Technical Specification Group Services and System Aspects ***TSGS#12(01)0515***

Meeting #13, Beijing, China, 24-27 September 2001

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 #13.
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.

CR #	Rev	Rel	Title	cat	Ver in	Ver out	S2 Tdoc #	WI
010		R5	CR on "23.228 Correction for the usage of CAMEL services on top of IMS"	F	5.1.0	5.2.0	S2-011673	IMS-CCR
011	2	R5	QoS-Assured Preconditions	F	5.1.0	5.2.0	S2-012332	IMS-CCR
022		R5	CR on "Incorrect text on interworking with ISUP"	F	5.1.0	5.2.0	S2-011264	IMS-CCR
025		R5	Corrections to 23.228 V5.0.0	F	5.1.0	5.2.0	S2-011267	IMS-CCR
032		R5	CR on "Correct information related to IPv4 handling"	F	5.1.0	5.2.0	S2-011322	IMS-CCR
045		R5	CR on "MRF functionality and architecture"	C	5.1.0	5.2.0	S2-011699	IMS-CCR
049	2	R5	Awareness of local SIP services in the IM Subsystem	C	5.1.0	5.2.0	S2-012440 rev 2	IMS-CCR
050		R5	Token generation at the PCF	F	5.1.0	5.2.0	S2-012105	QoS
051	2	R5	SIP protocol on the SIP+ (ISC) interface	B	5.1.0	5.2.0	S2-011684	IMS-CCR
052	2	R5	CR on "Emergency sessions"	B	5.1.0	5.2.0	S2-011704rev1	EMC1-PS
055	2	R5	CR on "Network Initiated De-registration procedure"	C	5.1.0	5.2.0	S2-011693rev3	IMS-CCR
058	1	R5	Terminology Change from SIP+ to ISC for Service Control interface	F	5.1.0	5.2.0	S2-011703	IMS-CCR
061	3	R5	Clarification of P-CSCF discovery	C	5.1.0	5.2.0	S2-012329 rev 2	
081		R5	P-CSCF and PCF Clarifications	F	5.1.0	5.2.0	S2-012259	IMS-CCR
083		R5	Service control during registration and de-registration	C	5.1.0	5.2.0	S2-012327	IMS

3GPP TSG-SA WG2 Meeting
Dallas, 25th –29th June 2001

Tdoc S2-011673

CR-Form-v3

CHANGE REQUEST

⌘ **23.228** **CR** **010** ⌘ rev **-** ⌘ Current version: **5.0.0** ⌘

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

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

Title:	⌘	23228 Correction for the usage of CAMEL services on top of IMS
Source:	⌘	Alcatel
Work item code:	⌘	IMS-CCR
Date:	⌘	25th June
Category:	⌘	**F**
Release:	⌘	Rel-5

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

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	Current text of section 4.2.1.1 does not reflect the agreement made in Gothenburg SA2 #17 meeting that there is no CAP interface on the S-CSCF
Summary of change:	⌘	
Consequences if not approved:	⌘	Inconsistent 23.228 text

Clauses affected:	⌘	4.2.1.1 Support of CAMEL		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

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

4.2.1 Virtual Home Environment (VHE)

4.2.1.1 Support of CAMEL

It shall be possible for an operator to offer access to services based on the CSE for its IM CN subsystem subscribers. ~~This shall be supported by a CAP interface to the Serving-CSCF~~. It should be noted that there is no requirement for any operator to support CAMEL services for their IM CN subsystem subscribers or for inbound roamers.

For more information refer to section 4.2.4.

~~It shall be possible for a home network to provide support for CAMEL based services to a subscriber roaming in a network that does not support CAMEL on the IM CN subsystem or does not support the required CAMEL Version. To achieve this, the home operator may support the CAP capable Serving-CSCF in the home network.~~

3GPP TSG- S2 #~~18~~19 ***Tdoc S2-~~011231012078~~012332***

~~Puerto Rico, USA~~Sophia Antipolis, ~~May 14th – 18th~~Aug. 27-31, 2001

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CHANGE REQUEST

⌘ **TS 23.228** **CR** **011** ⌘ rev ~~r1~~**r 2** ⌘ Current version: **5.~~0~~1.0** ⌘

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

Title:	⌘	QoS-Assured Preconditions
Source:	⌘	France Telecom, Telia, Vodafone, Nokia, Ericsson
Work item code:	⌘	IMS-CCR
Date:	⌘	~~May 9~~Aug. 27, 2001
Category:	⌘	**F**
Release:	⌘	REL-5

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

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

Reason for change:	⌘	When the informative annexes of 23.228 (in version 1.8.2) was removed before 23.228 was set to version 2.0.0 and approved in 5.0.0, the content of annex D.2 was deleted, without first being moved to the normative main body of 23.228. Annex D.2 has been agreed as a working assumption by S2 and is therefore proposed to be added to a new sub-clause of clause 5.4 (5.4.8), defining the concepts of QoS-Assured Preconditions and the criteria for resource reservation successful.
Summary of change:	⌘	Add a new subclause after 5.4.7 defining the concepts of QoS-Assured Preconditions and the criteria for resource reservation successful.
Consequences if not approved:	⌘	The concepts of QoS-Assured Preconditions and the criteria for resource reservation successful will be ambiguous in 3GPP.

Clauses affected:	⌘	5.4
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	The revision information shows changes compared to the original Annex D.2 of 23.228 ver 1.8.0.

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5.4.7 Interaction between QoS and session signalling

Skip text

5.4.8 QoS-Assured Preconditions

This section contains concepts for the relation between the resource reservation procedure and the procedure for end-to-end calls.

The ~~<manyfolks> draft introduces the notion~~ concept of "QoS-Assured" ~~and "QoS-Enabled"~~ sessions are introduced. A "QoS-Assured" session will not complete until required resources have been allocated to the session. ~~The <manyfolks> draft terms this~~ This is termed ~~as~~ a "precondition" for the session to complete.

In a QoS-Assured session, the UE must succeed in establishing the QoS bearer for the media stream according to the QoS preconditions defined at the session level before it may indicate a successful response with the Resource Reservation Successful message. The principles for when a UE shall regard QoS preconditions to be met are:

- A minimum requirement to meet the QoS preconditions defined for a media stream in a certain direction, is that a satisfactory PDP context is established at the local access for that direction.

~~It is local decision within the UE whether additional actions are also required such as the successful establishment of an RSVP session.~~

- The action to take in case a UE fails to fulfil the pre-conditions ~~it has selected to use~~ (e.g. failure in establishment of an RSVP session) depends on the reason for failure. If the reason is lack of resources in the network (e.g. an admission control function in the network rejects the request for resources), the UE shall fail to complete the session. For other reasons (e.g. lack of RSVP host or proxy along the path) the action to take is local decision within the UE. It may for example 1) choose to fail to complete the session, 2) attempt to complete the session by no longer requiring some of the additional actions (e.g. fall back to satisfactory establishment of PDP context only).

5.4.~~9~~8 Event and information distribution within IMS during a Session

The S-CSCF 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. an application server or some other network entity.

Skip to next chapter

5.4.~~10~~9 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.

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3GPP TSG-SA WG2 Meeting #18 **S2-011264**
Rio Grande, Puerto Rico, 14-18 May, 20001

CR-Form-v3

CHANGE REQUEST

⌘ **23.228** **CR** **022** ⌘ rev **-** ⌘ Current version: **5.0.0** ⌘

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

Title:	⌘	Incorrect text on interworking with ISUP
Source:	⌘	Lucent Technologies
Work item code:	⌘	IMS-CCR
Date:	⌘	14.2.2001
Category:	⌘	**F**
Release:	⌘	REL-5

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

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

Reason for change:	⌘	The text corresponding to figures 5.16, 5.19, B.4.1, and B.5.1 corresponding to interworking with ISUP incorrectly indicates that the ACM message is only sent if a Ringing message is received. The ACM message should be sent in any case.
Summary of change:	⌘	The text describing the sending of the ACM message is corrected.
Consequences if not approved:	⌘	Correct interworking with ISUP will not be supported.

Clauses affected:	⌘	5.6.3, 5.7.3, B.4.1, B.5.1
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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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 an 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.

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.

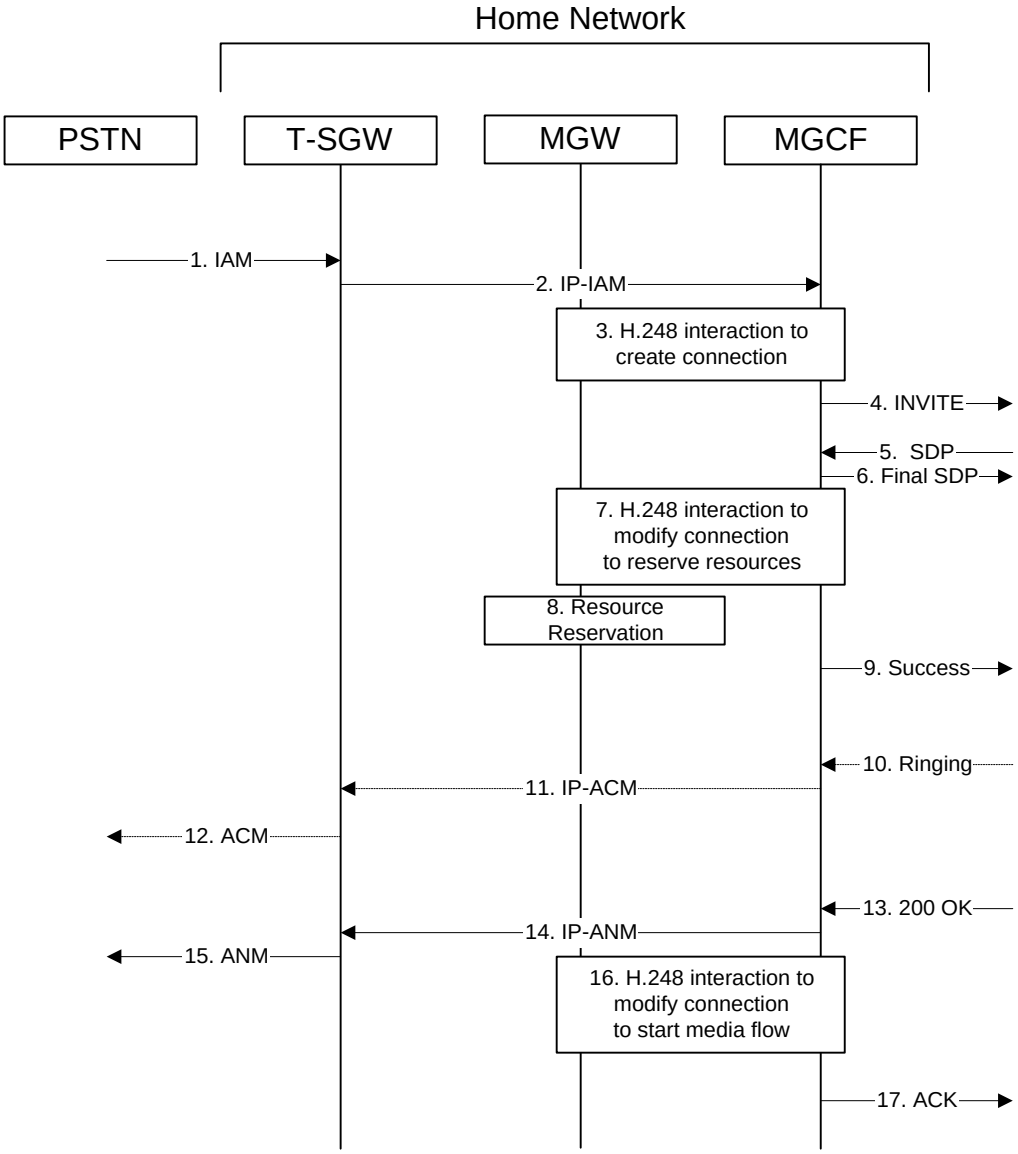


Figure 5.16: PSTN origination procedure

The PSTN Origination procedure is as follows:

1. The PSTN establishes a bearer path to the MGW, and signals to the T-SGW with a SS7 IAM message, giving the trunk identity and destination information
2. The T-SGW forwards the SS7 message, encapsulated in IP, to the MGCF.
3. The MGCF initiates a H.248 command, to seize the trunk and an IP port.
4. The MGCF initiates a SIP INVITE request, containing an initial SDP, as per the proper S-S procedure.

5. The media stream capabilities of the destination are returned along the signalling path, per the S-S procedures.
6. MGCF decides the final set of media streams for this session, and sends the final SDP per the S-S procedures.
7. MGCF initiates a H.248 command to modify the connection parameters and instruct the MGW to reserve the resources needed for the session.
8. MGW reserves the resources needed for the session
9. When the resource reservation is completed, MGCF sends the “Resource Reservation Successful” message to the terminating endpoint, per the S-S procedures.
10. 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.
11. The MGCF sends an IP-ACM to T-SGW to indicate that the destination has been contacted
12. The T-SGW forwards a SS7 ACM message
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 IP-ANM message to T-SGW
15. T-SGW forwards an ANM message to the PSTN
16. MGCF initiates a H.248 command to alter the connection at MGW to make it bi-directional
17. MGCF acknowledges the SIP final response with a SIP ACK message

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 an 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/T-SGW 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.

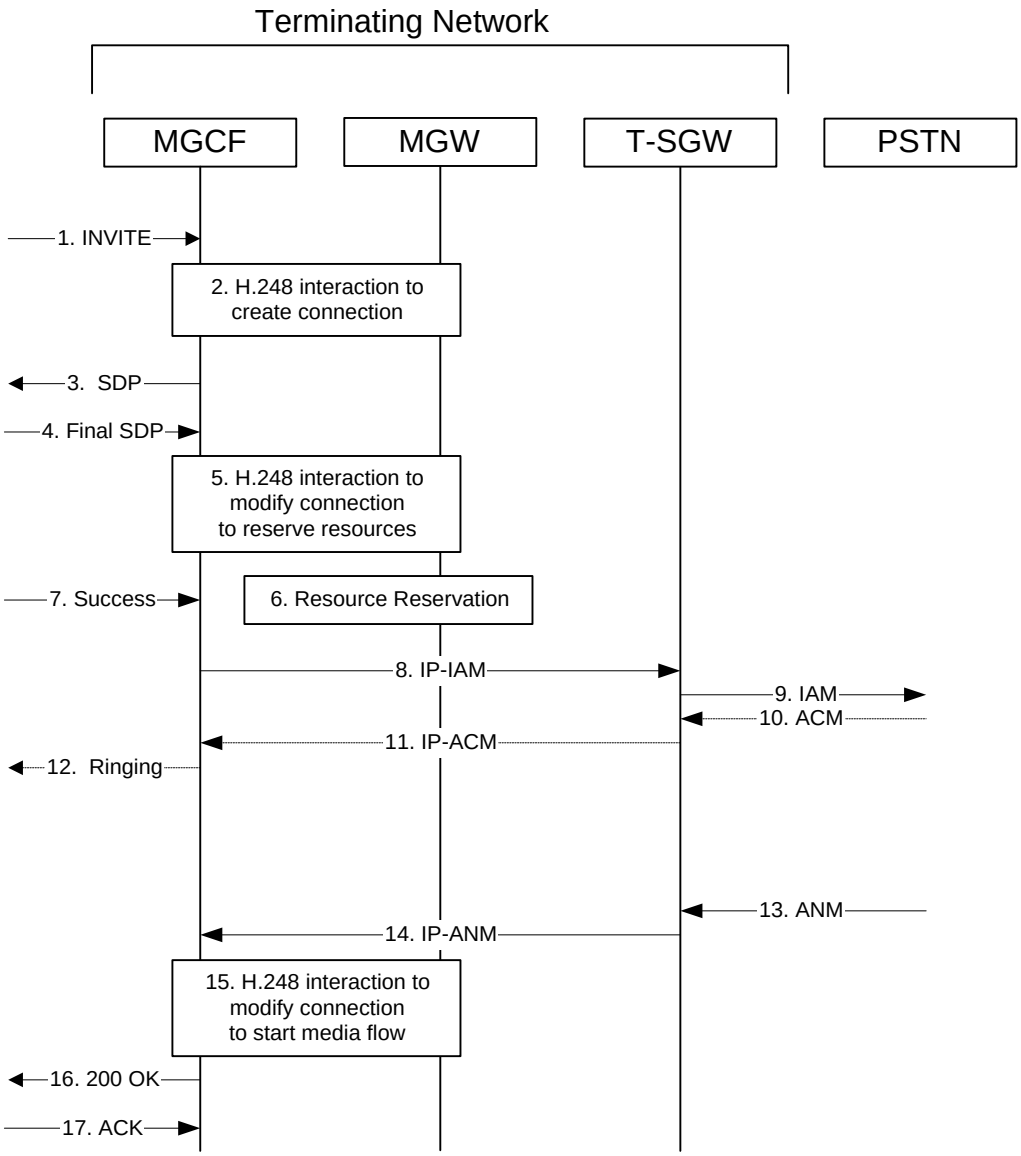


Figure 5.19: PSTN termination procedure

The PSTN termination procedure is as follows:

1. MGCF receives an INVITE request, 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 SDP message back to the originator. This response is sent via the S-S procedure.
4. The originating endpoint sends the final SDP to be used in this session, via the S-S procedure, to MGCF.
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. MGW reserved the resources necessary for the media streams.
7. When the originating endpoint has completed its resource reservation, it sends the “Resource Reservation Successful” message to MGCF, via the S-S procedures.
8. MGCF sends an IP-IAM message to the T-SGW
9. T-SGW receives the IP-IAM and sends the SS7 IAM message into the PSTN.

10. The PSTN sends an SS7 ACM message to indicate that the path to the destination has been established. It may optionally alert the destination user before completing the session.

11. The T-SGW sends an IP-ACM message to MGCF

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.

13. When the destination party answers, the PSTN sends an SS7 ANM message to T-SGW

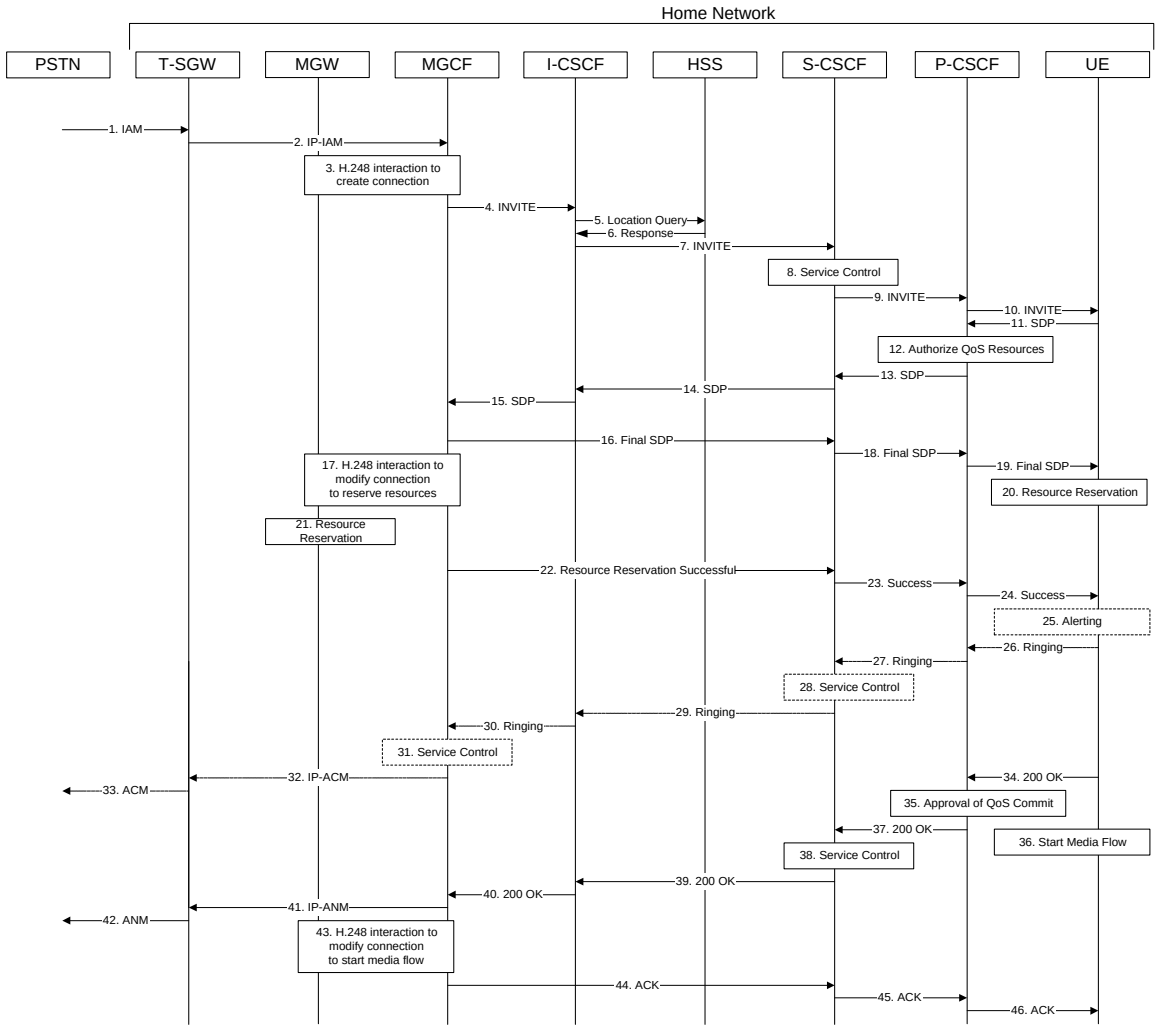
14. T-SGW sends an IP-ANM message to MGCF

15. MGCF initiates a H.248 interaction to make the connection in the MGW bi-directional.

16. MGCF sends a SIP 200-OK final response along the signalling path back to the session originator

17. The Originating party acknowledges the final response with a SIP ACK message

B.4.1 Session flow diagram



Step-by-step processing of this end-to-end session flow is as follows:

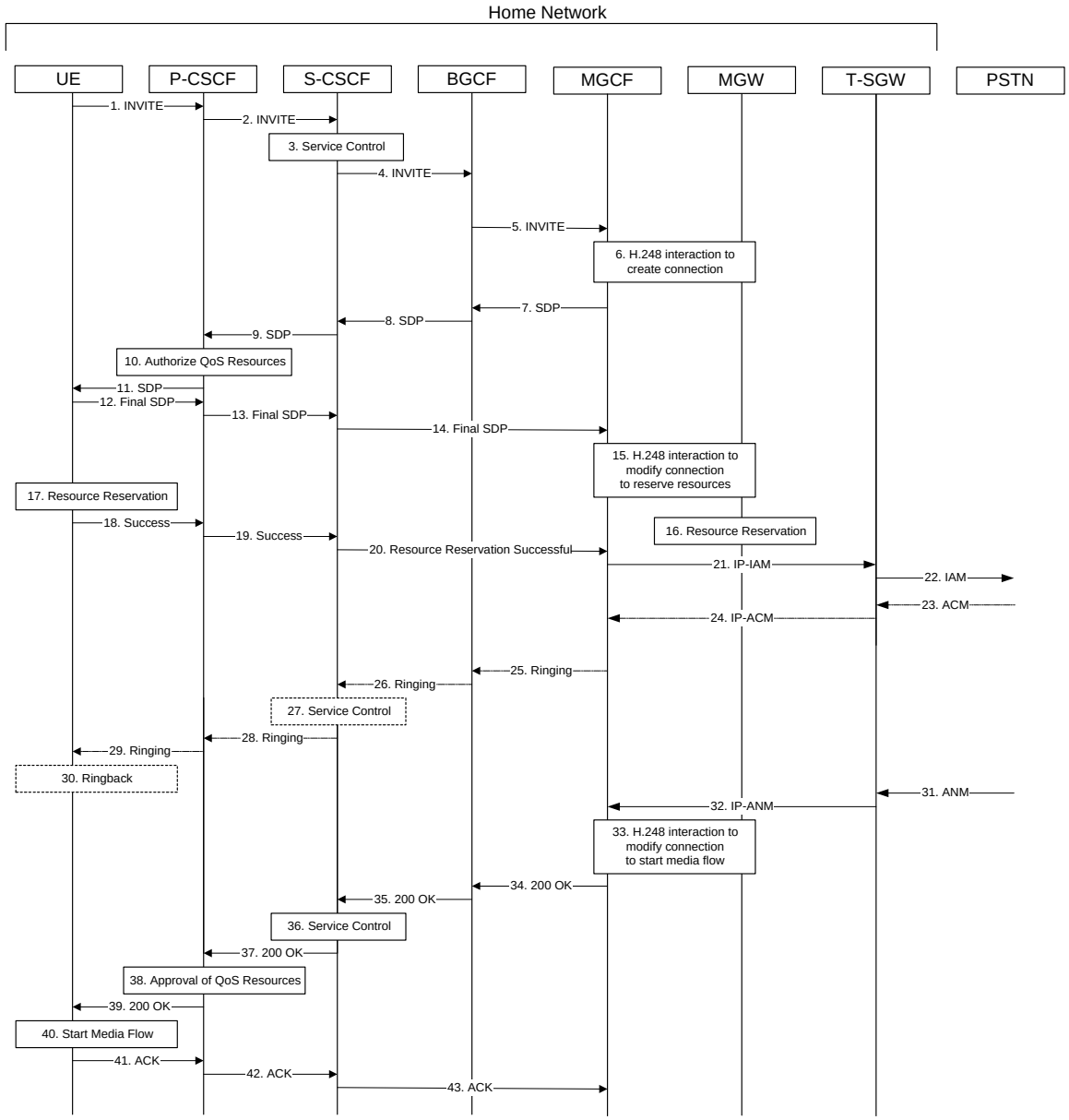
1. The PSTN establishes a bearer path to the MGW, and signals to the T-SGW with a SS7 IAM message, giving the trunk identity and destination information

2. The T-SGW forwards the SS7 message, encapsulated in IP, to the MGCF.

3. The MGCF initiates a H.248 command to seize the trunk and an IP port.
4. The MGCF translates the destination address and determines the session will be completed within the home network. MGCF initiates a SIP INVITE request, containing an initial SDP, to I-CSCF.
5. I-CSCF sends 'Cx-location-query' to the HSS to obtain the location information for the destination
6. The HSS responds with 'Cx-location-query-response' and indicates the destination is in the home service area.
7. I-CSCF forwards the INVITE to S-CSCF, identified by the HSS as serving this subscriber.
8. S-CSCF validates the service profile, and performs whatever service control logic is appropriate for this session setup attempt.
9. S-CSCF remembers (from the registration procedure) the address of P-CSCF, and forwards the INVITE to P-CSCF.
10. P-CSCF remembers (from the registration procedure) the address of UE, and forwards the INVITE to UE.
11. UE#2 returns the media stream capabilities of the destination to the session originator, along the signalling path established by the INVITE message
12. P-CSCF authorises the QoS resources required for this session
13. P-CSCF forwards the SDP to S-CSCF.
14. S-CSCF forwards the SDP to I-CSCF
15. I-CSCF forwards the SDP to MGCF
16. MGCF decides the final set of media streams for this session, and sends the Final SDP to S-CSCF. This message may be routed through I-CSCF, depending on operator configuration of I-CSCF.
17. MGCF initiates a H.248 command to modify the connection parameters and instruct the MGW to reserve the resources needed for the session
18. S-CSCF forwards the final SDP to P-CSCF.
19. P-CSCF forwards the final SDP to UE.
20. UE initiates the resource reservation procedures for the resources necessary for this session.
21. MGW reserves the resources needed for the session
22. When MGW has successfully reserved the needed resources, MGCF sends the "reservation successful" message to UE along the signalling path established by the INVITE message. The message is sent to S-CSCF, and may be routed through I-CSCF, depending on operator configuration of I-CSCF.
23. S-CSCF forwards the message to P-CSCF.
24. P-CSCF forwards the message to UE.
25. UE may optionally delay the session establishment in order to alert the subscriber to the incoming session.
26. If UE performs alerting, it sends a ringing indication to the originator via the signalling path. The message is sent first to P-CSCF.
27. P-CSCF forwards the ringing message to S-CSCF.
28. S-CSCF performs whatever service control is appropriate for this ringing session
29. S-CSCF forwards the message to I-CSCF
30. I-CSCF forwards the message to MGCF
31. MGCF performs whatever service control is appropriate for this ringing session.

32. The MGCF sends an IP-ACM to T-SGW to indicate that the destination has been contacted
33. The T-SGW forwards a SS7 ACM message
34. When the destination party answers, the UE sends a SIP 200-OK final response to P-CSCF
35. P-CSCF approves the commitment of the QoS resources for this session.
36. After sending the 200-OK, UE initiates the media flow.
37. P-CSCF sends the SIP 200-OK final response to S-CSCF
38. S-CSCF performs whatever service control logic is appropriate for this session setup completion
39. S-CSCF sends the SIP 200-OK final response to I-CSCF
40. I-CSCF sends the SIP 200-OK final response to MGCF
41. MGCF forwards an IP-ANM message to T-SGW
42. T-SGW forwards an ANM message to the PSTN
43. MGCF alters the connection at MGW, via a H.248 command, to make it bi-directional
44. MGCF acknowledges the SIP final response with a SIP ACK message, which is passed to UE#2 via the signalling path. This message is sent to S-CSCF, and may be routed through I-CSCF, depending on operator configuration of I-CSCF.
45. S-CSCF forwards the ACK to P-CSCF
46. P-CSCF forwards the ACK to UE

B.5.1 Session flow diagram



Step-by-step processing of this end-to-end session flow is as follows:

1. The UE sends a SIP INVITE request, containing an initial SDP, to the P-CSCF, which was obtained from the CSCF discovery procedures.

2. The P-CSCF forwards the INVITE to the next hop name/address, as determined from the registration procedures. In this case the next hop is the S-CSCF within the same operator's network.

3. The S-CSCF validates the service profile, and performs whatever service control logic is appropriate for this session setup attempt.

4. The S-CSCF translates the destination address and determines the session will break out to the PSTN. It therefore forwards the INVITE to a BGCF.

5. The BGCF decides to use an MGW in the home network, allocates a MGCF, and sends the INVITE request to the MGCF. Procedures for choice of the optimal Media Gateway are not standardised in this release.

6. MGCF initiates a H.248 interaction to pick an outgoing channel and determine media capabilities of the MGW.

7. MGCF determines the subset of the media flows proposed by the originating endpoint that it supports, and responds with an SDP message back to the originator via the signalling path. This response is sent to the BGCF.

8. BGCF forwards the SDP to S-CSCF

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

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

11. P-CSCF forwards the SDP message to the originating endpoint, UE.

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

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

14. S-CSCF forwards the final SDP to MGCF. This message may be routed directly to the MGCF.

15. MGCF initiates a H.248 interaction to modify the connection established in step #8 and instruct MGW to reserve the resources necessary for the media stream.

16. MGW reserves the resources necessary for the media stream.

17. After determining the final set of media streams for this session, step #14 above, UE initiates the reservation procedures for the resources needed for this session.

18. When UE has successfully reserved the needed resources, it sends the “reservation successful” message to MGCF along the signalling path established by the INVITE message. This message is send first to P-CSCF.

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

20. S-CSCF forwards the message to MGCF. This message may be routed through I-CSCF, depending on operator configuration of I-CSCF.

21. MGCF sends an IP-IAM message to the T-SGW

22. T-SGW receives the IP-IAM and sends the SS7 IAM message into the PSTN.

23. The PSTN sends an SS7 ACM message to indicate that the path to the destination has been established. It may optionally alert the destination user before completing the session.

24. T-SGW sends an IP-ACM message to MGCF

25. If the PSTN is alerting the destination user, MGCF indicates this to the originating party by a provisional response indicating Ringing. This message is sent to the BGCF.

26. The BGCF forwards the message to S-CSCF

27. S-CSCF performs whatever service control is appropriate for this ringing session.

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

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

29. P-CSCF forwards the message to UE

30. UE indicates to the originator that the session is being delayed due to alerting. Typically this involves playing a ringback sequence.

31. When the destination party answers, the PSTN sends an SS7 ANM message to T-SGW

32. T-SGW sends an IP-ANM message to MGCF

33. MGCF initiates a H.248 interaction to make the connection in the MGW bi-directional

34. MGCF sends a SIP 200-OK final response along the signalling path back to the session originator

35. BGCF sends a SIP 200-OK final response along the signalling path back to the session originator

36. S-CSCF performs whatever service control logic is appropriate for this session setup completion

37. S-CSCF sends a SIP 200-OK final response to P-CSCF

38. P-CSCF approves the commitment of the QoS resources for this session

39. P-CSCF sends a SIP 200-OK final response along the signalling path back to the session originator

40. UE starts the media flow for this session

41. UE responds to the final response with a SIP ACK message, which is passed to the MGCF via the signalling path. The message is sent first to P-CSCF

42. P-CSCF forwards the ACK to S-CSCF.

43. S-CSCF forwards the ACK to MGCF.

3GPP TSG-SA WG2 Meeting #18 **S2-011267**
Rio Grande, Puerto Rico, 14-18 May, 20001

CR-Form-v3

CHANGE REQUEST

⌘ **23.228** **CR** **025** ⌘ rev **-** ⌘ Current version: **5.0.0** ⌘

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

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

Title:	⌘	Corrections to 23.228 V5.0.0
Source:	⌘	Lucent Technologies
Work item code:	⌘	IMS-CCR
Date:	⌘	14.2.2001
Category:	⌘	**F**
Release:	⌘	REL-5

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

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

Reason for change:	⌘	Some inconsistencies were found in the document on review. This CR proposes to correct these inconsistencies.
Summary of change:	⌘	Text is changed in Section
Consequences if not approved:	⌘	The document will have internal inconsistencies.

Clauses affected:	⌘	5.5.4, 5.8.2, and 5.11.5.4
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
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http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

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

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

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

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

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

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

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

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

5.8.2 SLF on register

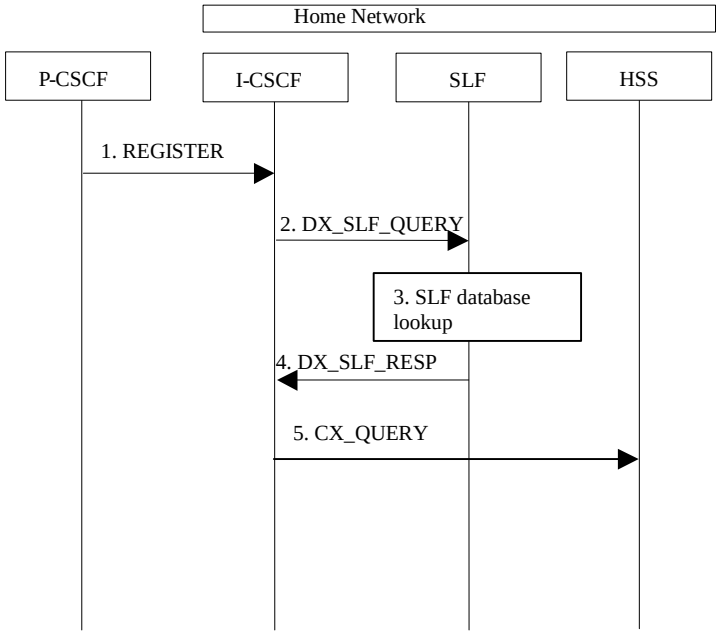

Figure 5.20: SLF on register

1. I-CSCF receives a REGISTER request and now has to query for the location of the subscriber’s data.
2. The I-CSCF sends a DX_SLF_QUERY to the SLF and includes as parameter the subscriber identity which is stated in the REGISTER request.
3. The SLF looks up its database for the queried subscriber identity.

4. The SLF answers with the HSS name in which the subscriber's data can be found.
5. The I-CSCF can proceed by querying the appropriate HSS.

5.11.5.4 Session Redirection initiated by P-CSCF

One of the functional elements in a basic session flow that may initiate a redirection is the P-CSCF of the destination subscriber. In handling of an incoming session setup attempt, the P-CSCF normally sends the INVITE request to the destination UE, and retransmits it as necessary until obtaining an acknowledgement indicating reception by the UE.

In cases when the destination subscriber is not currently reachable in the IM CN subsystem (due to such factors as roaming outside the service area or loss of battery, but the registration has not yet expired), the P-CSCF may initiate a redirection of the session. The P-CSCF informs the S-CSCF of this redirection, without specifying the new location; S-CSCF determines the new destination and performs according to sections 1, 2, or 3 above, based on the type of destination.

This is shown in the following information flow:

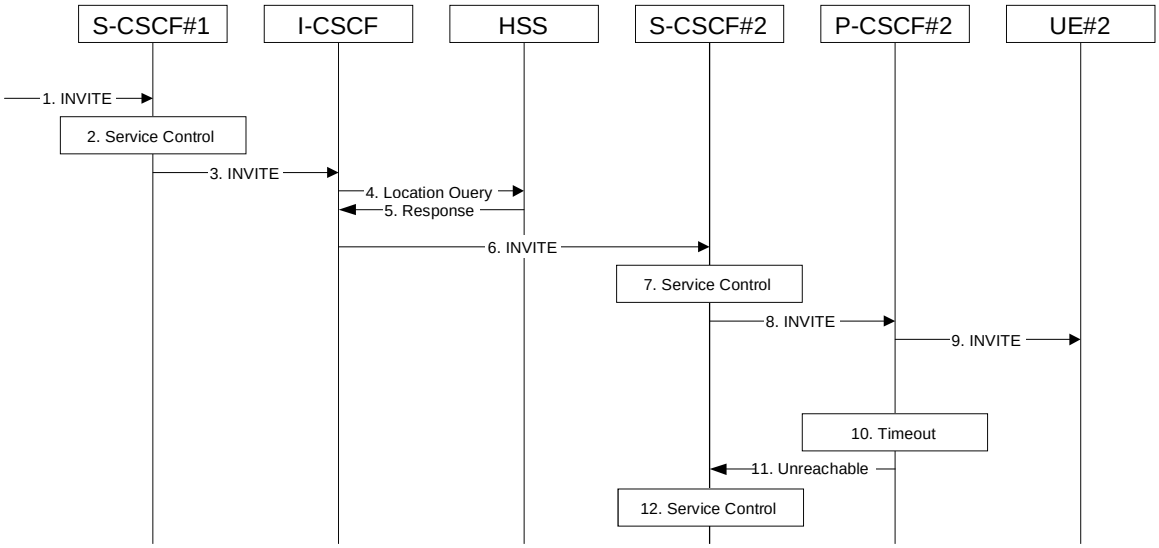

Figure 5.39: Session redirection initiated by P-CSCF

Step-by-step processing is as follows:

1. The SIP INVITE request is sent from the UE to S-CSCF#1 by the procedures of the originating flow.
2. S-CSCF#1 performs whatever service control 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. The INVITE message is sent to an I-CSCF for that operator, and may optionally go through an I-CSCF(firewall) if S-CSCF#1 is in a different operator's network than I-CSCF.
4. I-CSCF queries the HSS for current location information of the destination subscriber.
5. HSS responds with the address of the current Serving CSCF (S-CSCF#2) for the terminating subscriber.
6. I-CSCF forwards the INVITE request to S-CSCF#2, which will handle the session termination.
7. S-CSCF#2 performs whatever service control logic is appropriate for this session setup attempt.
8. S-CSCF#2 forwards the INVITE request to P-CSCF#2
9. P-CSCF#2 forwards the INVITE request to UE#2

10. Timeout expires in P-CSCF waiting for a response from UE#2. P-CSCF therefore assumes UE#2 is unreachable.

11. P-CSCF#2 generates a Unavailable response, without including a new destination, and sends the message to S-CSCF#2.

12. S-CSCF#2 performs whatever service control is appropriate for this session redirection. If the user does not subscribe to session redirection service, or did not supply a forwarding destination, S-CSCF#2 may terminate the session setup attempt with a failure response. Otherwise, S-CSCF#2 supplies a new destination URL, which may be a phone number, an email address, a web page, or anything else that can be expressed as a URL. Processing continues according to subsections 1, 2, or 3 above, based on the type of destination URL.

3GPP TSG-SA WG2 Meeting #18-
Puerto Rico, USA, 14-18 May, 2001

Tdoc S2-011322

CR-Form-v3

CHANGE REQUEST

⌘ **23.228** **CR** **032** ⌘ rev **-** ⌘ Current version: **5.0.0** ⌘

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

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

Title:	⌘	Correct information related to IPv4 handling
Source:	⌘	Ericsson
Work item code:	⌘	IMS-CCR
Date:	⌘	2001-05-14
Category:	⌘	**F**
Release:	⌘	REL-5

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

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	Corrections needed in IP MM subsystem TS 23.228 to be in line with the decision to have IPv6 only
Summary of change:	⌘	Correct & update Ipv4 handling in the spec and remove some leftover text related to visited control option which has been removed
Consequences if not approved:	⌘	Wrong & inconsistent spec

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

First Change

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 UE, 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 ~~may be directly to the S-CSCF in the same network (MO#2 for the roaming case, MO#3 for the home case), or~~ is to the S-CSCF in the home network (possibly through an I-CSCF to hide the network configuration) (MO#1). These next-hop addresses could be ~~IPv4/~~IPv6 addresses, or could be names that are translated via DNS to an ~~IPv4/~~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 via the TSGW. The MGCF initiates the SIP request, and subsequent nodes consider the signalling as if it came from a S-CSCF.

3GPP TSG-SA2 Drafting Meeting #18
Dallas, USA, 25-29 June 2001

S2-011699

CR-Form-v4

CHANGE REQUEST

⌘ **23.228** **CR** **045** ⌘ ev **1** ⌘ Current version: **5.1.0** ⌘

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

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

Title:	⌘	MRF functionality and architecture
Source:	⌘	SA2 drafting
Work item code:	⌘	IMS-CCR
Date:	⌘	2001-06-28
Category:	⌘	**C**
Release:	⌘	REL-5

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

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

Reason for change:	⌘	Clarification of the architecture of the MRF
Summary of change:	⌘	Adds information on the basic architecture concerning MRF
Consequences if not approved:	⌘	
Clauses affected:	⌘	4.7
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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

4.7 Multimedia Resource Function

The architecture concerning the Multimedia Resource Function is presented in Figure 5.x below.

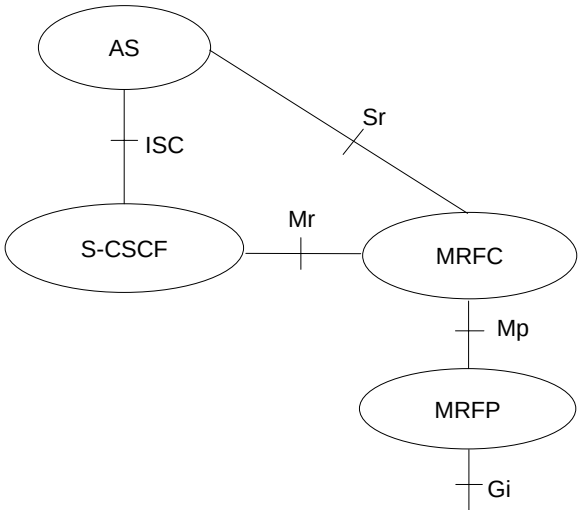

Figure 5.x: Architecture of MRF

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

Tasks of the MRFC are the following:

- Control the media stream resources in the MRFP.
- Interpret information coming from an AS and S-CSCF (e.g session identifier) and control MRFP accordingly.
- Generate of CDRs

Tasks of the MRFP are the following:

- Bearer control on the Gi interface.
- Provide resources to be controlled by the MRFC.
- Mixing of incoming media streams (e.g for multiple parties).
- Media stream source (for multimedia announcements).
- Media stream processing (e.g. audio transcoding, media analysis).

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

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

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

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

The Mp reference point has the following properties:

- Full compliance with the H.248 standard.
- Open architecture where extensions (packages) definition work on the interface may be carried out.

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

3GPP TSG-SA WG2#19 **Tdoc S2-012440rev2~~1~~**
Sophia-Antipolis, France, 27th –31st August

CR-Form-v4

CHANGE REQUEST

⌘ **23.228** **CR** **049** ⌘ ev **2** ⌘ Current version: **5.1.0** ⌘

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

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

Title:	⌘	Awareness of local SIP services in the IM Subsystem
Source:	⌘	Nortel Networks, Alcatel
Work item code:	⌘	IMS-CCR
Date:	⌘	August 2001
Category:	⌘	**C**
Release:	⌘	REL-5

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

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

Reason for change:	⌘	In order to maximise the revenue generation opportunities for an IM Subsystem operator, it is critical that standardised mechanisms are in place to inform the end user of the services that are available from the home and visited networks. This contribution proposes to capture the requirements for advertising available services direct to the user's handset, in a flexible and customised way. It is therefore proposed that the web portal capability is re-used in the context of IMS.
Summary of change:	⌘	Addition of requirements to make UE aware of available local services.
Consequences if not approved:	⌘	It will not be possible to inform the user of local services in release 5, reducing the possible opportunities for revenue generation.

Clauses affected:	⌘	4.2.2
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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

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

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

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

4.2.2 Support of Local Services in the IMS

The definition of local services can be found in [22]. Visited network provided services offer an opportunity for revenue generation by allowing access to services of a local nature to visiting users (inbound roamers). There shall be a standardised means for providing inbound roamers with access to local services. The mechanism to access local services shall be exactly the same for home users and inbound roamers.

Access to local Services shall be provided in the following manner

1. It shall be possible for the network to determine whether the subscriber is requesting a local service in the visited IMS or the home IMS network based upon information received from the UE. This information may be included in e.g. the Request URI.

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

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

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

3GPP TSG-SA2 Meeting #19 ***Tdoc S2-012105***
Sophia Antipolis, France, August 27 - 31, 2001

CR-Form-v4

CHANGE REQUEST

⌘ **23.228** **CR** **050** ⌘ ev **-** ⌘ Current version: **5.1.0** ⌘

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

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

Title:	⌘	Token generation at the PCF
Source:	⌘	Nortel Networks
Work item code:	⌘	IMS-CCR
Date:	⌘	27.08.2001
Category:	⌘	**F**
Release:	⌘	REL-5

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

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

Reason for change:	⌘	The current functionality of the P-CSCF relative to the PCF as found in 23.228 does not explain which of the 2 functional entities is responsible for token generation. There is a choice between providing the authorisation token and thus intelligence: - in the P-CSCF which is only valid for SIP applications - in the PCF which can be used for SIP and non-SIP applications - in both It is proposed that the P-CSCF outsources the decision of policy control to the PCF. The P-CSCF needs to provide information to the PCF, and needs to send the token back to the UE in the SIP message, but the decision is left to the PCF. This keeps the PCF role a generic one.
Summary of change:	⌘	PCF is used rather than the combination for sections about token generation.
Consequences if not approved:	⌘	It will be more difficult to make the future work for P-CSCF to PCF interface possible.

Clauses affected:	⌘	5.4.7.1		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ 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.

5.4.7.1 Authorise UMTS and IP QoS Resources

The GGSN serves as the Policy Enforcement Point that implements the policy decisions for performing admission control and authorising the UMTS and IP BS QoS Resource request, and policing IP flows entering the external IP network.
Authorisation of UMTS and IP QoS Resources shall be required for access to the IP Multimedia Subsystem. The GGSN shall determine the need for authorisation, possibly based on provisioning and/or based on the APN of the PDP context.
The authorisation shall be made prior to the allocation request from the UE. This authorisation may be given to the GGSN from the P-CSCF(PCF) via a 'Push'-type of interface, or may be 'Pulled' from the P-CSCF(PCF) by the GGSN when the allocation request is received from the UE. The authorisation shall include binding information, which shall also be provided by the UE to the GGSN in the allocation request, which enables accurate matching of requests and authorisations. This binding information may be an authorisation token assigned by the ~~P-CSCF(~~PCF~~)~~, possibly in consultation with the GGSN, and may contain information that identifies its generator.~~ the P-CSCF(PCF) that generated the token~~. The authorisation shall include limits on IP packet flows, and may include restrictions on IP destination address and port. These restrictions may take the form of a flowspec and filterspec, as defined in RFC2205. The P-CSCF(PCF) shall use the SDP contained in the SIP signaling to calculate the proper authorisation, as defined in TS 23.207. The authorisation shall be expressed in terms of the IP resources to be authorised.
Authorisation may contain information used by the network operator to correlate usage records generated by the GPRS system with those generated by the IP Multi-Media Subsystem. Such a correlation identifier, if included in the authorisation, shall be provided to the GPRS elements that generate such usage records.
Authorisation information, combined with the QoS allocation request from the UE, shall be sufficient for the GGSN to initiate an RSVP exchange with the remote endpoint of the IP packet flow.

3GPP TSG-SA WG2 drafting meeting
25-29 June, 2001
Dallas, USA

Tdoc S2-011684
~~70~~
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CR-Form-v3

CHANGE REQUEST

⌘ **23.228** **CR** **51** ⌘ rev **2** ⌘ Current version: **5.1~~0~~.0** ⌘

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

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

Title:	⌘	SIP protocol on the SIP+ (ISC) interface
Source:	⌘	SA2 drafting group
Work item code:	⌘	IMS-CCR
Date:	⌘	25.06.2001
Category:	⌘	**B**
Release:	⌘	REL-5

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

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

Reason for change:	⌘	There is no protocol agreed for the SIP+ (ISC) ~~service~~ interface
Summary of change:	⌘	This CR adds a statement on ~~using the SIP protocol on the SIP+ interface to carry SIP information.~~the protocol to be used on the SIP+ (ISC) interface
Consequences if not approved:	⌘	

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

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

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

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version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

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

4.2.4 Serving CSCF to service platform Interface

An Application Server (AS) offering value added IM services resides either in the user's home network or in a third party location. The third party could be a network or simply a stand-alone AS.
The Serving-CSCF to AS interface is used to provide services residing in an AS. Two cases were identified:

- Serving-CSCF to an AS in Home Network.

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

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

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

2. SIP+ is based on the SIP protocol information with necessary enhancements to allow for remote service execution; controversial enhancements should be avoided.

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

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

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

Editors Note: The details of the “filter” information has to be further identified.

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

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

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

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

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

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

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

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

More specifically the following requirements apply to the Serving-CSCF control interface:

1. SIP+ shall be capable to bring the full range of information (e.g. message headers, message bodies) available at the S-CSCF to the Application Server's attention.
2. SIP+ shall preserve the extensibility of the SIP network signalling protocol on the interface to the application server. Introducing extensions (e.g. new SIP method, SIP header) in the network SIP signalling protocol shall make these extensions implicitly available to the Application Server without requiring separate extensions to SIP+.
3. The S-CSCF is application logic agnostic, i.e. it has no specific knowledge about a particular application logic invoked via the SIP+ interface.
4. The S-CSCF contacts the Application Server for the execution of applications. This shall be possible during the registration and during the session from setup to the release.
5. An Application Server can initiate a new session/transactions at the S-CSCF without having been contacted by the S-CSCF beforehand.
6. SIP+ is currently envisioned to connect the S-CSCF to entities (Application Servers, OSA SCS, IM SSF) within the operators network.
7. SIP+ shall be a protocol between a Controlling Entity (SIP Application Server, IM-SSF, OSA-SCS) and a Controlled Entity (S-CSCF). The Controlling Entity takes/makes decisions on the SIP session. The Controlled Entity acts according to the requests from the Controlling Entity, and notifies the Controlling Entity of events of interest (e.g a timer event or a SIP event).
8. The SIP+ protocol shall enable a multi-vendor open interface between SIP application server/IMS-SSF/OSA-SCS and the S-CSCF.
9. SIP+ shall support service control for both originating SIP sessions and terminating SIP sessions. The A-party´s services are accessed from the A-party's S-CSCF. The B-party´s services are accessed from the B-party's S-CSCF
10. SIP+ shall allow the simultaneous handling of more than one service within a session.
11. SIP+ shall allow the Controlling Entity to request the transmission of a specific SIP message(s). This may, or may not, be in reaction to a message from the Controlled Entity
12. SIP+ shall allow the Controlling Entity to request the transmission of a SIP message with added/deleted/modified content.(headers & sip message body (e.g. SDP))
13. SIP+ shall allow filter setting from the Controlling Entity.
14. SIP+ shall allow Service Control triggering from the Controlled Entity on basic or complex triggers.
15. SIP+ shall allow the Controlling Entity to request the initiation of a SIP session. This may, or may not, be in reaction to a message from the Controlled Entity
16. SIP+ shall be able to convey charging information.
17. SIP+ shall support Load Control functions.
18. Means for detecting the failure/availability of a SIP AS/IM-SSF/OSA-SCS and S-CSCF shall be provided.
19. SIP+ shall support the transport of the following information from the S-CSCF to the Controlling Entity:
    - Subscriber ID (Private subscriber identifier and, optionally, public subscriber identifier)
    - Information on the event which occurred
    - terminating/originating information
    - SIP information
20. SIP+ shall support the transport of the following information from the Controlling Entity to the S-CSCF:
    - Subscriber ID
    - Session handling request
21. The "SIP+" protocol shall support the control of timers
22. The SIP+ protocol shall allow the S-CSCF to differentiate between session control and SIP+.

Editors Note: Further requirements are for further study.

The figure below depicts an overall view of how services can be provided.

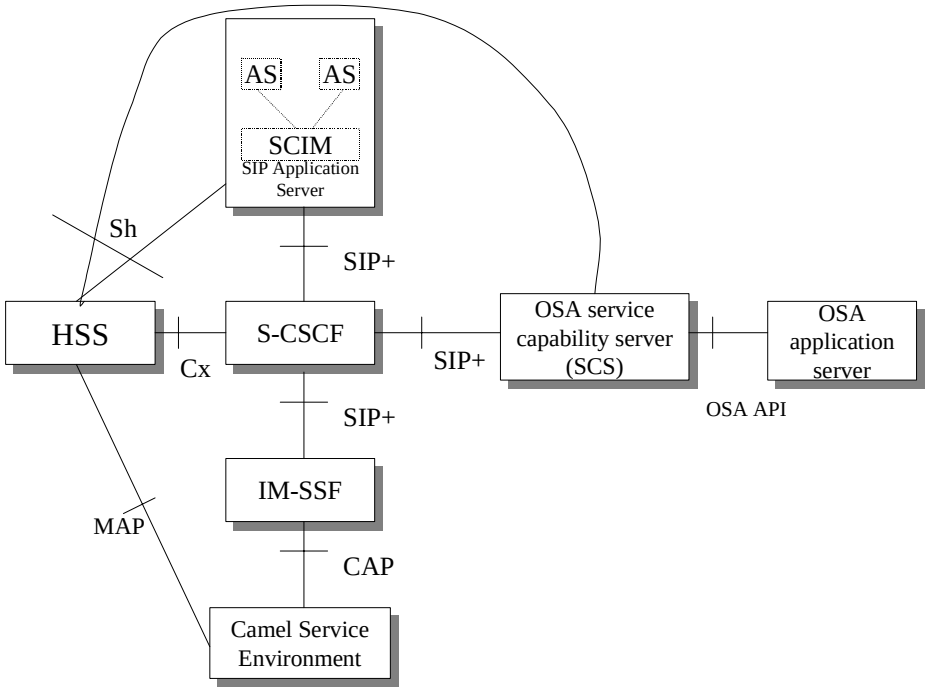

Figure 4.3: Functional architecture for the provision of service in the IMS

The protocol to be used on the ISC interface shall be SIP (as defined by RFC 2543, other relevant RFC's, and additional enhancements introduced to support 3GPP´s needs on the Mw, Mm, Mg interfaces). On the ISC interface, extensions to SIP shall be avoided but are not expressly prohibited.

The same SIP leg (as defined by the "Call-id", "To" and "From" information fields, with the associated "tag" information fields) that is received by the S-CSCF on the Mw, Mm and Mg interfaces is sent on the ISC interface. The same SIP leg (as defined by the "Call-id", "To" and "From" information fields, with the associated "tag" information fields) that is received by the S-CSCF on the ISC interface is sent on the Mw, Mm and Mg interfaces.

Concerning the relationship between the SIP legs of the ISC interface and the SIP legs of the Mw, Mm, and Mg interfaces the S-CSCF acts as a SIP proxy, as shown in Figures 4.a-4e below.

Figures 4.a-4e below depict the possible high level interactions envisioned between the S-CSCF and the Application Server.

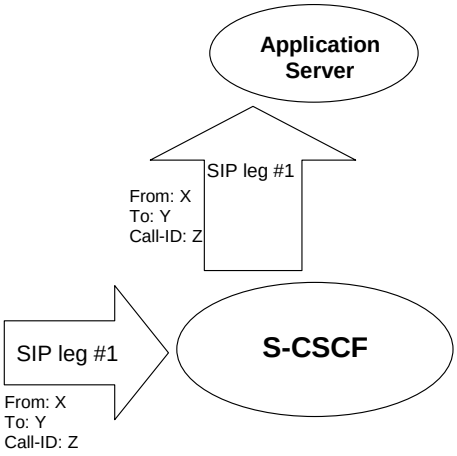

Figure 4.a: Application Server acting as terminating UA, or redirect server

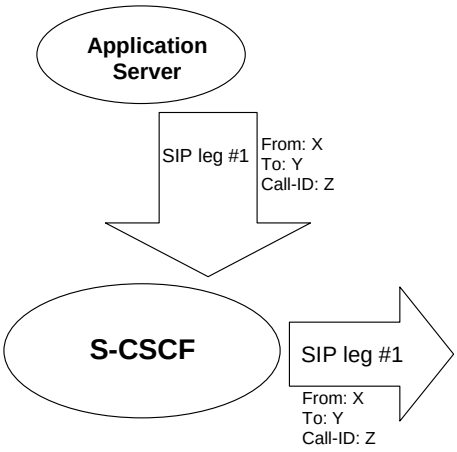

Figure 4.b: Application Server acting as originating UA

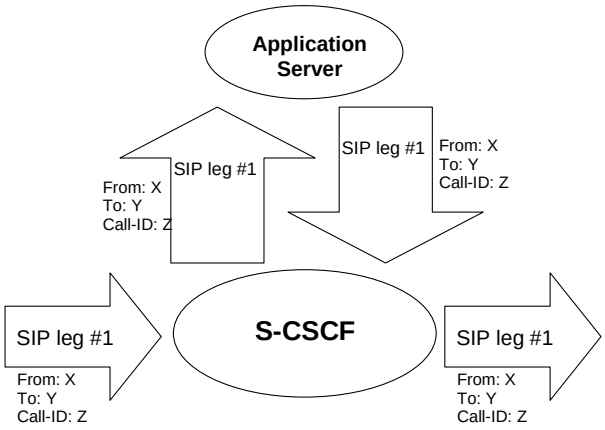

Figure 4.c: Application Server acting as a SIP proxy

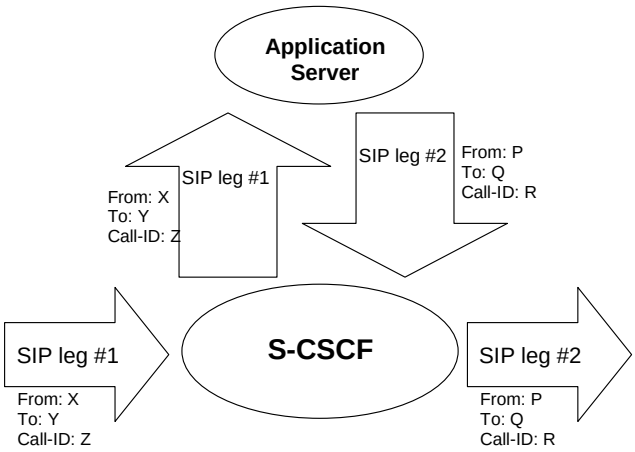

Figure 4.d: Application Server performing 3rd party call control

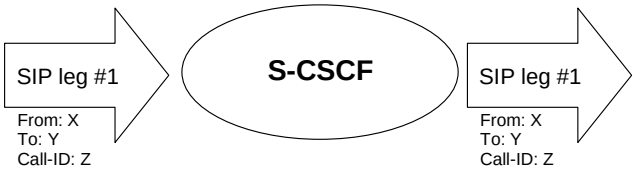

Figure 4.e: A SIP leg is passed through the S-CSCF without Application Server involvement

3GPP TSG-SA2 drafting
Dallas, June 2001

TDOC S2-011704rev1

CR-Form-v3

CHANGE REQUEST

⌘ **23.228 CR 52** ⌘ rev ~~21~~ ⌘ Current version: **5.1~~0~~.0** ⌘

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

Proposed change affects: ⌘ (U)SIM [X ?] ME/UE [X] Radio Access Network [X ?] Core Network [X]

Title: ⌘	Emergency sessions	
Source: ⌘	Nokia, Motorola, Lucent	
Work item code: ⌘	EMC1-PS	***Date:*** ⌘ 2001-06-28
Category: ⌘	**B**	***Release:*** ⌘ REL-5

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

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

Reason for change: ⌘	Currently 23.228 v.5.X.0 does not include emergency session flows although S2 has acknowledged S1's requirement for emergency sessions to be made via the IMS for UE with a SIM/USIM.
Summary of change: ⌘	Sessions flows for emergency sessions are added.
Consequences if not approved: ⌘	

Clauses affected: ⌘	New clause 5.~~x~~X.X		
Other specs affected: ⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments: ⌘			

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

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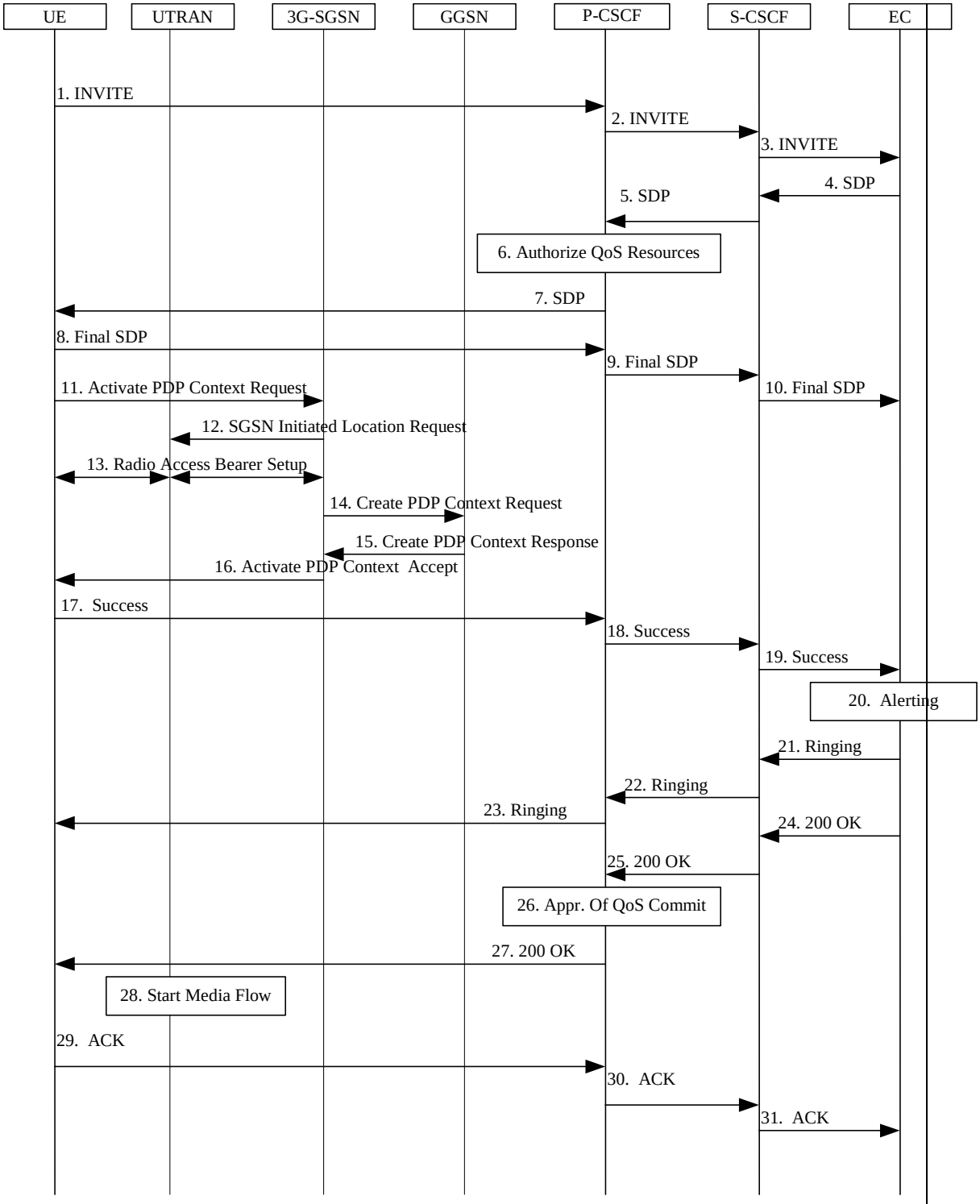
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

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

5.X.X Emergency Session for UE ~~with USIM~~, ~~and it~~that has successfully p~~p~~erformed GPRS attachment~~application level registration~~.

This subsection presents emergency session establishment for the case where the UE ~~is attached to both CS domain and IM CN subsystem and operator has decided to use IMS~~requests the ~~for~~ emerge~~m~~ncy session via the ~~, or the UE is attach only to~~ IM CN subsystem.

It is assumed that the UE has activated a signalling PDP context for emergency sessions to the GGSN in the visited PLMN.



1. UE sends the SIP INVITE request, containing an initial SDP, to a P-CSCF determined via the CSCF discovery mechanism. Location Information about

emergency ~~call~~session is sent in the INVITE message. UE includes the Cell Global ID information in the INVITE message.

2. ~~P-CSCF detects that the call is an emergency call using the information in the INVITE message e.g. by analysing the number or name requested.~~ P-CSCF selects a S-CSCF in the visited network and forwards the SIP INVITE request including the information about emergency ~~call~~session to S-CSCF.
3. S-CSCF uses the location information to select an appropriate EC. S-CSCF forwards the request to EC.
4. The media stream capabilities of the destination are returned along the signaling path.
5. S-CSCF forwards the message containing the destination SDP capabilities to P-CSCF.
6. P-CSCF authorizes the resources necessary for this session.
7. P-CSCF forwards the SDP message to the originating endpoint.
8. UE decides the final set of media streams for this session, and sends the Final SDP to P-CSCF.
9. P-CSCF forwards the final SDP to S-CSCF.
10. S-CSCF forwards this message to EC.
11. Activate PDP Context Request. The UE activates a PDP context for the emergency session by sending the Activate Secondary PDP Context Request message to the SGSN. The UE indicates that the PDP context is used for an emergency session. For the PDP context, the Allocation / Retention Priority shall be at once set to the high value, potentially by using a reserved value.
12. The SGSN, when recognising that the PDP context is for an emergency session, may itself request location information from SRNC, in order to receive updated or more accurate location information regarding the UE. SGSN thereafter sends a location report to Gateway Mobile Location services Centre (GMLC) as specified in TS 23.271, and the EC may obtain this location information from GMLC.
13. Radio Access Bearer Setup
14. Create PDP Context Request
15. Create PDP Context Response
16. Activate PDP Context Accept
17. UE sends the “Resource Reservation Successful” message to the terminating endpoint, via the signaling path established by the INVITE message.
18. P-CSCF forwards this message to S-CSCF.
19. S-CSCF forwards this message to EC.
20. Resources are reserved successfully.

21. EC sends information about alerting to S-CSCF.
22. S-CSCF forwards the Ringing message to P-CSCF.
23. P-CSCF forwards this message to UE.
24. EC answers the ~~call~~session and sends final 200 OK message to S-CSCF.
25. S-CSCF forwards final 200 OK message to P-CSCF.
26. P-CSCF indicates the resources reserved for this session should now be committed.
27. P-CSCF forwards final 200 OK message to UE.
28. UE starts the media flow for this session.
29. The calling party responds to the 200-OK final response with a SIP ACK message which is sent to P-CSCF.
30. P-CSCF forwards the SIP ACK message to S-CSCF
31. S-CSCF forwards the ACK message to EC.

3GPP TSG-S2 Drafting Meeting (IMS key issues)
Dallas, USA, 25-28th June 2001

Tdoc S2-011693rev321

CR-Form-v3

CHANGE REQUEST

⌘ **23.228 CR 055** ⌘ rev **2** ⌘ Current version: **5.1.0** ⌘

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

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

Title:	⌘	Network Initiated De-registration procedure
Source:	⌘	Nortel Networks
Work item code:	⌘	IMS
Date:	⌘	25-06-2001
Category:	⌘	**C**
Release:	⌘	REL-5

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

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	The Network Initiated De-registration Procedure can be initiated by the HSS or S-CSCF. The reasons for the network de-registering a user are described in section 5.3.2. The S-CSCF may want to de-register a user for network maintenance, change in service capabilities, etc. The procedure described in section 5.3.2.2 assume that the HSS can only initiate the de-registration, by sending a Cx-Deregister to the S-CSCF. In the case where the HSS initiates De-registration, the HSS can remove the S-CSCF as the registered S-CSCF for the UE. The S-CSCF does not need to send an extra message (Cx-Put) to the HSS. In the case where the S-CSCF initiates the de-registration, the Cx-Deregister messaging is not needed between the HSS and S-CSCF. The S-CSCF should send the Cx-Put to inform the HSS to remove it as the registered S-CSCF for the UE.
Summary of change:	⌘	If the HSS initiates the de-registration, then the Cx-Put messaging (steps 6 &7) is not needed. Add text stating that the S-CSCF may also initiate the de-registration. If so, then the Cx-Deregister messaging (steps 1 & 8) between the HSS and S-CSCF is not needed.
Consequences if not approved:	⌘	

Clauses affected:	⌘	5.3.2.2
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications
	⌘	
Other comments:	⌘	

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5.3.2.2 Network Initiated Application (SIP) De-registration, Administrative

For different reasons (e.g., subscription termination, lost terminal, etc.) a home network administrative function may determine a need to clear a user's SIP registration. This function initiates the de-registration procedure and may reside in various elements depending on the exact reason for initiating the de-registration.

~~A third trusted/secured party may also initiate the de-registration.~~

One such home network element is the HSS, which already knows the S-CSCF serving the user and that for this purpose makes use of the Cx-Deregister. Another home network element that could initiate the de-registration is the S-CSCF, in which case it makes use of the Cx-Put to inform the HSS. Other trusted/secured parties may also initiate de-registration to the S-CSCF.

The following flow shows a network initiated IM CN subsystem terminal application (SIP) de-registration based on an administrative action for example. The IP transport infrastructure (e.g., GGSN, SGSN) is not notified. If complete packet access is to be denied, a transport layer administrative mechanism would be used. This scenario does not address the administrative mechanisms used for updating any subscriber records, EIR records, access authorisation, etc. This scenario only addresses the specific action of clearing the SIP application registration that is currently in effect.

Editor's note: Release of ongoing multimedia sessions during this procedure is FFS.

5.3.2.2.1 Network Initiated De-registration by HSS, administrative

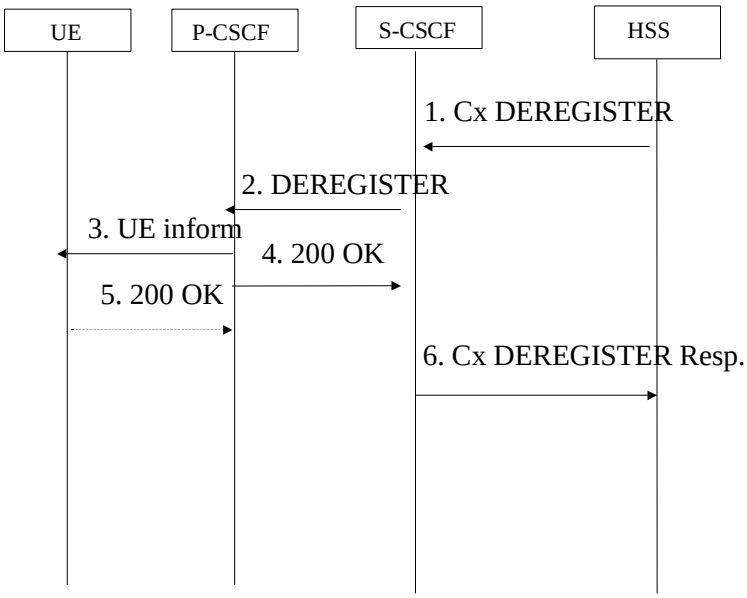
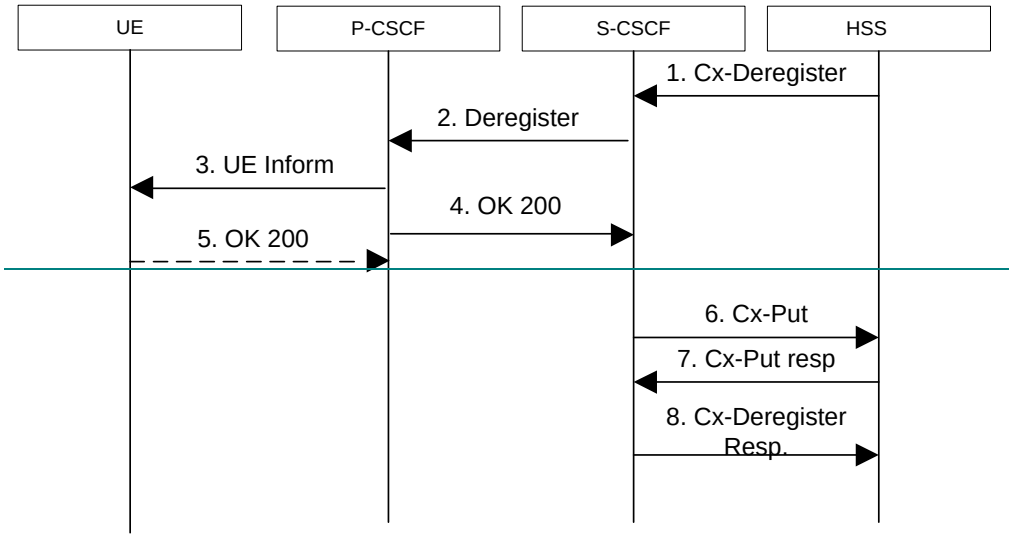


Figure 5.5: Network initiated application de-registration by HSS, administrative



~~Figure 5.5: Network initiated application de-registration, administrative~~

1. HSS initiates the de-registration, sending a Cx-Deregister (subscriber identity)

   ~~Note: A third trusted/secured party may also initiate the de-registration, most probably issuing a third party SIP registration with timer set to 0.~~

2. The S-CSCF issues a de-registration towards the P-CSCF for this UE and updates its internal database to remove the UE from being registered.

3. The P-CSCF informs the UE of the de-registration

Editors note: Due to loss of contact with the mobile, it might be possible that the UE does not receive the information of the deregistration. Implications of this is for FFS.

4. The P-CSCF sends a response to the S-CSCF and updates its internal database to remove the UE from being registered.

5. When possible, the UE sends a response to the P-CSCF to acknowledge the de-registration. A misbehaving UE or a UE that is out of P-CSCF coverage could not answer properly to the de-registration request. The P-CSCF should perform the de-registration in any case, e.g., after the timer for this request expires.

   Note: Steps 4 and 5 may be done in parallel: the P-CSCF does not wait for an answer from the UE before answering to the S-CSCF

~~6. The S-CSCF sends an update to the HSS to remove itself as the registered S-CSCF for this UE.~~

~~7. The HSS confirms the update.~~

~~6~~8. The S-CSCF returns a response to the entity that initiated the process.

Note that ~~a third~~another trusted/secured party may also request for de-registration via HSS through administrative mechanisms provided by the operator.

5.3.2.2.2 Network Initiated De-registration by S-CSCF

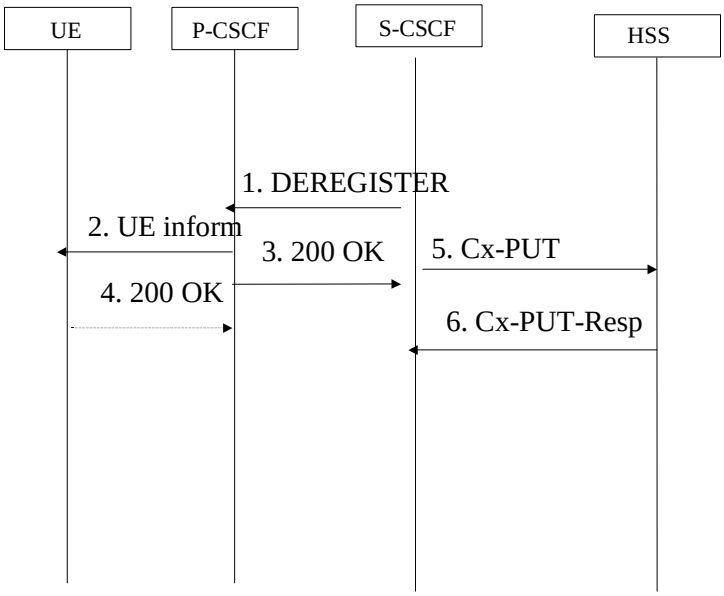


Figure 5.6: Network initiated application de-registration by S-CSCF, administrative

1. ~~1.~~ The S-CSCF issues a de-registration towards the P-CSCF for this UE and updates its internal database to remove the UE from being registered.

   ~~Note: A third trusted/secured party may also initiate the de-registration, most probably issuing a third party SIP registration with timer set to 0.~~

2. The P-CSCF informs the UE of the de-registration

Editors note: Due to loss of contact with the mobile, it might be possible that the UE does not receive the information of the deregistration. Implications of this is for FFS.

3. The P-CSCF sends a response to the S-CSCF and updates its internal database to remove the UE from being registered.

4. When possible, the UE sends a response to the P-CSCF to acknowledge the de-registration. A misbehaving UE or a UE that is out of P-CSCF coverage could not answer properly to the de-registration request. The P-CSCF should perform the de-registration in any case, e.g., after the timer for this request expires.

   Note: Steps 4 and 5 may be done in parallel: the P-CSCF does not wait for an answer from the UE before answering to the S-CSCF

5. The S-CSCF sends an update to the HSS to remove itself as the registered S-CSCF for this UE.

6. The HSS confirms the update.

   Note that ~~a third~~another trusted/secured party may also initiate the de-registration, for example, by issuing a third party SIP registration with timer set to 0 via S-CSCF.

3GPP TSG-SA WG2 drafting meeting
25-29 June, 2001
Dallas, USA

Tdoc S2-011703

CR-Form-v3

CHANGE REQUEST

⌘ **23.228** **CR** **058** ⌘ rev **1** ⌘ Current version: **5.1.0** ⌘

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

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

Title:	⌘	Terminology Change from SIP+ to ISC for Service Control interface
Source:	⌘	SA2 drafting group
Work item code:	⌘	IMS-CCR
Date:	⌘	27.06.2001
Category:	⌘	**F**
Release:	⌘	REL-5

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

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

Reason for change:	⌘	SIP+ is not suitable terminology for service control interface because the term also applies to SIP-T
Summary of change:	⌘	This CR replaces SIP+ interface with ISC (IMS Service Control Interface).
Consequences if not approved:	⌘	The terminology in 23.228 will be confusing and ambiguous and will not match the terminology used for the stage 3

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

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

4.2.4 ~~Serving CSCF to service platform~~IP multimedia Subsystem Service Control Interface (ISC)

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

An Application Server (AS) offering value added IM services resides either in the user's home network or in a third party location. The third party could be a network or simply a stand-alone AS.
The Serving-CSCF to AS interface is used to provide services residing in an AS. Two cases were identified:

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

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

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

~~2.SIP+ is based on the SIP protocol information with necessary enhancements to allow for remote service execution; controversial enhancements should be avoided.~~

~~3.~~2. The depicted functional architecture does not propose a specific physical implementation.

~~4.~~3. Scope of the SIP Application Server: the SIP Application Server may host and execute services. It is intended to allow the SIP Application Server to influence and impact the SIP session on behalf of the services and it uses ~~SIP+~~the ISC interface to communicate with the S-CSCF.

~~5.~~4. The S-CSCF shall decide whether an Application Server is required to receive information related to an incoming SIP session request to ensure appropriate service handling.. The decision at the S-CSCF is based on (filter) information received from the HSS (or other sources, e.g. application servers). This filter information is stored and conveyed on a per application server basis for each subscriber. The name(s)/address(es) information of the application server(s) are received from the HSS.

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

~~6.~~5. The purpose of the IM SSF is to host the CAMEL network features (i.e. trigger detection points, CAMEL Service Switching Finite State Machine, etc) and to interface to CAP.

~~7.~~6. The IM SSF and the CAP interface support legacy services only.

~~8.~~7. Once the IM SSF, OSA SCS or SIP Application Server has been informed of a SIP session request by the S-CSCF, the IM SSF, OSA SCS or SIP Application Server shall ensure that the S-CSCF is made aware of any resulting activity by sending messages to the S-CSCF.

~~9.~~8. From the perspective of the S-CSCF, The "SIP Application server", "OSA service capability server" and "IM-SSF" shall exhibit the same interface behaviour.

~~10.~~9. The application server may contain "service capability interaction manager" (SCIM) functionality and other application servers. The SCIM functionality is an application which performs the role of interaction management. The internal components are represented by the "dotted boxes" inside the SIP application server. The internal structure of the application server is outside the standards.
The Sh interface shall have sufficient functionality to enable this scenario.

~~11.~~10. When the name/address of more than one "application server" is transferred from the HSS, the S-CSCF shall contact the "application servers" in the order supplied by the HSS. The response from the first "application server" shall be used as the input to the second "application server".

~~12.~~11. The S-CSCF does not handle service interaction issues..

~~13.~~12. The S-CSCF does not provide authentication and security functionality for secure direct third party access to the IM subsystem. The OSA framework provides a standardized way for third party secure access to the IM subsystem.

More specifically the following requirements apply to the ~~Serving-CSCF~~IMS Service control interface:

1. ~~SIP+~~The protocol on the ISC interface shall be capable to bring the full range of information (e.g. message headers, message bodies) available at the S-CSCF to the Application Server's attention.
2. ~~SIP+~~The protocol on the ISC interface ~~-~~shall preserve the extensibility of the SIP network signalling protocol on the interface to the application server. Introducing extensions (e.g. new SIP method, SIP header) in the network SIP signalling protocol shall make these extensions implicitly available to the Application Server without requiring separate extensions to the protocol on the ISC interface~~SIP+.~~
3. The S-CSCF is application logic agnostic, i.e. it has no specific knowledge about a particular application logic invoked via the ISC~~SIP+~~ interface.
4. The S-CSCF contacts the Application Server for the execution of applications. This shall be possible during the registration and during the session from setup to the release.
5. An Application Server can initiate a new session/transactions at the S-CSCF without having been contacted by the S-CSCF beforehand.
6. ~~SIP+~~The ISC interface is currently envisioned to connect the S-CSCF to entities (SIP Application Servers, OSA SCS, IM SSF) within the operators network.
7. ~~SIP+~~The protocol on the ISC interface shall be a protocol between a Controlling Entity (SIP Application Server, IM-SSF, OSA-SCS) and a Controlled Entity (S-CSCF). The Controlling Entity takes/makes decisions on the SIP session. The Controlled Entity acts according to the requests from the Controlling Entity, and notifies the Controlling Entity of events of interest (e.g a timer event or a SIP event).
8. The ~~SIP+~~ protocol on the ISC interface shall enable a multi-vendor open interface between SIP application server/IMS-SSF/OSA-SCS and the S-CSCF.
9. ~~SIP+~~The ISC interface shall support service control for both originating SIP sessions and terminating SIP sessions. The A-party´s services are accessed from the A-party's S-CSCF. The B-party´s services are accessed from the B-party's S-CSCF
10. ~~SIP+~~The protocol on the ISC interface shall allow the simultaneous handling of more than one service within a session.
11. ~~SIP+~~The protocol on the ISC interface shall allow the Controlling Entity to request the transmission of a specific SIP message(s). This may, or may not, be in reaction to a message from the Controlled Entity
12. ~~SIP+~~The protocol on the ISC interface shall allow the Controlling Entity to request the transmission of a SIP message with added/deleted/modified content.(headers & sip message body (e.g. SDP))
13. The ISC interface ~~SIP+~~ shall allow filter setting from the Controlling Entity.
14. The protocol on the ISC interface ~~SIP+~~ shall allow Service Control triggering from the Controlled Entity on basic or complex triggers.
15. The protocol on the ISC interface ~~SIP+~~ shall allow the Controlling Entity to request the initiation of a SIP session. This may, or may not, be in reaction to a message from the Controlled Entity
16. The ISC interface ~~SIP+~~ shall be able to convey charging information.
17. The ISC interface ~~SIP+~~ shall support Load Control functions.
18. Means for detecting the failure/availability of a SIP AS/IM-SSF/OSA-SCS and S-CSCF shall be provided.
19. The protocol on the ISC interface ~~SIP+~~ shall support the transport of the following information from the S-CSCF to the Controlling Entity:
    - Subscriber ID (Private subscriber identifier and, optionally, public subscriber identifier)
    - Information on the event which occurred
    - terminating/originating information
    - SIP information
20. The protocol on the ISC interface ~~SIP+~~ shall support the transport of the following information from the Controlling Entity to the S-CSCF:
    - Subscriber ID
    - Session handling request
21. The ~~"SIP+"~~ protocol on the ISC interface shall support the control of timers
22. The ~~SIP+~~ protocol on the ISC interface shall allow the S-CSCF to differentiate between session control on Mw, Mm and Mg interfaces and~~-~~ the ISC interface.~~SIP+~~.

Editors Note: Further requirements are for further study.

The figure below depicts an overall view of how services can be provided.

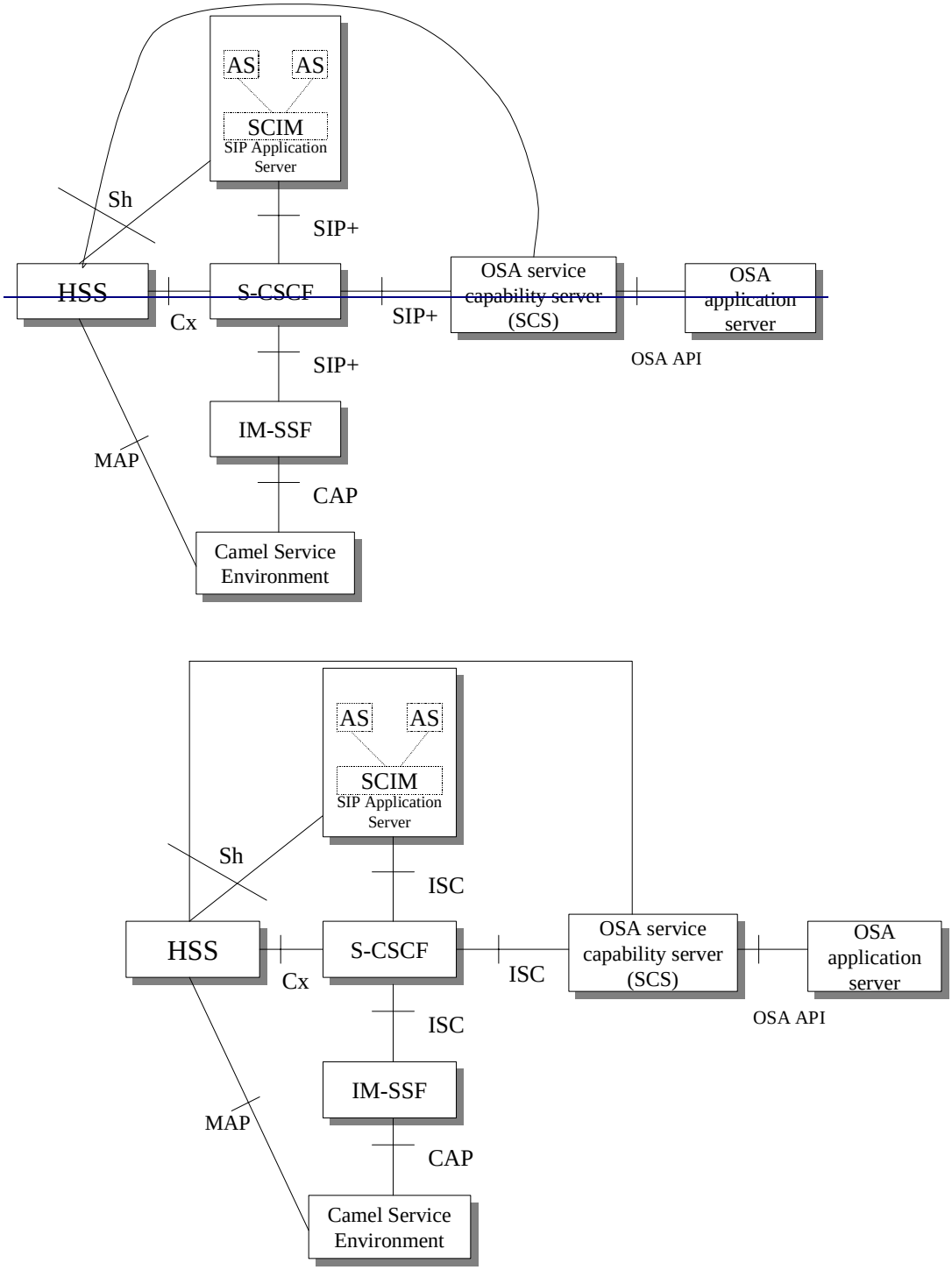

Figure 4.3: Functional architecture for the provision of service in the IMS

3GPP TSG-SA2 #19
27-31 August 2001
Sophia Antipolis, France

Tdoc S2-012329rev21141

CR-Form-v4

CHANGE REQUEST

⌘ **23.228** **CR** **061** ⌘ rev **32** ~~1~~ ⌘ Current version: **5.1.0** ⌘

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

Title:	⌘	Clarification of P-CSCF discovery
Source:	⌘	Ericsson, Nokia
Work item code:	⌘	IMS-CCR
Date:	⌘	11th ~~7th~~ September ~~30th 21st August~~ 2001
Category:	⌘	**C**
Release:	⌘	Rel-5

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

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	To clarify the procedures of local P-CSCF discovery as 23.228 does not clearly state: • How the information is propagated • The role of GGSN
Summary of change:	⌘	Included flows for the two procedures related to P-CSCF discovery and clarification of the role of GGSN. This CR also includes agreed changes as proposed in CR 076 (S2-012241).
Consequences if not approved:	⌘	Stage 2 work will not be clear enough.

Clauses affected:	⌘	5.1.1 Procedures related to local CSCF discovery
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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

5.1 CSCF related procedures

5.1.1 Procedures related to local CSCF discovery

The Proxy-CSCF discovery shall be performed after GPRS attach using one of the following mechanisms:

1. 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 below in sub-clause 5.1.1.1.

2. Transfer a Proxy-CSCF address within the PDP Context Activation signalling to the UE, as described below in sub-clause 5.1.1.2. 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~~to~~ the SGSN.

~~The second alternative shall be used for terminals not supporting DHCP.~~

5.1.1.1 DHCP/DNS procedure for P-CSCF discovery

The GGSN acts as a DHCP Relay Agent, relaying DHCP messages between UE and the DHCP server.

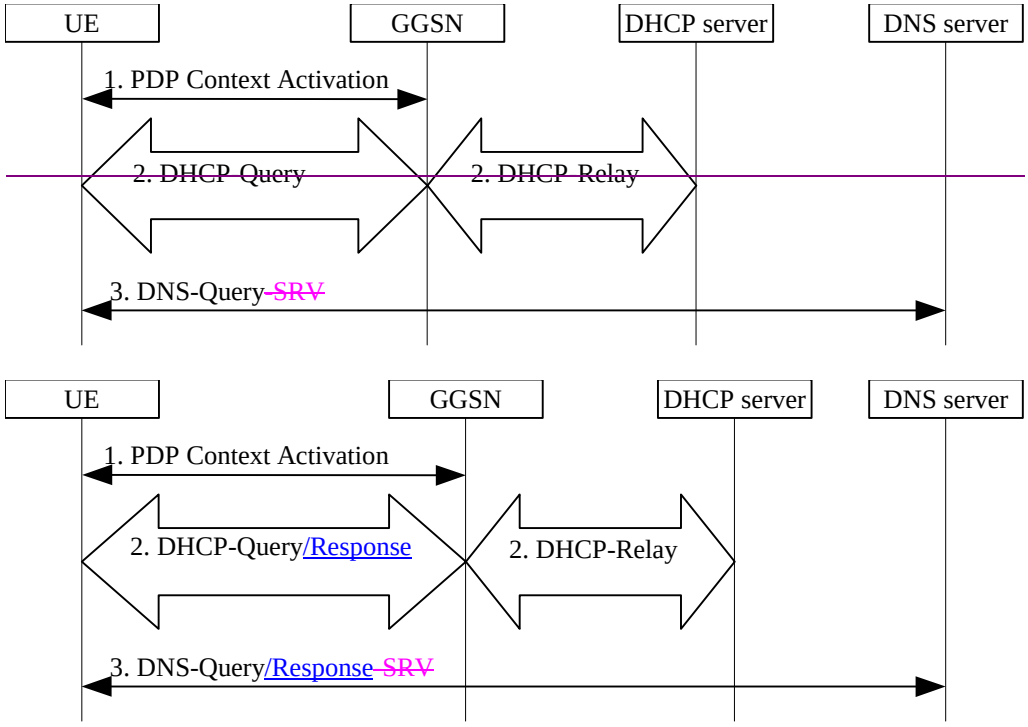

Figure X: P-CSCF discovery using DHCP and DNS

1. ~~Establishment of an appropriate~~Create PDP context bearer by using the procedure as specified in TS 23.060.

2. The UE ~~solicits~~requests a DHCP server and additionally requests the domain name of the P-CSCF and IP addresses of DNS servers. It may require a multiple DHCP Query/Response message exchange to retrieve the requested information.

3. The UE performs a DNS ~~SRV~~ query to retrieve a list of P-CSCF(s) IP addresses from which one is selected. If the response does not contain the IP addresses, an additional DNS query is needed to resolve a Fully Qualified Domain Name (FQDN) to an IP address.

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

5.1.1.2 GPRS procedure for P-CSCF discovery

This alternative shall be used for UE(s) not supporting DHCP. This may also be used for UE(s) supporting DHCP.

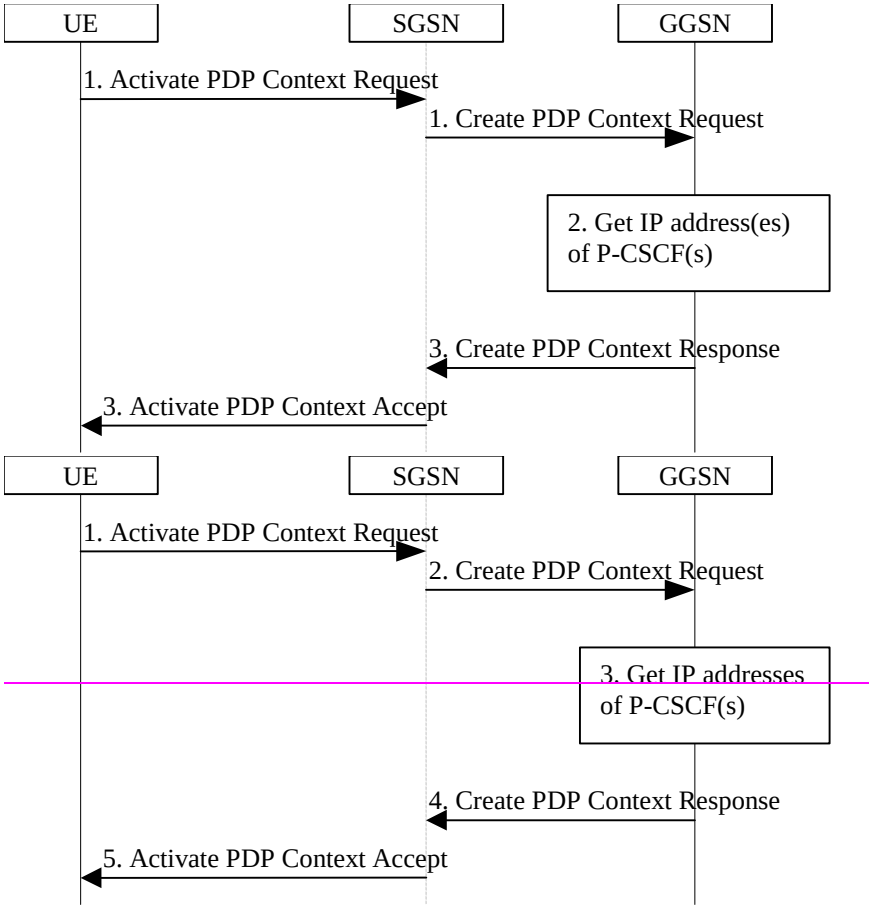

Figure Y: P-CSCF discovery using PDP Context Activation signalling

1. The UE requests ~~E~~establishment of a~~n appropriate~~ PDP context according to section 4.2.6 (QoS requirements for IM CN subsystem signalling).~~bearer by using the procedure as specified in TS 23.060 or by using specific PDP Context for IM 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. Any P-CSCF discovery information is transparent for the SGSN.~~

~~3~~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 ~~decision~~choice.

~~4~~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.

~~5. The P-CSCF address(es) is transparent for the SGSN.~~

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

Note. This request of a P-CSCF IP address(es) and response shall be transparent also for pre-R5 SGSN.

5.1.2 Procedures related to Serving-CSCF assignment

3GPP TSG-SA2 Meeting #19 ***Tdoc S2-012259***
Sophia Antipolis, France, August 27 - 31, 2001

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CHANGE REQUEST

⌘ **23.228** **CR** **081** ⌘ ev **-** ⌘ Current version: **5.1.0** ⌘

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

Title:	⌘	P-CSCF and PCF Clarifications
Source:	⌘	Lucent Technologies, Nortel, Motorola
Work item code:	⌘	IMS-CCR
Date:	⌘	27.08.2001
Category:	⌘	**F**
Release:	⌘	REL-5

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

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

Reason for change:	⌘	The current functionality of the P-CSCF relative to the PCF as found in 23.228 is unclear.
Summary of change:	⌘	Where possible, either P-CSCF or PCF is used rather than the combination. Further explanation of the role of the PCF in policy based control of the QoS resources is added.
Consequences if not approved:	⌘	Incorrect implementations and interoperability problems will result if this is not clarified.

Clauses affected:	⌘	Existing sections 5.4.7, 5.4.7.1, 5.4.7.2, 5.4.7.3, 5.4.7.4, and 5.4.7.5.
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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5.4.7 Interaction between QoS and session signalling

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

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

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

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

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

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

1. Authorise UMTS and IP resources. This establishes the 'gate' described above.
2. ~~Enable~~ Approval of QoS commit for ~~media stream~~resources authorised in (1), e.g. 'open' the 'gate'.
3. ~~Disable media stream~~Removal of QoS commit for resources authorised in (1), e.g. 'close' the 'gate'.
4. Revoke authorisation for UMTS and IP resources
5. Indicate from the GGSN to the ~~P-CSCF (~~PCF~~)~~ of PDP Context release.

There are two interactions between the UE and the GGSN:

1. Allocate the UMTS resources and IP resources (i.e. beyond the GGSN), within the previous authorisation ~~from the P-CSCF (PCF)~~
2. Release UMTS and IP resources

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

5.4.7.1 Authorise UMTS and IP QoS Resources

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

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

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

shall use the SDP contained in the SIP signaling to calculate the proper authorisation, as defined in TS 23.207. The authorisation shall be expressed in terms of the IP resources to be authorised.

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

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

5.4.7.2 ~~Enable Media Stream~~Approval of QoS commit

The ~~P-CSCF (~~PCF~~)~~ makes policy decisions and provides ~~a final decision~~ an indication to the GGSNabout ~~enabling~~ committing the allocated QoS resources for per-session authorisations.

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

5.4.7.3 ~~Disable Media Stream~~Removal of QoS commit

The ~~P-CSCF (~~PCF~~)~~ makes policy decisions and provides ~~a final decision~~an indication to the GGSN about ~~enabling~~ revoking commitment for the allocated QoS resources for per-session authorisations.

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

5.4.7.4 Revoke authorisation for UMTS and IP Resources

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

5.4.7.5 Indication of PDP Context release

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

In the particular case of PDP Context termination due to signal fade or loss of power at the UE, this indication ~~is~~ may be used by the P-CSCF~~(PCF)~~ to initiate a session release towards the remote endpoint.

3GPP TSG-SA2 Meeting
Nice, France, 27-31 August 2001

Tdoc S2-012327

CR-Form-v4

CHANGE REQUEST

⌘ **23.228** **CR** 083 ⌘ ev **-** ⌘ Current version: **5.0.0** ⌘

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

Title:	⌘	Service control during registration and de-registration (revised Td 1605)
Source:	⌘	BT
Work item code:	⌘	IMS-Registration/de-registration
Date:	⌘	19th June 2001
Category:	⌘	**C**
Release:	⌘	Rel-5

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

Reason for change:	⌘	To meet service needs it is essential for the service platform to be able to monitor and control UE registration/de-registration at the S-CSCF. This is needed for services such as fraud control.
Summary of change:	⌘	Message flows now have service control box added to S-CSCF columns Based on Filter Criteria. New section for network initiated application de-registration, service platform.
Consequences if not approved:	⌘	There will be no service platform monitoring or control of registration/de-registration in R5.

Clauses affected:	⌘	5.2 Application level registration procedures 5.3 Application level de-registration procedures
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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

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

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

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

5.2 Application level registration procedures

The following sub-sections address requirements and information flows related to registration in the IP multimedia subsystem. Assumptions that apply to the various information flows are listed as appropriate.

5.2.1 Requirements considered for registration

The following points are considered as requirements for the purpose of the registration procedures.

1. The architecture shall allow for the Serving-CSCFs to have different capabilities or access to different capabilities. E.g. a VPN CSCF or CSCFs in different stages of network upgrade.

2. The network operator shall not be required to reveal the internal network structure to another network. Association of the node names of the same type of entity and their capabilities and the number of nodes will be kept within an operator's network. However disclosure of the internal architecture shall not be prevented on a per agreement basis.

3. A network shall not be required to expose the explicit IP addresses of the nodes within the network (excluding firewalls and border gateways).

4. It is desirable that the UE will use the same registration procedure(s) within its home and visited networks.

5. It is desirable that the procedures within the network(s) are transparent to the UE, when it register with the IM CN subsystem.

6. The Serving-CSCF understands a service profile and the address of the functionality of the Proxy-CSCF.

Editor's Note: The specific procedures for subscription updating in the S-CSCF are FFS.

5.2.2 Registration flows

5.2.2.1 Requirements to consider for registration

The additional requirement for the registration information flow for this section is:

1. A Serving-CSCF is assigned at registration, this does not preclude additional Serving-CSCFs or change of CSCF at a later date. Procedures for use of additional CSCFs are not standardised in this release.

5.2.2.2 Assumptions

The following are considered as assumptions for the registration procedures as described in subclause 5.3.2.3:

1. Radio bearers are already established for signalling and a mechanism exists for the first REGISTER message to be forwarded to the proxy.

2. The I-CSCF shall use a mechanism for determining the Serving-CSCF address based on the required capabilities. The I-CSCF obtains the name of the S-CSCF from its role as an S-CSCF selector (Figure 5-1) for the determination and allocation of the Serving-CSCF during registration.

4. The decision for selecting the S-CSCF for the subscriber in the network is made in the I-CSCF.

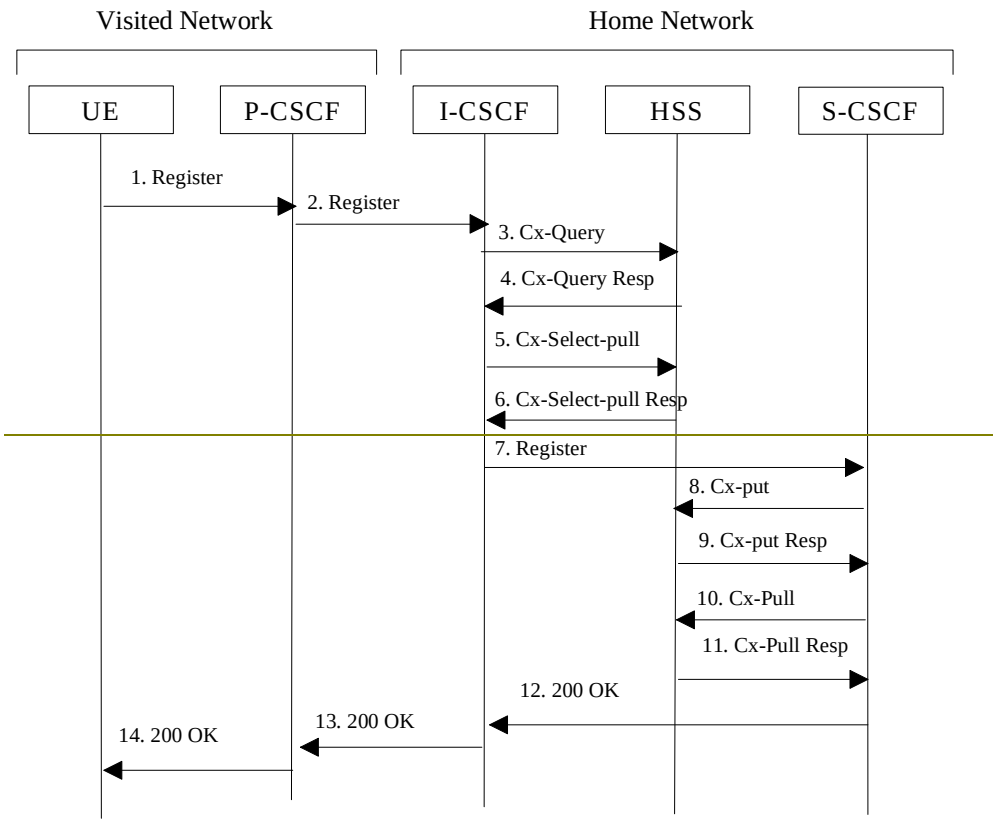
5. A role of the I-CSCF is the S-CSCF selection.

Editor's Note: In the following information flows, further work is required to identify the information elements related to credentials and possible additional processes required for authentication of the user and the messages.

In the information flows described in subclauses 5.2.2.3 and 5.2.2.4, there is a mechanism to resolve a name and address. The text in the information flows indicates when the name-address resolution mechanism is utilised.

5.2.2.3 Registration information flow – User not registered

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


Visited Network
Home Network
UE
P-CSCF
I-CSCF
HSS
S-CSCF
1. Register
2. Register
3. Cx-Query
4. Cx-Query Resp
5. Cx-Select-pull
6. Cx-Select-pull Resp
7. Register
8. Cx-put
9. Cx-put Resp
10. Cx-Pull
11. Cx-Pull Resp
12. 200 OK
13. 200 OK
14. 200 OK

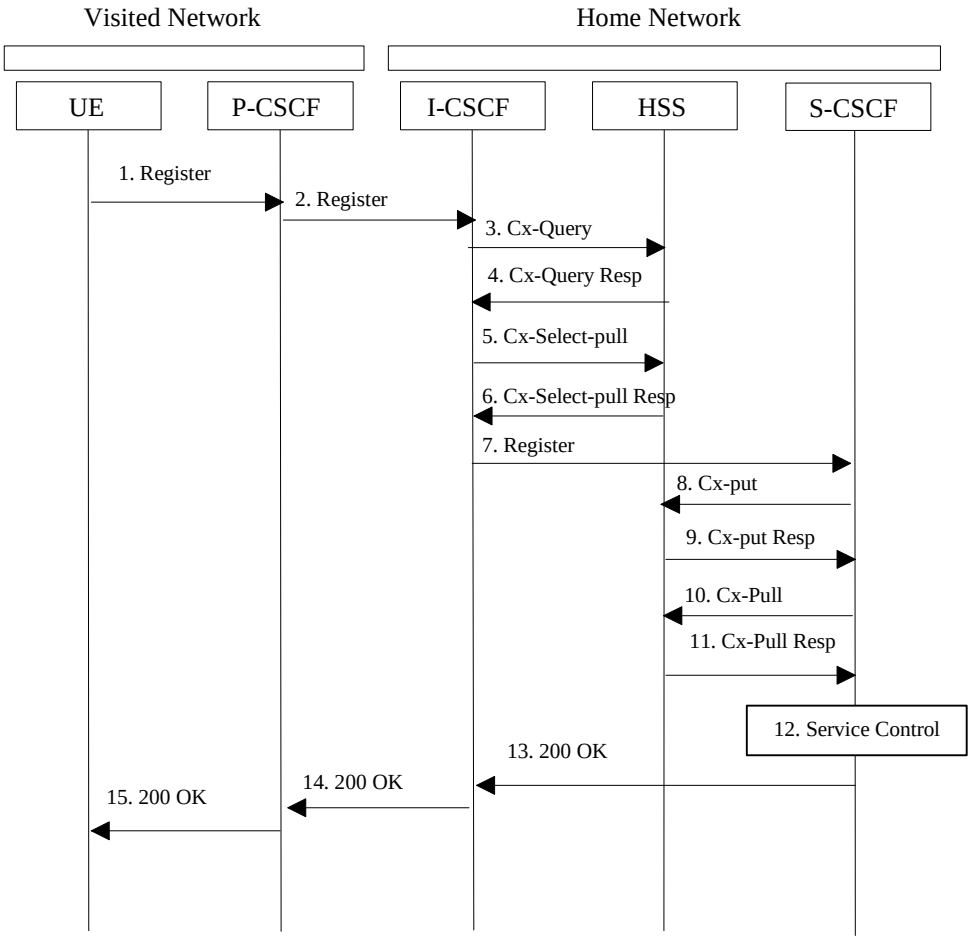

Visited Network
Home Network
UE
P-CSCF
I-CSCF
HSS
S-CSCF
1. Register
2. Register
3. Cx-Query
4. Cx-Query Resp
5. Cx-Select-pull
6. Cx-Select-pull Resp
7. Register
8. Cx-put
9. Cx-put Resp
10. Cx-Pull
11. Cx-Pull Resp
12. Service Control
13. 200 OK
14. 200 OK
15. 200 OK

Figure 5.1: Registration – User not registered

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

2. Upon receipt of the register information flow, it shall examine the "home domain name" to discover the entry point to the home network (i.e. the I-CSCF). The proxy shall send the Register information flow to the I-CSCF (P-CSCFs "name" in the contact header, subscriber identity, visited network contact name). A name-address resolution mechanism is utilised in order to determine the address of the home network from the home domain name. When the I-CSCF receives the registration information flow from the proxy, it shall examine the subscriber identity and the home domain name, and employ the services of a name-address resolution mechanism, to determine the HSS address to contact.

3. The I-CSCF shall send the Cx-Query information flow to the HSS (P-CSCF name, subscriber identity, home domain name, visited network contact name). The P-CSCF name is the contact name that the operator wishes to use for future contact to that P- CSCF.

Editors Note: It is FFS whether the terminal name, or proxy name, or both is included within this and subsequent register messages.

The Cx-query (P-CSCF name, subscriber identity, home domain name, visited network contact name) information flow is sent to the HSS. The HSS shall check whether the user is registered already. The HSS shall indicate whether the user is allowed to register in that visited network according to the User subscription and operator limitations/restrictions if any.

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

5. At this stage, it is assumed that the authentication of the user has been completed (although it may have been determined at an earlier point in the information flows). The I-CSCF shall send Cx-Select-Pull (serving network indication, subscriber identity) to the HSS to request the information related to the required S-CSCF capabilities which shall be input into the S-CSCF selection function.

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

7. The I-CSCF, using the name of the S-CSCF, shall determine the address of the S-CSCF through a name-address resolution mechanism and then shall send the register information flow (P-CSCFs "name" in the contact header, subscriber identity, visited network contact name) to the selected S-CSCF.

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

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

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

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

12. Based on the filter criteria, t~~T~~he S-CSCF shall send register information to the service control platform and perform whatever service control procedures are appropriate.

13~~2~~. The S-CSCF shall determine whether the home contact name is the S-CSCF name or an I-CSCF name. If an I-CSCF is chosen as the home contact name, it may be distinct from the I-CSCF that appears in this registration flow. The home contact name will be used by the P-CSCF to forward signalling to the home network. The S-CSCF shall return the 200 OK information flow (serving network contact name, S-CSCF name) to the I-CSCF.

14~~3~~. The I-CSCF shall send information flow 200 OK (serving network contact name) to the P-CSCF. The I-CSCF shall release all registration information after sending information flow 200 OK.

15~~4~~. The P-CSCF shall store the serving network contact name, and shall send information flow 200 OK to the UE.

5.2.2.4 Re-Registration information flow – User currently registered

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

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

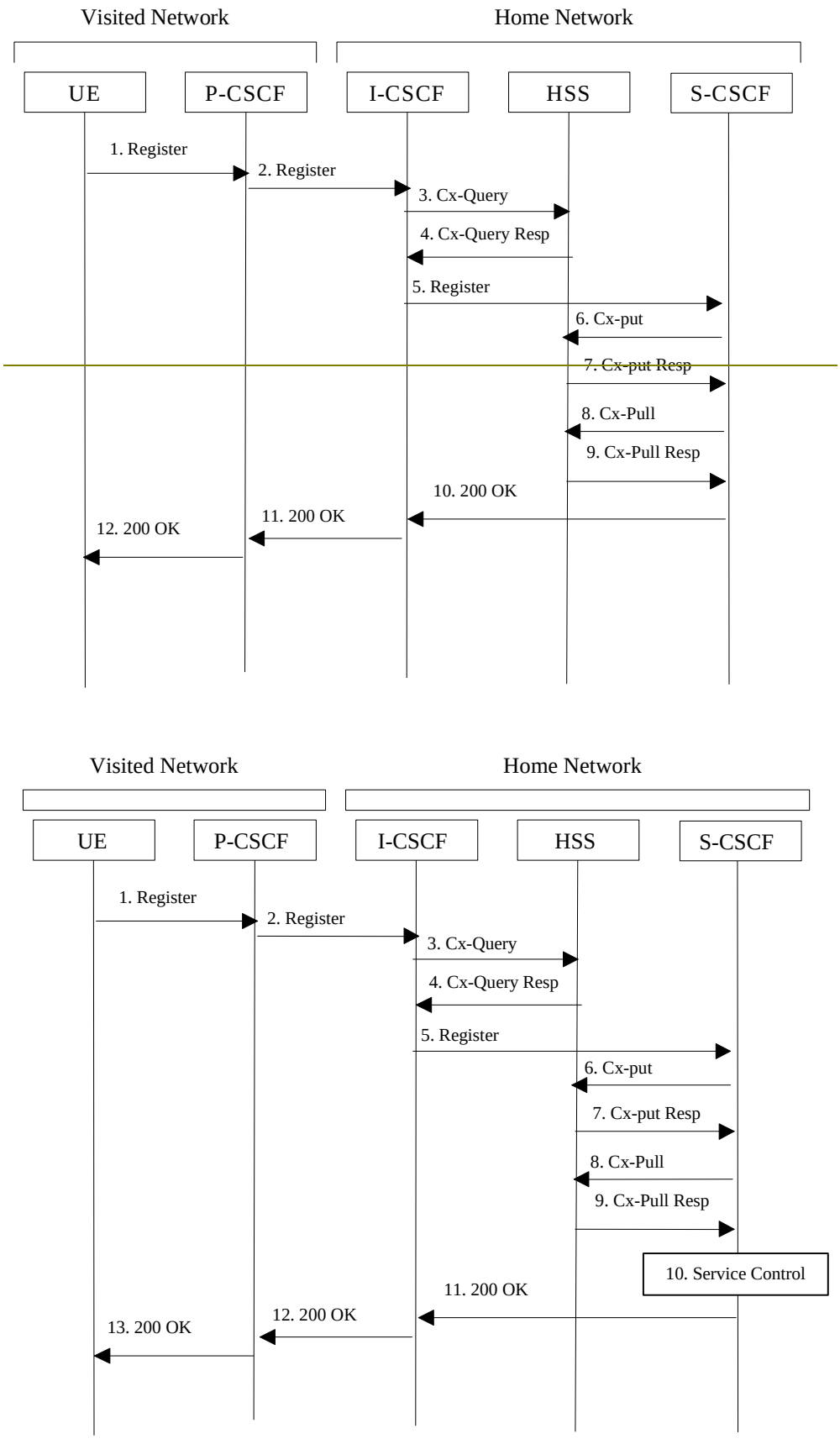


Figure 5.2: Re-registration - user currently registered

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

2. Upon receipt of the register information flow, the P-CSCF shall examine the "home domain name" to discover the entry point to the home network (i.e. the I-CSCF). The proxy does not use the entry point cached from prior registrations. The proxy shall send the Register information flow to the I-CSCF (P-CSCFs "name" in the contact header, subscriber identity, visited network contact name). A name-address resolution mechanism is utilised in order to determine the address of the home network from the home domain name. When the I-CSCF receives the registration information flow from the proxy, it shall examine the subscriber identity and the home domain name, and employ the services of a name-address resolution mechanism, to determine the HSS address to contact.

3. The I-CSCF shall send the Cx-Query information flow to the HSS (P-CSCF name, subscriber identity, home domain name, and visited network contact name). The P-CSCF name is the contact name that the operator wishes to use for future contact to that P- CSCF.

Editors Note: It is FFS whether the terminal name, or proxy name, or both is included within this and subsequent register messages.

The Cx-query (P-CSCF name, subscriber identity, home domain name, and visited network contact name) information flow is sent to the HSS.

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

5. At this stage, it is assumed that the authentication of the user has been completed (although it may have been determined at an earlier point in the information flows). The I-CSCF, using the name of the S-CSCF, shall determine the address of the S-CSCF through a name-address resolution mechanism and then shall send the re-register information flow (P-CSCFs "name" in the contact header, subscriber identity, visited network contact name) to the identified S-CSCF.

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

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

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

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

10. Based on the filter criteria, t~~T~~he S-CSCF shall send re-registration information to the service control platform and perform whatever service control procedures are appropriate.

11~~0~~. The S-CSCF shall determine whether the home contact name is the S-CSCF name or the I-CSCF name. If an I-CSCF is chosen as the home contact name, it may be distinct from the I-CSCF that appears in this registration flow. The home contact name will be used by the P-CSCF to forward signalling to the home network. The S-CSCF shall return the 200 OK information flow (serving network contact name, S-CSCF name) to the I-CSCF.

12~~1~~. The I-CSCF shall send information flow 200 OK (serving network contact name) to the P-CSCF. The I-CSCF shall release all registration information after sending information flow 200 OK.

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

5.2.2.5 Stored information.

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

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

Node	Before Registration	During Registration	After Registration
UE - in local network	Credentials Home Domain		Credentials Home Domain Proxy Name/Address
Proxy-CSCF - in local network	Routing Function	Network Entry point UE Address	Network Entry point UE Address
Interrogating-CSCF - in Home network	HSS Address	Serving-CSCF address/name (Editors Note: Access to Potential list of Serving-CSCFs is FFS)	No State Information
HSS	User Service Profile		Serving-CSCF address/name Proxy address/name?
Serving-CSCF (Home)	No state information	HSS Address/name Subscriber profile (limited – as per network scenario) Proxy address/name	May have session state Information HSS Address/name Subscriber information Proxy address/name

5.3 Application level de-registration procedures

5.3.1 Mobile initiated de-registration

Application level de-registration should be initiated by the UE upon roaming to a new network and power off of the terminal (if possible). De-registration is accomplished by a registration with an expiration time of zero seconds. De-registration follows the same path as defined in subclause 5.2.2.3 “Registration Information Flow – User not registered”.

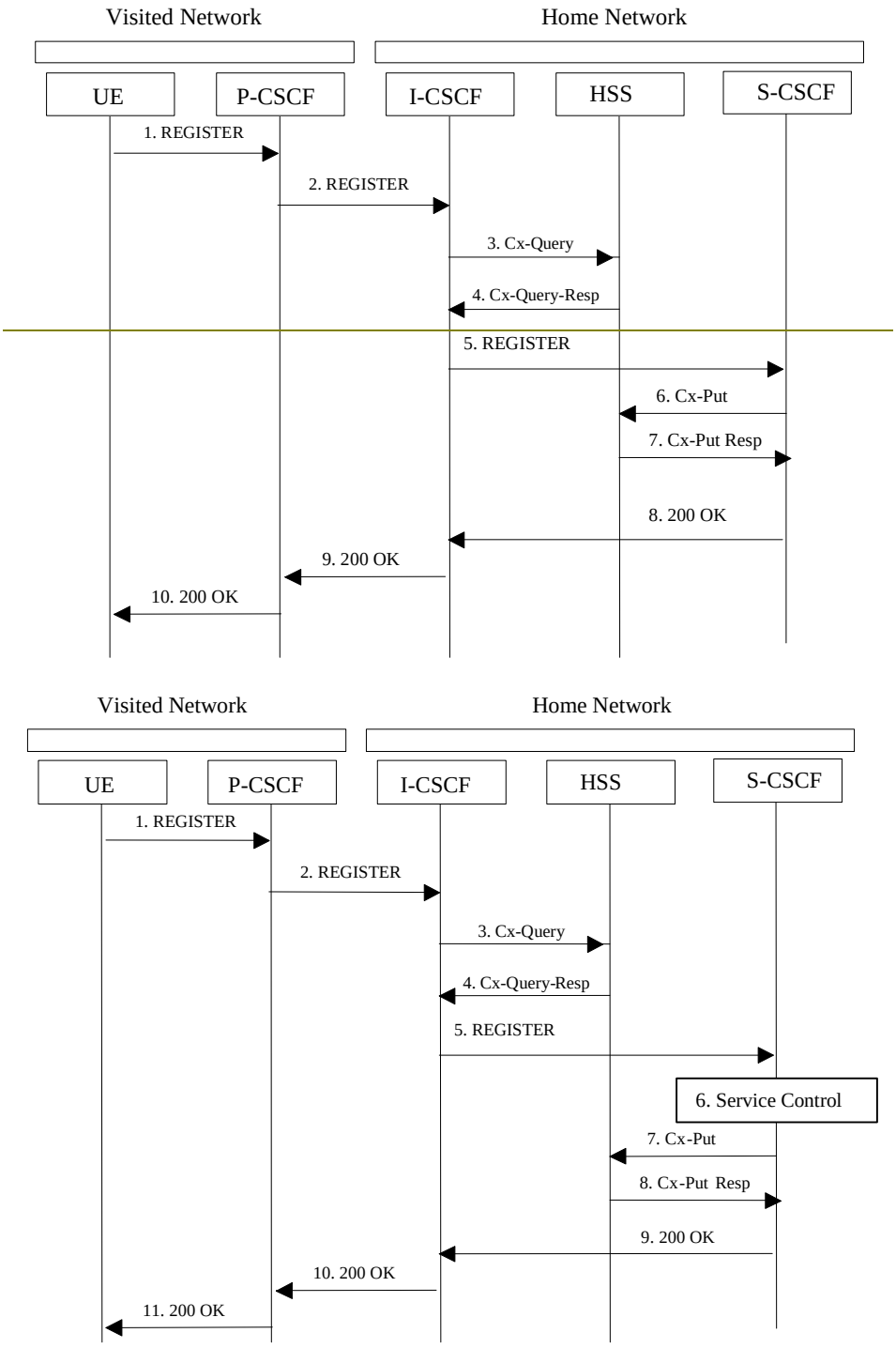


Figure 5.3: De-registration - user currently registered

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

2. Upon receipt of the register information flow, it shall examine the “home domain name” to discover the entry point to the home network (i.e. the I-CSCF). The proxy does not use the entry point cached from prior registrations. The proxy shall send the Register information flow to the I-CSCF (P-CSCFs “name” in the contact header, subscriber identity, and visited network contact name). A name-address resolution mechanism is utilised in order to determine the address of the home network from the home domain name. When the I-CSCF receives the registration information flow from the proxy, it shall examine the subscriber identity and the

home domain name, and employ the services of a name-address resolution mechanism, to determine the HSS address to contact.

3. The I-CSCF shall send the Cx-Query information flow to the HSS (P-CSCF name, subscriber identity, home domain name, visited network contact name). The P-CSCF name is the contact name that the operator wishes to use for future contact to that P- CSCF. The Cx-query (P-CSCF name, subscriber identity, home domain name, and visited network contact name) information flow is sent to the HSS.

(Editors Note: It is FFS whether the terminal name, or proxy name, or both is included within this and subsequent register messages).

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

5. The I-CSCF, using the name of the S-CSCF, shall determine the address of the S-CSCF through a name-address resolution mechanism and then shall send the de-register information flow (P-CSCFs "name" in the contact header, subscriber identity, visited network contact name) to the selected S-CSCF.

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

7~~6~~. The S-CSCF shall send Cx-Put (subscriber identity, clear S-CSCF name) to the HSS. The HSS clears the S-CSCF name for that subscriber.

8~~7~~. The HSS shall send Cx-Put Resp to the S-CSCF to acknowledge the sending of Cx-Put.

9~~8~~. The S-CSCF shall return the 200 OK information flow to the I-CSCF.

10~~9~~. The I-CSCF shall send information flow 200 OK to the P-CSCF. The I-CSCF shall release all registration information after sending information flow 200 OK.

11~~0~~. The P-CSCF shall send information flow 200 OK to the UE. The P-CSCF shall release all registration information after sending information flow 200 OK.

5.3.2 Network initiated de-registration

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

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

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

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

- **Application Layer determined**.
  Th~~i~~e service capability offered by the IM CN Subsystem to the Application Layers may

have parameters specifying whether all IM CN subsystem registrations are to be removed, or only those from one or a group of terminals from the user, etc.

- **Subscription Management**
  The operator must be able to restrict user access to the IM CN subsystem upon detection of contract expiration, removal of IM subscription, fraud detection, etc.

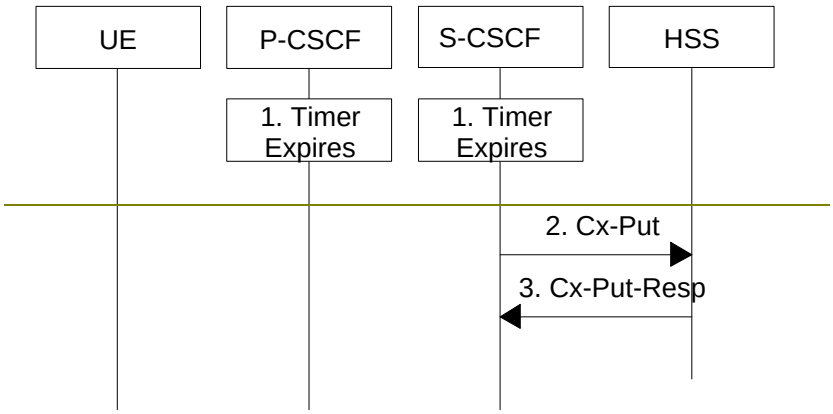
The following sections provide scenarios showing SIP application de-registration. Note that these flows have avoided the strict use of specific SIP protocol message names. This is in an attempt to focus on the architectural aspects rather than the protocol.

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

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

5.3.2.1 Network Initiated Application (SIP) De-registration, Registration Timeout

The following flow shows a network initiated IM CN subsystem terminal application (SIP) de-registration based on a registration timeout. A timer value is provided at initial registration and is refreshed by subsequent re-registrations. The flow assumes that the timer has expired. The locations (home or visited network) of the P-CSCF and S-CSCF are not indicated as the scenario remains the same for all cases.



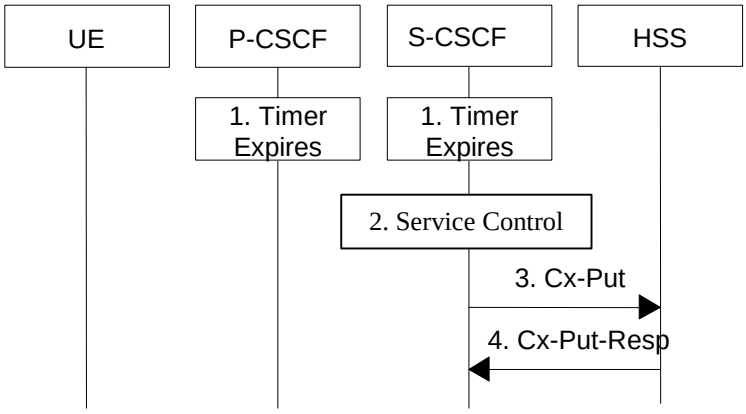


Figure 5.4: Network initiated application de-registration, registration timeout

1. The registration timers in the P-CSCF and in the S-CSCF expire. The timers are assumed to be close enough that no external synchronisation is required. The CSCFs update their internal databases to remove the UE from being registered. It is assumed that any GPRS PDP context cleanup will be handled by independent means.

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

3~~2~~. The S-CSCF sends an update to the HSS to remove itself as the registered S-CSCF for this UE.

4~~3~~. The HSS confirms the update.

5.3.2.2 Network Initiated Application (SIP) De-registration, Administrative

For different reasons (e.g., subscription termination, lost terminal, etc.) a home network administrative function may determine a need to clear a user's SIP registration. This function initiates the de-registration procedure and may reside in various elements depending on the exact reason for initiating the de-registration.

One such home network element is the HSS, which already knows the S-CSCF serving the user and that for this purpose makes use of the Cx-Deregister.

The following flow shows a network initiated IM CN subsystem terminal application (SIP) de-registration based on an administrative action for example. The IP transport infrastructure (e.g., GGSN, SGSN)is not notified. If complete packet access is to be denied, a transport layer administrative mechanism would be used. This scenario does not address the administrative mechanisms used for updating any subscriber records, EIR records, access authorisation, etc. This scenario only addresses the specific action of clearing the SIP application registration that is currently in effect.

Editor’s note: Release of ongoing multimedia sessions during this procedure is FFS.

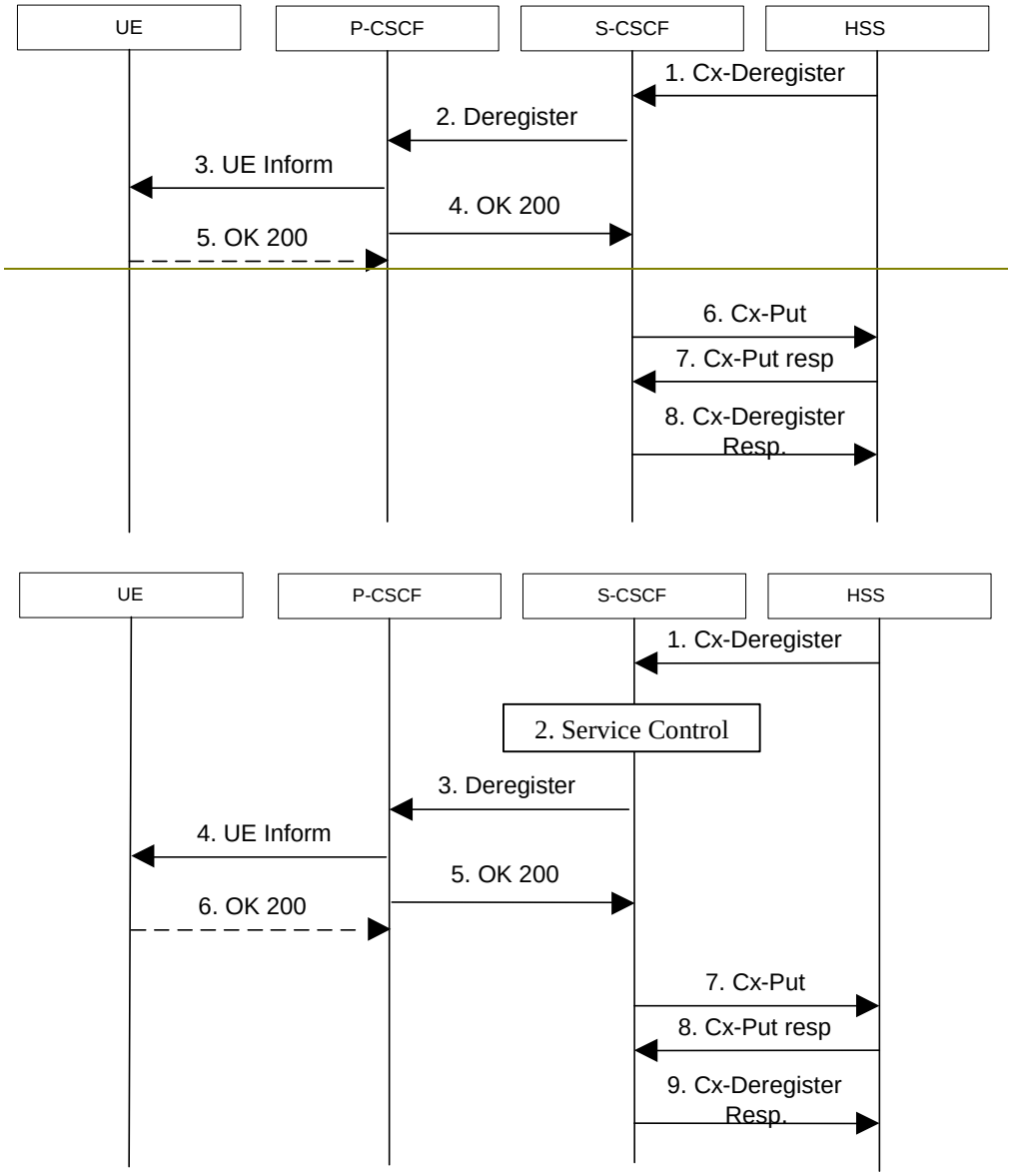


Figure 5.5: Network initiated application de-registration, administrative

1. HSS initiates the de-registration, sending a Cx-Deregister (subscriber identity)

   Note: A third trusted/secured party may also initiate the de-registration, most probably issuing a third party SIP registration with timer set to 0.

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

3~~2~~. The S-CSCF issues a de-registration towards the P-CSCF for this UE and updates its internal database to remove the UE from being registered.

4~~3~~. The P-CSCF informs the UE of the de-registration

Editors note: Due to loss of contact with the mobile, it might be possible that the UE does not receive the information of the deregistration. Implications of this is for FFS.

5~~4~~. The P-CSCF sends a response to the S-CSCF and updates its internal database to remove the UE from being registered.

65. When possible, the UE sends a response to the P-CSCF to acknowledge the de-registration. A misbehaving UE or a UE that is out of P-CSCF coverage could not answer properly to the de-registration request. The P-CSCF should perform the de-registration in any case, e.g., after the timer for this request expires.

    Note: Steps 4 and 5 may be done in parallel: the P-CSCF does not wait for an answer from the UE before answering to the S-CSCF

76. The S-CSCF sends an update to the HSS to remove itself as the registered S-CSCF for this UE.

87. The HSS confirms the update.

98. The S-CSCF returns a response to the entity that initiated the process.

5.3.2.3 Network Initiated Application (SIP) De-registration, Service Platform

A service platform may determine a need to clear a user's SIP registration. This function initiates the de-registration procedure and resides in a service platform.

The following flow shows a service control initiated IM CN subsystem terminal application (SIP) de-registration. The IP transport infrastructure (e.g., GGSN, SGSN) is not notified. If complete packet access is to be denied, a transport layer administrative mechanism would be used. This scenario does not address the administrative mechanisms used for updating any subscriber records, EIR records, access authorisation, etc. This scenario only addresses the specific action of clearing the SIP application registration that is currently in effect.

Editor's note: Release of ongoing multimedia sessions during this procedure is FFS.

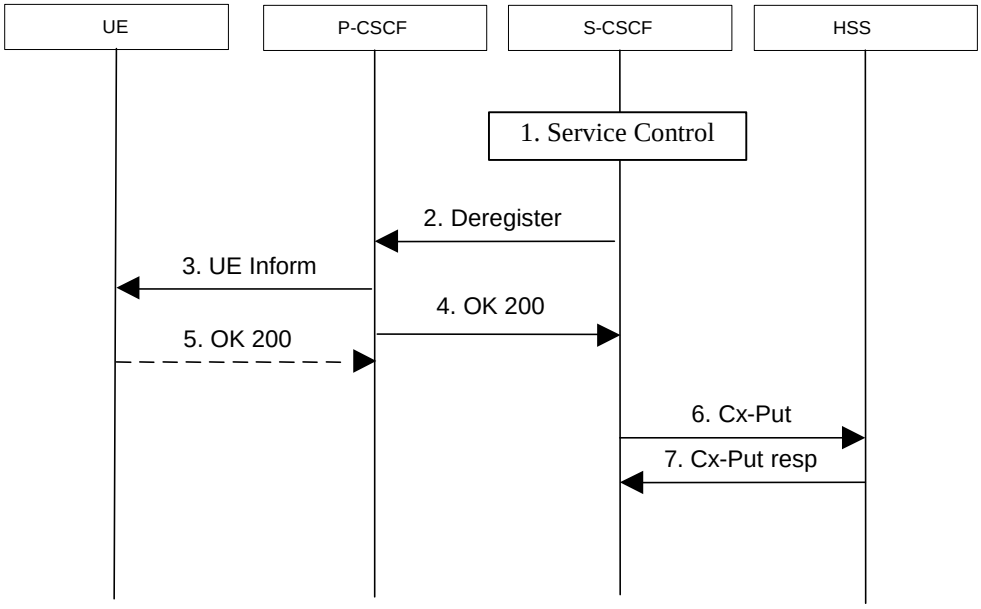


Figure 5.6: Network initiated application de-registration, service platform

1. The S-CSCF receives de-registration information from the service platform and performs whatever service control procedures are appropriate.
2. The S-CSCF issues a de-registration towards the P-CSCF for this UE and updates its internal database to remove the UE from being registered.

3. The P-CSCF informs the UE of the de-registration

Editors note: Due to loss of contact with the mobile, it might be possible that the UE does not receive the information of the deregistration. Implications of this is for FFS.

4. The P-CSCF sends a response to the S-CSCF and updates its internal database to remove the UE from being registered.

5. When possible, the UE sends a response to the P-CSCF to acknowledge the de-registration. A misbehaving UE or a UE that is out of P-CSCF coverage could not answer properly to the de-registration request. The P-CSCF should perform the de-registration in any case, e.g., after the timer for this request expires.

   Note: Steps 4 and 5 may be done in parallel: the P-CSCF does not wait for an answer from the UE before answering to the S-CSCF

6. The S-CSCF sends an update to the HSS to remove itself as the registered S-CSCF for this UE.

7. The HSS confirms the update.