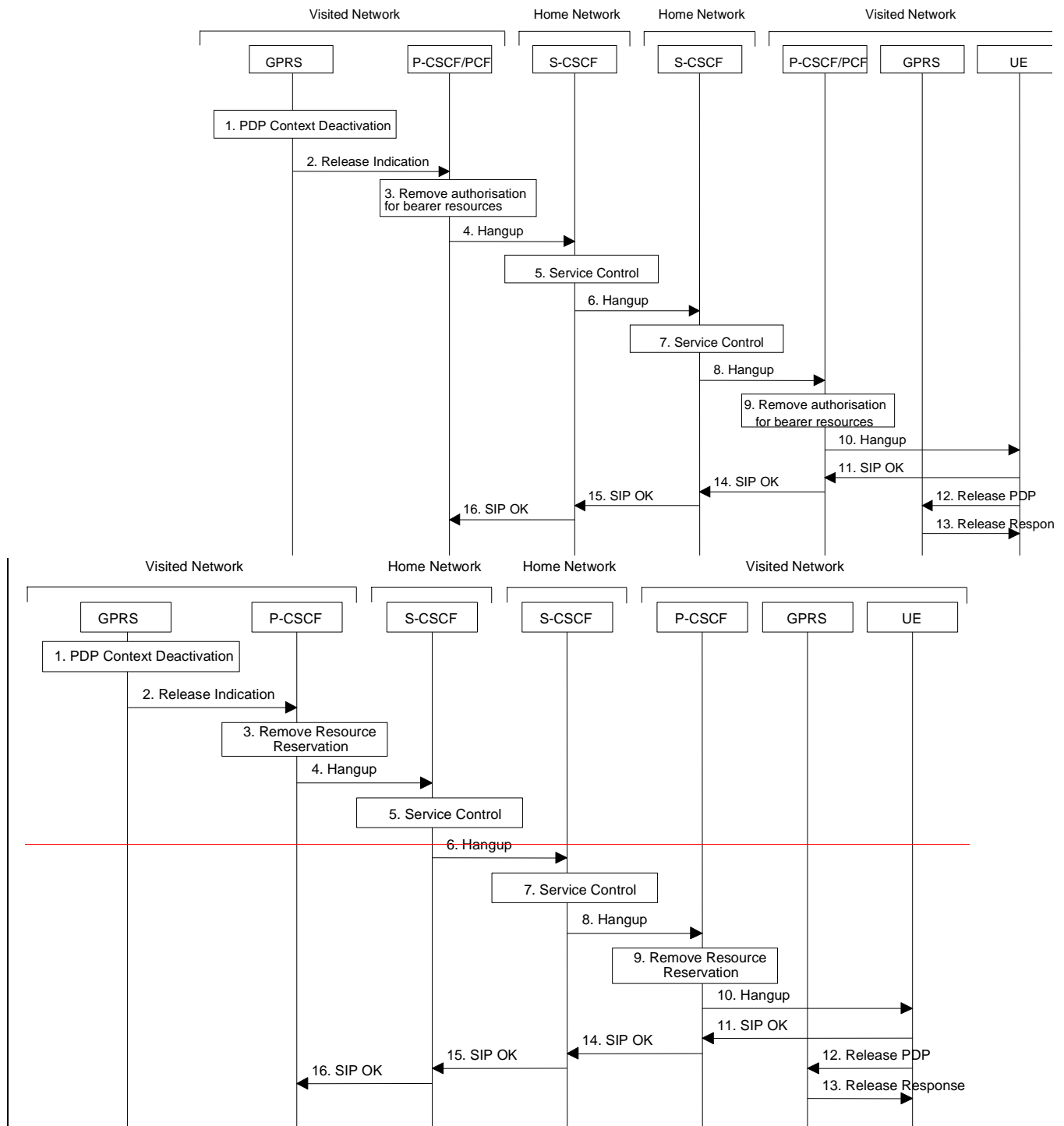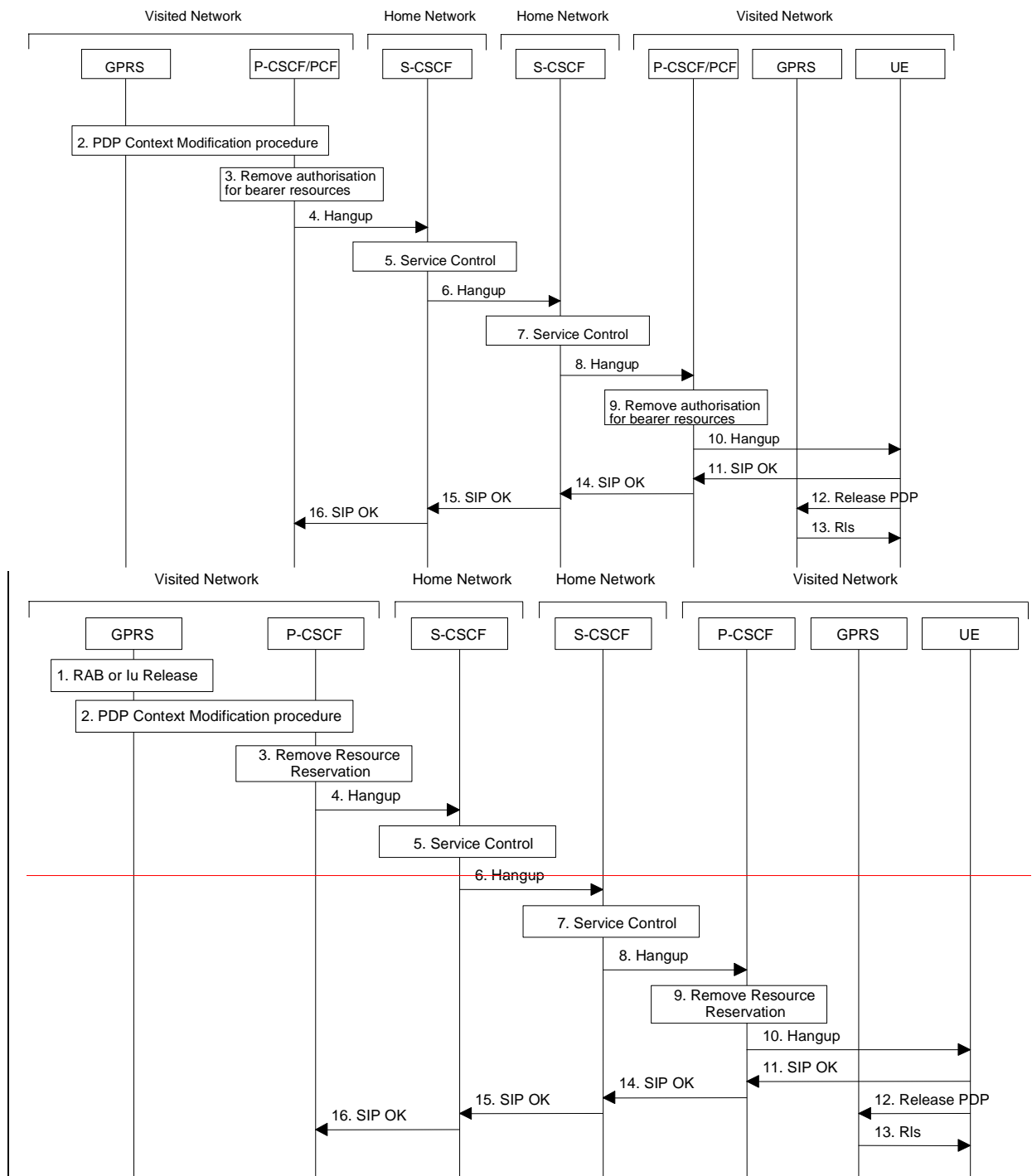

Figure 5.26: Network initiated session release - P-CSCF initiated - removal of PDP context

1. A bearer related to the session is terminated, for example, triggered by a mobile power down, etc. This is noted by the GPRS subsystem.

2. If a request state was created in the PCF at PDP context activation, the GGSN shall The GPRS subsystem may send a release indication to the P-CSCF/PCF for the disconnected bearer. The P-CSCF might also note the release due to a SIP Session Timeout.

3. The P-CSCF/PCF removes the authorisation for resources related to the bearer that had previously been issued for this endpoint for this session.

The following steps are only performed in case the P-CSCF/PCF has decided to terminate the session.

4. The P-CSCF may generates a Hangup (Bye message in SIP) to the S-CSCF of the releasing party (e.g. if all PDP contexts related to the same IMS sessions are deleted). It is noted that this message should be able to carry a cause value to indicate the reason for the generation of the hangup.

5. The S-CSCF performs whatever service control procedures are appropriate for this ending session.

6. The S-CSCF of the releasing party forwards the Hangup to the S-CSCF of the other party.

7. The S-CSCF performs whatever service control procedures are appropriate for this ending session.

8. The S-CSCF of the other party forwards the Hangup on to the P-CSCF.

9. The P-CSCF/PCF removes the authorisation for resources that had previously been issued for this endpoint for this session. This step also results in a release indication to the GPRS subsystem to confirm that the IP bearers associated with the session have been deleted for UE#2.

10. The P-CSCF forwards the Hangup on to the UE.

11. The mobile responds with an acknowledgement, the SIP OK message (number 200), which is sent back to the P-CSCF.

12. Steps 12 and 13 may be done in parallel with step 11. The Mobile initiates the release of the bearer PDP context.

13. The GPRS subsystem releases the PDP context. The IP network resources that had were been reserved for the message receive path to the mobile for this session are now released. This is initiated from the GGSN. If RSVP was used to allocated resources, then the appropriate release messages for that protocol would invoked here.

14. The SIP OK message is sent to the S-CSCF.

15. The S-CSCF of the other party forwards the OK to the S-CSCF of the releasing party.

16. The S-CSCF of the releasing party forwards the OK to the P-CSCF of the releasing party.

5.10.3.1.2 P-CSCF initiated session release after loss of radio coverage

Figure 5.26a: P-CSCF initiated session release after loss of radio coverage

1. In the event of loss of radio coverage the Iu connection or RAB(s) are released. In case of PDP context with streaming or conversational class the maximum bitrate of the GTP tunnel between SGSN and GGSN is modified to 0 kbit/s by PDP Context Modification procedures. For PDP

contexts using background or interactive traffic class, the PDP context is preserved with no modifications.

1. 2. If a request state was created in the PCF at PDP context activation, the GGSN shall The GPRS subsystem may initiate the PDP context modification procedure by sending a modify indication to the P-CSCF/PCF for the affected bearers in order to indicate the change of the maximum bitrate to 0 kbit/s. The P-CSCF/PCF shall accept this modification. It is optional for the P-CSCF/PCF to deactivate the affected bearer(s) and additionally IP bearers related to the affected session (e.g. a chat session could still be allowed). For these IP bearers the P-CSCF/PCF performs 'Revoke Authorization for UMTS and IP Resources' procedure (see 3GPP TS 23.207). If the P-CSCF decides to terminate the session then the P-CSCF/PCF removes the authorisation for resources that had previously been issued for this endpoint for this session.

The following steps are only performed in case the P-CSCF/PCF has decided to terminate the session.

4. The P-CSCF generates a Hangup (Bye message in SIP) to the S-CSCF of the releasing party. It is noted that this message should be able to carry a cause value to indicate the reason for the generation of the hangup.

5. The S-CSCF performs whatever service control procedures are appropriate for this ending session.

6. The S-CSCF of the releasing party forwards the Hangup to the S-CSCF of the other party.

7. The S-CSCF performs whatever service control procedures are appropriate for this ending session.

8. The S-CSCF of the other party forwards the Hangup on to the P-CSCF.

9. The P-CSCF/PCF removes the authorisation for resources that had previously been issued for this endpoint for this session. This step also results in a release indication to the GPRS subsystem to confirm that the IP bearers associated with the session have been deleted for UE#2.

10. The P-CSCF forwards the Hangup on to the UE.

11. The mobile responds with an acknowledgement, the SIP OK message (number 200), which is sent back to the P-CSCF.

12. Steps 12 and 13 may be done in parallel with step 11. The Mobile initiates the release of the bearer PDP context.

13. The GPRS subsystem releases the PDP context. The IP network resources that had were been reserved for the message receive path to the mobile for this session are now released. This is initiated from the GGSN. If RSVP was used to allocated resources, then the appropriate release messages for that protocol would invoked here.

14. The SIP OK message is sent to the S-CSCF.

15. The S-CSCF of the other party forwards the OK to the S-CSCF of the releasing party.

16. The S-CSCF of the releasing party forwards the OK to the P-CSCF of the releasing party.

CR-Form-v5

CHANGE REQUEST

⌘	**23.228** CR **133**	⌘rev	**-**	⌘	Current version:	**5.3.0**	⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title: ⌘	P-CSCF discovery	
Source: ⌘	Nokia	
Work item code: ⌘	IMS-CCR	***Date:*** ⌘ 13.02.2002
Category: ⌘	**F**	***Release:*** ⌘ REL-5

Use <u>one</u> of the following categories:
F (correction)
A (corresponds to a correction in an earlier release)
B (addition of feature),
C (functional modification of feature)
D (editorial modification)
Detailed explanations of the above categories can
be found in 3GPP <u>TR 21.900</u>.

Use <u>one</u> of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change: ⌘	During SA2#22 we sent an LS (S2-020328) to CN1 and CN4 on the transparent transfer via SGSN of application level information between UE and GGSN.
	Regarding to the requirement of providing a mechanism for GPRS P-CSCF discovery CN1 has developed the following changes to release 5 (TS 24.008) ;
	1) The Protocol Configuration Options (PCO) field, available in a Primary PDP Context messages is used to convey the P-CSCF address request.
	2) The PCO field available in Primary PDP Context response messages is used to convey the P-CSCF address(es) from GGSN to the UE.
	The PCO field (including the above capabilities) has been added to Secondary PDP Context messages for release 5.
Summary of change: ⌘	A note in subsection 5.1.1.2 is changed to reflect the information received from CN1.
Consequences if not approved: ⌘	Non-working solutions.

|	
Clauses affected: ⌘	5.1.1.2
Other specs affected: ⌘	**X** Other core specifications ⌘ 24.229
	☐ Test specifications
	☐ O&M Specifications
Other comments: ⌘	

How to create CRs using this form:
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Below is a brief summary:

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2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

5.1.1.2 GPRS procedure for P-CSCF discovery

This alternative shall be used for UE(s) not supporting DHCP. This may also be used for UE(s) supporting DHCP.
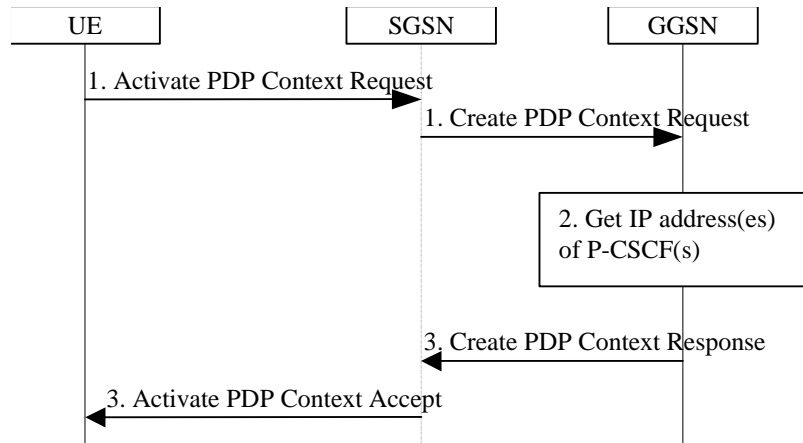
Figure 5.0b: P-CSCF discovery using PDP Context Activation signalling

1. The UE requests establishment of a PDP context according to section 4.2.6 (QoS requirements for IM CN subsystem signalling). The UE indicates that it requests a P-CSCF IP address(es). The indication is forwarded transparently by the SGSN to the GGSN.

2. The GGSN gets the IP address(es) of the P-CSCF(s). The mechanism to do this is a matter of internal configuration and is an implementation choice.

3. If requested by the UE, the GGSN includes the IP address(es) of the P-CSCF(s) in the Create PDP Context Response. The P-CSCF address(es) is forwarded transparently by the SGSN to the UE.

After reception of the IP address of a P-CSCF the UE may initiate communication towards the IM subsystem.

Note. This request of a P-CSCF IP address(es) and response ~~shall be~~is transparent also for pre-R5 SGSN in primary PDP context activation.

CR-Form-v5

CHANGE REQUEST

| | ⌘ | **23.228** CR **147** | ⌘**rev** | | ⌘ | Current version: | **5.3.0+ CR120** | ⌘ |

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Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Corrections on P-CSCF initiated session release after loss of radio coverage
Source:	⌘	Siemens

Work item code:	⌘	IMS-CCR	***Date:*** ⌘	14ᵗʰ February 2002	

Category:	⌘ **F**	***Release:*** ⌘ REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change:	⌘	CR 120 by Nortel clarified various items on handling of the PDP contexts in case of Iu release or RAB release. Unfortunately this CR deleted step 1 'RAB or Iu Release' in figure 5.26a. Beside in the description below this figure step 3 is missing. The description of step 3 is just behind step 2 without number.
Summary of change:	⌘	Step 1 'RAB or Iu Release' is included in figure 5.26a. Step 3 is numbered.
Consequences if not approved:	⌘	

Clauses affected:	⌘	5.10.3.1.2

|				
Other specs Affected:	⌘	☐ Other core specifications	⌘	
		☐ Test specifications		
		☐ O&M Specifications		

Other comments:	⌘	

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2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

5.10.3.1.2   P-CSCF initiated session release after loss of radio coverage
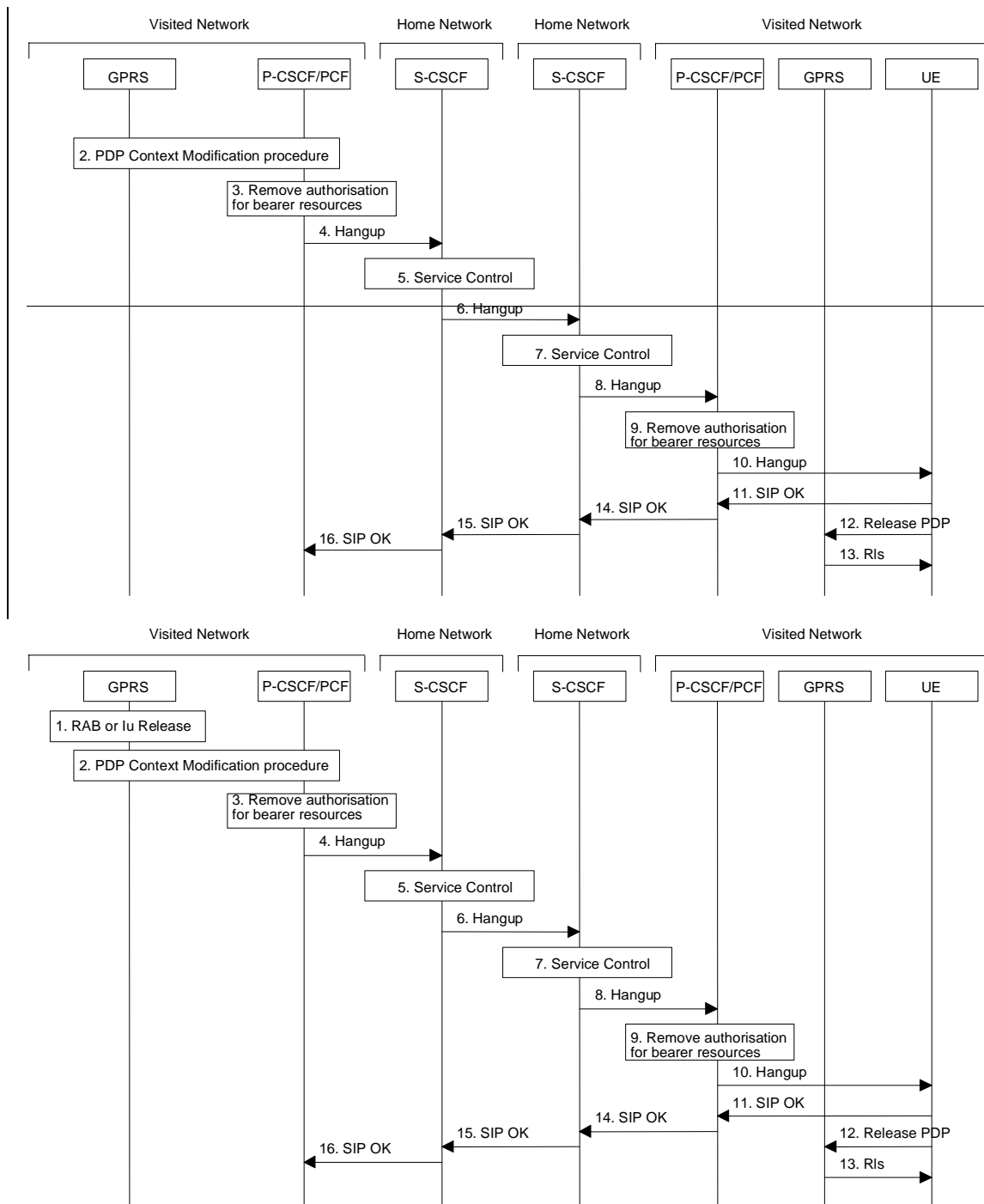
Figure 5.26a: P-CSCF initiated session release after loss of radio coverage

1. In the event of loss of radio coverage the Iu connection or RAB(s) are released. In case of PDP context with streaming or conversational class the maximum bitrate of the GTP tunnel between SGSN and GGSN is modified to 0 kbit/s by PDP Context Modification procedures. For PDP

contexts using background or interactive traffic class, the PDP context is preserved with no modifications.

2. If a request state was created in the PCF at PDP context activation, the GGSN shall initiate the PDP context modification procedure by sending a modify indication to the P-CSCF/PCF for the affected bearers in order to indicate the change of the maximum bitrate to 0 kbit/s. The P-CSCF/PCF shall accept this modification.

3. It is optional for the P-CSCF/PCF to deactivate the affected bearer(s) and additionally IP bearers related to the affected session (e.g. a chat session could still be allowed). For these IP bearers the P-CSCF/PCF performs 'Revoke Authorization for UMTS and IP Resources' procedure (see 3GPP TS 23.207). If the P-CSCF decides to terminate the session then the P-CSCF/PCF removes the authorisation for resources that had previously been issued for this endpoint for this session.

The following steps are only performed in case the P-CSCF/PCF has decided to terminate the session.

4. The P-CSCF generates a Hangup (Bye message in SIP) to the S-CSCF of the releasing party. It is noted that this message should be able to carry a cause value to indicate the reason for the generation of the hangup.

5. The S-CSCF performs whatever service control procedures are appropriate for this ending session.

6. The S-CSCF of the releasing party forwards the Hangup to the S-CSCF of the other party.

7. The S-CSCF performs whatever service control procedures are appropriate for this ending session.

8. The S-CSCF of the other party forwards the Hangup on to the P-CSCF.

9. The P-CSCF/PCF removes the authorisation for resources that had previously been issued for this endpoint for this session. This step also results in a release indication to the GPRS subsystem to confirm that the IP bearers associated with the session have been deleted for UE#2.

10. The P-CSCF forwards the Hangup on to the UE.

11. The mobile responds with an acknowledgement, the SIP OK message (number 200), which is sent back to the P-CSCF.

12. Steps 12 and 13 may be done in parallel with step 11. The Mobile initiates the release of the bearer PDP context.

13. The GPRS subsystem releases the PDP context. The IP network resources that had been reserved for the message receive path to the mobile for this session are now released. This is initiated from the GGSN. If RSVP was used to allocated resources, then the appropriate release messages for that protocol would invoked here.

14. The SIP OK message is sent to the S-CSCF.

15. The S-CSCF of the other party forwards the OK to the S-CSCF of the releasing party.

16. The S-CSCF of the releasing party forwards the OK to the P-CSCF of the releasing party.

CR-Form-v5

CHANGE REQUEST

| ⌘ | **23.228** CR **144** | ⌘**rev** | **1** | ⌘ | Current version: | **5.3.0+ CR12 2** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title: ⌘	Corrections for Section 5.4.7 Interaction between QoS and session signalling	
Source: ⌘	Siemens	
Work item code: ⌘	IMS-CCR	**Date:** ⌘ 13th February 2002
Category: ⌘ **F**		**Release:** ⌘ REL-5

Use *one* of the following categories:
  F *(correction)*
  A *(corresponds to a correction in an earlier release)*
  B *(addition of feature),*
  C *(functional modification of feature)*
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Use *one* of the following releases:
  2   *(GSM Phase 2)*
  R96 *(Release 1996)*
  R97 *(Release 1997)*
  R98 *(Release 1998)*
  R99 *(Release 1999)*
  REL-4 *(Release 4)*
  REL-5 *(Release 5)*

Reason for change: ⌘	Chapter 5.4.7 'Interaction between QoS and session signalling' describes the procedures of the service-based local policy. This description makes reference to 23.207. But the descriptions in 23.228 and 23.207 are not consistent:

- Different names are used.
- In TS 23.207 the 'Authorize QoS Resources' procedure describes the functionality of the PCF when the P-CSCF receives a SDP message. In TS 23.228 the 'Authorize UMTS and IP QoS Resources' describes also the functionality of the Policy Enforcement Point in the GGSN.
- In the 'Revoke Authorization for GPRS and IP Resources' the deactivation of the PDP context by the GGSN is optional in TS 23.228. In TS 23.207 this deactivation is not optional.
- The 'Resource Reservation' procedure (TS 23.207) is covered in TS 23.228 in the description of 'Authorize UMTS and IP QoS Resources' and 'Allocate UMTS and IP Resources'.

In TS 23.228 the procedures are distinguished in interactions between PCF and PEP and interactions between UE and GGSN. This classification seems not appropriate. Interactions between UE and GGSN often trigger interactions between PCF and GGSN, e.g. Activate PDP Context, Delete PDP Context. Vice versa the 'Revoke Authorization for GPRS and IP Resources' procedure triggers a PDP Context Deactivation. Therefore this classification is removed.

~~In sections 'Approval of QoS Commit' and 'Removal of QoS Commit' it is stated that the GGSN restricts IP and GPRS resources. But this is only possible in one direction; for GPRS resources only in downlink and for IP resources only in uplink. TS 23.207 reads that the GGSN only opens or closes the gate. It is not described in 23.207 that the GGSN restricts resources.~~

Summary of change: ⌘	TS 23.228 is aligned to 23.207. The names of the procedures are corrected. The descriptions of the procedures aligned to TS 23.207.

Consequences if not approved:	⌘	Inconsistent specifications.	

Clauses affected:	⌘	5.4.7	

Other specs Affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	

Other comments:	⌘		

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2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

5.4.7 Interaction between QoS and session signalling

At PDP context setup the user shall have access to either GPRS without service-based local policy, or GPRS with service-based local policy. It is operator choice whether to offer both or only one of these alternatives for accessing the IM Subsystem.

For the GPRS without service-based local policy case, the bearer is established according to the user's subscription, local operator's IP bearer resource based policy, local operator's admission control function and GPRS roaming agreements. The establishment of the PDP context bearer shall use the PDP context activation procedure specified in TS 23.060.

For the GPRS with service-based local policy case, Service-Based Local Policy decisions (e.g., authorisation and control) are also applied to the bearer.

The description in this subsection is applicable for the case when service-based local policy is employed.

The GGSN contains a Policy Enforcement Function (PEF) that has the capability of policing packet flow into the IP network, and restricting the set of IP destinations that may be reached from/through a PDP context according to a packet classifier. This service-based policy 'gate' function has an external control interface that allows it to be selectively 'opened' or 'closed' on the basis of IP destination address and port. When open, the gate allows packets to pass through (to the destination specified in the classifier) and when closed, no packets are allowed to pass through. The control is performed by a PCF, which is a logical entity of the P-CSCF. (Note: If the PCF is implemented in a separate physical node, the interface between the PCF and the P-CSCF is not standardised).

There are ~~six~~ seven interactions ~~between the PCF and the Policy Enforcement Function (PEF), located within the GGSN~~defined for service-based local policy:

1. ~~Authorise~~ Authorize UMTS ~~and IP~~QoS ~~resources~~Resources. ~~This establishes the 'gate' described above.~~

2. Resource Reservation with Service-based Local Policy.

~~2~~3. Approval of QoS ~~c~~Commit for resources authorised in (1), e.g. 'open' the 'gate'.

~~3~~4. Removal of QoS ~~c~~Commit for resources authorised in (1), e.g. 'close' the 'gate'.

~~4~~5. Revoke ~~a~~Authorisation for ~~UMTS~~ GPRS and IP resources.

~~5~~6. Indication of PDP Context Release~~e~~ from the GGSN to the PCF ~~of PDP Context release~~.

~~6~~7. Indicate~~ion~~ of PDP Context Modification from the GGSN to the PCF ~~of PDP Context Modification~~.

~~There are two interactions between the UE and the GGSN:~~

~~1. Allocate the UMTS resources and IP resources (i.e. beyond the GGSN), within the previous authorisation~~

~~2. Release UMTS and IP resources~~

The~~se~~ requirements and functional description of these interactions are explained further in the following sections. The complete specification of the interface between the Policy Control Function and the Policy Enforcement Function~~, and between the UE and the GGSN, are~~ is contained in TS 23.207.

5.4.7.1 ~~Authorise~~ Authorize ~~UMTS and IP~~ QoS Resources

The Authorize QoS Resources procedure is used during an establishment of a SIP session. The P-CSCF(PCF) shall use the SDP contained in the SIP signaling to calculate the proper authorisation. The PCF authorizes the required QoS resources.

~~The GGSN serves as the Policy Enforcement Point that implements the policy decisions for performing admission control and authorising the UMTS and IP BS QoS Resource request, and policing IP flows entering the external IP network.~~

~~Authorisation of UMTS and IP QoS Resources shall be required for access to the IP Multimedia Subsystem. The GGSN shall determine the need for authorisation, possibly based on provisioning and/or based on the APN of the PDP context.~~

~~The authorisation shall be made prior to the allocation request from the UE. This authorisation shall be 'Pulled' from the PCF by the GGSN when the allocation request is received from the UE.~~

The authorisation shall include binding information, which shall also be provided by the UE to the GGSN in the allocation request, which enables accurate matching of requests and authorisations. ~~This binding information may be an authorisation token assigned by the PCF~~The binding information includes an Authorisation Token sent by the P-CSCF to the UE during SIP signaling, and one or more Flow Identifiers, which are used, by the UE, GGSN and PCF to uniquely identify the media component(s).

~~, possibly in consultation with the GGSN, and may contain information that identifies its generator.~~

The authorisation shall be expressed in terms of the IP resources to be authorised and ~~The authorisation~~ shall include limits on IP packet flows, and may include restrictions on IP destination address and port.

~~These restrictions may take the form of a flowspec and filterspec, as defined in RFC2205. The P-CSCF(PCF) shall use the SDP contained in the SIP signaling to calculate the proper authorisation, as defined in TS 23.207. The authorisation shall be expressed in terms of the IP resources to be authorised.~~

~~Authorisation may contain information used by the network operator to correlate usage records generated by the GPRS system with those generated by the IP Multi-Media Subsystem. Such a correlation identifier, if included in the authorisation, shall be provided to the GPRS elements that generate such usage records.~~

~~Authorisation information, combined with the QoS allocation request from the UE, shall be sufficient for the GGSN to initiate an RSVP exchange with the remote endpoint of the IP packet flow.~~

5.4.7.2 Resource Reservation with Service-based Local Policy

The GGSN serves as the Policy Enforcement Point that implements the policy decisions for performing admission control and authorising the GPRS and IP BS QoS Resource request, and policing IP flows entering the external IP network.

Authorisation of GPRS and IP QoS Resources shall be required for access to the IP Multimedia Subsystem. The GGSN shall determine the need for authorisation, possibly based on provisioning and/or based on the APN of the PDP context.

Resource Reservation shall be initiated by the UE, and shall take place only after successful authorisation of QoS resources by the PCF. Resource reservation requests from the UE shall contain the binding information. The use of this binding information enables the GGSN to correctly match the reservation request to the corresponding authorisation. The authorisation shall be 'Pulled' from the PCF by the GGSN when the reservation request is received from the UE. When a UE combines multiple media flows onto a single PDP context, all of the binding information related to those media flows shall be provided in the resource reservation request.

With a request for GPRS QoS resources, the GGSN shall verify the request is less than the sum of the authorised IP resources (within the error tolerance of the conversion mechanism) for all of the combined media flows. With a request for IP QoS resources, the GGSN shall verify the request is less than the authorised IP resources.

The request for GPRS QoS resources may be signaled independently from the request for IP QoS resources by the UE. At the GPRS BS Level, the PDP Context activation shall be used for QoS signaling. At the IP BS Level, RSVP may be used for QoS signaling.

5.4.7.~~2~~3   Approval of QoS ~~c~~Commit

The PCF makes policy decisions and provides an indication to the GGSN about committing the allocated QoS resources for per-session authorisations unless this was done based on service based local policy at the time of the Resource Reservation procedure.

The GGSN enforces the policy decisions. The GGSN may restrict any use of the ~~UMTS~~ GPRS resources prior to this indication from the PCF. The GGSN shall restrict any use of the IP resources prior to this indication from the PCF, e.g. by open the gate and enabling the use of resources for the media flow. Based on local policy, GPRS~~UMTS~~ and/or IP resources may be committed at the time they are authorised by the PCF.

5.4.7.~~3~~4   Removal of QoS ~~c~~Commit

The PCF makes policy decisions and provides an indication to the GGSN about revoking commitment for the allocated QoS resources for per-session authorisations. Removal of QoS Commit for GPRS and IP resources shall be sent as a separate decision to the GGSN corresponding to the previous "Approval of QoS commit" request.

The GGSN enforces the policy decisions. The GGSN may restrict any use of the ~~UMTS~~ GPRS resources after this indication from the PCF. The GGSN shall restrict any use of the IP resources after this indication from the PCF, e.g. by closing the gate and blocking the media flow.

5.4.7.~~4~~5   Revoke ~~a~~Authorisation for ~~UMTS~~ GPRS and IP Resources

At IP multimedia session release, the UE should deactivate the PDP context(s) used for the IP multimedia session. In various cases, such as loss of signal from the mobile, the UE will be unable to perform this release itself. The Policy Control Function provides indication to the GGSN when the resources previous authorised, and possibly allocated by the UE, are to be released. The GGSN ~~may differentiate charging before and after the IP multimedia session release, or may~~shall deactivate the PDP context used for the IP multimedia session. ~~The latter ensures that the PDP context can not be used for other traffic than the IP multimedia session. The functions in the PS domain due to the IP multimedia session release are operator specific and are configured in the GGSN.~~

5.4.7.~~5~~6   Indication of PDP Context release

Any release of a PDP Context that was established based on authorisation from the PCF shall be reported to the PCF by the GGSN.

This indication may be used by the PCF to initiate a session release towards the remote endpoint.

5.4.7. X   Indication of PDP Context modification

When a PDP Context is modified such that the requested QoS falls outside of the limits that were authorized at PDP context activation (or last modification) or such that the maximum bit rate (downlink and uplink) is downgraded to 0 kbit/s then the GGSN shall report this to the PCF.

This indication may be used by the PCF to initiate a session release towards the remote endpoint.

5.4.7.6 Allocate UMTS and IP Resources

Allocation of QoS resources shall be initiated by the UE, and shall take place only after successful authorisation by subscription or by the PCF. The UE calculates its QoS resource needs from the SDP contained in the SIP signaling.

Allocation requests from the UE shall contain the binding information provided to the UE in the SIP signaling. The use of this binding information enables the GGSN to correctly match the allocation request to the corresponding authorisation. When a UE combines multiple media flows onto a single PDP context, all of the binding information related to those media flows shall be provided in the context activation/modification request.

The request for UMTS QoS resources may be signaled independently from the request for IP QoS resources by the UE. At the UMTS BS Level, the PDP Context activation shall be used for QoS signaling. At the IP BS Level, RSVP may be used for QoS signaling.

With a request for UMTS QoS resources, the GGSN shall verify the request is less than the sum of the authorised IP resources (within the error tolerance of the conversion mechanism) for all of the combined media flows. With a request for IP QoS resources, the GGSN shall verify the request is less than the authorised IP resources.

5.4.7.7 Release UMTS and IP Resources

Release of QoS resources shall be initiated by the UE, or is performed by the SGSN/GGSN e.g. due to the Revoke authorisation for UMTS and IP Resources procedure...

CR-Form-v3

CHANGE REQUEST

⌘ **TS 23.228 CR 130** ⌘ rev ⌘ Current version: **5.3.0** ⌘

For **HELP** *on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title: ⌘	Authorization of QoS Resources	
Source: ⌘	Orange France	
Work item code: ⌘	IMS - CCR	*Date:* ⌘ 10.02.2002
Category: ⌘ **F**		*Release:* ⌘ REL-5

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use one of the following releases:
2   *(GSM Phase 2)*
R96   *(Release 1996)*
R97   *(Release 1997)*
R98   *(Release 1998)*
R99   *(Release 1999)*
REL-4   *(Release 4)*
REL-5   *(Release 5)*

Reason for change: ⌘	Misalignement about Resources Autorization between
	- 23.207 v5.2.0 : 6.3.1. Authorize QoS Resources and
	- 23.228 v5.3.0 : 5.7.1. (MT#1) Mobile termination, roaming,
	                              5.7.2. (MT#2) Mobile termination, home
	                              5.11.3.1 Codec negotiation during initial session establishment

Summary of change: ⌘	In 23.207 v5.2.0, "Authorize QoS Resources" procedure (§6.3.1) indicates that "The Authorize QoS Resources procedure is triggered by the **P-CSCF receiving a SDP message.**" "The Authorization-Token is generated by the PCF and sent to the UE. For the originating UE, the Authorization-Token shall be included in the SIP message (183) from P-CSCF to the UE. **For the terminating UE, the Authorization-Token shall be included in the SIP Invite message from P-CSCF to the UE**." This point is coherent with IETF standard described in SIP Extensions for Media Authorization. Consequently to aligne 23.207 with 23.228, the authorization-token delivery is not considered as part of the "Authorize QoS Resources" procedure and should be done by P-CSCF - on the SDP message for the Originating part of the flows; - on the INVITE message instead of the SDP message for the Termating part of the flows. This contribution clarifies the use of the Authorization Token in the call flows.

Consequences if not approved: ⌘	The delivery of the Authorization token will not be possible.

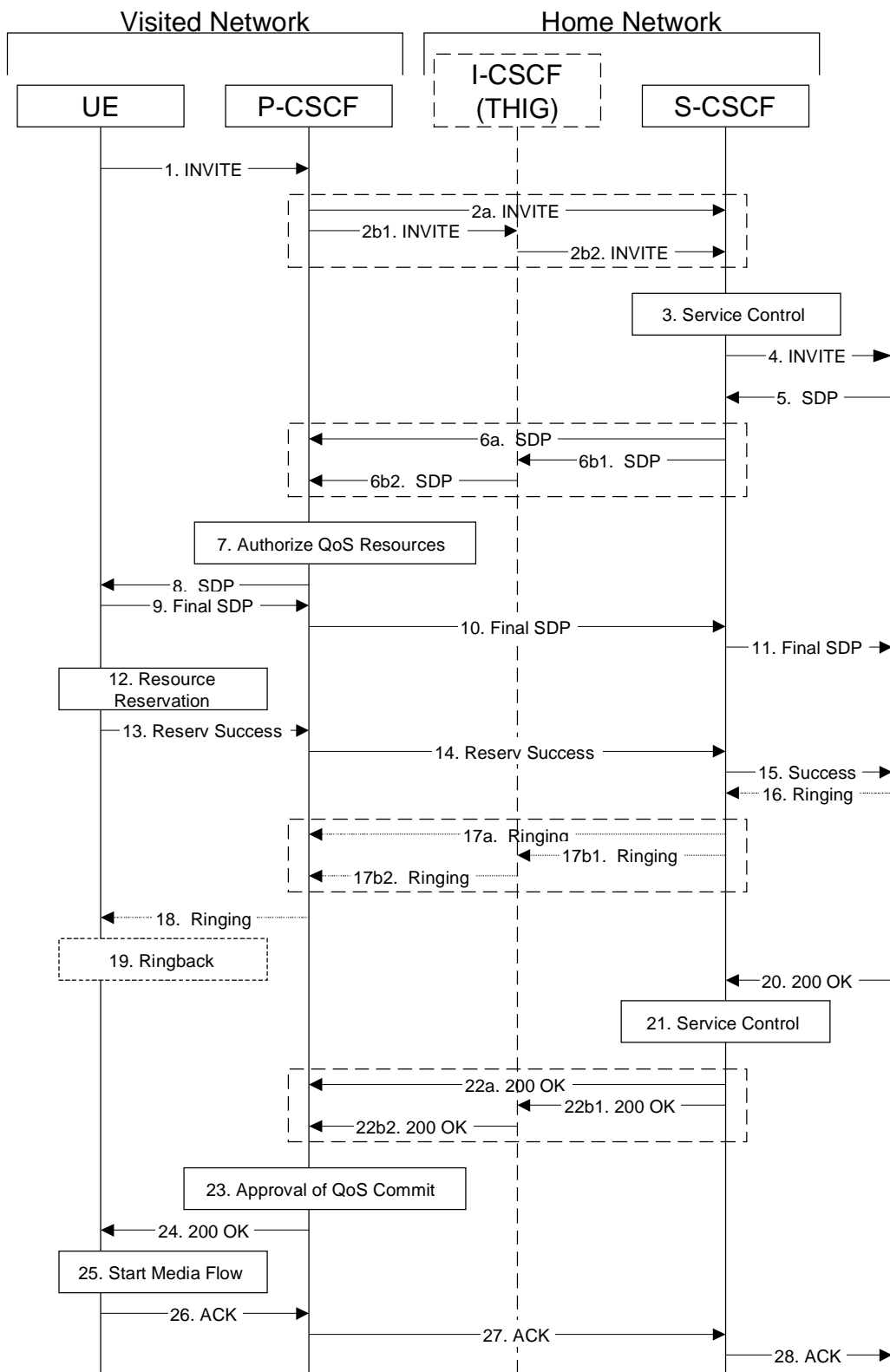|	
Clauses affected: ⌘	5.6.1 (MO#1) Mobile origination, roaming ~~5.6.1~~5.6.2 (MO#2) Mobile origination, home 5.7.1. (MT#1) Mobile termination, roaming 5.7.2. (MT#2) Mobile termination, home 5.11.3.4 Sample MM session flow - addition of another media

Other specs Affected: ⌘	☐ Other core specifications ⌘	
	☐ Test specifications	
	☐ O&M Specifications	

5.6.1   (MO#1) Mobile origination, roaming

This origination procedure applies to roaming subscribers. .

The UE is located in a visited network, and determines the P-CSCF via the CSCF discovery procedure described in section 5.1.1. The home network advertises either the S-CSCF or an I-CSCF as the entry point from the visited network.

When registration is complete, P-CSCF knows the name/address of the next hop in the signalling path toward the serving-CSCF, either I-CSCF(THIG) (if the home network wanted to hide their internal configuration) or S-CSCF (if there was no desire to hide the network configuration). I-CSCF, if it exists in the signalling path, knows the name/address of S-CSCF.

Figure 5.14: Mobile origination procedure - roaming

Procedure MO#1 is as follows:

1. UE sends the SIP INVITE request, containing an initial SDP, to the P-CSCF determined via the CSCF discovery mechanism. The initial SDP may represent one or more media for a multi-media session.

2. P-CSCF remembers (from the registration procedure) the next hop CSCF for this UE.

   This next hop is either the S-CSCF that is serving the visiting UE (choice (a)), or an I-CSCF(THIG) within the home network that is performing the configuration hiding function for the home network operator (choice (b)).

   (2a) If the home network operator does not desire to keep their network configuration hidden, the name/address of the S-CSCF was provided during registration, and the INVITE request is forwarded directly to the S-CSCF.

(2b) If the home network operator desires to keep their network configuration hidden, the name/address of an I-CSCF(THIG) in the home network was provided during registration, and the INVITE request is forwarded through this I-CSCF(THIG) to the S-CSCF.

> (2b1) P-CSCF forwards the INVITE request to I-CSCF(THIG)

> (2b2) I-CSCF(THIG) forwards the INVITE request to S-CSCF

3. S-CSCF validates the service profile, and performs any origination service control required for this subscriber. This includes authorisation of the requested SDP based on the user's subscription for multi-media services.

4. S-CSCF forwards the request, as specified by the S-S procedures.

5. The media stream capabilities of the destination are returned along the signalling path, per the S-S procedures.

6. S-CSCF forwards the SDP message to P-CSCF. Based on the choice made in step #2 above, this may be sent directly to P-CSCF (6a) or may be sent through I-CSCF(THIG)(firewall) (6b1 and 6b2).

7. P-CSCF authorises the resources necessary for this session. The Authorization-Token is generated by the PCF.

8. The Authorization-Token is included in the SDP message. P-CSCF forwards the SDP message to the originating endpoint

9. UE decides the final set of media streams for this session, and sends the Final SDP to P-CSCF

10. P-CSCF forwards the final SDP to S-CSCF. This may possibly be routed through the I-CSCF depending on operator configuration of the I-CSCF.

11. S-CSCF forwards this message to the terminating endpoint, as per the S-S procedure.

12. After determining the final media streams in step #9, UE initiates the reservation procedures for the resources needed for this session.

13. When the resource reservation is completed, UE sends the "Resource Reservation Successful" message to the terminating endpoint, via the signalling path established by the INVITE message. The message is sent first to P-CSCF.

14. P-CSCF forwards this message to S-CSCF. This may possibly be routed through the I-CSCF depending on operator configuration of the I-CSCF.

15. S-CSCF forwards this message to the terminating endpoint, as per the S-S procedure.

16. The destination UE may optionally perform alerting. If so, it signals this to the originating party by a provisional response indicating Ringing. This message is sent to S-CSCF per the S-S procedure.

17. S-CSCF forwards this message to P-CSCF. Based on the choice made in step #2 above, this may be sent directly to P-CSCF (17a) or may be sent through I-CSCF(THIG) (17b1 and 17b2).

18. P-CSCF forwards the ringing message to UE

Editor's Note: Additional QoS interactions to handle one-way media at this point (e.g. for PSTN ringback and announcements) is for further study.

19. UE indicates to the originating subscriber that the destination is ringing

20. When the destination party answers, the terminating endpoint sends a SIP 200-OK final response, as specified by the termination procedures and the S-S procedures, to S-CSCF.

21. S-CSCF performs whatever service control is appropriate for the completed session setup.

22. S-CSCF sends a SIP 200-OK final response along the signalling path back to P-CSCF. Based on the choice made in (2) above, this response may either be sent directly from S-CSCF to P-CSCF (choice (a)), or be sent indirectly through I-CSCF(THIG) (choice (b)).

23. P-CSCF indicates the resources reserved for this session should now be committed.

24. P-CSCF sends a SIP 200-OK final response to the session originator

25. UE starts the media flow(s) for this session

26. UE responds to the 200 OK with a SIP ACK message, which is sent to P-CSCF.

27. P-CSCF forwards the final ACK message to S-CSCF. This may possible be routed through the I-CSCF depending on operator configuration of the I-CSCF.

28. S-CSCF forwards the final ACK message to the terminating endpoint, per the S-S procedure.
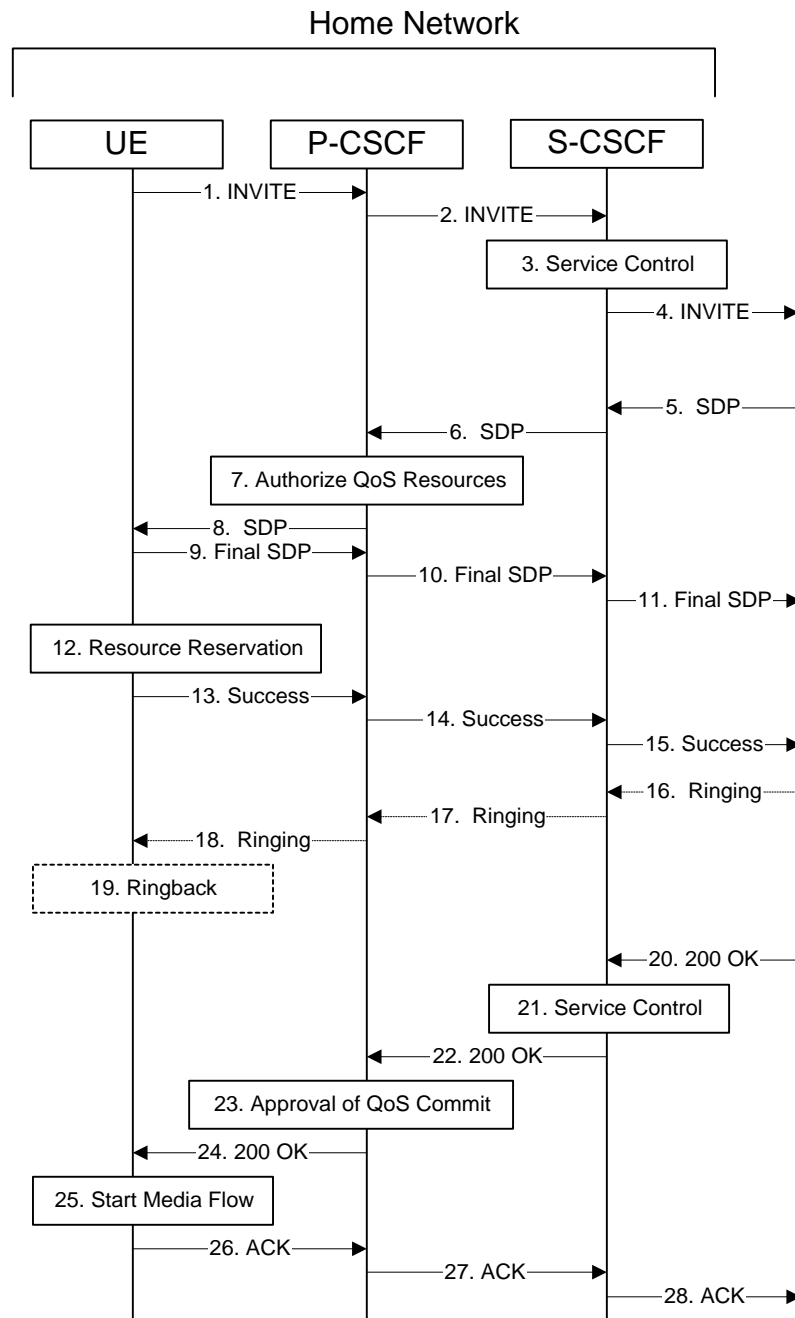
5.6.2 (MO#2) Mobile origination, home

This origination procedure applies to subscribers located in their home service area.

The UE is located in the home network, and determines the P-CSCF via the CSCF discovery procedure described in section 5.1.1. During registration, the home network allocates an S-CSCF in the home network.

When registration is complete, P-CSCF knows the name/address of S-CSCF.

Figure 5.15: Mobile origination procedure - home

Procedure MO#2 is as follows:

1. UE#1 sends the SIP INVITE request, containing an initial SDP, to the P-CSCF determined via the CSCF discovery mechanism. The initial SDP may represent one or more media for a multi-media session.

2. P-CSCF remembers (from the registration procedure) the next hop CSCF for this UE. In this case it forwards the INVITE to the S-CSCF in the home network.

3. S-CSCF validates the service profile, and performs any origination service control required for this subscriber. This includes authorisation of the requested SDP based on the user's subscription for multi-media services.

4. S-CSCF forwards the request, as specified by the S-S procedures.

5. The media stream capabilities of the destination are returned along the signalling path, per the S-S procedures.

6. S-CSCF forwards the SDP message to P-CSCF

7. P-CSCF authorises the resources necessary for this session. The Authorization-Token is generated by the PCF.

8. The Authorization-Token is included in the SDP message. P-CSCF forwards the SDP message to the originating endpoint.

9. UE decides the final set of media streams for this session, and sends the Final SDP to P-CSCF.

10. P-CSCF forwards this message to S-CSCF

11. S-CSCF forwards this message to the terminating endpoint, as per the S-S procedure.

12. After determining the final media streams in step #9, UE initiates the reservation procedures for the resources needed for this session.

13. When the resource reservation is completed, UE sends the "Resource Reservation Successful" message to the terminating endpoint, via the signalling path established by the INVITE message. The message is sent first to P-CSCF.

14. P-CSCF forwards this message to S-CSCF.

15. S-CSCF forwards this message to the terminating endpoint, as per the S-S procedure.

16. The destination UE may optionally perform alerting. If so, it signals this to the originating party by a provisional response indicating Ringing. This message is sent to S-CSCF per the S-S procedure.

17. S-CSCF forwards this message to P-CSCF.

18. P-CSCF forwards the ringing message to UE.

Editor's Note: Additional QoS interactions to handle one-way media at this point (e.g. for PSTN ringback and announcements) is for further study.

19. UE indicates to the originating subscriber that the destination is ringing.

20. When the destination party answers, the terminating endpoint sends a SIP 200-OK final response, as specified by the termination procedures and the S-S procedures, to S-CSCF.

21. S-CSCF performs any origination service control required by session setup completion.

22. S-CSCF passes the 200-OK response back to P-CSCF, following the path of the INVITE request of step (2) above.

23. P-CSCF indicates the resources reserved for this session should now be committed.

24. P-CSCF passes the 200-OK response back to UE

25. UE starts the media flow(s) for this session.

26. UE responds to the 200 OK with an ACK message which is sent to P-CSCF.

27. P-CSCF forwards the final ACK message to S-CSCF.

28. S-CSCF forwards the final ACK message to the terminating endpoint, per the S-S procedure.

*******************************NEXT MODIFICATION*******************************

5.7.1 (MT#1) Mobile termination, roaming

This termination procedure applies to roaming subscribers.

The UE is located in a visited network, and determines the P-CSCF via the CSCF discovery procedure described in section 5.1.1. The home network advertises either the S-CSCF, or an I-CSCF(THIG), as the entry point from the visited network.

When registration is complete, S-CSCF knows the name/address of its next hop in the signalling path, either I-CSCF or P-CSCF, I-CSCF (if it exists) knows the name/address of P-CSCF, and P-CSCF knows the name/address of the UE.
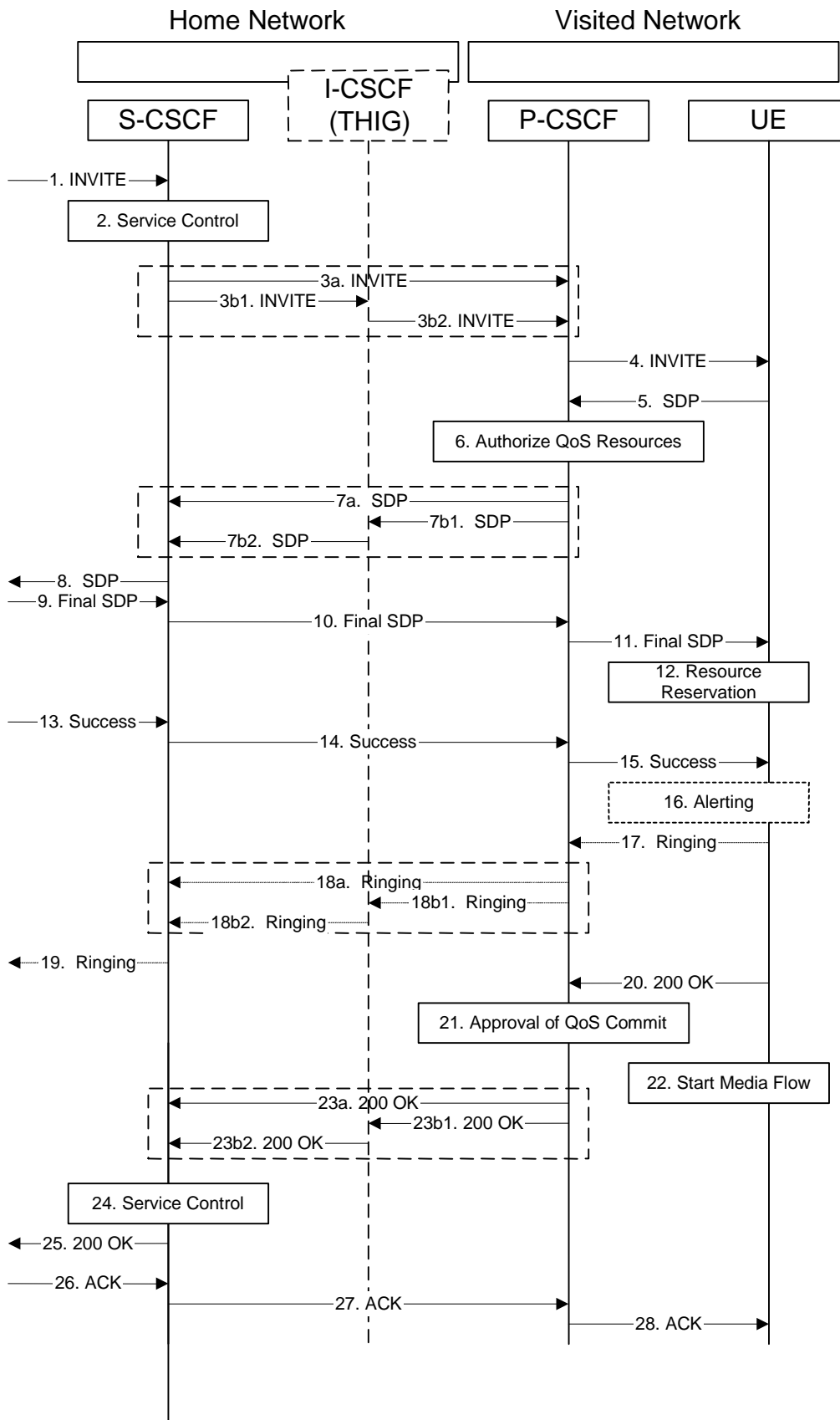
Figure 5.17: Mobile termination procedure - roaming

Procedure MT#1 is as follows:

1. The originating party sends the SIP INVITE request, via one of the origination procedures, and via one of the Inter-Serving procedures, to the Serving-CSCF for the terminating subscriber.

2. S-CSCF validates the service profile, and performs any termination service control required for this subscriber. This includes authorisation of the requested SDP based on the user's subscription for multi-media services.

3. S-CSCF remembers (from the registration procedure) the next hop CSCF for this UE. It forwards the INVITE to the P-CSCF in the visited network, possibly through an I-CSCF.

This next hop is either the P-CSCF that is serving the visiting UE (choice (a)), or an I-CSCF(THIG) within the home network that is performing the configuration hiding function for the home network operator (choice (b)).

(3a) If the home network operator does not desire to keep their network configuration hidden, the INVITE request is forwarded directly to the P-CSCF.

(3b) If the home network operator desires to keep their network configuration hidden, the INVITE request is forwarded through an I-CSCF(THIG) to the P-CSCF.

(3b1) S-CSCF forwards the INVITE request to I-CSCF(THIG)

(3b2) I-CSCF(THIG) forwards the INVITE request to P-CSCF

4. The Authorization-Token is generated by the PCFand included in the INVITE message. P-CSCF remembers (from the registration procedure) the UE address, and forwards the INVITE to the UE.

5. UE determines the subset of the media flows proposed by the originating endpoint that it supports, and responds with an SDP message back to the originator. This SDP may represent one or more media for a multi-media session. This response is sent to P-CSCF.

6. P-CSCF authorises the resources necessary for this session.

7. P-CSCF forwards the SDP message to S-CSCF. Based on the choice made in step #3 above, this may be sent directly to S-CSCF (7a) or may be sent through I-CSCF(THIG) (7b1 and 7b2).

8. S-CSCF forwards the SDP message to the originator, per the S-S procedure.

9. The originating endpoint sends the final SDP to be used in this session, via the S-S procedure, to S-CSCF.

10. S-CSCF forwards the final SDP to P-CSCF. This may possibly be routed through the I-CSCF depending on operator configuration of the I-CSCF.

11. P-CSCF forwards the final SDP to UE.

12. UE initiates the reservation procedures for the resources needed for this session.

13. When the originating endpoint has completed its resource reservation, it sends the "Resource Reservation Successful" message to S-CSCF, via the S-S procedures.

14. S-CSCF forwards the message to P-CSCF. This may possibly be routed through the I-CSCF depending on operator configuration of the I-CSCF.

15. P-CSCF forwards the message to UE.

16. Before proceeding with session establishment, the UE waits for two events. First, the resource reservation initiated in step #12 must complete successfully. Second, the resource reservation initiated by the originating endpoint must complete successfully (which is indicated by message #15 received by UE). The UE may now immediately accept the session (and proceed with step #20), or alert the destination subscriber of an incoming session setup attempt (and proceed with step #17).

17. UE may alert the user and wait for an indication from the user before completing the session setup. If so, it indicates this to the originating party by a provisional response indicating Ringing. This message is sent to P-CSCF.

18. P-CSCF forwards the Ringing message to S-CSCF. Based on the choice made in step #3 above, this may be sent directly to S-CSCF (18a) or may be sent through I-CSCF(THIG) (18b1 and 18b2).

19. S-CSCF forwards this message to the originating endpoint, per the S-S procedure.

20. When the destination party answers, the UE sends a SIP 200-OK final response to P-CSCF.

21. P-CSCF indicates the resources reserved for this session should now be committed.

22. UE starts the media flow(s) for this session

23. P-CSCF sends a SIP 200-OK final response along the signalling path back to the S-CSCF
Based on the choice made in (3) above, this response may either be sent directly from P-CSCF to S-CSCF (choice (a)), or be sent indirectly through the I-CSCF(THIG) (choice (b)).

24. S-CSCF performs whatever service control is required for the session setup completion

25. S-CSCF forwards the SIP 200-OK final response along the signalling path back to the session originator, as per the S-S procedure.

26. The originating party responds to the 200-OK final response with a SIP ACK message that is sent to S-CSCF via the S-S procedure.

27. S-CSCF forwards the SIP ACK message to P-CSCF. This may possibly be routed through the I-CSCF depending on operator configuration of the I-CSCF.

28. P-CSCF forwards the ACK message to UE.

5.7.2 (MT#2) Mobile termination, home

This termination procedure applies to subscribers located in their home service area.

The UE is located in the home network, and determines the P-CSCF via the CSCF discovery procedures described in section 5.1.1.

When registration is complete, S-CSCF knows the name/address of P-CSCF, and P-CSCF knows the name/address of the UE.
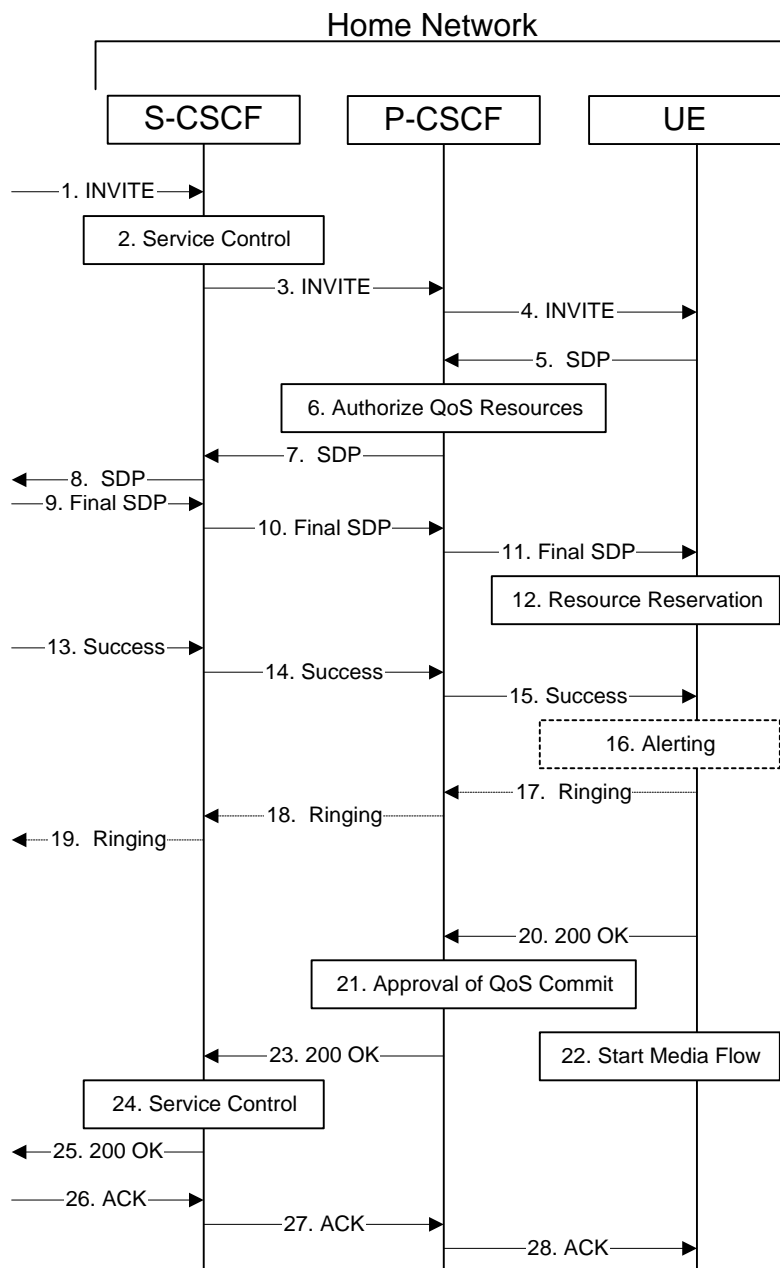
Figure 5.18: Mobile termination procedure - home

Procedure MT#2 is as follows:

1. UE#1 sends the SIP INVITE request, via one of the origination procedures, and via one of the Serving to Serving-CSCF procedures, to the Serving-CSCF for the terminating subscriber.

2. S-CSCF validates the service profile, and performs any termination service control required for this subscriber. This includes authorisation of the requested SDP based on the user's subscription for multi-media services.

3. S-CSCF remembers (from the registration procedure) the next hop CSCF for this UE. It forwards the INVITE to the P-CSCF in the home network.

4. The Authorization-Token is generated by the PCF and included in the INVITE message. P-CSCF remembers (from the registration procedure) the UE address, and forwards the INVITE to the UE.

5. UE determines the subset of the media flows proposed by the originating endpoint that it supports, and responds with an SDP message back to the originator. This SDP may represent one or more media for a multi-media session. This response is sent to P-CSCF.

6. P-CSCF authorises the resources necessary for this session.

7. P-CSCF forwards the SDP message to S-CSCF.

8. S-CSCF forwards the SDP message to the originator, per the S-S procedure.

9. The originating endpoint sends the final SDP to be used in this session, via the S-S procedure, to S-CSCF.

10. S-CSCF forwards the final SDP to P-CSCF.

11. P-CSCF forwards the final SDP to UE.

12. UE initiates the reservation procedures for the resources needed for this session.

13. When the originating endpoint has completed its resource reservation, it sends the "Resource Reservation Successful" message to S-CSCF, via the S-S procedures.

14. S-CSCF forwards the message to P-CSCF.

15. P-CSCF forwards the message to UE.

16. Before proceeding with session establishment, the UE waits for two events. First, the resource reservation initiated in step #12 must complete successfully. Second, the resource reservation initiated by the originating endpoint must complete successfully (which is indicated by message #15 received by UE). The UE may now immediately accept the session (and proceed with step #20), or alert the destination subscriber of an incoming session setup attempt (and proceed with step #17).

17. UE may alert the user and wait for an indication from the user before completing the session. If so, it indicates this to the originating party by a provisional response indicating Ringing. This message is sent to P-CSCF.

18. P-CSCF forwards the Ringing message to S-CSCF.

19. S-CSCF forwards this message to the originating endpoint, per the S-S procedure.

20. When the destination party answers, UE sends a SIP 200-OK final response to P-CSCF.

21. P-CSCF indicates the resources reserved for this session should now be committed.

22. UE starts the media flow(s) for this session.

23. P-CSCF forwards the 200-OK to S-CSCF, following the path of the INVITE request in step (3) above

24. S-CSCF performs any service control required on session setup completion.

25. S-CSCF forwards the 200-OK final response, as per the appropriate S-S procedure.

26. The session originator responds to the 200-OK by sending the ACK message to S-CSCF via the S-S procedure.

27. S-CSCF forwards the SIP ACK message to P-CSCF.

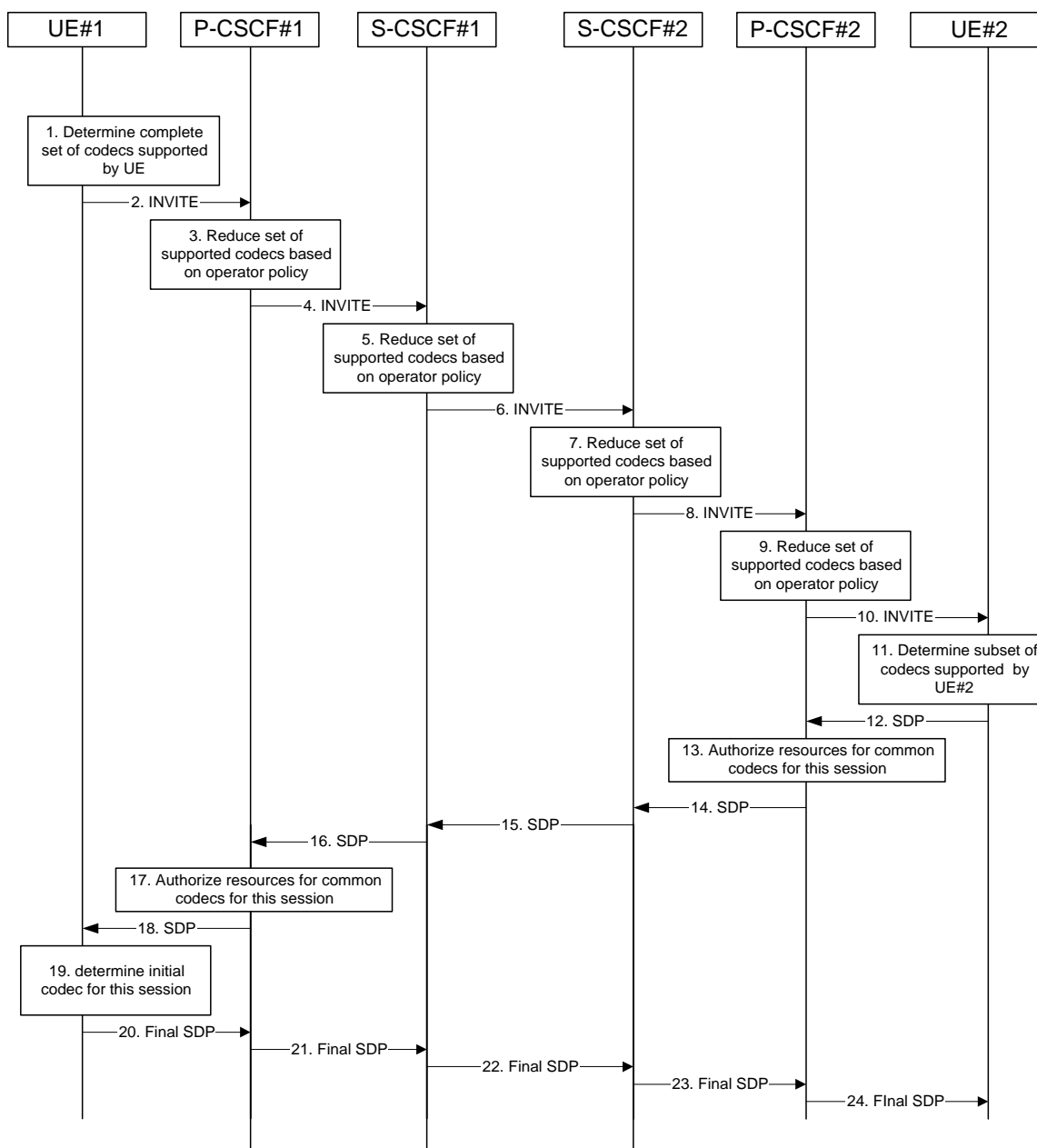28. P-CSCF forwards the ACK message to UE.

*******************************NEXT MODIFICATION*******************************

5.11.3.1   Codec negotiation during initial session establishment

Initial session establishment in the IM CN subsystem must determine a common codec (or set of common codecs for multi-media sessions) that will be used for the session. This is done through an end-to-end message exchange to determine the complete set of common codecs, then the decision is made by the session initiator as to the initial set of media flows.

The session initiator includes an SDP in the SIP INVITE message that lists every codec that the originator is willing to support for this session. When the message arrives at the destination endpoint, it responds with the subset that it is also willing to support for the session. Media authorisation is performed for this common subset. The session initiator, upon receiving the common subset, determines the codec (or set of codecs) to be used initially.

Once the session is established, the procedures of section 5.11.3.2 may be used by either endpoint to change to a different codec that was included in the initial common list, and for which no additional resources are required for media transport. The procedures of section 5.11.3.3 may be used by either endpoint to propose additional codecs, to receive additional authorisation for QoS resources, or to change to a different codec that requires resources beyond those allocated to the session.

Figure 5.30: Codec negotiation during initial session establishment

The detailed procedure is as follows:

1. UE#1 determines the complete set of codecs that it is capable of supporting for this session. It builds a SDP containing bandwidth requirements and characteristics of each, and assigns local port numbers for each possible media flow. Multiple media flows may be offered, and for each media flow (m= line in SDP), there may be multiple codec choices offered.

2. UE#1 sends the initial INVITE message to P-CSCF#1 containing this SDP

3. P-CSCF#1 examines the media parameters, and removes any choices that the nework operator decides based on local policy, not to allow on the network.

4. P-CSCF#1 forwards the INVITE message to S-CSCF#1

5. S-CSCF#1 examines the media parameters, and removes any choices that the subscriber does not have authority to request. As part of the S-CSCF session processing an 'application server' may be involved. When an 'application server' is involved the application server may also examine the media parameters and revise the session description.

6. S-CSCF#1 forwards the INVITE, through the S-S Session Flow Procedures, to S-CSCF#2

7. S-CSCF#2 examines the media parameters, and removes any choices that the destination subscriber does not have authority to request. As part of the S-CSCF session processing an 'application server' may be involved. When an 'application server' is involved the application server may also examine the media parameters and revise the session description.

8. S-CSCF#3 forwards the INVITE message to P-CSCF#2.

9. P-CSCF#2 examines the media parameters, and removes any that the network operator decides, based on local policy, not to allow on the network. The Authorization-Token is generated by the PCF.

10. The Authorization-Token is included in the INVITE message. P-CSCF#2 forwards the INVITE message to UE#2

11. UE#2 determines the complete set of codecs that it is capable of supporting for this session. It determines the intersection with those appearing in the SDP in the INVITE message. For each media flow that is not supported, UE#2 inserts a SDP entry for media (m= line) with port=0. For each media flow that is supported, UE#2 inserts a SDP entry with an assigned port and with the codecs in common with those in the SDP from UE#1.

12. UE#2 returns the SDP listing common media flows and codecs to P-CSCF#2

13. P-CSCF#2 authorises the QoS resources for the remaining media flows and codec choices.

14. P-CSCF#2 forwards the SDP response to S-CSCF#2.

15. S-CSCF#2 forwards the SDP response to S-CSCF#1

16. S-CSCF#1 forwards the SDP response to P-CSCF#1

17. P-CSCF#1 authorises the QoS resources for the remaining media flows and codec choices. The Authorization-Token is generated by the PCF.

18. The Authorization-Token is included in the SDP message. P-CSCF#1 forwards the SDP response to UE#1

19. UE#1 determines which media flows should be used for this session, and which codecs should be used for each of those media flows. If there was more than one media flow, or if there was more than one choice of codec for a media flow, then UE#1 must include an SDP in the "Final SDP" message sent to UE#2.

20-24. UE#2 sends the "Final SDP" message to UE#1, along the signalling path established by the INVITE request

The remainder of the multi-media session completes identically to a single media/single codec session.

CR-Form-v5

CHANGE REQUEST

| ⌘ | **23.228 CR 137** | ⌘ **rev** | **1** | ⌘ | Current version: | **5.3.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title: ⌘	Clarification on Sh interface definition	
Source: ⌘	Ericsson	
Work item code: ⌘	IMS-CCR	***Date:*** ⌘ 08-02-2002

Category: ⌘	**C**			***Release:*** ⌘	REL-5
	Use one of the following categories:			*Use one of the following releases:*	
	F *(correction)*			*2*	*(GSM Phase 2)*
	A *(corresponds to a correction in an earlier release)*			*R96*	*(Release 1996)*
	B *(addition of feature),*			*R97*	*(Release 1997)*
	C *(functional modification of feature)*			*R98*	*(Release 1998)*
	D *(editorial modification)*			*R99*	*(Release 1999)*
	Detailed explanations of the above categories can			*REL-4*	*(Release 4)*
	be found in 3GPP TR 21.900.			*REL-5*	*(Release 5)*

Reason for change: ⌘	Definition of Sh interface not clear enough
Summary of change: ⌘	Section 4.2.4a has been modified. The current description of Sh function means that HSS has not to be aware of what is sending of receiving through this interface. There are many situations, for example mapping of OSA SCFs, in which it is identified the need of parsing and understanding the messages (contents and semantics) by HSS. The term "transparent" is not accurate enough and it is creating a lot of confusion in CN groups. This CR proposes a general description of what this interface is intended for, not precluding the use of this interface for transport of data not known by the HSS.
Consequences if not approved: ⌘	Sh interface usage limited, potential functionality reduced. Confusion and misunderstanding in CN groups regarding this interface.

Clauses affected: ⌘	4.2.4a
Other specs affected: ⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments: ⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be

downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

4.2.4a HSS to service platform Interface

The "application server" (SIP Application Server and/or the OSA service capability server and/or IM-SSF) may communicate to the HSS. The Sh and Si interfaces are used for this purpose. The Sh and Si interfaces are shown in Figure 4.3.

For the Sh interface, the following shall apply:

1 The Sh interface is an intra-operator interface.

2. The Sh interface is between the HSS and the "SIP application server" and between the HSS and the "OSA service capability server".

3 The Sh interface transports transparent data for e.g. service related data , user related information, …
In this case, the term transparent implies that the exact representation of the information is not understood by the HSS or the protocol.

4 The Sh interface also supports mechanisms for transfer of user related data stored in the HSS (e.g. user service related data, MSISDN, visited network capabilities, user location, etc)

The Si interface is between the HSS and the IM-SSF. It transports CAMEL subscription information including triggers for use by CAMEL based application services.

<div align="right">*CR-Form-v5*</div>

CHANGE REQUEST

| | ⌘ | **23.228 CR 131** | ⌘**rev** | **1-** | ⌘ | Current version: | **5.3.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	S-CSCF change
Source:	⌘	Nokia
Work item code: ⌘	IMS-CCR	***Date:*** ⌘ 13.02.2002
Category:	⌘ **B**	***Release:*** ⌘ REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change: ⌘		In case the subscription of the user is changed, e.g. the user subscribes to new services, it may possible that new S-CSCF capabilities, which are required from the S-CSCF, are not supported by the current S-CSCF which has been assigned to the user. In this case, if the S-CSCF is not changed then the subscriber may not be able to use all his/her subscribed services. It may also be possible that the subscriber may receive services, which he/she is not anymore having, and the subscriber may be charged for these services. If the operator has denied services the subscriber may be able to use these services, which he/she is not authorised to use anymore.

In order to solve these issues, it is concluded that it should be possible to actively change the S-CSCF. |

Summary of change: ⌘		The requirement for changing actively the S-CSCF is added.

Consequences if not approved:	⌘	The subscriber may not be able to use all his/her subscribed services. The subscriber may be able to use these services, which he/she is not authorised to use anymore.

Clauses affected:	⌘	5.3.2

Other specs affected:	⌘ **X**	Other core specifications	⌘ 24.228, 24.229, 29.229
		Test specifications	
		O&M Specifications	

Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

5.3.2 Network initiated de-registration

If an ungraceful session termination occurs (e.g. flat battery or mobile leaves coverage), when a stateful proxy server (such as the S-CSCF) is involved in a session, memory leaks and eventually server failure can occur due to hanging state machines. To ensure stable S-CSCF operation and carrier grade service, a mechanism to handle the ungraceful session termination issue is required. This mechanism should be at the SIP protocol level in order to guarantee access independence for the IM CN subsystem.

The IM CN subsystem can initiate a Network Initiated De-Registration procedures for the following reasons:

- Network Maintenance.
  Forced re-registrations from subscribers, e.g. in case of data inconsistency at node failure, in case of SIM lost, etc. Cancelling the current contexts of the user spread among the IM CN Subsystem network nodes at registration, and imposing a new IM registration solves this condition.

- Network/traffic determined.
  The IM CN subsystem must support a mechanism to avoid duplicate registrations or inconsistent information storage. This case will occur when a subscriber roams to a different network without de-registering the previous one. This case may occur at the change of the roaming agreement parameters between two operators, imposing new service conditions to roamers.

- Application Layer determined.
  The service capability offered by the IM CN Subsystem to the Application Layers may have parameters specifying whether all IM CN subsystem registrations are to be removed, or only those from one or a group of terminals from the user, etc.

- Subscription Management
  The operator must be able to restrict user access to the IM CN subsystem upon detection of contract expiration, removal of IM subscription, fraud detection, etc. In case of changes in service profile of the user, e.g. the user subscribes to new services, it may possible that new S-CSCF capabilities, which are required from the S-CSCF, are not supported by the current S-CSCF which has been assigned to the user. In this case, it shall be possible to actively change the S-CSCF by using the network initiated de-registration by HSS procedure.

The following sections provide scenarios showing SIP application de-registration. Note that these flows have avoided the strict use of specific SIP protocol message names. This is in an attempt to focus on the architectural aspects rather than the protocol.

Two types of network-initiated de-registration procedures are required:

- To deal with registrations expirations.

- To allow the network to force de-registrations following any of the approved possible causes for this to occur.

CR-Form-v4

CHANGE REQUEST

| ⌘ | **23.228** CR **138** | ⌘ | ev | **-** | ⌘ | Current version: | **5.3.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network ☐ Core Network **X**

Title:	⌘	Extend support of information transfer between SIP end points
Source:	⌘	Ericsson, Nokia
Work item code: ⌘	IMS-CCR	*Date:* ⌘ 18 February 2002

Category: ⌘ **C**	*Release:* ⌘ R5

Use one of the following categories:
  F *(correction)*
  A *(corresponds to a correction in an earlier release)*
  B *(addition of feature),*
  C *(functional modification of feature)*
  D *(editorial modification)*
Detailed explanations of the above categories can
be found in 3GPP <u>TR 21.900</u>.

Use one of the following releases:
  2   *(GSM Phase 2)*
  R96 *(Release 1996)*
  R97 *(Release 1997)*
  R98 *(Release 1998)*
  R99 *(Release 1999)*
  REL-4 *(Release 4)*
  REL-5 *(Release 5)*

Reason for change:	⌘	Current section describing information exchange towards an UE is restricted to service and network related only. But existing procedures can be used to transfer information between end points as well via IMS taking advantage of services already available.
Summary of change:	⌘	Include the information exchange between end points using SIP based process via IMS.
Consequences if not approved:	⌘	Since the mechanisms already exist in SIP and outside of 3GPP (Internet community), it will restrict services as defined in 3GPP even when terminals may be supporting them for value added. This will create inconsistency and miss services that are value added without additional cost but reusing existing IMS.

Clauses affected:	⌘	Section 5.4.9
Other specs affected:	⌘ **X**	Other core specifications ⌘ 24.228, 24.229
	☐	Test specifications
	☐	O&M Specifications
Other comments:	⌘	

***************FIRST CHANGE*******************

5.4.9   Event and information distribution

The S-CSCF and Application Servers (SIP-AS, IM-SSF, OSA-SCS) shall be able to send service information messages to endpoints. This shall be done based on a SIP Request/Response information exchange containing the service information and/or a list of URI(s) pointing to the location of information represented in other media formats. The stimulus for initiating the service event related information message may come from e.g. a service logic residing in an application server or some other network entity.
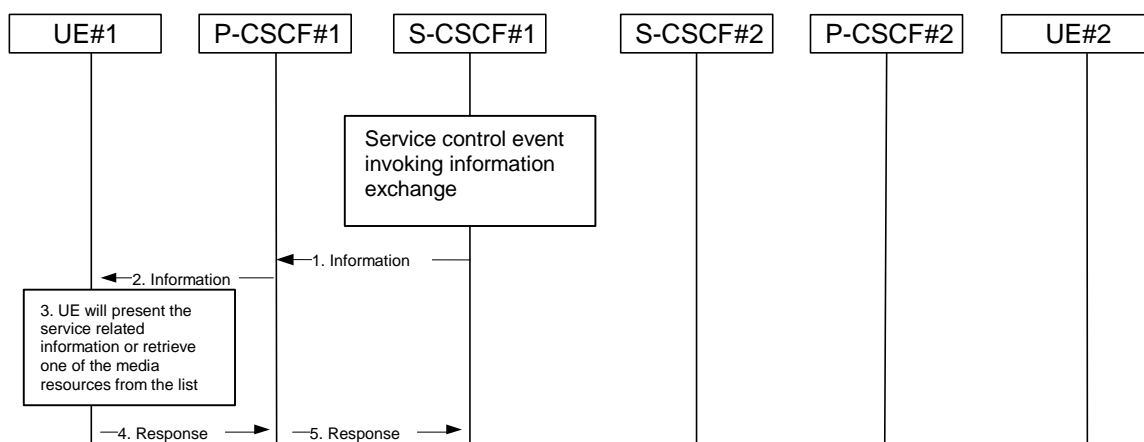
In addition, the end points shall also be able to send information to each other. This information shall be delivered using SIP based messages. The corresponding SIP messages shall be forwarded along the IMS SIP signalling path. This includes the S-CSCF but may also include SIP application servers. The information may be related or unrelated to any ongoing session and/or may be independent of any session. Applicable mechanisms (for e.g. routing, security, charging, etc) defined for IMS SIP sessions shall also be applied for the SIP based messages delivering the end-point information. The length of the information transferred is restricted by the message size (e.g. the MTU), so fragmentation and re-assembly of the information is not required to be supported in the UE. This information may include e.g. text message, http url, etc.

Editor's note: The exact list of these entities is for further study.

This mechanism considers the following issues:

- The IMS has the capability to handle different kinds of media. That is, it is possible to provide information contained within several different media formats e.g. text, pictures or video.

- The UE's level of supporting service event related information and its exchange may depend on the UE's capabilities and configuration.

- A UE not participating in the service related information exchange shall not be effected by a service related information exchange possibly being performed with another UE of the session.

Note: The service event related information exchange may either take place in the context of a session, or independently outside the context of any existing session.

Figure 5.8: Providing service event related information to related endpoint

1. When a service event occurs that the S-CSCF or the Application Server wishes to inform an endpoint about, the S-CSCF or the Application Server generates a message request containing information to be presented to the user. The contents may include text describing the service event, a list of URI(s) or other service modification information.

2. P-CSCF forwards the message request.

3. UE presents the service-related information, to the extent that it conforms to its capabilities and configuration, to the user.

4. Possibly after interaction with the user, the UE will be able to include information in the response to the S-CSCF.

5. P-CSCF forwards the response.

Editor's note: How the UE retrieves the service event related information is FFS.

Note: transport aspects of the information transfer described above may require further considerations.

CR-Form-v4

CHANGE REQUEST

| ⌘ | **23.228** CR **129** | ⌘ | ev **1** | ⌘ | Current version: | **5.3.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network ☐   Core Network ☐

Title: ⌘	Corrections to List of Symbols	
Source: ⌘	Siemens	
Work item code: ⌘	IMS-CCR	***Date:*** ⌘ 29/01/02

Category: ⌘ **D**		***Release:*** ⌘ Rel-5

Use <u>one</u> of the following categories: Use <u>one</u> of the following releases:
  F *(correction)*   2   *(GSM Phase 2)*
  A *(corresponds to a correction in an earlier release)*   R96   *(Release 1996)*
  B *(addition of feature),*   R97   *(Release 1997)*
  C *(functional modification of feature)*   R98   *(Release 1998)*
  D *(editorial modification)*   R99   *(Release 1999)*
Detailed explanations of the above categories can   REL-4   *(Release 4)*
be found in 3GPP <u>TR 21.900</u>.   REL-5   *(Release 5)*

Reason for change: ⌘	The list of symbols in 23.228 contains three symbols, which are not used. On the other hand, a number of symbols is missing.
Summary of change: ⌘	The symbols kbit/s and Mbit/s are deleted from the list of symbols. The symbol Sc is replaced by ISC in the list of symbols. The symbols Mb, Mi, Mj, Mk, Mr, Sh and Si are added to the list of symbols. The definition of Gi is corrected. Where applicable the term "interface" is replaced by "reference point" in alignment with 23.002.
Consequences if not approved: ⌘	

Clauses affected: ⌘	3.2

Other specs affected: ⌘	☐ Other core specifications ⌘	
	☐ Test specifications	
	☐ O&M Specifications	

Other comments: ⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

3.2 Symbols

For the purposes of the present document the following symbols apply:

Cx	~~Interface~~Reference Point between a CSCF and an HSS.
Dx	~~Interface~~Reference Point between an I-CSCF and an SLF.
Gi	Reference point between GPRS and an external packet data network ~~and between an access network and the IM CN Subsystem.~~
Gm	~~Interface~~Reference Point between a UE and a P-CSCF.
ISC	Reference Point between a CSCF and an Application Server.
Iu	Interface between the RNS and the core network. It is also considered as a reference point.
~~kbit/s~~	~~Kilobits per second.~~
~~Mbit/s~~	~~Megabits per second. 1 Mbit/s = 1 million bits per second.~~
Mb	Reference Point to IPv6 network services.
Mg	~~Interface~~Reference Point between a_n MGCF and a CSCF.
Mi	Reference Point between a CSCF and a BGCF.
Mj	Reference Point beetween a BGCF and an MGCF.
Mk	Reference Point betweeen a BGCF and another BGCF.
Mm	~~Interface~~Reference Point between a CSCF and an IP multimedia network.
Mr	Reference Point between an CSCF and an MRFC.
Mw	~~Interface~~Reference Point between a CSCF and another CSCF.
Sh	Reference Point between an AS (SIP-AS or OSA-CSCF) and an HSS.
Si	Reference Point between an IM-SSF and an HSS.
~~Sc~~	~~Interface between a CSCF and an Application Server.~~

CR-Form-v4

CHANGE REQUEST

| ⌘ | **23.228** CR **135** | ⌘ | rev | **1** | ⌘ | Current version: | **5.3.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network ☐   Core Network **X**

Title: ⌘	Corrections to registration parameters	
Source: ⌘	Lucent Technologies	
Work item code: ⌘	IMS-CCR	***Date:*** ⌘ 18.02.2002
Category: ⌘ **F**		***Release:*** ⌘ REL-5

Use <u>one</u> of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP <u>TR 21.900</u>.

Use <u>one</u> of the following releases:
2   *(GSM Phase 2)*
R96   *(Release 1996)*
R97   *(Release 1997)*
R98   *(Release 1998)*
R99   *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change: ⌘	The current text in 23.228 is not consistent with TS 24.228.
Summary of change: ⌘	The parameter lists contained in the sections dealing with Registration are revised to agree with TS 24.228.
Consequences if not approved: ⌘	Incorrect implementation by IMS developers

Clauses affected: ⌘	Existing sections 5.2.2.3, 5.2.2.4, 5.2.2.5, and 5.3.1
Other specs affected: ⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments: ⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

5.2.2.3   Registration information flow – User not registered

The application level registration can be initiated after the registration to the access is performed, and after IP connectivity for the signalling has been gained from the access network. For the purpose of the registration information flows, the subscriber is considered to be always roaming. For subscribers roaming in their home network, the home network shall perform the role of the visited network elements and the home network elements.
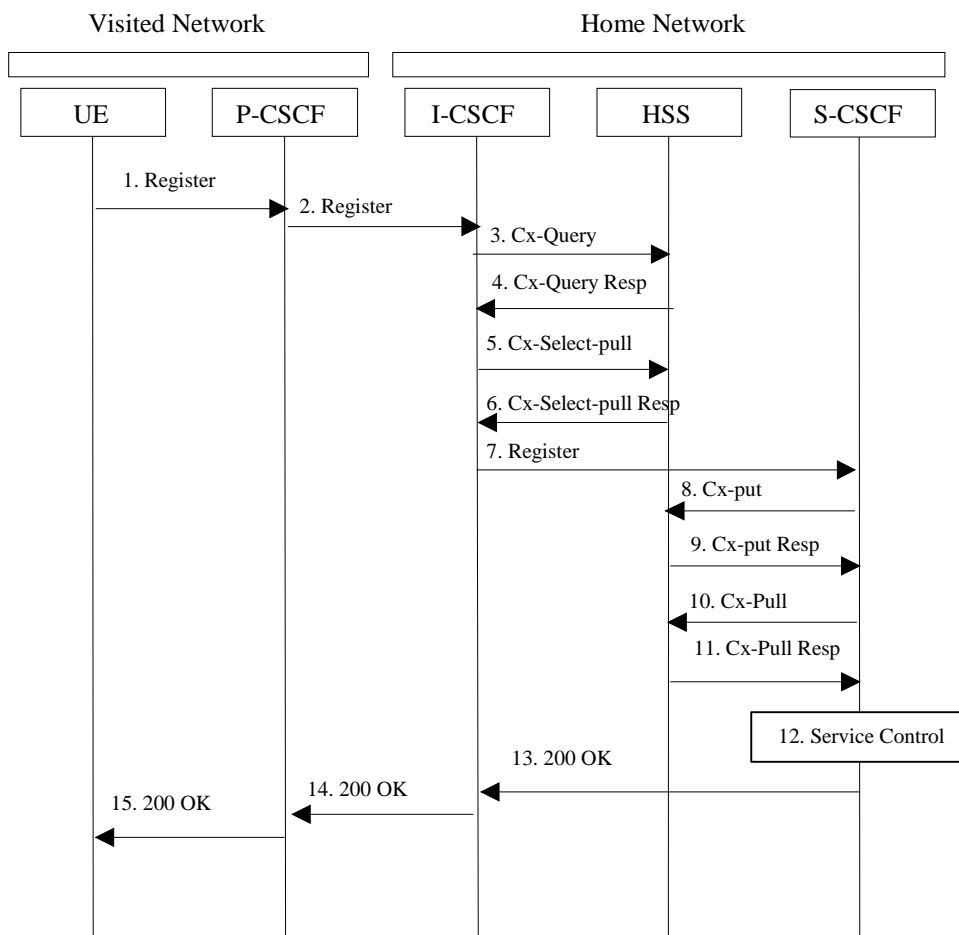

Figure 5.1: Registration – User not registered

1. After the UE has obtained a signalling channel through the access network, it can perform the IM registration. To do so, the UE sends the Register information flow to the proxy (~~subscriber~~ public user identity, private user identity, home network domain name, UE IP address).

2. Upon receipt of the register information flow, the P-CSCF shall examine the "home domain name" to discover the entry point to the home network (i.e. the I-CSCF). The proxy shall send the Register information flow to the I-CSCF (P-CSCF address/name, public user identity, private user~~subscriber~~ identity, P-CSCF network identifier, UE IP address ~~and P-CSCF network contact address/name~~). A name-address resolution mechanism is utilised in order to determine the address of the home network from the home domain name. ~~When the I-CSCF receives the registration information flow from the proxy, it shall examine the subscriber identity and the home domain name, and employ the services of a name-address resolution mechanism, to determine the HSS address to contact.~~ The P-CSCF network identifier is a string that identifies at the home network, the network where the P-CSCF is located (e.g., the P-CSCF network identifier may be the domain name of the P-CSCF network).

3. The I-CSCF shall send the Cx-Query information flow to the HSS (public user identity, private user ~~subscriber~~ identity, ~~home domain name and~~ P-CSCF network identifier).

   The HSS shall check whether the user is registered already. The HSS shall indicate whether the user is allowed to register in that P-CSCF network (identified by the P-CSCF network identifier) according to the User subscription and operator limitations/restrictions if any.

4. Cx-Query Resp is sent from the HSS to the I-CSCF. If the checking in HSS was not successful the Cx-Query Resp shall reject the registration attempt.

5. The I-CSCF shall send Cx-Select-Pull (public user identity, private user ~~subscriber~~ identity) to the HSS to request the information related to the required S-CSCF capabilities which shall be input into the S-CSCF selection function.

6. The HSS shall send Cx-Select-Pull Resp (required S-CSCF capabilities) to the I-CSCF.

7. The I-CSCF, using the name of the S-CSCF, shall determine the address of the S-CSCF through a name-address resolution mechanism. The I-CSCF also determines the name of a suitable home network contact point, possibly based on information received from the HSS. The home network contact point may either be the S-CSCF itself, or a suitable I-CSCF(THIG) in case network configuration hiding is desired. If an I-CSCF(THIG) is chosen as the home network contact point for implementing network configuration hiding, it may be distinct from the I-CSCF that appears in this registration flow, and it shall be capable of deriving the S-CSCF name from the home contact information. I-CSCF shall then send the register information flow (P-CSCF address/name, public user identity, private user ~~subscriber~~ identity, P-CSCF network identifier , ~~P-CSCF network contact address/name,~~ UE IP address, I-CSCF(THIG) in case network configuration hiding is desired) to the selected S-CSCF. The home network contact point will be used by the P-CSCF to forward session initiation signalling to the home network.

8. The S-CSCF shall send Cx-Put (public user ~~subscriber~~ identity, private user identity, S-CSCF name) to the HSS. The HSS stores the S-CSCF name for that subscriber.

9. The HSS shall send Cx-Put Resp to the I-CSCF to acknowledge the sending of Cx-Put.

10. On receipt of the Cx-Put Resp information flow, the S-CSCF shall send the Cx-Pull information flow (~~subscriber~~ public user identity, private user identity) to the HSS in order to be able to download the relevant information from the subscriber profile to the S-CSCF. The S-CSCF shall store the P-CSCF address/name, as supplied by the visited network. This represents the address/name that the home network forwards the subsequent terminating session signalling to for the UE.

11. The HSS shall return the information flow Cx-Pull Resp (user information) to the S-CSCF. The user information passed from the HSS to the S-CSCF shall include one or more names/addresses information which can be used to access the platform(s) used for service control while the user is registered at this S-CSCF. The S-CSCF shall store the information for the indicated user. In addition to the names/addresses information, security information may also be sent for use within the S-CSCF.

12. Based on the filter criteria, the S-CSCF shall send register information to the service control platform and perform whatever service control procedures are appropriate. ~~If an I-CSCF is chosen as the home network contact point for implementing network configuration hiding, the I-CSCF shall encrypt the S-CSCF address in the serving network contact information.~~

13. The S-CSCF shall return the 200 OK information flow (home~~serving~~ network contact information) to the I-CSCF. If an I-CSCF is chosen as the home network contact point for implementing network configuration hiding, the I-CSCF shall encrypt the S-CSCF address in the home network contact information.

14. The I-CSCF shall send information flow 200 OK (~~serving~~ home network contact information) to the P-CSCF. The I-CSCF shall release all registration information after sending information flow 200 OK.

15. The P-CSCF shall store the ~~serving~~ home network contact information, and shall send information flow 200 OK to the UE.

Note: The encryption mechanism for implementing network configuration hiding is specified in TS 33.203.

5.2.2.4 Re-Registration information flow – User currently registered

Editor's Note: the definition of re-registration timers requires further study, however it is noted that the timers in the UE are shorter than the registration related timers in the network.

Periodic application level re-registration is initiated by the UE either to refresh an existing registration or in response to a change in the registration status of the UE. Re-registration follows the same process as defined in subclause 5.2.2.3 "Registration Information Flow – User not registered".
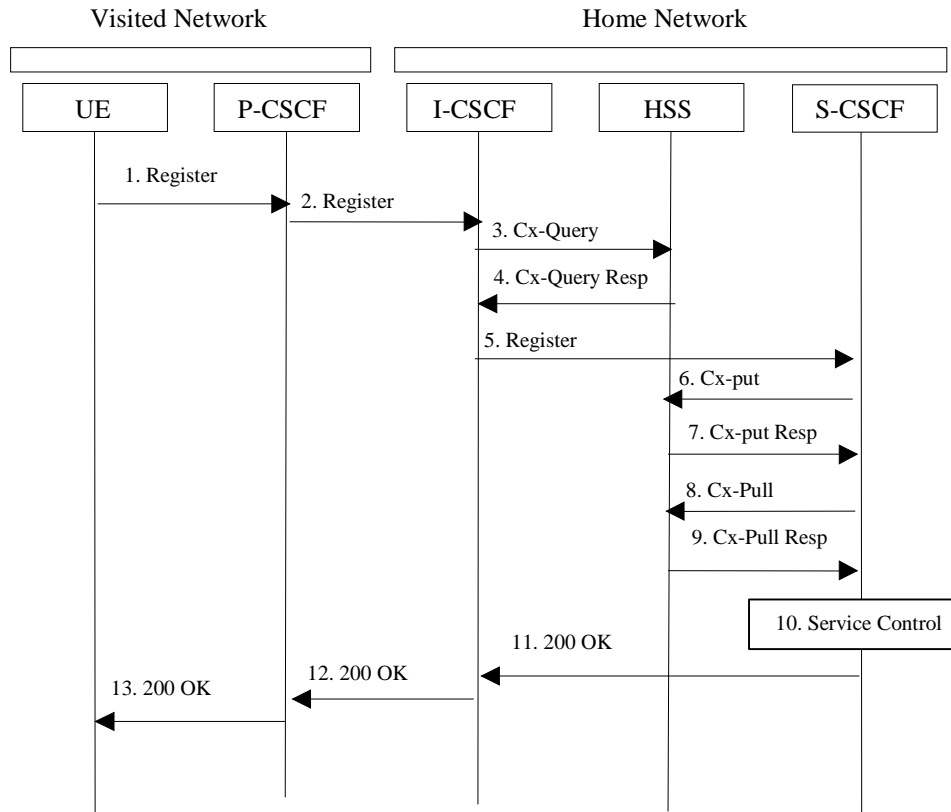
Figure 5.2: Re-registration - user currently registered

1. Prior to expiry of the agreed registration timer, the UE initiates a re-registration. To re-register, the UE sends a new REGISTER request. The UE sends the REGISTER information flow to the proxy (~~subscriber~~ public user identity, private user identity, home network domain name, UE IP address).

2. Upon receipt of the register information flow, the P-CSCF shall examine the "home domain name" to discover the entry point to the home network (i.e. the I-CSCF). The proxy does not use the entry point cached from prior registrations. The proxy shall send the Register information flow to the I-CSCF (P-CSCF address/name, ~~subscriber~~ public user identity, private user identity, P-CSCF network identifier, UE IP address ~~and P-CSCF network contact address/name~~). A name-address resolution mechanism is utilised in order to determine the address of the home network from the home domain name. ~~When the I-CSCF receives the registration information flow from the proxy, it shall examine the subscriber identity and the home domain name, and employ the services of a name-address resolution mechanism, to determine the HSS address to contact.~~ The P-CSCF network identifier is a string that identifies at the home network, the network where the P-CSCF is located (e.g., the P-CSCF network identifier may be the domain name of the P-CSCF network).

3. The I-CSCF shall send the Cx-Query information flow to the HSS (~~subscriber~~ public user identity, private user identity and P-CSCF network identifier).

4. The HSS shall check whether the user is registered already and return an indication indicating that an S-CSCF is assigned. The Cx-Query Resp (indication of entry contact point, e.g. S-CSCF) is sent from the HSS to the I-CSCF.

5. The I-CSCF, using the name of the S-CSCF, shall determine the address of the S-CSCF through a name-address resolution mechanism. The I-CSCF also determines the name of a suitable home network contact point, possibly based on information received from the HSS. The home network contact point may either be the S-CSCF itself, or a suitable I-CSCF(THIG) in case network configuration hiding is desired. If an I-CSCF(THIG) is chosen as the home network contact point for implementing network configuration hiding, it may be distinct from the I-CSCF that appears in this registration flow, and it shall be capable of deriving the S-CSCF name from the home contact information. I-CSCF shall then send the register information flow (P-CSCF address/name, ~~subscriber~~ public user identity, private user identity, P-CSCF network identifier~~contact address/name~~, UE IP address, I-CSCF(THIG) in case network configuration hiding is desired) to the selected S-CSCF. The home network contact point will be used by the P-CSCF to forward session initiation signalling to the home network.

6. The S-CSCF shall send Cx-Put (~~subscriber~~ public user identity, private user identity, S-CSCF name) to the HSS. The HSS stores the S-CSCF name for that subscriber. Note: Optionally as an optimisation, the S-CSCF can detect that this is a re-registration and omit the Cx-Put request.

7. The HSS shall send Cx-Put Resp to the S-CSCF to acknowledge the sending of Cx-Put.

8. On receipt of the Cx-Put Resp information flow, the S-CSCF shall send the Cx-Pull information flow (~~subscriber~~ public user identity, private user identity) to the HSS in order to be able to download the relevant information from the subscriber profile to the S-CSCF. The S-CSCF shall store the P-CSCF address/name, as supplied by the visited network. This represents the address/name that the home network forwards the subsequent terminating session signalling to for the UE. Note: Optionally as an optimisation, the S-CSCF can detect that this a re-registration and omit the Cx-Pull request.

9. The HSS shall return the information flow Cx-Pull-Resp (user information) to the S-CSCF. The S-CSCF shall store the user information for that indicated user.

10. Based on the filter criteria, the S-CSCF shall send re-registration information to the service control platform and perform whatever service control procedures are appropriate. ~~If an I-CSCF is chosen as the home network contact point for implementing network configuration hiding, the I-CSCF shall encrypt the S-CSCF address in the serving network contact information.~~

11. The S-CSCF shall return the 200 OK information flow (~~serving~~ home network contact information) to the I-CSCF. If an I-CSCF is chosen as the home network contact point for implementing network configuration hiding, the I-CSCF shall encrypt the S-CSCF address in the home network contact information.

12. The I-CSCF shall send information flow 200 OK (~~serving~~ home network contact information) to the P-CSCF. The I-CSCF shall release all registration information after sending information flow 200 OK.

13. The P-CSCF shall store the ~~serving~~ home network contact information, and shall send information flow 200 OK to the UE.

Note: The encryption mechanism for implementing network configuration hiding is specified in TS 33.203.

5.2.2.5 Stored information.

Table 5.1 provides an indication of the information stored in the indicated nodes during and after the registration process.

Table 5.1 Information Storage before, during and after the registration process

Node	Before Registration	During Registration	After Registration
UE - in local network	Credentials Home Domain Proxy Name/Address	Same as before registration	~~Credentials~~ ~~Home Domain~~ ~~Proxy Name/Address~~ Same as before registration
Proxy-CSCF - in local network	Routing Function	Initial Network Entry point UE Address Public and Private User IDs	Final Network Entry point UE Address Public and Private User IDs
Interrogating-CSCF - in Home network	HSS or SLF Address	Serving-CSCF address/name P-CSCF Network ID Home Network contact Information (Editors Note: Access to Potential list of Serving-CSCFs is FFS)	No State Information
HSS	User Service Profile	P-CSCF Network ID	Serving-CSCF address/name\
Serving-CSCF (Home)	No state information	HSS Address/name Subscriber profile (limited – as per network scenario) Proxy address/name P-CSCF Network ID Public/Private User ID UE IP Address	May have session state Information ~~HSS Address/name~~ ~~Subscriber information~~ ~~Proxy address/name~~Same as during registration

5.3 Application level de-registration procedures

5.3.1 Mobile initiated de-registration

When the UE wants to de-register from the IMS then the UE shall perform application level de-registration. De-registration is accomplished by a registration with an expiration time of zero seconds. De-registration follows the same path as defined in subclause 5.2.2.3 "Registration Information Flow – User not registered".
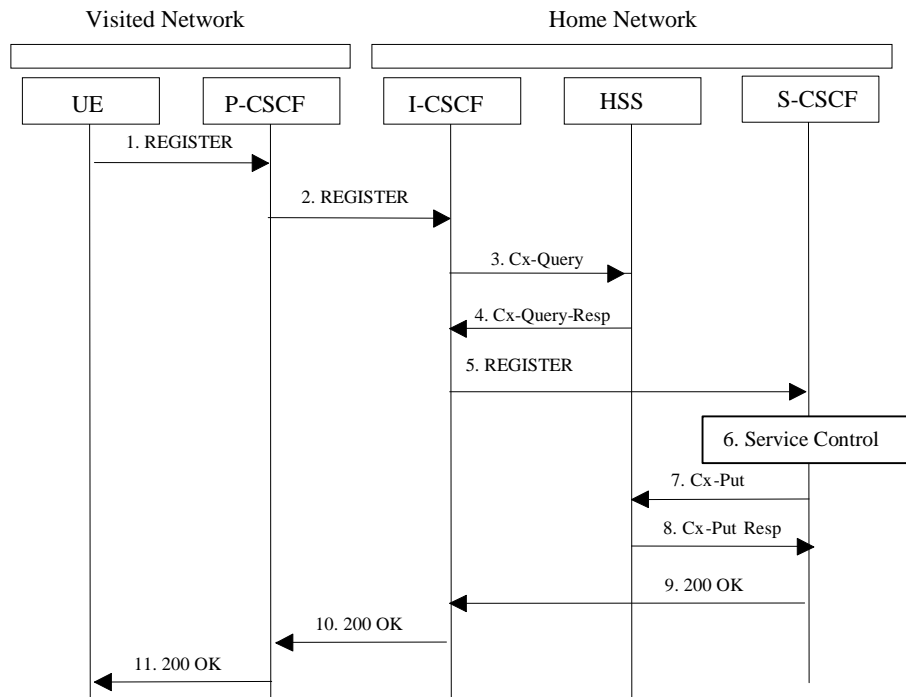
Figure 5.3: De-registration - user currently registered

1. The UE decides to initiate de-registration. To de-register, the UE sends a new REGISTER request with an expiration value of zero seconds. The UE sends the REGISTER information flow to the proxy (~~subscriber~~ public user identity, private user identity, home network domain name, UE IP address).

2. Upon receipt of the register information flow, it shall examine the "home domain name" to discover the entry point to the home network (i.e. the I-CSCF). The proxy does not use the entry point cached from prior registrations. The proxy shall send the Register information flow to the I-CSCF (P-CSCF address/name, ~~subscriber~~ public user identity, private user identity, P-CSCF network identifier, UE IP address ~~and P-CSCF network contact address/name~~). A name-address resolution mechanism is utilised in order to determine the address of the home network from the home domain name. ~~When the I-CSCF receives the registration information flow from the proxy, it shall examine the subscriber identity and the home domain name, and employ the services of a name-address resolution mechanism, to determine the HSS address to contact.~~ The P-CSCF network identifier is a string that identifies at the home network, the network where the P-CSCF is located (e.g., the P-CSCF network identifier may be the domain name of the P-CSCF network).

3. The I-CSCF shall send the Cx-Query information flow to the HSS (~~subscriber~~ public user identity, private user identity, ~~home domain name and~~ P-CSCF network identifier).

4. The HSS shall determine that the user is currently registered. The Cx-Query Resp (indication of entry point, e.g. S-CSCF) is sent from the HSS to the I-CSCF.

5. The I-CSCF, using the name of the S-CSCF, shall determine the address of the S-CSCF through a name-address resolution mechanism and then shall send the de-register information flow (P-CSCF addres/name, ~~subscriber~~ public user identity, private user identity, ~~P-CSCF network contact address/name~~ UE IP address, I-CSCF(THIG) in case network configuration hiding is desired) to the S-CSCF.

6. Based on the filter criteria, the S-CSCF shall send de-registration information to the service control platform and perform whatever service control procedures are appropriate.

7. The S-CSCF shall send Cx-Put (~~subscriber~~ public user identity, private user identity, clear S-CSCF name) to the HSS. The HSS clears the S-CSCF name for that subscriber.

8. The HSS shall send Cx-Put Resp to the S-CSCF to acknowledge the sending of Cx-Put.

9. The S-CSCF shall return the 200 OK information flow to the I-CSCF. The S-CSCF may release all registration information regarding this specific registration of the subscriber after sending information flow 200 OK.

10. The I-CSCF shall send information flow 200 OK to the P-CSCF.

11. The P-CSCF shall send information flow 200 OK to the UE. The P-CSCF may release all registration information regarding this specific registration of the subscriber after sending information flow 200 OK.

3GPP TSG-SA2 Meeting #23
Sophia Antipolis, France,18-22 Feb. 2002

Tdoc S2-020839

CHANGE REQUEST

⌘   **23.228 CR 149**   ⌘   **1**   ⌘   Current version: **5.3.0**   ⌘

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Proposed change affects: ⌘   (U)SIM ☐   ME/UE **X**   Radio Access Network ☐   Core Network **X**

Title: ⌘	Provision of 'VPLMN provided services' in IMS	
Source: ⌘	Drafting group: Alcatel, Ericsson, Siemens, Nokia, Vodafone	
Work item code: ⌘	IMS-CCR	***Date:*** ⌘ 21/2/02

Category: ⌘   **C**   ***Release:*** ⌘   REL-5

Use one of the following categories:
   F *(correction)*
   A *(corresponds to a correction in an earlier release)*
   B *(addition of feature),*
   C *(functional modification of feature)*
   D *(editorial modification)*
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use one of the following releases:
   2   *(GSM Phase 2)*
   R96   *(Release 1996)*
   R97   *(Release 1997)*
   R98   *(Release 1998)*
   R99   *(Release 1999)*
   REL-4   *(Release 4)*
   REL-5   *(Release 5)*

Reason for change: ⌘	The IMS specifications do not currently adequately describe how 'VPLMN provided services' are supported.
	This CR proposes a standardised means for their support.

Summary of change: ⌘	To clarify that:

- A roaming user must be able to indicate in the SIP INVITE whether 'Home Network' or 'Visited Network' dialing plan applies.
- The same indication shall be used to access Visited Network provided local services as well as to use the Visited Network local numbering plan.
- Processing the SIP URI (e.g. Number analysis and potential modification such as translation from Visited Network format into international format) shall be performed by an Application Server in the user's Home Network.
- A special filter in S-CSCF is needed to direct incoming SIP messages including this indication to that Home Network Application Server.
- The S-CSCF routes the SIP INVITE towards its destination (e.g. Application Server in Visited Network delivering the local service) via normal SIP routing. The ISC interface shall not be used as an inter-PLMN interface.

Consequences if not approved: ⌘	Local services cannot be provided in R'5.

Clauses affected: ⌘	4.2.2 and 4.6.1.

Other specs Affected: ⌘	☐ Other core specifications ⌘		
	☐ Test specifications		
	☐ O&M Specifications		

Other comments: ⌘	SA 1 might wish to consider standardising the MMI for 'local services'. During conversation a "minus" key was suggested.

4.2.2   Support of Local Services in the IMS

Visited network provided services offer an opportunity for revenue generation by allowing access to services of a local nature to visiting users (inbound roamers). There shall be a standardised means to access local services. The mechanism to access local services shall be exactly the same for home users and inbound roamers.

Access to local sServices shall be provided in the following manner

1. It shall be possible for the HPLMN network to determine whether the roaming subscriber is requesting a local service, or is "dialing" an address according to the local addressing plan. This shall be in the visited IMS or a local service in the home IMS network based upon an indicationinformation received from the UE. The same indication shall be used to access local services as well as to use the local addressing plan. This indicationinformation shallmay be included in the Request URI of the SIP Invite. e.g. the Request URI. The means by which the network determines whether the local services in the visited network or home network are accessed shall be standardised.

2.   In the case where the service is to be provided by the visited IMS network, the P-CSCF, if required, will modify the "routing information" to a globally routable address. This will result in the S-CSCF in the home network routing the request back to the visited network.

3. The P-CSCF shall route the session towards the S-CSCF as per the session origination procedures., where the execution of the originating subscriber's home services are to be executed.

4.   Processing the SIP URI (e.g. address analysis and potential modification such as translation into globally routable format) shall be performed by an Application Server in the subscriber's Home Network. The S-CSCF routes the session towards this Home Network Application Server based upon filter criteria which are triggered by the 'local indication' received from the UE.

5.   The S-CSCF routes the session, via normal SIP routing, towards its destination (eg a server in the VPLMN). The ISC interface is not used as an inter-operator interface.

For the mechanisms defined above local services may be provided by the visited and/or the home network based on the end-user's selection. The local services provided by the mechanism above do not depend on a profile of the home environment services.

There shall be a standardised mechanism for the UE that is registered in the IM Subsystem, to receive and/or retrieve information about the available local services. It shall be possible to advertise local services to a registered UE independent of whether the UE has an active SIP session. Local services may be presented e.g. by directing the user to a web page.

Note: For users who have roamed, local services relevant to the locality of the user may also be provided by the home network.

4.6 Roles of Session Control Functions

The CSCF may take on various roles as used in the IP multimedia subsystem. The following sections describe these various roles.

4.6.1 Proxy-CSCF

The Proxy-CSCF (P-CSCF) is the first contact point within the IM CN subsystem. Its address is discovered by UEs following PDP context activation, using the mechanism described in section "Procedures related to Local CSCF Discovery ". The P-CSCF behaves like a Proxy (as defined in RFC2543 or subsequent versions), i.e. it accepts requests and services them internally or forwards them on, ~~possibly after translation~~. The P-CSCF shall not modify the Request URI in the SIP INVITE message. The P-CSCF may ~~also~~ behave as a User Agent (as defined in the RFC2543 or subsequent versions), i.e. in abnormal conditions it may terminate and independently generate SIP transactions.

The Policy Control Function (PCF) is a logical entity of the P-CSCF. If the PCF is implemented in a separate physical node, the interface between the PCF and the P-CSCF is not standardised.

The functions performed by the P-CSCF are:

- Forward the SIP register request received from the UE to an I-CSCF determined using the home domain name, as provided by the UE.

- Forward SIP messages received from the UE to the SIP server (e.g. S-CSCF) whose name the P-CSCF has received as a result of the registration procedure.

- ~~As part of processing of the request and before forwarding, the P-CSCF may modify the Request URI of outgoing requests according to a set of provisioned rules defined by the network operator (e.g. Number analysis and potential modification such as translation from local to international format.)~~

- Forward the SIP request or response to the UE.

- Detect an emergency session and select a S-CSCF to handle emergency sessions.

- Generation of CDRs.

- Maintain a Security Association between itself and each UE, as defined in TS 33.203 [19].

- Should perform SIP message compression/decompression.

Editor's Note: The following functions require further study:

- Authorisation of bearer resources and QoS management. Details of the P-CSCF role in QoS management and authorisation of bearer resources for the session are being investigated by the QoS ad-hoc group.

									CR-Form-v5

CHANGE REQUEST

⌘	**23.228** CR **150**	⌘**rev**	**1**	⌘	Current version:	**5.3.0**	⌘

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Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title: ⌘	Corrections to P-CSCF's functions	
Source: ⌘	Nokia	
Work item code: ⌘	IMS-CCR	***Date:*** ⌘ 21.02.2002

Category: ⌘ **F**		***Release:*** ⌘ REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can
be found in 3GPP <u>TR 21.900</u>.

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change: ⌘	Ericsson's CR 109 (S2-013555) was agreed but the CR was not fully implemented on the TS 23.228 ver. 5.3.0. In addition in SA2#23 Lucent's CR 136 (S2-020513) cleans up Editor's Notes from the TS 23.228. The CR 109 contained an editor's note " Editors Note: It is for further study as to how the P-CSCF will understand that this is an emergency session request.".
Summary of change: ⌘	A correction to a subsection 4.6.1 is made based on 109<u>.</u> and the editor's note is removed.
Consequences if not approved: ⌘	Unconsistent specification and an agreed CR is not fully implemented

Clauses affected: ⌘	4.6.1	
Other specs affected: ⌘	☐ Other core specifications ⌘	
	☐ Test specifications	
	☐ O&M Specifications	
Other comments: ⌘		

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1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

4.6.1   Proxy-CSCF

The Proxy-CSCF (P-CSCF) is the first contact point within the IM CN subsystem. Its address is discovered by UEs following PDP context activation, using the mechanism described in section "Procedures related to Local CSCF Discovery ". The P-CSCF behaves like a Proxy (as defined in RFC2543 or subsequent versions), i.e. it accepts requests and services them internally or forwards them on, possibly after translation. The P-CSCF may also behave as a User Agent (as defined in the RFC2543 or subsequent versions), i.e. in abnormal conditions it may terminate and independently generate SIP transactions.

The Policy Control Function (PCF) is a logical entity of the P-CSCF. If the PCF is implemented in a separate physical node, the interface between the PCF and the P-CSCF is not standardised.

The functions performed by the P-CSCF are:

- Forward the SIP register request received from the UE to an I-CSCF determined using the home domain name, as provided by the UE.

- Forward SIP messages received from the UE to the SIP server (e.g. S-CSCF) whose name the P-CSCF has received as a result of the registration procedure.

- As part of processing of the request and before forwarding, the P-CSCF may modify the Request URI of outgoing requests according to a set of provisioned rules defined by the network operator (e.g. Number analysis and potential modification such as translation from local to international format.)

- Forward the SIP request or response to the UE.

- Detect and reject handle an emergency session establishment request as per error handling procedures defined by stage-3.and select a S-CSCF to handle emergency sessions.

- Generation of CDRs.

- Maintain a Security Association between itself and each UE, as defined in TS 33.203 [19].

- Should perform SIP message compression/decompression.

Editor's Note: The following functions require further study:

- Authorisation of bearer resources and QoS management. Details of the P-CSCF role in QoS management and authorisation of bearer resources for the session are being investigated by the QoS ad-hoc group.

CR-Form-v4

CHANGE REQUEST

| ⌘ | **23.228** CR **136** | ⌘ | rev | **1** | ⌘ | Current version: | **5.3.0** | ⌘ |

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Proposed change affects: ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network ☐   Core Network **X**

Title: ⌘	Removal of Editor's Notes and FFS items	
Source: ⌘	Lucent Technologies	
Work item code: ⌘	IMS-CCR	***Date:*** ⌘ 18.02.2002
Category: ⌘ **F**		***Release:*** ⌘ REL-5

Use <u>one</u> of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP <u>TR 21.900</u>.

Use <u>one</u> of the following releases:
2   *(GSM Phase 2)*
R96   *(Release 1996)*
R97   *(Release 1997)*
R98   *(Release 1998)*
R99   *(Release 1999)*
REL-4   *(Release 4)*
REL-5   *(Release 5)*

Reason for change: ⌘	There are several items that are incorrectly marked as for further study that need to be corrected.	
Summary of change: ⌘	For further study items are removed or replaced.	
Consequences if not approved: ⌘	The specification cannot be considered complete.	

Clauses affected: ⌘	Existing sections 4.2.3, 4.2.4, 4.2.4b, 4.3.3.4, 4.4, 4.6.1, 5.1.0, 5.1.2.1, 5.2.1, 5.2.2.4, 5.2.2.5, 5.3.2.2, 5.3.2.2.1, 5.3.2.2.2, 5.4.1, 5.4.9, 5.6.1, 5.6.2, 5.8.1, 5.8.3, 5.11.3, B.5.1, B.6, C.

Other specs affected: ⌘	☐	Other core specifications ⌘	
	☐	Test specifications	
	☐	O&M Specifications	

Other comments: ⌘	

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.
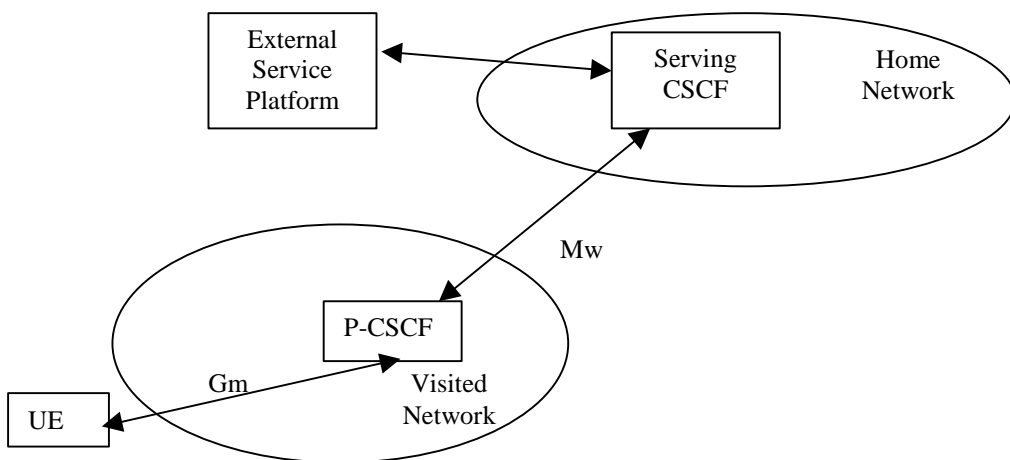
------First Change------

4.2.3   Support of roaming subscribers

The architecture shall be based on the principle that the service control for Home subscribed services for a roaming subscriber is in the Home network, e.g., the Serving-CSCF is located in the Home network.
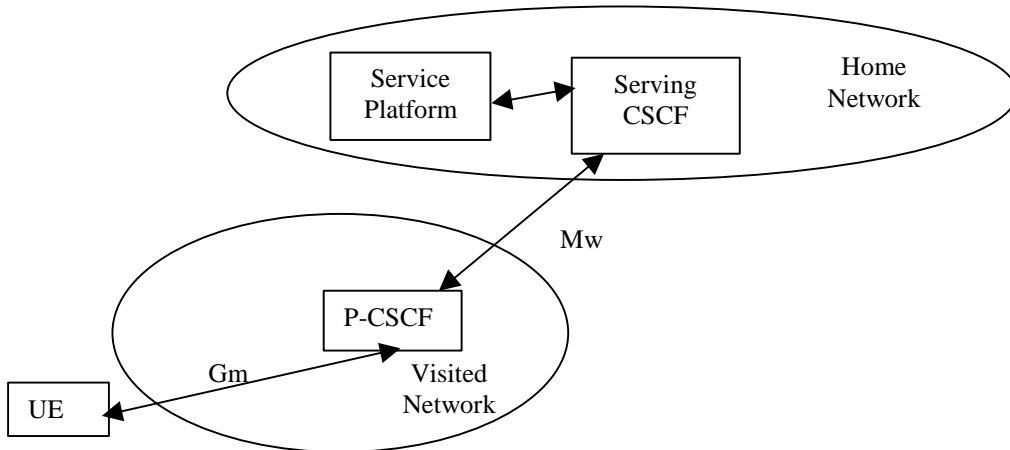
Figure 4-1: Service Platform in Home Network

Figure 4-2: External Service Platform

There are two possible scenarios to provide services:

   - via the service platform in the Home Network

   - via an external service platform (e.g. third party or visited network)

The box representing the external service platform could be located in either the visited network or in the 3rd party platform.

   Editor's Note: the types of protocols to be used on the interfaces between the Serving-CSCF and the different service platforms in these different scenarios are FFS.

The roles that the CSCF plays are described below.

------Next Change------

4.2.4 IP multimedia Subsystem Service Control Interface (ISC)

The ISC interface is between the Serving CSCF and the service platform(s).

An Application Server (AS) offering value added IM services resides either in the user's home network or in a third party location. The third party could be a network or simply a stand-alone AS.

The Serving-CSCF to AS interface is used to provide services residing in an AS. Two cases were identified:

- Serving-CSCF to an AS in Home Network.

- Serving-CSCF to an AS in External Network (e.g., Third Party or Visited)

Regarding the general provision of services in the IMS, the following statements shall guide the further development.

1. Besides the Cx interface the S-CSCF supports only one standardised protocol for service control, which delegates service execution to an "Application Server".

2. The depicted functional architecture does not propose a specific physical implementation.

3. Scope of the SIP Application Server: the SIP Application Server may host and execute services. It is intended to allow the SIP Application Server to influence and impact the SIP session on behalf of the services and it uses the ISC interface to communicate with the S-CSCF.

4. The S-CSCF shall decide whether an Application Server is required to receive information related to an incoming SIP session request to ensure appropriate service handling.. The decision at the S-CSCF is based on (filter) information received from the HSS (or other sources, e.g. application servers). This filter information is stored and conveyed on a per application server basis for each subscriber. The name(s)/address(es) information of the application server(s) are received from the HSS.

   ~~Editors Note: The details of the "filter" information has to be further identified.~~

5. The purpose of the IM SSF is to host the CAMEL network features (i.e. trigger detection points, CAMEL Service Switching Finite State Machine, etc) and to interface to CAP.

6. The IM SSF and the CAP interface support legacy services only.

7. Once the IM SSF, OSA SCS or SIP Application Server has been informed of a SIP session request by the S-CSCF, the IM SSF, OSA SCS or SIP Application Server shall ensure that the S-CSCF is made aware of any resulting activity by sending messages to the S-CSCF.

8. From the perspective of the S-CSCF, The "SIP Application server", "OSA service capability server" and "IM-SSF" shall exhibit the same interface behaviour.

9. The application server may contain "service capability interaction manager" (SCIM) functionality and other application servers. The SCIM functionality is an application which performs the role of interaction management. The internal components are represented by the "dotted boxes" inside the SIP application server. The internal structure of the application server is outside the standards.
   The Sh interface shall have sufficient functionality to enable this scenario.

10. When the name/address of more than one "application server" is transferred from the HSS, the S-CSCF shall contact the "application servers" in the order supplied by the HSS. The response from the first "application server" shall be used as the input to the second "application server".

11. The S-CSCF does not handle service interaction issues..

12. The S-CSCF does not provide authentication and security functionality for secure direct third party access to the IM subsystem. The OSA framework provides a standardized way for third party secure access to the IM subsystem.

More specifically the following requirements apply to the IMS Service control interface:

1. The ISC interface shall be able to convey charging information.

2. The protocol on the ISC interface shall support the control of timers

3. The protocol on the ISC interface shall allow the S-CSCF to differentiate between session control on Mw, Mm and Mg interfaces and the ISC interface.

Editors Note: Further requirements are for further study.

------Next Change------

4.2.4b   S-CSCF Service Control Model
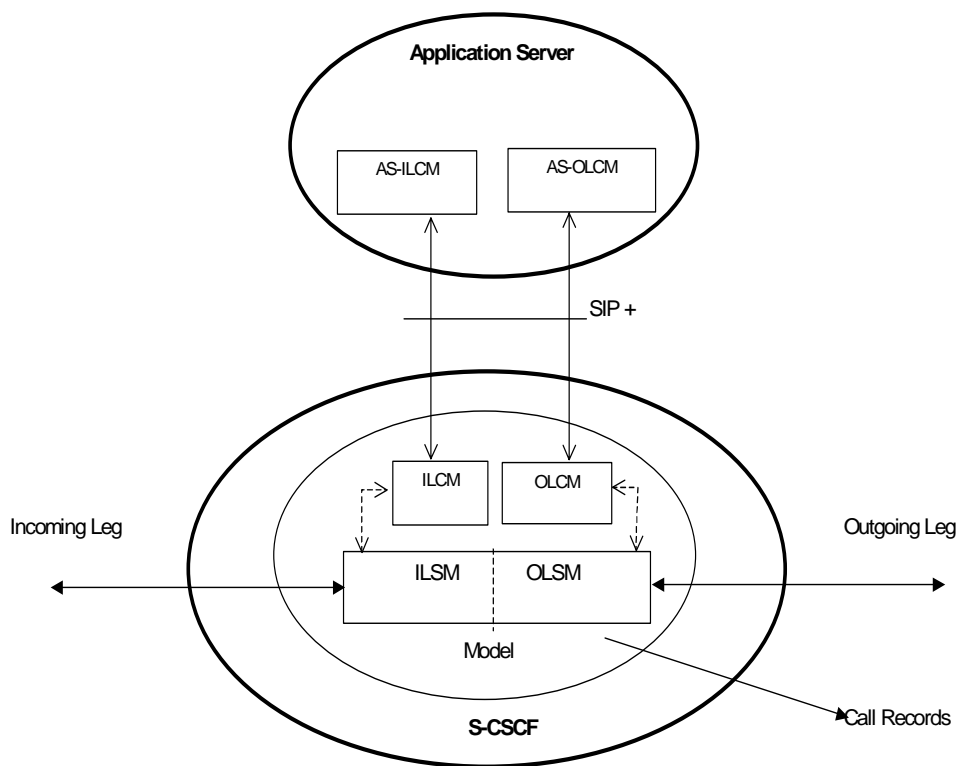
Figure 4.3f: Service Control Model with Incoming Leg Control and Outgoing Leg Control

Figure 1 illustrates the relationship between the S-CSCF and AS. It includes a first-level of modelling inside the S-CSCF and inside the AS. To keep the model simple only one incoming leg and one outgoing leg are shown. In practice a session may consist of more than one incoming leg and/or more than one outgoing leg(s), when using User Agents. An AS may create one or more outgoing legs independent of incoming legs. An AS may create one or more outgoing legs even when there are no incoming legs.
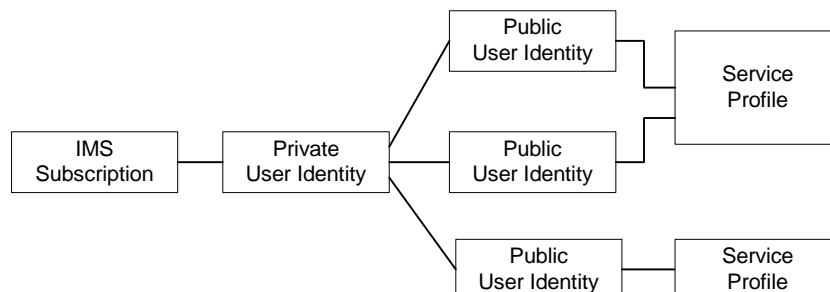
Editor's note: Registration is FFS.

While the above figures show session related flows, the service control model can be applied to other SIP transactions such as registration.

------Next Change------

4.3.3.4 Relationship of private and public user identities

The home network operator is responsible for the assignment of the private user identifier, and public user identifiers; other identities that are not defined by the operator may also exist.

Figure 4.5: Relationship of the private user identity and public user identities

All Public user identities that are associated with the same Service Profile should have the same set of services. Public user identities that are associated with a different Service Profile could have a different set of services. Each Public user identity is only associated with a single Service Profile.

All Service Profiles that share the same Private user identity are associated to the same S-CSCF. Later releases may allow different Service Profiles that share the same Private user identity to be associated with different S-CSCFs.

The home domain name of the subscriber shall be stored securely on the USIM, (it shall not be possible for the UE to modify the home domain name).

The storage location of the Private User Identity, Public User Identity and home domain name for a standalone SIP Client could be stored on the USIM.

> Editors Note: ~~Mechanisms used to extract the Private User Identity, Public User Identity and home domain name from the USIM (e.g. when an external SIP TE is used) are for further study of the groups T2, T3 and SA3.~~

It is not a requirement for a user to be able to register on behalf of another user or for a device to be able to register on behalf of another device or for combinations of the above for the IM CN subsystem for this release.

> ~~Editor's Note: Public User Identity Portability issues are FFS.~~

------Next Change------

4.4 Signalling concepts

A Single session control between the UE and CSCF. For Multi-Media type services delivered via the PS Domain within this architecture, a single session control protocol shall be used between the user equipment UE and the CSCF (over the Gm reference point).

Protocols over the Gm reference point. The single protocol applied between the UE and CSCF (over the Gm reference point) within this architecture will be based on SIP (as defined by RFC 2543 [12], other relevant RFC's, and additional enhancements required to support 3GPP's needs).

A Single session control on the Mw, Mm, Mg, Mi, Mj, Mk. A single session control protocol shall be used on the session control interfaces between:

- MGCF and CSCF (Mg),

- between CSCFs (Mw), and

- between a CSCF and external IP networks (Mm).

- Between CSCF and BGCF (Mi)

- Between BGCF and MGCF (Mj)

- Between BGCF and BGCF (Mk)

Protocols for the Mw, Mm, Mg, Mi, Mj, Mk. The single session control protocol applied to these interfaces will be based on SIP (as defined by RFC 2543, other relevant RFC's, and additional enhancements required to support 3GPP´s needs).

UNI vs. NNI session control. The SIP based signalling interactions between CN elements may be different then SIP based signalling between the UE and the CSCF.

Network configuration independence. It is a requirement that it shall be possible to hide the network topology from other operators. It shall be possible to restrict the following information from being passed outside of an operator's network: exact number of S-CSCFs, capabilities of S-CSCFs, or capacity of the network. A more detailed explanation of this requirement is given in Annex C.

Editor's Note: Requirements for configuration independence related to P-CSCFs are for further study (Note that UE needs to have the address of P-CSCF).

Restrict access from external networks. The signalling solution shall allow the operator to restrict access from external networks (application level).

Access to HSS. A network operator can control access to the HSS.

------Next Change------

4.6.1   Proxy-CSCF

The Proxy-CSCF (P-CSCF) is the first contact point within the IM CN subsystem. Its address is discovered by UEs following PDP context activation, using the mechanism described in section "Procedures related to Local CSCF Discovery ". The P-CSCF behaves like a Proxy (as defined in RFC2543 or subsequent versions), i.e. it accepts requests and services them internally or forwards them on, possibly after translation. The P-CSCF may also behave as a User Agent (as defined in the RFC2543 or subsequent versions), i.e. in abnormal conditions it may terminate and independently generate SIP transactions.

The Policy Control Function (PCF) is a logical entity of the P-CSCF. If the PCF is implemented in a separate physical node, the interface between the PCF and the P-CSCF is not standardised.

The functions performed by the P-CSCF are:

- Forward the SIP register request received from the UE to an I-CSCF determined using the home domain name, as provided by the UE.

- Forward SIP messages received from the UE to the SIP server (e.g. S-CSCF) whose name the P-CSCF has received as a result of the registration procedure.

- As part of processing of the request and before forwarding, the P-CSCF may modify the Request URI of outgoing requests according to a set of provisioned rules defined by the network operator (e.g. Number analysis and potential modification such as translation from local to international format.)

- Forward the SIP request or response to the UE.

- Detect an emergency session and select a S-CSCF to handle emergency sessions.

- Generation of CDRs.

- Maintain a Security Association between itself and each UE, as defined in TS 33.203 [19].

- Should perform SIP message compression/decompression.

Editor's Note: The following functions require further study:

- Authorisation of bearer resources and QoS management. ~~For details see TS 23.207 [9]. Details of the P-CSCF role in QoS management and authorisation of bearer resources for the session are being investigated by the QoS ad-hoc group.~~

------Next Change------

5.1.0 Establishing PDP Context for IM Subsystem Related Signalling

Before the UE can request IM services, a PDP context must be activated to carry IM Subsystem related signalling.

It shall be possible for the UE to convey to the network the intention of using the PDP context for IM Subsystem related signalling. For this purpose it uses the mechanism for 'PDP Context Used for Application Level Signalling Transport' as described in TS23.207. A signalling flag determines any rules and restrictions that shall apply at the GGSN for that PDP context, as described in section 4.2.6.

The QoS profile parameters for this PDP context are appropriate for IM Subsystem related signalling. ~~It is for further study whether new parameters are required or reserved values for existing parameters are used.~~ The QoS profile parameters are detailed in TS23.107. The signalling flag and the QoS profile parameters may be used independently of each other.

------Next Change------

5.1.2.1 Assigning a Serving-CSCF for a subscriber

When a UE attaches and makes itself available for access to IMS services by explicitly registering in the IMS, a S-CSCF shall be assigned to serve the UE.

The assignment of an S-CSCF is performed in the I-CSCF. The following information is needed in the selection of the S-CSCF:

1. Required capabilities for subscriber services
   This information is provided by the HSS.

2. Operator preference on a per-user basis
   This information is provided by the HSS.

4. Capabilities of individual S-CSCFs in the home network
   This is internal information within the operator's network. This information may be used in the S-CSCF selection. This information is obtained by the I-CSCF by methods not standardised in this release.

5. Topological (i.e. P-CSCF) information of where the subscriber is located
   This is internal information within the operator's network. This information may be used in the S-CSCF selection. The P-CSCF name is received in the registration request. The topological information of the P-CSCF is obtained by the I-CSCF by methods not standardised in Release 5.

6. Topological information of where the S-CSCF is located
   This is internal information within the operator's network. This information may be used in the S-CSCF selection. This information is obtained by the I-CSCF by methods not standardised in this release.

7. Availability of S-CSCFs
   This is internal information within the operator's network. This information may be used in the S-CSCF selection. This information is obtained by the I-CSCF by methods not standardised in this release.

In order to support the S-CSCF selection described above, it is required that the following types of information be transferred between the CSCF and the HSS:

1. The Cx reference point shall support the transfer of CSCF-UE security parameters from HSS to CSCF.

- This allows the CSCF and the subscriber to communicate in a trusted and secure way (there is no à priori trust relationship between a subscriber and a CSCF)

- The security parameters can be for example pre-calculated challenge-response pairs, or keys for an authentication algorithm, etc.

2. The Cx reference point shall support the transfer of service parameters of the subscriber from HSS to CSCF.

- This may include e.g. supplementary service parameters, application server address, triggers etc.

Editor's Note: It has also to be made clear what are the functionality of the application level and service level.

3. The Cx reference point shall support the transfer of CSCF capability information from CSCF to HSS.

- This may include e.g. supported service set, protocol version numbers etc.

------Next Change------

5.2.1   Requirements considered for registration

The following points are considered as requirements for the purpose of the registration procedures.

1. The architecture shall allow for the Serving-CSCFs to have different capabilities or access to different capabilities. E.g. a VPN CSCF or CSCFs in different stages of network upgrade.

2. The network operator shall not be required to reveal the internal network structure to another network. Association of the node names of the same type of entity and their capabilities and the number of nodes will be kept within an operator's network. However disclosure of the internal architecture shall not be prevented on a per agreement basis.

3. A network shall not be required to expose the explicit IP addresses of the nodes within the network (excluding firewalls and border gateways).

4. It is desirable that the UE will use the same registration procedure(s) within its home and visited networks.

5. It is desirable that the procedures within the network(s) are transparent to the UE, when it register with the IM CN subsystem.

6. The Serving-CSCF understands a service profile and the address of the functionality of the Proxy-CSCF.

Editor's Note: The specific procedures for subscription updating in the S-CSCF are FFS.

------Next Change------

5.2.2.4   Re-Registration information flow – User currently registered

Editor's Note: the definition of re-registration timers requires further study, however it is noted that the timers in the UE are shorter than the registration related timers in the network.

Periodic application level re-registration is initiated by the UE either to refresh an existing registration or in response to a change in the registration status of the UE. Re-registration follows the same process as defined in subclause 5.2.2.3 "Registration Information Flow – User not registered". When initiated by the UE, based on the registration time established during the previous registration, the UE shall keep a timer shorter than the registration related timer in the network.

------Next Change------

5.2.2.5   Stored information.

Table 5.1 provides an indication of the information stored in the indicated nodes during and after the registration process.

Table 5.1 Information Storage before, during and after the registration process

Node	Before Registration	During Registration	After Registration
UE - in local network	Credentials Home Domain		Credentials Home Domain Proxy Name/Address
Proxy-CSCF - in local network	Routing Function	Network Entry point UE Address	Network Entry point UE Address
Interrogating-CSCF - in Home network	HSS Address	Serving-CSCF address/name ~~(Editors Note: Access to Potential list of Serving-CSCFs is FFS)~~	No State Information
HSS	User Service Profile		Serving-CSCF address/name\
Serving-CSCF (Home)	No state information	HSS Address/name Subscriber profile (limited – as per network scenario) Proxy address/name	May have session state Information HSS Address/name Subscriber information Proxy address/name

------Next Change------

5.3.2.2 Network Initiated Application (SIP) De-registration, Administrative

For different reasons (e.g., subscription termination, lost terminal, etc.) a home network administrative function may determine a need to clear a user's SIP registration. This function initiates the de-registration procedure and may reside in various elements depending on the exact reason for initiating the de-registration.

One such home network element is the HSS, which already knows the S-CSCF serving the user and that for this purpose makes use of the Cx-Deregister. Another home network element that could initiate the de-registration is the S-CSCF, in which case it makes use of the Cx-Put to inform the HSS. Other trusted/secured parties may also initiate de-registration to the S-CSCF.

The following flow shows a network initiated IM CN subsystem terminal application (SIP) de-registration based on an administrative action for example. The IP transport infrastructure (e.g., GGSN, SGSN) is not notified. If complete packet access is to be denied, a transport layer administrative mechanism would be used. This scenario does not address the administrative mechanisms used for updating any subscriber records, EIR records, access authorisation, etc. This scenario only addresses the specific action of clearing the SIP application registration that is currently in effect.

~~Editor's note: Release of ongoing multimedia sessions during this procedure is FFS.~~

As determined by the operator, on-going sessions may be released by using network initiated session release procedures in Section 5.10.3.

------Next Change------

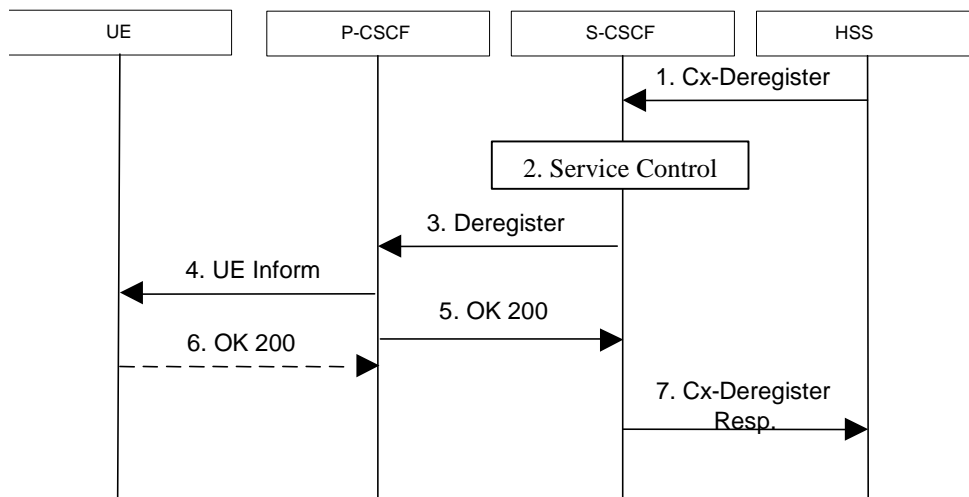5.3.2.2.1   Network Initiated De-registration by HSS, administrative

Figure 5.5: Network initiated application de-registration by HSS, administrative

1. HSS initiates the de-registration, sending a Cx-Deregister (subscriber identity) which may include the reason for the de-registration.

2. Based on the filter criteria, the S-CSCF shall send de-registration information to the service control platform and perform whatever service control procedures are appropriate.

3. The S-CSCF issues a de-registration towards the P-CSCF for this UE and updates its internal database to remove the UE from being registered. The reason for the de-registration received from the HSS shall be included if available.

4. The P-CSCF informs the UE of the de-registration and without modification forwards the reason for the de-registration, if available. Due to loss of contact with the mobile, it might be possible that the UE does not receive the information of the de-registration.

Editors note: Due to loss of contact with the mobile, it might be possible that the UE does not receive the information of the deregistration. Implications of this is for FFS.

5. The P-CSCF sends a response to the S-CSCF and updates its internal database to remove the UE from being registered.

6. When possible, the UE sends a response to the P-CSCF to acknowledge the de-registration. A misbehaving UE or a UE that is out of P-CSCF coverage could not answer properly to the de-registration request. The P-CSCF should perform the de-registration in any case, e.g., after the timer for this request expires.

If the UE does not perform automatic re-registration due to the de-registration the user shall be informed about the de-registration and of the reason, if available.

Note: Steps 4 and 5 may be done in parallel: the P-CSCF does not wait for an answer from the UE before answering to the S-CSCF

7. The S-CSCF returns a response to the entity that initiated the process.

Note: that aAnother trusted/secured party may also request for de-registration via HSS through administrative mechanisms provided by the operator.

------Next Change------

5.3.2.2.2 Network Initiated De-registration by S-CSCF

A service platform may determine a need to clear a user's SIP registration. This function initiates the de-registration procedure and resides in a service platform.

The following flow shows a service control initiated IMS terminal application (SIP) de-registration. The IP transport infrastructure (e.g., GGSN, SGSN) is not notified. If complete packet access is to be denied, a transport layer administrative mechanism would be used. This scenario does not address the administrative mechanisms used for updating any subscriber records, EIR records, access authorisation, etc. This scenario only addresses the specific action of clearing the SIP application registration that is currently in effect.

~~Editor's note: Release of ongoing multimedia sessions during this procedure is FFS.~~

As determined by the operator, on-going sessions may be released by using network initiated session release procedures in Section 5.10.3.
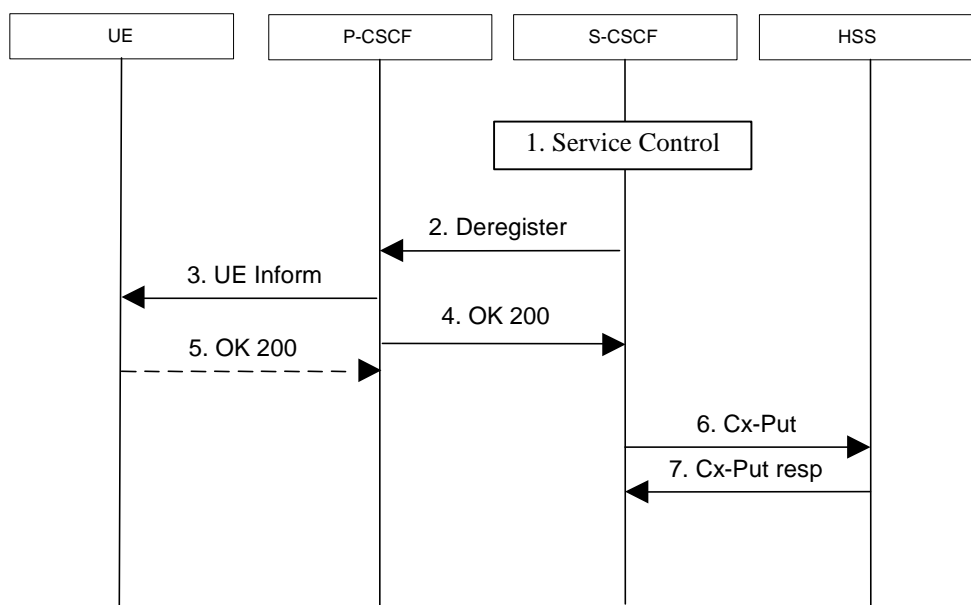
Figure 5.5a: Network initiated application de-registration, service platform

1. The S-CSCF receives de-registration information from the service platform and performs whatever service control procedures are appropriate. This information may include the reason for the de-registration.

2. The S-CSCF issues a de-registration towards the P-CSCF for this UE and updates its internal database to remove the UE from being registered. The reason for the de-registration shall be included, if available.

3. The P-CSCF informs the UE of the de-registration, and without modification forwards the reason for the de-registration, if available. Due to loss of contact with the mobile, it might be possible that the UE does not receive the information of the de registration.

~~Editors note: Due to loss of contact with the mobile, it might be possible that the UE does not receive the information of the deregistration. Implications of this is for FFS.~~

4. The P-CSCF sends a response to the S-CSCF and updates its internal database to remove the UE from being registered.

5. When possible, the UE sends a response to the P-CSCF to acknowledge the de-registration. A misbehaving UE or a UE that is out of P-CSCF coverage could not answer properly to the de-registration request. The P-CSCF should perform the de-registration in any case, e.g., after the timer for this request expires.

If the UE does not perform automatic re-registration due to the de-registration the user shall be informed about the de-registration and of the reason, if available.

Note: Steps 4 and 5 may be done in parallel: the P-CSCF does not wait for an answer from the UE before answering to the S-CSCF

6. The S-CSCF sends an update to the HSS to remove itself as the registered S-CSCF for this UE.

7. The HSS confirms the update.

Note: that aAnother trusted/secured party may also initiate the de-registration, for example, by issuing a third party SIP registration with timer set to 0 via S-CSCF.

------Next Change------

5.4.1 Bearer interworking concepts

Voice bearers from the IM CN subsystem need to be connected with the voice bearers of other networks. Elements such as Media Gateway Functions (MGW) are provided to support such bearer interworking. One of the functions of the MGW may be to support transcoding between a codec used by the UE in the IM CN subsystem and the codec being used in the network of the other party.

Default codecs to be supported within the UE are defined in [21]. The use of default codecs within the UE enables the IM CN subsystem to interwork with other networks on an end to end basis or through transcoding.

The IM CN subsystem is also able to interwork with the CS networks (e.g. PSTN, ISDN, CS domain of some PLMN) by supporting AMR to G.711 [17] transcoding in the IMS MGW element. Furthermore to allow interworking between users of the IM CN subsystem and IP multimedia fixed terminals and other codecs may (this is implementation dependent) be supported by the MGW.

Editor's note: Support for transcoding to other codec formats is for further study.

In order to support existing network capabilities, it is required that a UE be able to send DTMF tone indications to the terminating end of a session via the IMS. This can be done using SIP information. An additional element for bearer interworking is the interworking of these DTMF tones between one network and another. This may involve the generation of tones on the bearer of one network based on out of band signaling on the other network. In such a case, the MGW shall provide the tone generation under the control of the MGCF.

------Next Change------

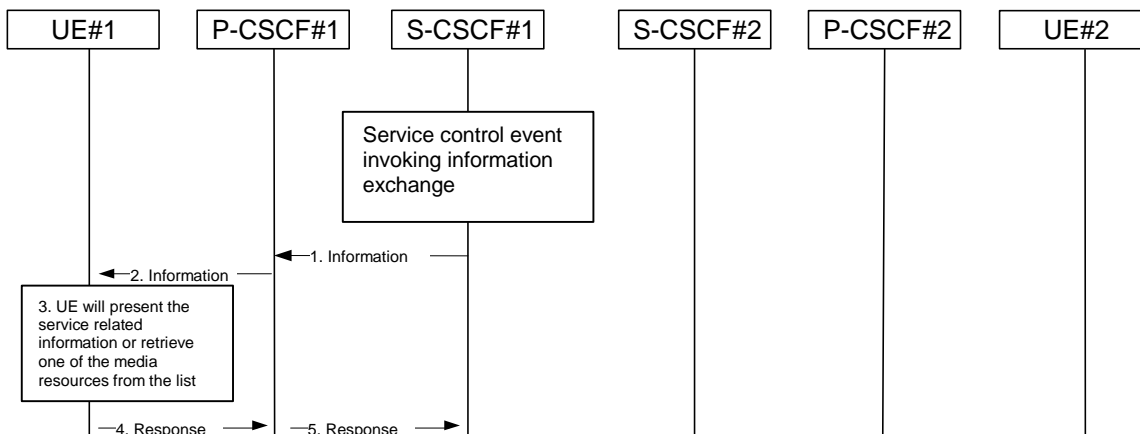## 5.4.9 Event and information distribution

The S-CSCF and Application Servers (SIP-AS, IM-SSF, OSA-SCS) shall be able to send service information messages to endpoints. This shall be done based on a SIP Request/Response information exchange containing the service information and/or a list of URI(s) pointing to the location of information represented in other media formats. The stimulus for initiating the service event related information message may come from e.g. a service logic residing in an application server or some other network entity.

Editor's note: The exact list of these entities is for further study.

This mechanism considers the following issues:

- The IMS has the capability to handle different kinds of media. That is, it is possible to provide information contained within several different media formats e.g. text, pictures or video.

- The UE's level of supporting service event related information and its exchange may depend on the UE's capabilities and configuration.

- A UE not participating in the service related information exchange shall not be effected by a service related information exchange possibly being performed with another UE of the session.

Note: The service event related information exchange may either take place in the context of a session, or independently outside the context of any existing session.

Figure 5.8: Providing service event related information to related endpoint

1. When a service event occurs that the S-CSCF or the Application Server wishes to inform an endpoint about, the S-CSCF or the Application Server generates a message request containing information to be presented to the user. The contents may include text describing the service event, a list of URI(s) or other service modification information.

2. P-CSCF forwards the message request.

3. UE presents the service-related information, to the extent that it conforms to its capabilities and configuration, to the user.

4. Possibly after interaction with the user, the UE will be able to include information in the response to the S-CSCF.

5. P-CSCF forwards the response.

~~Editor's note: How the UE retrieves the service event related information is FFS.~~

Note: The UE may retrieve service event related information using normal PS Domain or IMS procedures.

------Next Change------

5.6.1   (MO#1) Mobile origination, roaming

This origination procedure applies to roaming subscribers. .

The UE is located in a visited network, and determines the P-CSCF via the CSCF discovery procedure described in section 5.1.1. The home network advertises either the S-CSCF or an I-CSCF as the entry point from the visited network.

When registration is complete, P-CSCF knows the name/address of the next hop in the signalling path toward the serving-CSCF, either I-CSCF(THIG) (if the home network wanted to hide their internal configuration) or S-CSCF (if there was no desire to hide the network configuration). I-CSCF, if it exists in the signalling path, knows the name/address of S-CSCF.
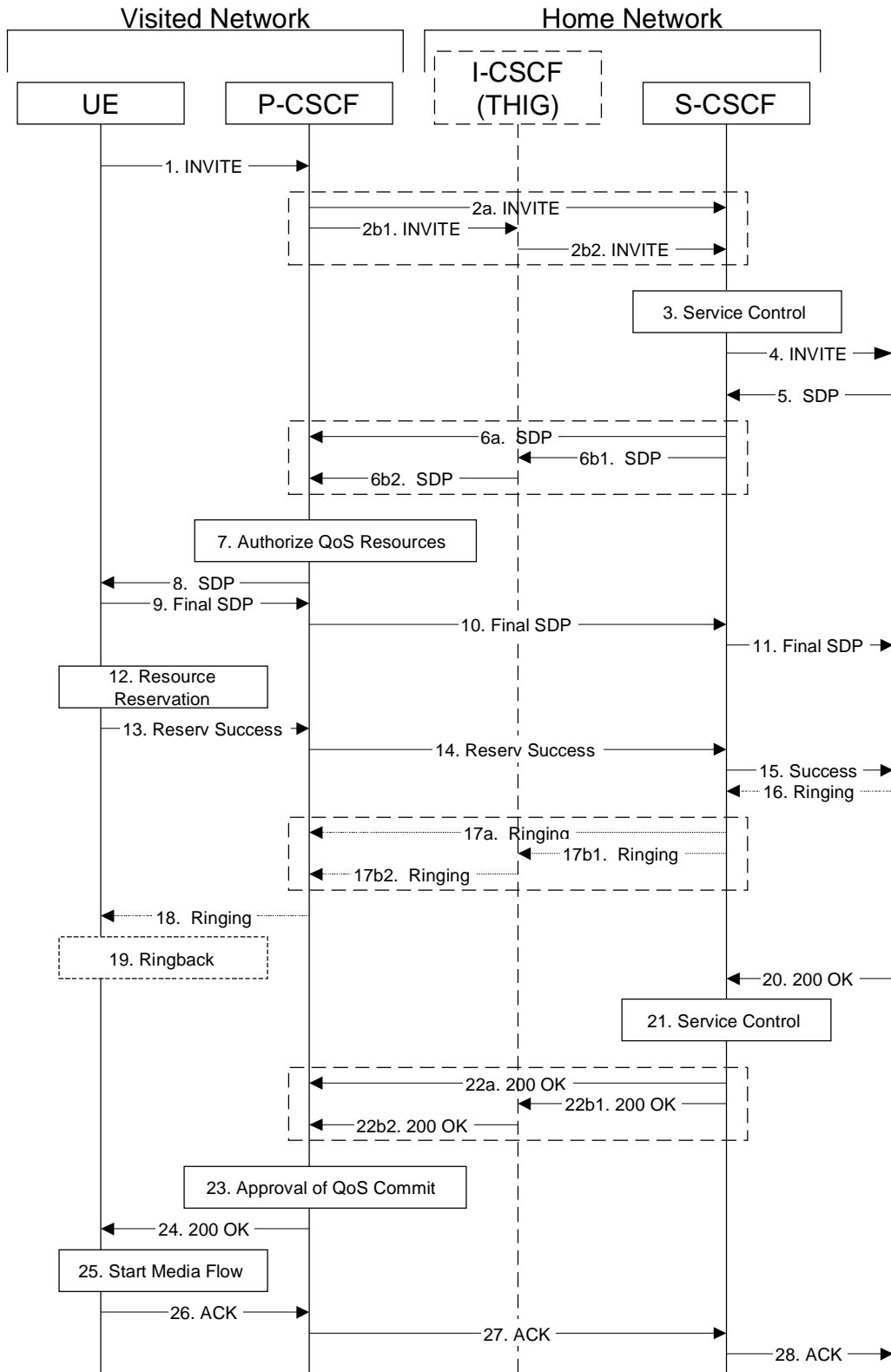
Figure 5.14: Mobile origination procedure - roaming

Procedure MO#1 is as follows:

1. UE sends the SIP INVITE request, containing an initial SDP, to the P-CSCF determined via the CSCF discovery mechanism. The initial SDP may represent one or more media for a multi-media session.

2. P-CSCF remembers (from the registration procedure) the next hop CSCF for this UE.

This next hop is either the S-CSCF that is serving the visiting UE (choice (a)), or an I-CSCF(THIG) within the home network that is performing the configuration hiding function for the home network operator (choice (b)).

(2a) If the home network operator does not desire to keep their network configuration hidden, the name/address of the S-CSCF was provided during registration, and the INVITE request is forwarded directly to the S-CSCF.

(2b) If the home network operator desires to keep their network configuration hidden, the name/address of an I-CSCF(THIG) in the home network was provided during registration, and the INVITE request is forwarded through this I-CSCF(THIG) to the S-CSCF.

(2b1) P-CSCF forwards the INVITE request to I-CSCF(THIG)

(2b2) I-CSCF(THIG) forwards the INVITE request to S-CSCF

3. S-CSCF validates the service profile, and performs any origination service control required for this subscriber. This includes authorisation of the requested SDP based on the user's subscription for multi-media services.

4. S-CSCF forwards the request, as specified by the S-S procedures.

5. The media stream capabilities of the destination are returned along the signalling path, per the S-S procedures.

6. S-CSCF forwards the SDP message to P-CSCF. Based on the choice made in step #2 above, this may be sent directly to P-CSCF (6a) or may be sent through I-CSCF(THIG)(firewall) (6b1 and 6b2).

7. P-CSCF authorises the resources necessary for this session

8. P-CSCF forwards the SDP message to the originating endpoint

9. UE decides the final set of media streams for this session, and sends the Final SDP to P-CSCF

10. P-CSCF forwards the final SDP to S-CSCF. This may possibly be routed through the I-CSCF depending on operator configuration of the I-CSCF.

11. S-CSCF forwards this message to the terminating endpoint, as per the S-S procedure.

12. After determining the final media streams in step #9, UE initiates the reservation procedures for the resources needed for this session.

13. When the resource reservation is completed, UE sends the "Resource Reservation Successful" message to the terminating endpoint, via the signalling path established by the INVITE message. The message is sent first to P-CSCF.

14. P-CSCF forwards this message to S-CSCF. This may possibly be routed through the I-CSCF depending on operator configuration of the I-CSCF.

15. S-CSCF forwards this message to the terminating endpoint, as per the S-S procedure.

16. The destination UE may optionally perform alerting. If so, it signals this to the originating party by a provisional response indicating Ringing. This message is sent to S-CSCF per the S-S procedure.

17. S-CSCF forwards this message to P-CSCF. Based on the choice made in step #2 above, this may be sent directly to P-CSCF (17a) or may be sent through I-CSCF(THIG) (17b1 and 17b2).

18. P-CSCF forwards the ringing message to UE

Editor's Note: Additional QoS interactions to handle one-way media at this point (e.g. for PSTN ringback and announcements) is for further study.

19. UE indicates to the originating subscriber that the destination is ringing

20. When the destination party answers, the terminating endpoint sends a SIP 200-OK final response, as specified by the termination procedures and the S-S procedures, to S-CSCF.

21. S-CSCF performs whatever service control is appropriate for the completed session setup.

22.   S-CSCF sends a SIP 200-OK final response along the signalling path back to P-CSCF. Based on the choice made in (2) above, this response may either be sent directly from S-CSCF to P-CSCF (choice (a)), or be sent indirectly through I-CSCF(THIG) (choice (b)).

23.   P-CSCF indicates the resources reserved for this session should now be committed.

24.   P-CSCF sends a SIP 200-OK final response to the session originator

25.   UE starts the media flow(s) for this session

26.   UE responds to the 200 OK with a SIP ACK message, which is sent to P-CSCF.

27.   P-CSCF forwards the final ACK message to S-CSCF. This may possible be routed through the I-CSCF depending on operator configuration of the I-CSCF.

28.   S-CSCF forwards the final ACK message to the terminating endpoint, per the S-S procedure.
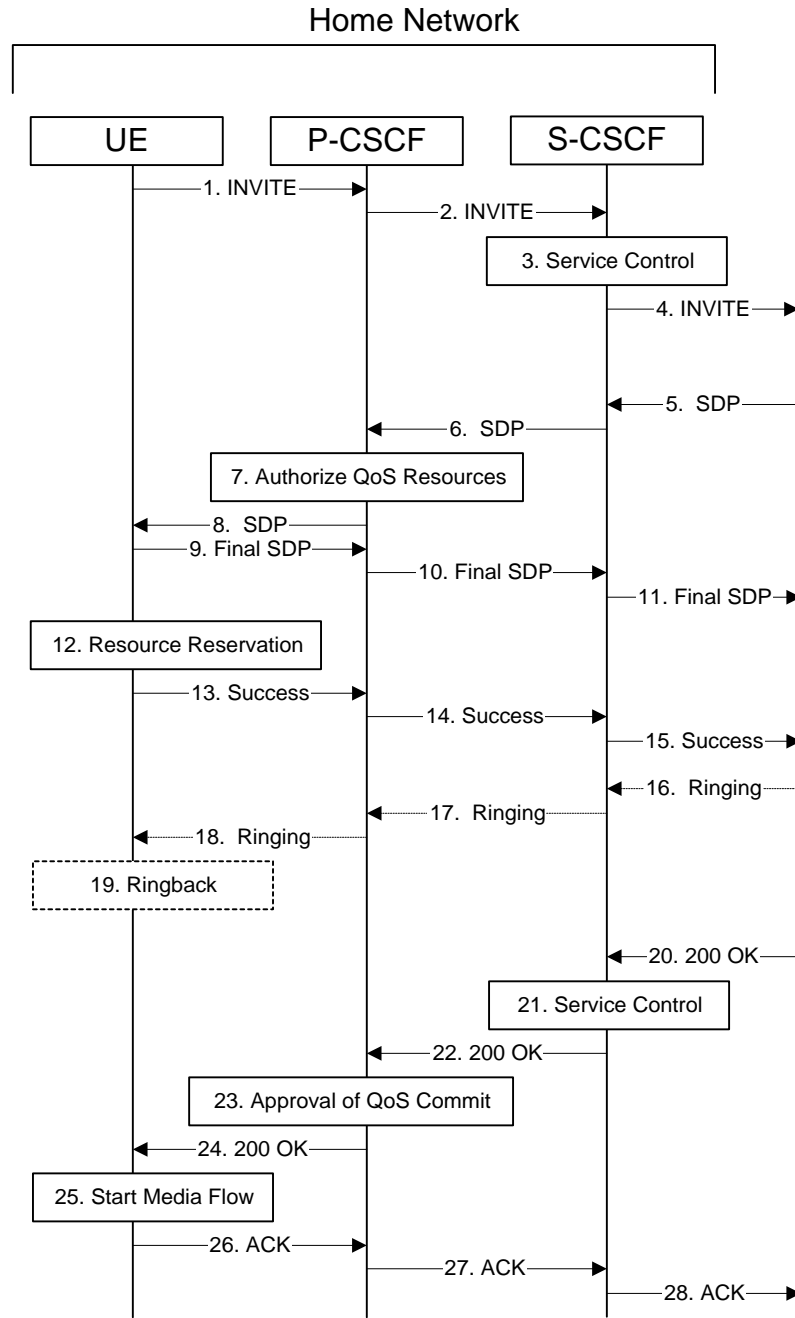

------Next Change------

5.6.2   (MO#2) Mobile origination, home

This origination procedure applies to subscribers located in their home service area.

The UE is located in the home network, and determines the P-CSCF via the CSCF discovery procedure described in section 5.1.1. During registration, the home network allocates an S-CSCF in the home network.

When registration is complete, P-CSCF knows the name/address of S-CSCF.

Home Network

Figure 5.15: Mobile origination procedure - home

Procedure MO#2 is as follows:

1. UE#1 sends the SIP INVITE request, containing an initial SDP, to the P-CSCF determined via the CSCF discovery mechanism. The initial SDP may represent one or more media for a multi-media session.

2. P-CSCF remembers (from the registration procedure) the next hop CSCF for this UE. In this case it forwards the INVITE to the S-CSCF in the home network.

3. S-CSCF validates the service profile, and performs any origination service control required for this subscriber. This includes authorisation of the requested SDP based on the user's subscription for multi-media services.

4. S-CSCF forwards the request, as specified by the S-S procedures.

5. The media stream capabilities of the destination are returned along the signalling path, per the S-S procedures.

6. S-CSCF forwards the SDP message to P-CSCF

7. P-CSCF authorises the resources necessary for this session

8. P-CSCF forwards the SDP message to the originating endpoint.

9. UE decides the final set of media streams for this session, and sends the Final SDP to P-CSCF.

10. P-CSCF forwards this message to S-CSCF

11. S-CSCF forwards this message to the terminating endpoint, as per the S-S procedure.

12. After determining the final media streams in step #9, UE initiates the reservation procedures for the resources needed for this session.

13. When the resource reservation is completed, UE sends the "Resource Reservation Successful" message to the terminating endpoint, via the signalling path established by the INVITE message. The message is sent first to P-CSCF.

14. P-CSCF forwards this message to S-CSCF.

15. S-CSCF forwards this message to the terminating endpoint, as per the S-S procedure.

16. The destination UE may optionally perform alerting. If so, it signals this to the originating party by a provisional response indicating Ringing. This message is sent to S-CSCF per the S-S procedure.

17. S-CSCF forwards this message to P-CSCF.

18. P-CSCF forwards the ringing message to UE.

Editor's Note: ~~Additional QoS interactions to handle one-way media at this point (e.g. for PSTN ringback and announcements) is for further study.~~

19. UE indicates to the originating subscriber that the destination is ringing.

20. When the destination party answers, the terminating endpoint sends a SIP 200-OK final response, as specified by the termination procedures and the S-S procedures, to S-CSCF.

21. S-CSCF performs any origination service control required by session setup completion.

22. S-CSCF passes the 200-OK response back to P-CSCF, following the path of the INVITE request of step (2) above.

23. P-CSCF indicates the resources reserved for this session should now be committed.

24. P-CSCF passes the 200-OK response back to UE

25. UE starts the media flow(s) for this session.

26. UE responds to the 200 OK with an ACK message which is sent to P-CSCF.

27. P-CSCF forwards the final ACK message to S-CSCF.

28. S-CSCF forwards the final ACK message to the terminating endpoint, per the S-S procedure.

------Next Change------

5.8.1 User identity to HSS resolution

This section describes the resolution mechanism, which enables the I-CSCF and the S-CSCF to find the address of the HSS, that holds the subscriber data for a given user identity when multiple and separately addressable HSSs have been deployed by the network operator. This resolution mechanism is not required in networks that utilise a single HSS e.g. optionally, it could be switched off on the I-CSCF and on the S-CSCF using O&M mechanisms. An example for a single HSS solution is a server farm architecture. By default, the resolution mechanism shall be supported.

On REGISTER and on MT INVITEs, the I-CSCF queries the HSS for subscriber specific data, e. g. the actual location or authentication parameters. This also has to be accomplished by the S-CSCF on REGISTER. In the case when more than one independently addressable HSS is utilized by a network operator, the HSS where user information for a given subscriber is available has to be found. To get the HSS name the I-CSCF and the S-CSCF query the Subscription Locator Functional (SLF) entity. ~~The relationship with number portability is for further study.~~

The subscription locator is accessed via the Dx interface. The Dx interface is the standard interface between the CSCF and the SLF.

A way to use the subscription locator is described in the following.

The Dx interface provides:

- an operation to query the subscription locator from the I-CSCF or from the S-CSCF, respectively

- a response to provide the HSS name towards the I-CSCF or towards the S-CSCF, respectively.

By sending the Dx-operation DX_SLF_QUERY the I-CSCF or the S-CSCF indicates a subscriber identity of which it is looking for an HSS. By the Dx-operation DX_SLF_RESP the SLF responds with the HSS name. The I-CSCF or the S-CSCF, respectively, continues by querying the selected HSS. As an option at the registration flow, the I-CSCF may forward the HSS name towards the serving CSCF to simplify the procedure by which the serving CSCF finds the subscriber's HSS. This option ~~is for further study and~~ can be used in a single HSS environment.

------Next Change------

5.8.3   SLF on UE invite
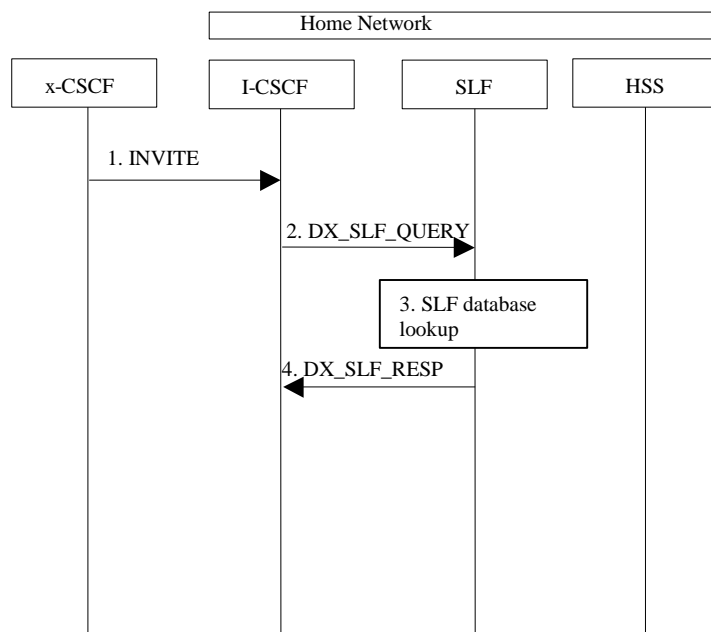
Figure 5.21: SLF on UE invite

1. I-CSCF receives an INVITE request and now has to query for the location of the subscriber's data.

2. The I-CSCF sends a DX_SLF_QUERY to the HSS and includes as parameter the subscriber identity which is stated in the INVITE request.

3. The SLF looks up its database for the queried subscriber identity.

4. The SLF answers with the HSS name in which the subscriber's data can be found.

The synchronisation between the SLF and the different HSSs is an O&M issue.

To prevent an SLF service failure e.g. in the event of a server outage, the SLF could be distributed over multiple servers. Several approaches could be employed to discover these servers. An example is the use of the DNS mechanism in combination with a new DNS SRV record. The specific algorithm for this however does not affect the basic SLF concept ~~and is thus for further study~~ and is outside the scope of this document.

------Next Change------

5.11.3   Procedures for codec and media flow negotiations

This section gives information flows for the procedures for determining the set of mutually-supported codecs between the endpoints of a multi-media session, determining the initial codecs to be used for the multi-media session, and the procedures for changing between codecs when multiple ones are supported.

~~Editor's note: If transcoding is to be supported, these procedures need to be adjusted.~~

------Next Change------

B.5.1 Session flow diagram
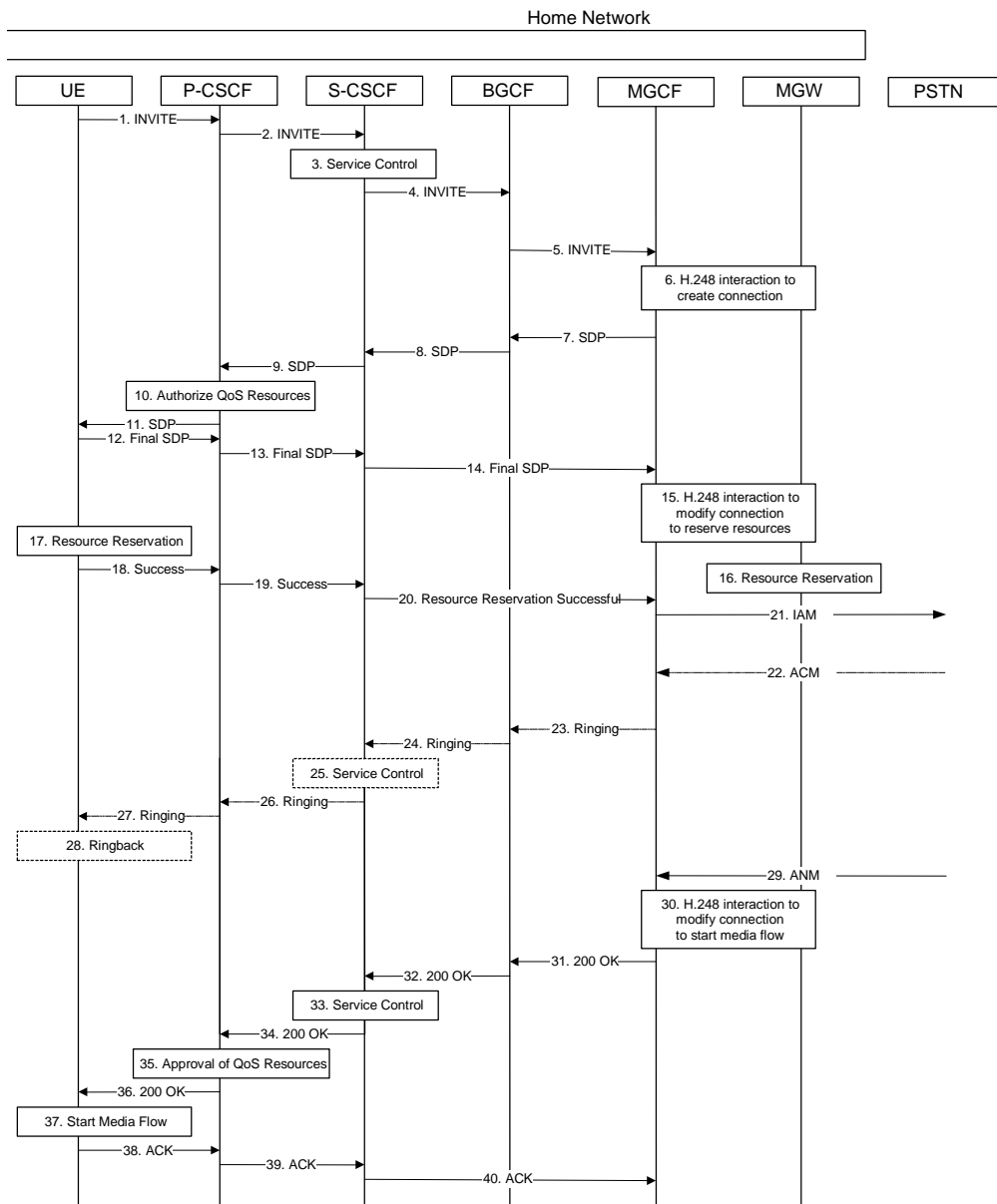
Step-by-step processing of this end-to-end session flow is as follows:

1. The UE sends a SIP INVITE request, containing an initial SDP, to the P-CSCF, which was obtained from the CSCF discovery procedures.

2. The P-CSCF forwards the INVITE to the next hop name/address, as determined from the registration procedures. In this case the next hop is the S-CSCF within the same operator's network.

3. The S-CSCF validates the service profile, and performs whatever service control logic is appropriate for this session setup attempt.

4. The S-CSCF translates the destination address and determines the session will break out to the PSTN. It therefore forwards the INVITE to a BGCF.

5. The BGCF decides to use an MGW in the home network, allocates a MGCF, and sends the INVITE request to the MGCF. Procedures for choice of the optimal Media Gateway are not standardised in this release.

6. MGCF initiates a H.248 interaction to pick an outgoing channel and determine media capabilities of the MGW.

7. MGCF determines the subset of the media flows proposed by the originating endpoint that it supports, and responds with an SDP message back to the originator via the signalling path. This response is sent to the BGCF.

8.   BGCF forwards the SDP to S-CSCF

9.   S-CSCF forwards the SDP message to P-CSCF

10.   P-CSCF authorises the resources necessary for this session

11.   P-CSCF forwards the SDP message to the originating endpoint, UE.

12.   The originator decides the final set of media streams for this session, and sends the Final SDP to P-CSCF.

13.   P-CSCF forwards the final SDP to S-CSCF

14.   S-CSCF forwards the final SDP to MGCF. This message may be routed directly to the MGCF.

15.   MGCF initiates a H.248 interaction to modify the connection established in step #8 and instruct MGW to reserve the resources necessary for the media stream.

16.   MGW reserves the resources necessary for the media stream.

17.   After determining the final set of media streams for this session, step #14 above, UE initiates the reservation procedures for the resources needed for this session.

18.   When UE has successfully reserved the needed resources, it sends the "reservation successful" message to MGCF along the signalling path established by the INVITE message. This message is send first to P-CSCF.

19.   P-CSCF forwards the message to S-CSCF.

20.   S-CSCF forwards the message to MGCF. This message may be routed through I-CSCF, depending on operator configuration of I-CSCF.

21.   MGCF sends an IAM message to the PSTN

22.   The PSTN sends an SS7 ACM message to indicate that the path to the destination has been established. It may optionally alert the destination user before completing the session.

23.   If the PSTN is alerting the destination user, MGCF indicates this to the originating party by a provisional response indicating Ringing. This message is sent to the BGCF.

24.   The BGCF forwards the message to S-CSCF

25.   S-CSCF performs whatever service control is appropriate for this ringing session.

26.   S-CSCF forwards the message to P-CSCF

Editor's Note: Additional QoS interactions to handle one-way media at this point (e.g. for PSTN ringback and announcements) is for further study.

27.   P-CSCF forwards the message to UE

------Next Change------

B.6   Sample end-end Session Flow - Mobile Origination, PSTN Termination by separate network operator

For this end-to-end session flow, we assume the originator is a UE located outside the service area of the network operator to whom the UE is subscribed. The UE has already established the proper PDP contexts for exchanging SIP signalling messages, has performed the proxy discovery procedures described in section 5.1.1, and has registered in the IM CN subsystem.

The UE originating the session addresses a destination that is not a 3GPP endpoint, i.e. an E.164 number that must be completed by the PSTN.

The visited network operator decides not to perform the PSTN gateway function for this session setup attempt, rather to a PSTN gateway of another network operator, the third party with whom prior agreement has been made.
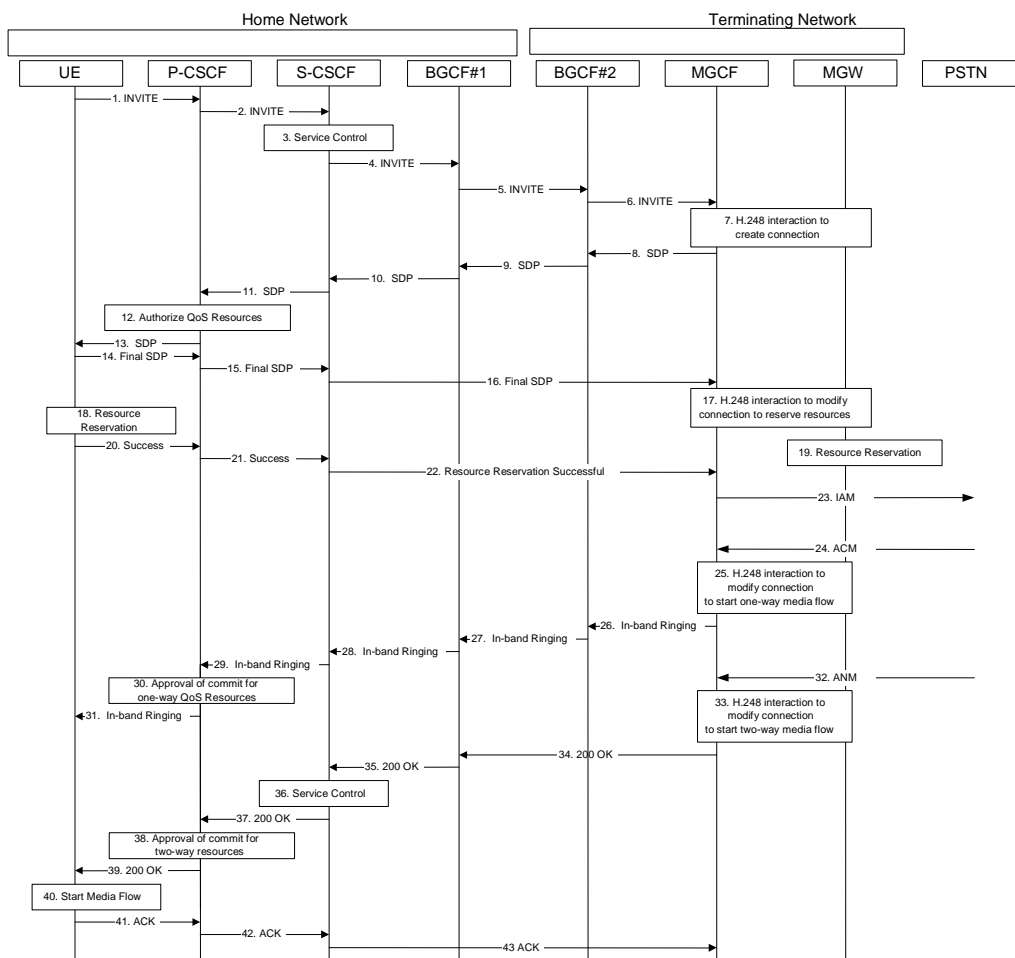
Step-by-step processing of this end-to-end session flow is as follows:

1. The UE sends a SIP INVITE request, containing an initial SDP, to the P-CSCF, which was obtained from the CSCF discovery procedures.

2. The P-CSCF forwards the INVITE to the next hop name/address, as determined from the registration procedures. In this case the next hop is the S-CSCF within the same operator's network.

3. The S-CSCF validates the service profile, and performs whatever service control logic is appropriate for this session setup attempt.

4. The S-CSCF translates the destination address and determines the session will break out to the PSTN. It therefore forwards the INVITE to BGCF#1.

5. BGCF#1 determines that another operator is better able to terminate this PSTN connection, and forwards the INVITE to BGCF#2 in that operator's network.

6. BGCF#2 decides to use an MGW in its network, allocates a MGCF, and sends the INVITE request to the MGCF. Procedures for choice of the optimal Media Gateway are not standardized in Release 5.

7. MGCF initiates a H.248 interaction to pick an outgoing channel and determine media capabilities of the MGW.

8. MGCF determines the subset of the media flows proposed by the originating endpoint that it supports, and responds with an SDP message back to the originator via the signaling path. This response is sent to BGCF#2.

9. BGCF#2 forwards the SDP to BGCF#1.

10.   BGCF#1 forwards the SDP to S-CSCF

11.   S-CSCF forwards the SDP message to P-CSCF

12.   P-CSCF authorizes the resources necessary for this session

13.   P-CSCF forwards the SDP message to the originating endpoint, UE.

14.   The originator decides the final set of media streams for this session, and sends the Final SDP to P-CSCF.

15.   P-CSCF forwards the final SDP to S-CSCF

16.   S-CSCF forwards the final SDP to MGCF. This message may be routed directly to the MGCF.

17.   MGCF initiates a H.248 interaction to modify the connection established in step #8 and instruct MGW to reserve the resources necessary for the media stream.

18.   MGW reserves the resources necessary for the media stream.

19.   After determining the final set of media streams for this session, step #13 above, UE initiates the reservation procedures for the resources needed for this session.

20.   When UE has successfully reserved the needed resources, it sends the "reservation successful" message to MGCF along the signaling path established by the INVITE message. This message is sent first to P-CSCF.

21.   P-CSCF forwards the message to S-CSCF.

22.   S-CSCF forwards the message to MGCF. This message may be routed through the BGCFs, depending on operator configuration of the BGCFs.

23.   MGCF sends an IAM message to the PSTN

24.   When the PSTN has established the path to the destination, it may optionally alert the destination user before completing the session. If so, it responds with an ACM message to the MGCF

25. MGCF performs the H.248 interaction with MGF to enable a one-way media flow.

26. If the PSTN is alerting the destination user, MGCF indicates this to the originating party by a provisional response indicating Ringing. This message is sent to BGCF#2.

27. BGCF#2 forwards the message to BGCF#1

28. BGCF#1 forwards the message to S-CSCF

29. S-CSCF forwards the message to P-CSCF

30. P-CSCF approves the resources needed for the one-way media flow.

Editor's Note: Additional QoS interactions to handle one-way media at this point (e.g. for PSTN ringback and announcements) is for further study.

31.   P-CSCF forwards the message to UE

------Next Change------

Annex C (informative):
Optional configuration independence between operator networks

It is a requirement that it shall be possible to hide the network topology from other operators. It shall be possible to restrict the following information from being passed outside of an operator's network: exact number of S-CSCFs, capabilities of S-CSCFs, or capacity of the network. Hiding requirements of P-CSCFs are for further study (Note that UE needs to have the address of P-CSCF).

3GPP TSG-SA2 Meeting #23
Sophia Antipolis, France,18-22 Feb. 2002

Tdoc S2-020862
rev of S2-020799

CR-Form-v4

CHANGE REQUEST

| ⌘ | **23.228** CR **148** | ⌘ | **R2** ⌘ | Current version: | **5.3.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** ISIM **X** Core Network **X**

Title:	⌘	Use of R'99 USIM for IMS, and, introduction of the ISIM application on UICC
Source:	⌘	Vodafone
Work item code: ⌘	IMS-CCR	*Date:* ⌘ 21/2/02

Category:	⌘ **C**	*Release:* ⌘	Rel-5

Use <u>one</u> of the following categories:
F (correction)
A (corresponds to a correction in an earlier release)
B (addition of feature),
C (functional modification of feature)
D (editorial modification)
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use <u>one</u> of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	For operational, roll out and inter-operability testing reasons it is necessary to be able to operate IMS services using an unmodified R'99 USIM.

Summary of change: ⌘		With R'5 IMS capable UICCs, it is expected that 3 types of identity are stored on the ISIM, namely the Private User Identity, the Public User identity and the Home Network Domain Name.

To support the use of an unmodified R'99 USIM, the proposal is that:

a) the Private User Identity is derived from the IMSI;

b) the Public User Identity is derived from the IMSI (SA 2 considered deriving the Public User Identity from the MSISDN and/or IMEI however, after discussion there was an overall preference to use the IMSI); and

c) the Home Network Domain name is derived from the leading 6 digits of the IMSI (these include the Mobile Country Code and Mobile Network Code).

The detailed encoding of these fields is a stage 3 matter. Hence this CR only describes this capability in abstract terms.

R'5 UICCs for IMS are expected to have an ISIM application in addition to the USIM application.

In order to limit options, this CR only permits two ways of implementing the UE-UICC relationship: namely an unmodified R'99/R'4 USIM and a UICC with an ISIM application.

Consequences if not approved:	⌘	An unnecessary and large barrier will be placed in the way of introducing IMS services if R'99 USIMs cannot be used.

Clauses affected:	⌘	2, 3.3, 4.3.3.1, 4.3.3.2 and 4.3.3.4.

Other specs Affected:	⌘	**X**	Other core specifications	⌘	23.003
			Test specifications		
			O&M Specifications		
Other comments:	⌘				

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 TS 23.002: "Network Architecture".

[2]   CCITT Recommendation E.164: "Numbering plan for the ISDN era".

[3]   CCITT Recommendation Q.65: "Methodology – Stage 2 of the method for the characterisation of services supported by an ISDN".

[4]   ITU Recommendation I.130: "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN"

[5]   GSM 03.64: "Digital cellular telecommunication system (Phase 2+); Overall Description of the General Packet Radio Service (GPRS) Radio Interface; Stage 2".

[6]   GSM 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".

[7]   3GPP TS 23.221: "Architectural Requirements".

[8]   3GPP TS 22.228: "Service requirements for the IP multimedia core network subsystem"

[9]   3GPP TS 23.207: "End-to-end QoS concept and architecture"

[10]   3GPP TS 24.228: "Signalling flows for the IP multimedia call control based on SIP and SDP"

[11]   3GPP TS 25.301: "Radio interface protocol architecture"

[12]   RFC 2543: "SIP: Session Initiation Protocol"

[13]   RFC 2396: "Uniform Resource Identifiers (URI): Generic Syntax"

[14]   RFC 2486: "The Network Access Identifier"

[15]   RFC 2806: "URLs for Telephone Calls"

[16]   RFC 2916: "E.164 number and DNS"

[17]   ITU Recommendation G.711: "Pulse code modulation (PCM) of voice frequencies"

[18]   ITU Recommendation H.248: "Gateway control protocol"

[19]   3GPP TS 33.203: "Access Security for IP-based services"

[20]   3GPP TS 33.2xx: "Network Domain Security: IP network layer security "

[21]   3GPP TS 26.235: "Packet Switched Multimedia Applications; Default Codecs".

[22]   3GPP TR 22.941: " IP Based Multimedia Services Framework "

[23]   3GPP TS 23.060: "General Packet Radio Service (GPRS); Service description; Stage 2

[24]   3GPP TS 23.003: "Technical Specification Group Core Network; Numbering, addressing and identification"

3.3　　Abbreviations

For the purposes of the present document the following abbreviations apply. Additional applicable abbreviations can be found in GSM 01.04 [1].

AMR	Adaptive Multi-rate
API	Application Program Interface
AS	Application Server
BCSM	Basic Call State Model
BG	Border Gateway
BGCF	Breakout Gateway Control Function
BS	Bearer Service
CAMEL	Customised Application Mobile Enhanced Logic
CAP	Camel Application Part
CDR	Charging DataRecord
CN	Core Network
CS	Circuit Switched
CSCF	Call Session Control Function (??)
CSE	CAMEL Service Environment
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
ENUM	E.164 Number
GGSN	Gateway GPRS Support Node
HSS	Home Subscriber Server
I-CSCF	Interrogating-CSCF
IETF	Internet Engineering Task Force
IM	IP Multimedia
IM CN SS	IP Multimedia Core Network Subsystem
IMS	IP Multimedia Core Network Subsystem
IMSI	International Mobile Subscriber Identifier
IP	Internet Protocol
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
ISDN	Integrated Services Digital Network
ISIM	IMS SIM
ISP	Internet Service Provider
ISUP	ISDN User Part
MAP	Mobile Application Part
MGCF	Media Gateway Control Function
MGF	Media Gateway Function
NAI	Network Access Identifier
OSA	Open Services Architecture
P-CSCF	Proxy-CSCF
PCF	Policy Control Function
PDN	Packet Data Network
PDP	Packet Data Protocol e.g., IP
PEF	Policy Enforcement Function
PLMN	Public Land Mobile Network
PSTN	Public Switched Telephone Network
QoS	Quality of Service
RAB	Radio Access Bearer
RFC	Request for Comments
SCS	Service Capability Server
S-CSCF	Serving-CSCF
SGSN	Serving GPRS Support Node
SLF	Subscription Locator Function
SSF	Service Switching Function
SS7	Signalling System 7
SIM	Subscriber Identity Module
SIP	Session Initiation Protocol
SGW	Signalling Gateway
THIG	Topology Hiding Inter-network Gateway
UE	User Equipment

UMTS	Universal Mobile Telecommunications System
URL	Universal Resource Locator
USIM	UMTS SIM

4.3.3   Identification of users

There are various identities that may be associated with a user of IP multimedia services. This section describes these identities and their use.

4.3.3.1   Private user identities

Every IM CN subsystem subscriber shall have a private user identity. The private identity is assigned by the home network operator, and used, for example, for Registration, Authorisation, Administration, and Accounting purposes. This identity shall take the form of a Network Access Identifier (NAI) as defined in RFC 2486 [14]. It is possible for a representation of the IMSI to be contained within the NAI for the private identity.

- The Private User Identity is not used for routing of SIP messages.

- The Private User Identity shall be contained in all Registration requests, (including Re-registration and De-registration requests) passed from the UE to the home network.

- An ISIM application shall securely store tThe Private User Identity shall be securely stored on the USIM. If the UICC does not have an ISIM application, then, the Private User Identity shall be derived from the USIM's IMSI. The rules for deriving the Private User Identity from the IMSI are specified in 3GPP TS 23.003 [24]. (Iit shall not be possible for the UE to modify the UICC's Private User Identity information).

- The Private User Identity is a unique global identity defined by the Home Network Operator, which may be used within the home network to uniquely identify the user from a network perspective.

- The Private User Identity shall be permanently allocated to a user (it is not a dynamic identity), and is valid for the duration of the user's subscription with the home network.

- The Private User Identity is used to identify the user's information (for example authentication information) stored within the HSS (for use for example during Registration).

- The Private User Identity may be present in charging records based on operator policies.

- The Private User Identity identifies the subscription (e.g. IM service capability) not the user.

- The Private User Identity is authenticated only during registration of the subscriber, (including re-registration and de-registration).

- The HSS and S-CSCF need to obtain and store the Private User Identity.

4.3.3.2   Public user identities

Every IM CN subsystem subscriber shall have one or more public user identities [8]. The public user identity/identities are used by any user for requesting communications to other users. For example, this might be included on a business card.

- Both telecom numbering and Internet naming schemes can be used to address users depending on the Public User identities that the users have.

- The public user identity/identities shall take the form of SIP URL (as defined in RFC2543 [12] and RFC2396 [13]) or E.164 numbers.

- An ISIM application shall securely store aAt least one Public User Identity shall be securely stored on the USIM (it shall not be possible for the UE to modify the Public User Identity), but it is not required that all additional Public User Identities be stored on the ISIM applicationUSIM. If the UICC does not contain an ISIM application, then, the Public User Identity shall be derived from the USIM's IMSI. The rules for deriving the Public User Identity from the IMSI are specified in 3GPP TS 23.003 [24].

- It shall be possible to register globally (i.e. through one single UE request) a subscriber that has more than one public identity via a mechanism within the IP multimedia CN subsystem (e.g. by using a Service Profile). This shall not preclude the user from registering individually some of his/her public identities if needed.

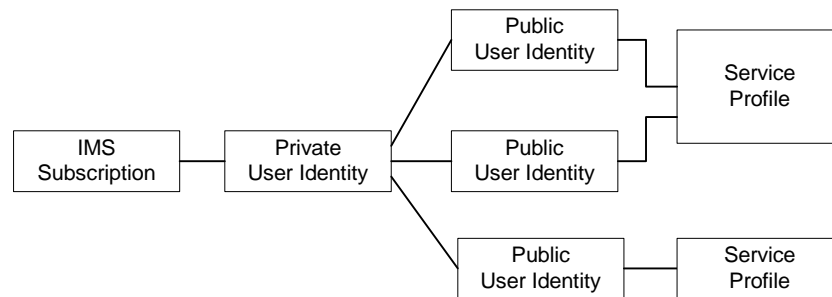- Public User Identitys are not authenticated by the network during registration.

- Public User Identities may be used to identify the user's information within the HSS (for example during mobile terminated session set-up).

4.3.3.3   Routing of SIP signalling within the IP multimedia subsystem

Routing of SIP signalling within the IMS shall use SIP URLs. E.164 [2] format public user identities shall not be used for routing within the IMS, and session requests based upon E.164 format public user identities will require conversion into SIP URL format for internal IMS usage.

4.3.3.4   Relationship of private and public user identities

The home network operator is responsible for the assignment of the private user identifier, and public user identifiers; other identities that are not defined by the operator may also exist.

Figure 4.5: Relationship of the private user identity and public user identities

All Public user identities that are associated with the same Service Profile should have the same set of services. Public user identities that are associated with a different Service Profile could have a different set of services. Each Public user identity is only associated with a single Service Profile.

All Service Profiles that share the same Private user identity are associated to the same S-CSCF. Later releases may allow different Service Profiles that share the same Private user identity to be associated with different S-CSCFs.

An ISIM application shall securely store tThe home domain name of the subscriber. shall be stored securely on the USIM If the UICC does not have an ISIM application, then, the home domain name shall be derived from the Mobile Country Code and Mobile Network Code fields of the USIM's IMSI. The rules for deriving the home domain name from the IMSI are specified in 3GPP TS 23.003 [24]., (Iit shall not be possible for the UE to modify the information from which the home domain name is derived).

The storage location of the Private User Identity, Public User Identity and home domain name for a standalone SIP Client could be stored on the USIMISIM.

Editors Note: Mechanisms used to extract the Private User Identity, Public User Identity and home domain name from the USIMISIM (e.g. when an external SIP TE is used) are for further study of the groups T2, T3 and SA3.

It is not a requirement for a user to be able to register on behalf of another user or for a device to be able to register on behalf of another device or for combinations of the above for the IM CN subsystem for this release.

Editor's Note: Public User Identity Portability issues are FFS.

CR-Form-v5

CHANGE REQUEST

| ⌘ | **23.228 CR 134** | ⌘**rev** | **21** | ⌘ | Current version: | **5.3.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network ☐ Core Network **X**

Title: ⌘	Number of media components per PDP Context	
Source: ⌘	Nokia, Alcatel, Siemens, Rogers Wireless, Lucent, Ericsson	
Work item code:⌘	IMS-CCR	**Date:** ⌘ 18.02.2002

Category: ⌘	**B**	**Release:** ⌘	REL-5

Use <u>one</u> of the following categories:
F (correction)
A (corresponds to a correction in an earlier release)
B (addition of feature),
C (functional modification of feature)
D (editorial modification)
Detailed explanations of the above categories can
be found in 3GPP <u>TR 21.900</u>.

Use <u>one</u> of the following releases:
2   (GSM Phase 2)
R96   (Release 1996)
R97   (Release 1997)
R98   (Release 1998)
R99   (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change: ⌘	The topic of number of media components allowed within one PDP context has been debated during S2#21 and SA2#22. Although realistically there may very well be a separate PDP context opened for each IMS media component due to e.g. charging reasons, this restriction shall not be explicitly stated in standards. Instead, a flexible mechanisms should be developed for the network to control whether the UE is allowed to multiplex media components. Having such a mechanism for Rel5 would ensure having some standardised tools already for Rel5 that can be developed to a full-blown solution for later releases. This would allow for migrating out of a media component number / PDP context restriction in later releases in a backward compatible manner. As a great advantage, introducing such a mechanism would allow for future-proofness and forward compatibility, i.e. a Rel6 IMS network may allow a Rel5 UE to multiplex media components.
Summary of change:⌘	A generic mechanism for an IMS-level indication on allowing the UE to have multiple IMS media components in a PDP context has been added.
Consequences if ⌘ **not approved:**	

Clauses affected: ⌘	New section: 4.2.5.1

Other specs ⌘ **affected:**	☐	Other core specifications ⌘	
	☐	Test specifications	
	☐	O&M Specifications	

Other comments: ⌘	Corresponding changes are implemented to TS 23.207 in CR#19

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

4.2.5.1 Relation of IMS media components and PDP contexts carrying IMS media

PDP contexts created to carry IMS media components may either carry a single media component, or may carry multiple media components.

It shall be possible to have a separate PDP context for each media component.

The IMS network shall have the capability to transfer an indication per media component to the UE to indicate to the UE whether it is allowed to have multiple media components carried in a single PDP Context. This indication shall be transferred upon session initiation and upon addition of media component(s) to active IMS sessions.

Each of these indications identifies a group. Media components that are indicated as belonging to the same group may be carried within the same PDP context. A group may contain a single media component or may contain multiple media components.

The Home Network of the UE is responsible for setting this indication. The criteria and information for setting this indication is an implementation and configuration matter of the Home Network.

The P-CSCF may validate this indication based on its knowledge about e.g. the GPRS charging capabilities. In the case that the Home Network mandates the opening of separate PDP contexts for certain media components, the P-CSCF shall not override this indication. In the case that the Home Network allows the grouping of certain media components, the P-CSCF may however override this indication and mandate the opening of separate PDP contexts for some/all of these media components. The criteria for this validation is an implementation and configuration matter of the P-CSCF.

The UE makes the final decision whether to have multiple or a single media components carried in a single PDP Context, even if the IMS network indicated that these components are allowed to be grouped. Media components assigned to different groups shall not be carried by the same PDP Context.

Note: An additional criteria for the UE to decide whether to have multiple or a single media component carried in a single PDP Context is the QoS requirements for these media components.

The indication described above shall be transferred to the UE before the UE initiates the PDP context activation for IMS media component.

Note: The exact SIP message and other detailed means of transferring this indication are subject to stage-3 design.

The indication described above shall be transferred to the UE before the UE initiates the PDP context. All associated IP flows (such as e.g. RTP / RTCP flows) used by the UE to support a single media component are assumed to be carried within the same PDP context.

CR-Form-v4

CHANGE REQUEST

| ⌘ | **23.228** CR **151** | ⌘ rev **-** | ⌘ Current version: | **5.3.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network ☐   Core Network **X**

Title: ⌘	Removal of Sr Interface for R5	
Source: ⌘	Lucent Technologies	
Work item code: ⌘	IMS-CCR	***Date:*** ⌘ 18.02.2002
Category: ⌘ **F**		***Release:*** ⌘ REL-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use one of the following releases:
2   *(GSM Phase 2)*
R96   *(Release 1996)*
R97   *(Release 1997)*
R98   *(Release 1998)*
R99   *(Release 1999)*
REL-4   *(Release 4)*
REL-5   *(Release 5)*

Reason for change: ⌘	The Sr interface is not included in R5 and 23.228 needs to be made consistent with the work in CN.
Summary of change: ⌘	Remove the Sr interface line from the Figure and remove the note regarding further study on the Sr.
Consequences if not approved: ⌘	Potential interoperability problems.

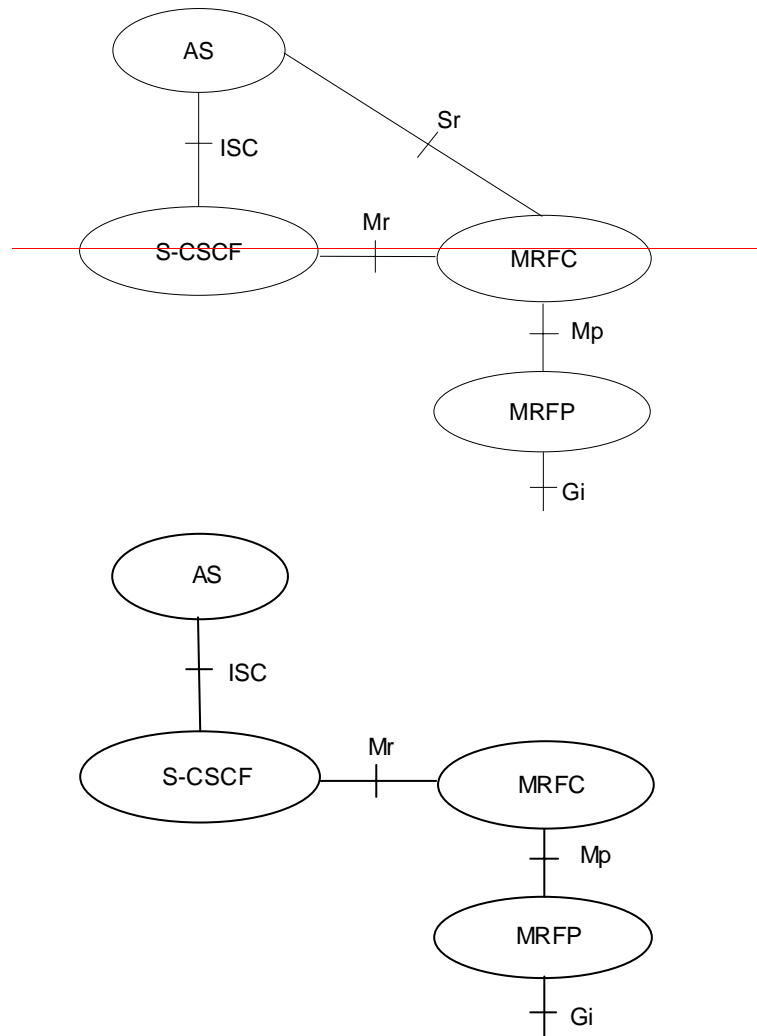|	
Clauses affected: ⌘	Existing clause 4.7.
Other specs affected: ⌘ ☐	Other core specifications ⌘
	☐ Test specifications
	☐ O&M Specifications
Other comments: ⌘	

How to create CRs using this form:

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1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

4.7 Multimedia Resource Function

The architecture concerning the Multimedia Resource Function is presented in Figure 4.5a below.

Figure 4.5a: Architecture of MRF

The MRF is split into Multimedia Resource Function Controller (MRFC) and Multimedia Resource Function Processor (MRFP).

Tasks of the MRFC are the following:

- Control the media stream resources in the MRFP.

- Interpret information coming from an AS and S-CSCF (e.g session identifier) and control MRFP accordingly.

- Generate of CDRs.

Tasks of the MRFP are the following:

- Bearer control on the Gi interface.

- Provide resources to be controlled by the MRFC.

- Mixing of incoming media streams (e.g for multiple parties).

- Media stream source (for multimedia announcements).

- Media stream processing (e.g. audio transcoding, media analysis).

Tasks of an Application Server with regards to MRF are e.g. the following:

- Conference booking and provide booking information (e.g. start time, duration, list of participants) to the MRFC.

- Provide a floor control mechanism, by which end users (e.g. participants, chairman) can influence floor and provide information to the MRFC on how incoming media streams should be mixed and distributed accordingly.

The protocol used for the Mr reference point is SIP (as defined by RFC 2543, other relevant RFC's, and additional enhancements introduced to support 3GPP´s needs).

The Mp reference point allows an MRFC to control media stream resources provided by an MRF.

The Mp reference point has the following properties:

- Full compliance with the H.248 standard.

- Open architecture where extensions (packages) definition work on the interface may be carried out.

~~The details and functionality, if any, of the Sr interface are for further study.~~

CR-Form-v5

CHANGE REQUEST

| ⌘ | **23.228** CR **139** | ⌘ **rev** | **1** | ⌘ | Current version: | **5.3.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **X**

Title: ⌘	Clean-up of MT Unregistered procedures	
Source: ⌘	Ericsson	
Work item code: ⌘	IMS-CCR	***Date:*** ⌘ 2002-02-13
Category: ⌘ **F**		***Release:*** ⌘ REL-5

Use <u>one</u> of the following categories:
F (correction)
A (corresponds to a correction in an earlier release)
B (addition of feature),
C (functional modification of feature)
D (editorial modification)
Detailed explanations of the above categories can be found in 3GPP <u>TR 21.900</u>.

Use <u>one</u> of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change: ⌘	Chapter 5.12 has not been updated according to the possibility of having one Public User Identity registered and one un-registered.
Summary of change: ⌘	It is clarified that the subscriber identity used in chapter 5.12 is the Public User Identity. Also, the service profile concept, which can be used per Public User Identity, is used instead of subscriber profile. Based on the assumption for Rel 5 that the service profiles sharing the same IMPI are associated to the same S-CSCF (section 4.3.3.4 in 23.228), it is also clarified that the S-CSCF shall be the same as the selected for registered IMPUs, if at least one of them is already registered
Consequences if not approved: ⌘	It will not be possible to apply terminating services for separately unregistered Public User Identities

Clauses affected: ⌘	5.12
Other specs Affected: ⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments: ⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be

downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

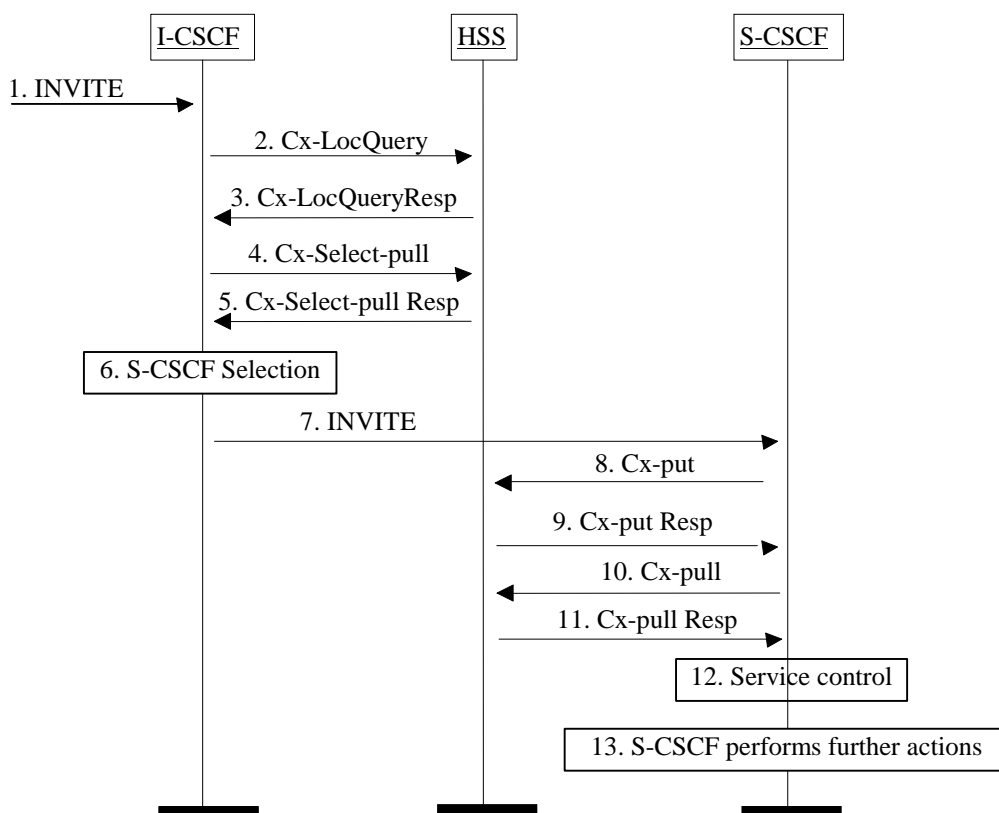# 5.12 Mobile Terminating call procedures to unregistered Public User Identities ~~IMS subscriber~~

This section describes information flows for the procedures of Mobile Terminating call flows for unregistered IMS ~~subscriber~~Public User Identities. The detection of an unregistered ~~subscriber~~ Public User Identity is done in HSS and if this Public User Identity ~~subscriber~~ has services related to ~~unregistration~~ unregistered state, a S-CSCF is selected for the ~~subscriber~~unregistered Public User Identity. S-CSCF performs whatever further actions are appropriate for the call attempt to the unregistered IMS ~~subscriber.~~Public User Identity.

The principle established in sub-clause 4.3.3.4, where the public user identifiers for the same profile are allocated to the same S-CSCF, is followed.

5.12.1 Mobile Terminating call procedures to unregistered Public User Identity~~IMS subscriber~~ that has services related to unregistered state

In Figure 5.43~~xx~~ below the Public User Identity~~subscriber~~ is unregistered for IMS and HSS responds back to I-CSCF with an indication that I-CSCF should select S-CSCF for this MT call to the unregistered Public User Identity of the subscriber. Before S-CSCF selection, I-CSCF shall query HSS for the information related to the required S-CSCF capabilities. I-CSCF selects a S-CSCF to perform service control and I-CSCF routes the call further to the selected destination. S-CSCF has to download the service ~~subscriber's~~ profile from HSS before it performs service control and any further actions in the call attempt. The service implemented by this information flow could be e.g. "Call Forward Unconditional."

This is shown by the information flow in Figure 5.43:

Figure 5.43: Mobile Terminating call procedures to unregistered IMS Public User Identity~~subscriber~~ that has services related to unregistered state

1. I-CSCF receives an INVITE message.

2. I-CSCF queries the HSS for current location information.

3. HSS either responds with an indication that the Public User Identitysubscriber is unregistered for IMS and I-CSCF should select a S-CSCF for the unregistered Public User Identity of the subscriber or provides the I-CSCF with the previously allocated S-CSCF name.

4. If the I-CSCF has not been provided with the location of the S-CSCF, the I-CSCF may send Cx-Select-Pull (unregistered, Public User Identitysubscriber identity) to the HSS to request the information related to the required S-CSCF capabilities which shall be input into the S-CSCF selection function. This query is optional.

5. The HSS shall send Cx-Select-Pull Resp (required S-CSCF capabilities) to the I-CSCF.

6. If the I-CSCF has not been provided with the location of the S-CSCF, the I-CSCF selects an S-CSCF for the unregistered Public User Identity of the subscriber.

7. I-CSCF forwards the INVITE request to the S-CSCF.

8. The S-CSCF sends Cx-Put (Public User Identitysubscriber identity, S-CSCF name) to the HSS. The HSS stores the S-CSCF name for unregistered Public User Identities of that subscriber. This will result in all terminating traffic for unregistered Public User Identities of that subscriber being routed to this particular S-CSCF until the registration period expires or the subscriber attaches the Public User Identity to the network.

9. The HSS shall send Cx-Put Resp to the I-CSCF to acknowledge the sending of Cx-Put.

10. If not available, Tthe S-CSCF shall send the Cx-Pull information flow (Public User Isubscriber identity) towards the HSS in order to be able to download the relevant information of the subscriberservice profile to the S-CSCF

11. The HSS shall return the information flow Cx-Pull Resp (user information) to the S-CSCF. The S-CSCF shall store it for that indicated Public User Identity user

12. S-CSCF performs whatever service control is appropriate for this call attempt.

13. S-CSCF performs whatever further actions are appropriate for this call attempt.

The S-CSCF may deregister the Public User Identity user at any time (e.g. according to operator network engineering requirements) by issuing a Cx-Put2 (Public User subscriber iIdentity clear S-CSCF name) clearing the S-CSCF name stored in the HSS. If S-CSCF name stored by the HSS does not match the name of the S-CSCF that originated the Cx-Put2 then the HSS will acknowledge the clearing request but take no further action.

Should the subscriber register a Public User Identity at another S-CSCF during the register expiry time then the registration from the new S-CSCF will take precedence, overwriting the previous S-CSCF name stored in the HSS.

5.12.2 Mobile Terminating call procedures to unregistered Public User Identitysubscriber that has no services related to unregistered state

In the example information flow the Public User Identity of the subscriber is unregistered and the Public User Identitysubscriber has no services related to unregistration unregistered state.

This is shown in the following information flow (figure 5.44):
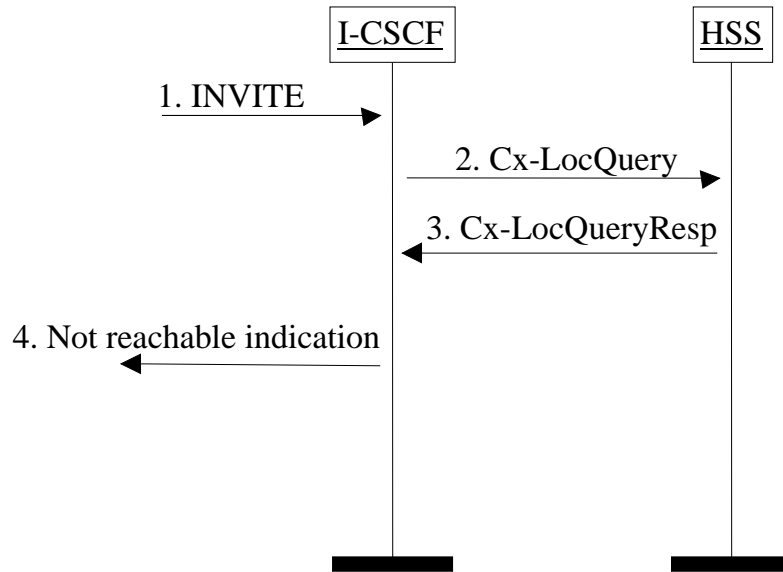
Figure 5.44: Mobile Terminating call procedures to unregistered <u>Public User Identity</u>~~subscriber~~ that has no services related to unregistered state

1. I-CSCF receives an INVITE message.

2. I-CSCF queries the HSS for current location information.

3. HSS responds with an indication that the <u>Public User Identity</u>~~subscriber~~ is unregistered, but no services are related to unregist<u>ered</u>~~ration~~ state.

I-CSCF responds to the origin of the request that the <u>user</u>~~subscriber~~ is not reachable at the moment.

5.13 Emergency sessions

CR-Form-v5

CHANGE REQUEST

| ⌘ | **23.228** CR **141** | ⌘**rev** **2** ⌘ | Current version: | **5.3.0** ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘   (U)SIM ☐   ME/UE **X**   Radio Access Network ☐   Core Network ☐

Title: ⌘	IP privacy requires re-registration	
Source: ⌘	Ericsson	
Work item code: ⌘	IMS-CCR	*Date:* ⌘ 2002-02-22
Category: ⌘ **F**		*Release:* ⌘ REL-5

Use *one* of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use *one* of the following releases:
2   (GSM Phase 2)
R96   (Release 1996)
R97   (Release 1997)
R98   (Release 1998)
R99   (Release 1999)
REL-4   (Release 4)
REL-5   (Release 5)

Reason for change: ⌘	According to the agreed CR in S2-020244, the prefix of the IPv6 address will be unique when the UE has acquired it using Stateless Address Autoconfiguration. If the UE changes its interface identity of the IPv6 address for privacy reasons (see RFC3041) then the new IPv6 address still will be globally addressable since the prefix is unique. However, the new IP address will not be possible to use for IMS since the address has not been registered within IMS. Hence, the address must be registered before it can be used for IMS services.
Summary of change: ⌘	It is added that the UE may change its IP address on its own, but the UE then have to register the new address to be able to use IMS services with the new address.
Consequences if not approved: ⌘	UE(s) using RFC3041 or similar for IP privacy will not be able to access IMS services.

Clauses affected: ⌘	2, 4.3.1, 4.5
Other specs affected: ⌘	**X** Other core specifications ⌘ 24.228, 24.229
	☐ Test specifications
	☐ O&M Specifications
Other comments: ⌘	

How to create CRs using this form:
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1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

********* First Change***************

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 TS 23.002: "Network Architecture".

[2]   CCITT Recommendation E.164: "Numbering plan for the ISDN era".

[3]   CCITT Recommendation Q.65: "Methodology – Stage 2 of the method for the characterisation of services supported by an ISDN".

[4]   ITU Recommendation I.130: "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN"

[5]   GSM 03.64: "Digital cellular telecommunication system (Phase 2+); Overall Description of the General Packet Radio Service (GPRS) Radio Interface; Stage 2".

[6]   GSM 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".

[7]   3GPP TS 23.221: "Architectural Requirements".

[8]   3GPP TS 22.228: "Service requirements for the IP multimedia core network subsystem"

[9]   3GPP TS 23.207: "End-to-end QoS concept and architecture"

[10]   3GPP TS 24.228: "Signalling flows for the IP multimedia call control based on SIP and SDP"

[11]   3GPP TS 25.301: "Radio interface protocol architecture"

[12]   RFC 2543: "SIP: Session Initiation Protocol"

[13]   RFC 2396: "Uniform Resource Identifiers (URI): Generic Syntax"

[14]   RFC 2486: "The Network Access Identifier"

[15]   RFC 2806: "URLs for Telephone Calls"

[16]   RFC 2916: "E.164 number and DNS"

[??]   RFC 3041: "Privacy Extensions for Stateless Address Autoconfiguration in IPv6"

[17]   ITU Recommendation G.711: "Pulse code modulation (PCM) of voice frequencies"

[18]   ITU Recommendation H.248: "Gateway control protocol"

[19]   3GPP TS 33.203: "Access Security for IP-based services"

[20]   3GPP TS 33.2xx: "Network Domain Security: IP network layer security "

[21]   3GPP TS 26.235: "Packet Switched Multimedia Applications; Default Codecs".

[22]   3GPP TR 22.941: " IP Based Multimedia Services Framework "

[23]   3GPP TS 23.060: "General Packet Radio Service (GPRS); Service description; Stage 2

********* Second Change***************

4.3   Naming and addressing concepts

4.3.1   Address management

The issues of general IP address management are discussed in TS 23.221 [7].

According to the procedures defined in TS 23.060 [23], when a UE is assigned an IPv6 prefix, it can change the global IPv6 address it is currently using via the mechanism defined in RFC 3041 [??], or similar means. When a UE is registered in the IM CN Subsystem, any change to the IP address that is used to access the IM CN subsystem shall trigger automatic registration in order to update the UE's IP address.

The ability of the User plane and the Control Plane for a single session being able to pass through different GGSNs is not defined in this release.

********* Third Change***************

4.5   Mobility related concepts

The Mobility related procedures for GPRS are described in [23] and the IP address management principles are described in [7]. As specified by the GPRS procedures, the UE shall acquire the necessary IP address(es) as part of the PDP context activation procedure(s).

The following procedures are supported by an UE when accessing IMS:

- Connect to the core network using GPRS procedures and acquire the necessary IP address via activation of a PDP context, which includes, or is followed by, the P-CSCF discovery procedure;

- Register to the IM subsystem as defined by the IMS registration procedures;

- If an UE explicitly deactivates a PDP context that is being used for IMS signalling, it shall first de-register from the IMS (while there is no IMS session in progress);

- If an UE explicitly deactivates a PDP context that is being used for IMS signalling while an IMS session is in progress, the UE must first release the session and de-register from the IMS and then deactivate the PDP context;

- If an UE acquires a new IP address due to changes triggered by the GPRS/UMTS procedures or by changing the IP address according to [7], the UE shall re- register in the IMS by executing the IMS registration;

- In order to be able to deliver an incoming IMS session, the PDP context that is being used for IMS signalling need to remain active as long as the UE is registered in the IM CN subsystem;

When the PLMN changes, and the attempt to perform an inter-PLMN routeing area update is unsuccessful, then the UE should attempt to re-attach to the network using GPRS procedures and re-register for IMS services. Typically this will involve a different GGSN.

4.6   Roles of Session Control Functions