TSGS#21(03)0380

Source: **TSG SA WG2**
Title: **CRs on 23.228**
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 #21.
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.

Tdoc #	Title	Spec	CR #	cat	Version in	REL	WI	S2 meeting
S2-032566	IMS corrections	23.228	330	F	5.9.0	5	IMS-CCR	S2-33
S2-032663	IMS corrections	23.228	329r1	A	6.2.0	6	IMS-CCR	S2-33
S2-033247	IMS-SIP interworking	23.228	337r2	F	5.9.0	5	IMS-CCR	S2-34
S2-033133	IMS-SIP interworking	23.228	336r1	B	6.2.0	6	IMS2	S2-34
S2-033252	UE in a visited Network with a P-CSCF located in the Home network	23.228	346r2	F	5.9.0	5	IMS	S2-34
S2-033265	UE in a visited Network with a P-CSCF located in the Home network	23.228	347r3	A	6.2.0	6	IMS	S2-34
S2-033079	Correction to Network initiated session release	23.228	348	F	5.9.0	5	IMS-CCR	S2-34
S2-033080	Correction to Network initiated session release	23.228	349	A	6.2.0	6	IMS-CCR	S2-34
S2-032664	Immediate IMS Messaging to multiple recipients	23.228	320r1	C	6.2.0	6	IMS2	S2-33
S2-032665	Some service aspects of IMS messaging	23.228	321r1	C	6.2.0	6	IMS2	S2-33
S2-032666	Session-based IMS messaging	23.228	322r1	C	6.2.0	6	IMS2	S2-33
S2-032671	Mobile-initiated Hold and Resume of a Mobile-PSTN Session	23.228	324r1	F	6.2.0	6	IMS2	S2-33
S2-032672	Subscription to information changes in e.g. AS or S-CSCF	23.228	325r1	B	6.2.0	6	IMS2	S2-33
S2-032673	Refreshing sessions	23.228	326r1	F	6.2.0	6	IMS2	S2-33
S2-032747	IP version interworking	23.228	331r2	B	6.2.0	6	IMS2	S2-33
S2-033254	Originating routing from ASs on behalf of PSIs	23.228	340r2	C	6.2.0	6	IMS2	S2-34
S2-033045	Signalling Path for Session Termination Procedures	23.228	342	F	6.2.0	6	IMS2	S2-34
S2-033047	Correction of cross references in Annex E	23.228	343	D	6.2.0	6	IMS-COOP	S2-34
S2-033255	PSI configuration in the HSS	23.228	350r2	C	6.2.0	6	IMS2	S2-34
S2-033249	PSI configuration and routing	23.228	351r2	C	6.2.0	6	IMS2	S2-34

Note 1: In CR #325r1, section 2 is impacted but not mentioned.
Note 2: For S2-033254 and S2-033255, the section numbering needs to be adjusted if S2-033255 is not approved.
Note 3: The figure numbering used in the CR 351r2 is incorrect and will need to be fixed if this CR is approved.

3GPP TSG-SA2 Meeting #33 ***Tdoc ⌘S2-032566***
Sophia Antipolis, France, July 7th –11th, 2003

CR-Form-v7

CHANGE REQUEST

⌘ **23.228** **CR** **330** ⌘ **rev** **-** ⌘ Current version: **5.9.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	IMS corrections
Source:	⌘	Ericsson, Lucent, Nokia
Work item code:	⌘	IMS-CCR
Date:	⌘	07/07/2003
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)*
Rel-6	*(Release 6)*

Reason for change:	⌘	In IMS, the I-CSCF always routes to a S-CSCF for incoming/terminating sessions towards end users. During the Release 5 development of IMS, some texts have been erronously left behind giving wrong possibility of I-CSCF directly communicating with MGCF based on certain information that are not available with current IMS flows. Additional errors have been detected that causes misalignment & ambiguity between stage 2 & 3. These errors have been corrected and aligned with the flows as only the steps were wrong and not the session flows.
Summary of change:	⌘	Errors listed above have been corrected.
Consequences if not approved:	⌘	Wrong stage2 specifications This will lead to stage 3 misalignment and unfulfilled stage 2 requirements which are undesirable and wrong.

Clauses affected:	⌘	5.5.1, 5.5.2, 5.5.4, 5.6.1

Other specs affected:	⌘	Y	N		⌘
			X	Other core specifications	
			X	Test specifications	
			X	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/specs/CR.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.

5.5 Serving-CSCF/MGCF to serving-CSCF/MGCF procedures

This section presents the detailed application level flows to define the procedures for Serving-CSCF to Serving-CSCF.

This section contains four session flow procedures, showing variations on the signalling path between the Serving-CSCF that handles session origination, and the Serving-CSCF that handles session termination. This signalling path depends on:

- whether the originator and destination are served by the same network operator,

- whether the network operators have chosen to hide their internal configuration.

The Serving-CSCF handling session origination performs an analysis of the destination address, and determines whether it is a subscriber of the same network operator or a different operator.

If the analysis of the destination address determined that it belongs to a subscriber of a different operator, the request is forwarded (optionally through 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. The I-CSCF then forwards the request to the S-CSCF. If the analysis of the destination address determines that it belongs to a subscriber of the same operator, the S-CSCF passes the request to a local I-CSCF, who queries the HSS for current location information. The I-CSCF then forwards the request to the S-CSCF.

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 user either located in the home service area, or roaming. The I-CSCF therefore forwards the request to the S-CSCF serving the destination user.

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.

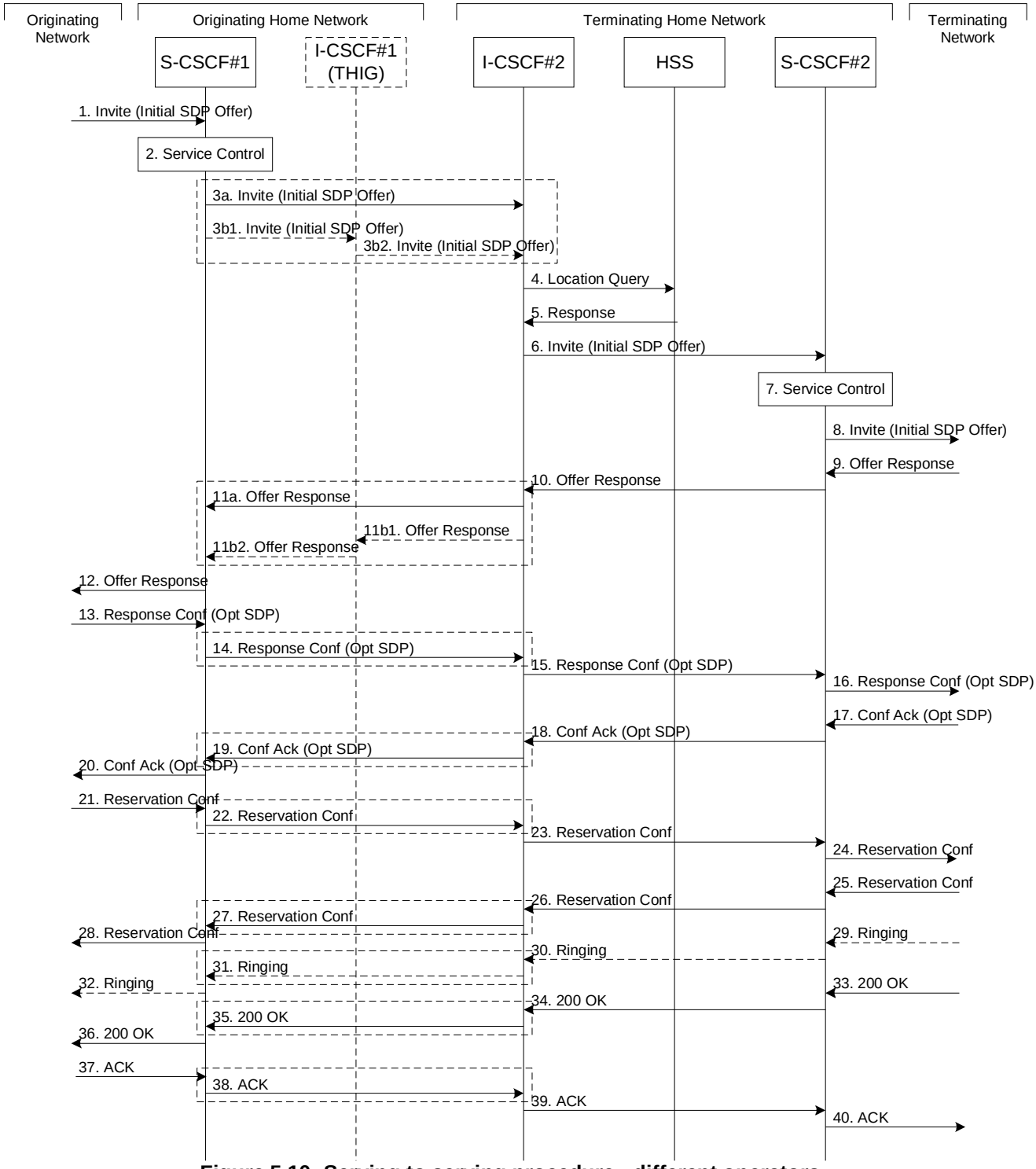

Figure 5.10: Serving to serving procedure - different operators

Procedure S-S#1 is as follows:

1. The SIP INVITE request is sent from the UE to S-CSCF#1 by the procedures of the originating flow. This message should contain the initial media description offer in the SDP.

2. S-CSCF#1 invokes whatever service logic is appropriate for this session attempt.

3. S-CSCF#1 performs an analysis of the destination address, and determines the network operator to whom the subscriber belongs. For S-S#1, this flow is an inter-operator message to the I-CSCF entry point for the terminating user. If the originating operator desires to keep their internal configuration hidden, then S-CSCF#1

forwards the INVITE request through I-CSCF(THIG)#1 (choice (b)); otherwise S-CSCF#1 forwards the INVITE request directly to I-CSCF#2, the well-known entry point into the terminating user's network (choice (a)).

(3a) If the originating network operator does not desire to keep their network configuration hidden, the INVITE request is sent directly to I-CSCF#2.

(3b) If the originating network operator desires to keep their network configuration hidden, the INVITE request is forwarded through an I-CSCF(THIG) in the originating operator's network, I-CSCF(THIG)#1.

(3b1) The INVITE request is sent from S-CSCF#1 to I-CSCF(THIG)#1

(3b2) I-CSCF(THIG)#1 performs the configuration-hiding modifications to the request and forwards it to I-CSCF#2

4. I-CSCF#2 (at the border of the terminating user's network) shall~~may~~ query the HSS for current location information. ~~If I-CSCF#2 cannot determine, based on analysis of the destination number, that the HSS query will fail, then it will send "Cx-location-query" to the HSS to obtain the location information for the destination. If I-CSCF#2 can determine, based on analysis of the destination number, that the HSS query will fail, it will not send the "Cx-location-query" message, allocate a MGCF for a PSTN termination, and continue with step #6.~~

5. HSS responds with the address of the current Serving-CSCF for the terminating user.

6. I-CSCF#2 forwards the INVITE request to the S-CSCF (S-CSCF#2) that will handle the session termination.

7. S-CSCF#2 invokes whatever service logic is appropriate for this session setup attempt

8. The sequence continues with the message flows determined by the termination procedure.

9. The media stream capabilities of the destination are returned along the signalling path, as per the termination procedure.

10. S-CSCF#2 forwards the SDP to I-CSCF#2

11. I-CSCF#2 forwards the SDP to S-CSCF#1. Based on the choice made in step #3 above, this may be sent directly to S-CSCF#1 (11a) or may be sent through I-CSCF(THIG)#1 (11b1 and 11b2)

12. S-CSCF#1 forwards the SDP to the originator, as per the originating procedure.

13. The originator decides on the offered set of media streams, confirms receipt of the Offer Response with a Response Confirmation, and forwards this information to S-CSCF#1 by the origination procedures. The Response Confirmation may also contain SDP. This may be the same SDP as in the Offer Response received in Step 12 or a subset.

14-15. S-CSCF#1 forwards the offered SDP to S-CSCF#2. This may possibly be routed through I-CSCF#1and/or I-CSCF#2 depending on operator configuration of the I-CSCFs. Step 14 may be similar to Step 3 depending on whether or not configuration hiding is used.

16. S-CSCF#2 forwards the offered SDP to the terminating endpoint, as per the termination procedure

17-20 The terminating end point acknowledges the offer with answered SDP and passes through the session path to the originating end point. Step 19 may be similar to Step 11 depending on whether or not configuration hiding is being used.

21-24. Originating end point acknowledges successful resource reservation and the message is forwarded to the terminating end point. This may possibly be routed through I-CSCF#1and/or I-CSCF#2 depending on operator configuration of the I-CSCFs. Step 22 may be similar to Step 3 depending on whether or not configuration hiding is used.

25-28. Terminating end point acknowledges the response and this message is sent to the originating end point through the established session path. Step 27 may be similar to Step 11 depending on whether or not configuration hiding is being used.

29-32. Terminating end point then generates ringing and this message is sent to the originating end point through the established session path. Step 31 may be similar to Step 11 depending on whether or not configuration hiding is being used.

33-36. Terminating end point then sends 200 OK via the established session path to the originating end point. Step 35 may be similar to Step 11 depending on whether or not configuration hiding is being used.

37-40. Originating end point acknowledges the establishment of the session and sends to the terminating end point via the established session path. This may possibly be routed through I-CSCF#1and/or I-CSCF#2 depending on operator configuration of the I-CSCFs. Step 38 may be similar to Step 3 depending on whether or not configuration hiding is used.

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 user either located in the home service area, or roaming. The I-CSCF therefore forwards the request to the S-CSCF serving the destination user.

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.

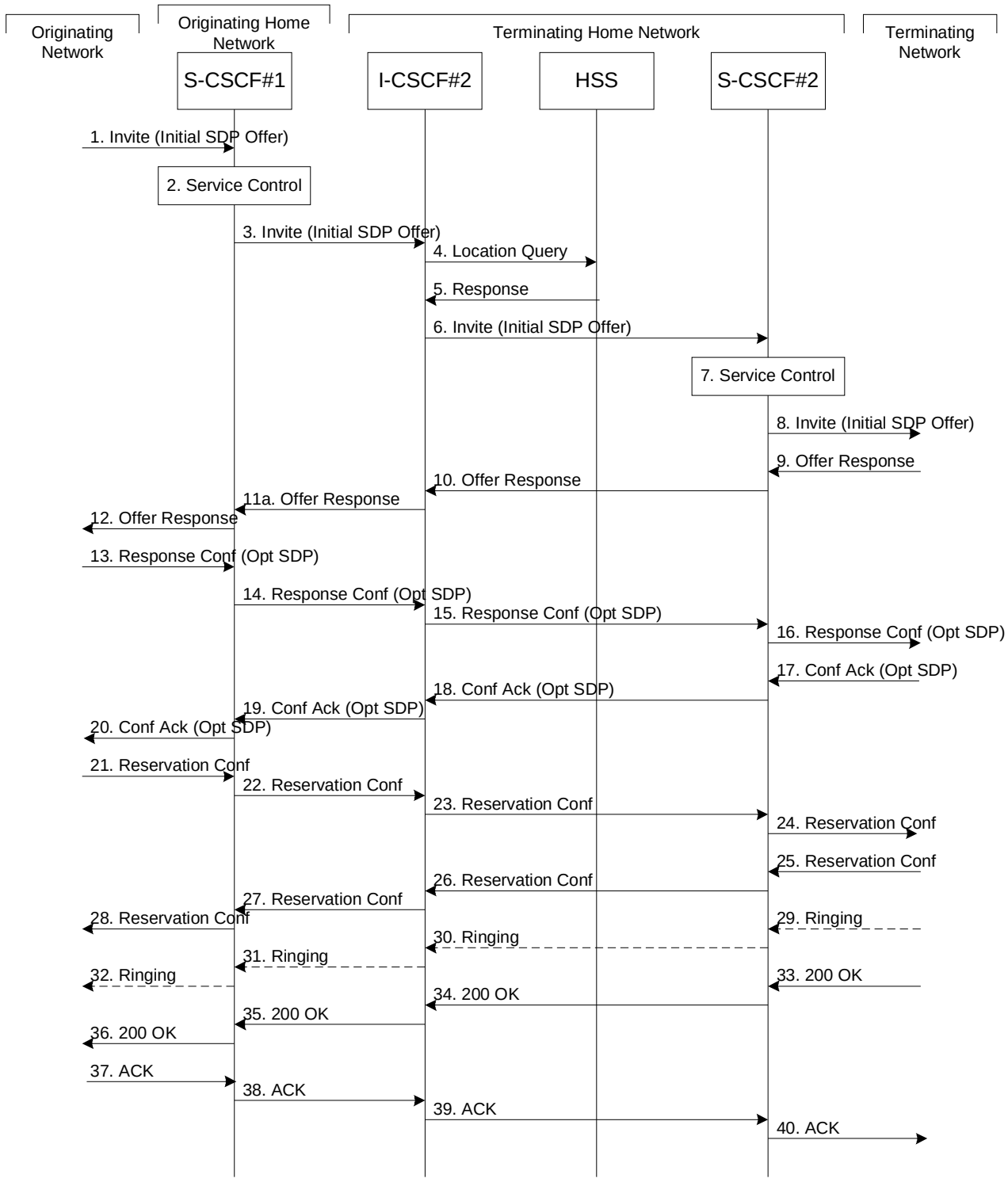

Figure 5.11: Serving to serving procedure - same operator

Procedure S-S#2 is as follows:

1. The SIP INVITE request is sent from the UE to S-CSCF#1 by the procedures of the originating flow. This message should contain the initial media description offer in the SDP.

2. S-CSCF#1 invokes whatever service logic is appropriate for this session setup attempt

3. S-CSCF#1 performs an analysis of the destination address, and determines the network operator to whom the subscriber belongs. Since it is local, the request is passed to a local I-CSCF.

4. I-CSCF shall~~may~~ query the HSS for current location information. ~~If I-CSCF cannot determine, based on analysis of the destination number, that the HSS query will fail, then it will send "Cx-location-query" to the HSS to~~

~~obtain the location information for the destination. If I-CSCF can determine, based on analysis of the destination number, that the HSS query will fail, it will not send the "Cx-location-query" message, allocate a MGCF for a PSTN termination, and continue with step #6.~~

5. HSS responds with the address of the current Serving-CSCF for the terminating user.
6. I-CSCF forwards the INVITE request to the S-CSCF (S-CSCF#2) that will handle the session termination.
7. S-CSCF#2 invokes whatever service logic is appropriate for this session setup attempt
8. The sequence continues with the message flows determined by the termination procedure.

9-12. The terminating end point responds with an answer to the offered SDP and this message is passed along the established session path.

13-16. The originator decides on the offered set of media streams, confirms receipt of the Offer Response with a Response Confirmation, and forwards this information to S-CSCF#1 by the origination procedures. This message is forwarded via the established session path to the terminating end point. The Response Confirmation may also contain SDP. This may be the same SDP as in the Offer Response received in Step 12 or a subset.

17-20. Terminating end point responds to the offered SDP and the response if forwarded to the originating end point via the established session path.

21-24. Originating end point sends successful resource reservation information towards the terminating end point via the established session path.

25-28. Terminating end point sends successful resource reservation acknowledgement towards the originating end point via the established session path

29-32. Terminating end point sends ringing message toward the originating end point via the established session path.

33-36. The SIP final response, 200-OK, is sent by the terminating endpoint over the signalling path. This is typically generated when the user has accepted the incoming session setup attempt. The message is sent to S-CSCF#2 per the termination procedure.

37-40. The originating endpoint sends the final acknowledgement to S-CSCF#1 by the origination procedures and it is then sent over the signalling path to the terminating end point.

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.

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.

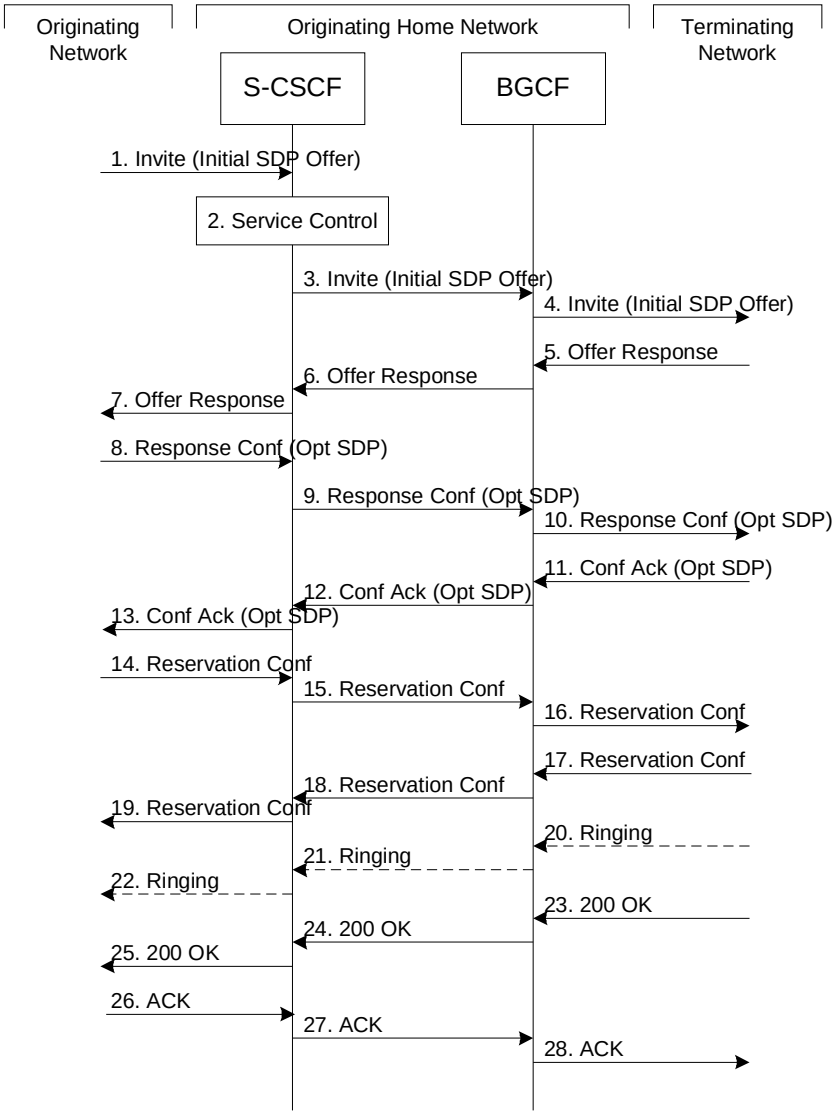

Figure 5.12: Serving to PSTN procedure - same operator

Procedure S-S#3 is as follows:

1. The SIP INVITE request is sent from the UE to S-CSCF#1 by the procedures of the originating flow. This message should contain the initial media description offer in the SDP.

2. S-CSCF#1 invokes whatever service logic is appropriate for this session setup attempt

3. S-CSCF#1 performs an analysis of the destination address. From the analysis of the destination address, S-CSCF#1 determines that this is for the PSTN, and passes the request to the BGCF.

4. The BGCF determines that the MGCF shall be in the same network, and hence proceeds to select an appropriate MGCF. The SIP INVITE request is forwarded to the MGCF. The PSTN terminating information flows are then followed.

5-7. The media stream capabilities of the destination are returned along the signalling path, as per the PSTN termination procedure.

8. The originator decides the offered set of media streams, confirms receipt of the Offer Response with a Response Confirmation, and forwards this information to S-CSCF#1 by the origination procedures. The Response Confirmation may also contain SDP. This may be the same SDP as in the Offer Response received in Step 7 or a subset.

9-10. S-CSCF#1 forwards the offered SDP to the terminating endpoint as per the PSTN terminating procedures via the established session path.

11-13. The terminating end point answers to the offered SDP and the message is passed through the established session path to the originating end point.

14-16. When the originating endpoint has completed the resource reservation procedures, it sends the successful resource reservation message to S-CSCF#1 by the origination procedures and it is passed to the terminating end point through the session path.

17-19. . The terminating endpoint acknowledges the result and the message is passed onto the originating end point via the session path.

20-22. Terminating end point generates ringing message and forwards it to BGCF which in tern forwards the message to SCSCF#1. S-CSCF#1 forwards the ringing message to the originator, per the origination procedure

23. When the destination party answers, the termination procedure results in a SIP 200-OK final response to the BGCF

24-25. The BGCF forwards this information to the S-CSCF#1 and then it is forwarded to the originating end point.

26. The 200-OK is returned to the originating endpoint, by the origination procedure from terminating end point.

27. The originating endpoint sends the final acknowledgement to S-CSCF#1 by the origination procedures.

28. S-CSCF#1 forwards this message to the terminating endpoint as per the PSTN terminating procedures.

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.

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

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

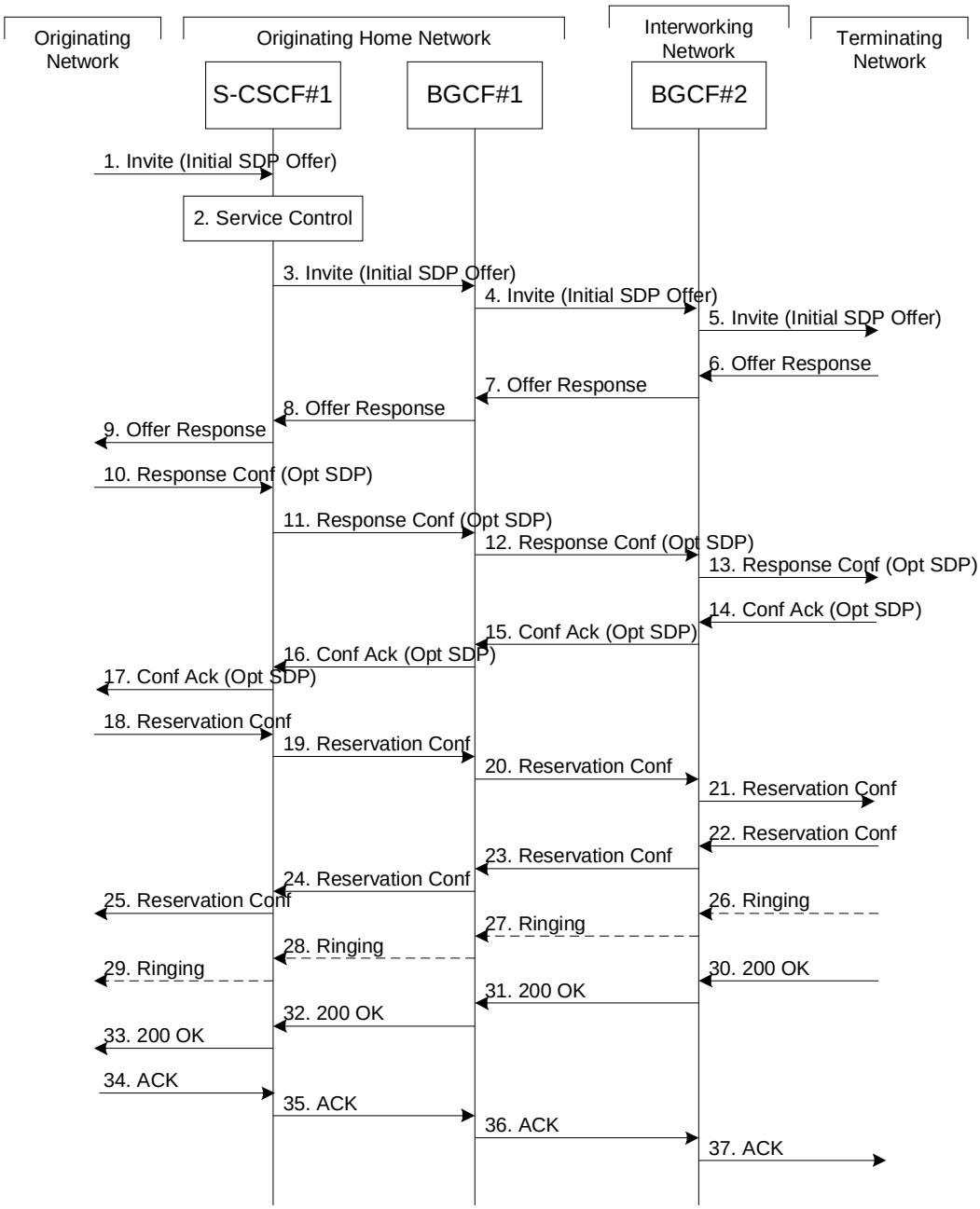

Figure 5.13: Serving to PSTN procedure - different operator

Procedure S-S#4 is as follows:

1. The SIP INVITE request is sent from the UE to S-CSCF#1 by the procedures of the originating flow. This message should contain the initial media description offer in the SDP.

2. S-CSCF#1 invokes whatever service logic is appropriate for this session setup attempt

3. S-CSCF#1 performs an analysis of the destination address. From the analysis of the destination address, S-CSCF#1 determines that this is for the PSTN, and passes the request to the BGCF#1.

4. The BGCF#1 determines that the PSTN interworking should occur in interworking network, and forwards the request on to BGCF#2. For the case that network hiding is required, the request is forwarded through an I-CSCF(THIG).

5. BGCF#2 determines that the MGCF shall be in the same network, and hence proceeds to select an appropriate MGCF. The SIP INVITE request is forwarded to the MGCF. The PSTN terminating information flows are then followed.

6-8. The media stream capabilities of the destination are returned along the signalling path, as per the PSTN termination procedure.

9. S-CSCF#1 forwards the SDP to the originator, as per the originating procedure.

10. The originator decides the offered set of media streams, confirms receipt of the Offer Response with a Response Confirmation, and forwards this information to S-CSCF#1 by the origination procedures. The Response Confirmation may also contain SDP. This may be the same SDP as in the Offer Response received in Step 12 or a subset.

11-13. S-CSCF#1 forwards the offered SDP to the terminating endpoint, as per the PSTN terminating procedure.

14-17. Terminating end point responds to the offer via the established session path towards the originating end point.

18-21.When the originating endpoint has completed the resource reservation procedures, it sends the successful resource reservation message to S-CSCF#1 by the origination procedures and it is forwarded to the terminating end point via established session path.

22-25. The terminating end point responds to the message towards the originating end point.

26-29. Terminating end point generates ringing message towards the originating end point.

30-33. Terminating end point sends 200 OK when the originating end answers the session.

34-37. Originating end point acknowledges the establishment of the session.

5.6 Origination procedures

This section presents the detailed application level flows to define the Procedures for session originations.

The session origination procedures specify the signalling path between the UE initiating a session setup attempt and the Serving-CSCF that is assigned to perform the session origination service. This signalling path is determined at the time of UE registration, and remains fixed for the life of the registration.

A UE always has a proxy (P-CSCF) associated with it. This P-CSCF is located in the same network as the GGSN, performs resource authorisation, and may have additional functions in handling of emergency sessions. The P-CSCF is determined by the CSCF discovery process, described in Section 5.1.1 (Local CSCF Discovery).

As a result of the registration procedure, the P-CSCF determines the next hop toward the Serving-CSCF. This next hop is to the S-CSCF in the home network (possibly through an I-CSCF(THIG) to hide the network configuration) (MO#1). These next-hop addresses could be IPv6 addresses, or could be names that are translated via DNS to an IPv6 address.

Sessions originated in the PSTN to a mobile destination are a special case of the Origination procedures. The MGCF uses H.248 [19] to control a Media Gateway, and communicates with the SS7 network. The MGCF initiates the SIP request, and subsequent nodes consider the signalling as if it came from a S-CSCF.

5.6.1 (MO#1) Mobile origination, roaming

This origination procedure applies to roaming users.

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.

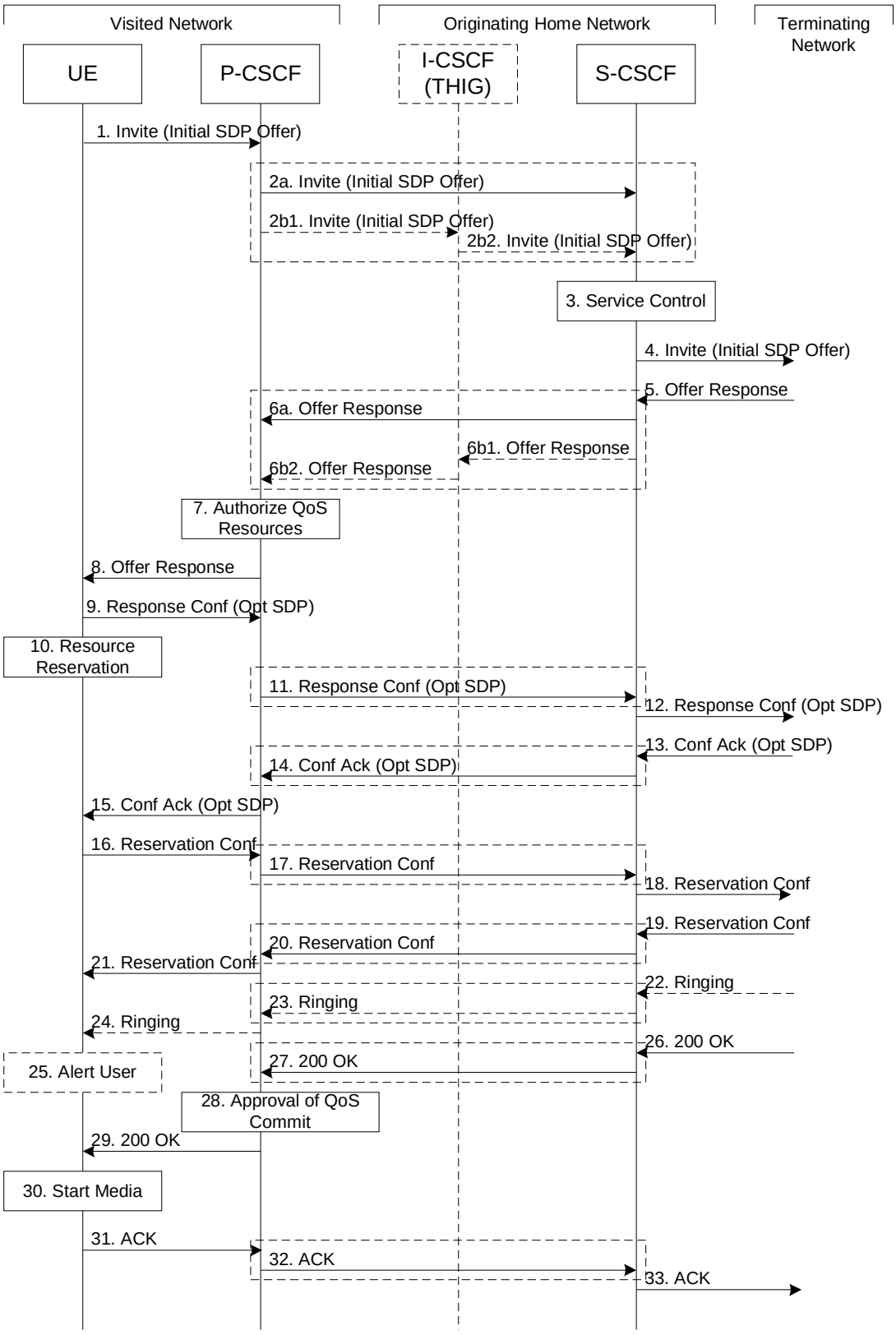

Figure 5.14: Mobile origination procedure - roaming

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 invokes any origination service logic required for this user. 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 Offer Response 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) (6b1 and 6b2).

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

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

9. UE decides the offered set of media streams for this session, confirms receipt of the Offer Response and sends the Response Confirmation to the P-CSCF. The Response Confirmation may also contain SDP. This may be the same SDP as in the Offer Response received in Step 8 or a subset. If new media are defined by this SDP, a new authorization (as in Step 7) will be done by the P-CSCF(PDF) following Step 14. The originating UE is free to continue to offer new media on this operation or on subsequent exchanges using the Update method. Each offer/answer exchange will cause the P-CSCF(PDF) to repeat the Authorization step (Step 7) again.

10. After determining the needed resources in step 8, UE initiates the reservation procedures for the resources needed for this session.

11. P-CSCF forwards the Response Confirmation to S-CSCF. This may possibly be routed through the I-CSCF depending on operator configuration of the I-CSCF. Step 11 may be similar to Step 2 depending on whether or not configuration hiding is used.

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

13-15. The terminating end point responds to the originating end with an acknowledgement. If Optional SDP is contained in the Response Confirmation, the Confirmation Acknowledge will also contain an SDP response. If the SDP has changed, the P-CSCF validates that the resources are allowed to be used. Step 14 may be similar to Step 6 depending on whether or not configuration hiding is used.

16-18. When the resource reservation is completed, UE sends the successful Resource Reservation message to the terminating endpoint, via the signalling path established by the INVITE message. The message is sent first to P-CSCF. Step 17 may be similar to Step 2 depending on whether or not configuration hiding is used.

19-21. The terminating end point responds to the originating end when successful resource reservation has occured. If the SDP has changed, the P-CSCF authorizes that the resources are allowed to be used. Step 20 may be similar to Step 6 depending on whether or not configuration hiding is used.

22-24. Terminating end point may generate ringing and it is then forwarded via the session path to the UE. Step 23 may be similar to Step 6 depending on whether or not configuration hiding is used.

25. UE indicates to the originating user that the destination is ringing

26. 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.

~~27. S-CSCF invokes whatever service logic is appropriate for the completed session setup.~~

27. S-CSCF sends a SIP 200-OK final response along the signalling path back to P-CSCF. Step 27~~3~~ may be similar to Step 6 depending on whether or not configuration hiding is used.

28. P-CSCF indicates the resources reserved for this session should now be approved for use.

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

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

31-33. UE responds to the 200 OK with a SIP ACK message sent along the signalling path. Step 32 may be similar to Step 2 depending on whether or not configuration hiding is used.

3GPP TSG-SA2 Meeting #33
Sophia Antipolis, France, July 7th – 11th, 2003

Tdoc ⌘S2-032663

CR-Form-v7

CHANGE REQUEST

⌘ **23.228** **CR** **329** ⌘ **rev** **1** ⌘ Current version: **6.2.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	IMS corrections
Source:	⌘	Ericsson, Lucent, Nokia
Work item code:	⌘	IMS-CCR
Date:	⌘	07-07-2003
Category:	⌘	**A**
Release:	⌘	Rel-6

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)*
Rel-6	*(Release 6)*

Reason for change:	⌘	In IMS, the I-CSCF always routes to a S-CSCF for incoming/terminating sessions towards end users. During the Release 5 development of IMS, some texts have been erronously left behind giving wrong possibility of I-CSCF directly communicating with MGCF based on certain information that are not available with current IMS flows. Additional errors have been detected that causes misalignment & ambiguity between stage 2 & 3. These errors have been corrected and aligned with the flows as only the steps were wrong and not the session flows.
Summary of change:	⌘	Errors listed above have been corrected
Consequences if not approved:	⌘	Wrong stage2 specifications This will lead to stage 3 misalignment and unfulfilled stage 2 requirements which are undesirable and wrong.

Clauses affected:	⌘	5.5.1, 5.5.2, 5.5.4, 5.6.1

		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	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/specs/CR.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

********** Next Change **********

5.5 Serving-CSCF/MGCF to serving-CSCF/MGCF procedures

This section presents the detailed application level flows to define the procedures for Serving-CSCF to Serving-CSCF.

This section contains four session flow procedures, showing variations on the signalling path between the Serving-CSCF that handles session origination, and the Serving-CSCF that handles session termination. This signalling path depends on:

- whether the originator and destination are served by the same network operator,

- whether the network operators have chosen to hide their internal configuration.

The Serving-CSCF handling session origination performs an analysis of the destination address, and determines whether it is a subscriber of the same network operator or a different operator.

If the analysis of the destination address determined that it belongs to a subscriber of a different operator, the request is forwarded (optionally through 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. The I-CSCF then forwards the request to the S-CSCF. If the analysis of the destination address determines that it belongs to a subscriber of the same operator, the S-CSCF passes the request to a local I-CSCF, who queries the HSS for current location information. The I-CSCF then forwards the request to the S-CSCF.

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 user either located in the home service area, or roaming. The I-CSCF therefore forwards the request to the S-CSCF serving the destination user.

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.

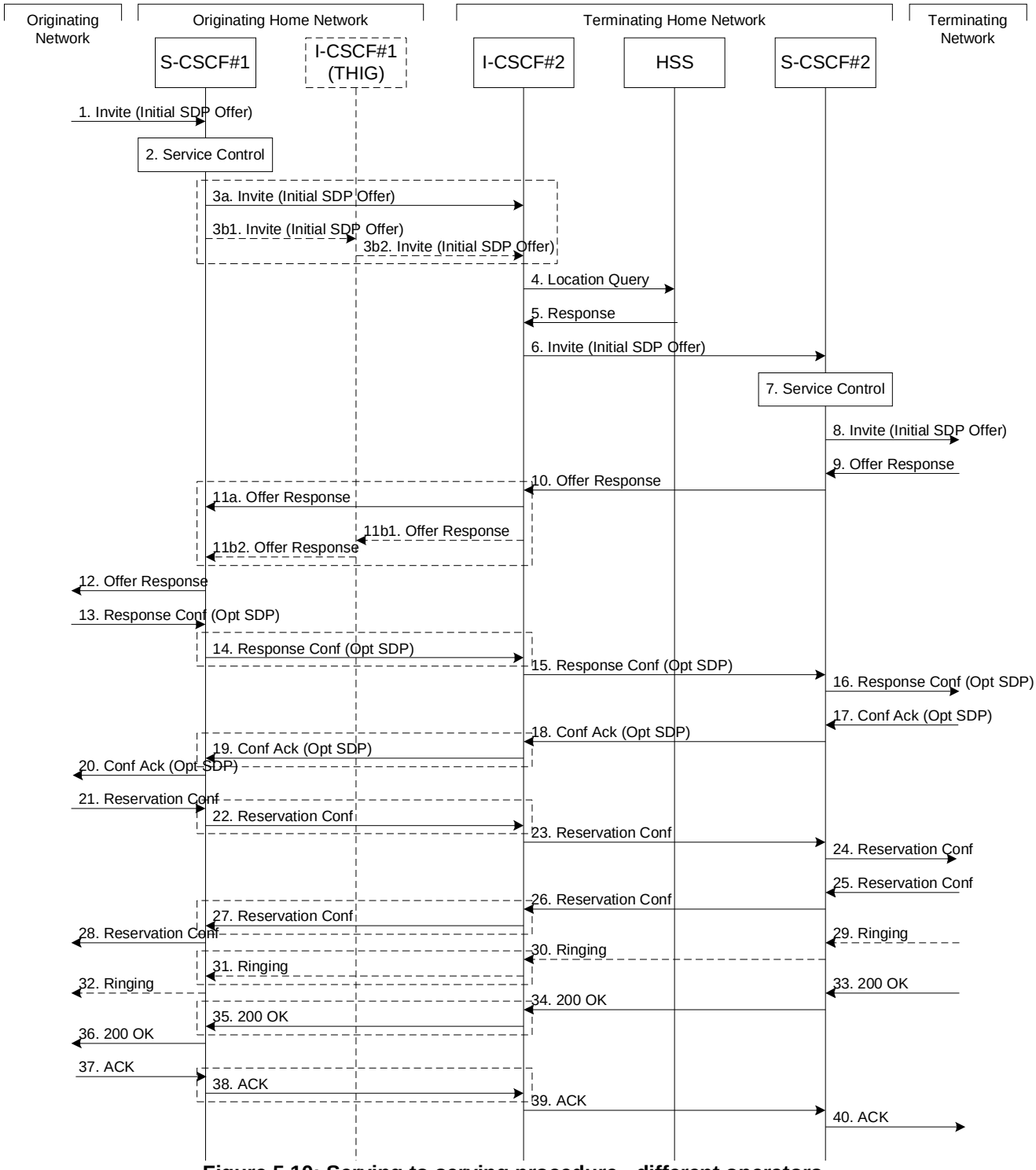

Figure 5.10: Serving to serving procedure - different operators

Procedure S-S#1 is as follows:

1. The SIP INVITE request is sent from the UE to S-CSCF#1 by the procedures of the originating flow. This message should contain the initial media description offer in the SDP.

2. S-CSCF#1 invokes whatever service logic is appropriate for this session attempt.

3. S-CSCF#1 performs an analysis of the destination address, and determines the network operator to whom the subscriber belongs. For S-S#1, this flow is an inter-operator message to the I-CSCF entry point for the terminating user. If the originating operator desires to keep their internal configuration hidden, then S-CSCF#1

forwards the INVITE request through I-CSCF(THIG)#1 (choice (b)); otherwise S-CSCF#1 forwards the INVITE request directly to I-CSCF#2, the well-known entry point into the terminating user's network (choice (a)).

(3a) If the originating network operator does not desire to keep their network configuration hidden, the INVITE request is sent directly to I-CSCF#2.

(3b) If the originating network operator desires to keep their network configuration hidden, the INVITE request is forwarded through an I-CSCF(THIG) in the originating operator's network, I-CSCF(THIG)#1.

(3b1) The INVITE request is sent from S-CSCF#1 to I-CSCF(THIG)#1

(3b2) I-CSCF(THIG)#1 performs the configuration-hiding modifications to the request and forwards it to I-CSCF#2

4. I-CSCF#2 (at the border of the terminating user's network) shall~~may~~ query the HSS for current location information. ~~If I-CSCF#2 cannot determine, based on analysis of the destination number, that the HSS query will fail, then it will send "Cx-location-query" to the HSS to obtain the location information for the destination. If I-CSCF#2 can determine, based on analysis of the destination number, that the HSS query will fail, it will not send the "Cx-location-query" message, allocate a MGCF for a PSTN termination, and continue with step #6.~~

5. HSS responds with the address of the current Serving-CSCF for the terminating user.

6. I-CSCF#2 forwards the INVITE request to the S-CSCF (S-CSCF#2) that will handle the session termination.

7. S-CSCF#2 invokes whatever service logic is appropriate for this session setup attempt

8. The sequence continues with the message flows determined by the termination procedure.

9. The media stream capabilities of the destination are returned along the signalling path, as per the termination procedure.

10. S-CSCF#2 forwards the SDP to I-CSCF#2

11. I-CSCF#2 forwards the SDP to S-CSCF#1. Based on the choice made in step #3 above, this may be sent directly to S-CSCF#1 (11a) or may be sent through I-CSCF(THIG)#1 (11b1 and 11b2)

12. S-CSCF#1 forwards the SDP to the originator, as per the originating procedure.

13. The originator decides on the offered set of media streams, confirms receipt of the Offer Response with a Response Confirmation, and forwards this information to S-CSCF#1 by the origination procedures. The Response Confirmation may also contain SDP. This may be the same SDP as in the Offer Response received in Step 12 or a subset.

14-15. S-CSCF#1 forwards the offered SDP to S-CSCF#2. This may possibly be routed through I-CSCF#1and/or I-CSCF#2 depending on operator configuration of the I-CSCFs. Step 14 may be similar to Step 3 depending on whether or not configuration hiding is used.

16. S-CSCF#2 forwards the offered SDP to the terminating endpoint, as per the termination procedure

17-20 The terminating end point acknowledges the offer with answered SDP and passes through the session path to the originating end point. Step 19 may be similar to Step 11 depending on whether or not configuration hiding is being used.

21-24. Originating end point acknowledges successful resource reservation and the message is forwarded to the terminating end point. This may possibly be routed through I-CSCF#1and/or I-CSCF#2 depending on operator configuration of the I-CSCFs. Step 22 may be similar to Step 3 depending on whether or not configuration hiding is used.

25-28. Terminating end point acknowledges the response and this message is sent to the originating end point through the established session path. Step 27 may be similar to Step 11 depending on whether or not configuration hiding is being used.

29-32. Terminating end point then generates ringing and this message is sent to the originating end point through the established session path. Step 31 may be similar to Step 11 depending on whether or not configuration hiding is being used.

33-36. Terminating end point then sends 200 OK via the established session path to the originating end point. Step 35 may be similar to Step 11 depending on whether or not configuration hiding is being used.

37-40. Originating end point acknowledges the establishment of the session and sends to the terminating end point via the established session path. This may possibly be routed through I-CSCF#1and/or I-CSCF#2 depending on operator configuration of the I-CSCFs. Step 38 may be similar to Step 3 depending on whether or not configuration hiding is used.

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 user either located in the home service area, or roaming. The I-CSCF therefore forwards the request to the S-CSCF serving the destination user.

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.

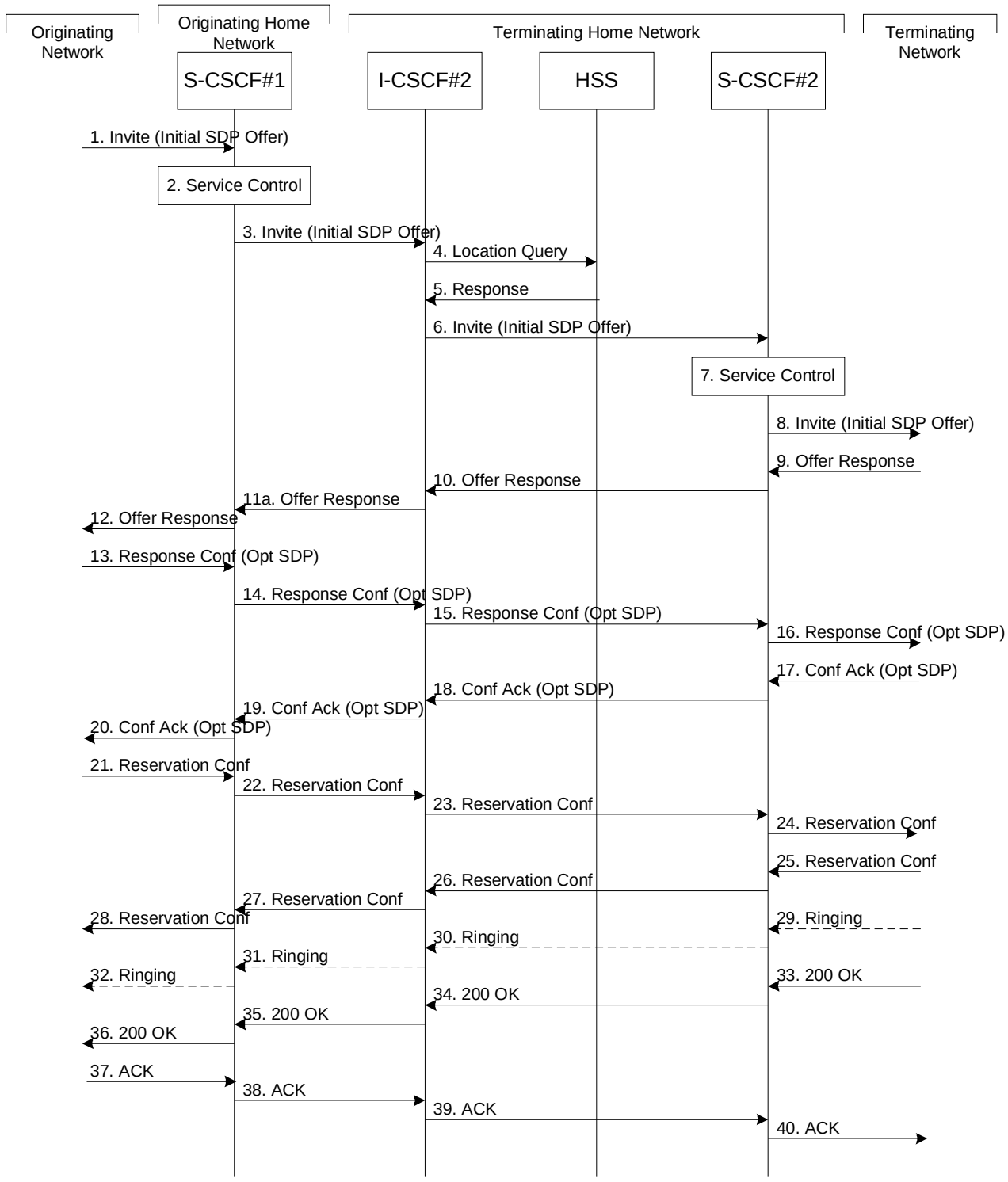

Figure 5.11: Serving to serving procedure - same operator

Procedure S-S#2 is as follows:

1. The SIP INVITE request is sent from the UE to S-CSCF#1 by the procedures of the originating flow. This message should contain the initial media description offer in the SDP.

2. S-CSCF#1 invokes whatever service logic is appropriate for this session setup attempt

3. S-CSCF#1 performs an analysis of the destination address, and determines the network operator to whom the subscriber belongs. Since it is local, the request is passed to a local I-CSCF.

4. I-CSCF shall~~may~~ query the HSS for current location information. ~~If I-CSCF cannot determine, based on analysis of the destination number, that the HSS query will fail, then it will send "Cx location query" to the HSS to obtain the location information for the destination. If I-CSCF can determine, based on analysis of the destination number, that the HSS query will fail, it will not send the "Cx location query" message, allocate a MGCF for a PSTN termination, and continue with step #6.~~

5. HSS responds with the address of the current Serving-CSCF for the terminating user.

6. I-CSCF forwards the INVITE request to the S-CSCF (S-CSCF#2) that will handle the session termination.

7. S-CSCF#2 invokes whatever service logic is appropriate for this session setup attempt

8. The sequence continues with the message flows determined by the termination procedure.

9-12. The terminating end point responds with an answer to the offered SDP and this message is passed along the established session path.

13-16. The originator decides on the offered set of media streams, confirms receipt of the Offer Response with a Response Confirmation, and forwards this information to S-CSCF#1 by the origination procedures. This message is forwarded via the established session path to the terminating end point. The Response Confirmation may also contain SDP. This may be the same SDP as in the Offer Response received in Step 12 or a subset.

17-20. Terminating end point responds to the offered SDP and the response if forwarded to the originating end point via the established session path.

21-24. Originating end point sends successful resource reservation information towards the terminating end point via the established session path.

25-28. Terminating end point sends successful resource reservation acknowledgement towards the originating end point via the established session path

29-32. Terminating end point sends ringing message toward the originating end point via the established session path.

33-36. The SIP final response, 200-OK, is sent by the terminating endpoint over the signalling path. This is typically generated when the user has accepted the incoming session setup attempt. The message is sent to S-CSCF#2 per the termination procedure.

37-40. The originating endpoint sends the final acknowledgement to S-CSCF#1 by the origination procedures and it is then sent over the signalling path to the terminating end point.

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.

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.

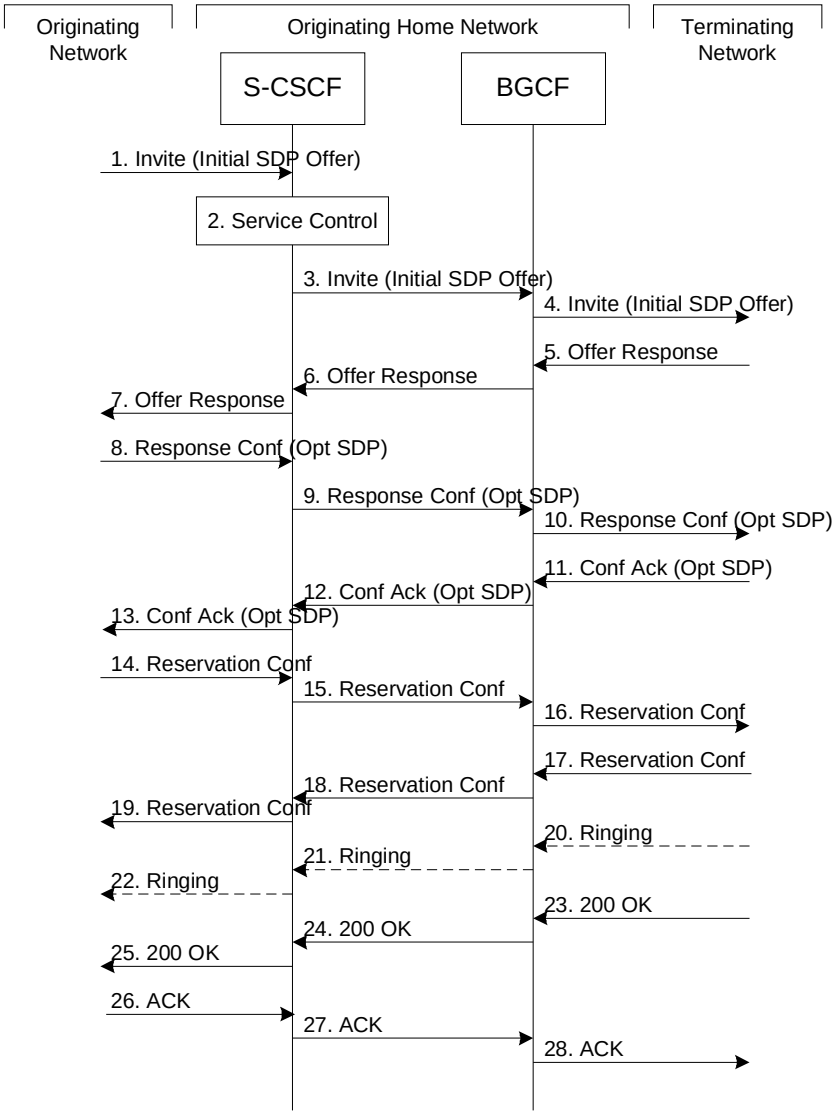

Figure 5.12: Serving to PSTN procedure - same operator

Procedure S-S#3 is as follows:

1. The SIP INVITE request is sent from the UE to S-CSCF#1 by the procedures of the originating flow. This message should contain the initial media description offer in the SDP.

2. S-CSCF#1 invokes whatever service logic is appropriate for this session setup attempt

3. S-CSCF#1 performs an analysis of the destination address. From the analysis of the destination address, S-CSCF#1 determines that this is for the PSTN, and passes the request to the BGCF.

4. The BGCF determines that the MGCF shall be in the same network, and hence proceeds to select an appropriate MGCF. The SIP INVITE request is forwarded to the MGCF. The PSTN terminating information flows are then followed.

5-7. The media stream capabilities of the destination are returned along the signalling path, as per the PSTN termination procedure.

8. The originator decides the offered set of media streams, confirms receipt of the Offer Response with a Response Confirmation, and forwards this information to S-CSCF#1 by the origination procedures. The Response Confirmation may also contain SDP. This may be the same SDP as in the Offer Response received in Step 7 or a subset.

9-10. S-CSCF#1 forwards the offered SDP to the terminating endpoint as per the PSTN terminating procedures via the established session path.

11-13. The terminating end point answers to the offered SDP and the message is passed through the established session path to the originating end point.

14-16. When the originating endpoint has completed the resource reservation procedures, it sends the successful resource reservation message to S-CSCF#1 by the origination procedures and it is passed to the terminating end point through the session path.

17-19. . The terminating endpoint acknowledges the result and the message is passed onto the originating end point via the session path.

20-22. Terminating end point generates ringing message and forwards it to BGCF which in tern forwards the message to SCSCF#1. S-CSCF#1 forwards the ringing message to the originator, per the origination procedure

23. When the destination party answers, the termination procedure results in a SIP 200-OK final response to the BGCF

24-25. The BGCF forwards this information to the S-CSCF#1 and then it is forwarded to the originating end point.

26. The 200-OK is returned to the originating endpoint, by the origination procedure from terminating end point.

27. The originating endpoint sends the final acknowledgement to S-CSCF#1 by the origination procedures.

28. S-CSCF#1 forwards this message to the terminating endpoint as per the PSTN terminating procedures.

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.

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

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

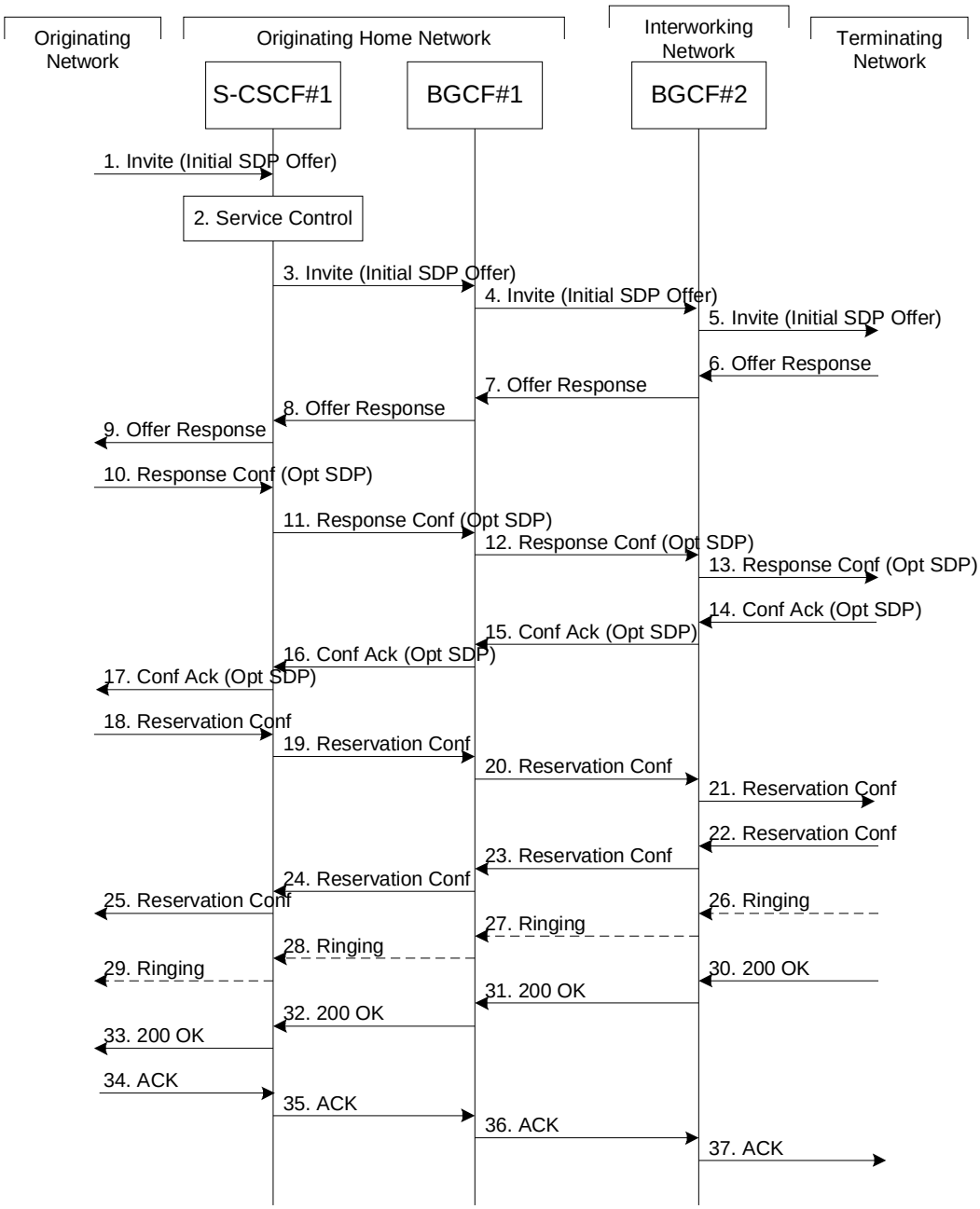

Figure 5.13: Serving to PSTN procedure - different operator

Procedure S-S#4 is as follows:

1. The SIP INVITE request is sent from the UE to S-CSCF#1 by the procedures of the originating flow. This message should contain the initial media description offer in the SDP.

2. S-CSCF#1 invokes whatever service logic is appropriate for this session setup attempt

3. S-CSCF#1 performs an analysis of the destination address. From the analysis of the destination address, S-CSCF#1 determines that this is for the PSTN, and passes the request to the BGCF#1.

4. The BGCF#1 determines that the PSTN interworking should occur in interworking network, and forwards the request on to BGCF#2. For the case that network hiding is required, the request is forwarded through an I-CSCF(THIG).

5. BGCF#2 determines that the MGCF shall be in the same network, and hence proceeds to select an appropriate MGCF. The SIP INVITE request is forwarded to the MGCF. The PSTN terminating information flows are then followed.

6-8. The media stream capabilities of the destination are returned along the signalling path, as per the PSTN termination procedure.

9. S-CSCF#1 forwards the SDP to the originator, as per the originating procedure.

10. The originator decides the offered set of media streams, confirms receipt of the Offer Response with a Response Confirmation, and forwards this information to S-CSCF#1 by the origination procedures. The Response Confirmation may also contain SDP. This may be the same SDP as in the Offer Response received in Step 12 or a subset.

11-13. S-CSCF#1 forwards the offered SDP to the terminating endpoint, as per the PSTN terminating procedure.

14-17. Terminating end point responds to the offer via the established session path towards the originating end point.

18-21.When the originating endpoint has completed the resource reservation procedures, it sends the successful resource reservation message to S-CSCF#1 by the origination procedures and it is forwarded to the terminating end point via established session path.

22-25. The terminating end point responds to the message towards the originating end point.

26-29. Terminating end point generates ringing message towards the originating end point.

30-33. Terminating end point sends 200 OK when the originating end answers the session.

34-37. Originating end point acknowledges the establishment of the session.

5.6 Origination procedures

This section presents the detailed application level flows to define the Procedures for session originations.

The flows presented in the section assume the use of service-based local policy.

The session origination procedures specify the signalling path between the UE initiating a session setup attempt and the Serving-CSCF that is assigned to perform the session origination service. This signalling path is determined at the time of UE registration, and remains fixed for the life of the registration.

A UE always has a proxy (P-CSCF) associated with it. This P-CSCF performs resource authorisation, and may have additional functions in handling of emergency sessions. The P-CSCF is determined by the CSCF discovery process, described in Section 5.1.1 (Local CSCF Discovery).

As a result of the registration procedure, the P-CSCF determines the next hop toward the Serving-CSCF. This next hop is to the S-CSCF in the home network (possibly through an I-CSCF(THIG) to hide the network configuration) (MO#1). These next-hop addresses could be IPv6 addresses, or could be names that are translated via DNS to an IPv6 address.

Sessions originated in the PSTN to a mobile destination are a special case of the Origination procedures. The MGCF uses H.248 [19] to control a Media Gateway, and communicates with the SS7 network. The MGCF initiates the SIP request, and subsequent nodes consider the signalling as if it came from a S-CSCF.

5.6.1 (MO#1) Mobile origination, roaming

This origination procedure applies to roaming users.

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.

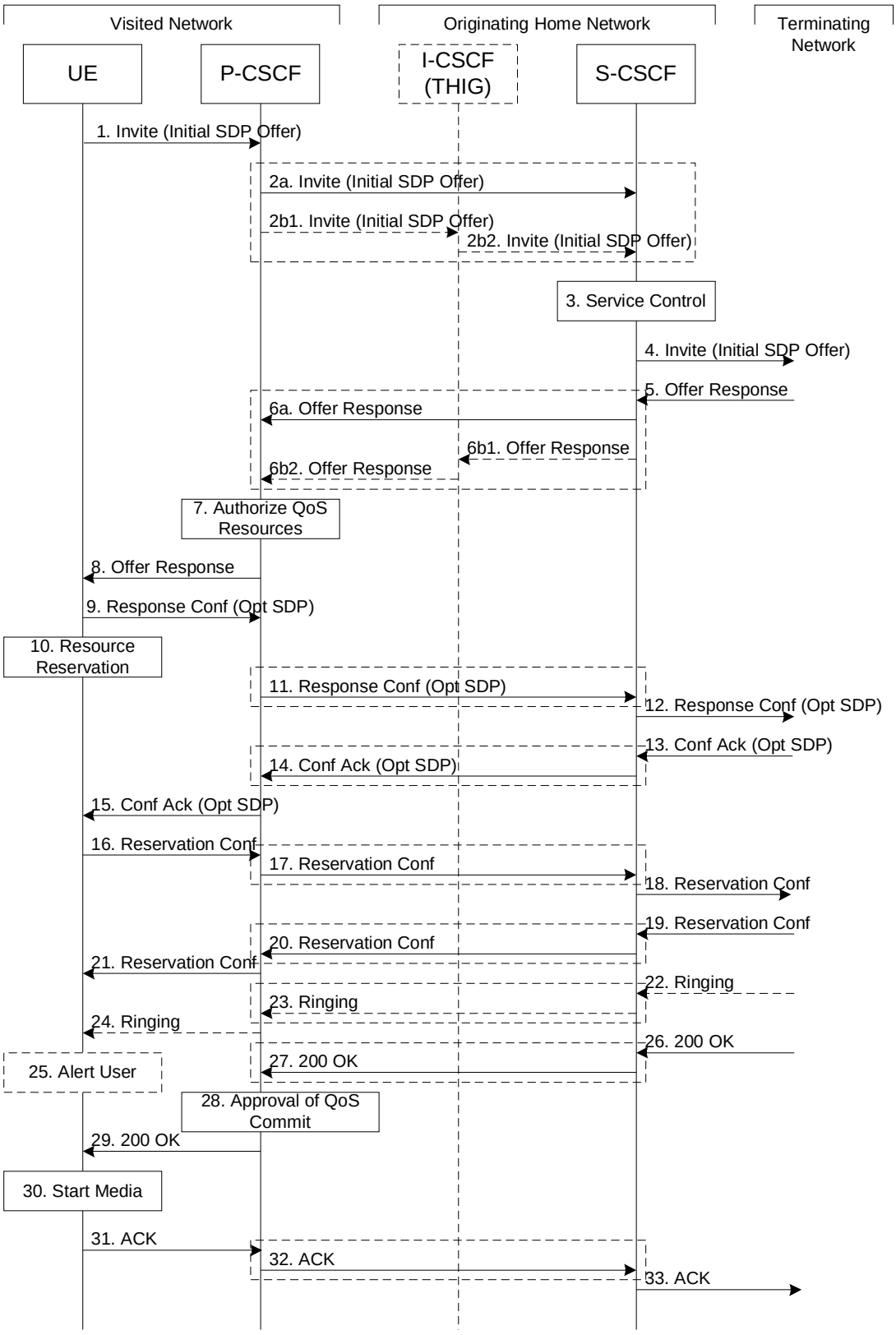

Figure 5.14: Mobile origination procedure - roaming

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 invokes any origination service logic required for this user. 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 Offer Response 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) (6b1 and 6b2).

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

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

9. UE decides the offered set of media streams for this session, confirms receipt of the Offer Response and sends the Response Confirmation to the P-CSCF. The Response Confirmation may also contain SDP. This may be the same SDP as in the Offer Response received in Step 8 or a subset. If new media are defined by this SDP, a new authorization (as in Step 7) will be done by the P-CSCF(PDF) following Step 14. The originating UE is free to continue to offer new media on this operation or on subsequent exchanges using the Update method. Each offer/answer exchange will cause the P-CSCF(PDF) to repeat the Authorization step (Step 7) again.

10. After determining the needed resources in step 8, UE initiates the reservation procedures for the resources needed for this session.

11. P-CSCF forwards the Response Confirmation to S-CSCF. This may possibly be routed through the I-CSCF depending on operator configuration of the I-CSCF. Step 11 may be similar to Step 2 depending on whether or not configuration hiding is used.

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

13-15. The terminating end point responds to the originating end with an acknowledgement. If Optional SDP is contained in the Response Confirmation, the Confirmation Acknowledge will also contain an SDP response. If the SDP has changed, the P-CSCF validates that the resources are allowed to be used. Step 14 may be similar to Step 6 depending on whether or not configuration hiding is used.

16-18. When the resource reservation is completed, UE sends the successful Resource Reservation message to the terminating endpoint, via the signalling path established by the INVITE message. The message is sent first to P-CSCF. Step 17 may be similar to Step 2 depending on whether or not configuration hiding is used.

19-21. The terminating end point responds to the originating end when successful resource reservation has occured. If the SDP has changed, the P-CSCF authorizes that the resources are allowed to be used. Step 20 may be similar to Step 6 depending on whether or not configuration hiding is used.

22-24. Terminating end point may generate ringing and it is then forwarded via the session path to the UE. Step 23 may be similar to Step 6 depending on whether or not configuration hiding is used.

25. UE indicates to the originating user that the destination is ringing

26. 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.

~~27. S-CSCF invokes whatever service logic is appropriate for the completed session setup.~~

27. S-CSCF sends a SIP 200-OK final response along the signalling path back to P-CSCF. Step 27~~3~~ may be similar to Step 6 depending on whether or not configuration hiding is used.

28. P-CSCF indicates the resources reserved for this session should now be approved for use.

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

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

31-33. UE responds to the 200 OK with a SIP ACK message sent along the signalling path. Step 32 may be similar to Step 2 depending on whether or not configuration hiding is used.

3GPP TSG-SA2 Meeting #33 ***Tdoc S2-032664***
Sophia Antipolis, France, 7 – 11 July 2003

CR-Form-v7

CHANGE REQUEST

⌘ **23.228** **CR** **320** ⌘ **rev** **1** ⌘ Current version: **6.2.0** ⌘

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

Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

Title:	⌘	Immediate IMS Messaging to multiple recipients
Source:	⌘	Nokia
Work item code:	⌘	IMS2 ***Date:*** ⌘ 07/07/2003
Category:	⌘	**C** ***Release:*** ⌘ Rel-6

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)*
Rel-6	*(Release 6)*

Reason for change:	⌘	TS 22.340 defines requirements for sending IMS immediate messages to multiple recipients. In stage-2 specifications there is no description how such a functionality can be realized.
Summary of change:	⌘	A new clause has been added to describe the IMS architectural support for immediate messages with multiple recipients.
Consequences if not approved:	⌘	

Clauses affected:	⌘	New clause 5.16.1.2

		Y	N			
Other specs affected:	⌘	X		Other core specifications	⌘	TS 24.228, TS 24.229
			X	Test specifications		
			X	O&M Specifications		

Other comments:	⌘	

How to create CRs using this form:
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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 and only set of changes **********

5.16.1.2 Immediate messages with multiple recipients

IMS users shall be able to send a single immediate message to multiple recipients, as specified in 3GPP TS 22.340 [29a]. The following means are supported to achieve this:

- A PSI identifying a new group is created in the appropriate Application Server, and members are added to this group (e.g. by the user via the Ut interface or by the operator via O&M mechanisms). Immediate messages addressed to this PSI will be routed to the AS hosting the PSI, and this AS shall create and send immediate messages addressed to a group member of the group identified by the PSI.- The user can send an immediate message by indicating the individual addresses (Public User Identities for IMS recipients) of the intended recipients as part of the immediate message. The AS of the user shall then create and send immediate messages addressed to each one of the intended recipients.

********** End of all changes **********

3GPP TSG-SA2 Meeting #33 ***Tdoc S2-032665***
Sophia Antipolis, France, 7 – 11 July 2003

CR-Form-v7

CHANGE REQUEST

⌘ **23.228** **CR** **321** ⌘ **rev** **1** ⌘ Current version: **6.2.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☒ Radio Access Network ☐ Core Network ☒

Title:	⌘	Some service aspects of IMS messaging
Source:	⌘	Nokia
Work item code:	⌘	IMS2 ***Date:*** ⌘ 07/07/2003
Category:	⌘	**C** ***Release:*** ⌘ Rel-6

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)*
Rel-6	*(Release 6)*

Reason for change:	⌘	TS 23.228 describes procedures for IMS messaging. Whilst these procedures are focused on specifying the stage-2 aspects, there is an apparent need to link these procedures with some basic service aspects of IMS messaging.
Summary of change:	⌘	Descriptive examples for possible multimedia content carried in immediate messages has been added. Examples to the type of processing an AS can do wrt MESSAGE requests has been added.
Consequences if not approved:	⌘	

Clauses affected:	⌘	2, 5.16.1.1, 5.16.1.1.1, 5.16.1.1.2

Other specs affected:	⌘	Y	N		⌘
			X	Other core specifications	
			X	Test specifications	
			X	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.

********** First set of changes **********

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"

[10a] 3GPP TS 24.229: " IP Multimedia Call Control based on SIP and SDP; Stage 3"

[11] 3GPP TS 25.301: "Radio interface protocol architecture"

[11a] 3GPP TS 29.207: " Policy control over Go interface "

[12] RFC 3261: "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"

[16a] 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 33.210: "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”

[25] 3GPP TS 32.200: “Telecommunication management; Charging management; Charging principles”

[26] 3GPP TS 32.225: ” Telecommunication Management; Charging Management; Charging Data Description for IP Multimedia Subsystem”

[27] 3GPP TS 22.071: “Technical Specification Group Services and System Aspects,Location Services (LCS);Service description, Stage 1”

[28] 3GPP TS 23.271: “Technical Specification Group Services and System Aspects, Functional stage 2 description of LCS”

[29] 3GPP TS 23.078: “Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 3 - Stage 2”

[29a] 3GPP TS 22.340: “ IMS Messaging; Stage 1”

[30] 3GPP TS 29.228:“IP Multimedia (IM) Subsystem Cx and Dx Interfaces; Signalling flows and message contents”

[31] 3GPP TS 23.240: "3GPP Generic User Profile - Architecture; Stage 2"

[32] 3GPP TS 22.250: “IP Multimedia Subsystem (IMS) group management”; Stage 1”

[nn] 3GPP TS 26.xxx:” IMS messaging and Presence; Media formats and codecs”

********** Second set of changes **********

5.16.1.1 Procedures to enable Immediate Messaging

IMS users shall be able to exchange immediate messages with each other by using the procedure described in this sub-clause. This procedure shall allow the exchange of any type of multimedia content (subject to possible restrictions based on operator policy and user preferences/intent), for example but not limited to:

- Pictures, video clips, sound clips with a format defined by 3GPP TS 26.xxx [nn]

The sender UE can include an indication in the message regarding the length of time the message will be considered valid.

5.16.1.1.1 Immediate messaging procedure to registered public user identity

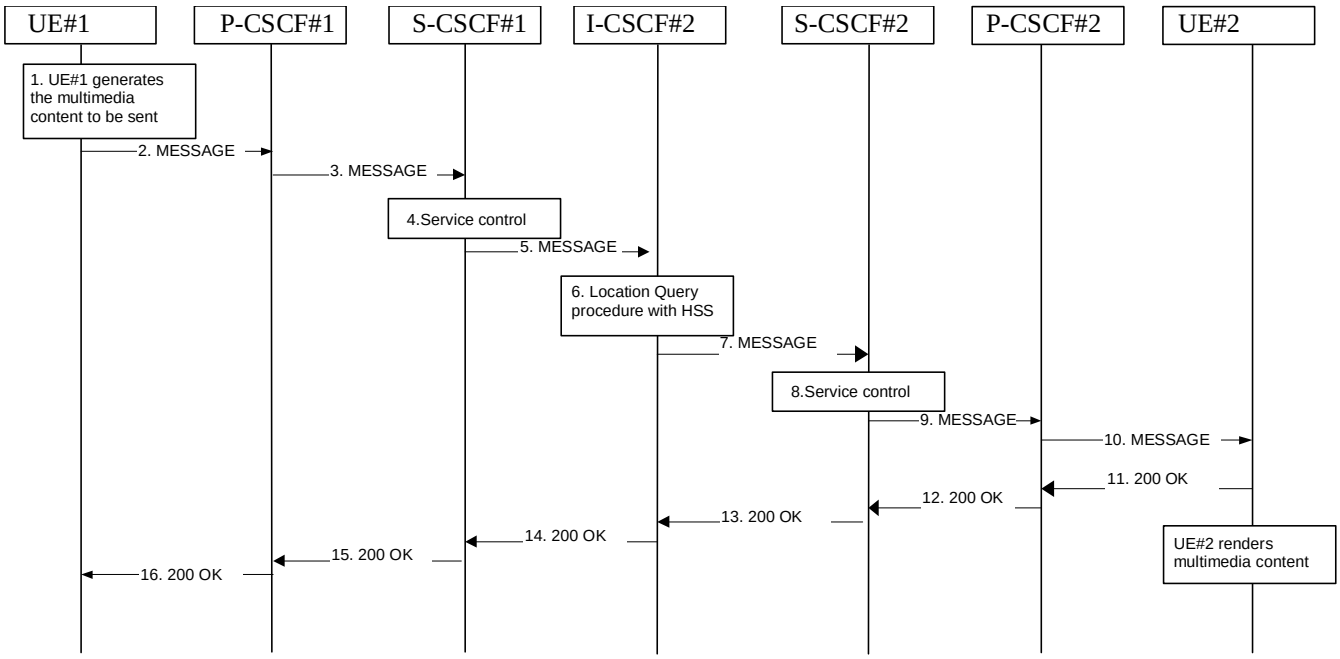

Figure 5.47: Immediate Messaging procedure to registered public user identity

1. UE#1 generates the multimedia content intended to be sent to UE#2.
2. UE#1 sends the MESSAGE request to P-CSCF#1 that includes the multimedia content in the message body.
3. P-CSCF#1 forwards the MESSAGE request to S-CSCF#1 along the path determined upon UE#1's most recent registration procedure.
4. Based on operator policy S-CSCF#1 may reject the MESSAGE request with an appropriate response, e.g. if content length or content type of the MESSAGE are not acceptable. S-CSCF#1 invokes whatever service control logic is appropriate for this MESSAGE request. This may include routing the MESSAGE request to an application server, which processes the request further on.
5. S-CSC#1 forwards the MESSAGE request to I-CSCF#2.
6. I-CSCF#2 performs Location Query procedure with the HSS to acquire the S-CSCF address of the destination user (S-CSCF#2).
7. I-CSCF#2 forwards the MESSAGE request to S-CSCF#2.
8. Based on operator policy S-CSCF#2 may reject the MESSAGE request with an appropriate response, e.g. if content length or content type of the MESSAGE are not acceptable. S-CSCF#2 invokes whatever service control logic is appropriate for this MESSAGE request. This may include routing the MESSAGE request to an application server, which processes the request further on.
   For example, the UE#2 may have a service activated that blocks the delivery of incoming messages that fullfill criterias set by the user. The AS may then respond to the MESSAGE request with an appropriate error response.
9. S-CSCF#2 forwards the MESSAGE request to P-CSCF#2 along the path determined upon UE#2's most recent registration procedure.
10. P-CSCF#2 forwards the MESSAGE request to UE#2. After receiving the MESSAGE UE#2 renders the multimedia content to the user.
11. – 16. UE#2 acknowledges the MESSAGE request with a response that indicates that the destination entity has received the MESSAGE request. The response traverses the transaction path back to UE#1.

5.16.1.1.2 Immediate messaging procedure to unregistered public user identity

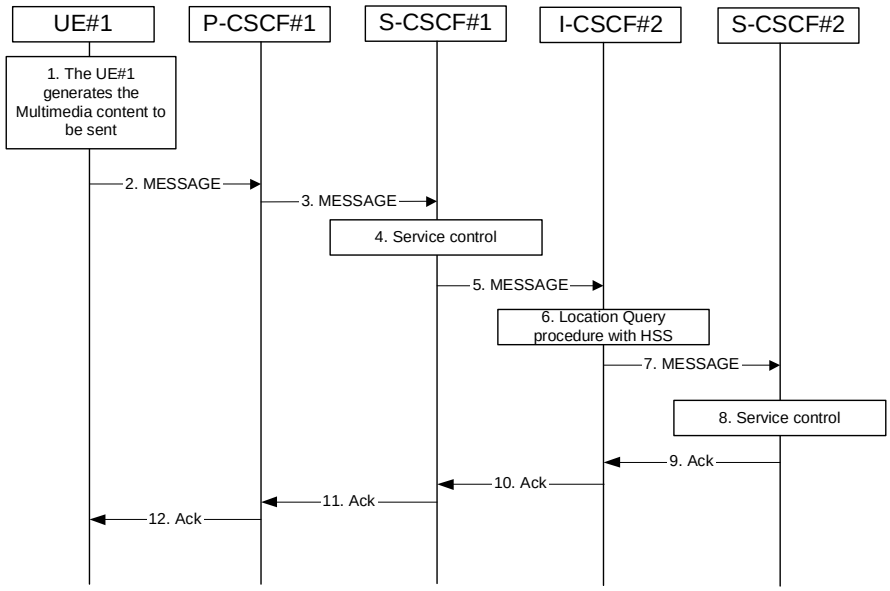

Figure 5.48: Immediate messaging to unregistered public user identity, service control invoked

1-5. The same actions apply as for when the Public user identity is registered, see step 1-5 in clause 5.16.1.1.1.

6. I-CSCF#2 interacts with the HSS as per the terminating procedures defined for unregistered public user identities in clause 5.12.1. If the public user identity has no services related to unregistered state activated the interaction with HSS would be as per the procedure defined in clause 5.12.2.

7. I-CSCF#2 forwards the MESSAGE request to S-CSCF#2.

8. Based on operator policy S-CSCF#2 may reject the MESSAGE request with an appropriate response, e.g. if content length or content type of the MESSAGE are not acceptable or the UE#2 does not have a service activated that temporarily hold the MESSAGE request in the network.

S-CSCF#2 invokes whatever service control logic appropriate for this MESSAGE request. This may include routing the MESSAGE request to an application server, which processes the request further on.

For example, the UE#2 may have a service activated that allows delivery of any pending MESSAGE request. The AS may then hold the MESSAGE request and deliver the MESSAGE request when the UE#2 becomes reachable. In this case, depending on user settings UE#2 controls the delivery of the pending MESSAGEs. .

9-12. The MESSAGE request is acknowledged with an appropriate acknowledgement response. The acknowledgement response traverses the transaction path back to UE#1.

********** End of all changes **********

3GPP TSG-SA2 Meeting #33 ***Tdoc S2-032666***
Sophia Antipolis, France, 7 – 11 July 2003

CR-Form-v7

CHANGE REQUEST

⌘ **23.228** **CR** **322** ⌘ **rev** **1** ⌘ Current version: **6.2.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☒ Radio Access Network ☐ Core Network ☒

Title:	⌘	Session-based IMS messaging
Source:	⌘	Nokia
Work item code:	⌘	IMS2
Date:	⌘	07/07/2003
Category:	⌘	**C**
Release:	⌘	Rel-6

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)*
Rel-6	*(Release 6)*

Reason for change:	⌘	TS 23.228 defines some basic architectural requirements for IMS messaging sessions. Further details were left for further study. It is not yet described how the concept of messaging fits into the IMS session delivery framework.
Summary of change:	⌘	A description has been added how messaging is envisioned within the context of IMS sessions. It is also clarified, that multiparty messaging sessions shall use the regular IMS conferencing architecture and solutions.
Consequences if not approved:	⌘	

Clauses affected:	⌘	5.16.2

Other specs affected: ⌘

Y	N	
	X	Other core specifications
	X	Test specifications
	X	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.

********** First and only set of changes **********

5.16.2 Session-based Messaging

This subclause describes architectural concepts and procedures for fulfiling the requirements for Session-based Messaging described in TS 22.340 [29a].

Session-based IMS messaging communications shall as much as possible use the same basic IMS session delivery mechanisms (e.g. routing, security, service control) as defined in clause 4 and 5 of this document. For session based messaging the session shall include a messaging media component, other media components may also be included. Once the session containing a messaging media component is established, messages in the session are transported between the session participants as per the parameters defined in the messaging media component part of the session description (SDP).

********** End of all changes **********

3GPP TSG-SA2 Meeting #33 **Tdoc ⌘S2-032671**
Sophia Antipolis, France, 7 - 11 July 2003

CR-Form-v7

CHANGE REQUEST

⌘ **23.228** **CR** **324** ⌘**rev** **1** ⌘ Current version: **6.2.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Mobile-initiated Hold and Resume of a Mobile-PSTN Session
Source:	⌘	Nokia
Work item code:	⌘	IMS2
Date:	⌘	07/07/2003
Category:	⌘	**F**
Release:	⌘	Rel-6

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)
Rel-6 (Release 6)

Reason for change:	⌘	Subclause 5.11.1.2 describes the procedures for placing sessions on hold. Current procedure does not show any indication towards the CS (PSTN) domain that the session has been put on hold.
Summary of change:	⌘	A hold indication is added towards the CS (PSTN) domain.
Consequences if not approved:	⌘	End user experience in the CS domain is decreased. Offered service via IMS domain would be less than in CS domain.

Clauses affected:	⌘	5.11.1.2

Other specs affected:	Y	N			
⌘	X		Other core specifications	⌘	29.163, 24.228, 24.229
		X	Test specifications		
		X	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.

5.11.1.2 Mobile-initiated Hold and Resume of a Mobile-PSTN Session

An IMS session was previously established between an initiating UE and a MGCF acting as a gateway for a session terminating on the PSTN, or between an initiating MGCF acting as a gateway for a session originating on the PSTN to a terminating UE. The UE has an associated P-CSCF, an S-CSCF assigned in its home network, and a BGCF that chooses the MGCF. These functional elements co-operate to clear the session, and the procedures are independent of whether they are located in the subscriber's home or visited networks. Therefore there is no distinction in this section of home network vs. visited network.

The session hold and resume procedure is similar whether the UE initiated the session to the PSTN, or if the PSTN initiated the session to the UE. The only difference is the optional presence of the BGCF in the case of a session initiated by the UE. Note that the BGCF might or might not be present in the signalling path after the first INVITE is routed.

The procedures for placing a media stream on hold, and later resuming the media stream, are as shown in the following information flow:

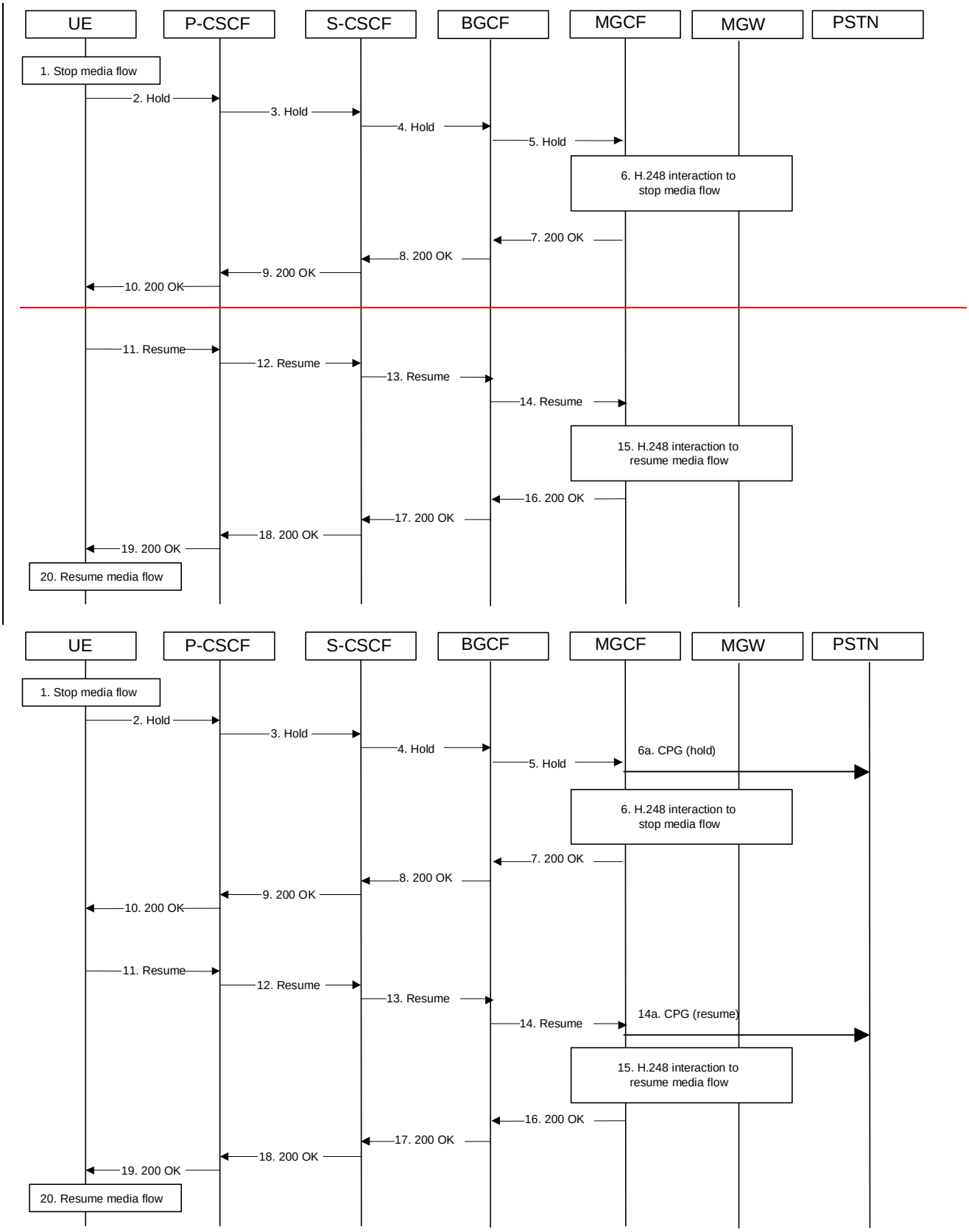

Figure 5.29: Mobile to PSTN session hold and resume

Information flow procedures are as follows:

1. UE detects a request from the user to place a media stream on hold. UE#1 stops sending the media stream to the remote endpoint, but keeps the resources for the session reserved.

2. UE sends a Hold message to its proxy, P-CSCF.
3. P-CSCF forwards the Hold message to S-CSCF.
4. S-CSCF forwards the Hold message to BGCF.
5. BGCF forwards the Hold message to MGCF.

5a MGCF sends a CPG(hold) in order to express that the call has been placed on hold.

6. MGCF initiates a H.248 interaction with MGW instructing it to stop sending the media stream, but to keep the resources for the session reserved.
7. MGCF acknowledges receipt of the Hold message with a 200-OK final response, send to BGCF.
8. BGCF forwards the 200-OK to the S-CSCF.
9. S-CSCF forwards the 200 OK final response to P-CSCF.
10. P-CSCF forwards the 200 OK final response to UE.
11. UE detects a request from the user to resume the media stream previously placed on hold. UE sends a Resume message to its proxy, P-CSCF.
12. P-CSCF forwards the Resume message to S-CSCF.
13. S-CSCF forwards the Resume message to BGCF.
14. BGCF forwards the Resume message to MGCF.

14a. MGCF sends a CPG(resume) in order to resume the call.

15. MGCF initiates a H.248 interaction with MGW instructing it to resume sending the media stream.
16. MGCF acknowledges receipt of the Resume message with a 200-OK final response, sent to BGCF.
17. BGCF forwards the 200 OK final response to the S-CSCF.
18. S-CSCF forwards the 200 OK final response to P-CSCF.
19. P-CSCF forwards the 200 OK final response to UE.
20. UE resumes sending the media stream to the remote endpoint.

3GPP TSG-SA2 Meeting #33
Sophia-Antipolis, France, 7th-11th July 2003

Tdoc ⌘S2-032672

CR-Form-v7

CHANGE REQUEST

⌘ **23.228** **CR** **325** ⌘ **rev** **1** ⌘ Current version: **6.2.0** ⌘

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

Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

Title:	⌘	Subscription to information changes in e.g. AS or S-CSCF
Source:	⌘	Ericsson
Work item code:	⌘	IMS2
Date:	⌘	09/07/2003
Category:	⌘	**B**
Release:	⌘	Rel-6

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)*
Rel-6	*(Release 6)*

Reason for change:	⌘	The stage 2 specification didn't explicitly include the capability to subscribe to different events in Rel-5, even though the stage 3 TS 24.229 included such capability for the registration event. In Rel-6 the Presence work require the capability to subscribe to events, i.e. watchers subscribe to Presentity's Presence information (see TS 23.141). The Presence and Messaging work also require the capability to manage service data in application servers via the Ut reference point. As the support for multiple PUAs are included in the Presence work, it could be important to get information of changes in e.g. the Presence Subscription authorization policies by subscribing to it.
Summary of change:	⌘	A new section is introduced to form the architectural requirements for subscribing to events caused by changes of information in application servers or S-CSCF.
Consequences if not approved:	⌘	

Clauses affected:	⌘	New clause 5.4.9.1 is added

Other specs affected:	⌘	Y	N		⌘
			X	Other core specifications	
			X	Test specifications	
			X	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 set of changes **********

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"

[10a] 3GPP TS 24.229: " IP Multimedia Call Control based on SIP and SDP; Stage 3"

[11] 3GPP TS 25.301: "Radio interface protocol architecture"

[11a] 3GPP TS 29.207: " Policy control over Go interface "

[12] RFC 3261: "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"

[16a] 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 33.210: "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”

[25] 3GPP TS 32.200: “Telecommunication management; Charging management; Charging principles”

[26] 3GPP TS 32.225: ” Telecommunication Management; Charging Management; Charging Data Description for IP Multimedia Subsystem”

[27] 3GPP TS 22.071: “Technical Specification Group Services and System Aspects,Location Services (LCS);Service description, Stage 1”

[28] 3GPP TS 23.271: “Technical Specification Group Services and System Aspects, Functional stage 2 description of LCS”

[29] 3GPP TS 23.078: “Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 3 - Stage 2”

[29a] 3GPP TS 22.340: “ IMS Messaging; Stage 1”

[30] 3GPP TS 29.228:“IP Multimedia (IM) Subsystem Cx and Dx Interfaces; Signalling flows and message contents”

[31] 3GPP TS 23.240: "3GPP Generic User Profile - Architecture; Stage 2"

[32] 3GPP TS 22.250: “IP Multimedia Subsystem (IMS) group management”; Stage 1”

[33] 3GPP TS 23.141: “Technical Specification Group Services and System Aspects, Presence Service”

3 Definitions, symbols and abbreviations

********** Second set of changes **********

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.

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.

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.

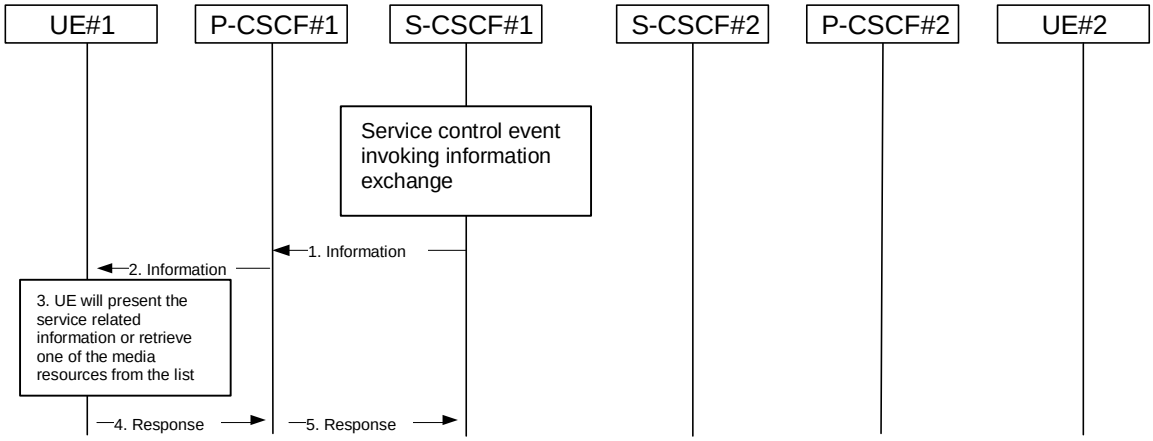

Figure 5.8: Providing service event related information to related endpoint

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.

Note 1: The UE may retrieve service event related information using IP-CAN or IMS procedures.

Note 2: transport aspects of the information transfer described above may require further considerations.

5.4.9.1 Subscription to event notifications

The SIP-event notification mechanism allows a SIP entity to request notification from remote nodes indicating that certain standardised events have occurred. Examples of such of events are changes in presence states, changes in registration states, changes in Subscription authorisation policies (see 3GPP TS 23.141 [33]) and other events that are caused by information changes in e.g. Application Servers or S-CSCF.

It shall be possible to either fetch relevant information once or monitor changes over a defined time. It shall be possible for a user to subscribe to events related to his/her own subscription (e.g. when the user subscribes to his own registration state) or to events related to other users' subscription (an example is when a watcher subscribes to presence information of a presentity, see 3GPP TS 23.141 [33]).

The S-CSCF is not mandated to stay in the path after the initial SubscribeEvent request and ACK has been exchanged, in case the S-CSCF does not execute any functions for the subsequent requests and responses of the dialog. The example, in figure 5.x below, assumes that the S-CSCF does not want to execute any functions for the subsequent requests.

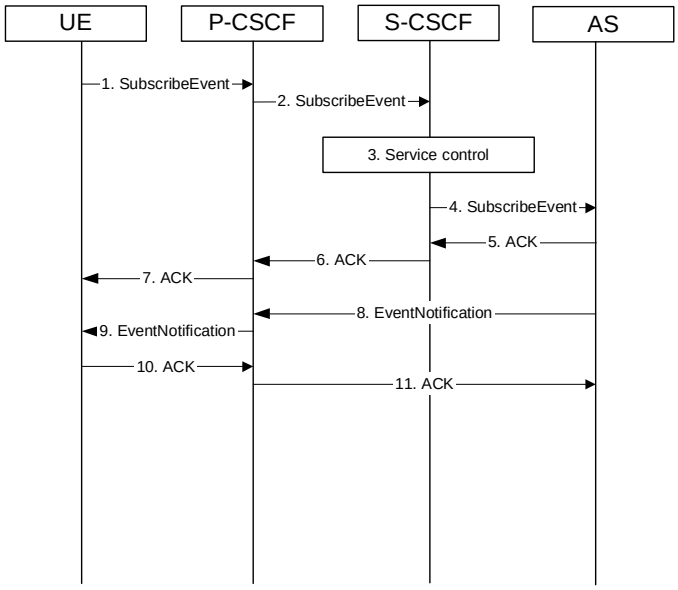

Figure 5.x: Subscription to event in AS

1. The UE initiates a subscription to an AS requesting notification of any changes in specified information stored in the control of the AS
2. The P-CSCF remembers (from the registration process) the next hop CSCF for this UE, i.e., the SubscribeEvent is forwarded to the S-CSCF in the home network.
3. The S-CSCF invokes whatever service logic procedures are appropriate for this request.
4. The S-CSCF applies regular routing procedures and forwards the request to the next hop.
5. The AS acknowledges the SubscribeEvent request.
6. The S-CSCF forwards the acknowledgement to the P-CSCF.
7. The P-CSCF forwards the acknowledgement to the UE.
8. As soon as the AS sends an acknowledgement to accept the subscription, the AS sends an EventNotification message with the current information the UE subscribed to. The EventNotification is sent along the path set-up

by the SubscribeEvent dialog to the P-CSCF allocated to the UE. Further notifications, if monitor of changes was requested, sent by the AS is sent along the same path.

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

10. The UE acknowledges the EventNotification.

11. The P-CSCF forwards the acknowledgement to the AS.

3GPP TSG-SA2 Meeting #33
Sophia-Antipolis, France, 7th-11th July 2003

Tdoc ⌘S2-032673

CR-Form-v7

CHANGE REQUEST

⌘ **23.228** **CR** **326** ⌘ **rev** **1** ⌘ Current version: **6.2.0** ⌘

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

Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

Title:	⌘	Refreshing sessions
Source:	⌘	Ericsson, Siemens, Nokia
Work item code:	⌘	IMS2
Date:	⌘	09/07/2003
Category:	⌘	**F**
Release:	⌘	Rel-6

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)*
Rel-6	*(Release 6)*

Reason for change:	⌘	Chapter 5.x "Refreshing sessions" includes a mechanism to refresh the states in stateful entities. Some parts of the mechamism needs further clarifications as indicated by the note stating that "It is FFS how the refreshing mechanism is initiated and whether this refreshing mechanism is on a per-UE or on a per-session basis". The intention of the mechanism is only to remove session states from stateful elements of the session path, i.e. there are no reasons to refresh the sessions in shorter periods than in the range of hours.
Summary of change:	⌘	It is clarified that the refreshing period for the refresh mechanism is expected to be in the range of hours and when used it is applicable per session. Also, a recommendation is added for the support of the refresh mechanism in all entities acting as SIP User Agents according to the SIP RFC 3261.
Consequences if not approved:	⌘	The refresh mechanism remains unclear.

Clauses affected:	⌘	Clause 5.17			
Other specs affected:	⌘	**Y**	**N**		
			X	Other core specifications	⌘
			X	Test specifications	
			X	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 and only set of changes **********

5.17 Refreshing sessions

The active sessions in stateful network elements (e.g. CSCFs, ASs) may need to be refreshed periodically. This allows these stateful elements to detect and free resources that are being used ~~up~~ by hanging sessions.

This SIP-level session refreshing mechanism is to be used to allow removing session state from the stateful elements of the session path upon unexpected error situations (e.g. loss of radio coverage, crash of application in the UE, etc…). The refreshing period is typically in the range of several tens of minutes / hours. The mechanism is intended as a complementary mechanism for the "Network initiated session release" described in sub-clause 5.10.3. Whether the session refresh mechanism is used for a particular session is negotiated between the endpoints of the session upon session initiation.

IMS entities acting as User Agents as defined in RFC 3261 [12] should support the refresh mechanism of SIP sessions. This includes support for the negotiation of the session refresh details upon session initiation, and the initiation of session refresh requests.

~~Note i: Based on the nature of the refreshing mechanism described above, the expected refreshing period is in the several minute range.~~

~~Note ii: It is FFS how the refreshing mechanism is initiated and whether this refreshing mechanism is on a per-UE or on a per-session basis.~~

3GPP TSG-SA2 Meeting #33
Sophia Antipolis, France, July 7th-11th, 2003

Tdoc ⌘ S2-02347
revised S2-032691

CR-Form-v7

CHANGE REQUEST

⌘ **23.228** **CR** **331** ⌘ **rev** **2** ⌘ Current version: **6.2.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Support for IP version Interworking in IMS
Source:	⌘	Ericsson
Work item code:	⌘	IMS2
Date:	⌘	11/07/2003
Category:	⌘	**B**
Release:	⌘	Rel-6

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
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R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	IMS is IPv6 only, part of Release 6 IMS enhancements is to complete the architecture for IP version interworking in IMS. This CR introduces changes to support IMS interworking.
Summary of change:	⌘	Introduction of Translation GW and IMS ALG so that IMS IPv6 clients can interwork with IPv4 SIP clients.
Consequences if not approved:	⌘	Release 6 IMS should provide IP version interworking as one of the main functions, this is the first building blocks towards that goal, unless it is approved further delays in stage 3 work would occur.

Clauses affected:	⌘	New section Annex E.5, 5.4.x, 5.18, 4.6.5 and modified sections 2, 3			
Other specs affected:	⌘	**Y** / **N**	Other core specifications	⌘	29.162
		☐ / ☐	Test specifications		
		☐ / ☐	O&M Specifications		
Other comments:	⌘				

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**********First Change **********

2 References

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[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".

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[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"

[10a] 3GPP TS 24.229: " IP Multimedia Call Control based on SIP and SDP; Stage 3"

[11] 3GPP TS 25.301: "Radio interface protocol architecture"

[11a] 3GPP TS 29.207: " Policy control over Go interface "

[12] RFC 3261: "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"

[16a] 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 33.210: "Network Domain Security: IP network layer security "

[21] 3GPP TS 26.235: "Packet Switched Multimedia Applications; Default Codecs".

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[28] 3GPP TS 23.271: “Technical Specification Group Services and System Aspects, Functional stage 2 description of LCS”

[29] 3GPP TS 23.078: “Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 3 - Stage 2”

[29a] 3GPP TS 22.340: “ IMS Messaging; Stage 1”

[30] 3GPP TS 29.228:“IP Multimedia (IM) Subsystem Cx and Dx Interfaces; Signalling flows and message contents”

[31] 3GPP TS 23.240: "3GPP Generic User Profile - Architecture; Stage 2"

[32] 3GPP TS 22.250: “IP Multimedia Subsystem (IMS) group management”; Stage 1”

[33] Network Address Translation-Protocol Translation (NAT-PT), RFC 2766

[34] IP Network Address Translator (NAT) Terminology and Considerations, RFC 2663

[35] Transition Scenarios for 3GPP Networks, draft-ietf-v6ops-3gpp-cases-03.txt, work in progress

3 Definitions, symbols and abbreviations

3.1 Definitions

Refer to TS 23.002 [1] for the definitions of some terms used in this document.

For the purposes of the present document the following additional definitions apply.

IP-Connectivity Access Network: refers to the collection of network entities and interfaces that provides the underlying IP transport connectivity between the UE and the IMS entities**.** An example of an "IP-Connectivity Access Network" is GPRS.

Subscriber: A Subscriber is an entity (comprising one or more users) that is engaged in a Subscription with a service provider. The subscriber is allowed to subscribe and unsubscribe services, to register a user or a list of user authorised to enjoy these services, and also to set the limits relative to the use that users make of these services.

NAT-PT/NAPT-PT: NAT-PT uses a pool of globally unique IPv4 addresses for assignment to IPv6 nodes on a dynamic basis as sessions are initiated across the IP version boundaries. NAT-PT binds addresses in IPv6 network with addresses in IPv4 network and vice versa to provide transparent routing between the two IP domain without requiring any changes to end points, like the UE. NAT-PT needs to track the sessions it supports and mandates that inbound and outbound data for a specific session traverse the same NAT-PT router.

NAPT-PT provides additional translation of transport identifier (e.g., TCP and UDP port numbers, ICMP query identifiers). This allows the transport identifiers of a number of IPv6 hosts to be multiplexed into the transport identifiers of a single assigned IPv4 address. See Reference [33] for more details.

ALG: Application Level Gateway (ALG) is an application specific functional entity that allows a IPv6 node to communicate with a IPv4 node and vice versa when certain applications carry network addresses in the payloads like SIP/SDP. NA(P)T-PT is application unaware whereas ALGs are application specific translation entities that allow a host running an application to communicate transparently with another host running the same application but in a different IP version. See Reference [34] for more details.

For IMS, an **IMS ALG** provides the necessary application function for SIP/SDP protocols in order to communicate between IPv6 and IPv4 SIP applications.

3.2 Symbols

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

Cx	Reference Point between a CSCF and an HSS.
Dx	Reference Point between an I-CSCF and an SLF.
Gi	Reference point between GPRS and an external packet data network
Gm	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.
Ix	Reference Point between IMS ALG and NA(P)T-PT
Le	Reference Point between an AS and a GMLC
Mb	Reference Point to IPv6 network services.
Mg	Reference Point between an 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	Reference Point between a CSCF and an IP multimedia network.
Mr	Reference Point between an CSCF and an MRFC.
Mw	Reference Point between a CSCF and another CSCF.
Mx	Reference Point between a CSCF and IMS ALG
Sh	Reference Point between an AS (SIP-AS or OSA-CSCF) and an HSS.
Si	Reference Point between an IM-SSF and an HSS.
Ut	Reference Point between UE and an Application Server.

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
GMLC	Gateway Mobile Location Centre
GUP	Generic User Profile
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
IMS ALG	IMS Application Level Gateway
IMSI	International Mobile Subscriber Identifier
IP	Internet Protocol
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
IP-CAN	IP-Connectivity Access Network
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
NA(P)T-PT	Network Address (Port-Multiplexing) Translation-Protocol Translation
OSA	Open Services Architecture
P-CSCF	Proxy-CSCF
PDF	Policy Decision Function
PDN	Packet Data Network
PDP	Packet Data Protocol e.g., IP
PEF	Policy Enforcement Function
PLMN	Public Land Mobile Network
PSI	Public Service Identity
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
TrGW	Translation Gateway
UE	User Equipment
UMTS	Universal Mobile Telecommunications System
URL	Universal Resource Locator
USIM	UMTS SIM

**********Next Change **********

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 using the mechanism described in section “Procedures related to Local CSCF Discovery ”. The P-CSCF behaves like a Proxy (as defined in RFC 3261 [12] or subsequent versions), i.e. it accepts requests and services them internally or forwards them on. The P-CSCF shall not modify the Request URI in the SIP INVITE message. The P-CSCF may behave as a User Agent (as defined in the RFC 3261 [12] or subsequent versions), i.e. in abnormal conditions it may terminate and independently generate SIP transactions.

The Policy Decision Function (PDF) is a logical entity of the P-CSCF. If the PDF is implemented in a separate physical node, the interface between the PDF 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.
- Forward the SIP request or response to the UE.

Detect and handle an emergency session establishment request as per error handling procedures defined by stage-3.

- 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.
- Authorisation of bearer resources and QoS management. For details see TS 23.207 [9].

4.6.2 Interrogating-CSCF

Interrogating-CSCF (I-CSCF) is the contact point within an operator’s network for all connections destined to a user of that network operator, or a roaming user currently located within that network operator’s service area. There may be multiple I-CSCFs within an operator’s network. The functions performed by the I-CSCF are:

Registration

- Assigning a S-CSCF to a user performing SIP registration (see section on Procedures related to Serving-CSCF assignment)

Session-related and session-unrelated flows

- Route a SIP request received from another network towards the S-CSCF.
- Obtain from HSS the Address of the S-CSCF.
- Forward the SIP request or response to the S-CSCF determined by the step above

Charging and resource utilisation:

- Generation of CDRs.

4.6.2.1 Topology Hiding Inter-network Gateway

In performing the above functions the operator may use a Topology Hiding Inter-network Gateway (THIG) function in the I-CSCF (referred to hereafter as I-CSCF(THIG)) or other techniques to hide the configuration, capacity, and topology of the network from the outside. When an I-CSCF(THIG) is chosen to meet the hiding requirement then for sessions traversing across different operators domains, the I-CSCF(THIG) may forward the SIP request or response to another I-CSCF(THIG) allowing the operators to maintain configuration independence.

4.6.3 Serving-CSCF

The Serving-CSCF (S-CSCF) performs the session control services for the UE. It maintains a session state as needed by the network operator for support of the services. Within an operator's network, different S-CSCFs may have different functionalities. The functions performed by the S-CSCF during a session are:

Registration

- May behave as a Registrar as defined in RFC 3261 [12] or subsequent versions, i.e. it accepts registration requests and makes its information available through the location server (eg. HSS).

Session-related and session-unrelated flows

- Session control for the registered endpoint's sessions. It shall reject IMS communication to/from public user identity(s) that are barred for IMS communications after completion of registration, as described in subclause 5.2.1.
- May behave as a Proxy Server as defined in RFC 3261 [12] or subsequent versions, i.e. it accepts requests and services them internally or forwards them on, possibly after translation.
- May behave as a User Agent as defined in RFC 3261 [12] or subsequent versions, i.e. it may terminate and independently generate SIP transactions.
- Interaction with Services Platforms for the support of Services
- Provide endpoints with service event related information (e.g. notification of tones/announcement together with location of additional media resources, billing notification)
- On behalf of an originating endpoint (i.e. the originating user/UE)
    - Obtain from a database the Address of the I-CSCF for the network operator serving the destination user from the destination name (e.g. dialled phone number or SIP URL), when the destination user is a customer of a different network operator, and forward the SIP request or response to that I-CSCF.
    - When the destination name of the destination user (e.g. dialled phone number or SIP URL), and the originating user is a customer of the same network operator, forward the SIP request or response to an I-CSCF within the operator's network.
    - Depending on operator policy, forward the SIP request or response to another SIP server located within an ISP domain outside of the IM CN subsystem.
    - Forward the SIP request or response to a BGCF for call routing to the PSTN or CS Domain.
- On behalf of a destination endpoint (i.e. the terminating user/UE)
    - Forward the SIP request or response to a P-CSCF for a MT procedure to a home user within the home network, or for a user roaming within a visited network where the home network operator has chosen not to have an I-CSCF in the path
    - Forward the SIP request or response to an I-CSCF for a MT procedure for a roaming user within a visited network where the home network operator has chosen to have an I-CSCF in the path.
    - Modify the SIP request for routing an incoming session to CS domain according to HSS and service control interactions, in case the user is to receive the incoming session via the CS domain.
    - Forward the SIP request or response to a BGCF for call routing to the PSTN or the CS domain.

Charging and resource utilisation:

- Generation of CDRs.

4.6.4 Breakout Gateway Control Function

The Breakout Gateway control function (BGCF) selects the network in which PSTN/CS Domain breakout is to occur. If the BGCF determines that the breakout is to occur in the same network in which the BGCF is located within, then the

BGCF shall select a MGCF which will be responsible for the interworking with the PSTN/CS Domain. If the break out is in another network, the BGCF will forward this session signalling to another BGCF in the selected network.

The functions performed by the BGCF are:

- Receives request from S-CSCF to select appropriate PSTN/CS Domain break out point for the session
- Select the network in which the interworking with the PSTN/CS Domain is to occur. If the interworking is in another network, then the BGCF will forward the SIP signalling to the BGCF of that network. If the interworking is in another network and network hiding is required by the operator, the BGCF will forward the SIP signaling via an I-CSCF(THIG) toward the BGCF of the other network.
- Select the MGCF in the network in which the interworking with PSTN/CS Domain is to occur and forward the SIP signalling to that MGCF. This may not apply if the interworking is a different network.
- Generation of CDRs.

The BGCF may make use of information received from other protocols, or may make use of administrative information, when making the choice of which network the interworking shall occur.

4.6.5 IMS ALG

The IMS ALG provides the necessary application function for SIP/SDP protocol stack in order to establish communication between IPv6 and IPv4 SIP applications.

The IMS ALG receives an incoming SIP message from CSCF nodes or from an external IPv4 SIP network. It then changes the appropriate SIP/SDP parameters, translating the IPv6 addresses to IPv4 addresses and vice versa. The IMS ALG needs to modify the SIP message bodies and headers that have IP address association indicated. The IMS ALG will request NA(P)T-PT to provide the bindings data between the different IP addresses (IPv6 to IPv4 and vice versa) upon session initiation, and will release the bindings at session release.

**********Next Change **********

5.4 Procedures for IP multi-media sessions

Basic IMS sessions between mobile users will always involve two S-CSCFs (one S-CSCF for each). The session flow is decomposed into two parts: an origination part between the UE & the S-CSCF and termination part between the S-CSCF and the UE, including all network elements in the path.

A basic session between a user and a PSTN endpoint involves an S-CSCF for the UE, a BGCF to select the PSTN gateway, and an MGCF for the PSTN.

The session flow is decomposed into three parts – an origination part, an inter-Serving-CSCF/ MGCF part, and a termination part. The origination part covers all network elements between the UE (or PSTN) and the S-CSCF for that UE (or MGCF serving the MGW). The termination part covers all network elements between the S-CSCF for the UE (or MGCF serving the MGW) and the UE (or PSTN).

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, for example, 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.

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 using the bearer, i.e. inband signalling. 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.

5.4.2 Interworking with Internet

Depending on operator policy, the S-CSCF may forward the SIP request or response to another SIP server located within an ISP domain outside of the IM CN subsystem.

5.4.x IP version interworking

Following interworking scenarios exist:

Application Level Interworking

It should be possible for users connected to IPv6 IMS network to communicate with users that are connected to IPv4 SIP based networks via interworking. Section 5.18 describes in more detail how such interworking is performed for IMS.

Transport Level Interworking

Inter-working also includes tunnelling level interconnection of IMS networks via IPv4 transit networks using for example, configured tunnels as described in 3GPP TS 23.221[7]. Figure 5.x below shows an example configuration scenario where two IPv6 IMS networks are connected via an IPv4 network.

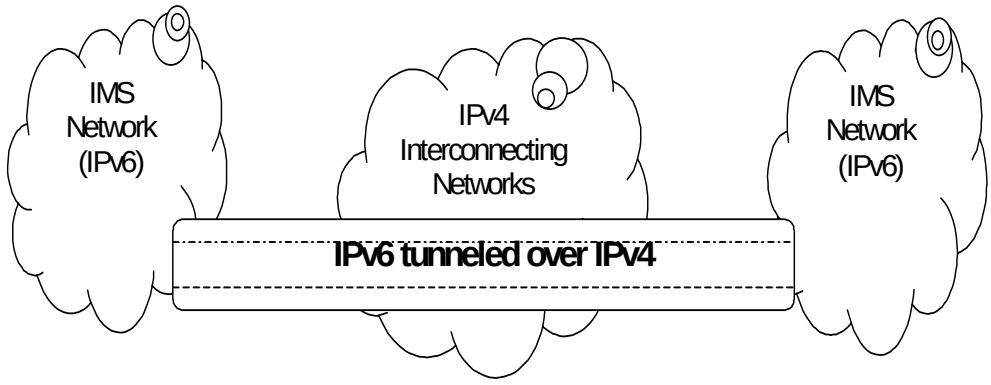

Figure 5.x Example tunneling of IPv6 traffic over IPv4 networks

5.4.3 Interworking with PSTN

The S-CSCF, possibly in conjunction with an application server, shall determine that the session should be forwarded to the PSTN. The S-CSCF will forward the Invite information flow to the BGCF in the same network.

The BGCF selects the network in which the interworking should occur, and the selection of the interworking network is based on local policy.

If the BGCF determines that the interworking should occur in the same network, then the BGCF selects the MGCF which will perform the interworking, otherwise the BGCF forward the invite information flow to the BGCF in the selected network.

The MGCF will perform the interworking to the PSTN and control the MG for the media conversions.

The high level overview of the network initiated PSTN interworking process is shown in figure 5.6.

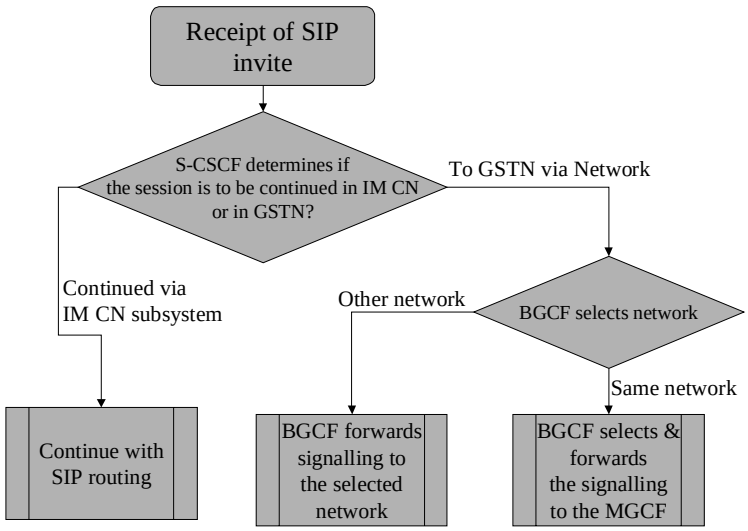

Figure 5.6: Network based PSTN interworking breakout process

**********Next Change **********

5.17 Refreshing sessions

The active sessions in stateful elements (e.g. CSCFs, ASs) need to be refreshed periodically. This allows these stateful elements to detect and free resources used up by hanging sessions.

This SIP-level refreshing mechanism is to be used to allow removing session state from the stateful elements of the session path upon unexpected error situations (e.g. loss of radio coverage, crash of application in the UE, etc…). The mechanism is intended as a complementary mechanism for the "Network initiated session release" described in sub-clause 5.10.3.

Note-i: Based on the nature of the refreshing mechanism described above, the expected refreshing period is in the several minute range.

Note-ii: It is FFS how the refreshing mechanism is initiated and whether this refreshing mechanism is on a per-UE or on a per-session basis.

5.18 Architecture scenarios for IP version Interworking

The IP version interworking should not adversely affect IMS sessions that are primarily IPv6 only.
The network shall, at a minimum, support mechanisms that support IP version interworking for UEs, which comply with previous release of specifications. In addition, any impacts due to specific properties of the IP CAN shall be taken care of by the IP-CAN itself without affecting the IMS. One possible architecture scenario can be based on the principle defined in 3GPP TS 23.221[7] using gateways.

Figure 5.y shows a high-level architecture diagram for one interworking model. In this case, the TrGW is a NA(P)T-PT providing the translation function.

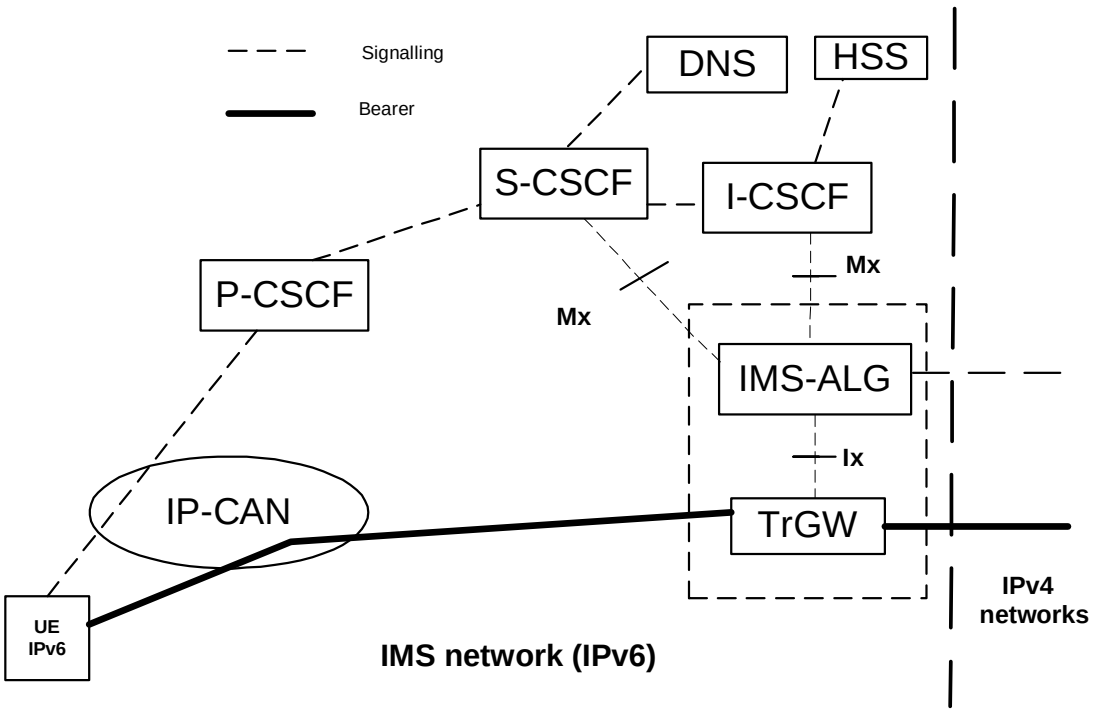

Figure 5.y General IP version interworking principle with TrGW

It is FFS whether there are any additional mechanisms (other than the principles described here) that can be used for IMS IP version interworking.

Note that the standardisation and functional requirements of Ix reference point are FFS.

The Mx reference point allows S-CSCF/I-CSCF to communicate with an IMS ALG function in order to provide interworking with IPv4 SIP networks. It is FFS whether both S-CSCF and I-CSCF need to communicate with the IMS ALG.

Note that the procedure of inserting the IMS ALG (e.g. which CSCF is responsible) in relation to originating and terminating sessions are for FFS.

5.18.1 Originating Session Flows towards IPv4 SIP network

Note this section will contain high-level session flow and interaction for originating session.

5.18.2 Terminaing Session Flows from IPv4 SIP network

Note this section will contain high-level session flow and interaction for terminating session.

**********Next Change **********

Annex E (normative): IP-Connectivity Access Network specific concepts when using GPRS to access IMS

This clause describes the main IP-Connectivity Access Network specific concepts that are used for the provisioning of IMS services over GPRS access with a GERAN and/or UTRAN radio access.

When using GPRS-access, the IP-Connectivity Access Network bearers are provided by PDP Context(s).

E.1 Mobility related concepts

The Mobility related procedures for GPRS are described in TS 23.060 [23] and the IP address management principles are described in TS 23.221 [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).

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;

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.

E.1.1 Procedures for P-CSCF discovery

This clause describes the P-CSCF discovery procedures applicable for GPRS access. These procedures follow the generic mechanisms described in clause 5.1.1, hence the following applies:

P-CSCF discovery shall take place after GPRS attach and after or as part of a successful activation of a PDP context for IMS signalling using one of the following mechanisms:

1. Transfer a Proxy-CSCF address within the PDP Context Activation signalling to the UE, as described in Annex X.1.1.1. The UE shall request the P-CSCF address(es) from the GGSN when activating the PDP context. The GGSN shall send the P-CSCF address(es) to the UE when accepting the PDP context activation. Both the P-CSCF address(es) request and the P-CSCF address(es) shall be sent transparently through the SGSN.

2. Use of DHCP to provide the UE with the domain name of a Proxy-CSCF and the address of a Domain Name Server (DNS) that is capable of resolving the Proxy-CSCF name, as described in clause 5.1.1.

When using DHCP/DNS procedure for P-CSCF discovery (according to the mechanisms described in sub-clause 5.1.1.1) with GPRS-access, the GGSN acts as DHCP Relay agent relaying DHCP messages between UE and the DHCP server.

E.1.1.1 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.

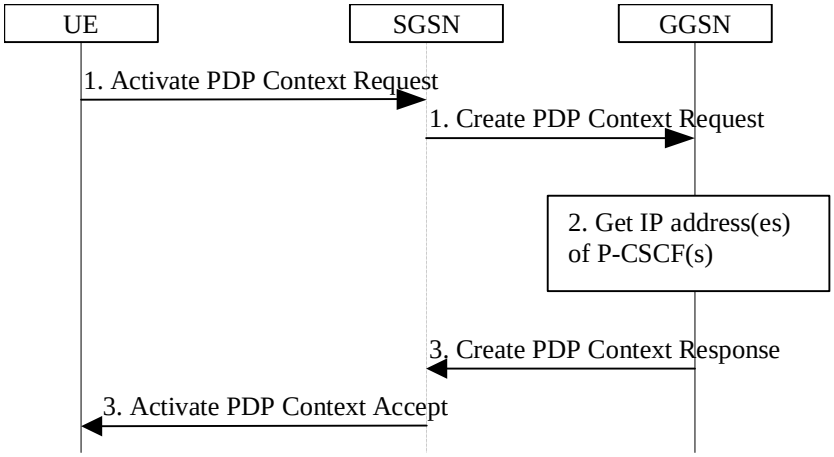

Figure E.1: P-CSCF discovery using PDP Context Activation signalling

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 is not transparent for pre-R5 SGSN when using the Secondary PDP Context Activation Procedure as defined in TS 23.060 [23].

E.2 QoS related concepts

E.2.1 Application Level Signalling for IMS

When the UE uses GPRS-access for IMS services, it shall be able to establish a dedicated signalling PDP-Context for IM Subsystem related signalling or utilize a general-purpose PDP context for IM subsystem signalling traffic.

E.2.1.1 QoS Requirements for Application Level Signalling

The UE shall be able to request prioritised handling over the radio for IM Subsystem related signalling by including the Signalling Indication in the QoS IE of the PDP Context to be used for this traffic as described in TS 23.207.

E.2.1.2 Requirements for IM CN subsystem signalling flag

The IM CN Subsystem Signalling flag is used to indicate the dedicated signalling PDP context for IMS signalling. If the network operator does not support a dedicated signalling PDP context or the UE does not include the IM CN Subsystem Signalling flag, the network will consider the PDP context as a general purpose PDP context.

A dedicated signalling PDP context provides dedicated IP-Connectivity Access Network bearers for IM CN subsystem signalling traffic, hence architectural requirements described in clause 4.2.6 for the usage of dedicated bearer resources shall be applied. The UE is not trusted to implement these restrictions, therefore the restrictions are enforced in the GGSN by the operator of the GGSN.

E.2.1.3 Application Level Signalling support for IMS services

In order to receive different level of support for application level signalling in a PDP context, the UE may choose one of the following options:

- Include both the IM CN Subsystem Signalling Flag in the PCO IE and the Signalling Indication in the QoS IE in PDP context activation procedure. This indicates to the network (radio & core) the requirement of using the PDP context for application level signalling after it has been negotiated with the networks, to provide prioritised handling over the radio interface (as described in sub clause E.2.1.1), with rules and restrictions applied in the network (as described in sub clause E.2.1.2).

- Include the IM CN Subsystem Signalling Flag in the PCO IE in the PDP context activation procedure. This indicates to the GPRS network the requirement of using PDP context for application level signalling with restricted handling as described in sub clause E.2.1.2, after it has been negotiated with the networks.

- Utilize a general purpose PDP Context with a negotiated QoS profile.

The IM CN Subsystem signalling flag is used to reference rules and restrictions on the PDP context used for application level signalling, as described in section E.2.2.

The Signalling Indication in QoS IE provides prioritised handling over the radio interface and is detailed in 3GPP TS 23.107 & 3GPP TS 23.207.

Depending on the operator's policy, one or more of the above combinations may be allowed in the GPRS network.

E.2.1a PDP context procedures for IMS

E.2.1a.1 Establishing PDP Context for IM CN 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 & Application Level Signalling in ssub clauses E.2.1.1, E.2.1.2 & E.2.1.3.

A IM CN Subsystem signalling flag determines any rules and restrictions that shall apply at the GGSN for that PDP context, these rules and restrictions are described in section 4.2.6. It shall not be possible to modify a general purpose PDP context into a dedicated PDP context for IM Subsystem related signalling and vice versa.

The IM CN subsystem signalling flag and the Signalling Indication in the QoS IE may be used independently of each other.

E.2.1a.2 Deletion of PDP Context used to transport IMS SIP signalling

In case the GPRS subsystem deletes the PDP Context used to transport IMS SIP signalling, then according to clause 5.10.3.0 the UE shall initiate a procedure to re-establish a PDP Context for IMS signalling transport. If there are any IMS related PDP contexts active, the re-establishment of the PDP context to transport IMS signalling shall be performed by using the Secondary PDP Context Activation Procedure as defined in TS 23.060 [23].

E.2.2 The QoS requirements for an IM CN subsystem session

The selection, deployment, initiation and termination of QoS signalling and resource allocation shall consider

- the general requirements described in clause 4.2.5.

- and the requirements described in this clause so as to guarantee the QoS requirement associated with an IM CN subsystem session when using GPRS access for IMS services.

1. QoS Signalling at Different Bearer Service Control Levels

   During the session set-up in a IM CN subsystem, at least two levels of QoS signalling/negotiation and resource allocation should be included in selecting and setting up an appropriate bearer for the session:

a. The QoS signalling/negotiation and resource allocation at the IP Bearer Service (BS) Level:

The QoS signalling and control at IP BS level is to pass and map the QoS requirements at the IP Multimedia application level to the UMTS BS level and performs any required end-to-end QoS signalling by inter-working with the external network. The IP BS Manager at the UE and the GGSN is the functional entity to process the QoS signalling at the IP BS level.

b. The QoS signalling/negotiation and resource allocation at the UMTS Bearer Service Level:

The QoS signalling at the UMTS BS Level is to deliver the QoS requirements from the UE to the RAN, the CN, and the IP BS manager, where appropriate QoS negotiation and resource allocation are activated accordingly. When UMTS QoS negotiation mechanisms are used to negotiate end-to-end QoS, the translation function in the GGSN shall co-ordinate resource allocation between UMTS BS Manager and the IP BS Manager.

Interactions (QoS class selection, mapping, translation as well as reporting of resource allocation) between the QoS signalling/control at the IP BS Level and the UMTS BS Level take place at the UE and the GGSN which also serve as the interaction points between the IM CN subsystem session control and the UMTS Bearer QoS control.

UMTS specific QoS signalling, negotiation and resource allocation mechanisms (e.g. RAB QoS negotiation and PDP Context set-up) shall be used at the UMTS BS Level. Other QoS signalling mechanisms such as RSVP at the IP BS Level shall only be used at the IP BS Level.

It shall be possible to negotiate a single resource allocation at the UMTS Bearer Service Level and utilise it for multiple sessions at the IP Bearer Service Level.

E.2.2.1 Relation of IMS media components and PDP contexts carrying IMS media

The relation between IMS media components and PDP contexts carrying IMS media is controlled by the IMS network on media component level in the following way:

The P-CSCF shall have the capability to indicate to the UE that a separate PDP Context is required for each IMS media component indicated.The P-CSCF shall apply and maintain the same policy to separate specific media components into separate PDP Contexts during a session. If a media component is added during the session, the new decision on the separation for the media components shall not contradict any former decisions. For mobile originating sessions the P-CSCF shall apply the policy to the initial offer to ensure identical decisions for different answers, e.g. a media component not required to use a separate PDP Context initially, shall not later require a separate PDP Context (e.g. in case of subsequent answers received due to forking).

- If the UE receives such an indication for a media component, it shall open a separate PDP Context for this media component. If the UE receives no such indication for a media component, the UE makes the decision whether to open a separate PDP Context or modify an existing PDP Context for this media component.

- The criteria and information for setting this indication is determined by local policy in the network where the P-CSCF is located.

Note: the bearer charging capabilities of the P-CSCF's network, and the capabilities of deployed UEs should be taken into account when defining such policies in the visited IMS network operator's domain.

- The IMS network shall have the capability to transfer the media component level indication described above to the UE. This media component level indication shall be transferred in SIP/SDP signaling upon session initiation and addition of media component(s) to active IMS sessions.

It is assumed that media components from different IMS sessions are not carried within the same 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.

E.2.3 Interaction between GPRS QoS and session signaling

The generic mechanisms for interaction between QoS and session signaling are described in clause 5.4.7, the mechanisms described there are applicable to GPRS-access as well.
This clause describes the GPRS-access-specific concepts.

At PDP context setup the user shall have access to either GPRS without service-based local policy, or GPRS with service-based local policy. The GGSN shall determine the need for service-based local policy, possibly based on provisioning and/or based on the APN of the PDP context.

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 GGSN contains a Policy Enforcement Function (PEF).

E.2.3.1 Resource Reservation with Service-based Local Policy

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.

E.2.4 Network initiated session release - P-CSCF initiated

In the event of loss of coverage, 3GPP 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 in up- and downlink direction. This is indicated to the P-CSCF / PDF by performing the 'Indication of PDP Context Modification' procedure (see 3GPP TS 23.207) as shown in Figure X.2. For loss of coverage in case of other PDP contexts (background or interactive traffic class), the PDP context is preserved with no modifications and therefore no indication to the P-CSCF/PDF.

E.2.4.1 Network initiated session release - P-CSCF initiated after loss of radio coverage

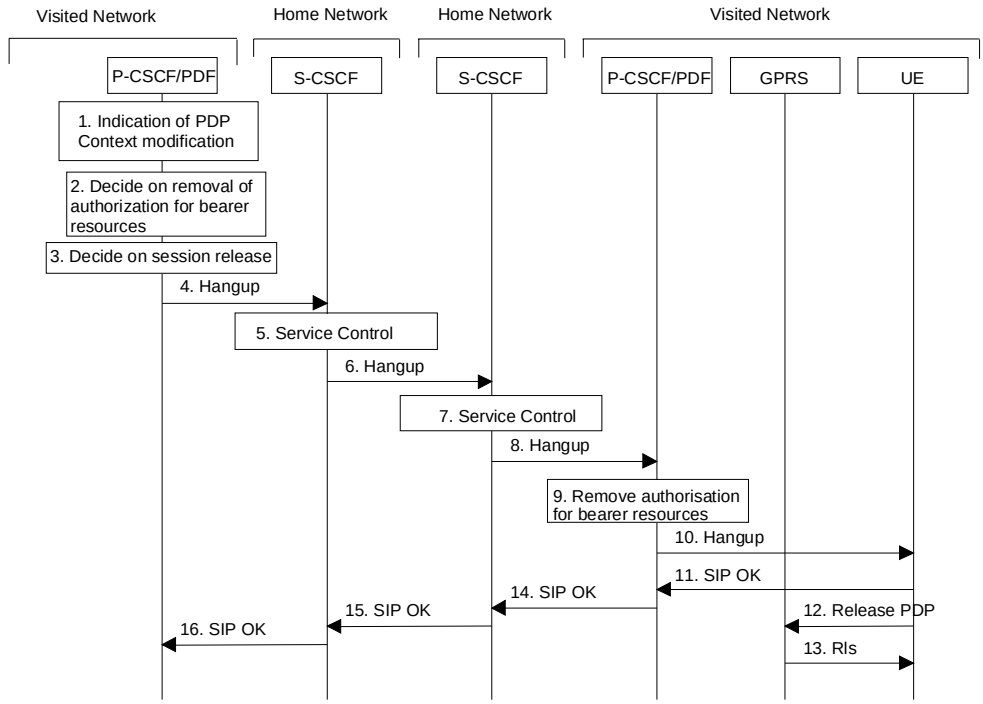

Figure E.2: Network initiated session release - P-CSCF initiated after loss of radio coverage

1. In the event of loss of radio coverage for a PDP context with streaming or conversational class the maximum bitrate of the GTP tunnel between SGSN and GGSN is modified to 0 kbit/s in up- and downlink direction. The P-CSCF/PDF receives an indication of PDP context modification.

2. It is optional for the P-CSCF/PDF to deactivate the affected bearer and additional IP bearers (e.g. an IP bearer for chat could still be allowed). For these IP bearers the P-CSCF/PDF performs the '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/PDF removes the authorisation for resources that had previously been issued for this endpoint for this session.

3. The P-CSCF decides on the termination of the session. If the P-CSCF decides to terminate the session then the P-CSCF/PDF removes the authorisation for resources that had previously been issued for this endpoint for this session. The P-CSCF/PDF shall perform the 'Revoke Authorization for UMTS and IP Resources' procedure (see 3GPP TS 23.207) in case that all IP bearers associated with the session have not been deleted yet.

The following steps are only performed in case the P-CSCF/PDF 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 invokes whatever service logic 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 invokes whatever service logic 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/PDF 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 UE 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 UE 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 UE 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.

E.3 Address and identity management concepts

E.3.1 Deriving IMS identifiers from the USIM

If the UICC does not contain an ISIM application, then the private user identity shall be derived from the USIM's IMSI, which allows for uniquely identifying the user within the 3GPP operator's network. The format of the private user identity derived from the IMSI is specified in 3GPP TS 23.003 [24].

If the UICC does not contain an ISIM application, then:

- A Temporary Public User identity shall be derived from the USIM's IMSI, and shall be used during initial SIP registration procedures. The Temporary public user identity shall take the form of a SIP URL (as defined in RFC 3261 [12] and RFC 2396 [13]). The format of the Temporary public user identity is specified in 3GPP TS 23.003 [24].

It is strongly recommended that the Temporary Public User Identity is set to barred for IMS non-registration procedures. The following applies if the Temporary Public User Identity is barred:

- A Temporary public user identity shall not be displayed to the user and shall not be used for public usage such as displaying on a business card.

- The Temporary Public User Identity shall only be used during the registration to obtain implicitly registered Public User Identities.

- The implicitly registered public user identities shall be used for session handling, in other SIP messages and at subsequent registration processes.

- After the initial registration, the UE shall only use the implicitly registered Public User Identity(s).

- A Temporary public user identity shall only be available to the CSCF and HSS nodes.

  Note that in case of Temporary Public Identity is used, the user can not initiate any sessions until the implicitly registered public identities are available in the UE.

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 format of the home domain name is specified in 3GPP TS 23.003 [24].

In order to support pre-Rel 5 UICC accessing IMS services, a Temporary public user identity is generated using appropriate identity related to subscriber's subscription (e.g. in 3GPP it shall use IMSI)

When a Temporary Public Identity has been used to register an IMS user, the implicit registration will ensure that the UE, P-CSCF & S-CSCF have public user Identity(s) for all IMS procedures after the initial registration has been completed .

E.4 IMS Emergency sessions

It shall be possible for the network to identify that a PDP context to be activated is for emergency use (signalling and media context). It allows to apply special treatment (e.g. with respect to filtering, higher priority, routing, QoS) of IMS emergency sessions.

If the UE is not attached to GPRS network, then it shall first perform a GPRS attach. It shall be possible for the network to discriminate between a normal Attach and an Attach for emergency use.

E.5 IP version interworking in IMS

A PDP context & its associated additional PDP contexts (i.e. PDP contexts associated to the same IP address/prefix) support either PDP type IPv4 or IPv6. For communication with the IMS, the UE establishes an IPv6 PDP context. Termination of this PDP context will normally trigger de-registration of IMS application first. Hence, the PDP context that has been established for IMS communication must be retained for the UE to establish a SIP session via the IMS with an IPv4 SIP client.

As such, any interworking on IP version on the application level (i.e. IMS & SIP) need to work with the architecture requirement from GPRS of maintaining the IP connectivity over GPRS by maintaining the PDP contexts.

A user may be connected either to a home GGSN or a visited GGSN depending on the configuration as specified in 3GPP TS 23.221[7].

3GPP TSG-SA WG2 Meeting #34 *Tdoc ⌘S2-033045*
Brussels, Belgium, 18th – 22nd August, 2003

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CHANGE REQUEST

⌘ **23.228** **CR** **342** ⌘ **rev** **-** ⌘ Current version: **6.2.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Signalling Path for Session Termination Procedures
Source:	⌘	Siemens
Work item code:	⌘	IMS-2
Date:	⌘	12/08/2003
Category:	⌘	**F**
Release:	⌘	Rel-6

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)*
Rel-6	*(Release 6)*

Reason for change:	⌘	The introductory text in clause 5.7 states that the signalling path for session termination is the reverse path of session origination. This is not correct. For example, signalling for sessions terminating in the PSTN uses the BGCF, while signalling originating from the PSTN does not. Also the use of the I-CSCF is not symmetric in general.
Summary of change:	⌘	Delete misleading sentence.
Consequences if not approved:	⌘	Specification remains incorrect.

Clauses affected:	⌘	5.7			
Other specs affected:	⌘	**Y**	**N**		⌘
			X	Other core specifications	
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘	The same error exists in the Release 5 specification.			

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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.

5.7 Termination procedures

This section presents the detailed application level flows to define the Procedures for session terminations.

The flows presented in the section assume the use of service-based local policy.

The session termination procedures specify the signalling path between the Serving-CSCF assigned to perform the session termination service and the UE. This signalling path is determined at the time of UE registration, and remains fixed for the life of the registration. ~~This signalling path is the reverse of the session initiation signalling path of Section 5.6. Therefore there is a one-to-one correspondence between the origination procedures of section 5.6 and the termination procedures of this section.~~

A UE always has a proxy (P-CSCF) associated with it. This P-CSCF performs resource authorisation for the sessions to the UE. The P-CSCF is determined by the CSCF discovery process, described in Section 5.1.1 (Local CSCF Discovery).

As a result of the registration procedure, the P-CSCF knows the address of the UE. The assigned S-CSCF, knows the name/address of the P-CSCF (procedure MT#3, and MT#4, depending on the location of S-CSCF and P-CSCF). If the network operator owning the S-CSCF wants to keep their configuration private, the S-CSCF will have chosen an I-CSCF(THIG) who will perform the configuration hiding and pass messages to the P-CSCF (procedure MT#1).

Sessions destined to the PSTN are a special case of the Termination procedures. The MGCF uses H.248 to control a Media Gateway, and communicates with the SS7 network. The MGCF receives and processes SIP requests, and subsequent nodes consider the signalling as if it came from a S-CSCF.

3GPP TSG-SA WG2 Meeting #34
Brussels, Belgium, 18-22 August 2003

Tdoc ⌘S2-033047

CR-Form-v7

CHANGE REQUEST

⌘ **23.228** **CR** **343** ⌘ **rev** **-** ⌘ Current version: **6.2.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☐

Title:	⌘	Correction of cross references in Annex E
Source:	⌘	Siemens
Work item code:	⌘	IMSCOOP
Date:	⌘	28/07/2003
Category:	⌘	**D**
Release:	⌘	Rel-6

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)*
Rel-6	*(Release 6)*

Reason for change:	⌘	There are two wrong cross-references within the normative Annex E. They refer to an Annex X, rather than E.
Summary of change:	⌘	Correct cross-references twice.
Consequences if not approved:	⌘	Editorial errors remain and might confuse people every now and then.

Clauses affected:	⌘	E.1.1, E.2.4

		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	

Other comments:	⌘	

How to create CRs using this form:
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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.

Annex E (normative): IP-Connectivity Access Network specific concepts when using GPRS to access IMS

This clause describes the main IP-Connectivity Access Network specific concepts that are used for the provisioning of IMS services over GPRS access with a GERAN and/or UTRAN radio access.

When using GPRS-access, the IP-Connectivity Access Network bearers are provided by PDP Context(s).

E.1 Mobility related concepts

The Mobility related procedures for GPRS are described in TS 23.060 [23] and the IP address management principles are described in TS 23.221 [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).

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;

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.

E.1.1 Procedures for P-CSCF discovery

This clause describes the P-CSCF discovery procedures applicable for GPRS access. These procedures follow the generic mechanisms described in clause 5.1.1, hence the following applies:

P-CSCF discovery shall take place after GPRS attach and after or as part of a successful activation of a PDP context for IMS signalling using one of the following mechanisms:

1. Transfer a Proxy-CSCF address within the PDP Context Activation signalling to the UE, as described in sub-clause ~~Annex X~~E.1.1.1. The UE shall request the P-CSCF address(es) from the GGSN when activating the PDP context. The GGSN shall send the P-CSCF address(es) to the UE when accepting the PDP context activation. Both the P-CSCF address(es) request and the P-CSCF address(es) shall be sent transparently through the SGSN.

2. Use of DHCP to provide the UE with the domain name of a Proxy-CSCF and the address of a Domain Name Server (DNS) that is capable of resolving the Proxy-CSCF name, as described in clause 5.1.1.

When using DHCP/DNS procedure for P-CSCF discovery (according to the mechanisms described in sub-clause 5.1.1.1) with GPRS-access, the GGSN acts as DHCP Relay agent relaying DHCP messages between UE and the DHCP server.

*** NEXT CHANGE ***

E.2.4 Network initiated session release - P-CSCF initiated

In the event of loss of coverage, 3GPP 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 in up- and downlink direction. This is indicated to the P-CSCF / PDF by performing the 'Indication of PDP Context Modification' procedure (see 3GPP TS 23.207) as shown in Figure ~~X.~~E.2. For loss of coverage in case of other PDP contexts (background or interactive traffic class), the PDP context is preserved with no modifications and therefore no indication to the P-CSCF/PDF.

E.2.4.1 Network initiated session release - P-CSCF initiated after loss of radio coverage

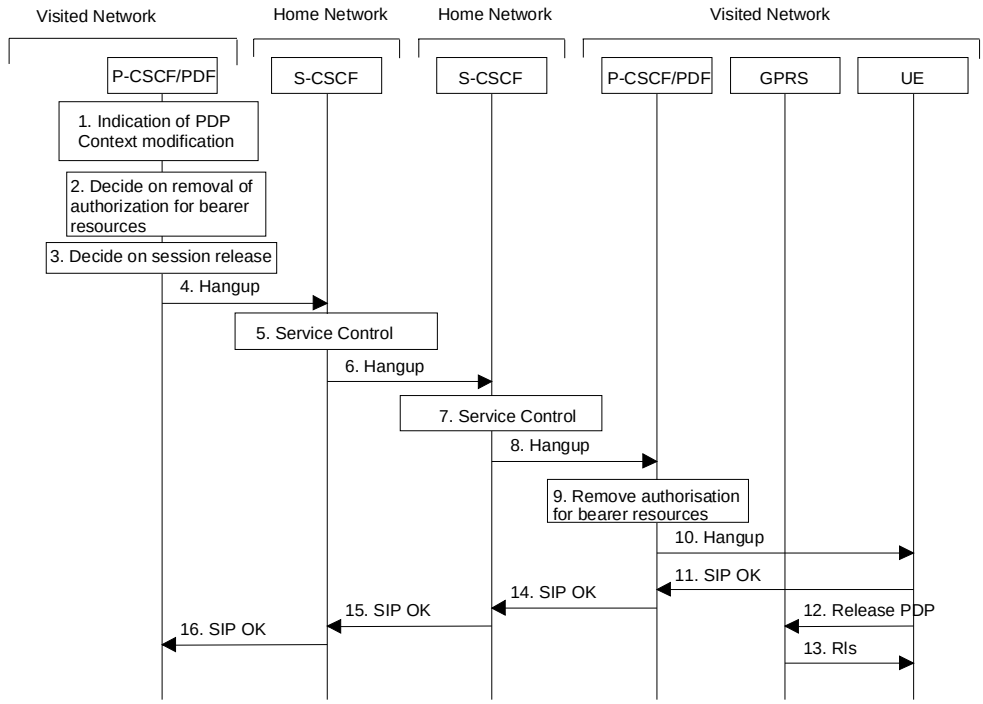

Figure E.2: Network initiated session release - P-CSCF initiated after loss of radio coverage

1. In the event of loss of radio coverage for a PDP context with streaming or conversational class the maximum bitrate of the GTP tunnel between SGSN and GGSN is modified to 0 kbit/s in up- and downlink direction. The P-CSCF/PDF receives an indication of PDP context modification.

2. It is optional for the P-CSCF/PDF to deactivate the affected bearer and additional IP bearers (e.g. an IP bearer for chat could still be allowed). For these IP bearers the P-CSCF/PDF performs the '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/PDF removes the authorisation for resources that had previously been issued for this endpoint for this session.

3. The P-CSCF decides on the termination of the session. If the P-CSCF decides to terminate the session then the P-CSCF/PDF removes the authorisation for resources that had previously been issued for this endpoint for this session. The P-CSCF/PDF shall perform the 'Revoke Authorization for UMTS and IP Resources' procedure (see 3GPP TS 23.207) in case that all IP bearers associated with the session have not been deleted yet.

The following steps are only performed in case the P-CSCF/PDF 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 invokes whatever service logic 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 invokes whatever service logic 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/PDF 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 UE 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 UE 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 UE 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.

3GPP TSG-SA2 Meeting #34 ***Tdoc S2-033079***
Brussels, Belgium, 18 – 22 August 2003

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CHANGE REQUEST

⌘ **23.228** **CR** **348** ⌘**rev** **-** ⌘ Current version: **5.9.0** ⌘

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Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Correction of network initiated session release
Source:	⌘	Nokia
Work item code:	⌘	IMS-CCR
Date:	⌘	18/08/2003
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)*
Rel-6	*(Release 6)*

Reason for change:	⌘	The stage-2 specification for network initiated session release contains text that refers to using cause codes in SIP session release requests to indicate the cause of the release. Neither the 3GPP Stage-3 SIP protocol specifications, nor the relevant IETF RFCs contain such codes for session release requests.
Summary of change:	⌘	The references to cause codes in IMS session release requests are removed.
Consequences if not approved:	⌘	Stage-2 specifications would not be aligned with Stage-3 SIP protocol specifications and relevant IETF RFCs

Clauses affected:	⌘	5.10.3.1.1, 5.10.3.1.2			
Other specs affected:	⌘	**Y**	**N**		⌘
			X	Other core specifications	
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

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

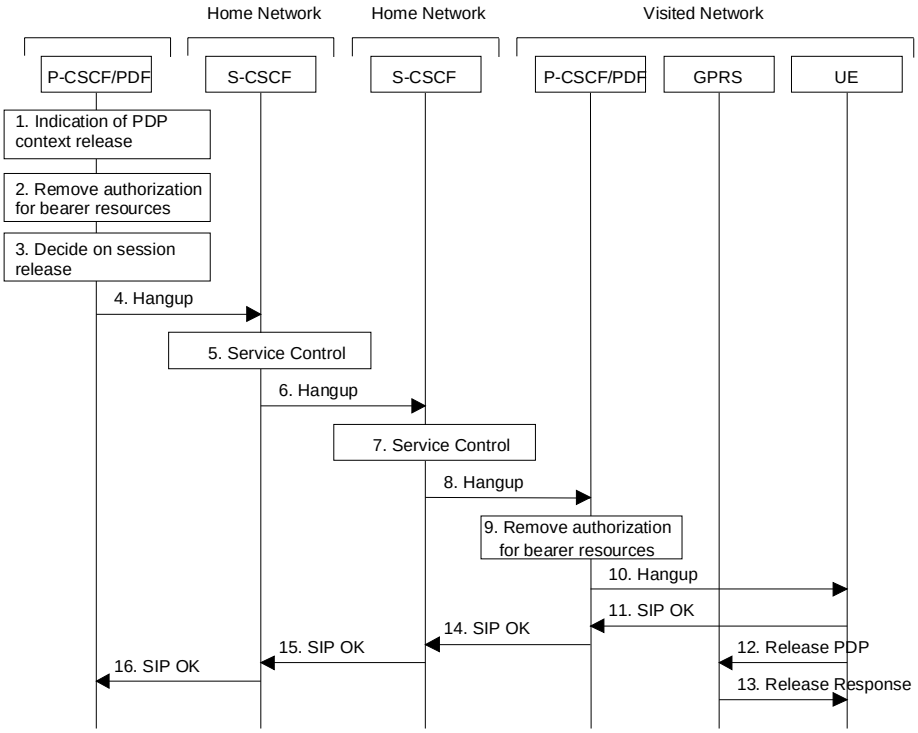

Figure 5.26: Network initiated session release - P-CSCF initiated after removal of PDP context

1. A bearer related to the session is terminated. The P-CSCF/PDF receives an indication of PDP context release.

2. The P-CSCF/PDF removes the authorisation for resources related to the released bearer that had previously been issued for this endpoint for this session. It is optional for the P-CSCF/PDF to deactivate additional IP bearers (e.g. an IP bearer for chat could still be allowed). For these IP bearers the P-CSCF/PDF performs the 'Revoke Authorization for UMTS and IP Resources' procedure (see 3GPP TS 23.207).

3. The P-CSCF decides on the termination of the session. For example, the P-CSCF may decide to terminate the session if all PDP contexts related to the same IMS session are deleted. If the P-CSCF decides to terminate the session then the P-CSCF/PDF removes the authorisation for resources that has previously been issued for this endpoint for this session. The P-CSCF/PDF shall perform the 'Revoke Authorization for UMTS and IP Resources' procedure (see 3GPP TS 23.207) in case that all IP bearers associated with the session have not been deleted yet.

The following steps are only performed in case the P-CSCF/PDF 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 invokes whatever service logic 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 invokes whatever service logic 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/PDF 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 UE 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 UE 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 UE 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 Network initiated session release - P-CSCF initiated after loss of radio coverage

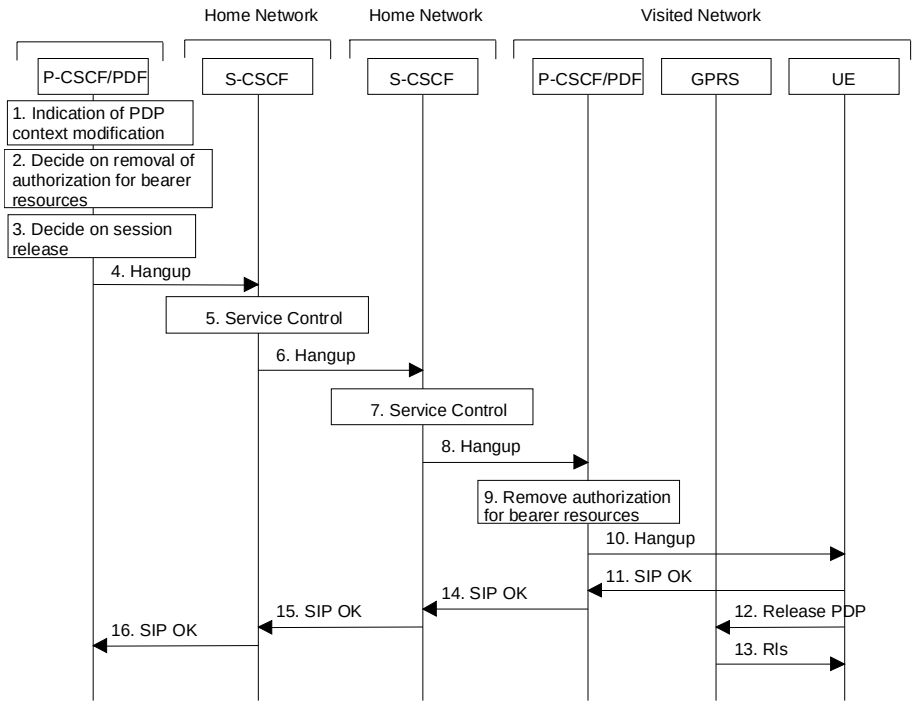

Figure 5.26a: Network initiated session release - P-CSCF initiated after loss of radio coverage

1. In the event of loss of radio coverage for a PDP context with streaming or conversational class the maximum bitrate of the GTP tunnel between SGSN and GGSN is modified to 0 kbit/s in up- and downlink direction. The P-CSCF/PDF receives an indication of PDP context modification.

2. It is optional for the P-CSCF/PDF to deactivate the affected bearerand additional IP bearers (e.g. an IP bearer for chat could still be allowed). For these IP bearers the P-CSCF/PDF performs the 'Revoke Authorization for UMTS and IP Resources' procedure (see 3GPP TS 23.207).

3. The P-CSCF decides on the termination of the session. If the P-CSCF decides to terminate the session then the P-CSCF/PDF removes the authorisation for resources that had previously been issued for this endpoint for this session. The P-CSCF/PDF shall perform the 'Revoke Authorization for UMTS and IP Resources' procedure (see 3GPP TS 23.207) in case that all IP bearers associated with the session have not been deleted yet.

The following steps are only performed in case the P-CSCF/PDF 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 invokes whatever service logic 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 invokes whatever service logic 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/PDF 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 UE 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 UE 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 UE 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.

3GPP TSG-SA2 Meeting #34 ***Tdoc S2-033080***
Brussels, Belgium, 18 – 22 August 2003

CR-Form-v7

CHANGE REQUEST

⌘ **23.228** **CR** **349** ⌘**rev** **-** ⌘ Current version: **6.2.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Correction of network initiated session release
Source:	⌘	Nokia
Work item code:	⌘	IMS-CCR
Date:	⌘	18/08/2003
Category:	⌘	**A**
Release:	⌘	Rel-6

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)*
Rel-6	*(Release 6)*

Reason for change:	⌘	The stage-2 specification for network initiated session release contains text that refers to using cause codes in SIP session release requests to indicate the cause of the release. Neither the 3GPP Stage-3 SIP protocol specifications, nor the relevant IETF RFCs contain such codes for session release requests.
Summary of change:	⌘	The references to cause codes in IMS session release requests are removed.
Consequences if not approved:	⌘	Stage-2 specifications would not be aligned with Stage-3 SIP protocol specifications and relevant IETF RFCs

Clauses affected:	⌘	5.10.3.1.1, E.2.4.1			
Other specs affected:	⌘	**Y**	**N**		
			X	Other core specifications	⌘
			X	Test specifications	
			X	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.

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 **********

5.10.3.1.1 Network initiated session release - P-CSCF initiated – after removal of IP-Connectivity Access Network bearer

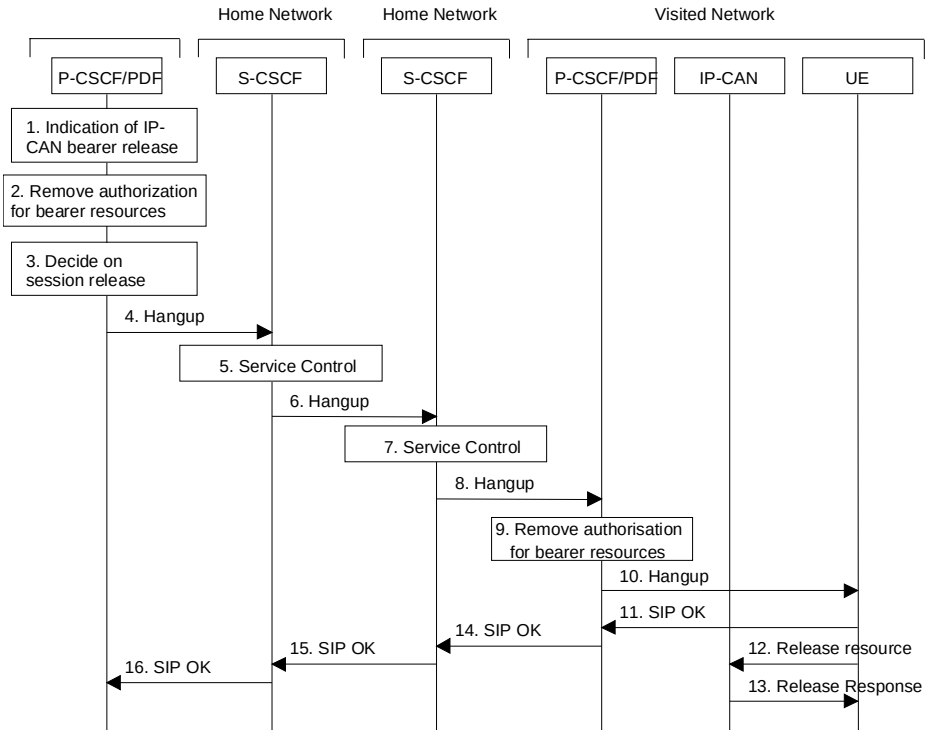

Figure 5.26: Network initiated session release - P-CSCF initiated – after removal of IP-CAN bearer

1. A bearer related to the session is terminated. The P-CSCF/PDF receives an indication of IP-CAN bearer release.
2. The P-CSCF/PDF removes the authorisation for resources related to the released bearer that had previously been issued for this endpoint for this session. It is optional for the P-CSCF/PDF to deactivate additional IP-CAN bearers (e.g. an IP-CAN bearer for chat could still be allowed). For these IP-CAN bearers the P-CSCF/PDF performs the 'Revoke Authorization for IP-CAN and IP Resources' procedure (see 3GPP TS 23.207).
3. The P-CSCF decides on the termination of the session. For example, the P-CSCF may decide to terminate the session if all IP-CAN bearers related to the same IMS session are deleted. If the P-CSCF decides to terminate the session then the P-CSCF/PDF removes the authorisation for resources that has previously been issued for this endpoint for this session. The P-CSCF/PDF shall perform the 'Revoke Authorization for IP-CAN and IP Resources' procedure (see 3GPP TS 23.207) in case that all IP-CAN bearers associated with the session have not been deleted yet.

The following steps are only performed in case the P-CSCF/PDF 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 invokes whatever service logic 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 invokes whatever service logic 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/PDF 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 IP-CAN 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 UE 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 UE initiates the release of the IP-CAN bearer .
13. The IP-CAN releases the IP-CAN bearer. The IP network resources that had been reserved for the message receive path to the UE for this session are now released. This is initiated from the IP-CAN. 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.

********** Second change **********

E.2.4.1 Network initiated session release - P-CSCF initiated after loss of radio coverage

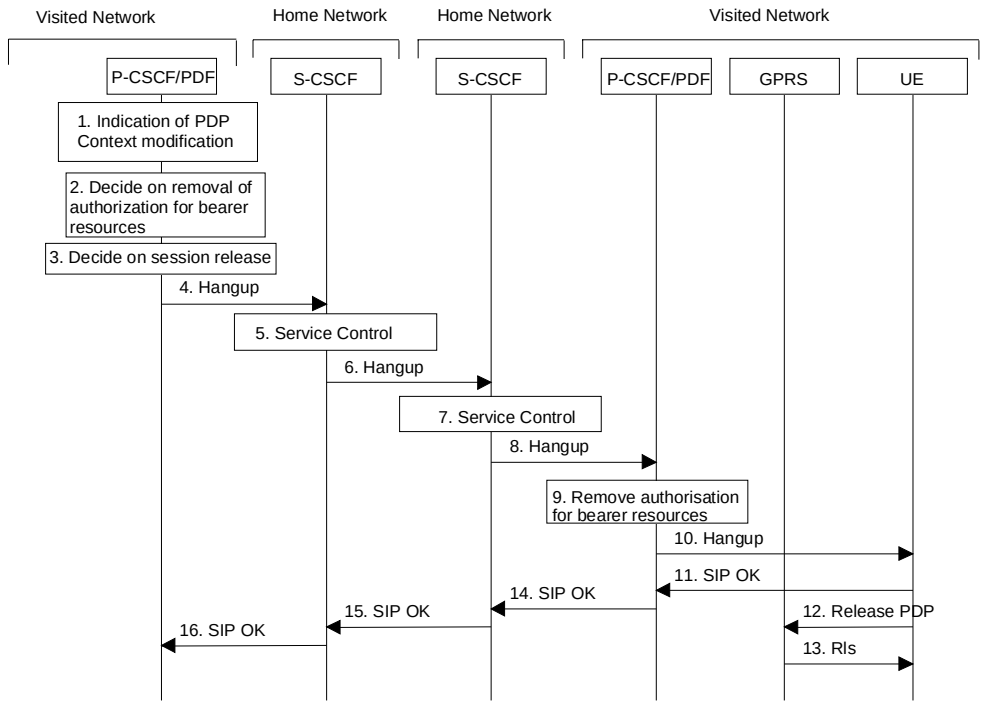

Figure E.2: Network initiated session release - P-CSCF initiated after loss of radio coverage

1. In the event of loss of radio coverage for a PDP context with streaming or conversational class the maximum bitrate of the GTP tunnel between SGSN and GGSN is modified to 0 kbit/s in up- and downlink direction. The P-CSCF/PDF receives an indication of PDP context modification.

2. It is optional for the P-CSCF/PDF to deactivate the affected bearer and additional IP bearers (e.g. an IP bearer for chat could still be allowed). For these IP bearers the P-CSCF/PDF performs the '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/PDF removes the authorisation for resources that had previously been issued for this endpoint for this session.

3. The P-CSCF decides on the termination of the session. If the P-CSCF decides to terminate the session then the P-CSCF/PDF removes the authorisation for resources that had previously been issued for this endpoint for this

session. The P-CSCF/PDF shall perform the 'Revoke Authorization for UMTS and IP Resources' procedure (see 3GPP TS 23.207) in case that all IP bearers associated with the session have not been deleted yet.

The following steps are only performed in case the P-CSCF/PDF 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 invokes whatever service logic 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 invokes whatever service logic 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/PDF 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 UE 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 UE 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 UE 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.

********** End of changes **********

3GPP TSG-SA WG2 Meeting #34 *Tdoc ⌘S2-033133*
Brussels, Belgium, 18th – 22nd August, 2003

CR-Form-v7

CHANGE REQUEST

⌘ **23.228** **CR** **336** ⌘ **rev** **1** ⌘ Current version: **6.2.0** ⌘

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Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

Title:	⌘	IMS-SIP interworking
Source:	⌘	Ericsson, Nokia, Siemens
Work item code:	⌘	IMS2
Date:	⌘	21/08/2003
Category:	⌘	**B**
Release:	⌘	Rel-6

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)*
Rel-6 *(Release 6)*

Reason for change:	⌘	CN3 (& CN1) has done comprehensive analysis on the interworking of IMS & SIP entities outside of IMS. TR 29.962 documents different architecture options on this issue and CN3 has asked SA2 to agree on the architecture for interworking. At SA2#33, architectural impacts were analysed and decision was taken to go forward with end-to-end flow based solution. This CR provides technical update to the specification to conform to the agreement.
Summary of change:	⌘	Interworking principle based on end to end model applied for Internet and originating and terminating flows added to reflect the scenarios.
Consequences if not approved:	⌘	There would be no standardized interworking with Internet/non-IMS SIP clients.

Clauses affected:	⌘	5.4.2, 5.4.10, and new sub-clauses added in 5.6 (new section is 5.6.4) & 5.7 (new section is 5.7.4)

		Y	N			
Other specs Affected:	⌘	X		Other core specifications	⌘	29.162
			X	Test specifications		
			X	O&M Specifications		

Other comments:	⌘	

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Below is a brief summary:

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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.

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**********First Change**********

5.4.2 Interworking with Internet

Depending on operator policy, the S-CSCF may forward the SIP request or response to another SIP server located within an ISP domain outside of the IM CN subsystem.

In cases where the external SIP client does not support one or more of the SIP extensions required for IMS end points to set up IMS sessions (e.g. Preconditions, Update, 100Rel) as described in 3GPP TS 24.229 [10a], then the UE or other SIP user agents within the IMS should be able to fall back to SIP procedures, which allow interworking towards the external client. Depending on the home network operator policy, the network may restrict session initiation requests towards and from external SIP clients without the support of SIP extensions defined for IMS sessions.

**********Second 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.

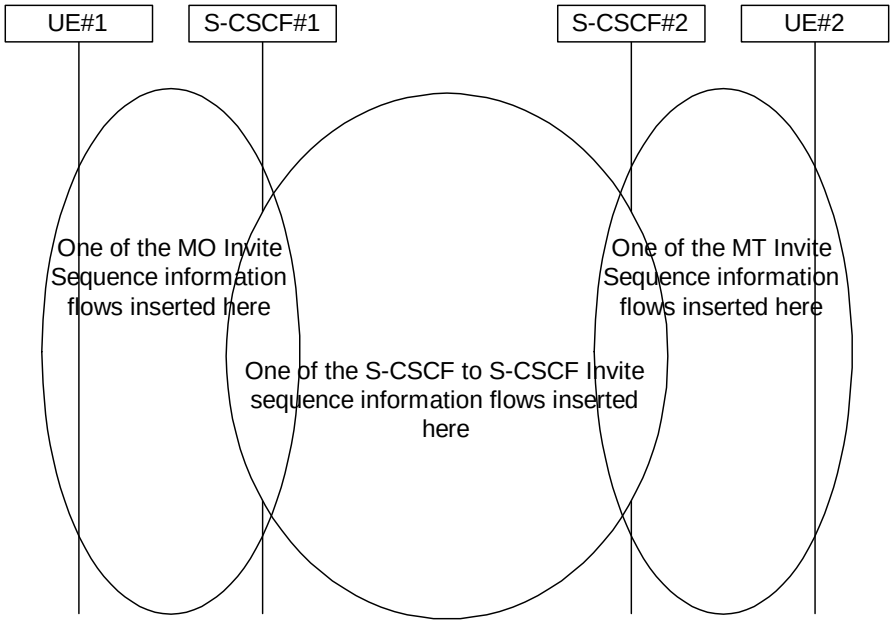

Figure 5.9: Overview of Session Flow Sections

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

The media being offered and acknowledged to can take multiple negotiation steps or only one negotiation may be used. In these flows, a minimum of two negotiations has been shown. But the subsequent responses may not carry any media information and just confirm the initial media set agreement.

For example, for a non-roaming user initiating a session to another non-roaming user, 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

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).

Service control can occur at any point during a session, based on the filter criteria.

Note that the flows show service control only for the initial INVITE for originating and terminating party as an example.

Third Change

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.
MO#1 Mobile origination, roaming, home control of services (2). MO#2 Mobile origination, located in home service area.	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.

In addition, variants of MO#1, MO#2, MT#1 and MT#2 are supported for interworking with external SIP clients, which do not support the SIP extensions required for IMS end points. These variants are not used in combination with any other session procedure.

5.6 Origination procedures

This section presents the detailed application level flows to define the Procedures for session originations.

The flows presented in the section assume the use of service-based local policy.

The session origination procedures specify the signalling path between the UE initiating a session setup attempt and the Serving-CSCF that is assigned to perform the session origination service. This signalling path is determined at the time of UE registration, and remains fixed for the life of the registration.

A UE always has a proxy (P-CSCF) associated with it. This P-CSCF performs resource authorisation, and may have additional functions in handling of emergency sessions. The P-CSCF is determined by the CSCF discovery process, described in Section 5.1.1 (Local CSCF Discovery).

As a result of the registration procedure, the P-CSCF determines the next hop toward the Serving-CSCF. This next hop is to the S-CSCF in the home network (possibly through an I-CSCF(THIG) to hide the network configuration) (MO#1). These next-hop addresses could be IPv6 addresses, or could be names that are translated via DNS to an IPv6 address.

Sessions originated in the PSTN to a mobile destination are a special case of the Origination procedures. The MGCF uses H.248 [19] to control a Media Gateway, and communicates with the SS7 network. The MGCF initiates the SIP request, and subsequent nodes consider the signalling as if it came from a S-CSCF.

5.6.1 (MO#1) Mobile origination, roaming

This origination procedure applies to roaming users.

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.

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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.

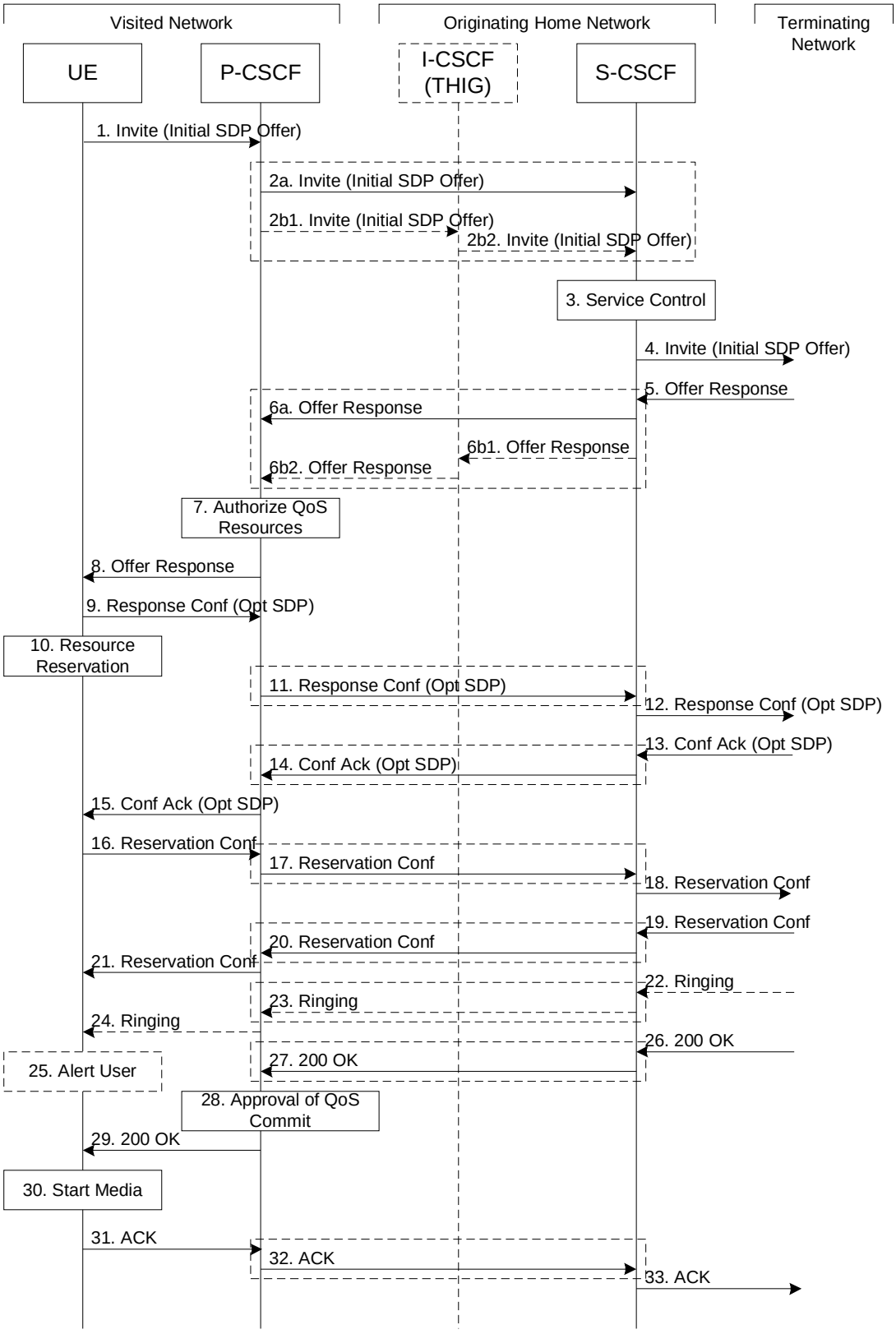

Figure 5.14: Mobile origination procedure - roaming

Procedure MO#1 is as follows:

~~Third Change~~ ~~Third Change~~ ~~Third Change~~

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 invokes any origination service logic required for this user. 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 Offer Response 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) (6b1 and 6b2).

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

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

9. UE decides the offered set of media streams for this session, confirms receipt of the Offer Response and sends the Response Confirmation to the P-CSCF. The Response Confirmation may also contain SDP. This may be the same SDP as in the Offer Response received in Step 8 or a subset. If new media are defined by this SDP, a new authorization (as in Step 7) will be done by the P-CSCF(PDF) following Step 14. The originating UE is free to continue to offer new media on this operation or on subsequent exchanges using the Update method. Each offer/answer exchange will cause the P-CSCF(PDF) to repeat the Authorization step (Step 7) again.

10. After determining the needed resources in step 8, UE initiates the reservation procedures for the resources needed for this session.

11. P-CSCF forwards the Response Confirmation to S-CSCF. This may possibly be routed through the I-CSCF depending on operator configuration of the I-CSCF. Step 11 may be similar to Step 2 depending on whether or not configuration hiding is used.

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

13-15. The terminating end point responds to the originating end with an acknowledgement. If Optional SDP is contained in the Response Confirmation, the Confirmation Acknowledge will also contain an SDP response. If the SDP has changed, the P-CSCF validates that the resources are allowed to be used. Step 14 may be similar to Step 6 depending on whether or not configuration hiding is used.

16-18. When the resource reservation is completed, UE sends the successful Resource Reservation message to the terminating endpoint, via the signalling path established by the INVITE message. The message is sent first to P-CSCF. Step 17 may be similar to Step 2 depending on whether or not configuration hiding is used.

19-21. The terminating end point responds to the originating end when successful resource reservation has occured. If the SDP has changed, the P-CSCF authorizes that the resources are allowed to be used. Step 20 may be similar to Step 6 depending on whether or not configuration hiding is used.

22-24. Terminating end point may generate ringing and it is then forwarded via the session path to the UE.

25. UE indicates to the originating user that the destination is ringing

26. 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.

27. S-CSCF invokes whatever service logic is appropriate for the completed session setup.

27. S-CSCF sends a SIP 200-OK final response along the signalling path back to P-CSCF. Step 23 may be similar to Step 6 depending on whether or not configuration hiding is used.

28. P-CSCF indicates the resources reserved for this session should now be approved for use.

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

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

31-33. UE responds to the 200 OK with a SIP ACK message sent along the signalling path. Step 32 may be similar to Step 2 depending on whether or not configuration hiding is used.

5.6.2 (MO#2) Mobile origination, home

This origination procedure applies to users 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.

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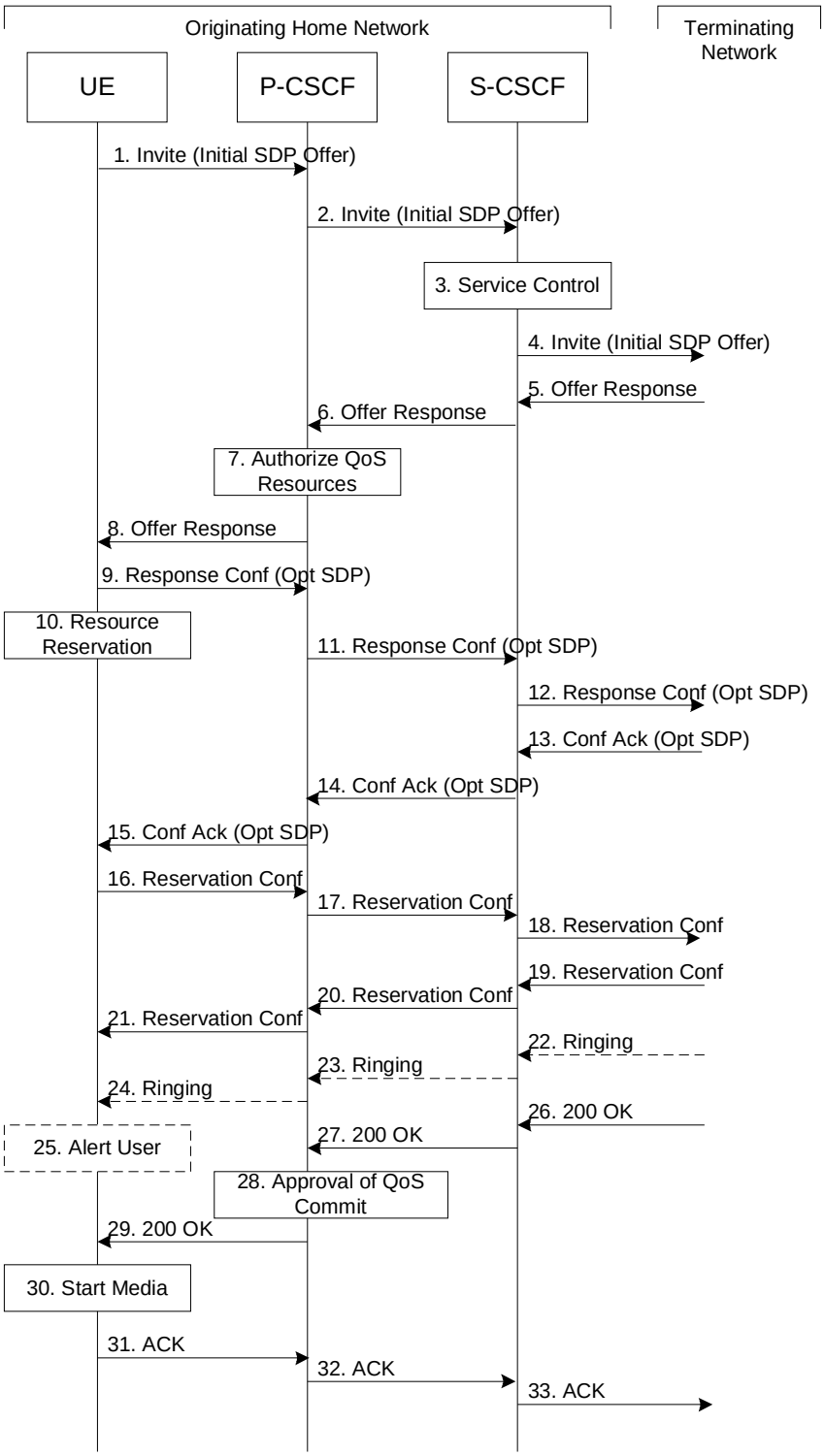

Figure 5.15: Mobile origination procedure - home

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 invokes any origination service logic required for this user. 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 Offer Response message to P-CSCF

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

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

9. UE decides the offered set of media streams for this session, confirms receipt of the Offer Response and sends the Response Confirmation to P-CSCF. The Response Confirmation may also contain SDP. This may be the same SDP as in the Offer Response received in Step 8 or a subset. If new media are defined by this SDP, a new authorization (as in Step 7) will be done by the P-CSCF(PDF) following Step 14. The originating UE is free to continue to offer new media on this operation or on subsequent exchanges using the Update method. Each offer/answer exchange will cause the P-CSCF(PDF) to repeat the Authorization step (Step 7) again.

10. UE initiates resource reservation for the offered media.

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

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

13-14. The terminating end point responds to the originating end with an acknowledgement. If Optional SDP is contained in the Response Confirmation, the Confirmation Acknowledge will also contain an SDP response. If the SDP has changed, the PCSCF authorises the media.

15. PCSCF forwards the answered media towards the UE.

16-18. When the resource reservation is completed, UE sends the successful Resource Reservation message to the terminating endpoint, via the signalling path established by the INVITE message. The message is sent first to P-CSCF.

19-21. The terminating end point responds to the originating end when successful resource reservation has occured. If the SDP has changed, the P-CSCF again authorizes that the resources are allowed to be used.

22-24. 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. It is sent from there toward the originating end along the signalling path.

25. UE indicates to the originating user that the destination is ringing.

26-27. When the destination party answers, the terminating endpoint sends a SIP 200-OK final response along the signalling path to the originating end, as specified by the termination procedures and the S-S procedures, to S-CSCF.

28. P-CSCF indicates the resources reserved for this session should now be approved for use.

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

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

31-33. UE responds to the 200 OK with an ACK message which is sent to P-CSCF and passed along the signalling path to the terminating end.

5.6.3 (PSTN-O) PSTN origination

The MGCF in the IM CN subsystem is a SIP endpoint that initiates requests on behalf of the PSTN and Media Gateway. The subsequent nodes consider the signalling as if it came from a S-CSCF. The MGCF incorporates the network security functionality of the S-CSCF. This MGCF does not invoke Service Control, as this may be carried out in the GSTN or at the terminating S-CSCF. This origination procedure can be used for any of the S-S procedures.

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Due to routing of sessions within the PSTN, this origination procedure will only occur in the home network of the destination subscriber. However due to cases of session forwarding and electronic surveillance, the destination of the session through the IM CN subsystem may actually be another PSTN termination.

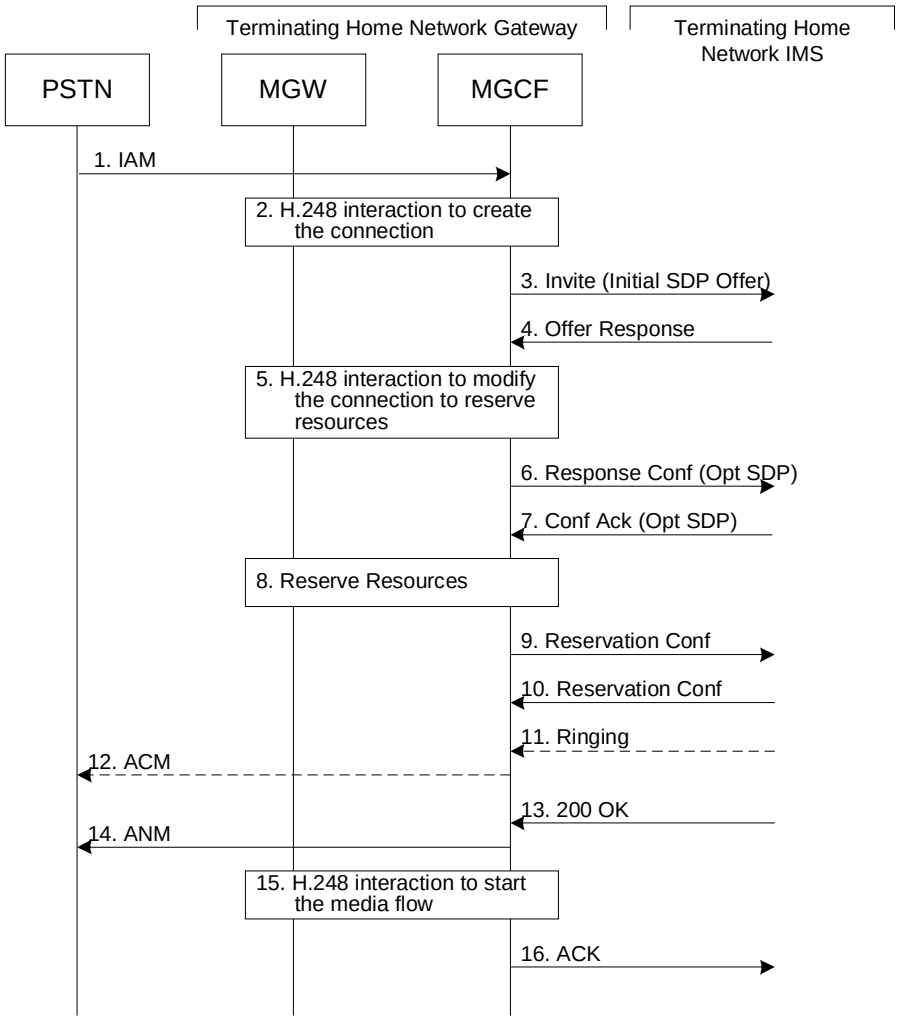

Figure 5.16: PSTN origination procedure

The PSTN Origination procedure is as follows:

1. The PSTN establishes a bearer path to the MGW, and signals to the MGCF with a IAM message, giving the trunk identity and destination information
2. The MGCF initiates a H.248 command, to seize the trunk and an IP port.
3. The MGCF initiates a SIP INVITE request, containing an initial SDP, as per the proper S-S procedure.
4. The media stream capabilities of the destination are returned along the signalling path, per the S-S procedures.
5. MGCF initiates a H.248 command to modify the connection parameters and instruct the MGW to reserve the resources needed for the session.
6. MGCF decides the offered set of media streams for this session, confirms receipt of the Offer Response and sends the Response Confirmation per the S-S procedures.
7. Terminating end point responds to the Response Confirmation. If Optional SDP is contained in the Response Confirmation, the Confirmation Acknowledge will also contain an SDP response.
8. MGW reserves the resources needed for the session

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9. When the resource reservation is completed, MGCF sends the successful Resource Reservation message to the terminating endpoint, per the S-S procedures.

10. Terminating end point responds to the successful media resource reservation.

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

12. If alerting is being performed, the MGCF forwards an ACM message to PSTN

13. When the destination party answers, the terminating and S-S procedures result in a SIP 200-OK final response being sent to MGCF

14. MGCF forwards an ANM message to to the PSTN

15. MGCF initiates a H.248 command to alter the connection at MGW to make it bi-6directional

16. MGCF acknowledges the SIP final response with a SIP ACK message

5.6.4 Mobile Origination procedure towards an external SIP client

This clause describes the IMS originating session setup procedures towards external SIP clients that don't support the required IMS SIP extensions.

In this scenario, the UE originates an IMS session requiring the support for precondition capabilities towards an external SIP entity that does not support those capabilities. Based on the response indicating no support, the UE re-initiates the session by resetting the requirements and announcing its own support only. The UE sets all the media components to inactive until the media information has been negotiated at a later stage of the session. When both parties have agreed to the session and media parameters and the UE has established resources for the media, the UE initiates session modification setting the status of the media components to active and is thus enabling the media transfer to start. Below figures 5.16.a, 5.16.b and 5.16.c together illustrate session flows for one possible originating session establishment towards a non-IMS client in an external network with QoS authorisation and service based local policy support. In this example the external SIP client does not support the Precondition extension of SIP.

For illustration purposes these session flows show the case of a non-roaming origination. This flow is a variant of MO#2 defined in clause 5.6.2. The same principles apply in roaming cases, i.e. analogous variants of MO#1 defined in clause 5.6.1 are also supported for interworking with SIP clients that do not support the required IMS procedures.

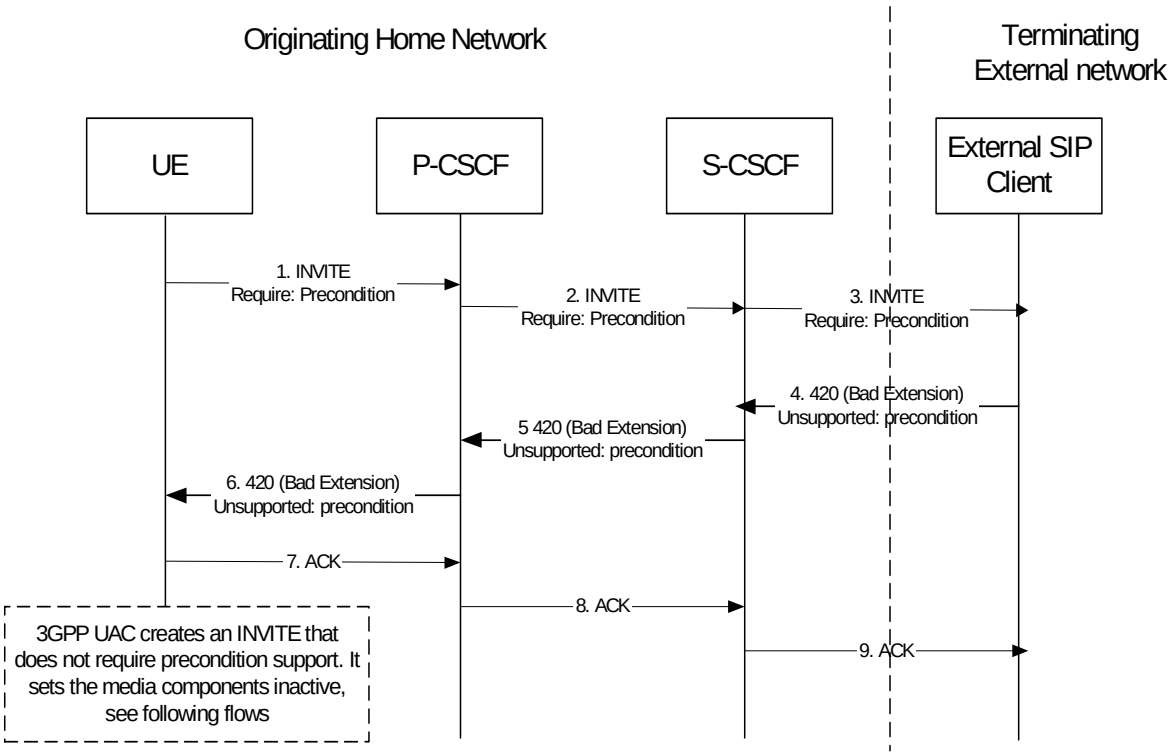

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Figure 5.16a. Originating session towards external SIP client, detection phase

The Originating IMS session detection phase is as follows:

1-3. The UE initiates an IMS session towards an external SIP client, and requires support for precondition capabilities in the session initiation.

4-6. The terminating party informs the UE that the precondition capability is not supported by the receiving entity.

7-9. Acknowledgement to the response is sent through the session path and the session setup procedure is terminated.

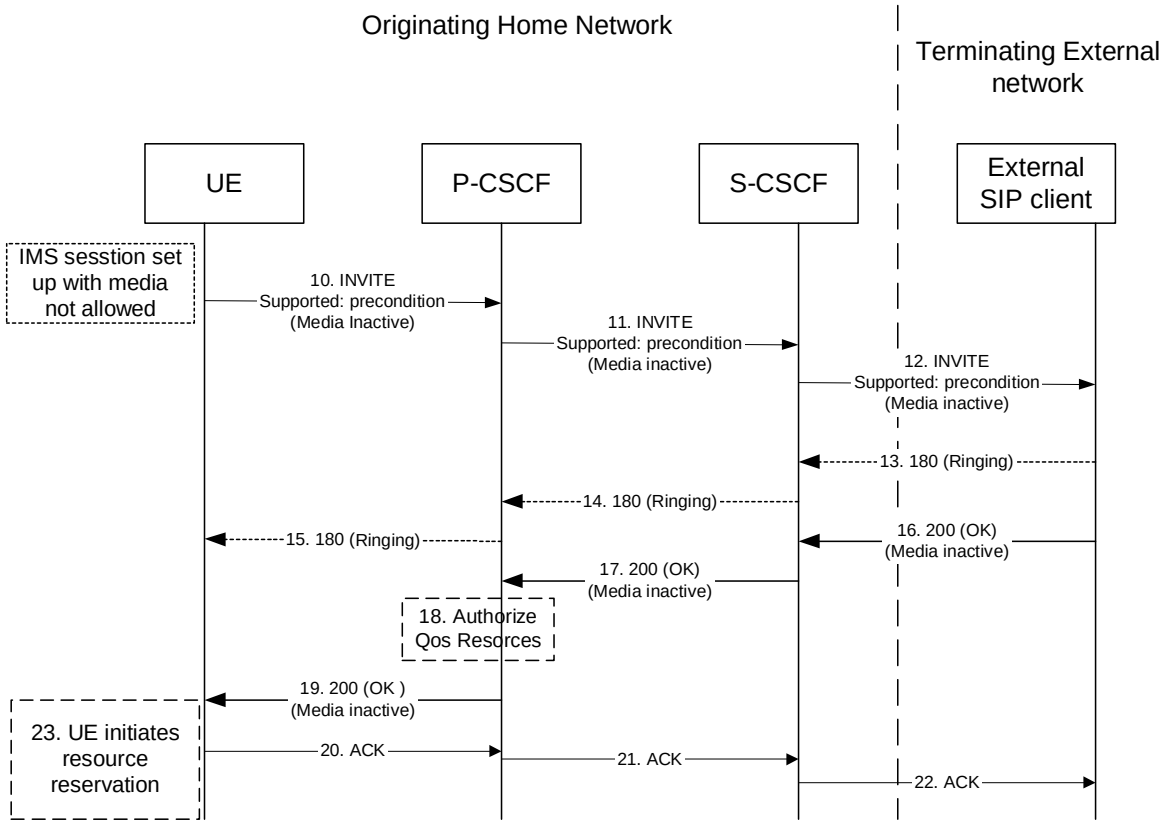

Figure 5.16b. Originating session towards external SIP client, re-initiate session set up not requiring precondition capabilities and with inactive media

At this point, the UE IMS client may choose to retry setting up the session. For that purpose it initiates a new INVITE message, which indicates the support of the precondition capabiliy (rather than the requirement of the precondition capability) and sets all media components to inactive state, as shown in figure 5.16b & 5.16c.

10-12. UE initiates a new IMS session indicating the support of the precondition capability and setting all media components to inactive state.

13-15. Ringing from the terminating party is sent through the session path towards the originating UE.

16-17. Acknowledgement of the session and media parameters are sent from the terminating side to the P-CSCF.

18. The P-CSCF/PDF may at this point authorise the resources being negotiated.

19. The acknowledgement of the session and media parameters forwarded towards the originating UE.

20-22. The session is established, but media transfer is not allowed yet.

23. The UE starts the resource reservation for the media.

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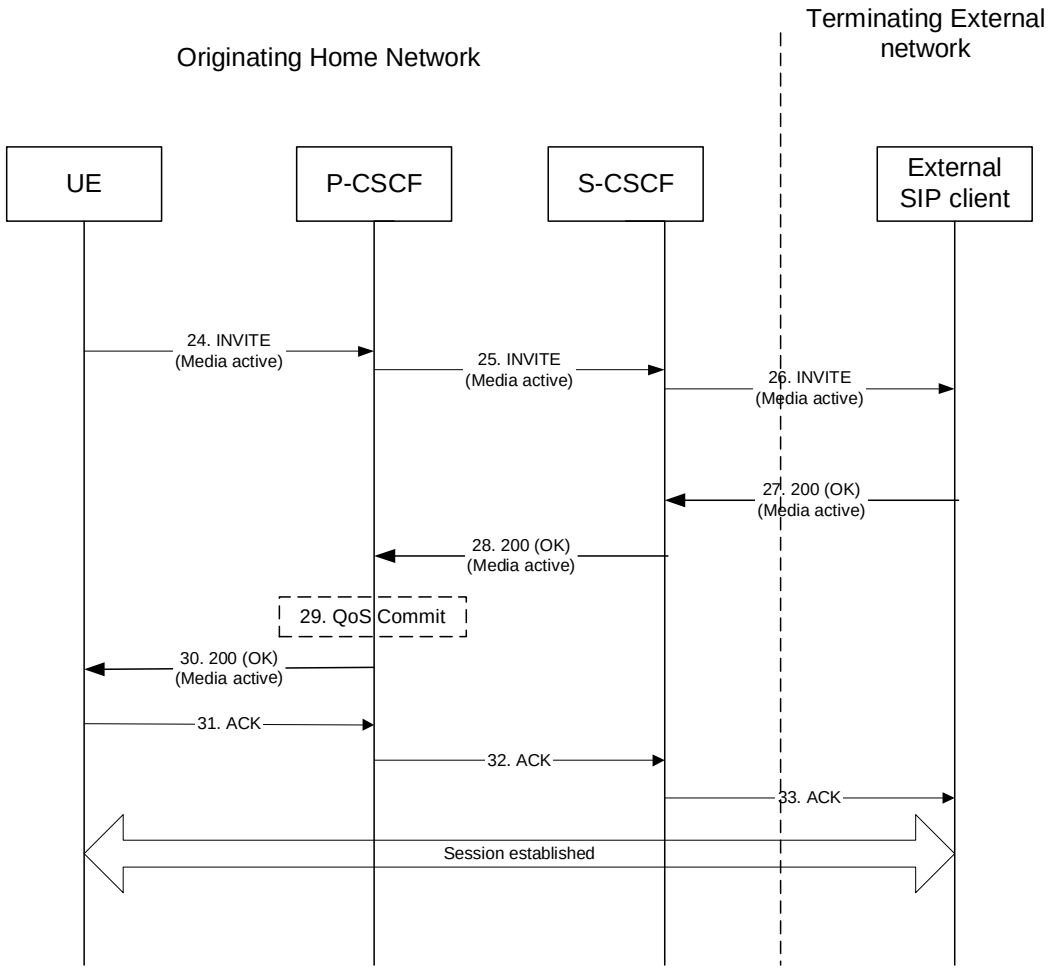

Figure 5.16c. Continuation of originating session towards external SIP client, session set up with active media

Once the session parameters have been agreed and the UE has successfully reserved resources for the media components, the session set-up continues by setting the media components to active, as shown in session flow 5.16c.

24-26. UE initiates activation of media by initiating an INVITE procedure towards the terminating party.

27-28. The terminating party accepts media activation, and corresponding signaling is passed back towards the originating party along the session path.

29. The P-CSCF/PDF receives the acceptance of media activation. At this point, the P-CSCF/PDF may commit/approve the resources that have been authorised for the session

30.The P-CSCF/PDF forwards the signaling message to the originating UE indicating that the session setup can continue and activation of media is performed.

31-33. The Session establishment is then acknowledged through the session path.

At this point in time, the session is established between the two parties.

5.7 Termination procedures

This section presents the detailed application level flows to define the Procedures for session terminations.

The flows presented in the section assume the use of service-based local policy.

The session termination procedures specify the signalling path between the Serving-CSCF assigned to perform the session termination service and the UE. This signalling path is determined at the time of UE registration, and remains fixed for the life of the registration. This signalling path is the reverse of the session initiation signalling path of Section

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5.6. Therefore there is a one-to-one correspondence between the origination procedures of section 5.6 and the termination procedures of this section.

A UE always has a proxy (P-CSCF) associated with it. This P-CSCF performs resource authorisation for the sessions to the UE. The P-CSCF is determined by the CSCF discovery process, described in Section 5.1.1 (Local CSCF Discovery).

As a result of the registration procedure, the P-CSCF knows the address of the UE. The assigned S-CSCF, knows the name/address of the P-CSCF (procedure MT#3, and MT#4, depending on the location of S-CSCF and P-CSCF). If the network operator owning the S-CSCF wants to keep their configuration private, the S-CSCF will have chosen an I-CSCF(THIG) who will perform the configuration hiding and pass messages to the P-CSCF (procedure MT#1).

Sessions destined to the PSTN are a special case of the Termination procedures. The MGCF uses H.248 to control a Media Gateway, and communicates with the SS7 network. The MGCF receives and processes SIP requests, and subsequent nodes consider the signalling as if it came from a S-CSCF.

5.7.1 (MT#1) Mobile termination, roaming

This termination procedure applies to roaming users.

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.

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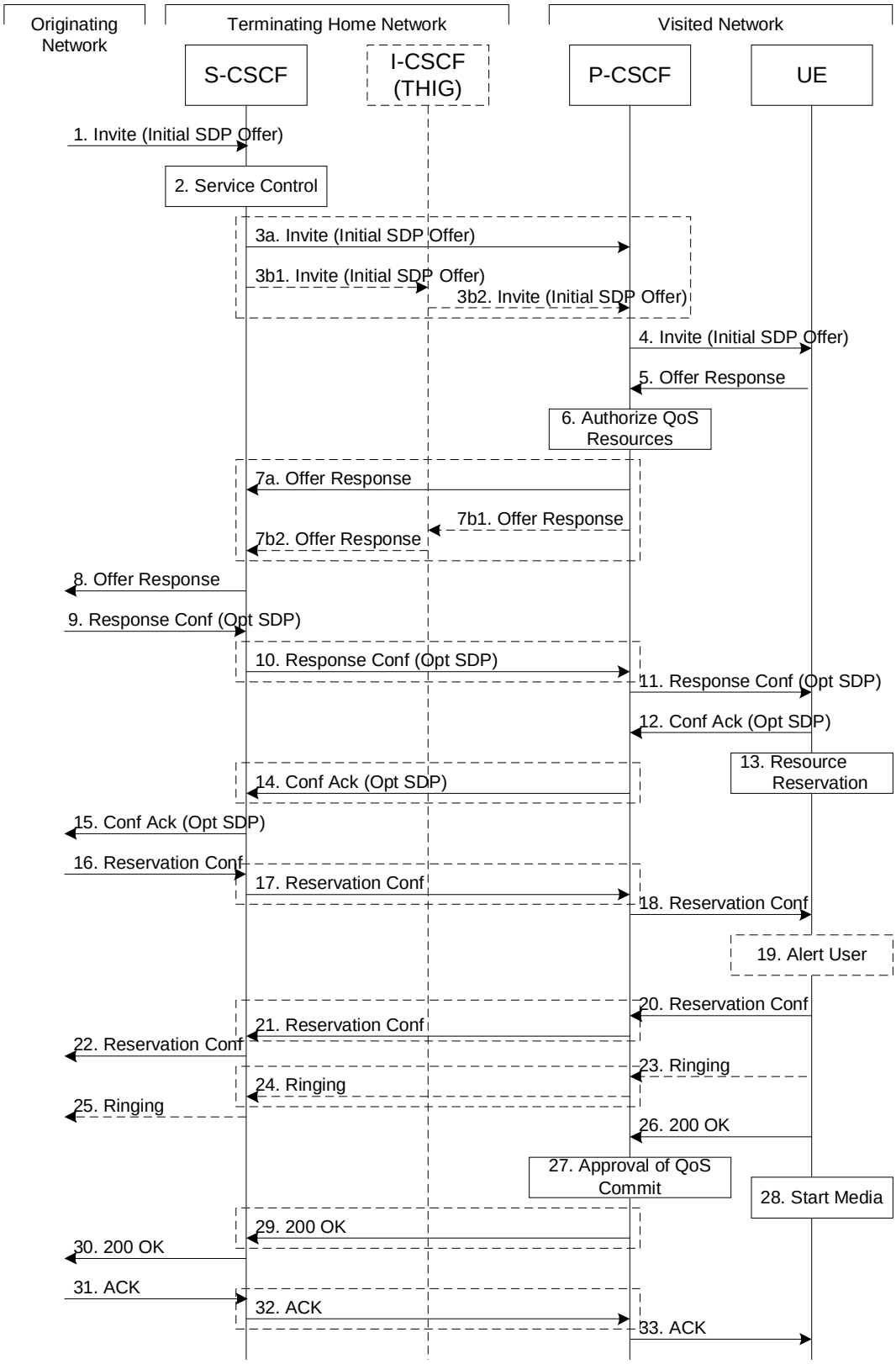

Figure 5.17: Mobile termination procedure - roaming

Procedure MT#1 is as follows:

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

2. S-CSCF validates the service profile, and invokes any termination service logic required for this user. 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 PDFand 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 Offer Response message back to the originator. The 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 Offer Response 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 Offer Response message to the originator, per the S-S procedure.

9. The originating endpoint sends a Response Confirmation via the S-S procedure, to S-CSCF. The Response Confirmation may also contain SDP. This may be the same SDP as in the Offer Response sent in Step 8 or a subset. If new media are defined by this SDP, a new authorization (as in Step 6) will be done by the P-CSCF(PDF) following Step 12. The originating UE is free to continue to offer new media on this operation or on subsequent exchanges using the Update method. Each offer/answer exchange will cause the P-CSCF(PDF) to repeat the Authorization step (Step 6) again.

10. S-CSCF forwards the Response Confirmation to P-CSCF. This may possibly be routed through the I-CSCF depending on operator configuration of the I-CSCF. Step 10 may be similar to Step 3 depending on whether or not configuration hiding is used.

11. P-CSCF forwards the Response Confirmation to UE.

12. UE responds to the Response Confirmation with an acknowledgement. If Optional SDP is contained in the Response Confirmation, the Confirmation Ack will also contain an SDP response. If the SDP has changed, the P-CSCF authorizes that the resources are allowed to be used.

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

14-15. PCSCF forwards the Confirmation Ack to the S-CSCF and then to the originating end point via session path. Step 14 may be similar to Step 7 depending on whether or not configuration hiding is used.

16-18. When the originating endpoint has completed its resource reservation, it sends the successful Resource Reservation message to S-CSCF, via the S-S procedures. The S-CSCF forwards the message toward the terminating endpoint along the signalling path. Step 17 may be similar to Step 3 depending on whether or not configuration hiding is used.

19. UE#2 alerts the destination user of an incoming session setup attempt.

20-22. UE#2 responds to the successful resource reservation towards the originating end point. Step 21 may be similar to Step 7 depending on whether or not configuration hiding is used.

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23-25. 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 and along the signalling path to the originating end. Step 24 may be similar to Step 7 depending on whether or not configuration hiding is used.

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

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

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

29-30. P-CSCF sends a SIP 200-OK final response along the signalling path back to the S-CSCF
Step 29 may be similar to Step 7 depending on whether or not configuration hiding is used.

31-33. 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 and forwarded to the terminating end along the signalling path. Step 32 may be similar to Step 3 depending on whether or not configuration hiding is used.

5.7.2 (MT#2) Mobile termination, home

This termination procedure applies to users 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.

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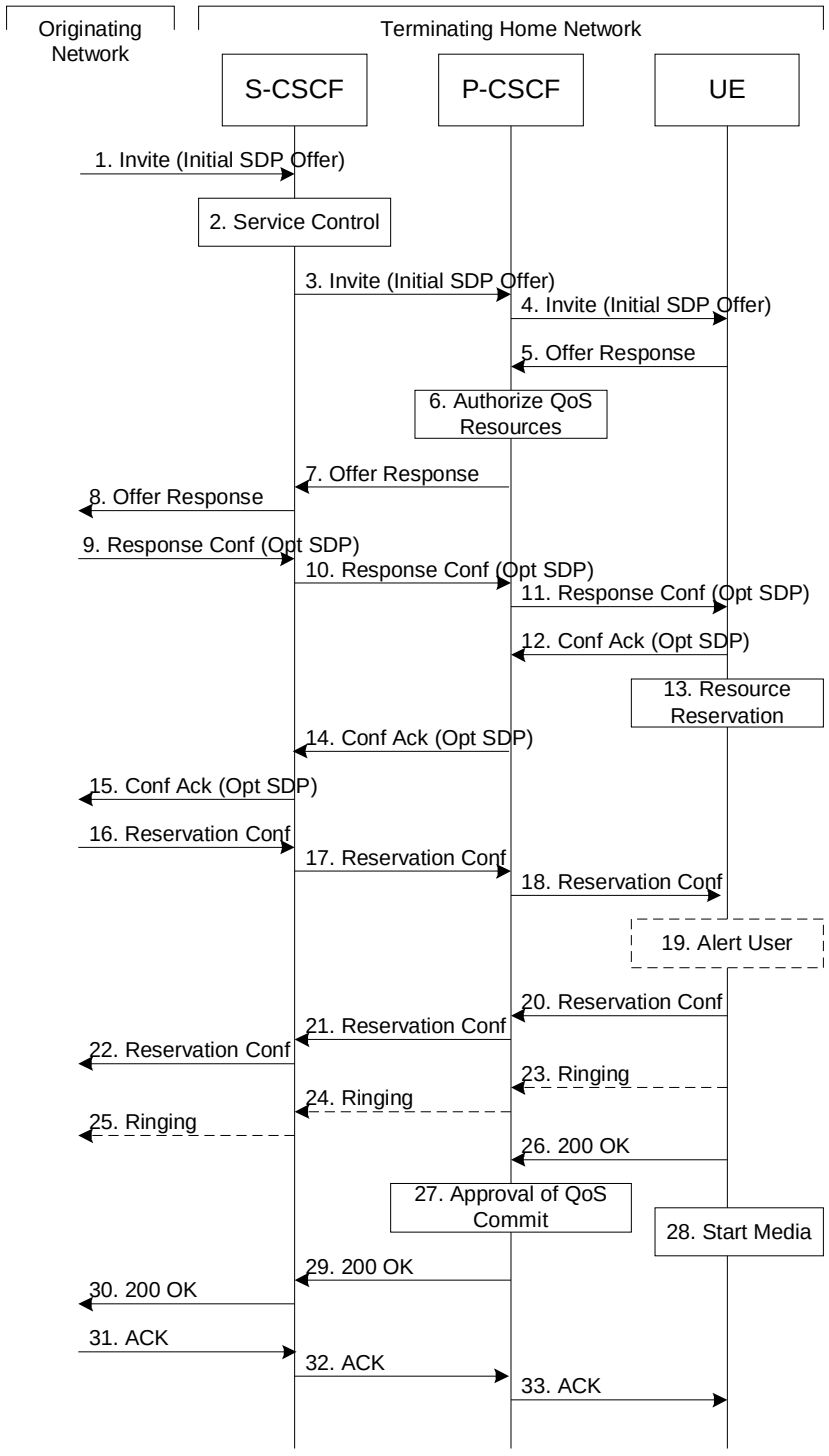

Figure 5.18: Mobile termination procedure - home

Procedure MT#2 is as follows:

1. UE#1 sends the SIP INVITE request, containing an initial SDP, via one of the origination procedures, and via one of the Serving to Serving-CSCF procedures, to the Serving-CSCF for the terminating user.

2. S-CSCF validates the service profile, and invokes any termination service logic required for this user. 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 PDF 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 Offer Response message back to the originator. The 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 Offer Response message to S-CSCF.

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

9. The originating endpoint sends a Response Confirmation via the S-S procedure, to S-CSCF. The Response Confirmation may also contain SDP. This may be the same SDP as in the Offer Response sent in Step 8 or a subset. If new media are defined by this SDP, a new authorization (as in Step 6) will be done by the P-CSCF(PDF) following Step 12. The originating UE is free to continue to offer new media on this operation or on subsequent exchanges using the Update method. Each offer/answer exchange will cause the P-CSCF(PDF) to repeat the Authorization step (Step 6) again.

10. S-CSCF forwards the Response Confirmation to P-CSCF.

11. P-CSCF forwards the Response Confirmation to UE.

12. UE responds to the Response Confirmation with an acknowledgement. If Optional SDP is contained in the Response Confirmation, the Confirmation Ack will also contain an SDP response. If the SDP has changed, the P-CSCF authorizes that the resources are allowed to be used.

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

14-15. The response is forwarded to the originating end point.

16-18. When the originating endpoint has completed its resource reservation, it sends the successful Resource Reservation message to S-CSCF, via the S-S procedures. The S-CSCF forwards the message toward the terminating endpoint along the signalling path.

19. UE#2 alerts the destination user of an incoming session setup attempt.

20-22. UE#2 responds to the successful resource reservation and the message is forwarded to the originating end.

23-25. 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 and along the signalling path to the originating end.

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

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

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

29-30. P-CSCF forwards the 200-OK to S-CSCF, following the signaling path.

31-33. The session originator responds to the 200-OK by sending the ACK message to S-CSCF via the S-S procedure and it is forwarded to the terminating end along the signalling path..

5.7.2a (MT#3) Mobile termination, CS Domain roaming

This termination procedure applies to a user registered for CS services, either in the home network or in a visited network. The user has both IMS and CS subscriptions but is unregistered for IMS services

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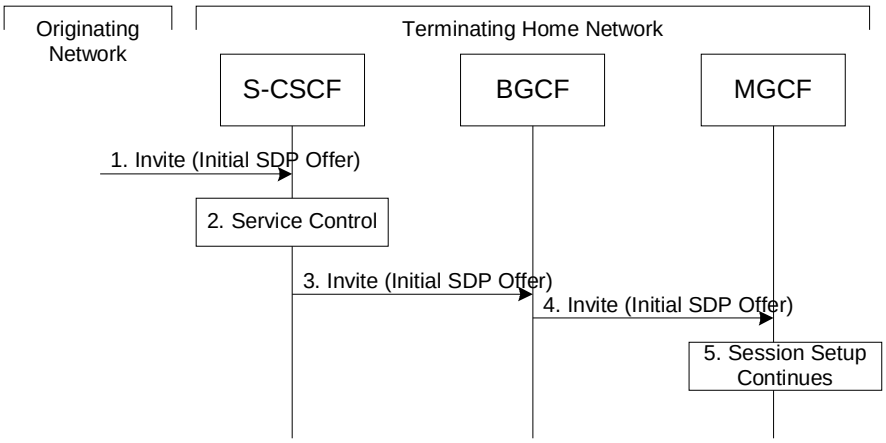

Figure 5.18a: Mobile Terminating procedures to a user that is unregistered for IMS services but is registered for CS services

1. In case the terminating user does not have an S-CSCF allocated, the session attempt is routed according to the section 5.12.1 (Mobile Terminating procedures to unregistered IMS user that has services related to unregistered state).

2. S-CSCF invokes service control appropriate for this session setup attempt, which may result in e.g. re-routing the session to a messaging service, or continued routing towards the user's CS domain termination address (e.g. E.164).

3. S-CSCF performs whatever further actions are appropriate for this session setup attempt. In case of routing towards the user's CS domain termination address, the S-CSCF performs an analysis of this address. From the analysis of the destination address, S-CSCF determines that this is for the CS domain, and passes the request to the BGCF.

4. The BGCF forwards the SIP INVITE message to the appropriate MGCF in the home network, or to a BGCF in another network. This depends on the PSTN interworking configuration of the IMS network. Eventually, the session initiation arrives to an MGCF.

5. Normal session setup continues according to PSTN-T flow as described in Section 5.7.3

5.7.3 (PSTN-T) PSTN termination

The MGCF in the IM CN subsystem is a SIP endpoint that initiates and receives requests on behalf of the PSTN and Media Gateway (MGW).Other nodes consider the signalling as if it came from a S-CSCF. The MGCF incorporates the network security functionality of the S-CSCF.

PSTN termination may be done in the same operator's network as the S-CSCF of the session originator. Therefore, the location of the MGCF/MGW are given only as "Terminating Network" rather than "Home Network" or "Visited Network."

Further, agreements between network operators may allow PSTN termination in a network other than the originator's visited network or home network. This may be done, for example, to avoid long distance or international tariffs.

This termination procedure can be used for any of the inter-serving procedures, in place of the S-CSCF.

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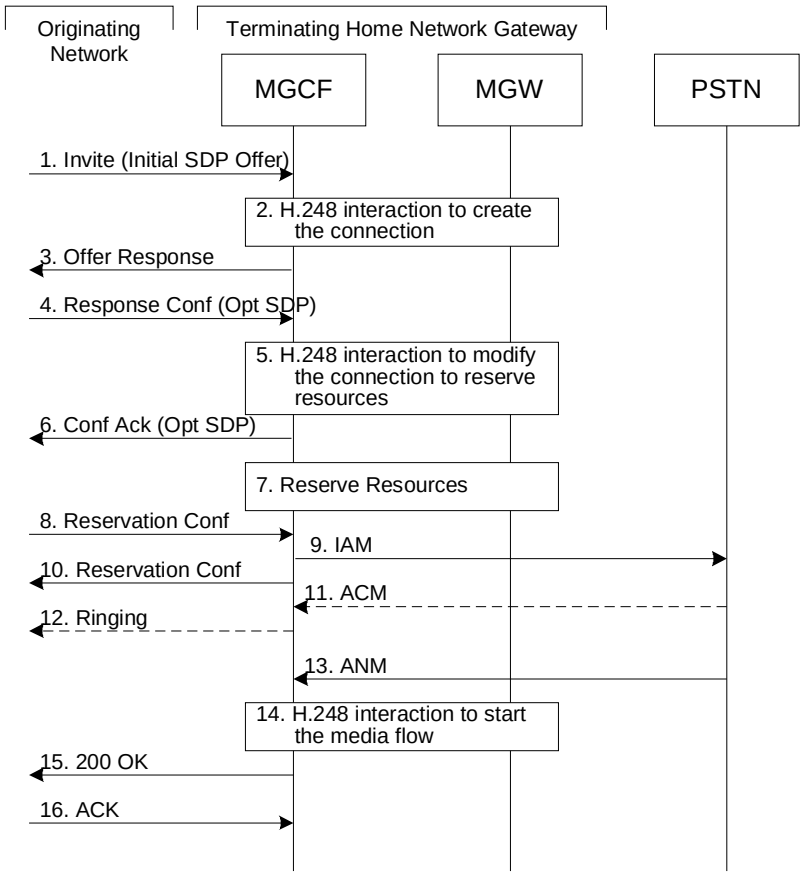

Figure 5.19: PSTN termination procedure

The PSTN termination procedure is as follows:

1. MGCF receives an INVITE request, containing an initial SDP, through one of the origination procedures and via one of the inter-serving procedures.
2. MGCF initiates a H.248 interaction to pick an outgoing channel and determine media capabilities of the MGW.
3. MGCF determines the subset of the media flows proposed by the originating endpoint that it supports, and responds with an Offer Response message back to the originator. This response is sent via the S-S procedure.
4. The originating endpoint sends a Response Confirmation. The Response Confirmation may also contain SDP. This may be the same SDP as in the Offer Response sent in Step 3 or a subset. The originating UE is free to continue to offer new media on this operation or on subsequent exchanges using the Update method.
5. MGCF initiates a H.248 interaction to modify the connection established in step #2 and instruct MGW to reserve the resources necessary for the media streams.
6. MGCF responds to the offered media towards the originating party.
7. MGW reserved the resources necessary for the media streams.
8. When the originating endpoint has completed its resource reservation, it sends the successful Resource Reservation message to MGCF, via the S-S procedures.
9. MGCF sends an IAM message to the PSTN
10. MGCF sends response to the successful resource reservation towards originating end.
11. The PSTN establishes the path to the destination. It may optionally alert the destination user before completing the session. If so, it responds with an ACM message.
12. 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 via the S-S procedures.

~~Third Change~~

13. When the destination party answers, the PSTN sends an ANM message to MGCF
14. MGCF initiates a H.248 interaction to make the connection in the MGW bi-directional.
15. MGCF sends a SIP 200-OK final response along the signalling path back to the session originator
16. The Originating party acknowledges the final response with a SIP ACK message

5.7.4 Mobile Termination from an external SIP client

This clause describes the terminating session setup procedures from an external SIP client that doesn't support the required IMS SIP extensions, towards an IMS UE.

An incoming SIP request may arrive, where the UE detects that the originating party does not support the IMS SIP extensions described in 3GPP TS 24.229 [10a]. In case the external SIP client does not support the Precondition extension of SIP, the UE continues to setup the session without activating media transfer until the session parameters have been negotiated and accepted. Session flows 5.19a and 5.19b show an example of an end-to-end session setup in such a case.

For illustration purposes these session flows show the case of a non-roaming termination. This flow is a variant of MT#2 defined in clause 5.7.2. The same principles apply in roaming cases, i.e. analogous variants of MT#1 defined in clause 5.7.1 are also supported for interworking with SIP clients that do not support the required IMS procedures.

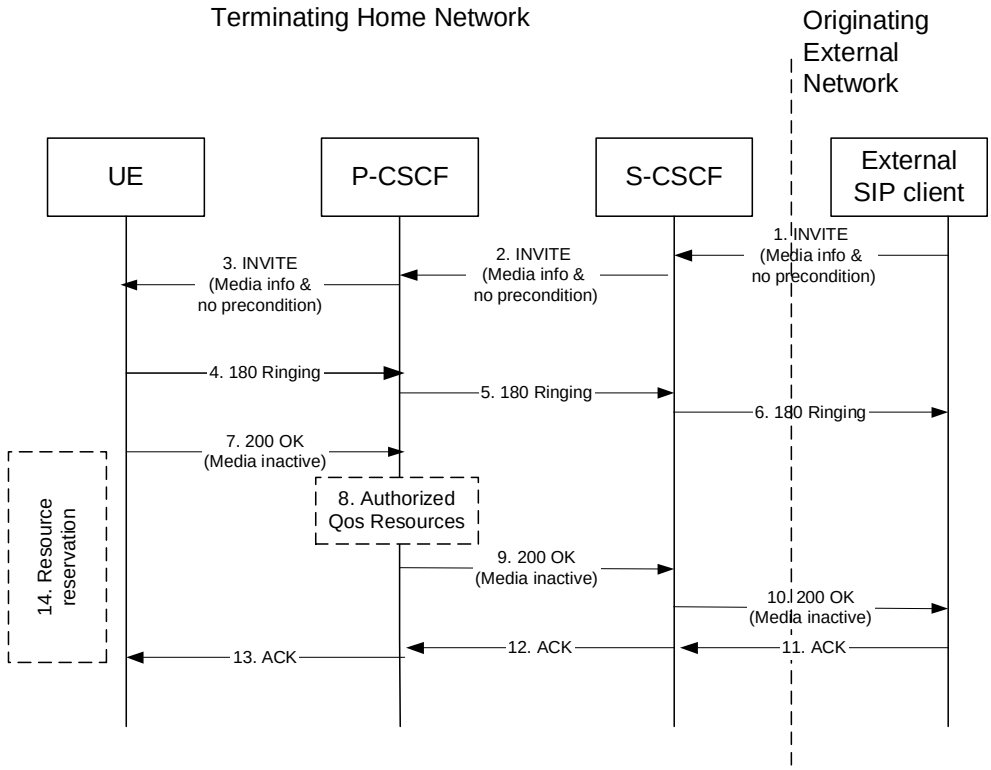

Figure 5.19a. Terminating session from external SIP client, detection & initial setup with media not allowed

1-3. A session arrives at the UE in the IMS network with media information but without requiring precondition capability.

4-6. Ringing information is sent end to end towards the originating party.

7-10. The UE begins the resource reservation according to the session and media parameters. The P-CSCF/PDF may authorise the media parameters being negotiated and the originating party is notified of the session setup details with all media components set to inactive.

~~Third Change~~ ~~Third Change~~ ~~Third Change~~

11-13. The originating party acknowledges the session.

14. When the UE has completed the resource reservation procedures, the UE continues with the session setup according to flow 5.19b. The UE sets the media components to active state.

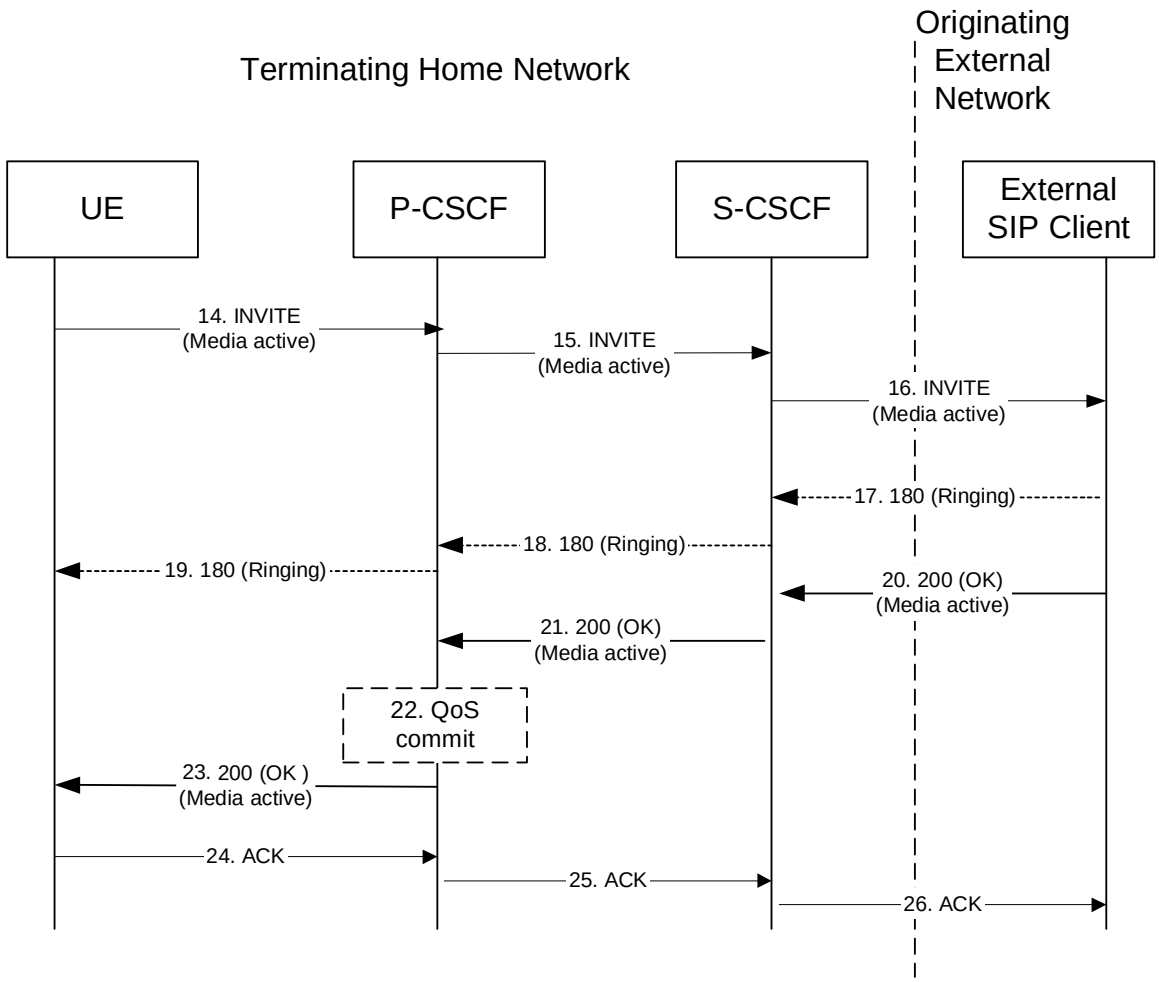

Figure 5.19b. Continuation of terminating session from external SIP client, session setup with active media

14-16. By sending a re-INVITE indicating the support for the precondition capability, the terminating UE initiates setting of media components to active.

17-19. Ringing Information may be sent from an external SIP entity (in this case the originating party) through the session path towards the terminating UE.

20-23. The originating SIP client accepts the re-INVITE with the active media streams. In step 22, The P-CSCF/PDF may commit/approve the resources authorised for the session.

24-26. Session is acknowledged end-to-end.

3GPP TSG-SA WG2 Meeting #34 *Tdoc ⌘S2-033247*
Brussels, Belgium, 18th – 22nd August, 2003

CR-Form-v7

CHANGE REQUEST

⌘ **23.228** **CR** **337** ⌘ **rev** **2** ⌘ Current version: **5.9.0** ⌘

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

Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [ ] Core Network [X]

Title:	⌘	IMS-SIP interworking
Source:	⌘	Ericsson
Work item code:	⌘	IMS-CCR
Date:	⌘	21/08/2003
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)*
Rel-6	*(Release 6)*

Reason for change:	⌘	CN3 (& CN1) has done comprehensive analysis on the interworking of IMS & SIP entites outside of IMS. TR 29.962 documents different architecture options on this issue and CN3 has asked SA2 to agree on the archtiecture for interworking. At SA2#33, architectural impacts were analysed and decision taken to go forward with end-to-end flow based solution. This CR provides technical update to the specification to conform to the agreement, speciafically in case of -interoperability towards Rel 5. This CR does not change the functional behaviour of Release 5 IMS, it only provides a recommendation to take into account the interoperability issue from Release 6. It provides a possible mechanism so the the user does not have ambiguous experience in IMS when roaming between Rel 5 and Rel 6 networks.
Summary of change:	⌘	Provides a recommendation to handle compatibility of interworking towards Rel5.
Consequences if not approved:	⌘	Interworking with Internet/non-IMS SIP clients will not be possible in a backward compatible way.

Clauses affected:	⌘	5.4.2			
Other specs affected:	⌘	Y: Other core specifications	⌘	24.229	
		N: Test specifications			
		N: 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/specs/CR.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.

5.4.2 Interworking with Internet

Depending on operator policy, the S-CSCF may forward the SIP request or response to another SIP server located within an ISP domain outside of the IM CN subsystem.

The remote SIP client may not support IMS required capabilities such as “Preconditions”, "Update” and “100rel” as described in 3GPP TS 24.229. In the case that the remote SIP client does not support these capabilities, then the same session may be re-initiated by relaxing the requirements on the capabilities (by setting them to the status of desired) following the principle set by RFC 3261 [12]. The home network may impose restriction on session initiation without the IMS required capabilities.

3GPP TSG-SA WG2 Meeting #34
Brussels, Belgium, 18-22 August, 2003

Tdoc ⌘S2-033249

CR-Form-v7

CHANGE REQUEST

⌘ **23.228** **CR** **351** ⌘ **rev** **2** ⌘ Current version: **6.2.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	PSI configuration and routing
Source:	⌘	Ericsson, Nokia, Siemens
Work item code:	⌘	IMS-2
Date:	⌘	22/08/2003
Category:	⌘	**C**
Release:	⌘	Rel-6

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)
Rel-6 (Release 6)

Reason for change:	⌘	The current text on PSI routing needs to be clearified. It is unclear how the different kind of PSIs are configured in the network, and how routing to these PSIs is performed. Also adds some flows to elaborate the PSI routing principles.
Summary of change:	⌘	This contribution introduces restructuring of the PSI routing section and introduces clearly the originating and terminating AS usage. It also introduces definition of PSI in home network databases. Description added how a statically created PSI can be used by a termninating Application Server. Text restructuring and rewording has also been applied. Text restructuring and rewording has also been applied. This contribution introduces flows related to different PSI routing mechanism
Consequences if not approved:	⌘	Limited flexibility for statically created PSIs. No additional Application Servers can be invoked. PSI routing remains unspecified, causing stage 3 input ambiguous/not complete.

Clauses affected:	⌘	5.4.12. (including all subclauses) and 5.4.12.1, 5.4.12.2, 5.4.12.3			
Other specs affected:	⌘	**Y**	**N**		⌘
			X	Other core specifications	
			X	Test specifications,	
			X	O&M Specifications	
Other comments:	⌘	Merged CRs from 307 (according to S2-032670 from SA2#33 and revision of S2-03001 from SA2#34) and 335 (according to S2-033003).			

How to create CRs using this form:

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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.

5.4.12 Configuration and Routing principles for Public Service Identities

~~Within IMS, routing to/from a Public Service Identity (PSI) shall be provided using basic principles used for IMS routing.~~

Depending on the service nature, different mechanisms may be used for configuration and routing of PSIs according to operator preference.

When PSIs are created, the uniqueness of a PSI shall be ensured.

Whenever possible, routing to/from a Public Service Identity (PSI) should be provided using basic principles used for IMS routing.

5.4.12.1 PSIs on the originating side

The application server hosting the PSI may be invoked as an originating application server. This can be achieved by modifying the filter information within the subscription information of the users intending to use the service identified by the PSI. The PSI is then made available to these users.

The SIP requests are directed to the corresponding application server hosting the service according to the originating filtering rules in the S-CSCF of the user who is using the service.

Such statically pre-configured PSIs are only available internally within IMS of the operator's domain.

5.4.12.2 PSIs on the terminating side

The application server hosting the PSI may be invoked as a terminating application server with the AS and related PSIs configured in the home network, e.g. HSS. Such PSIs are globally routable and can be made available to users within and outside the operator domain, and can take the following form:

- Distinct PSIs (e.g. my_service@example.com).
- Wildcarded PSIs (chatlist_*@example.com): A range of PSIs with the same domain part in the SIP URI is defined using a wildcard indication in the userpart of the SIP-URI. Distinct PSIs can be created or deleted within the wildcarded range by the users using the Ut interface, or by the operator via O&M mechanisms.

For both the distinct PSIs and wildcarded PSIs, there are two ways to route towards the AS hosting the PSI:

a) The HSS maintains the assigned S-CSCF information and ISC Filter Criteria to route to the AS hosting the PSI according to IMS routing principles. In this case, the I-CSCF receives SIP requests at the terminating side, queries the HSS and directs the request to the S-CSCF assigned to the PSI. The S-CSCF forwards the session to the application server hosting the PSI according to the terminating ISC Filter Criteria.

b) The home database maintains the address information of the AS hosting the PSI. In this case, the AS address information for the PSI is returned to the I-CSCF in the location query response, in which case the I-CSCF will forward the request directly to the AS hosting the PSI.

Figure 5.4.12.a depicts a routing example for incoming session where the HSS has the PSI defined in the database and then the session request is routed directly to the AS hosting the PSI.

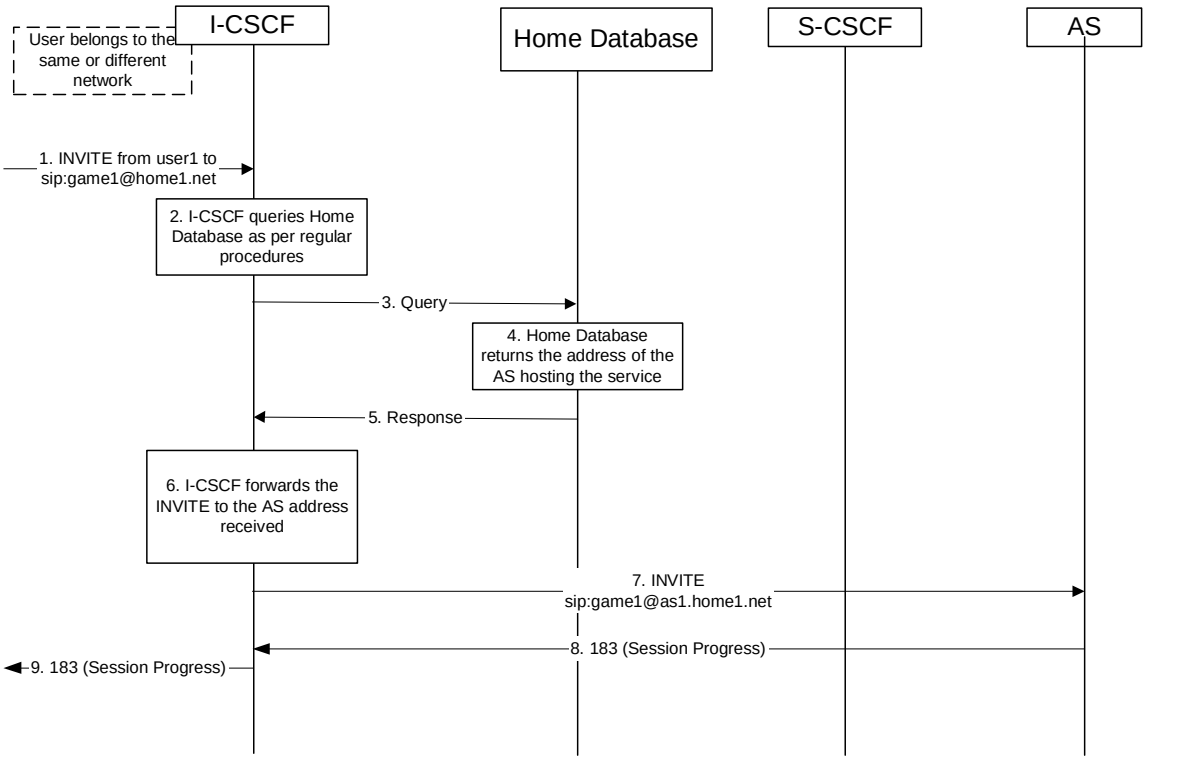

Figure 5.4.12.a Incoming session, direct route towards the AS

1. I-CSCF receives a request destined to the PSI.

2-3. I-CSCF queries Home Database in order to determine the next hop in the routing path for the PSI.

4. Home database determines the routing information, i.e., the address of the AS hosting the PSI.

5. Home database returns the AS address to the I-CSCF.

6-7. I-CSCF forwards the request to the address received from the query.

8-9. Session setup completes as per existing procedures.

Figure 5.4.12.b depicts an example routing scenario where the basic IMS routing via S-CSCF is used to route the session.

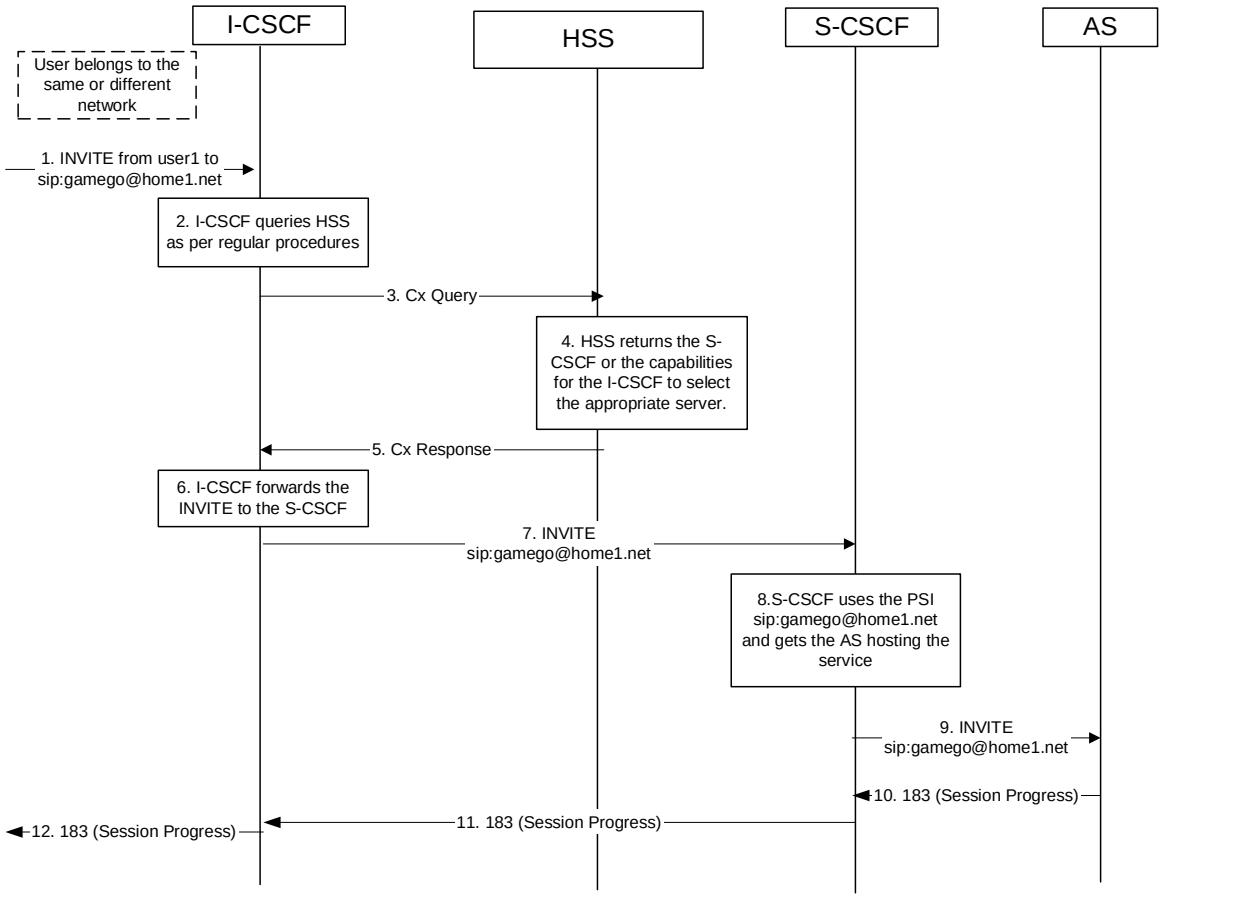

Figure 5.4.12.b Incoming session, indirect route to AS via S-CSCF

1. I-CSCF receives a request destined to the PSI.

2-3. I-CSCF queries HSS in order to determine the next hop in the routing path for the PSI.

4. HSS determines the routing information, which is the S-CSCF defined for the AS hosting the PSI.

5. HSS returns the S-CSCF address/capabilities to the I-CSCF.

6-7. I-CSCF, as per existing procedures, forwards the request towards the entity (i.e., S-CSCF) received from the query, or the I-CSCF selects a new S-CSCF if required.

8. S-CSCF evaluates the filter criteria and gets the AS address where to forward the request.

9. The request is then routed towards the AS identified by the filter criteria.

10-.12.Session setup completes as per existing procedures.

5.4.12.3 Subdomain based PSIs on the originating and terminating side

Subdomains defined for PSIs allow both operators and users to define these PSIs for specific applications. For this purpose, subdomains are defined in the DNS infrastructure. Within the subdomain, specific PSIs can be created either statically or dynamically.

Subdomain based PSIs are globally routable and can be made available to users within and outside the operator domain.

In this case, there are two ways to route towards the AS hosting the PSI:

a) When the subdomain name is defined in the global DNS, then the originating S-CSCF receives the IP address of the AS hosting the PSI, when it queries DNS. The principles defined in RFC 3263 “Session Initiation Protocol (SIP): Locating SIP Servers” may be used. For example, a NAPTR query and then a SRV query may be used to get the IP address of the AS.

b) The PSI is resolved by the global DNS to an I-CSCF address in the domain where the AS hosting the PSI is located. The I-CSCF recognises the subdomain (and thus does not query the HSS). It resolves the same PSI to the address of the actual destination AS hosting the PSI using an internal DNS mechanism, and forwards the requests directly to the AS.

Figure 5.4.12.c shows an example of DNS based routing of an incoming session from an external network. The routing from the external network leads to the entry point of the IMS subsystem hosting the subdomain of the PSI.

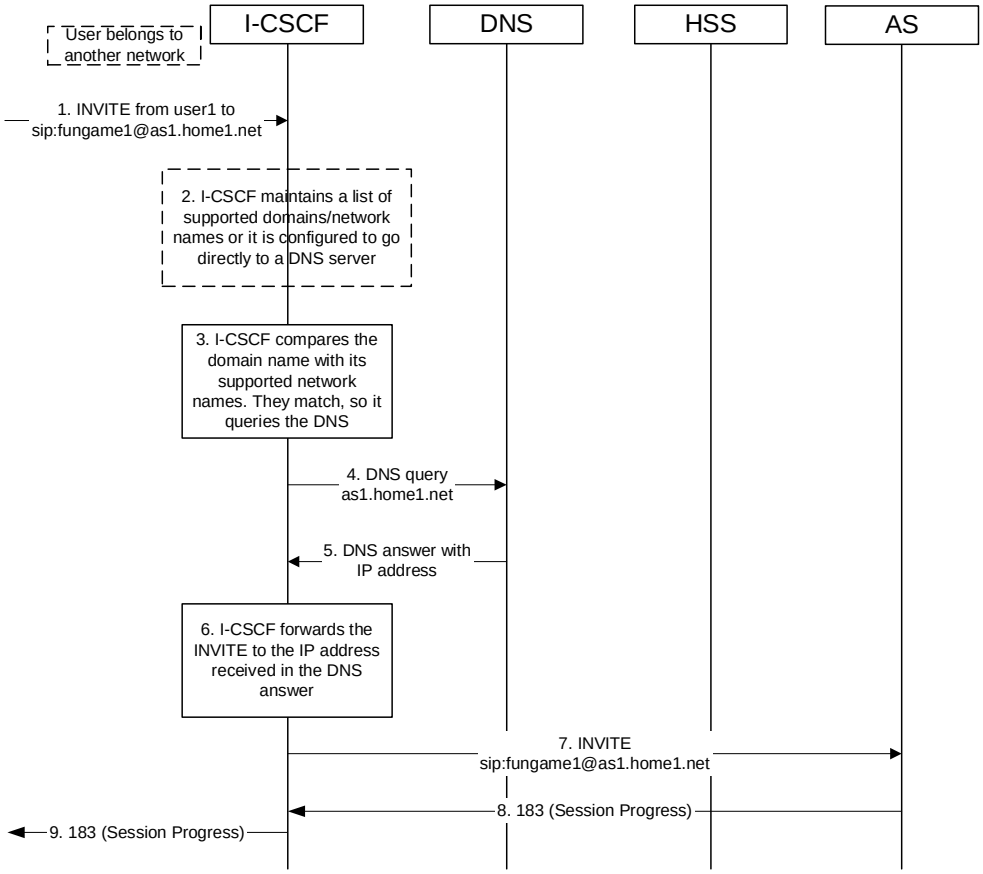

Figure 5.4.12.c Incoming session, direct route to AS using DNS

1. I-CSCF receives a request that is destined tothe PSI.
2. I-CSCF has been configured with the list of supported domains/network names, or it may have been configured to directly query a local DNS server.
3. In this case the I-CSCF checks the list and finds a match.
4. I-CSCF sends DNS query to find the route.
5. DNS server returns the IP address of the AS hosting the PSI.

6-7. I-CSCF forwards the request towards the IP address received from the query.

8-9. Session setup completes as per existing procedures.

~~5.4.12.1 Statically created PSIs~~

~~For statically created PSIs pre-configured in the HSS, communications to the PSI needs to be enabled by the operator via O&M mechanisms by modifying the filter information within the subscription information of the users intending to use the service identified by the PSI. The PSI is then made available to these users.~~

~~The SIP requests are directed to the corresponding application server hosting the service according to the originating filtering rules in the S-CSCF of the user who created and/or using the service.~~

~~Such statically pre-configured PSIs are only available internally within the operator's domain.~~

~~5.4.12.2 Dynamically created PSIs~~

~~Dynamically created PSIs allows both operators and users to define these PSIs for specific applications.~~

~~For dynamicaly created PSIs via subdomain concept, the DNS infrastructure is used to create the subdomains to define PSIs dynamically and enable routing communcation requests to the PSIs for the operator's domain. The users and operators are able to define the PSIs within the defined subdomains.~~

~~It shall also be possible to define PSIs dynamically without using the DNS infrastructure, via other form of databases.~~

~~Users from other domains/networks shall be able to use the services identified by the PSI, when the PSI is used as a terminating host.~~

~~5.4.12.2.1 Direct Route~~

~~The service is provided to the user by initiating SIP requests to the PSI and then the originating S-CSCF queries the DNS to find the host.~~

~~The principles defined in RFC 3263 "Session Initiation Protocol (SIP): Locating SIP Servers" may be used. For example, a NAPTR query and then a SRV query may be used to get the IP address of the destination host.~~

~~The domain name has to be defined in the global DNS.~~

~~5.4.12.2.2 Indirect Route~~

~~When using subdomain approach, endpoints intending to access the services identified by a PSI may be located in a different domain compared to where the AS hosting the PSI is located.~~

~~In this case an intermediate node (i.e. an I-CSCF) within the domain where the AS hosting the PSI is located may be used to facilitate routing to this AS. An external SIP server can resolve the PSI to the address of the I-CSCF, and the I-CSCF can resolve the same PSI to the address of the actual destination AS hosting the PSI and route directly to the host AS.~~

~~In this case, I-CSCF selects to route to the AS hosting the PSI instead of querying the HSS as otherwise done for normal session termination.~~

~~When a generic database is used instead of the domain concept, the SIP request destined to the PSI is first routed to an I-CSCF within the domain of the AS hosting the PSI according to standard IMS routing principles. The I-CSCF then querries a database to find the AS hosting the PSI; and routes the SIP request directly to this host.~~

5.5 Serving-CSCF/MGCF to serving-CSCF/MGCF procedures

3GPP TSG–SA2 Meeting #34
Brussels, Belgium, 18th to 22nd August 2003

***Tdoc* ⌘S2-033252**
revision of S2-033134

CR-Form-v7

CHANGE REQUEST

⌘ **23.228** **CR** **346** ⌘ **rev** **2** ⌘ Current version: **5.9.0** ⌘

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

Proposed change affects: UICC apps⌘ [ ] ME [ ] Radio Access Network [ ] Core Network [X]

Title:	⌘	UE in a visited network with a P-CSCF located in the Home network
Source:	⌘	Orange
Work item code:	⌘	IMS
Date:	⌘	12/06/2003
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)*
Rel-6	*(Release 6)*

Reason for change:	⌘	It is stated that "The Proxy-CSCF is located in the same network as the GGSN" (§ 4.2.3 + 5.6) which means that in the roaming case, the P-CSCF can be in the home or visited network. However, the defined procedures always consider the P-CSCF in the visited network when the user is roaming.
Summary of change:	⌘	A statement is added at the beginning of section 5 clarifying that the procedures defined for the non-roaming case also apply to the roaming case with the P-CSCF in the home network. Table 5.1 in section 5.2.2.5 is corrected: the P-CSCF is specified as being in the visited or home network.
Consequences if not approved:	⌘	The TS is incorrect, because it doesn't cover the roaming case with the P-CSCF in the home network.

Clauses affected:	⌘	5, 5.2.2.5
Other specs affected:	⌘	Y / N [ ] / X Other core specifications [ ] / X Test specifications [ ] / X 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 co

*** FIRST MODIFICATION ***

5 IP multimedia subsystem procedures

This section documents the main procedures that are used for the provision of services in the IP multimedia subsystem. These procedures are described using text description as well as information flow diagrams. The procedures described in this document are meant to provide a high level description and are not intended to be exhaustive. Additional procedures and details are provided in TS 24.228 [10].

In the following sections, user roaming procedures apply to cases where P-CSCF is located in the visited network. Procedures for cases where the user- is roaming and the~~with~~ P-CSCF is located in the home network are similar to procedures for a non-roaming user.

*** SECOND MODIFICATION ***

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~~ Home or Visited 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	No State Information
HSS	User Service Profile	P-CSCF Network ID	Serving-CSCF address/name\
Serving-CSCF (Home)	No state information	HSS Address/name User 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 Same as during registration

*** END OF MODIFICATION ***

3GPP TSG-SA2 Meeting #34 ***Tdoc S2-033254***
Brussels, Belgium, 18 – 22 August 2003 **revision of S2-033138**

CR-Form-v7

CHANGE REQUEST

⌘ **23.228** **CR** **340** ⌘**rev** **2** ⌘ Current version: **6.2.0** ⌘

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Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Originating routing from ASs on behalf of PSIs
Source:	⌘	Nokia
Work item code:	⌘	IMS2
Date:	⌘	18/08/2003
Category:	⌘	**C**
Release:	⌘	Rel-6

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)*
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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)
Rel-6 (Release 6)

Reason for change:	⌘	The means for routing requests destined to PSIs has been specified in 23.228. At the same time, it has not been clarified yet how sessions/transactions originated from an AS on behalf of a PSI are routed.
Summary of change:	⌘	Before the originating sessions/transactions from the AS hosting the PSI can be routed to the destination network there are functions that may need to be performed – based on operators network configuration and policies. These functions have already been defined, this CR clarifies how these functions are applied in case of PSI-originating requests.
Consequences if not approved:	⌘	

Clauses affected:	⌘	New clause 5.4.12.5			
Other specs Affected:	⌘	**Y** / **N**	Other core specifications	⌘	24.229, 24.147
		X /	Other core specifications		
		/ **X**	Test specifications		
		/ **X**	O&M Specifications		
Other comments:	⌘	CR#350 and CR#351 also implement changes to sub-clauses of 5.4.12, but those changes are implementable independently from the changes proposed in this CR. Numbering of the new sub-clause in this CR assumes that CRs #350 and #351 are approved.			

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.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.

5.4.12.5 Requests originated by the AS hosting the PSI

The AS hosting the PSI may originate requests with the PSI as the originating party. For such originating requests, the home IMS network shall be capable to perform the following functions:

- In case network configuration hiding is to be applied, the request shall be routed as per the principles described in sub-clause 4.6.2.1. This means that the last hop within the originating IMS is an I-CSCF (THIG), which processes the request further on and routes it towards the destination network.

- Network Domain Security [20] shall be used where applicable.

- Charging requirements such as providing appropriate accounting and charging functions via the charging entities shall be supported according to 3GPP TS 32.200 [25].

- In case the target identity is a tel: URL, ENUM translation needs to be performed, and the request shall be routed based on the translation result.

Routing from the Originating AS hosting the PSI can be performed as follows:

a) The AS may forward the originating request to the destination network without involving a S-CSCF. If this option is applied where the target identity is a tel: URL, the AS performs an ENUM query and routes the request based on the translation result. ENUM support for an AS is optional. If an AS does not support ENUM, it shall be configured to use b) at least in case of tel: URLs.

b) In case the PSI has a S-CSCF assigned, the AS forwards the originating request to this S-CSCF, which then processes the request as per regular originating S-CSCF procedures.

To prevent fraudulent or unsecure IMS traffic possibly caused by AS originated requests, security and authentication procedures may be performed towards the AS.

3GPP TSG-SA2 Meeting #34 ***Tdoc S2-033255***
Brussels, Belgium, 18 – 22 August 2003 **revision of S2-033139**

CR-Form-v7

CHANGE REQUEST

⌘ **23.228** **CR** **350** ⌘**rev** **2** ⌘ Current version: **6.2.0** ⌘

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

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	PSI configuration in the HSS
Source:	⌘	Ericsson
Work item code:	⌘	IMS2
Date:	⌘	19/08/2003
Category:	⌘	**C**
Release:	⌘	Rel-6

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)
Rel-6 (Release 6)

Reason for change:	⌘	It introduces the PSI configuration clarification in the HSS
Summary of change:	⌘	Before the originating sessions/transactions from the AS hosting the PSI can be routed to the destination network there is a need to define acces to IMS system. This CR introduces the concept of "PSI user" that can be configured in the HSS without having to define a gneral IMS user concept and reuse existing mechanism to access the AS.
Consequences if not approved:	⌘	PSI principles remain incomplete for stage 3

Clauses affected:	⌘	New clause 5.4.12.4

Other specs affected:	⌘	Y	N		⌘
		X		Other core specifications	24.147
			X	Test specifications	
			X	O&M Specifications	

Other comments:	⌘	CR#351and CR#340 also implement changes to sub-clauses of 5.4.12, but those changes are implementable independently from the changes proposed in this CR. Numbering of the new sub-clause in this CR assumes that CRs #351 is approved.

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.

5.4.12.4 PSI configuration in the HSS

In order to support configuration of an AS hosting a PSI in the HSS, the PSI hosted in the AS needs to be configured in the HSS. This configuration is required when the PSI has S-CSCF assigned. The configuration shall include procedures to allow:

- PSI to be configured in the HSS via operation and maintanence procedures,
- Allow authorization and verification of access as "PSI user" with the Public Service Identity assigned to the AS,
- Allow access to "PSI user" information (e.g. the S-CSCF) over the Cx reference point from the CSCF nodes,
- Allow defining the "PSI user" similar to the principle of IMS user, without requiring any subscription/access information (e.g. CS/PS domain data) that are required for IMS user.

Further functional requirements such as how S-CSCF is provisioned with the PSI data need to be studied.

Note that the PSI configuration in the HSS does not affect the filter criteria based access to AS as defined in the user profiles.

3GPP TSG–SA2 Meeting #34
Brussels, Belgium, 18th to 22nd August 2003

***Tdoc* ⌘S2-033265**

CR-Form-v7

CHANGE REQUEST

⌘ **23.228** **CR** **347** ⌘ **rev** **3** ⌘ Current version: **6.2.0** ⌘

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

Proposed change affects: UICC apps⌘ [ ] ME [ ] Radio Access Network [ ] Core Network [X]

Title:	⌘	UE in a visited network with a P-CSCF located in the Home network
Source:	⌘	Orange
Work item code:	⌘	IMS
Date:	⌘	12/06/2003
Category:	⌘	**A**
Release:	⌘	REL-6

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)*
Rel-6	*(Release 6)*

Reason for change:	⌘	It is stated that "The Proxy-CSCF is located in the same network as the GGSN" (§ 4.2.3 + 5.6) which means that in the roaming case, the P-CSCF can be in the home or visited network. However, the defined procedures always consider the P-CSCF in the visited network when the user is roaming.
Summary of change:	⌘	A statement is added at the beginning of section 5 clarifying that the procedures defined for the non-roaming case also apply to the roaming case with the P-CSCF in the home network. Table 5.1 in section 5.2.2.5 is corrected: the P-CSCF is specified as being in the visited or home network.
Consequences if not approved:	⌘	The TS is incorrect, because it doesn't cover the roaming case with the P-CSCF in the home network.

Clauses affected:	⌘	5, 5.2.2.5
Other specs affected:	⌘	Y N [ ] [X] Other core specifications [ ] [X] Test specifications [ ] [X] O&M Specifications
	⌘	
Other comments:	⌘	Revised by Chairman and MCC after the meeting to have revision marks against Rel-6 specification.

How to create CRs using this form:

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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 co

*** FIRST MODIFICATION ***

5 IP multimedia subsystem procedures

This section documents the main procedures that are used for the provision of services in the IP multimedia subsystem. These procedures are described using text description as well as information flow diagrams. The procedures described in this document are meant to provide a high level description and are not intended to be exhaustive. Additional procedures and details are provided in TS 24.228 [10].

In the following sections, user roaming procedures apply to cases where P-CSCF is located in the visited network. Procedures for cases where the user is roaming and the~~with~~ P-CSCF is located in the home network are similar to procedures for a non-roaming user.

*** SECOND MODIFICATION ***

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~~ Home or Visited 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	No State Information
HSS	User Service Profile	P-CSCF Network ID	Serving-CSCF address/name\
Serving-CSCF (Home)	No state information	HSS Address/name User 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 Same as during registration

*** END OF MODIFICATION ***