

**Source:** TSG CN WG 1  
**Title:** CRs to Rel-5 on Work Item IMS-CCR towards 24.228  
**Agenda item:** 8.1  
**Document for:** APPROVAL

---

**Introduction:**

This document contains **10** CRs on **Rel-5** on Work Item "IMS-CCR", that have been agreed by **TSG CN WG1**, and are forwarded to TSG CN Plenary meeting #16 for approval.

Spec	CR	Rev	Phase	Subject	Cat	Version Current	Version-New	Meeting-2nd-Level	Doc-2nd-Level
24.228	023		Rel-5	S-S#3 update	F	5.0.0	5.1.0	N1-SIP0204	N1-021040
24.228	024	1	Rel-5	S-S#4 update	F	5.0.0	5.1.0	N1-24	N1-021229
24.228	025	3	Rel-5	CS-O, CS-T Reference flow update		5.0.0	5.1.0	N1-24	N1-021239
24.228	027		Rel-5	Update of Mobile terminal initiated session release flows (non-hiding)	F	5.0.0	5.1.0	N1-24	N1-021151
24.228	028	2	Rel-5	Downloading the implicitly registered public user identities from the S-CSCF to P-CSCF	F	5.0.0	5.1.0	N1-24	N1-021473
24.228	029	1	Rel-5	Update of Mobile terminal initiated session release flows (hiding)	F	5.0.0	5.1.0	N1-24	N1-021464
24.228	030	1	Rel-5	Correction of the subscription to the registration event package	F	5.0.0	5.1.0	N1-24	N1-021435
24.228	031	1	Rel-5	Addition of further Media Streams Flow Update	F	5.0.0	5.1.0	N1-24	N1-021415
24.228	034	2	Rel-5	MO#1a failures update	F	5.0.0	5.1.0	N1-24	N1-021500
24.228	035	2	Rel-5	MT#1a failures update	F	5.0.0	5.1.0	N1-24	N1-021501

CR-Form-v5	
<b>CHANGE REQUEST</b>	
⌘	24.228 CR 023 ⌘ 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

<b>Title:</b>	⌘ S-S#3 flow update		
<b>Source:</b>	⌘ Nokia		
<b>Work item code:</b>	⌘ IMS-CCR <span style="float: right;"><b>Date:</b> ⌘ 18-04-2002</span>		
<b>Category:</b>	⌘ <b>F</b> <span style="float: right;"><b>Release:</b> ⌘ REL-5</span>		
	<table border="0"><tr><td style="vertical-align: top;"><i>Use one of the following categories:</i> <b>F</b> (correction) <b>A</b> (corresponds to a correction in an earlier release) <b>B</b> (addition of feature), <b>C</b> (functional modification of feature) <b>D</b> (editorial modification) Detailed explanations of the above categories can be found in 3GPP <a href="http://www.3gpp.org/ftp/Specs/24.229">TR 21.900</a>.</td><td style="vertical-align: top;"><i>Use one of the following releases:</i> 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) REL-4 (Release 4) REL-5 (Release 5)</td></tr></table>	<i>Use one of the following categories:</i> <b>F</b> (correction) <b>A</b> (corresponds to a correction in an earlier release) <b>B</b> (addition of feature), <b>C</b> (functional modification of feature) <b>D</b> (editorial modification) Detailed explanations of the above categories can be found in 3GPP <a href="http://www.3gpp.org/ftp/Specs/24.229">TR 21.900</a> .	<i>Use one of the following releases:</i> 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) REL-4 (Release 4) REL-5 (Release 5)
<i>Use one of the following categories:</i> <b>F</b> (correction) <b>A</b> (corresponds to a correction in an earlier release) <b>B</b> (addition of feature), <b>C</b> (functional modification of feature) <b>D</b> (editorial modification) Detailed explanations of the above categories can be found in 3GPP <a href="http://www.3gpp.org/ftp/Specs/24.229">TR 21.900</a> .	<i>Use one of the following releases:</i> 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) REL-4 (Release 4) REL-5 (Release 5)		

<b>Reason for change:</b>	⌘ Update the S-S#3 flow based on accepted CR #004
<b>Summary of change:</b>	⌘ See CR #004
<b>Consequences if not approved:</b>	⌘ 24.228 call flows are not standard compliant

<b>Clauses affected:</b>	⌘ 7.3.6
<b>Other specs affected:</b>	⌘ <input checked="" type="checkbox"/> Other core specifications ⌘ 24.229 <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications
<b>Other comments:</b>	⌘

**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](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/](http://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.

## 7.3.6 S-S#3

### 7.3.6.1 (S-S#3) PSTN Termination performed by home network of originator (MO#2 assumed)

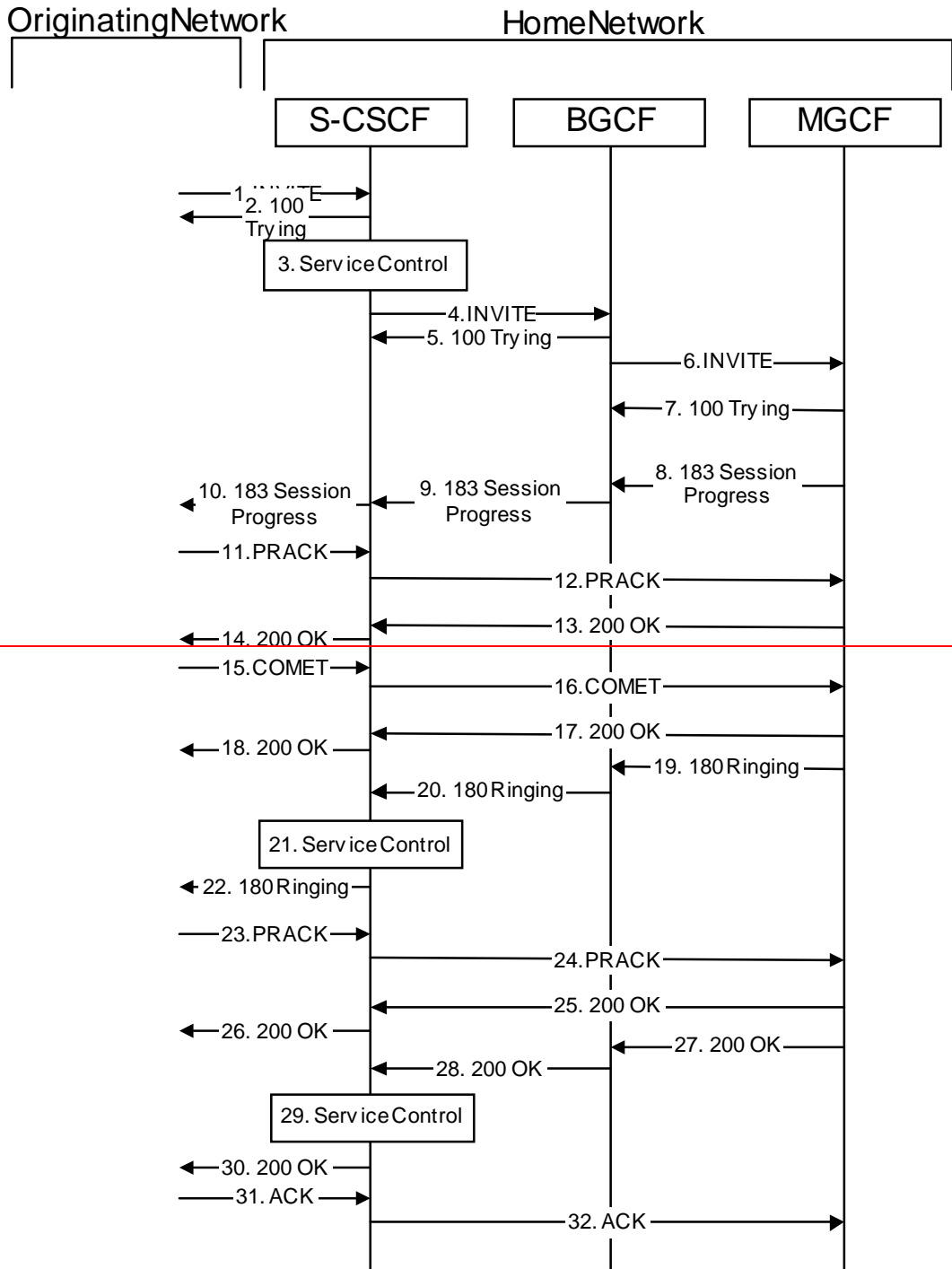
Figure 7.3.6.1-1 shows a S-CSCF handling session origination, which performs an analysis of the destination address, and determines that it will result in a PSTN termination. The request is therefore forwarded to a local BGCF. The BGCF performs further analysis of the destination address, combined with information of agreements between operators for optimum Gateway selection, and decides to do the PSTN termination locally. The BGCF therefore allocates a MGCF within the home network, and sends the request to it. [This example flow does not show Application Server involvement.](#)

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

- MO#1a** Mobile origination, roaming, without a THIG. The "Originating Network" of S-S#3 is therefore a visited network.
- MO#1b** Mobile origination, roaming, with a THIG in home network. The "Originating Network" of S-S#3 is therefore a visited network.
- MO#2** Mobile origination, located in home service area. The "Originating Network" of S-S#3 is therefore the home network.
- CS-O** CS Networks origination. The "Originating Network" of S-S#3 is the home network. The element labelled S-CSCF#1 is the MGCF of the CS-O procedure.

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

- CS-T** CS Networks termination.



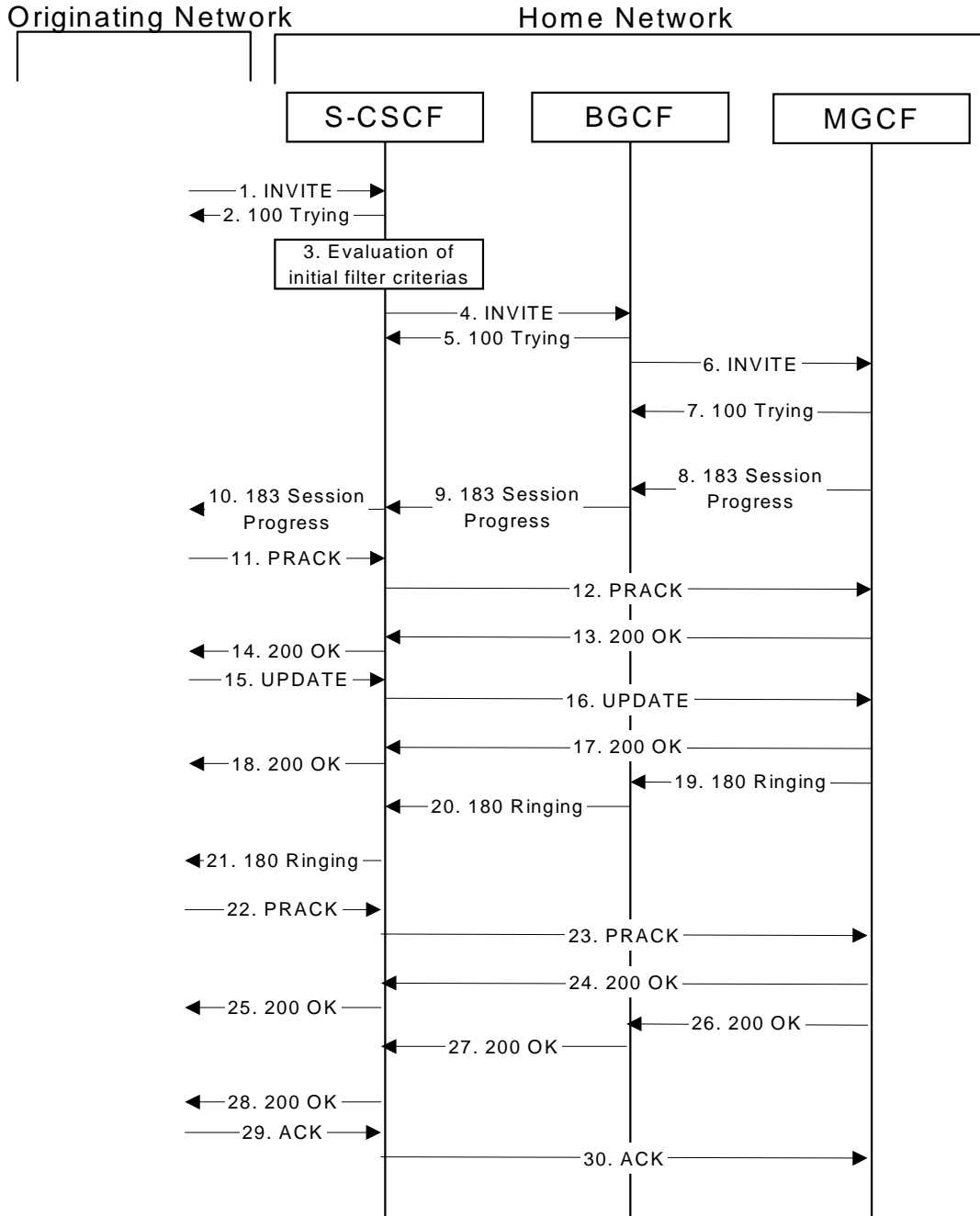


Figure 7.3.6.1-1: S-S#3

Procedure S-S#3 is as follows:

1. INVITE (MO to S-S#3) – see example in table 7.3.6.1-1

The INVITE request is sent from the UE to S-CSCF#1 by the procedures of the originating signalling flow.

Table 7.3.6.1-1: INVITE (MO to S-S#3)

```

INVITE sip: +1-212-555-2222@home1.net;user=phone;scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 69
Route: sip:+1-212-555-2222@home1.net;user=phone
Record-Route: sip:431h23.1@pcscf1.home1.net;lr
Route: sip:scscf1.home1.net;lr
Supported: 100rel
Remote-Party-ID: "John Doe" <tel:+1-212-555-1111>;privacy=off
RPID-Privacy: privacy=off;party=calling

```

```

Anonymity: Off
From: "Alien Blaster" <sip:B36(SHA-1(user1_public1@home1.net; time=36123E5B;
seq=72))@localhost>;tag=171828
To: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: precondition
Supported: 100rel
Contact: sip:[5555::aaa:bbb:ccc:ddd]
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 3400 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv a=qos:mandatory-sendrecv
a=rtpmap:99:MPV
m=video 3402 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv a=qos:mandatory-sendrecv
a=rtpmap:99:MPV
m=audio 3456 RTP/AVP 97 96 0 15
b=AS:25.4
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv a=qos:mandatory-sendrecv
m=audio 3458 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
a=qos:mandatory-sendrecv

```

## 2. 100 Trying (S-S#3 to MO) – see example in table 7.3.6.1-2

S-CSCF#1 responds to the INVITE request (1) with a 100 Trying provisional response.

**Table 7.3.6.1-2: 100 Trying (S-S#3 to MO)**

```

SIP/2.0 100 Trying
Via: SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0

```

## 3. Evaluation of initial filter criterias ~~Service Control~~

S-CSCF#1 validates the service profile of this subscriber and evaluates the initial filter criterias. For this example, assume no Application Server involvement.

~~S-CSCF#1 performs whatever service control logic is appropriate for this session attempt.~~

~~— S-CSCF#1 examines the media parameters, and removes any choices that the subscriber does not have authority to request.~~

~~— For this example, assume the subscriber is not allowed video.~~

#### 4. INVITE (S-CSCF to BGCF) – see example in table 7.3.6.1-4

S-CSCF#1 performs an analysis of the destination address, and determines the destination is on the PSTN. S-CSCF forwards the INVITE request to the BGCF in the local network.

S-CSCF examines the media parameters, and removes any choices that the subscriber does not have authority to request. For this example, assume the subscriber is not allowed video.

**Table 7.3.6.1-4: INVITE (S-CSCF to BGCF)**

```
INVITE sip:+1-212-555-2222@home2.net;user=phonesip:bgcf1.home1.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
Route: sip:+1-212-555-2222@home1.net;user=phone
Record-Route: sip:332b23.1@scscf1.home1.net;lr, sip:431h23.1@pcscf1.home1.net;lr
Route: sip:bgcf1.home1.net
Supported:
Remote-Party-ID: "John Doe" <tel:+1-212-555-1111>;privacy=offscreen=yes
RPID-Privacy:
Anonymity+
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtptime:99:MPV
m=video 0 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtptime:99:MPV
m=audio 3456 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=qos+mandatory-sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtptime:96 G726-32/8000
m=audio 3458 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=qos+mandatory-sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtptime:96 G726-32/8000
```

~~**Route:** In the case of a TEL-URL, it has to be translated to a globally routable SIP-URL before sending the INVITE request. For this address translation the S-CSCF may use the services of an ENUM-DNS based database structure, or any other suitable translation database.~~

**Request-URI:** In the case where the Request-URI of the incoming INVITE request to S-CSCF contains a TEL-URL [5], it has to be translated to a globally routable SIP-URL before applying it as Request-URI of the outgoing INVITE request. For this address translation the S-CSCF shall use the services of an ENUM-DNS protocol according to RFC 2916 [6], or any other suitable translation database. Database aspects of ENUM are outside the scope of this specification.

~~Editor's Note: It remains to be clarified if the use of the word "may" in the above sentence, needs to be changed to "shall". 23.228v170 states that an S-CSCF shall support an ENUM-DNS translation mechanism, so the above text needs to be aligned with Stage 2.~~

#### 5. 100 Trying (BGCF to S-CSCF) – see example in table 7.3.6.1-5

BGCF sends a 100 Trying provisional response to S-CSCF.

**Table 7.3.6.1-5: 100 Trying (BGCF to S-CSCF)**

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

#### 6. INVITE (BGCF to MGCF) – see example in table 7.3.6.1-6

BGCF analyzes the destination address, and allocates a MGCF to handle the termination. BGCF forwards the INVITE request to the MGCF.

**Table 7.3.6.1-6: INVITE (BGCF to MGCF)**

```
INVITE sip:+1-212-555-2222@home2.net;user=phone@mgcf1.home1.net SIP/2.0
Via: SIP/2.0/UDP bgcf1.home1.net;branch=6546q2.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
    SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 67
Record-Route:
Route: sip:mgcf1.home1.net;lr+1-212-555-2222@home1.net;user=phone
Record-Route:
Supported:
Remote-Party-ID:
RPID-Privacy:
Anonymity+
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
```



```

a=
a=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=

```

NOTE: The BGCF does not add itself to the Record-Route header, as it has no need to remain in the signalling path once the session is established.

7. **100 Trying (MGCF to BGCF) – see example in table 7.3.6.1-7**

MGCF responds to the INVITE request (6) with a 100 Trying provisional response.

**Table 7.3.6.1-7: 100 Trying (MGCF to BGCF)**

```

SIP/2.0 100 Trying
Via: SIP/2.0/UDP bgcf1.home1.net;branch=6546q2.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
    SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0

```

8. **183 Session Progress (MGCF to BGCF) – see example in table 7.3.6.1-8**

The MGCF returns the media stream capabilities of the destination along the signalling path in a 183 Session Progress provisional response.

**Table 7.3.6.1-8: 183 Session Progress (MGCF to BGCF)**

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP bgcf1.home1.net;branch=6546q2.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
    SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route: sip:332b23.1@scscf1.home1.net;lr, sip:431h23.1@pcscf1.home1.net;lr
Remote-Party-ID: "John Smith" <tel:+1-212-555-2222>;privacy=off;screen=yes
RPID-Privacy: privacy=off;party=called
Anonymity: Off
Require: 100rel
From:
To: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost; tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: sip:mgcf1.home1.net
RSeq: 9021
Content-Disposition: precondition
Content-Type: application/sdp
Content-Length: (...)

```

```

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97 96
b=AS:25.4-3
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
a=qos+mandatory-sendrecv-confirm
m=audio 0 RTP/AVP 97 96 0 15

```

9. 183 Session Progress (BGCF to S-CSCF) – see example in table 7.3.6.1-9

BGCF forwards the 183 Session Progress provisional response to S-CSCF.

**Table 7.3.6.1-9: 183 Session Progress (BGCF to S-CSCF)**

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route:
Remote-Party-ID:
RPID-Privacy:
Anonymity:
Require:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Disposition:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
m=

```

10. 183 Session Progress (S-S#3 to MO) – see example in table 7.3.6.1-10

S-CSCF#1 forwards the 183 Session Progress to the originator, as per the originating procedure.

**Table 7.3.6.1-10: 183 Session Progress (S-S#3 to MO)**

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route:

```

```

Remote-Party-ID:
RPID-Privacy:
Anonymity:
Require:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Disposition:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=

```

**11. PRACK (MO to S-S#3) – see example in table 7.3.6.1-11**

The originator decides the final set of media streams, and includes this information in the PRACK request sent to S-CSCF#1 by the origination procedures.

**Table 7.3.6.1-11: PRACK (MO to S-S#3)**

```

PRACK sip:mgcfesef1.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 69
Route: sip:scscfmgcf1.home1.net/lr
From: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;tag=171828
To: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 128 PRACK
Require: precondition
Rack: 9021 127 INVITE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=qos+mandatory-sendrecv
m=audio 0 RTP/AVP 97 96 0 15

```

**12. PRACK (S-CSCF to MGCF) – see example in table 7.3.6.1-12**

S-CSCF forwards the PRACK request to MGCF.

**Table 7.3.6.1-12: PRACK (S-CSCF to MGCF)**

```
PRACK sip:mgcf1.home1.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
From:
To:
Call-ID:
Cseq:
Require:
Rack:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
```

**13. 200 OK (MGCF to S-CSCF) – see example in table 7.3.6.1-13**

The MGCF responds to the PRACK request (12) with a 200 OK response.

**Table 7.3.6.1-13: 200 OK (MGCF to S-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15
```

**14. 200 OK (S-S#3 to MO) – see example in table 7.3.6.1-14**

S-CSCF#1 forwards the 200 OK response to the originating endpoint.

**Table 7.3.6.1-14: 200 OK (S-S#3 to MO)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
m=
```

15. **COMETUPDATE** (MO to S-S#3) – see example in table 7.3.6.1-15

When the originating endpoint has completed the resource reservation procedures, it sends the **COMETUPDATE** request to S-CSCF#1 by the origination procedures.

**Table 7.3.6.1-15: COMETUPDATE (MO to S-S#3)**

```
COMETUPDATE sip:sese1mgcfl.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 69
Route: sip:mgcflscscf1.home1.net;lr
From: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;tag=171828
To: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 129 COMETUPDATE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=qos+success-sendonly
m=audio 0 RTP/AVP 97 96 0 15
```

16. **COMETUPDATE** (S-CSCF to MGCF) – see example in table 7.3.6.1-16

S-CSCF forwards the **COMETUPDATE** request to MGCF.

**Table 7.3.6.1-16: COMETUPDATE (S-CSCF to MGCF)**

```
COMETUPDATE sip:mgcfl.home1.net SIP/2.0
```

```
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
m=
```

17. 200 OK (MGCF to S-CSCF) – see example in table 7.3.6.1-17

The MGCF responds to the **COMETUPDATE** request (16) with a 200 OK response.

Table 7.3.6.1-17: 200 OK (MGCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15
```

18. 200 OK (S-S#3 to MO) – see example in table 7.3.6.1-18

S-CSCF#1 forwards the 200 OK response to the originating endpoint.

Table 7.3.6.1-18: 200 OK (S-S#3 to MO)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
```

[Content-Type:](#)  
[Content-Length:](#)

[V=](#)  
[O=](#)  
[S=](#)  
[C=](#)  
[r=](#)  
[m=](#)  
[m=](#)  
[m=](#)  
[b=](#)  
[a=](#)  
[a=](#)  
[a=](#)  
[a=](#)  
[a=](#)  
[a=](#)  
~~m=Content-Length:~~

### 19. 180 Ringing (MGCF to BGCF) – see example in table 7.3.6.1-19

The MGCF may optionally send a 180 Ringing provisional response indicating alerting is in progress. This response is sent by the termination procedure to BGCF.

**Table 7.3.6.1-19: 180 Ringing (MGCF to BGCF)**

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP bgcf1.home1.net;branch=6546q2.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
    SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route: sip:332b23.1@scscf1.home1.net/1r, sip:431h23.1@pcscf1.home1.net/1r
Require: 100rel
From:
To:
Call-ID:
CSeq: 127 INVITE
Require: 100rel
Contact: sip:mgcf1.home1.net
RSeq: 9022
Content-Length: 0
```

### 20. 180 Ringing (BGCF to S-CSCF) – see example in table 7.3.6.1-20

BGCF forwards the 180 Ringing response to S-CSCF.

**Table 7.3.6.1-20: 180 Ringing (BGCF to S-CSCF)**

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route:
Require:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

### ~~21. Service Control~~

~~— The S-CSCF validates the service profile and performs any service control required for this subscriber.~~

### ~~22. 180 Ringing (S-S#3 to MO) – see example in table 7.3.6.1-21~~

~~S-CSCF forwards the 180 Ringing response to the originator, per the origination procedure.~~

**Table 7.3.6.1-212: 180 Ringing (S-S#3 to MO)**

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route:
Require:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

**232. PRACK (MO to S-S#3) – see example in table 7.3.6.1-223**

The originator acknowledges the 180 Ringing provisional response (212) with a PRACK request.

**Table 7.3.6.1-232: PRACK (MO to S-S#3)**

```
PRACK sip:sescfmgcf1.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 69
Route: sip:mgefscscf1.home1.net;lr
From: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;tag=171828
To: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 130 PRACK
Rack: 9022 127 INVITE
Content-Length: 0
```

**243. PRACK (S-CSCF to MGCF) – see example in table 7.3.6.1-234**

S-CSCF forwards the PRACK request to MGCF.

**Table 7.3.6.1-243: PRACK (S-CSCF to MGCF)**

```
PRACK sip:mgcf1.home1.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
From:
To:
Call-ID:
Cseq:
Rack:
Content-Length:
```

**254. 200 OK (MGCF to S-CSCF) – see example in table 7.3.6.1-245**

The MGCF responds to the PRACK request (234) with a 200 OK response.

**Table 7.3.6.1-254: 200 OK (MGCF to S-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

**265. 200 OK (S-S#3 to MO) – see example in table 7.3.6.1-256**

S-CSCF forwards the 200 OK response to the originating endpoint.



**Table 7.3.6.1-256: 200 OK (S-S#3 to MO)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length:
```

**276. 200 OK (MGCF to BGCF) – see example in table 7.3.6.1-267**

The final response, 200 OK, is sent by the MGCF over the signalling path when the subscriber has accepted the incoming session attempt.

**Table 7.3.6.1-267: 200 OK (MGCF to BGCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP bgcf1.home1.net;branch=6546q2.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route: sip:332b23.1@scscf1.home1.net;lr, sip:431h23.1@pcscf1.home1.net;lr
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: sip:mgcf1.home1.net
Content-Type: application/sdp
Content-Length: 0(....)

v=0
o=-2987933615-2987933615-IN-IP6-5555::aaa:bbb:ccc:ddd
s=
e=IN-IP6-5555::eee:fff:aaa:bbb
t=907165275-0
m=video-0-RTP/AVP-99
m=video-0-RTP/AVP-99
m=audio-6544-RTP/AVP-97
b=AS:25.4
a=rtpmap:97-AMR
a=fmtp:97-mode-set=0,2,5,7;maxframes=2
a=qos:success-sendrecv
m=audio-0-RTP/AVP-97-96-0-15
```

**287. 200 OK (BGCF to S-CSCF) – see example in table 7.3.6.1-278**

The 200 OK response is forwarded to the S-CSCF.

**Table 7.3.6.1-278: 200 OK (BGCF to S-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Type:
Content-Length:

v=
o=
s=
e=
t=
m=
m=
m=
b=
a=
a=
a=
m=
```

**29. Service Control**

~~— S-CSCF performs whatever service control logic is appropriate for this session completion.~~

**3028. 200 OK (S-S#3 to MO) – see example in table 7.3.6.1-2830**

The 200 OK is returned to the originating endpoint, by the origination procedure.

**Table 7.3.6.1-2830: 200 OK (S-S#3 to MO)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Type:
Content-Length:

v=
o=
s=
e=
t=
m=
m=
m=
b=
a=
a=
a=
m=
```

**3129. ACK (MO to S-S#3) – see example in table 7.3.6.1-2931**

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

**Table 7.3.6.1-3129: ACK (MO to S-S#3)**

```
ACK sip:sesefmgcf1.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 69
```

```
Route: sip:mgcfscsf1.home1.net;lr
From: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;tag=171828
To: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 ACK
Content-Length: 0
```

### **302. ACK (S-CSCF to MGCF) – see example in table 7.3.6.1-302**

S-CSCF#1 forwards the ACK request to MGCF.

**Table 7.3.6.1-302: ACK (S-CSCF to MGCF)**

```
ACK sip:mgcf1.home1.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
From:
To:
Call-ID:
Cseq:
Content-Length:
```

CR-Form-v5

## CHANGE REQUEST

⌘ **24.228 CR 024** ⌘ rev **1** ⌘ 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

<b>Title:</b>	⌘ S-S#4 flow update		
<b>Source:</b>	⌘ Nokia		
<b>Work item code:</b>	⌘ IMS-CCR	<b>Date:</b>	⌘ 18-04-2002
<b>Category:</b>	⌘ <b>F</b> Use <u>one</u> of the following categories: <b>F</b> (correction) <b>A</b> (corresponds to a correction in an earlier release) <b>B</b> (addition of feature), <b>C</b> (functional modification of feature) <b>D</b> (editorial modification) Detailed explanations of the above categories can be found in 3GPP <a href="http://www.3gpp.org/ftp/Specs/CRs.htm">TR 21.900</a> .	<b>Release:</b>	⌘ REL-5 Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) REL-4 (Release 4) REL-5 (Release 5)

<b>Reason for change:</b>	⌘ Update the S-S#4 flow based on accepted CR #004
<b>Summary of change:</b>	⌘ See CR #004
<b>Consequences if not approved:</b>	⌘ 24.228 call flows are not standard compliant

<b>Clauses affected:</b>	⌘ 7.3.7
<b>Other specs affected:</b>	⌘ <input checked="" type="checkbox"/> Other core specifications ⌘ 24.229 <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications
<b>Other comments:</b>	⌘

### 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](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/](http://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.

## 7.3.7 S-S#4

### 7.3.7.1 (S-S#4) PSTN Termination performed by different operator than origination (MO#2 assumed)

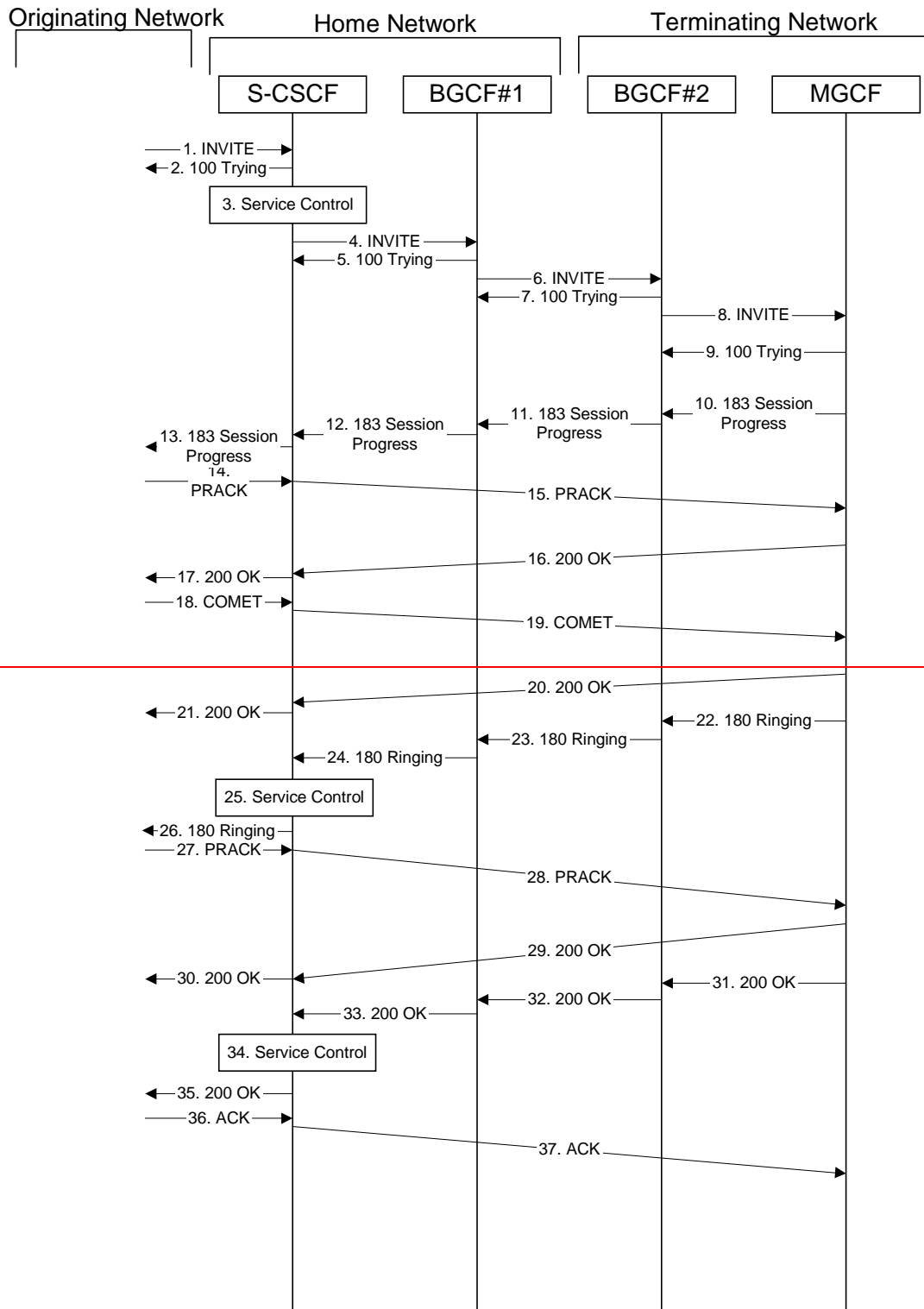
Figure 7.3.7.1-1 shows a S-CSCF handling session origination, which performs an analysis of the destination address, and determines that it will result in a PSTN termination. The request is therefore forwarded to a local BGCF (BGCF#1). BGCF#1 performs further analysis of the destination address, combined with information of agreements between operators for optimum Gateway selection, and decides to do the PSTN termination in a different operator's network. BGCF#1 therefore forwards the request to a BGCF in the terminating operator's network, BGCF#2. BGCF#2 allocates a MGCF within the its network, and sends the request to it. [This example flow does not show Application Server involvement.](#)

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

- MO#1a** Mobile origination, roaming, without a THIG. The "Originating Network" of S-S#4 is therefore a visited network.
- MO#1b** Mobile origination, roaming, with a THIG in home network. 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.
- CS-O** CS Networks origination. The "Originating Network" of S-S#4 is the home network. The element labeled S-CSCF#1 is the MGCF of the CS-O procedure.

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

- CS-T** CS Networks termination.



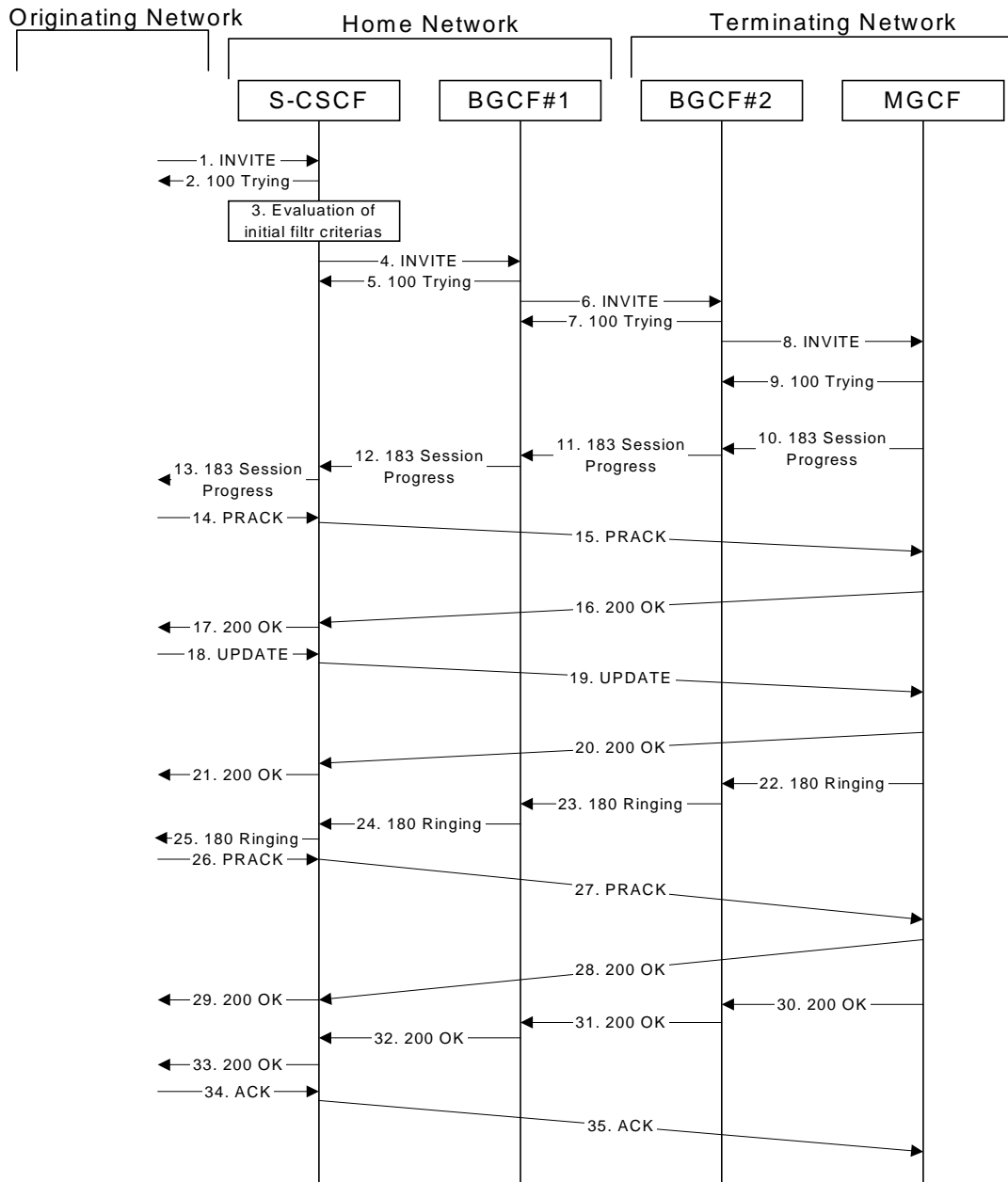


Figure 7.3.7.1-1: S-S#4

Procedure S-S#4 is as follows:

1. INVITE (MO to S-S#4) – see example in table 7.3.7.1-1

The INVITE request is sent from the UE to S-CSCF#1 by the procedures of the originating signalling flow.

Table 7.3.7.1-1: INVITE (MO to S-S#4)

```

INVITE sip:+1-212-555-2222@home1.net;user=phone sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 69
Route: sip:+1-212-555-2222@home1.net;user=phone
Record-Route: sip:431h23.1@pcscf1.home1.net;lr
Route: scscf1.home1.net;lr
Supported: 100rel
Remote-Party-ID: "John Doe" <tel:+1-212-555-1111>;privacy=off
RPID-Privacy: privacy=off;party=calling
Anonymity: Off

```

```

From: "Alien Blaster" <sip:B36(SHA-1(user1_public1@home1.net; time=36123E5B;
seq=72))@localhost>;tag=171828
To: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: precondition
Supported: 100rel
Contact: sip:[5555::aaa:bbb:ccc:ddd]
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 3400 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=qos:mandatory sendrecv
a=rtpmap:99:MPV
m=video 3402 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=qos:mandatory sendrecv
a=rtpmap:99:MPV
m=audio 3456 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
a=qos:mandatory sendrecv
m=audio 3458 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
a=qos:mandatory sendrecv

```

2. **100 Trying (S-S#4 to MO)** – see example in table 7.3.7.1-2

S-CSCF#1 responds to the INVITE request (1) with a 100 Trying provisional response.

**Table 7.3.7.1-2: 100 Trying (S-S#4 to MO)**

```

SIP/2.0 100 Trying
Via: SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0

```

3. **Evaluation of initial filter criterias**

S-CSCF#1 validates the service profile of this subscriber and evaluates the initial filter criterias. For this example, assume no Application Server involvement. **Service Control**

**S-CSCF#1 performs whatever service control logic is appropriate for this session attempt.**



~~S-CSCF#1 examines the media parameters, and removes any choices that the subscriber does not have authority to request.~~

~~For this example, assume the subscriber is not allowed video.~~

#### 4. INVITE (S-CSCF to BGCF) – see example in table 7.3.7.1-4

S-CSCF#1 performs an analysis of the destination address, and determines the destination is on the PSTN. S-CSCF#1 forwards the INVITE request to the BGCF in the local network.

S-CSCF examines the media parameters, and removes any choices that the subscriber does not have authority to request. For this example, assume the subscriber is not allowed video.

**Table 7.3.7.1-4: INVITE (S-CSCF to BGCF)**

```
INVITE sip:+1-212-555-2222@home2.net;user=phone bgef1.home1.net-SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1 SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68Route: sip:+1-212-555-2222@home2.net;user=phone
Record-Route: sip:332b23.1@scscf1.home1.net;lr, sip:431h23.1@pcscf1.home1.net;lr
Route: sip:bgcf1.home1.net;lrSupported:
Remote-Party-ID: "John Doe" <tel:+1-212-555-1111>;privacy=off;screen=yes
RPID-Privacy:
Anonymity+
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
b=AS:54.6
a=curr:gqos local none
a=curr:gqos remote none
a=des:gqos mandatory local sendrecv
a=des:gqos none remote sendrecv
a=rtpmap:99:MPV
m=video 0 RTP/AVP 99
b=AS:54.6
a=curr:gqos local none
a=curr:gqos remote none
a=des:gqos mandatory local sendrecv
a=des:gqos none remote sendrecv
a=rtpmap:99:MPV
m=audio 3456 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:gqos local none
a=curr:gqos remote none
a=des:gqos mandatory local sendrecv
a=des:gqos none remote sendrecv
a=gqos+mandatory-sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
m=audio 3458 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:gqos local none
a=curr:gqos remote none
a=des:gqos mandatory local sendrecv
a=des:gqos none remote sendrecv
a=gqos+mandatory-sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
```

## 5. 100 Trying (BGCF to S-CSCF) – see example in table 7.3.7.1-5

BGCF#1 sends a 100 Trying provisional response to S-CSCF#1.

**Table 7.3.7.1-5: 100 Trying (BGCF to S-CSCF)**

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

## 6. INVITE (BGCF to BGCF) – see example in table 7.3.7.1-6

BGCF#1 analyses the destination address, and the inter-operator agreements for optimal PSTN termination, and selects the network operator that can best terminate this session. BGCF#1 forwards the INVITE request to the BGCF (BGCF#2) in the network that will handle the session termination.

**Table 7.3.7.1-6: INVITE (BGCF to BGCF)**

```
INVITE sip:+1-212-555-2222@home2.net;user=phonebgcf2.home2.net SIP/2.0
Via: SIP/2.0/UDP bgcf1.home1.net;branch=6546q2.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
    SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 67
Record-Route:
Route: sip:bgcf2.home2.net;lr+1-212-555-2222@home2.net;user=phone
Record-Route:
Supported:
Remote-Party-ID:
RPID-Privacy:
Anonymity:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
m=
m=
b=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
```

m=  
b=  
a=  
a=  
a=  
a=  
a=  
a=  
a=

7. 100 Trying (BGCF to BGCF) – see example in table 7.3.7.1-7

BGCF#2 responds to the INVITE request (6) with a 100 Trying provisional response.

Table 7.3.7.1-7: 100 Trying (BGCF to BGCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP bgcf1.home1.net;branch=6546q2.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
    SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

8. INVITE (BGCF to MGCF) – see example in table 7.3.7.1-8

BGCF#2 allocates a Media Gateway Controller, and forwards the INVITE request to that MGCF.

Table 7.3.7.1-8: INVITE (BGCF to MGCF)

```
INVITE sip:+1-212-555-2222@home2.net;user=phonemgcf2.home2.net SIP/2.0
Via: SIP/2.0/UDP bgcf2.home2.net;branch=456u71.1, SIP/2.0/UDP bgcf1.home1.net;branch=6546q2.1,
    SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 66
Record-Route:
Route: sip:mgcf2.home2.netsip:+1-212-555-2222@home2.net;user=phone
Record-Route: Supported:
Remote-Party-ID:
RPID-Privacy:
Anonymity:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
m=
```



```

RSeq: 9021
Content-Disposition: precondition
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97 96
b=AS:25.4-3
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
a=qos:mandatory sendrecv confirm
m=audio 0 RTP/AVP 97 96 0 15

```

**11. 183 Session Progress (BGCF to BGCF) – see example in table 7.3.7.1-11**

BGCF#2 forwards the 183 Session Progress provisional response to BGCF#1.

**Table 7.3.7.1-11: 183 Session Progress (BGCF to BGCF)**

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP bgcf1.home1.net;branch=6546q2.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
    SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route:
Remote-Party-ID:
RPID-Privacy:
Anonymity:
Require:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Disposition:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
m=

```

### 12. 183 Session Progress (BGCF to S-CSCF) – see example in table 7.3.7.1-12

BGCF#1 forwards the 183 Session Progress provisional response to S-CSCF.

**Table 7.3.7.1-12: 183 Session Progress (BGCF to S-CSCF)**

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route:
Remote-Party-ID:
RPID-Privacy:
Anonymity:
Require:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Disposition:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
```

### 13. 183 Session Progress (S-S#4 to MO) – see example in table 7.3.7.1-13

S-CSCF#1 forwards the 183 Session Progress response to the originator, as per the originating procedure.

**Table 7.3.7.1-13: 183 Session Progress (S-S#4 to MO)**

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route:
Remote-Party-ID:
RPID-Privacy:
Anonymity:
Require:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Disposition:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
```

```
m=  
m=  
b=  
a=  
a=  
a=  
a=  
a=  
a=  
a=  
m=
```

#### 14. PRACK (MO to S-S#4) – see example in table 7.3.7.1-14

The originator decides the final set of media streams, and includes this information in the PRACK request sent to S-CSCF by the origination procedures.

**Table 7.3.7.1-14: PRACK (MO to S-S#4)**

```
PRACK sip:mgcf2.home2.netsip:scscf1.home1.net SIP/2.0  
Via: SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]  
Max-Forwards: 69  
Route: sip:scscf1.home1.net;lrsip:6546q2.1@bgcf1.home1.net, sip:456u71.1@bgcf2.home2.net,  
sip:mgcf2.home2.net  
From: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;tag=171828  
To: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159  
Call-ID: cb03a0s09a2sdfglkj490333  
Cseq: 128 PRACK  
Require: precondition  
Rack: 9021 127 INVITE  
Content-Type: application/sdp  
Content-Length: (...)  
  
v=0  
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd  
s=-  
c=IN IP6 5555::aaa:bbb:ccc:ddd  
t=907165275 0  
m=video 0 RTP/AVP 99  
m=video 0 RTP/AVP 99  
m=audio 3456 RTP/AVP 97  
b=AS:25.4  
a=curr:gosp local none  
a=curr:gosp remote none  
a=des:gosp mandatory local sendrecv  
a=des:gosp mandatory remote sendrecv  
a=rtptime:97 AMR  
a=fmtp:97 mode-set=0,2,5,7; maxframes=2  
a=gosp:mandatory sendrecv  
m=audio 0 RTP/AVP 97 96 0 15
```

#### 15. PRACK (S-CSCF to MGCF) – see example in table 7.3.7.1-15

S-CSCF forwards the PRACK request to the MGCF.

**Table 7.3.7.1-15: PRACK (BGCF to MGCF)**

```
PRACK sip:mgcf2.home2.net SIP/2.0  
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,  
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]  
Max-Forwards: 68  
From:  
To:  
Call-ID:  
Cseq:  
Require:  
Rack:  
Content-Type:  
Content-Length:  
  
v=  
o=
```

```
s=  
c=  
t=  
m=  
m=  
m=  
b=  
a=  
a=  
a=  
a=  
a=  
a=  
m=
```

**16. 200 OK (MGCF to S-CSCF) – see example in table 7.3.7.1-16**

The MGCF responds to the PRACK request (15) with a 200 OK response.

**Table 7.3.7.1-16: 200 OK (MGCF to BGCF)**

```
SIP/2.0 200 OK  
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,  
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]  
From:  
To:  
Call-ID:  
CSeq:  
Content-Length: 0  
Content-Type: application/sdp  
Content-Length: (...)  
  
v=0  
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd  
s=-  
c=IN IP6 5555::eee:fff:aaa:bbb  
t=907165275 0  
m=video 0 RTP/AVP 99  
m=video 0 RTP/AVP 99  
m=audio 6544 RTP/AVP 97  
b=AS:25.4  
a=curr:qos local none  
a=curr:qos remote none  
a=des:qos mandatory local sendrecv  
a=des:qos mandatory remote sendrecv  
a=conf:qos remote sendrecv  
a=rtpmap:97 AMR  
a=fmtp:97 mode-set=0,2,5,7; maxframes=2  
m=audio 0 RTP/AVP 97 96 0 15
```

**17. 200 OK (S-S#4 to MO) – see example in table 7.3.7.1-17**

S-CSCF forwards the 200 OK response to the originating endpoint.

**Table 7.3.7.1-17: 200 OK (S-S#4 to MO)**

```
SIP/2.0 200 OK  
Via: SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]  
From:  
To:  
Call-ID:  
CSeq:  
Content-Type:  
Content-Length:  
  
v=  
o=  
s=  
c=  
t=  
m=  
m=  
m=
```



```
b=  
a=  
a=  
a=  
a=  
a=  
a=  
a=  
a=  
m=Content-Length:
```

18. **COMETUPDATE** (MO to S-S#4) – see example in table 7.3.7.1-18

When the originating endpoint has completed the resource reservation procedures, it sends the **COMETUPDATE** request to S-CSCF#1 by the origination procedures.

Table 7.3.7.1-18: **COMETUPDATE** (MO to S-S#4)

```
COMETUPDATE sip:mgcf2.home2.netsip:sescf1.home1.net SIP/2.0  
Via: SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]  
Max-Forwards: 69  
Route: sip:scscf1.home1.net;lrsip:mgcf2.home2.net  
From: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;tag=171828  
To: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159  
Call-ID: cb03a0s09a2sdfglkj490333  
Cseq: 129 COMETUPDATE  
Content-Type: application/sdp  
Content-Length: (...)  
  
v=0  
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd  
s=-  
c=IN IP6 5555::aaa:bbb:ccc:ddd  
t=907165275 0  
m=video 0 RTP/AVP 99  
m=video 0 RTP/AVP 99  
m=audio 3456 RTP/AVP 97  
b=AS:25.4  
a=curr:qos local sendrecv  
a=curr:qos remote none  
a=des:qos mandatory local sendrecv  
a=des:qos mandatory remote sendrecv  
a=rtpmap:97 AMR  
a=fmtp:97 mode-set=0,2,5,7; maxframes=2  
a=qos:succcess-sendonly  
m=audio 0 RTP/AVP 97 96 0 15
```

19. **COMETUPDATE** (BGCF to MGCF) – see example in table 7.3.7.1-19

S-CSCF forwards the **COMETUPDATE** request to the MGCF.

Table 7.3.7.1-19: **COMETUPDATE** (BGCF to MGCF)

```
COMETUPDATE sip:mgcf2.home2.net SIP/2.0  
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,  
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]  
Max-Forwards: 68  
From:  
To:  
Call-ID:  
Cseq:  
Content-Type:  
Content-Length:  
  
v=  
o=  
s=  
c=  
t=  
m=  
m=  
m=  
b=  
a=
```

```
a=  
a=  
m=
```

## 20. 200 OK (MGCF to BGCF) – see example in table 7.3.7.1-20

The MGCF responds to the [COMETUPDATE](#) request (19) with a 200 OK response.

**Table 7.3.7.1-20: 200 OK (MGCF to BGCF)**

```
SIP/2.0 200 OK  
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,  
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]  
From:  
To:  
Call-ID:  
CSeq:  
Content-Length: 0Content-Type: application/sdp  
Content-Length: (...)  
  
v=0  
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd  
s=-  
c=IN IP6 5555::eee:fff:aaa:bbb  
t=907165275 0  
m=video 0 RTP/AVP 99  
m=video 0 RTP/AVP 99  
m=audio 6544 RTP/AVP 97  
b=AS:25.4  
a=curr:qos local none  
a=curr:qos remote none  
a=des:qos mandatory local sendrecv  
a=des:qos mandatory remote sendrecv  
a=conf:qos remote sendrecv  
a=rtptime:97 AMR  
a=fmtp:97 mode-set=0,2,5,7; maxframes=2  
m=audio 0 RTP/AVP 97 96 0 15
```

## 21. 200 OK (S-S#4 to MO) – see example in table 7.3.7.1-21

S-CSCF#1 forwards the 200 OK response to the originating endpoint.

**Table 7.3.7.1-21: 200 OK (S-S#4 to MO)**

```
SIP/2.0 200 OK  
Via: SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]  
From:  
To:  
Call-ID:  
CSeq:  
Content-Length:Content-Type:  
Content-Length:  
  
v=  
o=  
s=  
c=  
t=  
m=  
m=  
m=  
b=  
a=  
a=  
a=  
a=  
a=  
a=  
a=  
m=
```

## 22. 180 Ringing (MGCF to BGCF) – see example in table 7.3.7.1-22

The MGCF may optionally send a 180 Ringing provisional response indicating alerting is in progress.

**Table 7.3.7.1-22: 180 Ringing (MGCF to BGCF)**

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP bgcf2.home2.net;branch=456u71.1, SIP/2.0/UDP bgcf1.home1.net;branch=6546q2.1,
    SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route: sip:_332b23-1@scscf1.home1.net;lr, sip:_431h23-1@pcscf1.home1.net;lr
Require: 100rel
From:
To:
Call-ID:
CSeq: 127 INVITE
Require: 100rel
Contact: sip:mgcf2.home2.net
RSeq: 9022
Content-Length: 0
```

## 23. 180 Ringing (BGCF to BGCF) – see example in table 7.3.7.1-23

BGCF#2 forwards the 180 Ringing response to BGCF#1.

**Table 7.3.7.1-23: 180 Ringing (BGCF to BGCF)**

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP bgcf1.home1.net;branch=6546q2.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
    SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route:
Require:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

## 24. 180 Ringing (BGCF to S-CSCF) – see example in table 7.3.7.1-24

BGCF#1 forwards the 180 Ringing response to S-CSCF.

**Table 7.3.7.1-24: 180 Ringing (BGCF to S-CSCF)**

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route:
Require:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

## 25. Service Control

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

## 26. 180 Ringing (S-S#4 to MO) – see example in table 7.3.7.1-26

S-CSCF#1 forwards the 180 Ringing response to the originator, per the origination procedure.

**Table 7.3.7.1-25: 180 Ringing (S-S#4 to MO)**

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route:
Require:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

**276. PRACK (MO to S-S#4) – see example in table 7.3.7.1-276**

The originator acknowledges the 180 Ringing provisional response (3325) with a PRACK request.

**Table 7.3.7.1-276: PRACK (MO to S-S#4)**

```
PRACK sip:mgcf2.home2.net;sip:sescf1.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 69
Route: sip:scscf1.home1.net;lr:sip:mgcf2.home2.net
From: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;tag=171828
To: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 130 PRACK
Rack: 9022 127 INVITE
Content-Length: 0
```

**287. PRACK (BGCF to MGCF) – see example in table 7.3.7.1-278**

S-CSCF forwards the PRACK request to the MGCF.

**Table 7.3.7.1-287: PRACK (S-CSCF to MGCF)**

```
PRACK sip:mgcf2.home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
From:
To:
Call-ID:
Cseq:
Rack:
Content-Length:
```

**298. 200 OK (MGCF to S-CSCF) – see example in table 7.3.7.1-289**

The MGCF responds to the PRACK request (287) with a 200 OK response.

**Table 7.3.7.1-288: 200 OK (MGCF to S-SCSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home2.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

**3029. 200 OK (S-S#4 to MO) – see example in table 7.3.7.1-2930**

S-CSCF forwards the 200 OK to the originating endpoint.

**Table 7.3.7.1-2930: 200 OK (S-S#4 to MO)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length:
```

**340. 200 OK (MGCF to BGCF) – see example in table 7.3.7.1-301**

The final response, 200 OK, is sent by the MGCF when the subscriber has accepted the incoming session attempt.

**Table 7.3.7.1-301: 200 OK (MGCF to BGCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route: sip:332b23.1@scscf1.home1.net;lr, sip:_431h23.1@pcscf1.home1.net;lr
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: sip:mgcf2.home2.net
Content-Type: application/sdp
Content-Length: 0(. . .)

v=0
o=-2987933615-2987933615-IN-IP6-5555::aaa:bbb:ccc:ddd
s=
e=IN-IP6-5555::eee:fff:aaa:bbb
t=907165275-0
m=video-0-RTP/AVP-99
m=video-0-RTP/AVP-99
m=audio-6544-RTP/AVP-97
b=AS:25.4
a=rtpmap:97-AMR
a=fmtp:97-mode-set=0,2,5,7;maxframes=2
a=qos:success-sendrecv
m=audio-0-RTP/AVP-97-96-0-15
```

**321. 200 OK (BGCF to BGCF) – see example in table 7.3.7.1-321**

BGCF#2 forwards the 200 OK final response to BGCF#1.

**Table 7.3.7.1-321: 200 OK (BGCF to BGCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP bgcf1.home.net, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Type:
Content-Length:

v=
e=
s=
e=
t=
m=
m=
m=
b=
a=
a=
a=
```

**332. 200 OK (BGCF to S-CSCF) – see example in table 7.3.7.1-323**

BGCF#1 forwards the 200 OK final response to S-CSCF.

**Table 7.3.7.1-332: 200 OK (BGCF to S-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Type:
Content-Length:

v=
e=
s=
e=
t=
m=
m=
m=
b=
a=
a=
a=
```

**34. Service Control**

~~— S-CSCF performs whatever service control logic is appropriate for this session completion.~~

**353. 200 OK (S-S#4 to MO) – see example in table 7.3.7.1-335**

The 200 OK response is returned to the originating endpoint, by the origination procedure.

**Table 7.3.7.1-353: 200 OK (S-S#4 to MO)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Type:
Content-Length:

v=
e=
s=
e=
t=
m=
m=
b=
a=
a=
```

**364. ACK (MO to S-S#4) – see example in table 7.3.7.1-346**

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

**Table 7.3.7.1-346: ACK (MO to S-S#4)**

```
ACK sip:mgcf2.home2.net;sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 69
Route: sip:scscf1.home1.net;sip:mgcf2.home2.net
From: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;tag=171828
To: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
Call-ID: cb03a0s09a2sdfgkjlj490333
Cseq: 127 ACK
Content-Length: 0
```

**375. ACK (S-CSCF to MGCF) – see example in table 7.3.7.1-357**

S-CSCF forwards the ACK request to the MGCF.

**Table 7.3.7.1-375: ACK (S-CSCF to MGCF)**

```
ACK sip:mgcf2.home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
From:
To:
Call-ID:
Cseq:
Content-Length:
```

## CHANGE REQUEST

⌘ **24.228** CR **025** ⌘ rev **3** ⌘ Current version: **5.0.0** ⌘  
**2**

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

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

<b>Title:</b>	⌘ CS-O, CS-T Reference flow update		
<b>Source:</b>	⌘ <a href="#">Nokia</a> <del>Nortel</del> Networks		
<b>Work item code:</b>	⌘ IMS-CCR	<b>Date:</b>	⌘ 18-04-2002
<b>Category:</b>	⌘ <b>F</b>	<b>Release:</b>	⌘ Rel-5
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	<b>F</b> (correction)	<b>2</b> (GSM Phase 2)	
	<b>A</b> (corresponds to a correction in an earlier release)	<b>R96</b> (Release 1996)	
	<b>B</b> (addition of feature),	<b>R97</b> (Release 1997)	
	<b>C</b> (functional modification of feature)	<b>R98</b> (Release 1998)	
	<b>D</b> (editorial modification)	<b>R99</b> (Release 1999)	
	Detailed explanations of the above categories can be found in 3GPP <a href="#">TR 21.900</a> .		<b>REL-4</b> (Release 4)
			<b>REL-5</b> (Release 5)

<b>Reason for change:</b>	⌘ <a href="#">Revision 3: branch paramater related changes are removed since those are covered in CR#040</a> Update the CS-O and CS-T flows based on accepted CR #004		
<b>Summary of change:</b>	⌘ See CR #004		
<b>Consequences if not approved:</b>	⌘ 24.228 call flows are not standard compliant		

<b>Clauses affected:</b>	⌘ 7.2.4, 7.4.4		
<b>Other specs affected:</b>	⌘ <input type="checkbox"/> Other core specifications	⌘	
	<input type="checkbox"/> Test specifications		
	<input type="checkbox"/> O&M Specifications		
<b>Other comments:</b>	⌘		

### 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](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.



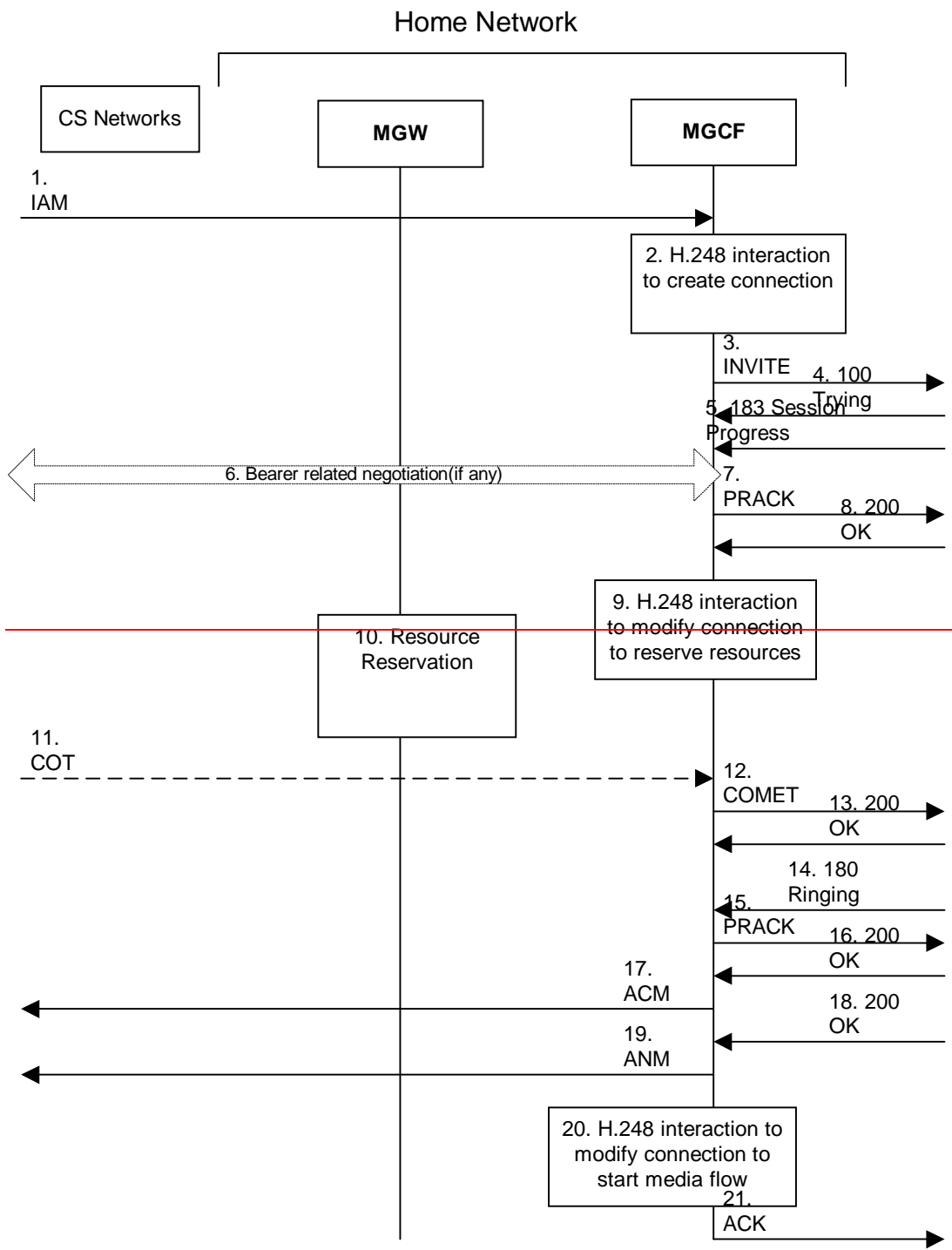
## 7.2.4 (CS-O) CS Networks origination

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

Due to routing of sessions within the CS Networks, this origination procedure will only occur in the home network of the destination subscriber. However, the destination subscriber may be roaming in a different operator's network. Further, due to cases of session forwarding and electronic surveillance, the destination of the session through the IM subsystem may actually be another CS Networks termination.

### 7.2.4.1 CS Networks originated sessions routed towards IM CN subsystem (through MGCF) (S-S#2, MT#2 assumed)

This clause and figure 7.2.4.1-1 presents only the case of CS Networks originated sessions routed towards the IM CN subsystem reaching first a MGCF.



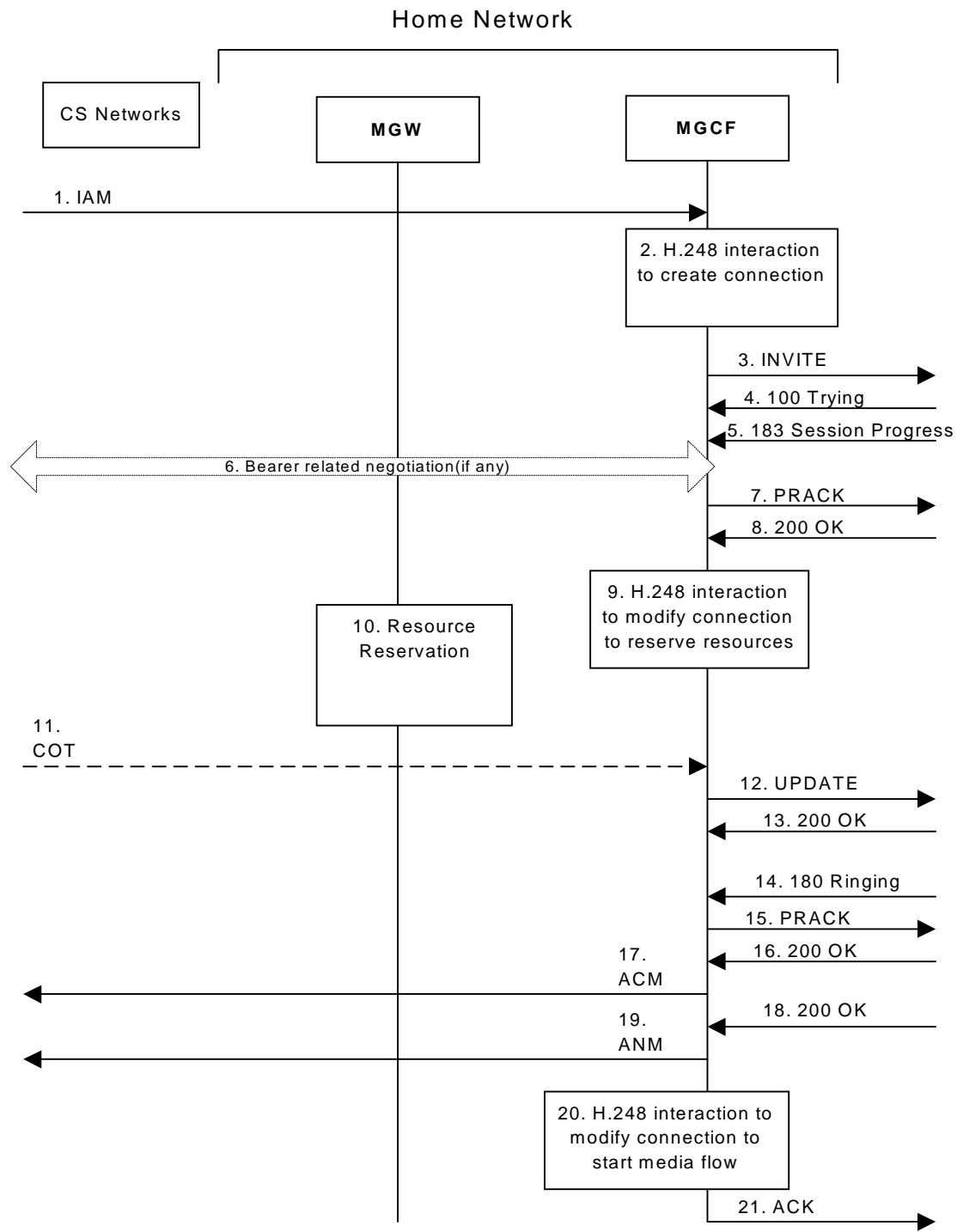


Figure 7.2.4.1-1: CS Networks origination

The CS Networks Origination procedure is as follows:

1. SS7: IAM

The CS Network establishes a bearer path to the MGW, and signals to the MGCF with a IAM message, giving the trunk identity, destination information and optionally the continuity indication.

2. H.248 Interaction

The MGCF initiates a H.248 command, to seize the trunk and an IP port.

### 3. INVITE (CS-O to S-S) – see example in table 7.2.4.1-3

The MGCF initiates an INVITE request, containing an initial SDP, as per the proper S-CSCF to S-CSCF procedure.

**Table 7.2.4.1-3: INVITE (CS-O to S-S)**

```
INVITE sip:+1-212-555-2222@home1.net;user=phone SIP/2.0
Via: SIP/2.0/UDP mgcf1.home1.net;branch=543b27.1
Max-Forwards: 70
Supported: 100rel
Remote-Party-ID: "John Doe" <tel:+1-212-555-1111>;privacy=off;screen=yes
RPID-Privacy: privacy=off;party=calling
Anonymity: Off
From: <sip:B36(SHA-1(+1-212-555-1111; time=36123E5B; seq=72))@localhost>;tag=171828
To: <sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: precondition
Supported: 100rel
Contact: sip: mgcf1.home1.net
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=audio 3456 RTP/AVP 97 3 96
b=AS:25.4
a=curr:gosp local none
a=curr:gosp remote none
a=des:gosp mandatory local sendrecv
a=des:gosp none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
a=gosp:mandatory sendrecv
```

<b>Request-URI:</b>	Contains the keyed number from the user, as obtained from CS Networks signalling.
<b>Via:</b>	Contains the IP address or FQDN of the originating MGCF.
<b>Remote-Party-ID:</b>	Contains the identity of the originator. The Display name is optional.
<b>From:/To:/Call-ID:</b>	Follow the recommendations of draft-ietf-sip-privacy-01 [13], even though anonymity is not being requested for this session.
<b>Cseq:</b>	A random starting number.
<b>Contact:</b>	Is the SIP URL that contains the IP address or FQDN of the originating UE.
<b>SDP</b>	The SDP contains a preconfigured set of codecs supported by the MGW.

### 4. 100 Trying (S-S to CS-O) – see example in table 7.2.4.1-4

MGCF receives a 100 Trying provisional response, as specified by the S-CSCF to S-CSCF procedures.

**Table 7.2.4.1-4: 100 Trying (S-S to CS-O)**

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP mgcf1.home1.net;branch=543b27.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

### 5. 183 Session Progress (S-S to CS-O) – see example in table 7.2.4.1-5

The media stream capabilities of the destination are returned along the signalling path, in a 183 Session Progress provisional response, per the S-CSCF to S-CSCF procedures.

**Table 7.2.4.1-5: 183 Session Progress (S-S to CS-O)**

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP mgcf1.home1.net;branch=543b27.1
Record-Route: sip:pcscf2.home1.net;lr, sip:scscf2.home1.net;lr
Remote-Party-ID: "John Smith" <tel:+1-212-555-2222>;privacy=off;screen=yes
Anonymity: Off
Require: 100rel
RPID-Privacy: privacy=off;party=called
From:
To: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost; tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: sip:[5555::eee:fff:aaa:bbb]
RSeq: 9021
Content-Disposition: precondition
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=audio 6544 RTP/AVP 97
b=AS:25.4 3
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=qos:mandatory-sendrecv-confirm
```

Upon receiving the 183 Session Progress, the MGCF stores the following information about this session – see example in table 7.2.4.1-6b. calculates the proper Route header to add to future requests, and saves that information. The saved value of the Route header is:

**Table 7.2.4.1-6b: Storage of information at MGCF**

```
Request-URI: sip:+1-212-555-2222@home1.net;user=phone
From: <sip:B36(SHA-1(+1-212-555-1111; time=36123E5B; seq=72))@localhost>;tag=171828
To: <sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost>
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 127 INVITE
Route: sip:scscf2.home1.net, sip:pcscf2.home1.net,sip:[5555::eee:fff:aaa:bbb]
```

### 6. Possible bearer related negotiation takes place

Steps 6 and 7 can be done in an arbitrary order.

## 7. PRACK (CS-O to S-S) – see example in table 7.2.4.1-7

MGCF decides the final set of media streams for this session, and includes this information in the PRACK request, send to the destination per the S-CSCF to S-CSCF procedures.

**Table 7.2.4.1-7: PRACK (CS-O to S-S)**

```
PRACK sip:[5555::eee:fff:aaa:bbb]scscf2.home1.net--SIP/2.0
Via: SIP/2.0/UDP mgcf1.home1.net;branch=543b27.1
Max-Forwards: 70
Route: sip:scscf2.home1.net;lr, sip:pcscf2.home1.net;lr,sip:[5555::eee:fff:aaa:bbb]
From: <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;tag=171828
To: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 128 PRACK
Require:
Rack: 9021 127 INVITE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=qos:mandatory sendrecv
```

- Request-URI:** Takes the first component of the saved Route header.
- Via:** Takes the value of either the IP address or FQDN of the originating MGCF.
- Route:** Takes the saved Route header without the first component.
- From:/To:/Call-ID:** Copied from the 183 Session Progress response so that they include any tag parameter.
- Cseq:** Takes a higher value than that in the previous request.

*The final selection of the media stream from the set of those supported by the terminating endpoint, given in the received 183 Session Progress response (5), is made by the originating MGCF and included in the SDP.*

## 8. 200 OK (S-S to CS-O) – see example in table 7.2.4.1-8

The destination responds to the PRACK request (76) with a 200 OK response.

**Table 7.2.4.1-8: 200OK (S-S to CS-O)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP mgcf1.home1.net;branch=543b27.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
```

```

c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:goss local none
a=curr:goss remote none
a=des:goss mandatory local sendrecv
a=des:goss mandatory remote sendrecv
a=conf:goss remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2

```

## 9. H.248 Interaction

MGCF initiates a H.248 command to modify the connection parameters and instruct the MGW to reserve the resources needed for the session.

### 10. Reserve Resources

MGW reserves the resources needed for the session.

### 11. COT

In case the IAM had contained a continuity indication, the COT message arrives to the MGCF.

### 12. **COMET-UPDATE** (CS-O to S-S) – see example in table 7.2.4.1-12

When the resource reservation is completed and the possible COT message is received, MGCF sends the **COMET-UPDATE** request to the terminating endpoint, per the S-S procedures.

**Table 7.2.4.1-12: **COMET-UPDATE** (CS-O to S-S)**

```

COMET-UPDATE sip:[5555::eee:fff:aaa:bbb] sscsf2.home1.net SIP/2.0
Via: SIP/2.0/UDP mgcf1.home1.net;branch=543b27.1
Max-Forwards: 70
Route: sip:scsf2.home1.net;lr,sip:pcscf2.home1.net;lr,sip:[5555::eee:fff:aaa:bbb]
From: "Alien Blaster"<sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;tag=171828
To: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 129 COMETUPDATE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:goss local sendrecv
a=curr:goss remote none
a=des:goss mandatory local sendrecv
a=des:goss mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=goss:success-sendonly

```

**Request-URI:** The first component of saved the Route header.

**Via:** Contains the IP address or FQDN of the originating MGCF.

**Route:** Takes the saved Route header without the first component.

**From:/To:/Call-ID:** Copied from the 183 Session Progress response so that they include any tag parameters.

**Cseq:** Takes a higher value than that in the previous request.

The SDP indicates that the resource reservation was successful [in the local segment](#).

### 13. 200 OK (S-S to CS-O) – see example in table 7.2.4.1-13

The destination endpoint responds to the ~~COMET-UPDATE~~ request (120) with a 200 OK response.

**Table 7.2.4.1-13: 200 OK (S-S to CS-O)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP mgcf1.home1.net;branch=543b27.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
```

[The SDP indicates that the resource reservation was successful both in the local and the remote segment.](#)

### 14. 180 Ringing (S-S to CS-O) – see example in table 7.2.4.1-14

The destination endpoint may optionally perform alerting. If so, it signals this to the calling party by a 180 Ringing provisional response. This response is sent to MGCF per the S-CSCF to S-CSCF procedure.

**Table 7.2.4.1-14: 180 Ringing (S-S to CS-O)**

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP mgcf1.home1.net;branch=543b27.1
Record-Route: sip:pcscf2.home1.net;lr, sip:scscf2.home1.net;lr
Require: 100rel
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: sip:[5555::eee:fff:aaa:bbb]
RSeq: 9022
Content-Length: 0
```

### 15. PRACK (CS-O to S-S) – see example in table 7.2.4.1-15

MGCF acknowledges the 180 Ringing provisional response (142) with a PRACK request. MGCF adds the Route header corresponding to the session.

**Table 7.2.4.1-15: PRACK (CS-O to S-S)**

```
PRACK sip:[5555::eee:fff:aaa:bbb] scscf2.home1.net-SIP/2.0
Via: SIP/2.0/UDP mgcf1.home1.net;branch=543b27.1
Max-Forwards: 70
```



```
Route: sip:scscf2.home1.net;lr, sip:pcscf2.home1.net;lr, sip:[5555::eee:fff:aaa:bbb]
From: <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;tag=171828
To: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
Call-ID:
Cseq: 130 PRACK
Rack: 9022 127 INVITE
Content-Length: 0
```

#### 16. 200 OK (S-S to CS-O) – see example in table 7.2.4.1-16

The destination endpoint responds to the PRACK request (153) with a 200 OK response.

**Table 7.2.4.1-16: 200 OK (S-S to CS-O)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP mgcf1.home1.net;branch=543b27.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

#### 17. SS7: ACM

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

#### 18. 200 OK (S-S to CS-O) – see example in table 7.2.4.1-18

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

**Table 7.2.4.1-18: 200 OK (S-S to CS-O)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP mgcf1.home1.net;branch=543b27.1
Record-Route: sip:pcscf2.home1.net;lr, sip:scscf2.home1.net;lr
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: sip:[5555::eee:fff:aaa:bbb]
Content-Type: application/sdp
Content-Length: 0(....)

v=0
o=2987933615-2987933615-IN-IP6-5555::aaa:bbb:ccc:ddd
s=
e=IN-IP6-5555::eee:fff:aaa:bbb
t=907165275-0
m=audio-6544-RTP/AVP-97
b=AS:25.4
a=rtpmap:97-AMR
a=fmtp:97-mode-set=0,2,5,7;maxframes=2
a=qos:success-sendrecv
```

#### 19. SS7: ANM

MGCF forwards an ANM message to the CS Networks.

#### 20. H.248: Interaction

MGCF initiates a H.248 command to alter the connection at MGW to make it bidirectional.

#### 21. ACK (CS-O to S-S) – see example in table 7.2.4.1-21

MGCF acknowledges the 200 OK final response (186) with an ACK request.

**Table 7.2.4.1-21: ACK (CS-O to S-S)**

```
ACK sip:[5555::eee:fff:aaa:bbb]_scscf2.home1.net SIP/2.0
Via: SIP/2.0/UDP mgcf1.home1.net;branch=543b27.1
Max-Forwards: 70
Route: sip:pcscf2.home1.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq: 127 ACK
Content-Length: 0
```

**Request-URI:** the first component of the saved Route header.

**Route:** takes the saved Route header without the first component.

**Cseq:** is required to be the same value as Cseq is original INVITE request [3]

#### 7.2.4.2 CS Networks originated sessions routed towards CS domain (through G-MSC) (not provided)

An example of this flow is not shown in the present document.

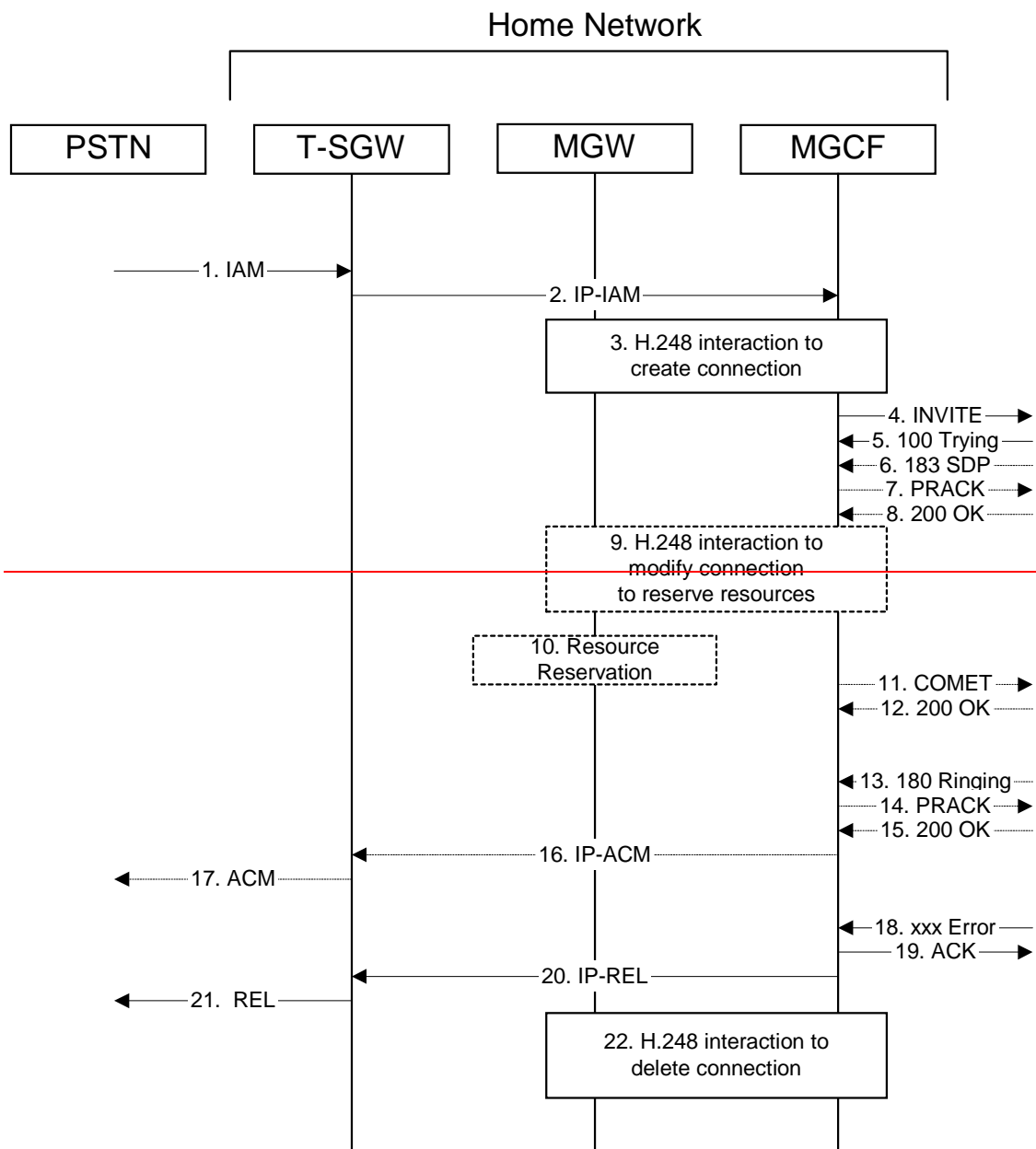
#### 7.2.4.3 CS Networks originated sessions routed either towards IM CN subsystem or towards CS domain (not provided)

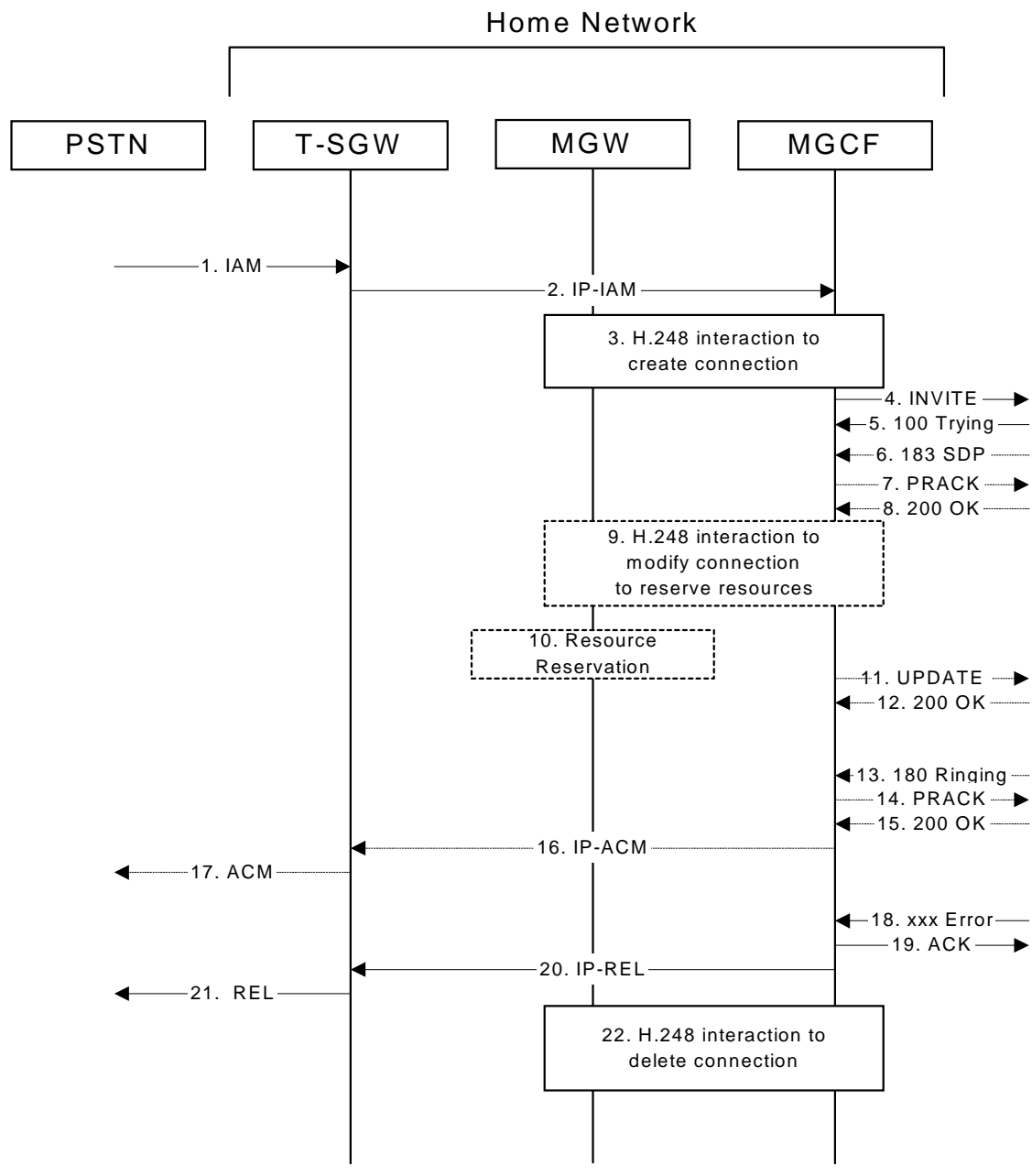
An example of this flow is not shown in the present document.

#### 7.2.4.4 Failure in termination procedure

The PSTN subscriber that initiated a session with procedure CS-O had the attempt fail due to an error detected in the Termination procedure or in the S-CSCF-to-S-CSCF procedure. This could be due to, for example, destination busy (error code 486), destination service denied (error code 403), destination currently out of coverage (error code 480), or some other error.

Depending on the exact error that causes the session initiation failure, and when the error situation was detected, the originator could be at many different stages in the session establishment procedure. This is shown in figure 7.2.4.4-1, as optional messages 5-17 that may appear in this error procedure.





**Figure 7.2.4.4-1: Failure in termination procedure**

**4. INVITE (MGCF to S-S) et seq**

The PSTN originator initiated a session, as described in subclause 7.2.4.1.

**5-17.100 Trying (S-S to CS-O) et seq**

Session initiation possibly continued, prior to detection of a failure condition, as described in subclause 7.2.4.1.

**18. xxx Error (S-S to CS-O) – see example in table 7.2.4.4-18**

The termination procedure detected some error situation, and returned a SIP error response.

NOTE 1: The error response may be, for example, "486 Busy", "403 Service Denied", "480 Temporarily Unavailable", or others. For this example, "486 Busy" is shown.

**Table 7.2.4.4-18: 486 Busy Here (S-S to CS-O)**

```
SIP/2.0 486 Busy Here
Via: SIP/2.0/UDP mgcf1.home1.net;branch=543b27.1
From: "Alien Blaster"<sip:B36(SHA-1(user1_public1@home1.net; time=36123E5B; seq=72))@localhost>;
tag=171828
To: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost; tag=1234
Contact: sip:[5555::eee:fff:aaa:bbb]
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 127 INVITE
Retry-After: 3600
Content-Length: 0
```

**19. ACK (CS-O to S-S) – see example in table 7.2.4.4-19**

Upon receive the 486 response from the S-S procedure, S-CSCF sends ACK.

**Table 7.2.4.4-19: ACK (CS-O to S-S)**

```
ACK sip:[5555::eee:fff:aaa:bbb]+1-212-555-2222@home2.net;user=phone-SIP/2.0
Via: SIP/2.0/UDP mgcf1.home1.net;branch=543b27.1
Max-Forwards: 70
From:
To:
Call-ID:
CSeq: 127 ACK
Content-Length: 0
```

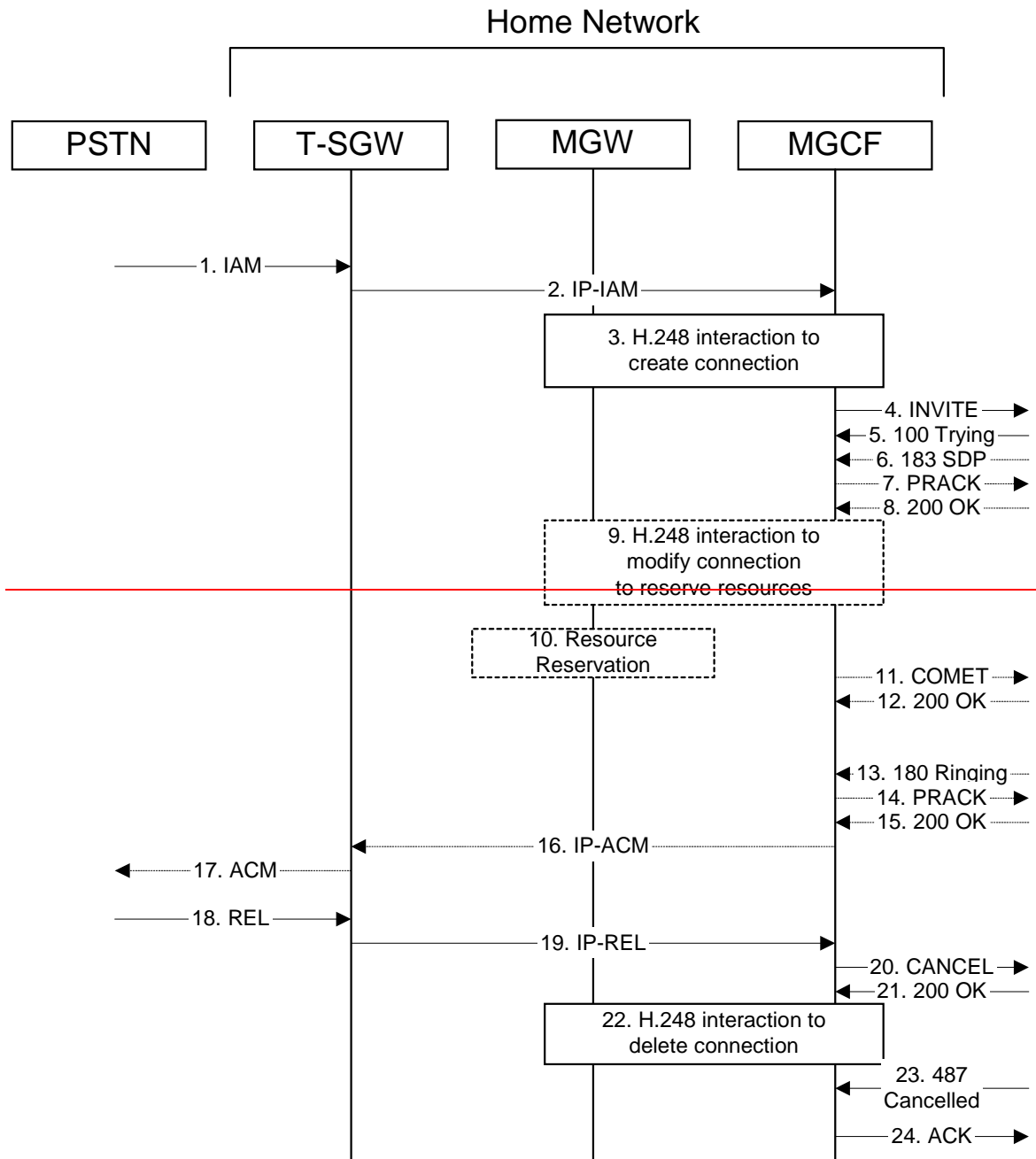
**20. H.248 Interaction**

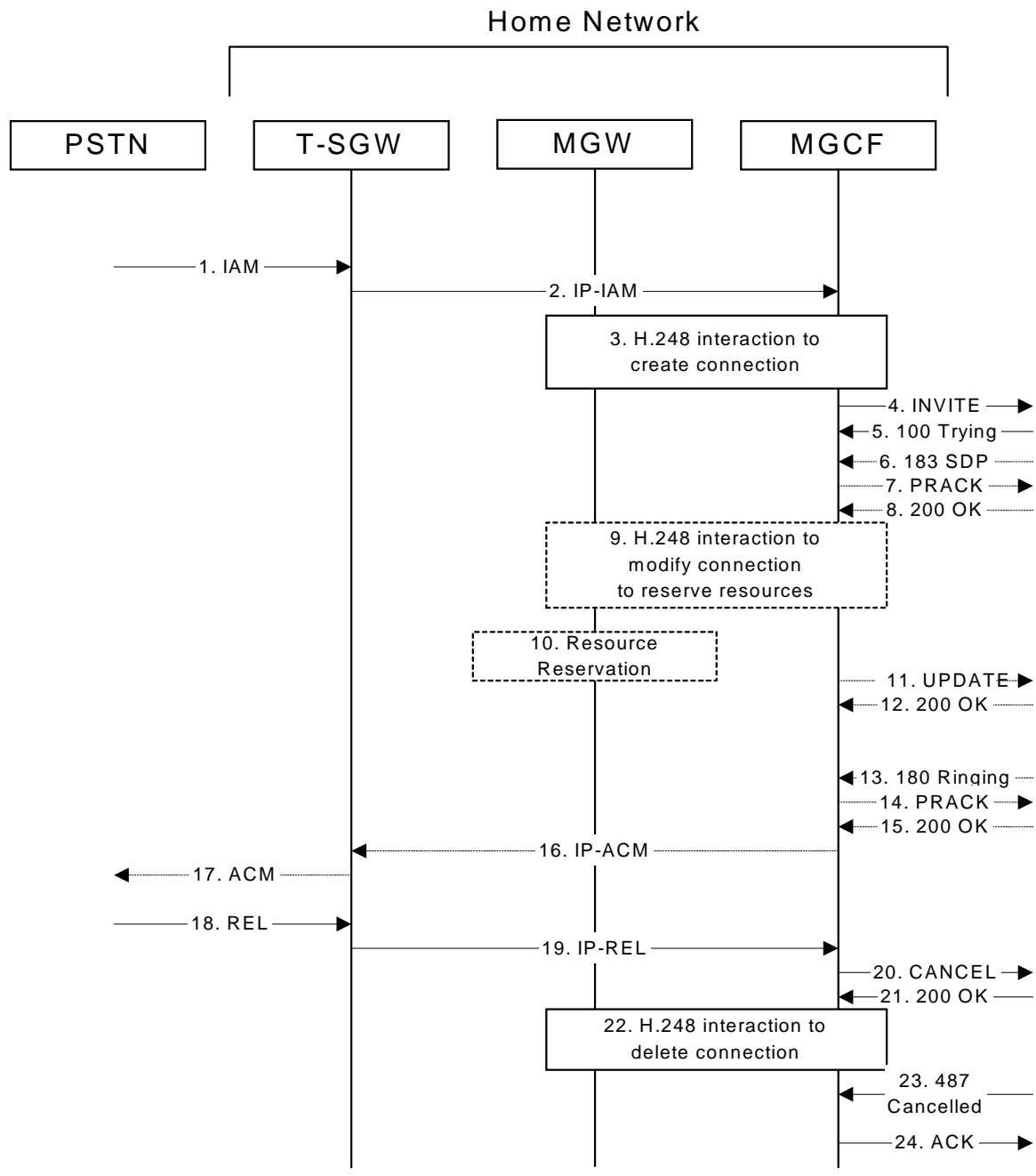
MGCF initiates a H.248 interaction with MGW to delete the connection.

**7.2.4.5 Session abandoned, or resource failure**

The PSTN subscriber that initiated a session with procedure CS-O either abandoned the attempt, or was unable to obtain the resources necessary for the session. The signalling flow for this error handling is shown in figure 7.2.4.5-1.

If the session is aborted due to failure to obtain resources, it will occur at step #10 in the signalling flow; steps 11-17 (marked as optional) will not be present. If the session is abandoned due to user command, it can happen at any point between steps 5-17.





**Figure 7.2.4.5-1: Session abandoned or resource failure**

**4. INVITE (CS-O to S-S) et seq**

CS-O initiated a session, as described in subclause 7.2.4.1.

**5-15. 183 SDP (S-S to CS-O) et seq**

Session initiation possibly continued, prior to detection of a failure condition, as described in subclause 7.2.4.1.

**20. CANCEL (CS-O to S-S) – see example in table 7.2.4.5-20**

The PSTN cancelled the original INVITE request.

**Table 7.2.4.5-20: CANCEL (CS-O to S-S)**

```

CANCEL sip:[5555::eee:fff:aaa:bbb] scscf2.home1.net SIP/2.0
Via: SIP/2.0/UDP mgcf1.home1.net;branch=543b27.1
Max-Forwards: 70
Route: sip:scscf2.home1.net;lr, sip:pcscf2.home1.net;lr, sip:[5555::eee:fff:aaa:bbb]
From: "Alien Blaster" <sip:B36(SHA-1(user1_public1@home1.net; time=36123E5B;
    seq=72))@localhost>;tag=171828
To: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 127 CANCEL
Content-Length: 0

```

**21. 200 OK (S-S to CS-O) – see example in table 7.2.4.5-21**

Upon receive the CANCEL request from CS-O, the S-S procedure sends 200 OK.

**Table 7.2.4.5-21: 200 OK (S-S to CS-O)**

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP mgcf1.home1.net;branch=543b27.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0

```

**22. H.248 Interaction**

MGCF initiates a H.248 interaction with MGW to delete the connection

**23. 487 Cancelled (S-S to CS-O) – see example in table 7.2.4.5-23**

The termination procedure processed the CANCEL request, and returned a SIP error response.

**Table 7.2.4.5-23: 487 Cancelled (S-S to CS-O)**

```

SIP/2.0 487 Cancelled
Via: SIP/2.0/UDP mgcf1.home1.net;branch=543b27.1
From:
To:
Contact:
Call-ID:
Cseq: 127 INVITE
Retry-After: 3600
Content-Length: 0

```

**24. ACK (CS-O to S-S) – see example in table 7.2.4.5-24**

Upon receive the 487 response from the S-S procedure, MGCF sends ACK.

**Table 7.2.4.5-24: ACK (CS-O to S-S)**

```

ACK sip:[5555::eee:fff:aaa:bbb] +1-212-555-2222@home1.net;user=phone SIP/2.0
Via: SIP/2.0/UDP mgcf1.home1.net;branch=543b27.1
Max-Forwards: 70
From:
To:
Call-ID:
CSeq: 127 ACK
Content-Length: 0

```



\*\*\*\*\* Next Modified Section \*\*\*\*\*

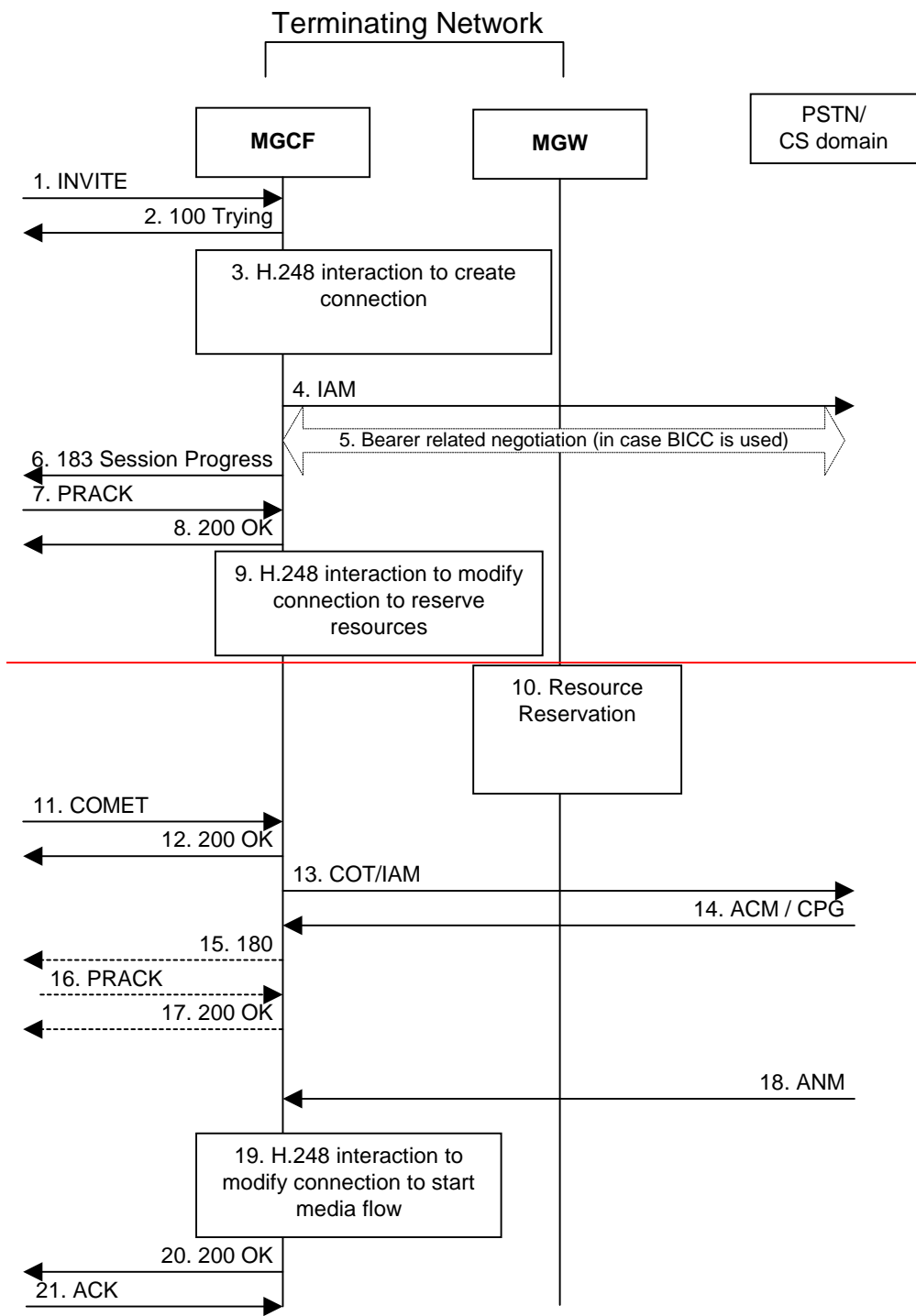
## 7.4.4 CS-T

### 7.4.4.1 (CS-T) CS Networks termination (MO#2, S-S#3 assumed)

Figure 7.4.4.1-1 shows the MGCF in the IM CN subsystem, which is a SIP endpoint that initiates and receives requests on behalf of the CS Networks and Media Gateway (MGW). Other nodes consider the signalling as if it came from a S-CSCF. The MGCF incorporates the network security functionality of the S-CSCF.

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

This termination procedure can be used in either S-S#3 or S-S#4.



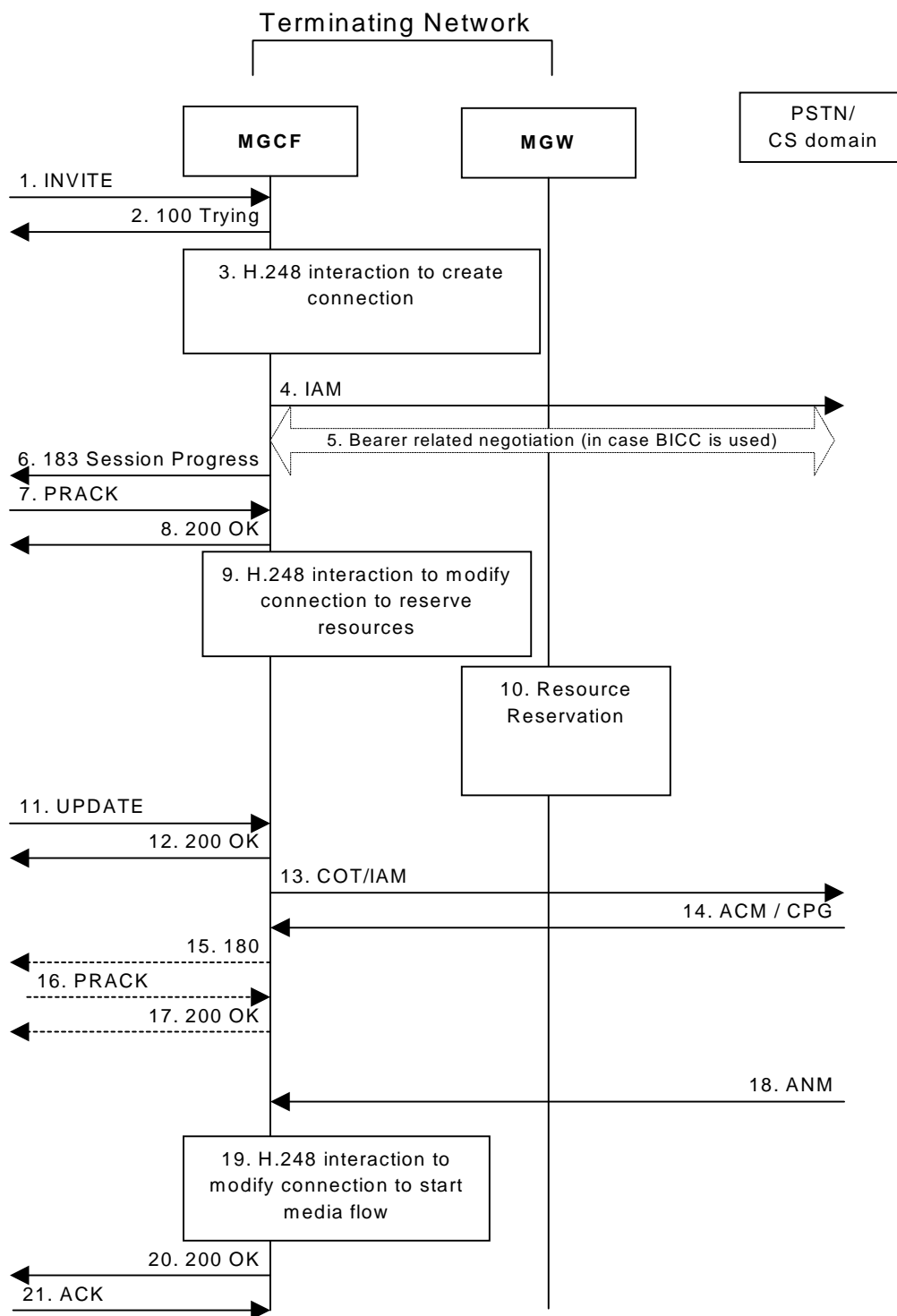


Figure 7.4.4.1-1: CS Networks termination

The CS Networks termination procedure is as follows:

1. INVITE (S-S to CS-T) – see example in table 7.4.4.1-1

MGCF receives an INVITE request, through one of the origination procedures and via one of the S-CSCF to S-CSCF procedures.

**Table 7.4.4.1-1: INVITE (S-S to CS-T)**

```

INVITE sip:+1-212-555-2222@home2.net;user=phonemgcf1.home1.net SIP/2.0
Via: SIP/2.0/UDP bgcf1.home1.net;branch=6546q2.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 67
Route: sip:+1-212-555-2222@home1.net;user=phone
Record-Route: sip:_332b23.1@scscf1.home1.net;lr, sip:_431h23.1@pcscf1.home1.net;lr
Supported: 100rel
Remote-Party-ID: "John Doe" <tel:+1-212-555-1111>;privacy=off;screen=yes
RPID-Privacy: privacy=off;party=calling
Anonymity: Off
From: "Alien Blaster" <sip:B36(SHA-1(user1_public1@home1.net; time=36123E5B;
seq=72))@localhost>;tag=171828
To: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 127 INVITE
Require: precondition
Supported:
Contact: sip:[5555::aaa:bbb:ccc:ddd]
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
b=AS:25.4
a=curr:goss local none
a=curr:goss remote none
a=des:goss mandatory local sendrecv
a=des:goss none remote sendrecv
m=video 0 RTP/AVP 99
b=AS:25.4
a=curr:goss local none
a=curr:goss remote none
a=des:goss mandatory local sendrecv
a=des:goss none remote sendrecv
m=audio 3456 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:goss local none
a=curr:goss remote none
a=des:goss mandatory local sendrecv
a=des:goss none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
a=goss:mandatory-sendrecv
m=audio 3458 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:goss local none
a=curr:goss remote none
a=des:goss mandatory local sendrecv
a=des:goss none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
a=goss:mandatory-sendrecv

```

Upon receiving the INVITE, the MGCF stores the following information about this session – see example in [table 7.4.4.1-1b](#).

**Table 7.4.4.1-1b: Storage of information at MGCF**

```

Request-URI: sip:+1-212-555-2222@home1.net;user=phone
From: "Alien Blaster" <sip:B36(SHA-1(+1-212-555-1111; time=36123E5B; seq=72))@localhost>;tag=171828
To: <sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost>
Call-ID: cb03a0s09a2sdfg1kj490333

```

```
Cseq: 127 INVITE
Route: sip:scscf1.home1.net, sip:pcscf1.home1.net
```

MGCF calculates the proper Route header to add to future requests, and saves that information. The saved value of the Route header is:

```
Route: sip:332b23.1@scscf1.home1.net, sip:431h23.1@pcscf1.home1.net, sip:[5555::aaa:bbb:ccc:ddd]
```

**SDP** The SDP contains the desired set of supported codecs from the session originator, as restricted by the originating network operator. The "m=" lines for the video media streams show a port number zero, which removes them from the negotiation.

## 2. 100 Trying (CS-T to S-S) – see example in table 7.4.4.1-2

MGCF may respond to the INVITE request with a 100 Trying provisional response.

**Table 7.4.4.1-2: 100 Trying (CS-T to S-S)**

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP bgcf1.home1.net;branch=6546q2.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

## 3. H.248 Interaction to Create Connection

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

## 4. SS7: IAM

Based on the continuity support of the outgoing channel selected, MGCF may decide to send an IAM message out to the CS Networks at this point. In case the outgoing channel does not support continuity indication, MGCF sends out an IAM message only in step 14.

## 5. Possible bearer related negotiation takes place (in case BICC is used)

## 6. 183 Session Progress (CS-T to S-S) – see example in table 7.4.4.1-6

MGCF determines the subset of the media flows proposed by the originating endpoint that it supports, and responds with a 183 Session Progress response back to the originator. This response is sent via the S-CSCF to S-CSCF procedure.

**NOTE:** in order to be able to send the IAM message at step 4, the MGCF has to select one media from the SDP received in INVITE.

**Table 7.4.4.1-6: 183 Session Progress (CS-T to S-S)**

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP bgcf1.home1.net;branch=6546q2.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route: sip:_332b23.1@scscf1.home1.net;lr, sip:_431h23.1@pcscf1.home1.net;lr
Require: 100rel
Remote-Party-ID: <tel:+1-212-555-2222>;privacy=off;screen=yes
RPID-Privacy: privacy=off;party=called
Anonymity: Off
From:
To: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost; tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: sip:mgcf1.home1.net
```

```

RSeq: 9021
Content-Disposition: precondition
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m-video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97
b=AS:25.4 3
a=curr:goss local none
a=curr:goss remote none
a=des:goss mandatory local sendrecv
a=des:goss none remote sendrecv
a=conf:goss remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=goss mandatory sendrecv confirm
m=audio 0 RTP/AVP 97 96 0 15

```

#### 7. PRACK (S-S to CS-T) – see example in table 7.4.4.1-7

The originating endpoint sends a PRACK request containing the final SDP to be used in this session, via the S-CSCF to S-CSCF procedure, to MGCF.

**Table 7.4.4.1-7: PRACK (S-S to CS-T)**

```

PRACK sip:+1-212-555-2222@home2.net;user=phone mgcf1.home1.net-SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
From: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;tag=171828
To: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 128 PRACK
Rack: 9021 127 INVITE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
m-video 0 RTP/AVP 99
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:goss local none
a=curr:goss remote none
a=des:goss mandatory local sendrecv
a=des:goss mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=goss mandatory sendrecv
m=audio 0 RTP/AVP 97 96 0 15

```

#### 8. 200 OK (CS-T to S-S) – see example in table 7.4.4.1-8

MGCF acknowledges the PRACK request (8) with a 200 OK response.

**Table 7.4.4.1-8: 200 OK (CS-T to S-S)**

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97
b=AS:25.4 3
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15

```

## 9. H.248 Interaction to Modify Connection

MGCF initiates a H.248 interaction to modify the connection established in step #3 and instruct MGW to reserve the resources necessary for the media streams.

## 10. Resource Reservation

MGW reserved the resources necessary for the media streams.

## 11. **COMETUPDATE** (S-S to CS-T) – see example in table 7.4.4.1-11

When the originating endpoint has completed its resource reservation, it sends the **COMETUPDATE** request to MGCF, via the S-CSCF to S-CSCF procedures.

**Table 7.4.4.1-11: **COMETUPDATE** (S-S to CS-T)**

```

COMETUPDATE sip:+1-212-555-2222@home2.net;user=phone mgcf1.home1.net-SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
From: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;tag=171828
To: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 129 COMETUPDATE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 3456 RTP/AVP 97 3 96
b=AS:25.4

```

```

a=curr:gosp local sendrecv
a=curr:gosp remote none
a=des:gosp mandatory local sendrecv
a=des:gosp mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
a=gosp:success-sendonly
m=audio 0 RTP/AVP 97 96 0 15

```

## 12. 200 OK (CS-T to S-S) – see example in table 7.4.4.1-12

MGCF acknowledges the **COMETUPDATE** request (112) with a 200 OK response.

**Table 7.4.4.1-12: 200 OK (CS-T to S-S)**

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 3456 RTP/AVP 97 3 96
b=AS:25.4
a=curr:gosp local none
a=curr:gosp remote none
a=des:gosp mandatory local sendrecv
a=des:gosp mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
m=audio 0 RTP/AVP 97 96 0 15

```

## 13. SS7: COT/IAM

Based on the continuity support of the outgoing channel selected MGCF sends a IAM or COT message to the CS Networks. In case the outgoing channel supports continuity indication, MGCF has already sent out the IAM message in step 4, and at this point sends out a COT message.

## 14. SS7: ACM/CPG

The CS Networks establishes the path to the destination. In the present case the CS Networks responds with an ACM message containing a "subscriber free" indication, implying that the called party is being alerted.

## 15. 180 (CS-T to S-S) – see example in table 7.4.4.1-15

If the CS Network is alerting the destination user, MGCF indicates this to the calling party by a 180 Ringing provisional response. This response is sent via the S-CSCF to S-CSCF procedures.

As the indication of called party being alerted ("subscriber free" indication) may not be available in ACM, the 180 Ringing is only sent when the indication is available. An ACM without the "subscriber free" indication will not trigger any SIP message.



**Table 7.4.4.1-15: 180 Ringing (CS-T to S-S)**

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP bgcf1.home1.net;branch=6546q2.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
    SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route: sip:_332b23.1@scscf1.home1.net;lr, sip:_431h23.1@pcscf1.home1.net;lr
Require: 100rel
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: sip:mgcf1.home1.net
RSeq: 9022
Content-Length: 0
```

The 180 Ringing is used when the ACM has indicated that the called party is being alerted.

#### 16. PRACK (S-S to CS-T) – see example in table 7.4.4.1-16

The originator acknowledges the 180 Ringing provisional response (156) with a PRACK request.

**Table 7.4.4.1-16: PRACK (S-S to CS-T)**

```
PRACK sip:+1-212-555-2222@home2.net;user=phone mgcf1.home1.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
From: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;tag=171828
To: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 130 PRACK
Rack: 9022 127 INVITE
Content-Length: 0
```

#### 17. 200 OK (CS-T to S-S) – see example in table 7.4.4.1-17

MGCF acknowledges the PRACK request (167) with a 200 OK response.

**Table 7.4.4.1-17: 200 OK (CS-T to S-S)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

#### 18. SS7: ANM

When the called party answers, the CS Network sends an ANM message to the MGCF.

#### 19. H.248: Interaction to Modify Connection

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

#### 20. 200 OK (CS-T to S-S) – see example in table 7.4.4.1-20

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

**Table 7.4.4.1-20: 200 OK (CS-T to S-S)**

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP bgcf1.home1.net;branch=6546q2.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
    SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route: sip:332b23.1@scscf1.home1.net;lr, sip:431h23.1@pcscf1.home1.net;lr
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: sip:mgcf1.home1.net
Content-Type: application/sdp
Content-Length: 0<...>

v=0
o=2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275-0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97
b=AS:25.4
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=qos:success-sendrecv
m=audio 0 RTP/AVP 97 96 0 15

```

**21. ACK (S-S to CS-T) – see example in table 7.4.4.1-21**

The Calling party acknowledges the final response (20) with an ACK request.

**Table 7.4.4.1-21: ACK (S-S to CS-T)**

```

ACK sip:+1-212-555-2222@home2.net;user=phone mgcf1.home1.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
From:
To:
Call-ID:
Cseq: 127 ACK
Content-Length: 0

```

**7.4.4.2 MGCF-detected failure/resource failure (not provided)**

An example of this flow is not shown in the present document.

**7.4.4.3 Origination failure (not provided)**

An example of this flow is not shown in the present document.

## CHANGE REQUEST

⌘ **24.228 CR 027** ⌘ 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

<b>Title:</b>	⌘ Update of Mobile terminal initiated session release flows (non-hiding)		
<b>Source:</b>	⌘ Lucent Technologies		
<b>Work item code:</b>	⌘ IMS-CCR	<b>Date:</b>	⌘ 30/04/02
<b>Category:</b>	⌘ <b>F</b>	<b>Release:</b>	⌘ Rel-5
	Use <u>one</u> of the following categories: <b>F</b> (correction) <b>A</b> (corresponds to a correction in an earlier release) <b>B</b> (addition of feature), <b>C</b> (functional modification of feature) <b>D</b> (editorial modification) Detailed explanations of the above categories can be found in 3GPP <a href="#">TR 21.900</a> .		Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) REL-4 (Release 4) REL-5 (Release 5)

<b>Reason for change:</b>	⌘ There have been a number of revisions to 24.228 in other clauses since this clause was created, and this clause has failed to keep step with those changes. Therefore this CR proposes an alignment with other clauses.
<b>Summary of change:</b>	⌘ <ol style="list-style-type: none"> <li>1. Inclusion of the Max-Forwards header in the BYE request.</li> <li>2. Reformatting of the textual description associated with each header.</li> <li>3. Deletion of the Contact header from the BYE request.</li> <li>4. Inclusion of new Request-URI in BYE request.</li> <li>5. Inclusion of compatible contents in the Route header with those stored by the related INVITE flows, with the impact that the Route header now also contains the loose routing parameter.</li> <li>6. Removal of service control boxes, as these are now performed by the Application Server. Need associated CR to 24.228 to explain why these are not shown.</li> <li>7. Removal of Record-Route header from BYE requests. While the Record Route header SHOULD be inserted by proxies in subsequent requests, its use does not appear in any other sequences showing subsequent requests, and a proxy should act consistently with regard to this usage.</li> </ol>
<b>Consequences if not approved:</b>	⌘ 24.228 will contain errors on the usage of SIP, and this clause will be inconsistent with other clauses that have been modified.

<b>Clauses affected:</b>	⌘ 8.2		
<b>Other specs affected:</b>	<input type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications	⌘	
<b>Other comments:</b>	⌘		

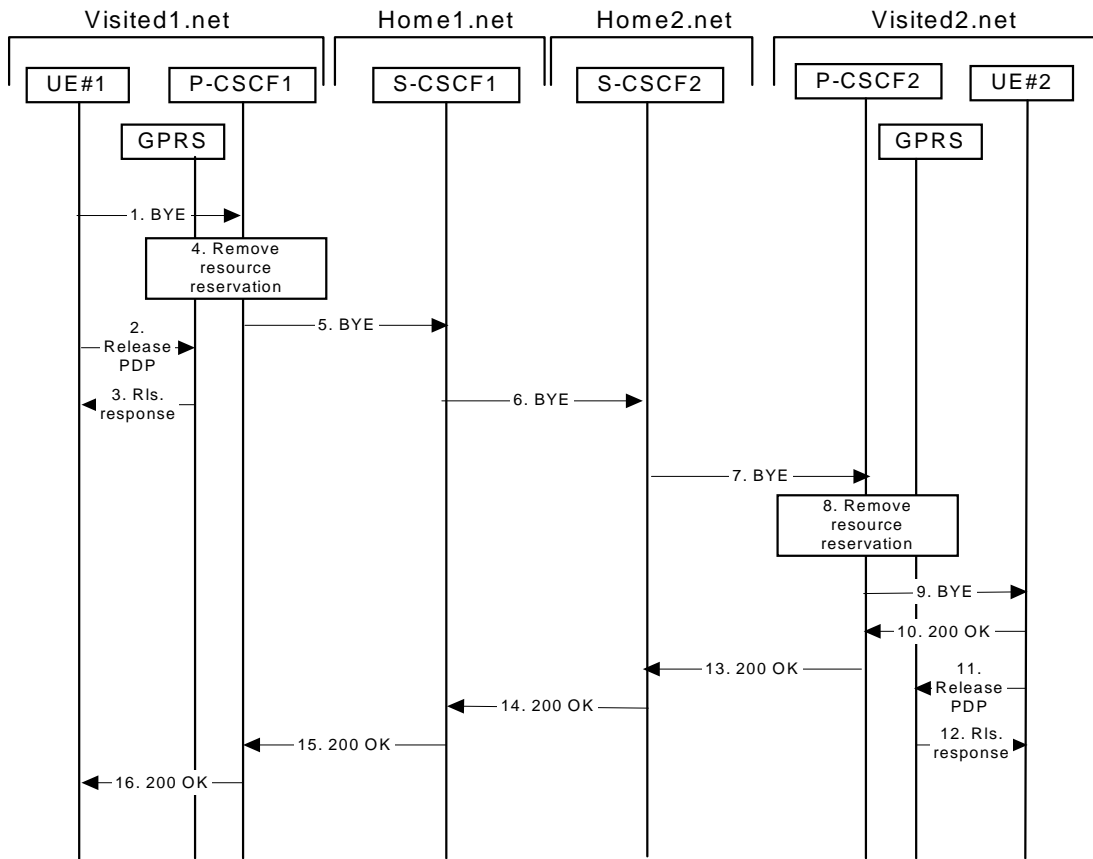
**How to create CRs using this form:**

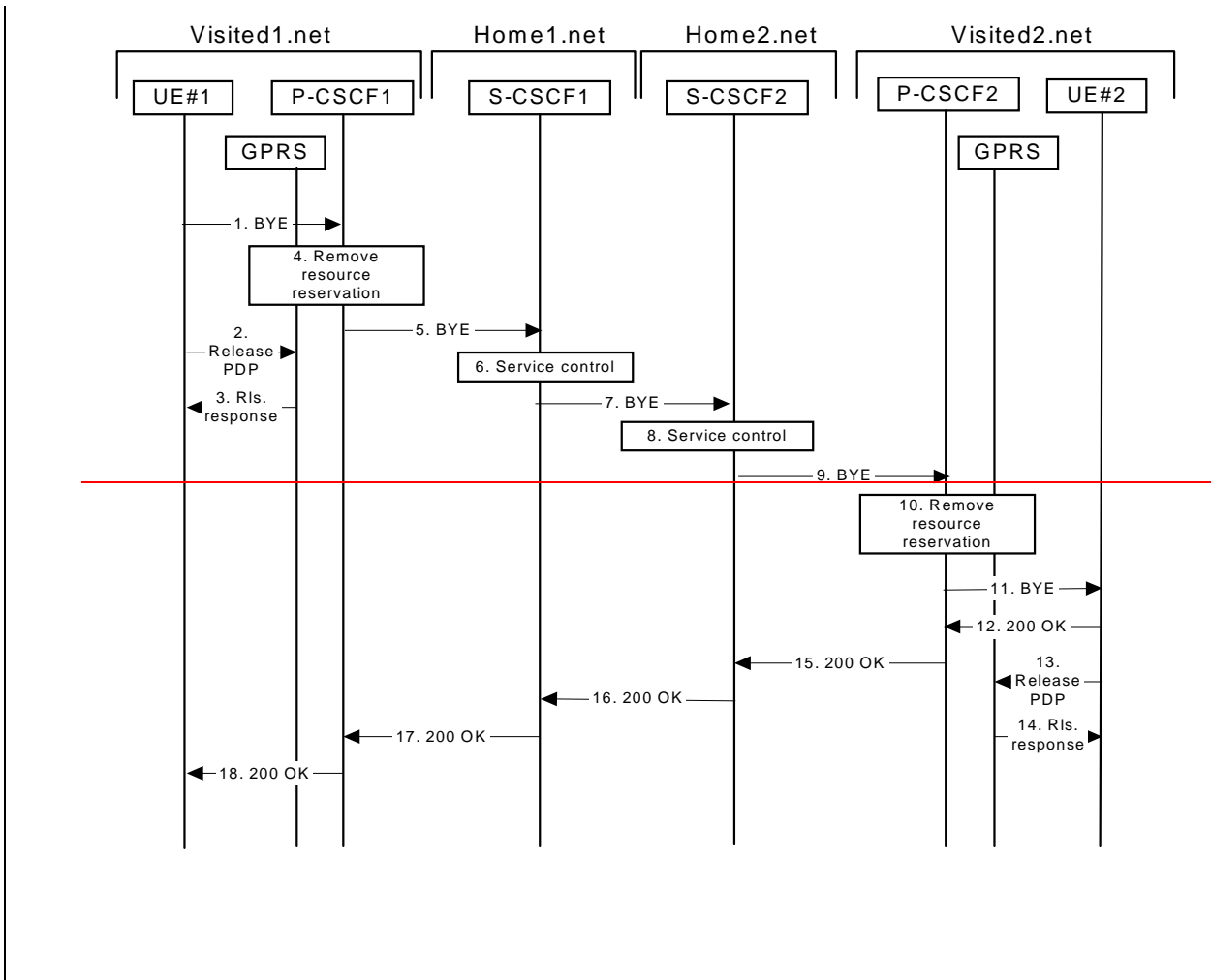
Comprehensive information and tips about how to create CRs can be found at: [http://www.3gpp.org/3G\\_Specs/CRs.htm](http://www.3gpp.org/3G_Specs/CRs.htm). Below is a brief summary:

- 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.

## 8.2 Mobile terminal initiated session release

Figure 8.2-1 shows a mobile terminal initiated IM CN subsystem application (SIP) session release. It is assumed that the session is active and that the bearer was established directly between the two visited networks (the visited networks could be the Home network in either or both cases).





**Figure 8.2-1: Mobile initiated session release**

**1 SIP BYE (UE to P-CSCF) - see example in table 8.2-1**

One mobile party hangs up, which generates a SIP BYE request from the UE to the P-CSCF.

**Table 8.2-1: SIP BYE (UE to P-CSCF)**

```

BYE sip:[5555::eee:fff:aaa:bbb]sip:token10@pcscf1.visited1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 70
From: "Alien Blaster" <sip:B36(SHA-1(user1_public1@home1.net; time=36123E5B; seq=72))@localhost>
;tag=171828
To: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
CSeq: 153 BYE
Contact: sip:[5555::aaa:bbb:ccc:ddd]
Content-Length: 0

```

**Request-URI:** The request URI takes the value of the Contact header of the ~~previously~~ original received response.

**Via:** The Via header and the contact header takes the value of either the IP address or the FQDN of the originating UE.

**From:/To:/Call-ID:** The example contents of the From header, the To header and Call-ID header are used to identify the session being cleared, and therefore are identical to those of the previously received response for that session, so that they include any tag parameters.

**CSeq:** The content of the Cseq header must have a higher sequence number than the previous transaction. Here it is assumed that a Cseq value no greater than 152 has been previously used.

## 2 Release PDP

Steps 2 and 3 may take place before or after Step 1 and in parallel with Step 4. The UE initiates the release of the bearer PDP context. The GPRS subsystem releases the PDP context. The IP network resources that had been reserved for the message receive path to the mobile for this session are now released. This is initiated from the GGSN. If RSVP was used to allocated resources, then the appropriate release messages for that protocol would be invoked here.

## 3 Rls. Response

The GPRS subsystem responds to the UE.

## 4 Remove resource reservation

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

## 5 SIP BYE (P-CSCF to S-CSCF) - see example in table 8.2-5

The P-CSCF sends a SIP BYE request to the S-CSCF of the releasing party.

**Table 8.2-5: SIP BYE (P-CSCF to S-CSCF)**

```
BYE sip:[5555::eee:fff:aaa:bbb]sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 69
Route: sip:scscf1.home1.net;lr, sip:scscf2.home2.net;lr,
sip:pcscf2.visited2.net;lr;sip:764z87.1@scscf2.home2.net;
sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home2.net
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length: 0
```

## ~~6 Service control~~

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

## ~~7 SIP BYE (S-CSCF to S-CSCF) see example in table 8.2-7~~

~~The SIP BYE request is sent from the S-CSCF to the S-CSCF of the network of the other party.~~

**Table 8.2-7: SIP BYE (S-CSCF to S-CSCF)**

```
BYE sip:[5555::eee:fff:aaa:bbb] sip:scscf2.home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
Route: sip:scscf2.home2.net;lr,
sip:pcscf2.visited2.net;lr;sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home2.net
Record-Route: sip:332b23.1@scscf1.home1.net
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

## ~~8 Service control~~

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

## ~~9 SIP BYE (S-CSCF to P-CSCF) - see example in table 8.2-9~~

~~The SIP BYE request is forwarded directly to the P-CSCF.~~



### Table 8.2-79: SIP BYE (S-CSCF to P-CSCF)

```
BYE sip:pcscf2.visited2.net SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
    SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 67
Route: sip:pcscf2.visited2.net;lr sip:%5b5555%3a%3aeee%3affff%3aaaa%3abbb%5d@pcscf2.visited2.net
Record-Route: sip:764z87.1@scscf2.home2.net, sip:332b23.1@scscf1.home1.net
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length: 0
```

### 840 Remove resource reservation

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

### 944 SIP BYE (P-CSCF to UE) - see example in table 8.2-944

The P-CSCF forwards the SIP BYE request on to the UE.

### Table 8.2-944: SIP BYE (P-CSCF to UE)

```
BYE sip:[5555::eee:fff:aaa:bbb] SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1;branch=token25
Max-Forwards: 66
From:
To:
Call-ID:
CSeq:
Contact: token25@pcscf2.visited2.net
Content-Length: 0
```

### 102 200 OK (UE to P-CSCF) - see example in table 8.2-102

The mobile responds with a 200 OK response, which is sent back to the P-CSCF.

### Table 8.2-102: 200 OK (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1;branch=token25
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

### 113 Release PDP

Steps 124 and 135 may be done in parallel with step 1311. The Mobile initiates the release of the bearer PDP context.

### 124 Rls response

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

### 135 200 OK (P-CSCF to S-CSCF) - see example in table 8.2-135

The P-CSCF sends a 200 OK response to the S-CSCF directly.

**Table 8.2-135: 200 OK (P-CSCF to S-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
    SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route:
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

**146 200 OK (S-CSCF to S-CSCF) - see example in table 8.2-146**

The S-CSCF of the other party forwards the 200 OK response to its local S-CSCF.

**Table 8.2-146: 200 OK (S-CSCF to S-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route:
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

**157 200 OK (S-CSCF to P-CSCF) - see example in table 8.2-157**

The S-CSCF of the releasing party forwards the 200 OK response to the P-CSCF of the releasing party. ~~The example contents of the 200 OK response are shown in table 9-9.~~

**Table 8.2-157: 200 OK (S-CSCF to P-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route:
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

**168 200 OK (P-CSCF to UE) - see example in table 8.2-168**

The P-CSCF of the releasing party forwards the 200 OK response to the UE.

**Table 8.2-168: 200 OK (P-CSCF to UE)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

CR-Form-v5

## CHANGE REQUEST

⌘ **24.228 CR 028** ⌘ rev **2** ⌘ 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

<b>Title:</b>	⌘ Downloading the list of public user identities with P-Associated-URI		
<b>Source:</b>	⌘ Nokia, Siemens, Ericsson, Nortel, Dynamicsoft		
<b>Work item code:</b>	⌘ IMS-CCR	<b>Date:</b>	⌘ 17-May-2002
<b>Category:</b>	⌘ <b>F</b>	<b>Release:</b>	⌘ REL-5
	<i>Use one of the following categories:</i> <b>F</b> (correction) <b>A</b> (corresponds to a correction in an earlier release) <b>B</b> (addition of feature), <b>C</b> (functional modification of feature) <b>D</b> (editorial modification) Detailed explanations of the above categories can be found in 3GPP <a href="#">TR 21.900</a> .		<i>Use one of the following releases:</i> <b>2</b> (GSM Phase 2) <b>R96</b> (Release 1996) <b>R97</b> (Release 1997) <b>R98</b> (Release 1998) <b>R99</b> (Release 1999) <b>REL-4</b> (Release 4) <b>REL-5</b> (Release 5)

<b>Reason for change:</b>	⌘ With the current solution the UE will get the implicitly registered public IDs once it has subscribed to its own registration information.
<b>Summary of change:</b>	⌘ A new P-Associated-URI header has been added to the 200 OK response to REGISTER requests. The S-CSCF will insert the list of associated public user identities into this header. The P-CSCF and the UE will store the content of it.
<b>Consequences if not approved:</b>	⌘ The UE will get the list of implicitly public user identities in a NOTIFY, but it will not get the non registered IDs. If the ISIM application is not present, the UE will not have a valid public user identity to subscribe to its own registration-state

<b>Clauses affected:</b>	⌘ 6.2, 6.3, 16.2, 16.3, 16.5		
<b>Other specs affected:</b>	⌘ <input checked="" type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications	⌘ 24.229 (CR 079)	
<b>Other comments:</b>	⌘		

### 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](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.

## 6.2 Registration signalling: user not registered

Figure 6.2-1 shows the registration signalling flow for the scenario when the user is not registered. For the purpose of this registration signalling flow, the subscriber is considered to be roaming. This flow also shows the authentication of the private user identity. In this signalling flow, the home network does not have network configuration hiding active.

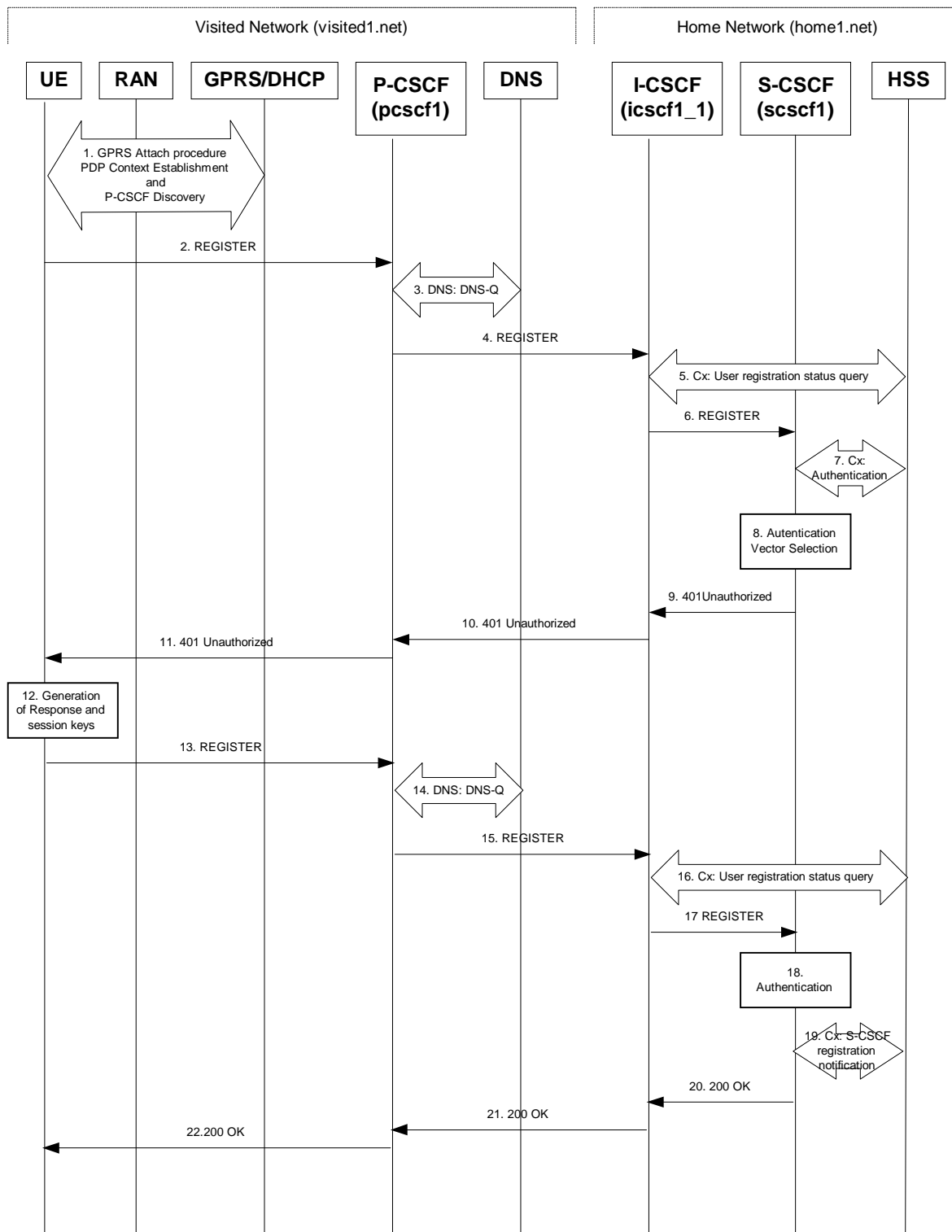


Figure 6.2-1: Registration signalling: user not registered

**1. GPRS Attach / PDP Context Establishment and P-CSCF Discovery (UE to GPRS)**

This signalling flow is shown to indicate prerequisites for the registration signalling.

See subclause 5.2 for details.

**2. REGISTER request (UE to P-CSCF) – see example in table 6.2-2**

The purpose of this request is to register the user's SIP URI with a S-CSCF in the home network. This request is routed to the P-CSCF because it is the only SIP server known to the UE. In the following SIP request, the Contact field contains the user's host address.

The P-CSCF will perform two actions, binding and forwarding. The binding is between the User's SIP address (user1\_public1@home1.net) and the host (terminal) address ([5555::aaa:bbb:ccc:ddd]) which was acquired during PDP context activation process.

[Editor's note: The security mode set-up procedure supports the negotiation of different protection mechanisms. This will involve the addition of a "security-setup" field to the SIP REGISTER request and the REGISTER response performing the authentication challenge containing the parameters:

- list of Authentication (integrity) algorithms, and optionally list of encryption (confidentiality) algorithms
- SA-ID that is used to uniquely identify the SA at the receiving side.
- Key length: the length of encryption and authentication (integrity) keys is 128 bits.

The exact format and use for the security mode setup is being worked through IETF and is FFS]

**Table 6.2-2: REGISTER request (UE to P-CSCF)**

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From: <sip:user1_public1@home1.net>;tag=4fa3
To: <sip:user1_public1@home1.net>
Contact: sip:[5555::aaa:bbb:ccc:ddd]
Call-ID: apb03a0s09dkjdfglkj49111
Authorization: eap eap-p=base64(user1_private1@home1.net)
CSeq: 1 REGISTER
Expires: 7200
Content-Length: 0
```

**Request-URI:** The Request-URI (the URI that follows the method name, "REGISTER", in the first line) indicates the destination domain of this REGISTER request. The rules for routing a SIP request describe how to use DNS to resolve this domain name ("home1.net") into an address or entry point into the home operator's network (the I-CSCF). This information is stored in the USIM.

**Via:** IPv6 address of the SIP session allocated during the PDP Context Activation process.

**From:** This indicates the public user identity originating the REGISTER request. The public user identity may be obtained from the USIM.

**To:** This indicates the public user identity being registered. This is the identity by which other parties know this subscriber. It may be obtained from the USIM.

**Contact:** This indicates the point-of-presence for the subscriber - the IP address of the UE. This is the temporary point of contact for the subscriber that is being registered. Subsequent requests destined for this subscriber will be sent to this address. This information is stored in the P-CSCF and S-CSCF.

**Authorization:** It carries authentication information. The private user identity (user1\_private1@home1.net) is carried in the user ID field of the extensible authentication protocol (EAP).

**NOTE:** The actual Authorization header value may look like this as it is in base64 form:  
Authorization: eap eap-p=QWxhZGRpbjpvGvuIHNlc2FtZQ==

Upon receiving this request the P-CSCF will set it's SIP registration timer for this UE to the Expires time in this request.

### 3. DNS: DNS-Q

Based on the user's URI, the P-CSCF determines that UE is registering from a visiting domain and performs a DNS query to locate the I-CSCF in the home network. The look up in the DNS is based on the address specified in the Request URI.

The P-CSCF sends the REGISTER request - after local processing - to the address indicated in the Request-URI. When forwarding the REGISTER request the P-CSCF needs to specify the protocol, port number and IP address of the I-CSCF server in the home network to which to send the REGISTER request. The P-CSCF tries to find this information by querying the DNS. Since the Request-URI does not specify the transport protocol, the P-CSCF selects the UDP.

**Table 6.2-3a: DNS: DNS Query (P-CSCF to DNS)**

```
OPCODE=SQUERY
QNAME=_sip._udp.registrar.home1.net, QCLASS=IN, QTYPE=SRV
```

The DNS records are retrieved according to RFC 2782 [4].

**Table 6.2-3b: DNS Query Response (DNS to P-CSCF)**

```
OPCODE=SQUERY, RESPONSE, AA
QNAME=_sip._udp.registrar.home1.net, QCLASS=IN, QTYPE=SRV

_sip._udp.registrar.home1.net      0 IN SRV 1 10 5060 icscf1_p.home1.net
                                   0 IN SRV 1  0 5060 icscf7_p.home1.net

icscf1_p.home1.net                 0 IN AAAA      5555::aba:dab:aaa:daa
icscf7_p.home1.net                 0 IN AAAA      5555::a1a:b2b:c3c:d4d
```

In the Answer field of the query-response each I-CSCF is identified by its host domain name. The returned SRV Resource Records (RRs) are merged and ordered, and the selection technique (employing the Priority and Weight parameters returned in the RRs) as specified in RFC 2782 [4] is used to select the I-CSCF (i.e. the icscf1\_p.home1.net). Since the Additional Data field of the query-response also contains the IP address of the selected I-CSCF (i.e. 5555::aba:dab:aaa:daa), a new query to the DNS is not required.

Once the IP address of the I-CSCF is obtained, the P-CSCF forwards the REGISTER request to this IP address (i.e. 5555::aba:dab:aaa:daa) using the UDP protocol and port number 5060.

### 4. REGISTER request (P-CSCF to I-CSCF) - see example in table 6.2-4

The P-CSCF needs to be in the path for all mobile originated and mobile terminated requests for this user. To ensure this, the P-CSCF adds itself to the Path header value for future requests.

The P-CSCF binds the public user identity under registration to the Contact header supplied by the user.

The P-CSCF adds also the Roaming-Info header (if not present). The P-CSCF adds the *vnid* parameter with the contents of the identifier of the P-CSCF network. This may be the visited network domain name or any other identifier that identifies the visited network at the home network.

This signalling flow shows the REGISTER request being forward from the P-CSCF to the I-CSCF in the home domain.

**Table 6.2-4: REGISTER request (P-CSCF to I-CSCF)**

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscfl.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:pcscfl.visited1.net>
Proxy-require: path
Require: path
Roaming-Info: vnid="Visited Network Number 1"
From:
To:
Contact:
Call-ID:
Authorization:
CSeq:
Expires:
Content-Length:
```

**Path:** This is the address of the P-CSCF and is included to inform the S-CSCF where to route terminating sessions.

**Require:/Proxy-Require:** These headers are included to ensure that the recipient correctly handles the Path header. If the recipient does not support the path header, a response will be received with a status code of 420 and an Unsupported header indicating "path". Such a response indicates a misconfiguration of the routing tables and the request has been routed outside the IM CN subsystem.

**Roaming-Info:** The *vnid* parameter contains the identifier of the P-CSCF network at the home network.

#### 5. Cx: User registration status query procedure

The I-CSCF makes a request for information related to the Subscriber registration status by sending the private user identity, public user identity and visited domain name to the HSS. The HSS returns the S-CSCF required capabilities and the I-CSCF uses this information to select a suitable S-CSCF.

For detailed message flows see 3GPP TS 29.228.

Table 6.2-5a provides the parameters in the REGISTER request (flow 4) which are sent to the HSS.

**Table 6.2-5a Cx: User registration status query procedure (I-CSCF to HSS)**

Message source & destination	Cx Information element name	Information Source in REGISTER	Description
I-CSCF to HSS	Private User Identity	Authorization:	The Private User Identity is encoded according to the Authorization protocol.
	Public User Identity	To:	Identity which is used to communicate with other users
	Visited Network Identifier	Roaming Info: vnid	This information indicates the network identifier of the visited network

#### 6. REGISTER request (I-CSCF to S-CSCF) – see example in table 6.2-6

I-CSCF does not modify the Path header.

This signalling flow forwards the REGISTER request from the I-CSCF to the S-CSCF selected.



**Table 6.2-6: REGISTER request (I-CSCF to S-CSCF)**

```
REGISTER sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:pcscf1.visited1.net>
Proxy-require:
Require:
Roaming-Info:
From:
To:
Contact:
Call-ID:
Authorization:
CSeq:
Expires:
Content-Length:
```

**Path:** The S-CSCF stores the contents of the Path headers and uses these addresses for routing mobile terminated sessions.

Upon receiving this request the S-CSCF may set its SIP registration timer for this UE to the Expires time in this request or the S-CSCF may assign another registration timer for this registration

### 7. Cx: Authentication procedure

On receiving a REGISTER request from an unauthenticated user, the S-CSCF requires at least one authentication vector to be used in the challenge to the user. If a valid AV is not available, then the S-CSCF requests at least one AV from the HSS.

The S-CSCF indicates to the HSS that it has been assigned to serve this user.

For detailed message flows see 3GPP TS 29.228.

Table 6.2-7a provides the parameters in the REGISTER request (flow 6) which are sent to the HSS.

**Table 6.2-7a Cx: S-CSCF authentication information procedure (S-CSCF to HSS)**

Message source & destination	Cx Information element name	Information Source in REGISTER	Description
S-CSCF to HSS	Public User Identity	To:	Identity which is used to communicate with other users
	Private User Identity	Authorization:	The Private User Identity is encoded according to the Authorization protocol.
	S-CSCF Name	Request-URI:	This information element contains the name of the S-CSCF. The presence of this IE indicates that the user has not been authenticated yet by the S-CSCF

### 8. Authentication vector selection

The S-CSCF selects an authentication vector for use in the authentication challenge. For detailed description of the authentication vector, see 3GPP TS 33.203.

NOTE 1: The authentication vector may be of the form as in 3GPP TS 33.203 (if IMS AKA is the selected authentication scheme):

- AV = RAND<sub>n</sub>||AUTN<sub>n</sub>||XRES<sub>n</sub>||CK<sub>n</sub>||IK<sub>n</sub> where:
  - RAND: random number used to generate the XRES, CK, IK, and part of the AUTN. It is also used to generate the RES at the UE.
  - AUTN: Authentication token (including MAC and SQN).
  - XRES: Expected (correct) result from the UE.
  - CK: Cipher key (optional).
  - IK: Integrity key.

**9. 401 Unauthorized response (S-CSCF to I-CSCF) - see example in table 6.2-9**

The authentication challenge is sent in the 401 Unauthorized response towards the UE.

**Table 6.2-9: 401 Unauthorized response (S-CSCF to I-CSCF)**

```
SIP/2.0 401 Unauthorized
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From: <sip:user1_public1@home1.net>;tag=4fa3
To: <sip:user1_public1@home1.net>; tag=5ef4
Call-ID: apb03a0s09dkjdfglkj49111
WWW-Authenticate: eap eap-p=base64(user1_private1@home1.net, RAND, AUTN)
CSeq: 1 REGISTER
Content-Length: 0
```

NOTE 2: The actual WWW-Authenticate header value may look like this as it is in base64 form:  
WWW-Authenticate: eap eap-p=QWxh4ZGRpb2jpcvGVuNlctZQ==

**Editor's Note: The mechanism to transport the session keys (IK and optionally, CK) from the S-CSCF to the P-CSCF is FFS.**

**10. 401 Unauthorized response (I-CSCF to P-CSCF) - see example in table 6.2-10**

The authentication challenge is sent in the 401 Unauthorized response towards the UE.

**Table 6.2-10: 401 Unauthorized response (I-CSCF to P-CSCF)**

```
SIP/2.0 401 Unauthorized
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
WWW-Authenticate:
CSeq:
Content-Length:
```

**Editor's Note: The mechanism to transport the session keys (IK and optionally, CK) from the S-CSCF to the P-CSCF is FFS.**

**11. 401 Unauthorized response (P-CSCF to UE) - see example in table 6.2-11**

The P-CSCF removes any keys received in the 401 Unauthorized response and forwards the rest of the response to the UE.

Table 6.2-11: 401 Unauthorized response (P-CSCF to UE)

```
SIP/2.0 401 Unauthorized
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
WWW-Authenticate: eap eap-p=base64(user1_privatel.home1.net, RAND, AUTN)
CSeq:
Content-Length:
```

## 12. Generation of response and session keys at UE

Upon receiving the Unauthorised response, the UE extracts the MAC and the SQN from the AUTN. The UE calculates the XMAC and checks that XMAC matches the received MAC and that the SQN is in the correct range. If both these checks are successful the UE calculates the response, RES, and also computes the session keys IK and CK. The RES is put into the Authorization header and sent back to the registrar in the REGISTER request.

## 13. REGISTER request (UE to P-CSCF) - see example in table 6.2-13

Table 6.2-13 REGISTER request (UE to P-CSCF)

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From: <sip:user1_public1@home1.net>;tag=4fa3
To: <sip:user1_public1@home1.net>
Contact: <sip:[5555::aaa:bbb:ccc:ddd]>
Call-ID: apb03a0s09dkjdfglkj49112
Authorization: eap eap-p=base64(user1_privatel@home1.net, RES)
CSeq: 2 REGISTER
Expires: 7200
Content-Length: 0
```

**Authorization:** This carries the response to the authentication challenge received in step 11 along with the private user identity both encoded in base64 format.

## 14. DNS: DNS-Q

Based on the user's URI, the P-CSCF determines that UE is registering from a visiting domain and performs a DNS query to locate the I-CSCF in the home network. The look up in the DNS is based on the address specified in the Request URI.

The P-CSCF sends the REGISTER request - after local processing - to the address indicated in the Request-URI. When forwarding the REGISTER request the P-CSCF needs to specify the protocol, port number and IP address of the I-CSCF server in the home network to which to send the REGISTER request. The P-CSCF tries to find this information by querying the DNS. Since the Request-URI does not specify the transport protocol the, P-CSCF selects the UDP.

Table 6.2-14a DNS: DNS Query (P-CSCF to DNS)

```
OPCODE=SQUERY
QNAME=__sip_udp.registrar.home1.net, QCLASS=IN, QTYPE=SRV
```

The DNS records are retrieved according to RFC 2782 [4].

Table 6.2-14b DNS Query Response (DNS to P-CSCF)

```
OPCODE=SQUERY, RESPONSE, AA
QNAME=__sip_udp.registrar.home1.net, QCLASS=IN, QTYPE=SRV
_sip_udp.registrar.home1.net      0 IN SRV 1 10 5060 icscf1_p.home1.net
                                0 IN SRV 1 0 5060 icscf7_p.home1.net
```

```
-----
icscf1_p.home1.net      0 IN AAAA      5555::aba:dab:aaa:daa
icscf7_p.home1.net     0 IN AAAA      5555::a1a:b2b:c3c:d4d
-----
```

In the Answer field of the query-response each I-CSCF is identified by its host domain name. The returned SRV Resource Records (RRs) are merged and ordered, and the selection technique (employing the Priority and Weight parameters returned in the RRs) as specified in RFC2782 [4] is used to select the I-CSCF (i.e. the icscf1\_p.home1.net). Since the Additional Data field of the query-response also contains the IP address of the selected I-CSCF (i.e. 5555::aba:dab:aaa:daa), a new query to the DNS is not required.

Once the IP address of the I-CSCF is obtained, the P-CSCF forwards the REGISTER request to this IP address (i.e. 5555::aba:dab:aaa:daa) using the UDP protocol and port number 5060.

#### 15. REGISTER request (P-CSCF to I-CSCF) - see example in table 6.2-15

This signalling flow shows the REGISTER request being forwarded from the P-CSCF to the I-CSCF in the home domain.

**Table 6.2-15 REGISTER request (P-CSCF to I-CSCF)**

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:pcscf1.visited1.net>
Proxy-require: path
Require: path
Roaming-Info: vnid="Visited Network Number 1"
From:
To:
Contact:
Call-ID:
Authorization:
CSeq:
Expires:
Content-Length:
```

**Path:** This is the address of the P-CSCF and is included to inform the S-CSCF where to route terminating sessions.

#### 16. Cx: User registration status query procedure

The I-CSCF requests information related to the Subscriber registration status by sending the private user identity, public user identity and visited domain name to the HSS. The HSS returns the S-CSCF name which was previously selected in step 5 (Cx: User registration status query procedure).

For detailed message flows see 3GPP TS 29.228.

Table 6.2-16a provides the parameters in the REGISTER request (flow 15), which are sent to the HSS.

**Table 6.2-16a Cx: User registration status query procedure (I-CSCF to HSS)**

Message source & destination	Cx Information element name	Information Source in REGISTER	Description
I-CSCF to HSS	Private User Identity	Authorization:	The Private User Identity is encoded according to the Authorization protocol.
	Public User Identity	To:	Identity which is used to communicate with other users
	Visited Network Identifier	Roaming-Info: vnid	This information indicates the network identifier of the visited network

#### 17. REGISTER request (I-CSCF to S-CSCF) - see example in table 6.2-17

This signalling flow forwards the REGISTER request from the I-CSCF to the S-CSCF.

**Table 6.2-17: REGISTER request (I-CSCF to S-CSCF)**

```
REGISTER sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:pcscf1.visited1.net>
Proxy-require:
Require:
Roaming-Info:
From:
To:
Contact:
Call-ID:
Authorization:
CSeq:
Expires:
Content-Length:
```

**Path:** The S-CSCF stores the contents of the Path headers and uses these addresses for routing mobile terminated sessions.

**18. Authentication**

Upon receiving the REGISTER request carrying the authentication response, RES, the S-CSCF checks that the user's active, XRES matches the received RES. If the check is successful then the user has been authenticated and the public user identity is registered in the S-CSCF.

**19. Cx: S-CSCF registration notification procedure**

On registering a user the S-CSCF informs the HSS that the user has been registered at this instance. Upon being requested by the S-CSCF, the HSS will also include the user profile in the response sent to the S-CSCF.

For detailed message flows see 3GPP TS 29.228.

Table 6.2-19a provides the parameters in the REGISTER request (flow 17), which are sent to the HSS.

**Table 6.2-19a Cx: S-CSCF registration notification procedure (S-CSCF to HSS)**

Message source & destination	Cx Information element name	Information Source in REGISTER	Description
S-CSCF to HSS	Public User Identity	To:	Identity which is used to communicate with other users
	Private User Identity	Authorization:	The Private User Identity is encoded according to the Authorization protocol. Unique identity in IMS which is used by network to authenticate this user
	S-CSCF name	Request-URI:	This information indicates the serving CSCF's name of that user

**20. 200 OK response (S-CSCF to I-CSCF) - see example in table 6.2-20**

The S-CSCF sends acknowledgement to the I-CSCF indicating that Registration was successful.

Table 6.2-20: 200 OK response (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:scscf1.home1.net>, <sip:pcscf1.visited1.net>
From:
To:
Call-ID:
Contact: sip:[5555::aaa:bbb:ccc:ddd]
CSeq:
Date: Wed, 11 July 2001 08:49:37 GMT
Expires: 7200
P-Associated-URI: sip:user1_public2@home1.net, sip:user1_public3@home1.net, tel:+1-212-555-
1111
Content-Length:
```

**Path:** The S-CSCF inserts its own name to the front of the list.

#### 21. 200 OK response (I-CSCF to P-CSCF) - see example in table 6.2-21

The I-CSCF forwards acknowledgement from the S-CSCF to the P-CSCF indicating that Registration was successful.

Table 6.2-21: 200 OK response (I-CSCF to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:scscf1.home1.net>, <sip:pcscf1.visited1.net>
From:
To:
Call-ID:
Contact:
CSeq:
Date:
Expires:
P-Associated-URI:
Content-Length:
```

#### 22. 200 OK response (P-CSCF to UE) - see example in table 6.2-22

The P-CSCF removes its address from the Path header, reverses the order of the fields, saves the resulting Path header and associates it with the UE. The P-CSCF then removes the Path header from the 200 OK response. The P-CSCF then forwards acknowledgement from the I-CSCF to the UE indicating that Registration was successful.

Table 6.2-22: 200 OK response (P-CSCF to UE)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
Contact:
CSeq:
Date:
Expires:
P-Associated-URI:
Content-Length:
```

## 6.3 Registration signalling: reregistration - user currently registered

For the purpose of the reregistration signalling flow shown in figure 6.3-1, the subscriber is considered to be roaming. The HSS information indicates that the subscriber is registered and authenticated, and that the S-CSCF has been allocated to this subscriber. In this signalling flow, the home network does not have network configuration hiding active. This flow also shows the authentication of the private user identity.

This signalling flow assumes:

1. That the same PDP Context allocated during the initial registration scenario is still used for reregistration. For the case when the UE does not still have an active PDP context then PDP context procedures from subclause 16.2 is completed first.

**Editor's Note:** If the same PDP-Context is not available, is it guaranteed that the UE will get back the same IP address at this point? If this is not possible, would there be a problem with the binding in the P-CSCF (user\_public1@home1.net and [5555::aaa:bbb:ccc:ddd])?

2. The DHCP procedure employed for P-CSCF discovery is not needed.
3. The S-CSCF selection procedure invoked by the I-CSCF is not needed.

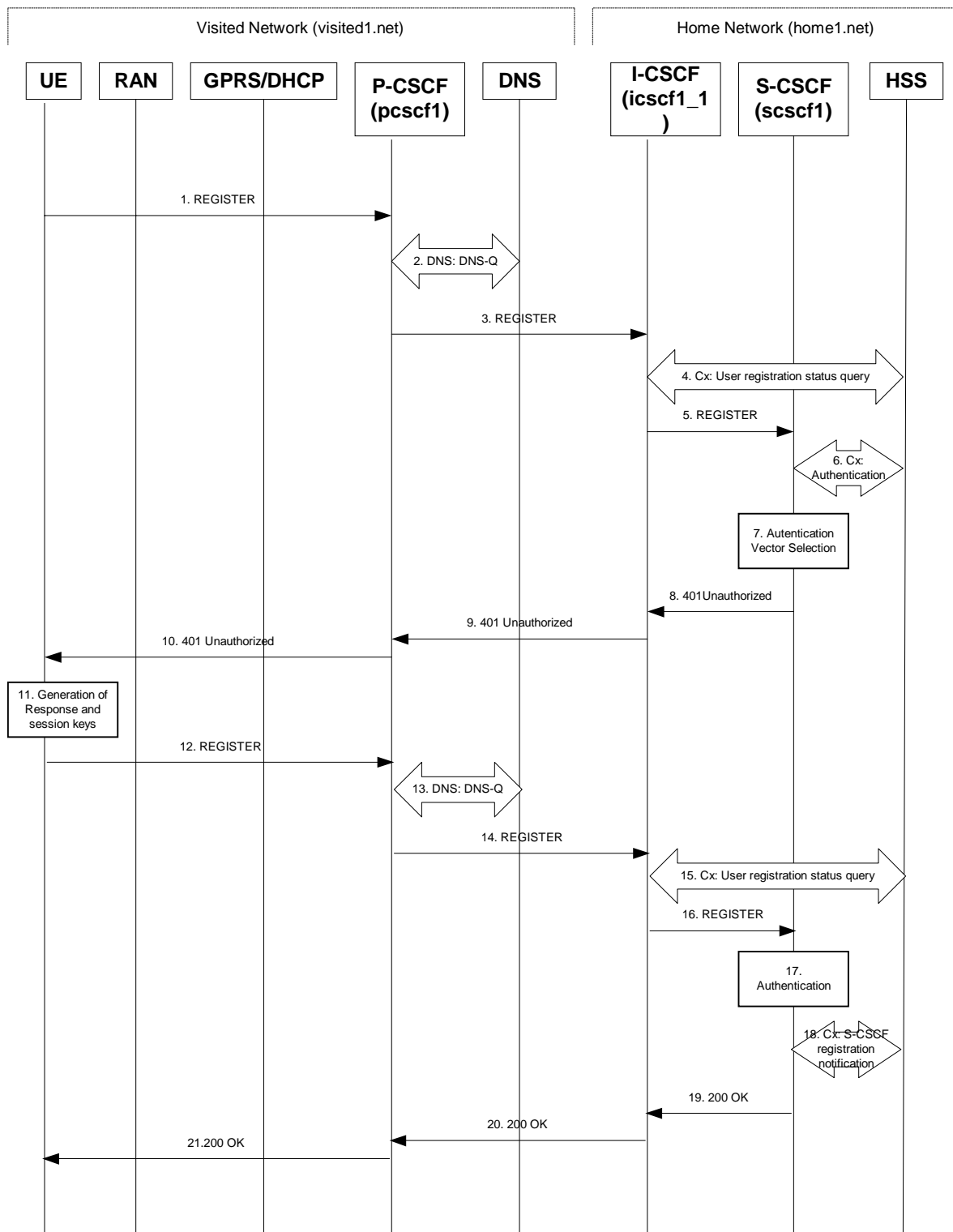


Figure 6.3-1: Reregistration when UE roaming

1. REGISTER request (UE to P-CSCF) - see example in table 6.3-1

The registration expires in the UE. The UE reregisters by sending a new REGISTER request. This request is sent to the same P-CSCF with which the UE initially registered. The P-CSCF maintains the same binding



between the public user address (user1\_public1@home1.net) and the host (terminal) address ([5555::aaa:bbb:ccc:ddd]) which it established during the original registration.

**Table 6.3-1: REGISTER request (UE to P-CSCF)**

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From: <sip:user1_public1@home1.net>;tag=4fa3
To: <sip:user1_public1@home1.net>
Contact: sip:[5555::aaa:bbb:ccc:ddd]
Call-ID: apb03a0s09dkjdfglkj49111
Authorization: eap eap-p=base64(user1_privatel@home1.net)
CSeq: 3 REGISTER
Expires: 7200
Content-Length: 0
```

The header field usage is the same as for the initial registration scenario:

- From:** This indicates the public user identity originating the REGISTER request. The public user identity may be obtained from the USIM.
- To:** This indicates public user identity being registered. This is the identity by which other parties know this subscriber.
- Contact:** This indicates the point-of-presence for the subscriber – the IP address of the UE. This is the temporary identifier for the subscriber that is being registered. Subsequent requests destined for this subscriber will be sent to this address. This information is stored in the P-CSCF and the S-CSCF.
- Authorization:** It carries authentication information. The private user identity (user1\_privatel@home1.net) is carried in the user ID field of the extensible authentication protocol (EAP).

NOTE 1: The actual Authorization header value may look like this as it is in base64 form:  
Authorization: eap eap-p=QWxhZGRpbjpvGcVvIHNIc2FtZQ==

- Request-URI:** The Request-URI (the URI that follows the method name, "REGISTER", in the first line) indicates the destination domain of this REGISTER request. The rules for routing a SIP request describe how to use DNS to resolve this domain name ("home1.net") into an address or entry point into the home operator's network (the I-CSCF). This information is stored in the USIM.

Upon receiving this request the P-CSCF will detect that it already has a registration record for this UE and will reset it's SIP registration timer for this UE to the Expires time in this request.

## 2. DNS: DNS-Q

Based on the user's URI, the P-CSCF determines that UE is registering from a visiting domain and performs a DNS query to locate the I-CSCF in the home network. The look up in the DNS is based on the address specified in the Request URI. The DNS provides the P-CSCF with an address of the I-CSCF in the home network. The P-CSCF must not use the I-CSCF address cached as a result of the previous registration.

## 3. REGISTER request (P-CSCF to I-CSCF) - see example in table 6.3-3

This signalling flow shows the REGISTER request being forward from the P-CSCF to the I-CSCF in the home domain.

**Table 6.3-3 REGISTER request (P-CSCF to I-CSCF)**

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:pcscf1.visited1.net>
Proxy-require: path
Require: path
Roaming-Info: vnid="Visited Network Number 1"
From:
To:
```

```
Contact:
Call-ID:
Authorization:
CSeq:
Expires:
Content-Length:
```

**Path:** This is the address of the P-CSCF and is included to inform the S-CSCF where to route terminating sessions.

**Require:/Proxy-Require:** These headers are included to ensure that the recipient correctly handles the Path header. If the recipient does not support the path header, a response will be received with a status code of 420 and an Unsupported header indicating "path". Such a response indicates a misconfiguration of the routing tables and the request has been routed outside the IM CN subsystem.

**Roaming-Info:** The *vnid* parameter contains the identifier of the P-CSCF network at the home network.

#### 4. Cx: User registration status query procedure

The I-CSCF requests information related to the Subscriber registration status by sending the private user identity, public user identity and visited domain name to the HSS. Because the user has registered, the HSS returns the I-CSCF with the S-CSCF address for the subscriber.

For detailed message flows see 3GPP TS 29.228.

For the parameters in the REGISTER request (flow 3) which need to be sent to HSS, see table 6.2-5a.

Table 6.3-4a provides the parameters in the REGISTER request (flow 5), which are obtained from the information sent back from the HSS.

**Table 6.3-4a Cx: User registration status query procedure (HSS to I-CSCF)**

Message source & destination	Cx Information element name	Mapping to SIP header in REGISTER	Description
HSS to I-CSCF	S-CSCF name	Request-URI:	This information indicates the serving CSCF's name of that user

#### 5. REGISTER request (I-CSCF to S-CSCF) - see example in table 6.3-5

This signalling flow forwards the REGISTER request from the I-CSCF to the S-CSCF selected. The Request-URI is changed to the address of the S-CSCF.

**Table 6.3-5: REGISTER request (I-CSCF to S-CSCF)**

```
REGISTER sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:pcscf1.visited1.net>
Proxy-require:
Require:
Roaming_Info:
From:
To:
Contact:
Call-ID:
Authorization:
CSeq:
Expires:
Content-Length:
```

**Path:** The S-CSCF stores the contents of the Path headers and uses these addresses for routing mobile terminated sessions.

**Roaming-Info:** The *vnid* parameter contains the identifier of the P-CSCF network at the home network.

Upon receiving this request the S-CSCF will detect that it already has a registration record for this UE and will reset its SIP registration timer for this UE to the Expires time in this request.

## 6. Cx: Authentication procedure

On receiving a REGISTER request from a registered user, the S-CSCF requires at least one authentication vector to be used in the challenge to the user. If a valid AV is not available, then the S-CSCF requests at least one AV from the HSS.

For detailed message flows see 3GPP TS 29.228.

Table 6.3-6a provides the parameters in the REGISTER request (flow 5) which need to be sent to HSS.

**Table 6.3-6a Cx: S-CSCF authentication information procedure (S-CSCF to HSS)**

Message source & destination	Cx Information element name	Information Source in REGISTER	Description
S-CSCF to HSS	Public User Identity	To:	Identity which is used to communicate with other users
	Private User Identity	Authorization:	The Private User Identity is encoded according to the Authorization protocol.
	S-CSCF name	Request-URI:	This information indicates the serving CSCF's name of that user

## 7. Authentication vector selection

The S-CSCF selects an authentication vector for use in the authentication challenge. For detailed description of the authentication vector, see 3GPP TS 33.203.

NOTE 2: The authentication vector may be of the form as in 3GPP TS 33.203 (if IMS AKA is the selected authentication scheme):

- $AV = RAND_n || AUTN_n || XRES_n || CK_n || IK_n$  where:
  - RAND: random number used to generate the XRES, CK, IK, and part of the AUTN. It is also used to generate the RES at the UE.
  - AUTN: Authentication token (including MAC and SQN).
  - XRES: Expected (correct) result from the UE.
  - CK: Cipher key (optional).
  - IK: Integrity key.

## 8. 401 Unauthorized response (S-CSCF to I-CSCF) - see example in table 6.3-8

The authentication challenge is sent in the 401 Unauthorized response towards the UE.

Table 6.3-8: 401 Unauthorized response (S-CSCF to I-CSCF)

```
SIP/2.0 401 Unauthorized
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From: <sip:user1_public1@home1.net>;tag=4fa3
To: <sip:user1_public1@home1.net>; tag=5ef4
Contact: <sip:[5555::aaa:bbb:ccc:ddd]>
Call-ID: apb03a0s09dkjdfglkj49111
WWW-Authenticate: eap eap-p=base64(user1_privat1@home1.net, RAND, AUTN)
CSeq: 1 REGISTER
Expires: 7200
Content-Length: 0
```

NOTE 3: The actual WWW-Authenticate header value may look like this as it is in base64 form:  
WWW-Authenticate: eap eap-p=QWxh4ZGRpb2jpvGVuNlctZQ==

**Editor's Note:** The mechanism to transport the session keys (IK and optionally, CK) from the S-CSCF to the P-CSCF is FFS.

9. **401 Unauthorized response (I-CSCF to P-CSCF) - see example in table 6.3-9**

The authentication challenge is sent in the 401 Unauthorized response towards the UE.

Table 6.3-9: 401 Unauthorized response (I-CSCF to P-CSCF)

```
SIP/2.0 401 Unauthorized
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Contact:
Call-ID:
WWW-Authenticate:
CSeq:
Expires:
Content-Length:
```

**Editor's Note:** The mechanism to transport the session keys (IK and optionally, CK) from the S-CSCF to the P-CSCF is FFS

10. **401 Unauthorized response (P-CSCF to UE) - see example in table 6.3-10**

The P-CSCF removes any keys received in the 401 Unauthorized response and forwards the rest of the response to the UE.

Table 6.3-10: 401 Unauthorized response (P-CSCF to UE)

```
SIP/2.0 401 Unauthorized
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Contact:
Call-ID:
WWW-Authenticate: eap eap-p=base64(user1_privat1.home1.net, RAND, AUTN)
CSeq:
Expires:
Content-Length:
```

11. **Generation of response and session keys at UE**

Upon receiving the Unauthorised response, the UE extracts the MAC and the SQN from the AUTN. The UE calculates the XMAC and checks that XMAC matches the received MAC and that the SQN is in the correct range. If both these checks are successful the UE calculates the response, RES, and also computes the session keys IK and CK. The RES is put into the Authorization header and sent back to the registrar in a REGISTER request.

12. REGISTER request (UE to P-CSCF) - see example in table 6.3-12

Table 6.3-12: REGISTER request (UE to P-CSCF)

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From: <sip:user1_public1@home1.net>;tag=4fa3
To: <sip:user1_public1@home1.net>
Contact: <sip:[5555::aaa:bbb:ccc:ddd]>
Call-ID: apb03a0s09dkjdfglkj49112
Authorization: eap eap-p=base64(user1_privatel@home1.net, RES)
CSeq: 4 REGISTER
Expires: 7200
Content-Length: 0
```

**Authorization:** This carries the response to the authentication challenge received in step 10 along with the private user identity both encoded in base64 format.

13. DNS: DNS-Q

Based on the user's URI, the P-CSCF determines that UE is registering from a visiting domain and performs a DNS query to locate the I-CSCF in the home network. The look up in the DNS is based on the address specified in the Request URI.

The P-CSCF sends the REGISTER request - after local processing - to the address indicated in the Request-URI. When forwarding the REGISTER request the P-CSCF needs to specify the protocol, port number and IP address of the I-CSCF server in the home network to which to send the REGISTER request. The P-CSCF tries to find this information by querying the DNS. Since the Request-URI does not specify the transport protocol the, P-CSCF selects the UDP.

Table 6.3-13a: DNS: DNS Query (P-CSCF to DNS)

```
OPCODE=SQUERY
QNAME=__sip._udp.registrar.home1.net, QCLASS=IN, QTYPE=SRV
```

The DNS records are retrieved according to RFC 2782 [4].

Table 6.3-13b: DNS Query Response (DNS to P-CSCF)

```
OPCODE=SQUERY, RESPONSE, AA
QNAME=__sip._udp.registrar.home1.net, QCLASS=IN, QTYPE=SRV

_sip._udp.registrar.home1.net      0 IN SRV 1 10 5060 icscf1_p.home1.net
                                   0 IN SRV 1 0 5060 icscf7_p.home1.net

icscf1_p.home1.net                0 IN AAAA      5555::aba:dab:aaa:daa
icscf7_p.home1.net                0 IN AAAA      5555::a1a:b2b:c3c:d4d
```

In the Answer field of the query-response each I-CSCF is identified by its host domain name. The returned SRV Resource Records (RRs) are merged and ordered, and the selection technique (employing the Priority and Weight parameters returned in the RRs) as specified in RFC 2782 [4] is used to select the I-CSCF (i.e. the icscf1\_p.home1.net). Since the Additional Data field of the query-response also contains the IP address of the selected I-CSCF (i.e. 5555::aba:dab:aaa:daa), a new query to the DNS is not required.

Once the IP address of the I-CSCF is obtained, the P-CSCF forwards the REGISTER request to this IP address (i.e. 5555::aba:dab:aaa:daa) using the UDP protocol and port number 5060.

14. REGISTER request (P-CSCF to I-CSCF) - see example in table 6.2-14

This signalling flow shows the REGISTER request being forwarded from the P-CSCF to the I-CSCF in the home domain.

**Table 6.3-14: REGISTER request (P-CSCF to I-CSCF)**

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:pcscf1.visited1.net>
Proxy-require: path
Require: path
Roaming-Info: vnid="Visited Network Number 1"
From:
To:
Contact:
Call-ID:
Authorization:
CSeq:
Expires:
Content-Length:
```

**Path:** This is the address of the P-CSCF and is included to inform the S-CSCF where to route terminating sessions.

**Roaming-Info:** The *vnid* parameter contains the identifier of the P-CSCF network at the home network.

**15. Cx: User registration status query procedure**

The I-CSCF requests information related to the Subscriber registration status by sending the private user identity, public user identity and visited domain name to the HSS. Because the user has registered, the HSS returns the I-CSCF with the S-CSCF address for the subscriber.

For detailed message flows see 3GPP TS 29.228.

For the parameters in the REGISTER request (flow 14) which need to be sent to HSS, see table 6.2-16a.

Table 6.3-15a provides the parameters in the REGISTER request (flow 16), which are obtained from the information sent back from the HSS

**Table 6.3-15a: User registration status query response (HSS to I-CSCF)**

Message source & destination	Cx Information element name	Mapping to SIP header in REGISTER	Description
HSS to I-CSCF	S-CSCF name	Request-URI:	This information indicates the serving CSCF's name of that user

**16. REGISTER request (I-CSCF to S-CSCF) - see example in table 6.3-16**

This signalling flow forwards the REGISTER request from the I-CSCF to the S-CSCF selected.

**Table 6.3-16: REGISTER request (I-CSCF to S-CSCF)**

```
REGISTER sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:pcscf1.visited1.net>
Proxy-require:
Require:
Roaming-Info:
From:
To:
Contact:
Call-ID:
Authorization:
CSeq:
Expires:
Content-Length:
```

**Path:** The S-CSCF stores the contents of the Path headers and uses these addresses for routing mobile terminated sessions.

#### 17. Authentication

Upon receiving the REGISTER request, carrying the authentication response, RES, the S-CSCF checks that the user's active, XRES matches the received RES. If the check is successful then the user has been authenticated and the public user identity is registered in the S-CSCF.

#### 18. Cx: S-CSCF registration notification procedure

On registering a user the S-CSCF informs the HSS that the user has been re-registered at this instance.

For detailed message flows see 3GPP TS 29.228.

#### 19. 200 OK response (S-CSCF to I-CSCF) - see example in table 6.3-19

The S-CSCF sends acknowledgement to the I-CSCF indicating that Registration was successful. This response will traverse the path that the REGISTER request took as described in the Via list.

**Table 6.3-19 200 OK response (S-CSCF to I-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:scscf1.home1.net>, <sip:pcscf1.visited1.net>
From:
To:
Call-ID:
Contact: sip:[5555::aaa:bbb:ccc:ddd]
CSeq:
Date: Wed, 11 July 2001 08:49:37 GMT
Expires: 7200
P-Associated-URI: sip:user1_public2@home1.net, sip:user1_public3@home1.net, tel:+1-212-555-
1111
Content-Length:
```

**Path:** The S-CSCF inserts its own name to the front of the list.

#### 20. 200 OK response (I-CSCF to P-CSCF) - see example in table 6.3-20

The I-CSCF forwards acknowledgement from the S-CSCF to the P-CSCF indicating that Registration was successful. This response will traverse the path that the REGISTER request took as described in the Via list.

**Table 6.3-20: 200 OK response (I-CSCF to P-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:scscf1.home1.net, <sip:pcscf1.visited1.net>
From:
To:
Call-ID:
Contact:
CSeq:
Date:
Expires:
P-Associated-URI:
Content-Length:
```

#### 21. 200 OK response (P-CSCF to UE) - see example in table 6.3-21

The P-CSCF removes its address from the Path header, reverses the order of the fields, saves the resulting Path header and associates it with the UE. The P-CSCF then removes the Path header from the 200 OK response. The P-CSCF then forwards acknowledgement from the I-CSCF to the UE indicating that Registration was successful.

Table 6.3-21: 200 OK response (P-CSCF to UE)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
Contact:
CSeq:
Date:
Expires:
P-Associated-URI:
Content-Length:
```

\*\*\*\*\* Next proposed change \*\*\*\*\*

## 16.2 Registration signalling: user not registered

Figure 16.2-1 shows the registration signalling flow for the scenario when the user is not registered. For the purpose of this signalling flow, the subscriber is considered to be roaming. This flow also shows the authentication of the private user identity. In this signalling flow, the home network has network configuration hiding active.



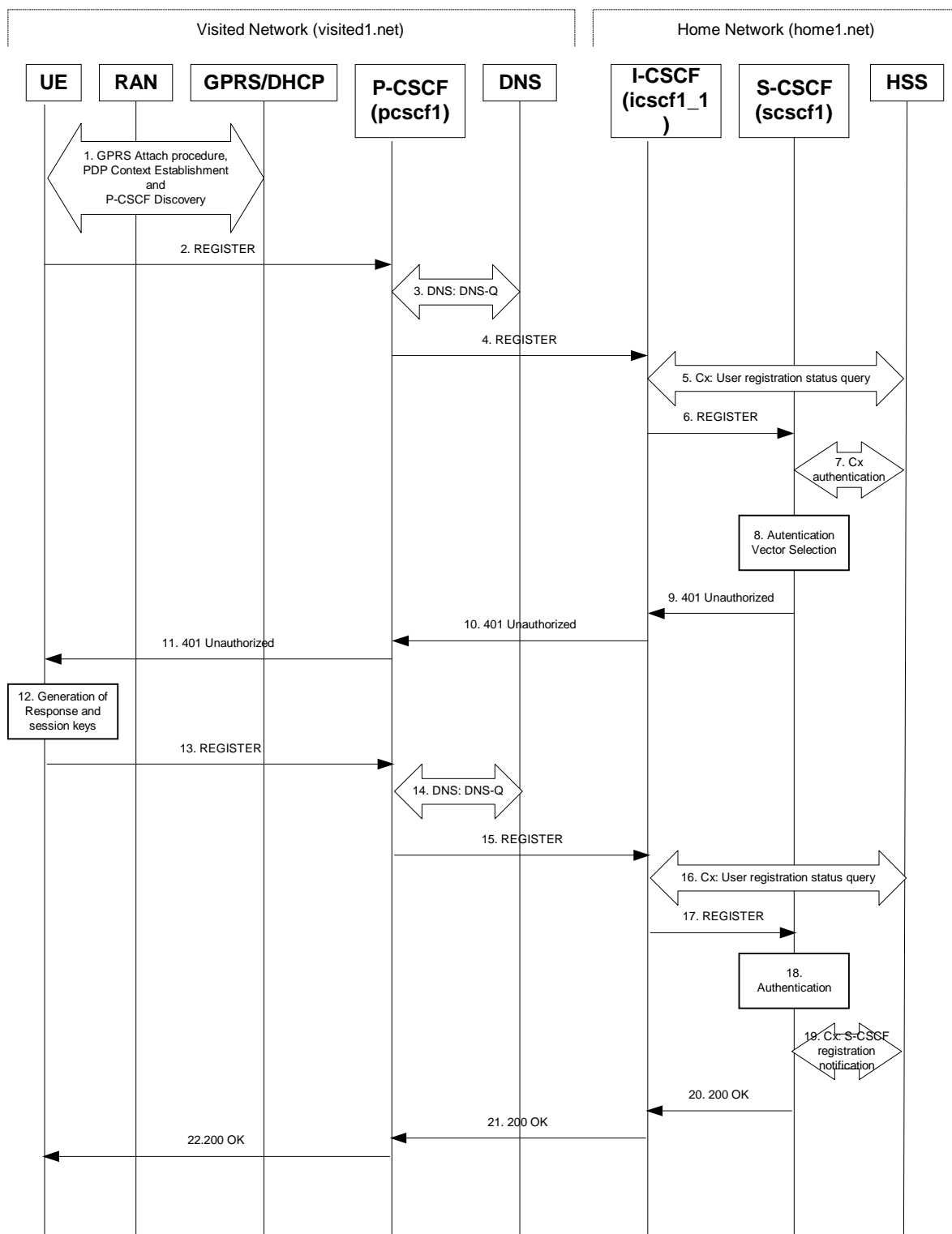


Figure 16.2-1: Registration when UE roaming

1. GPRS Attach / PDP Context Establishment and P-CSCF Discovery (UE to GPRS)

This signalling flow is shown to indicate prerequisites for the registration signalling.

See subclause 5.2 for details.

**2. REGISTER request (UE to P-CSCF) – see example in table 16.2-2**

The purpose of this request is to register the user's SIP URI with a S-CSCF in the home network. This request is routed to the P-CSCF because it is the only SIP server known to the UE. In the following SIP request, the Contact field contains the user's host address.

The P-CSCF will perform two actions, binding and forwarding. The binding is between the User's SIP address (user1\_public1@home1.net) and the host (terminal) address ([5555::aaa:bbb:ccc:ddd]) which was acquired during PDP context activation process.

**Editor's note:** The security mode set-up procedure supports the negotiation of different protection mechanisms. This will involve the addition of a "security-setup" field to the SIP REGISTER request and the REGISTER response performing the authentication challenge containing the parameters:

list of Authentication (integrity) algorithms, and optionally list of encryption (confidentiality) algorithms

SA-ID that is used to uniquely identify the SA at the receiving side.

Key length: the length of encryption and authentication (integrity) keys is 128 bits.

The exact format and use for the security mode setup is being worked through IETF and is FFS

**Table 16.2-2 REGISTER request (UE to P-CSCF)**

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From: <sip:user1_public1@home1.net>;tag=4fa3
To: <sip:user1_public1@home1.net>
Contact: <sip:[5555::aaa:bbb:ccc:ddd]>
Call-ID: apb03a0s09dkjdfg1kj49111
Authorization: eap eap-p=base64(user1_private1@home1.net)
CSeq: 1 REGISTER
Expires: 7200
Content-Length: 0
```

**Request-URI:** The Request-URI (the URI that follows the method name, "REGISTER", in the first line) indicates the destination domain of this REGISTER request. The rules for routing a SIP request describe how to use DNS to resolve this domain name ("home1.net") into an address or entry point into the home operator's network (the I-CSCF). This information is stored in the USIM.

**Via:** IPv6 PDP address of the SIP session allocated during the PDP Context Activation process.

**From:** This indicates the public user identity originating the REGISTER request. The public user identity may be obtained from the USIM.

**To:** This indicates the public user identity being registered. This is the identity by which other parties know this subscriber. It may be obtained from the USIM.

**Contact:** This indicates the point-of-presence for the subscriber – the IP address of the UE. This is the temporary point of contact for the subscriber that is being registered. Subsequent requests destined for this subscriber will be sent to this address. This information is stored in the P-CSCF and S-CSCF.

**Editor's note:** It is for further study whether this information is stored in the HSS and the S-CSCF for the subscriber in order to support multiple registrations.

**Authorization:** It carries authentication information. The private user identity (user1\_private1@home1.net) is carried in the user ID field of the extensible authentication protocol (EAP).

Upon receiving this request the P-CSCF will set it's SIP registration timer for this UE to the Expires time in this request.

3. DNS: DNS-Q

Based on the user's URI, the P-CSCF determines that UE is registering from a visiting domain and performs a DNS query to locate the I-CSCF in the home network. The look up in the DNS is based on the address specified in the Request URI.

The P-CSCF sends the REGISTER request - after local processing - to the address indicated in the Request-URI. When forwarding the REGISTER request the P-CSCF needs to specify the protocol, port number and IP address of the I-CSCF server in the home network to which to send the REGISTER request. The P-CSCF tries to find this information by querying the DNS. Since the Request-URI does not specify the transport protocol the, P-CSCF selects the UDP.

Table 16.2-3a DNS: DNS Query (P-CSCF to DNS)

```
OPCODE=SQUERY
QNAME=_sip._udp.registrar.home1.net, QCLASS=IN, QTYPE=SRV
```

The DNS records are retrieved according to RFC 2782 [4].

Table 16.2-3b DNS: DNS Query Response (DNS to P-CSCF)

```
OPCODE=SQUERY, RESPONSE, AA
QNAME=_sip._udp.registrar.home1.net, QCLASS=IN, QTYPE=SRV
_sip._udp.registrar.home1.net      0 IN SRV 1 10 5060 icscf1_p.home1.com
                                   0 IN SRV 1 0 5060 icscf7_p.home1.com
icscf1_p.home1.net                 0 IN AAAA      5555::aba:dab:aaa:daa
icscf7_p.home1.net                 0 IN AAAA      5555::ala:b2b:c3c:d4d
```

In the Answer field of the query-response each I-CSCF is identified by its host domain name. The returned SRV Resource Records (RRs) are merged and ordered, and the selection technique (employing the Priority and Weight parameters returned in the RRs) as specified in RFC 2782 [4] is used to select the I-CSCF (i.e. the icscf1\_p.home1.net). Since the Additional Data field of the query-response also contains the IP address of the selected I-CSCF (i.e. 5555::aba:dab:aaa:daa), a new query to the DNS is not required.

Once the IP address of the I-CSCF is obtained, the P-CSCF forwards the REGISTER request to this IP address (i.e. 5555::aba:dab:aaa:daa) using the UDP protocol and port number 5060.

4. REGISTER request (P-CSCF to I-CSCF) – see example in table 16.2-4

The P-CSCF needs to be in the path for all mobile originated and mobile terminated requests for this user. To ensure this, the P-CSCF adds itself to the path for future requests.

The P-CSCF binds the public user identity under registration to the Contact header supplied by the user.

The P-CSCF adds also the Roaming-Info header (if not present). The P-CSCF adds the *vnid* parameter with the contents of the identifier of the P-CSCF network. This may be the visited network domain name or any other identifier that identifies the visited network at the home network.

This signalling flow shows the REGISTER request being forward from the P-CSCF to the I-CSCF in the home domain.

Table 16.2-4 REGISTER request (P-CSCF to I-CSCF)

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:pcscf1.visited1.net>
Proxy-require: path
Require: path
Roaming-Info: vnid="Visited Network Number 1"
From:
To:
Contact:
Call-ID:
Authorization:
CSeq:
Expires:
Content-Length:
```

**Path:** This is the address of the P-CSCF and is included to inform the S-CSCF where to route terminating sessions.

**Require:/Proxy-Require:** These headers are included to ensure that the recipient correctly handles the Path header. If the recipient does not support the path header, a response will be received with a status code of 420 and an Unsupported header indicating "path". Such a response indicates a misconfiguration of the routing tables and the request has been routed outside the IM CN subsystem.

**Roaming-Info:** The *vnid* parameter contains the identifier of the P-CSCF network at the home network.

#### 5. Cx: User registration status query procedure

The I-CSCF makes a request for information related to the Subscriber registration status by sending the private user identity, public user identity and visited domain name to the HSS. The HSS returns the S-CSCF required capabilities and the I-CSCF uses this information to select a suitable S-CSCF.

For detailed message flows see 3GPP TS 29.228.

Table 6.2-5a provides the parameters in the REGISTER request (flow 4) which need to be sent to HSS.

#### 6. REGISTER request (I-CSCF to S-CSCF) – see example in table 16.2-6

I-CSCF adds a proper I-CSCF name to the Path header.

This signalling flow forwards the REGISTER request from the I-CSCF to the S-CSCF selected. The Request-URI is changed to the address of the S-CSCF.

Table 16.2-6 REGISTER request (I-CSCF to S-CSCF)

```
REGISTER sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:icscf1_p.home1.net>, <sip:pcscf1.visited1.net>
Proxy-require:
Require:
Roaming-Info:
From:
To:
Contact:
Call-ID:
Authorization:
CSeq:
Expires:
Content-Length:
```

**Path:** The S-CSCF stores the contents of the Path headers and uses these addresses for routing mobile terminated sessions.

Upon receiving this request the S-CSCF will set it's SIP registration timer for this UE to the Expires time in this request.

#### 7. Cx: S-CSCF authentication procedure

On receiving a REGISTER request from an unauthenticated user, the S-CSCF requires at least one authentication vector to be used in the challenge to the user. If a valid AV is not available, then the S-CSCF requests at least one AV from the HSS.

For detailed message flows see 3GPP TS 29.228.

Table 6.2-7a provides the parameters in the REGISTER request (flow 6) which need to be sent to HSS.

#### 8. Authentication vector selection

The S-CSCF selects an authentication vector for use in the authentication challenge. For detailed description of the authentication vector, see 3GPP TS 33.203.

NOTE 1: The authentication vector may be of the form 3GPP TS 33.203 (if IMS AKA is the selected authentication scheme):

AV = RAND<sub>n</sub>||AUTN<sub>n</sub>||XRES<sub>n</sub>||CK<sub>n</sub>||IK<sub>n</sub> where:

- RAND: random number used to generate the XRES, CK, IK, and part of the AUTN. It is also used to generate the RES at the UE.
- AUTN: Authentication token (including MAC and SQN).
- XRES: Expected (correct) result from the UE.
- CK: Cipher key (optional).
- IK: Integrity key.

#### 9. 401 Unauthorized response (S-CSCF to I-CSCF) – see example in table 16.2-9

The authentication challenge is sent in the 401 Unauthorized response towards the UE.

**Table 16.2-9: 401 Unauthorized response (S-CSCF to I-CSCF)**

```
SIP/2.0 401 Unauthorized
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To: <sip:user1_public1@home1.net>; tag=5ef4
Call-ID:
WWW-Authenticate: eap eap-p=base64(user1_privatel@home1.net, RAND, AUTN)
CSeq:
Content-Length:
```

NOTE 2: The actual WWW-Authenticate header value may look like this as it is in base64 form:

- WWW-Authenticate: eap eap-p=QWxh4ZGRpb2jpvGVuNlctZQ==

**Editor's Note: The mechanism to transport the session keys (IK and optionally, CK) from the S-CSCF to the P-CSCF is FFS.**

#### 10. 401 Unauthorized response (I-CSCF to P-CSCF) – see example in table 16.2-10

The authentication challenge is sent in the 401 Unauthorized response towards the UE.

**Table 16.2-10: 401 Unauthorized response (I-CSCF to P-CSCF)**

```
SIP/2.0 401 Unauthorized
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
```

```
To:  
Call-ID:  
WWW-Authenticate:  
CSeq:  
Content-Length:
```

**Editor's Note:** The mechanism to transport the session keys (IK and optionally, CK) from the S-CSCF to the P-CSCF is FFS.

#### 11. 401 Unauthorized response (P-CSCF to UE) – see example in table 16.2-11

The P-CSCF removes any keys received in the 401 Unauthorized response and forwards the rest of the response to the UE.

**Table 16.2-11: 401 Unauthorized response (P-CSCF to UE)**

```
SIP/2.0 401 Unauthorized  
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]  
From:  
To:  
Call-ID:  
WWW-Authenticate:  
CSeq:  
Content-Length:
```

#### 12. Generation of response and session keys at UE

Upon receiving the Unauthorized response, the UE extracts the MAC and the SQN from the AUTN. The UE calculates the XMAC and checks that XMAC matches the received MAC and that the SQN is in the correct range. If both these checks are successful the UE calculates the response, RES, and also computes the session keys IK and CK. The RES is put into the Authorization header and sent back to the registrar in the REGISTER request.

#### 13. REGISTER request (UE to P-CSCF) – see example in table 16.2-13

**Table 16.2-13 REGISTER request (UE to P-CSCF)**

```
REGISTER sip:registrar.home1.net SIP/2.0  
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]  
From: <sip:user1_public1@home1.net>; tag=4fa3  
To: <sip:user1_public1@home1.net>; tag=5ef4  
Contact: <sip:[5555::aaa:bbb:ccc:ddd]>  
Call-ID: apb03a0s09dkjdfgk49112  
Authorization: eap eap-p=base64(user1_privatel@home1.net, RES)  
CSeq: 2 REGISTER  
Expires: 7200  
Content-Length: 0
```

**Authorization:** This carries the response to the authentication challenge received in step 11 along with the private user identity both encoded in base64 format.

#### 14. DNS: DNS-Q

Based on the user's URI, the P-CSCF determines that UE is registering from a visiting domain and performs a DNS query to locate the I-CSCF in the home network. The look up in the DNS is based on the address specified in the Request URI.

The P-CSCF sends the REGISTER request - after local processing - to the address indicated in the Request-URI. When forwarding the REGISTER request the P-CSCF needs to specify the protocol, port number and IP address of the I-CSCF server in the home network to which to send the REGISTER request. The P-CSCF tries to find this information by querying the DNS. Since the Request-URI does not specify the transport protocol the, P-CSCF selects the UDP.

**Table 16.2-14a DNS: DNS Query (P-CSCF to DNS)**

```
OPCODE=SQUERY
QNAME=__sip_udp.registrar.home1.net, QCLASS=IN, QTYPE=SRV
```

The DNS records are retrieved according to RFC 2782 [4].

**Table 16.2-14b DNS Query Response (DNS to P-CSCF)**

```
OPCODE=SQUERY, RESPONSE, AA
QNAME=__sip_udp.registrar.home1.net, QCLASS=IN, QTYPE=SRV

__sip_udp.registrar.home1.net          0 IN SRV 1 10 5060 icscf1_p.home1.net
                                       0 IN SRV 1 0 5060 icscf7_p.home1.net

icscf1_p.home1.net                    0 IN AAAA      5555::aba:dab:aaa:daa
icscf7_p.home1.net                    0 IN AAAA      5555::ala:b2b:c3c:d4d
```

In the Answer field of the query-response each I-CSCF is identified by its host domain name. The returned SRV Resource Records (RRs) are merged and ordered, and the selection technique (employing the Priority and Weight parameters returned in the RRs) as specified in RFC 2782 [4] is used to select the I-CSCF (i.e. the icscf1\_p.home1.net). Since the Additional Data field of the query-response also contains the IP address of the selected I-CSCF (i.e. 5555::aba:dab:aaa:daa), a new query to the DNS is not required.

Once the IP address of the I-CSCF is obtained, the P-CSCF forwards the REGISTER request to this IP address (i.e. 5555::aba:dab:aaa:daa) using the UDP protocol and port number 5060.

**15. REGISTER request (P-CSCF to I-CSCF) – see example in table 16.2-15**

This signalling flow shows the REGISTER request being forwarded from the P-CSCF to the I-CSCF in the home domain.

**Table 16.2-15 REGISTER request (P-CSCF to I-CSCF)**

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:pcscf1.visited1.net>
Proxy-require: path
Require: path
Roaming-Info: vnid="Visited Network Number 1"
From:
To:
Contact:
Call-ID:
Authorization:
CSeq:
Expires:
Content-Length:
```

**Path:** This is the address of the P-CSCF and is included to inform the S-CSCF where to route terminating sessions.

**16. Cx: User registration status query procedure**

The I-CSCF requests information related to the Subscriber registration status by sending the private user identity, public user identity and visited domain name to the HSS. The HSS returns the S-CSCF required capabilities and the I-CSCF uses this information to select a suitable S-CSCF.

For detailed message flows see 3GPP TS 29.228.

Table 6.2-16a provides the parameters in the REGISTER request (flow 15) which need to be sent to HSS.

**17. REGISTER request (I-CSCF to S-CSCF) – see example in table 16.2-17**

This signalling flow forwards the REGISTER request from the I-CSCF to the S-CSCF selected.

Table 16.2-17 REGISTER request (I-CSCF to S-CSCF)

```
REGISTER sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:icscf1_p.home1.net>, <sip:pcscf1.visited1.net>
Proxy-require:
Require:
Roaming-Info:
From:
To:
Contact:
Call-ID:
Authorization:
CSeq:
Expires:
Content-Length:
```

**Path:** The S-CSCF stores the contents of the Path headers and uses these addresses for routing mobile terminated sessions.

### 18. Authentication

Upon receiving the REGISTER request, carrying the authentication response, RES, the S-CSCF checks that the user's active XRES matches the received RES. If the check is successful then the user has been authenticated and the public user identity is registered in the S-CSCF.

### 19. Cx: S-CSCF registration notification procedure

On registering a user the S-CSCF informs the HSS that the user has been registered at this instance. The HSS stores the S-CSCF name for that subscriber. For a positive response, the HSS will include the user profile in the response sent to the S-CSCF.

For detailed message flows see 3GPP TS 29.228.

Table 6.2-19a provides the parameters in the SIP REGISTER request (flow 17) which need to be sent to HSS.

### 20. 200 OK response (S-CSCF to I-CSCF) – see example in table 16.2-20

The S-CSCF sends acknowledgement to the I-CSCF indicating that Registration was successful. This response will traverse the path that the REGISTER request took as described in the Via list.

Table 16.2-20 200 OK response (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:scscf1.home1.net>, <sip:icscf1_p.home1.net>, <sip:pcscf1.visited1.net>
From:
To:
Call-ID:
Contact: sip:[5555::aaa:bbb:ccc:ddd]
CSeq:
Date: Wed, 11 July 2001 08:49:37 GMT
Expires: 7200
P-Associated-URI: sip:user1_public2@home1.net, sip:user1_public3@home1.net, tel:+1-212-555-1111
Content-Length:
```

**Path:** The S-CSCF inserts its own name to the front of the list.

### 21. 200 OK response (I-CSCF to P-CSCF) – see example in table 16.2-21

The I-CSCF translates the S-CSCF name in the Path header. The I-CSCF forwards acknowledgement from the S-CSCF to the P-CSCF indicating that Registration was successful. This response will traverse the path that the REGISTER request took as described in the Via list.



**Table 16.2-21 200 OK response (I-CSCF to P-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:token(scscf1.home1.net)>, <sip:icscf1_p.home1.net>, <sip:pcscf1.visited1.net>
From:
To:
Call-ID:
Contact:
CSeq:
Date:
Expires:
P-Associated-URI:
Content-Length:
```

**22. 200 OK response (P-CSCF to UE) – see example in table 16.2-22**

The P-CSCF removes its address from the Path header, reverses the order of the fields, saves the resulting Path header and associates it with the UE. The P-CSCF then removes the Path header from the 200 OK response. The P-CSCF then forwards acknowledgement from the I-CSCF to the UE indicating that Registration was successful.

**Table 16.2-22 200 OK response (P-CSCF to UE)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
Contact:
CSeq:
Date:
Expires:
P-Associated-URI:
Content-Length:
```

### 16.3 Registration signalling: reregistration – user currently registered

For the purpose of the reregistration signalling flow shown in figure 16.3-1, the subscriber is considered to be roaming. This flow also shows the authentication of the private user identity. In this signalling flow, the home network has network configuration hiding active.

This signalling flow assumes:

1. That the same PDP Context allocated during the initial registration scenario is still used for reregistration. For the case when the UE does not still have an active PDP context then PDP context procedures from subclause 16.2 is completed first.

**Editor's Note:** If the same PDP-Context is not available, is it guaranteed that the UE will get back the same IP address at this point? If this is not possible, would there be a problem with the binding in the P-CSCF (user\_public1@home1.net and [5555::aaa:bbb:ccc:ddd])?2. The DHCP procedure employed for P-CSCF discovery is not needed.

2. The S-CSCF selection procedure invoked by the I-CSCF is not needed.

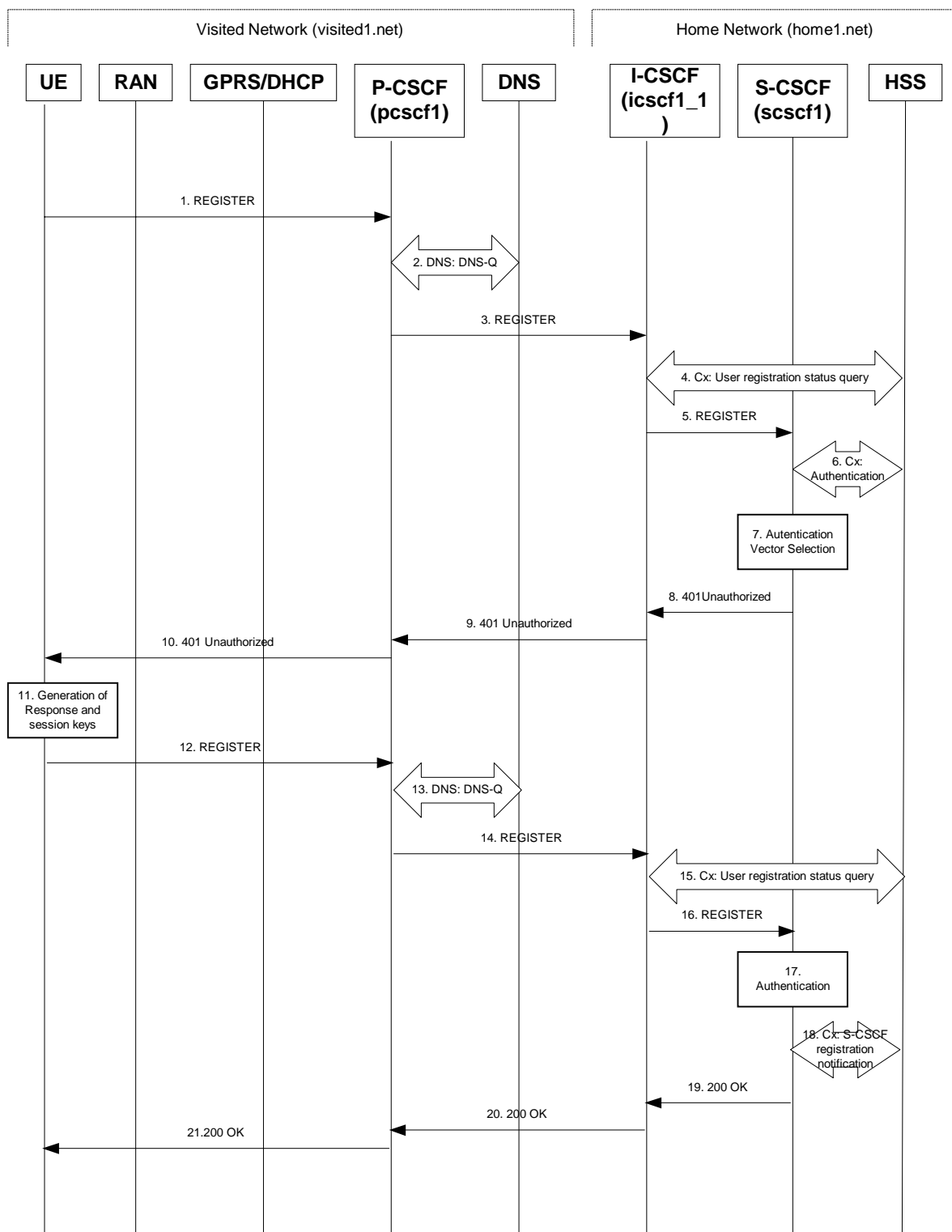


Figure 16.3-1: Reregistration when UE roaming

1. REGISTER request (UE to P-CSCF) – see example in table 16.3-1

The registration expires in the UE. The UE reregisters by sending a new REGISTER request. This request is sent to the same P-CSCF with which the UE initially registered. The P-CSCF maintains the same binding

between the User's SIP public address (user1\_public1@home1.net) and the host (terminal) address ([5555::aaa:bbb:ccc:ddd]) which it established during the original registration.

**Table 16.3-1 REGISTER request (UE to P-CSCF)**

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From: <sip:user1_public1@home1.net>;tag=4fa3
To: <sip:user1_public1@home1.net>;tag=5ef4
Contact: <sip:[5555::aaa:bbb:ccc:ddd]>
Call-ID: apb03a0s09dkjdfglkj49111
Authorization: eap eap-p=base64(user1_private1@home1.net)
CSeq: 3 REGISTER
Expires: 7200
Content-Length: 0
```

The header field usage is the same as for the initial registration scenario:

- From:** This indicates the public user identity originating the REGISTER request. The public user identity may be obtained from the USIM.
- To:** This indicates public user identity being registered. This is the identity by which other parties know this subscriber.
- Contact:** This indicates the point-of-presence for the subscriber – the IP address of the UE. This is the temporary identifier for the subscriber that is being registered. Subsequent requests destined for this subscriber will be sent to this address. This information is stored in the P-CSCF.

**Editor's note:** It is for further study whether this information is stored in the HSS and the S-CSCF for the subscriber in order to support multiple registrations.

**Authorization:** It carries authentication information. The private user identity (user1\_private1@home1.net) is carried in the user ID field of the extensible authentication protocol (EAP).

NOTE 1: The actual Authorization header value may look like this as it is in base64 form:

- Authorization: eap eap-p=QWxhZGRpbjpvGVuIHNIc2FtZQ==

**Request-URI:** The Request-URI (the URI that follows the method name, "REGISTER", in the first line) indicates the destination domain of this REGISTER request. The rules for routing a SIP request describe how to use DNS to resolve this domain name ("home1.net") into an address or entry point into the home operator's network (the I-CSCF). This information is stored in the USIM.

Upon receiving this request the P-CSCF will detect that it already has a registration record for this UE and will reset its SIP registration timer for this UE to the Expires time in this request.

## 2. DNS: DNS-Q

Based on the user's URI, the P-CSCF determines that UE is registering from a visiting domain and performs a DNS query to locate the I-CSCF in the home network. The look up in the DNS is based on the address specified in the Request URI. The DNS provides the P-CSCF with an address of the I-CSCF in the home network. The P-CSCF must not use the I-CSCF address cached as a result of the previous registration.

## 3. REGISTER request (P-CSCF to I-CSCF) – see example in table 16.3-3

This signalling flow shows the REGISTER request being forward from the P-CSCF to the I-CSCF in the home domain.

Table 16.3-3 REGISTER request (P-CSCF to I-CSCF)

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:pcscf1.visited1.net>
Proxy-require: path
Require: path
Roaming-Info: vnid="Visited Network Number 1"
From:
To:
Contact:Call-ID:
Authorization: eap eap-p=base64(user1_privatel@home1.net)
CSeq:
Expires:
Content-Length:
```

**Path:** This is the address of the P-CSCF and is included to inform the S-CSCF where to route terminating sessions.

**Require:/Proxy-Require:** These headers are included to ensure that the recipient correctly handles the Path header. If the recipient does not support the path header, a response will be received with a status code of 420 and an Unsupported header indicating "path". Such a response indicates a misconfiguration of the routing tables and the request has been routed outside the IM CN subsystem.

**Roaming-Info:** The *vnid* parameter contains the identifier of the P-CSCF network at the home network.

#### 4. Cx: User registration status query procedure

The I-CSCF requests information related to the Subscriber registration status by sending the private user identity, public user identity and visited domain name to the HSS. Because the user has registered, the HSS returns the I-CSCF with the S-CSCF address for the subscriber

For detailed message flows see 3GPP TS 29.228.

For the parameters in the REGISTER request (flow 3), which are sent to the HSS, see table 6.2-5a.

Table 6.3-4a provides the parameters in the SIP REGISTER request (flow 5), which are obtained from the information sent back from the HSS.

#### 5. REGISTER request (I-CSCF to S-CSCF) – see example in table 16.3-5

This signalling flow forwards the REGISTER request from the I-CSCF to the S-CSCF selected. The Request-URI is changed to the address of the S-CSCF.

I-CSCF adds a proper I-CSCF name to the Path header.

Table 16.3-5 REGISTER request (I-CSCF to S-CSCF)

```
REGISTER sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:icscf1_p.home1.net>, <sip:pcscf1.visited1.net>
Proxy-require:
Require:
Roaming-Info:
From:
To:
Contact:
Authorization: eap eap-p=base64(user1_privatel@home1.net)
Call-ID:
CSeq:
Expires:
Content-Length:
```

**Path:** The S-CSCF stores the contents of the Path headers and uses these addresses for routing mobile terminated sessions.

**Roaming-Info:** The *vnid* parameter contains the identifier of the P-CSCF network at the home network.

Upon receiving this request the S-CSCF will detect that it already has a registration record for this UE and will reset its SIP registration timer for this UE to the Expires time in this request.

#### 6. Cx: Authentication procedure

On receiving a REGISTER request from a registered user, the S-CSCF requires at least one authentication vector to be used in the challenge to the user. If a valid AV is not available, then the S-CSCF requests at least one AV from the HSS.

For detailed message flows see 3GPP TS 29.228.

Table 6.3-6a provides the parameters in the REGISTER request (flow 5), which are sent to the HSS.

#### 7. Authentication vector selection

The S-CSCF selects an authentication vector for use in the authentication challenge. For detailed description of the authentication vector, see 3GPP TS 33.203.

NOTE 2: The authentication vector may be of the form 3GPP TS 33.203 (if IMS AKA is the selected authentication scheme):

AV = RANDn||AUTNn||XRESn||CKn||IKn where:

- RAND: random number used to generate the XRES, CK, IK, and part of the AUTN. It is also used to generate the RES at the UE.
- AUTN: Authentication token (including MAC and SQN).
- XRES: Expected (correct) result from the UE.
- CK: Cipher key (optional).
- IK: Integrity key.

#### 8. 401 Unauthorized response (S-CSCF to I-CSCF) – see example in table 16.3-8

The authentication challenge is sent in the 401 Unauthorized response towards the UE.

**Table 16.3-8: 401 Unauthorized response (S-CSCF to I-CSCF)**

```
SIP/2.0 401 Unauthorized
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
WWW-Authenticate: eap eap-p=base64(user1_privatel@home1.net, RAND, AUTN)
CSeq:
Content-Length:
```

NOTE 3: The actual WWW-Authenticate header value may look like this as it is in base64 form:

- WWW-Authenticate: eap eap-p=QWxh4ZGRpb2jpvGVuNlctZQ==

**Editor's Note: The mechanism to transport the session keys (IK and optionally, CK) from the S-CSCF to the P-CSCF is FFS.**

#### 9. 401 Unauthorized response (I-CSCF to P-CSCF) – see example in table 16.3-9

The authentication challenge is sent in the 401 Unauthorized response towards the UE.

**Table 16.3-9: 401 Unauthorized response (I-CSCF to P-CSCF)**

```
SIP/2.0 401 Unauthorized
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
WWW-Authenticate: eap eap-p=base64(user1_privatel@home1.net, RAND, AUTN)
CSeq:
Content-Length:
```

**Editor's Note:** The mechanism to transport the session keys (IK and optionally, CK) from the S-CSCF to the P-CSCF is FFS.

**10. 401 Unauthorized response (P-CSCF to UE) – see example in table 16.3-10**

The P-CSCF removes any keys received in the 401 Unauthorized response and forwards the rest of the response to the UE.

**Table 16.3-10: 401 Unauthorized response (P-CSCF to UE)**

```
SIP/2.0 401 Unauthorized
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
WWW-Authenticate:
CSeq:
Content-Length:
```

**11. Generation of response and session keys at UE**

Upon receiving the Unauthorised response, the UE extracts the MAC and the SQN from the AUTN. The UE calculates the XMAC and checks that XMAC matches the received MAC and that the SQN is in the correct range. If both these checks are successful the UE calculates the response, RES, and also computes the session keys IK and CK. The RES is put into the Authorization header and sent back to the registrar in the REGISTER request.

**12. REGISTER request (UE to P-CSCF) – see example in table 16.3-12**

**Table 16.3-12 REGISTER request (UE to P-CSCF)**

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From: <sip:user1_public1@home1.net>;tag=4fa3
To: <sip:user1_public1@home1.net>;tag=5ef4
Contact: <sip:[5555::aaa:bbb:ccc:ddd]>
Call-ID: apb03a0s09dkjdfglkj49112
Authorization: eap eap-p=base64(user1_privatel@home1.net, RES)
CSeq: 4 REGISTER
Expires: 7200
Content-Length: 0
```

**Authorization:** This carries the response to the authentication challenge received in step 10 along with the private user identity both encoded in base64 format.

**13. DNS: DNS-Q**

Based on the user's URI, the P-CSCF determines that UE is registering from a visiting domain and performs a DNS query to locate the I-CSCF in the home network. The look up in the DNS is based on the address specified in the Request URI.

The P-CSCF sends the REGISTER request - after local processing - to the address indicated in the Request-URI. When forwarding the REGISTER request the P-CSCF needs to specify the protocol, port number and

IP address of the I-CSCF server in the home network to which to send the REGISTER request. The P-CSCF tries to find this information by querying the DNS. Since the Request-URI does not specify the transport protocol the, P-CSCF selects the UDP.

**Table 16.3-13a DNS: DNS Query (P-CSCF to DNS)**

```
-----  
OPCODE=SQUERY  
QNAME=__sip._udp.registrar.home1.net, QCLASS=IN, QTYPE=SRV  
-----
```

The DNS records are retrieved according to RFC2782 [4].

**Table 16.3-13b DNS Query Response (DNS to P-CSCF)**

```
-----  
OPCODE=SQUERY, RESPONSE, AA  
QNAME=__sip._udp.registrar.home1.net, QCLASS=IN, QTYPE=SRV  
  
_sip._udp.registrar.home1.net          0 IN SRV 1 10 5060 icscf1_p.home1.net  
                                       0 IN SRV 1 0 5060 icscf7_p.home1.net  
  
icscf1_p.home1.net                    0 IN AAAA      5555::aba:dab:aaa:daa  
icscf7_p.home1.net                    0 IN AAAA      5555::ala:b2b:c3c:d4d  
-----
```

In the Answer field of the query-response each I-CSCF is identified by its host domain name. The returned SRV Resource Records (RRs) are merged and ordered, and the selection technique (employing the Priority and Weight parameters returned in the RRs) as specified in RFC 2782 [4] is used to select the I-CSCF (i.e. the icscf1\_p.home1.net). Since the Additional Data field of the query-response also contains the IP address of the selected I-CSCF (i.e. 5555::aba:dab:aaa:daa), a new query to the DNS is not required.

Once the IP address of the I-CSCF is obtained, the P-CSCF forwards the REGISTER request to this IP address (i.e. 5555::aba:dab:aaa:daa) using the UDP protocol and port number 5060.

#### 14. REGISTER request (P-CSCF to I-CSCF) – see example in table 16.3-14

This signalling flow shows the REGISTER request being forwarded from the P-CSCF to the I-CSCF in the home domain.

**Table 16.3-14 REGISTER request (P-CSCF to I-CSCF)**

```
REGISTER sip:registrar.home1.net SIP/2.0  
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]  
Path: <sip:pcscf1.visited1.net>  
Proxy-require: path  
Require: path  
Roaming-Info: vnid="Visited Network Number 1"  
From:  
To:  
Contact:  
Call-ID:  
Authorization:  
CSeq:  
Expires:  
Content-Length:
```

**Path:** This is the address of the P-CSCF and is included to inform the S-CSCF where to route terminating sessions.

#### 15. Cx: User registration status query procedure

The I-CSCF requests information related to the Subscriber registration status by sending the private user identity, public user identity and visited domain name to the HSS. Because the user has registered, the HSS returns the I-CSCF with the S-CSCF address for the subscriber.

For detailed message flows see 3GPP TS 29.228.

For the parameters in the REGISTER request (flow 14), which are sent to the HSS, see table 6.2-16a.

Table 6.3-15a provides the parameters in the REGISTER request (flow 16), which are obtained from the information sent back from the HSS.

**16. REGISTER request (I-CSCF to S-CSCF) – see example in table 16.3-16**

This signalling flow forwards the REGISTER request from the I-CSCF to the S-CSCF selected.

**Table 16.3-16 REGISTER request (I-CSCF to S-CSCF)**

```
REGISTER sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:pcscf1.visited1.net>
Proxy-require:
Require:
Roaming-Info:
From:
To:
Contact:
Call-ID:
Authorization:
CSeq:
Expires:
Content-Length:
```

**Path:** The S-CSCF stores the contents of the Path headers and uses these addresses for routing mobile terminated sessions.

**17. Authentication**

Upon receiving the REGISTER request, carrying the authentication response, RES, the S-CSCF checks that the user's active XRES matches the received RES. If the check is successful then the user has been authenticated and the public user identity is registered in the S-CSCF.

**18. Cx: S-CSCF registration notification procedure**

On registering a user the S-CSCF informs the HSS that the user has been registered at this instance. The HSS stores the S-CSCF name for that subscriber. For a positive response, the HSS will include the user profile in the response sent to the S-CSCF.

For detailed message flows see 3GPP TS 29.228.

For the parameters in the REGISTER request (flow 16), which are sent to HSS, see table 6.2-19a.

**19. 200 OK response (S-CSCF to I-CSCF) – see example in table 16.3-19**

The S-CSCF sends acknowledgement to the I-CSCF indicating that Registration was successful. This response will traverse the path that the REGISTER request took as described in the Via list.

**Table 16.3-19 200 OK response (S-CSCF to I-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:scscf1.home1.net>, <sip:icscf1_p.home1.net>, <sip:pcscf1.visited1.net>
From:
To:
Call-ID:
Contact: sip:[5555::aaa:bbb:ccc:ddd]
CSeq:
Date: Wed, 11 July 2001 08:49:37 GMT
Expires: 7200
P-Associated-URI: sip:user1_public2@home1.net, sip:user1_public3@home1.net, tel:+1-212-555-1111
Content-Length:
```



**Path:** The S-CSCF inserts its own name to the front of the list.

**20. 200 OK response (I-CSCF to P-CSCF) – see example in table 16.3-20**

The I-CSCF translates the S-CSCF name in the Path header. The I-CSCF forwards acknowledgement from the S-CSCF to the P-CSCF indicating that Registration was successful. This response will traverse the path that the REGISTER request took as described in the Via list.

**Table 16.3-20 200 OK response (I-CSCF to P-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:token(scscf1.home1.net)>, <sip:icscf1_p.home1.net>, <sip:pcscf1.visited1.net>
From:
To:
Call-ID:
Contact:
CSeq:
Date:
Expires:
P-Associated-URI:
Content-Length:
```

**21. 200 OK response (P-CSCF to UE) – see example in table 16.3-21**

The P-CSCF removes its address from the Path header, reverses the order of the fields, saves the resulting Path header and associates it with the UE. The P-CSCF then removes the Path header from the 200 OK response. The P-CSCF then forwards acknowledgement from the I-CSCF to the UE indicating that Registration was successful.

**Table 16.3-21 200 OK response (P-CSCF to UE)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
Contact:
CSeq:
Date:
Expires:
P-Associated-URI:
Content-Length:
```

## 16.4 Registration signalling: mobile initiated deregistration

Figure 16.4-1 shows a signalling flow for mobile initiated deregistration. For the purposes of this deregistration signalling flow, the subscriber is considered to be roaming. In this signalling flow, the home network has configuration hiding active.

This signalling flow assumes:

1. That the same PDP Context allocated during the initial registration scenario is still used for deregistration. For the case when the UE does not still have an active PDP context then PDP context procedures from subclause 16.2 must first be completed.

**Editor's Note:** If the same PDP-Context is not available, is it guaranteed that the UE will get back the same IP address at this point? If this is not possible, would there be a problem with the binding in the P-CSCF (user\_public1@home1.net and [5555::aaa:bbb:ccc:ddd])?

2. The procedure employed for P-CSCF discovery is not needed.
3. The S-CSCF selection procedure invoked by the I-CSCF is not needed.

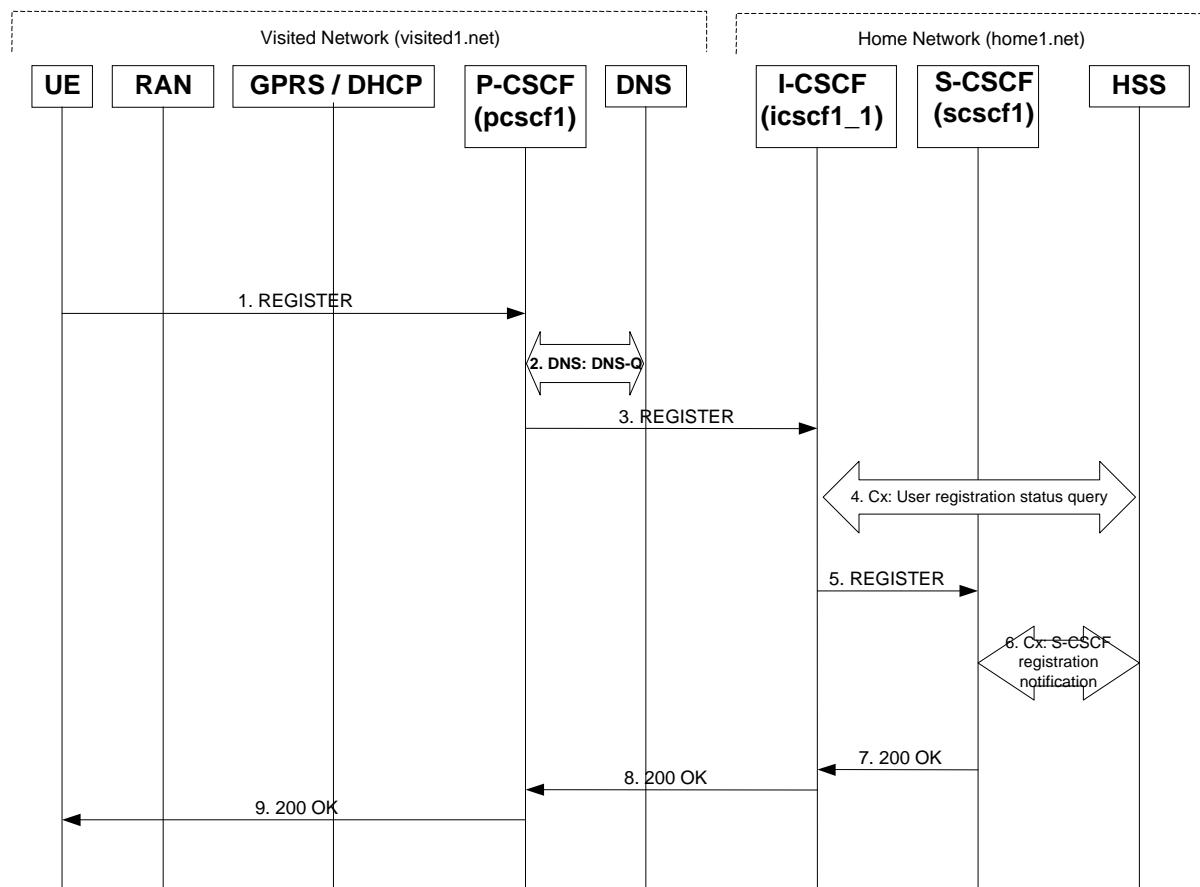


Figure 16.4-1: Registration signalling: mobile initiated deregistration

1. REGISTER request (UE to P-CSCF) – see example in table 16.4-1

The UE intends to de-register itself. It does so by sending a new REGISTER request. This request looks similar as in reregister case, but the Expires header contains zero. This request is sent to the same P-CSCF with which the UE initially registered.

Table 16.4-1 REGISTER (UE to P-CSCF)

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From: <sip:user1_public1@home1.net>;tag=4fa3
To: <sip:user1_public1@home1.net>
Contact: <sip:[5555::aaa:bbb:ccc:ddd]>
Call-ID: apb03a0s09dkjdfg1kj49111
Authorization: eap eap-p=AQAAEwFqYXJpQGfya2tvLmNvbQ==
CSeq: 7 REGISTER
Expires: 0
Content-Length: 0
```

The header field usage is the same as for the initial registration scenario:

- From:** This indicates the public user identity originating the REGISTER request. The public user identity may be obtained from the USIM.
- To:** This indicates public user identity. This is the identity by which other parties know this subscriber.
- Contact:** This indicates the point-of-presence for the subscriber – the IP address of the UE. This is the temporary identifier for the subscriber that is being de-registered.

**Authorization:** It carries authentication information. The private user identity is carried in the user ID field of the authentication protocol.

**Request-URI:** The Request-URI (the URI that follows the method name, "REGISTER", in the first line) indicates the destination domain of this REGISTER request. The rules for routing a SIP request describe how to use DNS to resolve this domain name ("home1.net") into an address or entry point into the home operator's network (the I-CSCF). This information is stored in the USIM.

**Expires:** The 0 value indicates the registration is being cancelled.

Upon receiving this request the P-CSCF will reset the SIP registration timer for this UE to 0.

## 2. DNS: DNS-Q

Based on the user's URI, the P-CSCF determines that UE is registering from a visiting domain and performs a DNS query to locate the I-CSCF in the home network. The look up in the DNS is based on the address specified in the Request URI. The DNS provides the P-CSCF with an address of the I-CSCF in the home network. The P-CSCF must not use the I-CSCF address cached as a result of the previous registration.

## 3. REGISTER request (P-CSCF to I-CSCF) – see example in table 16.4-3

This signalling flow shows the REGISTER request being forward from the P-CSCF to the I-CSCF in the home domain.

**Table 16.4-3 REGISTER request (P-CSCF to I-CSCF)**

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:pcscf1.visited1.net>
Proxy-require: path
Require: path
Roaming-Info: vnid="Visited Network Number 1"
From:
To:
Contact:
Call-ID:
Authorization:
CSeq:
Expires:
Content-Length:
```

**Path:** This is the address of the P-CSCF and is included to inform the S-CSCF where to route terminating sessions.

**Require:/Proxy-Require:** These headers are included to ensure that the recipient correctly handles the Path header. If the recipient does not support the path header, a response will be received with a status code of 420 and an Unsupported header indicating "path". Such a response indicates a misconfiguration of the routing tables and the request has been routed outside the IM CN subsystem.

**Roaming-Info:** The *vnid* parameter contains the identifier of the P-CSCF network at the home network.

## 4. Cx: User registration status query procedure

The I-CSCF requests information related to the Subscriber registration status by sending the private user identity, public user identity and visited domain name to the HSS. Because the user has registered, the HSS returns the I-CSCF with the S-CSCF address for the subscriber

For detailed message flows see 3GPP TS 29.228.

For the parameters in the SIP REGISTER request (flow 3) which are sent to the HSS, see table 6.2-5a.

Table 6.3-4a provides the parameters in the SIP REGISTER request (flow 5) which are obtained from the information sent back from the HSS.

**5. REGISTER (I-CSCF to S-CSCF) – see example in table 16.4-5**

I-CSCF adds a proper I-CSCF name to the Path header.

This signalling flow forwards the REGISTER request from the I-CSCF to the S-CSCF selected. The Request-URI is changed to the address of the S-CSCF.

**Table 16.4-5 REGISTER request (I-CSCF to S-CSCF)**

```
REGISTER sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:icscf1_p.home1.net> <sip:pcscf1.visited1.net>
Proxy-require:
Require:
Roaming-Info:
From:
To:
Contact:
Call-ID:
Authorization:
CSeq:
Expires:
Content-Length:
```

Upon receiving this request the S-CSCF will reset the SIP registration timer for this UE to 0.

**6. Cx: S-CSCF registration notification procedure**

The S-CSCF shall notify the HSS to clear its location information for that subscriber. The HSS deletes the S-CSCF name for that subscriber. The HSS sends a response to the S-CSCF to acknowledge the clearing of location information.

For detailed message flows see 3GPP TS 29.228.

For the parameters in the SIP REGISTER request (flow 5), which are sent to the HSS, see table 6.2-7a.

**7. 200 OK (S-CSCF to I-CSCF) – see example in table 16.4-7**

The S-CSCF sends acknowledgement to the I-CSCF indicating that deregistration was successful. This request will traverse the path that the REGISTER request took as described in the Via list. The S-CSCF clears its information for that subscriber.

**Table 16.4-7 200 OK response (S-CSCF to I-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:scscf1.home1.net>, <sip:icscf1_p.home1.net>, <sip:pcscf1.visited1.net>
From:
To: <sip:user1_public1@home1.net>
Call-ID: apb03a0s09dkjdfglkj49111
Contact: <sip:[5555::aaa:bbb:ccc:ddd]>
CSeq: 3 REGISTER
Date: Wed, 11 July 2001 08:49:37 GMT
Expires: 0
P-Associated-URI: sip:user1_public2@home1.net, sip:user1_public3@home1.net, tel:+1-212-555-1111
Content-Length: 0
```

**Path:** The S-CSCF inserts its own name to the front of the list.

**8. 200 OK (I-CSCF to P-CSCF) – see example in table 16.4-8**

The I-CSCF forwards acknowledgement from the S-CSCF to the P-CSCF indicating that deregistration was successful. This response will traverse the path that the REGISTER request took as described in the Via list.

**Table 16.4-8 200 OK response (I-CSCF to P-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Path: <sip:token(scscf1.homel.net)>, <sip:icscf1_p.homel.net>, <sip:pcscf1.visited1.net>
From:
To:
Call-ID:
Contact:
CSeq:
Date:
Expires:
P-Associated-URI:
Content-Length:
```

**9. 200 OK (P-CSCF to UE) – see example in table 16.4-9**

The P-CSCF forwards the acknowledgement from the I-CSCF to the UE indicating that deregistration was successful. The P-CSCF clears its information for that subscriber after sending the acknowledgement to the UE.

**Table 16.4-9 200 OK response (P-CSCF to UE)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
Contact:
CSeq:
Date:
Expires:
P-Associated-URI:
Content-Length:
```

## CHANGE REQUEST

⌘ **24.228 CR 029** ⌘ rev **1** ⌘ 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

<b>Title:</b>	⌘ Update of Mobile terminal initiated session release flows (hiding)		
<b>Source:</b>	⌘ Lucent Technologies		
<b>Work item code:</b>	⌘ IMS-CCR	<b>Date:</b>	⌘ 30/04/02
<b>Category:</b>	⌘ <b>F</b> Use <u>one</u> of the following categories: <b>F</b> (correction) <b>A</b> (corresponds to a correction in an earlier release) <b>B</b> (addition of feature), <b>C</b> (functional modification of feature) <b>D</b> (editorial modification) Detailed explanations of the above categories can be found in 3GPP <a href="#">TR 21.900</a> .	<b>Release:</b>	⌘ Rel-5 Use <u>one</u> of the following releases: <b>2</b> (GSM Phase 2) <b>R96</b> (Release 1996) <b>R97</b> (Release 1997) <b>R98</b> (Release 1998) <b>R99</b> (Release 1999) <b>REL-4</b> (Release 4) <b>REL-5</b> (Release 5)

<b>Reason for change:</b>	⌘ There have been a number of revisions to 24.228 in other clauses since this clause was created, and this clause has failed to keep step with those changes. Therefore this CR proposes an alignment with other clauses.
<b>Summary of change:</b>	⌘ <ol style="list-style-type: none"><li>1. Inclusion of the Max-Forwards header in the BYE request.</li><li>2. Reformatting of the textual description associated with each header.</li><li>3. Deletion of the Contact header from the BYE request.</li><li>4. Inclusion of new Request-URI in BYE request.</li><li>5. Inclusion of compatible contents in the Route header with those stored by the related INVITE flows, with the impact that the Route header now also contains the loose routing parameter.</li><li>6. Removal of service control boxes, as these are now performed by the Application Server. Need associated CR to 24.228 to explain why these are not shown.</li><li>7. Removal of Record-Route header from BYE requests. While the Record Route header SHOULD be inserted by proxies in subsequent requests, its use does not appear in any other sequences showing subsequent requests, and a proxy should act consistently with regard to this usage.</li></ol>
<b>Consequences if not approved:</b>	⌘ 24.228 will contain errors on the usage of SIP, and this clause will be inconsistent with other clauses that have been modified.

<b>Clauses affected:</b>	⌘ 18.2
<b>Other specs affected:</b>	⌘ <input type="checkbox"/> Other core specifications ⌘ <input type="checkbox"/> <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications
<b>Other comments:</b>	⌘ A branch parameter needs adding to all the I-CSCF addresses; it is understood that this will be added by another CR.

### **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](http://www.3gpp.org/3G_Specs/CRs.htm). Below is a brief summary:

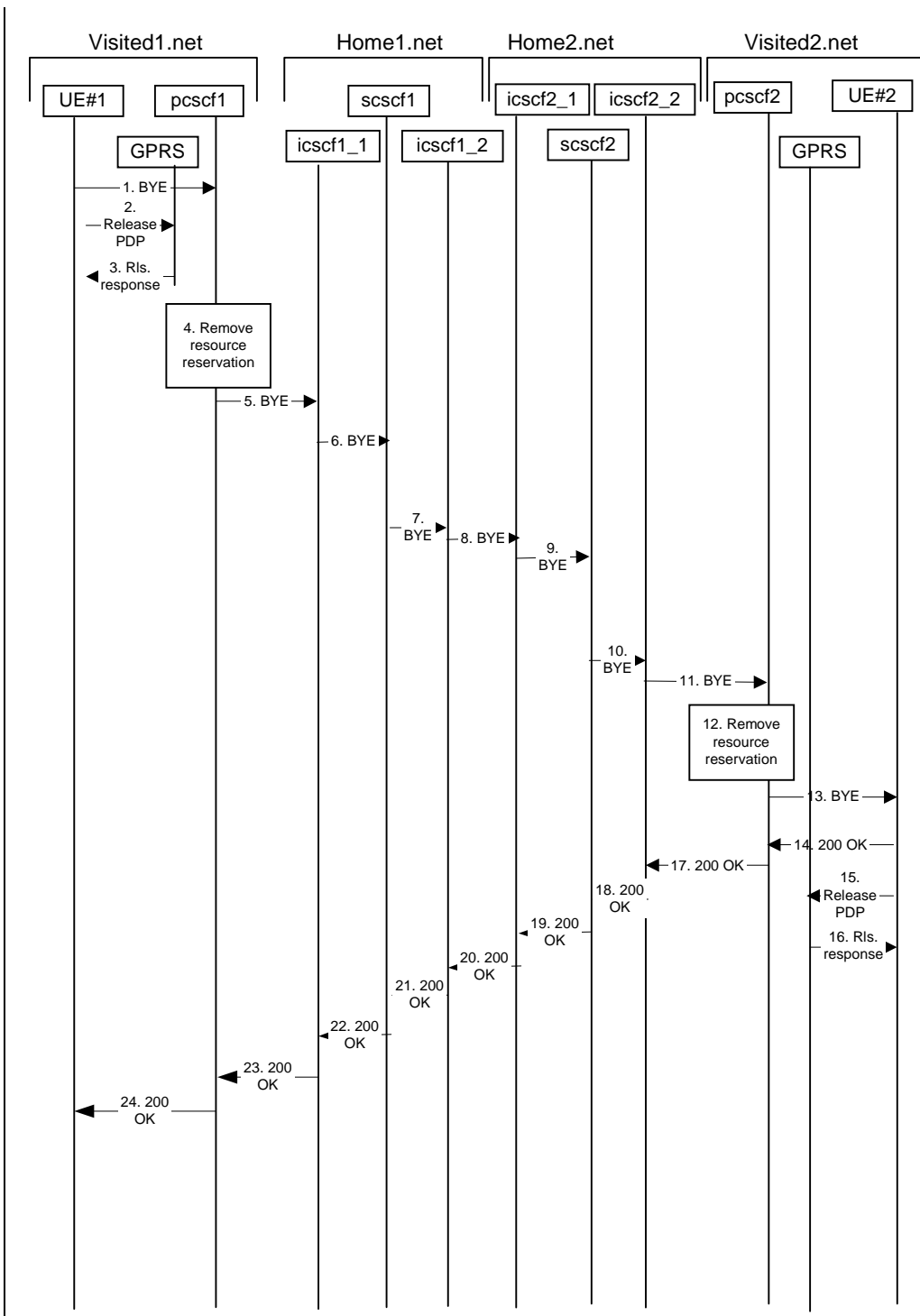
- 1) Fill out the above form. The symbols above marked ☹ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") 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.

## 18.2 Mobile terminal initiated session release

Figure 18.2-1 shows a mobile terminal initiated IM CN subsystem application (SIP) session release. It is assumed that the session is active and that the bearer was established directly between the two visited networks (the visited networks could be the home network in either or both cases).

NOTE 1: For the purposes of the description of the I-CSCF in figure 18.2-1 and in the associated text, it is assumed that the party that established the session initiated the clearing. For clearing in the reverse direction, there is a slight change in the optionality of the I-CSCFs between the S-CSCFs. This is as described for session establishment.





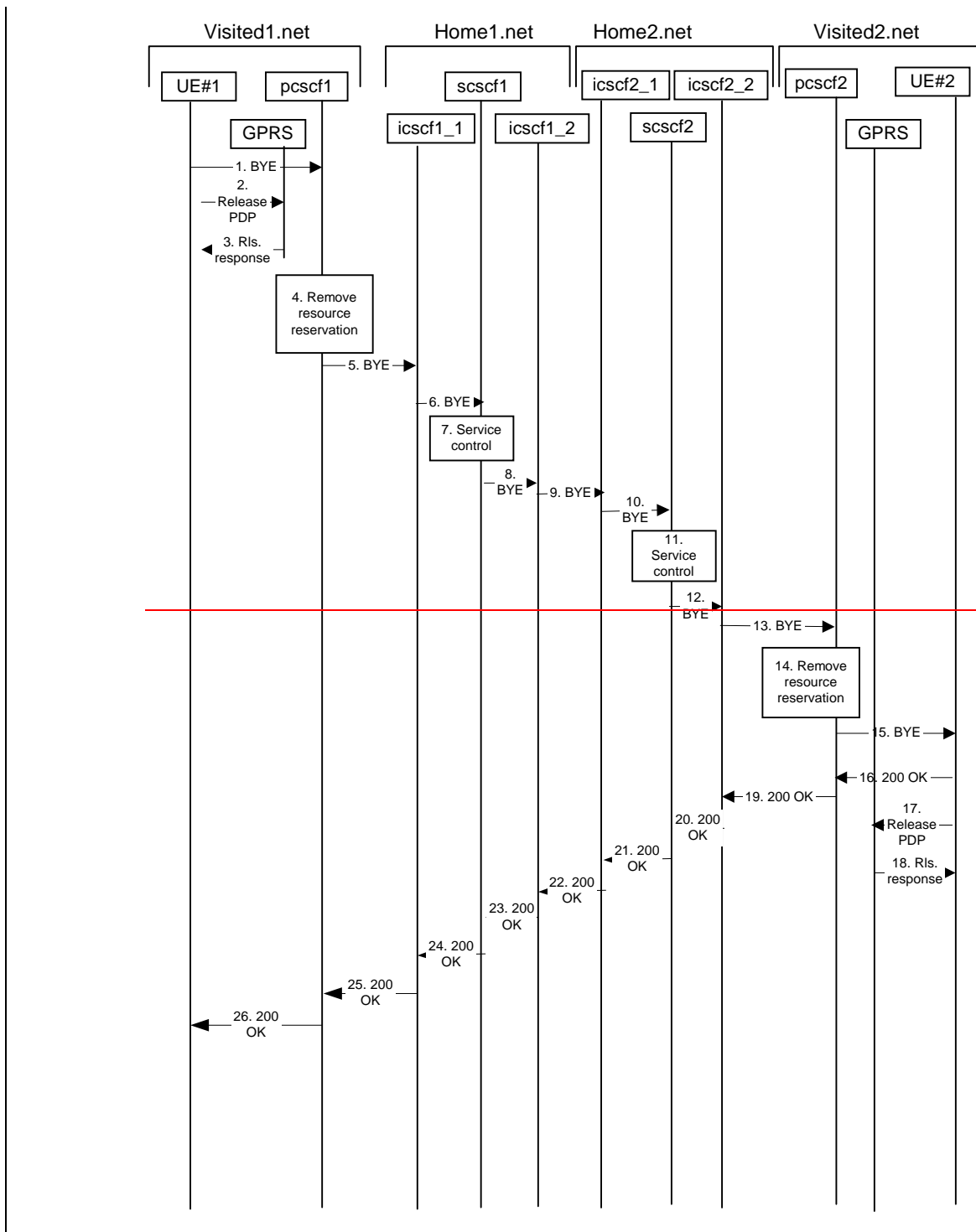


Figure 18.2-1: Mobile initiated session release

1. SIP BYE (UE to P-CSCF) - see example in table 18.2-1

One mobile party hangs up, which generates a SIP BYE request from the UE to the P-CSCF.

Table 18.2-1: SIP BYE (UE to P-CSCF)

```

BYE sip:[5555::eee:fff:aaa:bbb]sip:token10@pcscf1.visited1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 70
From: "Alien Blaster" <sip:B36(SHA-1(user1_public1@home1.net; time=36123E5B; seq=72))@localhost>
;tag=171828
To: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
Call-ID: cb03a0s09a2sdfgklkj490333
CSeq: 153 BYE
    
```

```
Contact: sip:[5555::aaa:bbb:ccc:ddd]
Content-Length: 0
```

**Request-URI:** ~~The request URI~~ takes the value of the Contact header of the ~~previously~~ original received response.

**Via:** ~~The Via header and the contact header~~ takes the value of either the IP address or the FQDN of the originating UE.

**From:/To:/Call-ID:** ~~The~~ the example contents of the From header, the To header and Call-ID header are used to identify the session being cleared, and therefore are identical to those of the previously received response for that session, so that they include any tag parameters.

**CSeq:** ~~The~~ the content of the Cseq header must have a higher sequence number than the previous transaction. Here it is assumed that a Cseq value no greater than 152 has been previously used.

## 2. Release PDP

Steps 2 and 3 may take place before or after Step 1 and in parallel with Step 4. The UE initiates the release of the bearer PDP context. The GPRS subsystem releases the PDP context. The IP network resources that had been reserved for the message receive path to the mobile for this session are now released. This is initiated from the GGSN. If RSVP was used to allocated resources, then the appropriate release messages for that protocol would be invoked here.

## 3. Rls. Response

The GPRS subsystem responds to the UE.

## 4. Remove resource reservation

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

## 5. SIP BYE (P-CSCF to I-CSCF) - see example in table 18.2-5

The P-CSCF sends a SIP BYE request to the I-CSCF (THIG) hiding the S-CSCF of the releasing party.

**Table 18.2-5: SIP BYE (P-CSCF to I-CSCF)**

```
BYE sip:[5555::eee:fff:aaa:bbb]sip:icscf1a.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 69
Route: sip:icscf1_p.home1.net;lr, sip:Token(sip:scscf1_s.home1.net;lr)@home1.net;tokenized-by=home1.net)@home1.net;tokenised-by=home2.net, sip:icscf2_s.home2.net;lr, sip:Token(sip:scscf2.home2.net;lr, sip:icscf2_p.home2.net;lr)@home2.net;tokenized-by=home2.net, sip:@pcscf2.visited2.net;lr)@home2.net;tokenized-by=home2.net764z87.1@scscf2.home2.net), sip:%5b5555%3a%3acecc%3affff%3aaaa%3abbb%5d@pcscf2.visited2.net)@home1.net;tokenized-by=home1.net
From:
To:
Call-ID:
CSeq:
Contact: sip:%5b5555%3a%3aaaa%3abbb%3acecc%3add%5d@pcscf1.visited1.net
Content-Length: 0
```

## 6. SIP BYE (I-CSCF to S-CSCF) - see example in table 18.2-6

The I-CSCF (THIG) sends a SIP BYE request to the S-CSCF of the releasing party.

**Table 18.2-6: SIP BYE (I-CSCF to S-CSCF)**

```
BYE sip:[5555::eee:fff:aaa:bbb]sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1a.icscf1_p.home1.net, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
Record-Route: sip:351g45.1@icscf1_p.home1.net
```

```
Route: sip:scscf1.home1.net;lr, sip:icscf1_s.home1.net;lr, sip:Token(sip:scscf2.home2.net;lr,
sip:icscf2_p.home2.net;lr)@home2.net;tokenized-by=home2.net,
sip:@pcscf2.visited2.net;lr)@home2.net;tokenized-by=home2.net;764z87.1@scscf2.home2.net,
sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.visited2.net
Record-Route: sip:icscf1a.home1.net
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length: 0
```

## ~~7. Service control~~

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

## ~~7.8. SIP BYE (S-CSCF to I-CSCF) - see example in table 18.2-78~~

The SIP BYE request is sent from the S-CSCF to the I-CSCF (THIG).

**Table 18.2-78: SIP BYE (S-CSCF to I-CSCF)**

```
BYE sip:[5555::eee:fff:aaa:bbb]sip:icscf1b.home1.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP icscf1_pa.home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 67
Route: sip:icscf1_s.home1.net;lr, sip:icscf2_s.home2.net;lr, sip:Token(sip:scscf2.home2.net;lr,
sip:icscf2_p.home2.net;lr)@home2.net;tokenized-by=home1.net,
sip:@pcscf2.visited2.net;lr)@home2.net;tokenized-by=home1.net; sip:icscf2b.home2.net,
sip:Token(scscf2.home2.net), sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.visited2.net
Record-Route: sip:332b23.1@scscf1.home1.net
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length: 0
```

## ~~8.9. SIP BYE (I-CSCF to I-CSCF) - see example in table 18.2-89~~

The SIP BYE request is sent from the I-CSCF (THIG) to the I-CSCF of the network of the other party.

**Table 18.2-89: SIP BYE (I-CSCF to I-CSCF)**

```
BYE sip:[5555::eee:fff:aaa:bbb]sip:icscf2b.home2.net SIP/2.0
Via: SIP/2.0/UDP icscf1_sb.home1.net, SIP/2.0/UDP Token(scscf1.home1.net, SIP/2.0/UDP
icscf1_pa.home1.net)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])@home1.net;tokenized-
by=home1.net
Max-Forwards: 66
Route: sip:Token(sip:scscf2.home2.net;lr), sip:icscf2_p.home2.net;lr)@home2.net;tokenized-
by=home2.net,
sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.visited2.net;lr)@home2.net;tokenized-
by=home2.net
Record-Route: sip:icscf1b.home1.net, sip:Token(scscf1.home1.net)
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length: 0
```

## ~~9.10. SIP BYE (I-CSCF to S-CSCF) - see example in table 18.2-910~~

The SIP BYE request is forwarded from the I-CSCF that was used to determine the location of S-CSCF of the other party.

**Table 18.2-910: SIP BYE (I-CSCF to S-CSCF)**

```

BYE sip:[5555::eee:fff:aaa:bbb]sip:sescf2.home2.net SIP/2.0
Via: SIP/2.0/UDP icscf2_sb.home2.net, SIP/2.0/UDP icscf1_sb.home1.net, SIP/2.0/UDP
Token(scscf1.home1.net, SIP/2.0/UDP icscf1_pa.home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])@home1.net;tokenized-
by=home1.net
Max-Forwards: 65
Route: sip:scscf2.home2.net;lr, icscf2_p.home2.net;lr,
sip:%5b5555%3a%3aeee%3afff%3aaaa%3abb%5d@pcscf2.visited2.net;lr
Record-Route: sip:icscf2b.home2.net, sip:icscf1b.home1.net, sip:Token(sescf1.home1.net)
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length: 0

```

**11. Service control**

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

**102. SIP BYE (S-CSCF to I-CSCF) - see example in table 18.2-102**

The SIP BYE request is forwarded to a I-CSCF (THIG).

**Table 18.2-102: SIP BYE (S-CSCF to I-CSCF)**

```

BYE sip:[5555::eee:fff:aaa:bbb]sip:icscf2a.home2.net SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP icscf2_sb.home2.net, SIP/2.0/UDP
icscf1_sb.home1.net, SIP/2.0/UDP Token(scscf1.home1.net, SIP/2.0/UDP
icscf1_pa.home1.net)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])@home1.net;tokenized-
by=home1.net
Max-Forwards: 64
Route: sip:icscf2_p.home2.net;lr, sip:%5b5555%3a%3aeee%3afff%3aaaa%3abb%5d@pcscf2.visited2.net;lr
Record-Route: sip:764z87.1@sescf2.home2.net, sip:332b23.1@sescf1.home1.net
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length: 0

```

**113. SIP BYE (I-CSCF to P-CSCF) - see example in table 18.2-113**

The I-CSCF (THIG) forwards the SIP BYE request to the P-CSCF.

**Table 18.2-113: SIP BYE (I-CSCF to P-CSCF)**

```

BYE sip:[5555::eee:fff:aaa:bbb]sip:%5b5555%3a%3aeee%3afff%3aaaa%3abb%5d@pcscf2.visited2.net SIP/2.0
Via: SIP/2.0/UDP icscf2_pa.home2.net, SIP/2.0/UDP Token(scscf2.home2.net;branch=764z87.1,
SIP/2.0/UDP icscf2_sb.home2.net)@home2.net;tokenized-by=home2.net, SIP/2.0/UDP
icscf1_sb.home1.net, SIP/2.0/UDP Token(scscf1.home1.net, SIP/2.0/UDP
icscf1_pa.home1.net)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])@home1.net;tokenized-
by=home1.net)@home2.net;tokenized-by=home2.net
Max-Forwards: 63
Record-Route: sip:icscf2a.home2.net, sip:Token(sescf2.home2.net, sip:332b23.1@sescf1.home1.net)
Route: sip:pcscf2.visited2.net;lr
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length: 0

```

**124. Remove resource reservation**

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

### 135. SIP BYE (P-CSCF to UE) - see example in table 18.2-135

The P-CSCF forwards the SIP BYE request on to the UE.

**Table 18.32-15: SIP BYE (P-CSCF to UE)**

```
BYE sip:[5555::eee:fff:aaa:bbb] SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1;branch=token25
Max-Forwards: 62
From:
To:
Call-ID:
CSeq:
Contact: token26@pcscf2.visited2.net
Content-Length: 0
```

### 146. 200 OK (UE to P-CSCF) - see example in table 18.2-146

The mobile responds with a 200 OK response, which is sent back to the P-CSCF.

**Table 18.2-146: 200 OK (UE to P-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1;branch=token26
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

### 157. Release PDP

Steps 154 and 165 may be done in parallel with step 143. The Mobile initiates the release of the bearer PDP context.

### 168. RIs response

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

### 179. 200 OK (P-CSCF to I-CSCF) - see example in table 18.2-179

The P-CSCF sends a 200 OK response to the I-CSCF (THIG).

**Table 18.2-179: 200 OK (P-CSCF to I-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_pa.home2.net, SIP/2.0/UDP Token(scscf2.home2.net;branch=764z87.1,
SIP/2.0/UDP icscf2_sb.home2.net)@home2.net;tokenized-by=home2.net, SIP/2.0/UDP
icscf1_sb.home1.net, SIP/2.0/UDP Token(scscf1.home1.net, SIP/2.0/UDP
icscf1_pa.home1.net)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]@home1.net;tokenized-
by=home1.net)@home2.net;tokenized-by=home2.net
Record-Route: sip:icscf2a.home2.net, sip:Token(scscf2.home2.net, sip:332b23.1@scscf1.home1.net)
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

### 1820. 200 OK (I-CSCF to S-CSCF) - see example in table 18.2-1820

The I-CSCF (THIG) sends a 200 OK response to the S-CSCF.

**Table 18.2-1820: 200 OK (I-CSCF to S-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP icscf2_sb.home2.net, SIP/2.0/UDP
icscf1_sb.home1.net, SIP/2.0/UDP Token(scscf1.home1.net, SIP/2.0/UDP
icscf1_pa.home1.net)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]@home1.net;tokenized-
by=home1.net
Record-Route: sip:icsef2a.home2.net, sip:764z87.1@scscf2.home2.net, sip:332b23.1@scscf1.home1.net
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

**1921. 200 OK (S-CSCF to I-CSCF) - see example in table 18.2-1921**

The S-CSCF of the other party forwards the 200 OK response to its selecting I-CSCF.

**Table 18.2-1924: 200 OK (S-CSCF to I-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_sb.home2.net, SIP/2.0/UDP icscf1_sb.home1.net, SIP/2.0/UDP
Token(scscf1.home1.net, SIP/2.0/UDP icscf1_pa.home1.net)@home1.net;tokenized-by=home1.net,
SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]@home1.net;tokenized-by=home1.net
Record-Route: sip:icsef2b.home2.net, sip:icsef1b.home1.net, sip:Token(scscf1.home1.net)
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

**202. 200 OK (I-CSCF to I-CSCF) - see example in table 18.2-202**

The selecting I-CSCF forwards the 200 OK response to the I-CSCF (THIG).

**Table 18.2-202: 200 OK (I-CSCF to I-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_sb.home1.net, SIP/2.0/UDP Token(scscf1.home1.net, SIP/2.0/UDP
icscf1_pa.home1.net)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]@home1.net;tokenized-
by=home1.net
Record-Route: sip:Token(icsef1b.home1.net), sip:332b23.1@scscf1.home1.net
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

**213. 200 OK (I-CSCF to S-CSCF) - see example in table 18.2-213**

The I-CSCF (THIG) forwards the 200 OK response to the S-CSCF.

**Table 18.2-213: 200 OK (I-CSCF to S-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP icscf1_pa.home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route: sip:Token(scscf2.home2.net), sip:icsef.home2.net, sip:icsef.home1.net,
sip:332b23.1@scscf1.home1.net
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

**224. 200 OK (S-CSCF to I-CSCF) - see example in table 18.2-224**

The S-CSCF of the releasing party forwards the 200 OK response to the I-CSCF (THIG).

**Table 18.2-224: 200 OK (S-CSCF to I-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1.pa.home1.net, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]
Record-Route: sip:764z87.1@sescf2.home2.net, sip:332b23.1@sescf1.home1.net, sip:iescf1a.home1.net
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

**235. 200 OK (I-CSCF to P-CSCF) - see example in table 18.2-235**

The I-CSCF (THIG) forwards the 200 OK response to the P-CSCF of the releasing party.

**Table 18.2-235: 200 OK (I-CSCF to P-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route: sip:Token(sescf1.home1.net, sip:764z87.1@sescf2.home2.net), sip:icscf2.home2.net
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

**246. SIP OK (P-CSCF to UE) - see example in table 18.2-246**

The P-CSCF of the releasing party forwards the 200 OK response to the UE.

**Table 18.2-246: SIP 200 OK (P-CSCF to UE)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```



## CHANGE REQUEST

⌘ **24.228 CR 030** ⌘ rev **1** ⌘ 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

<b>Title:</b>	⌘ Correction of subscription to the registration event package		
<b>Source:</b>	⌘ Siemens AG		
<b>Work item code:</b>	⌘ IMS-CCR	<b>Date:</b>	⌘ 6 <sup>th</sup> May 2002
<b>Category:</b>	⌘ <b>F</b>	<b>Release:</b>	⌘ REL-5
	Use <u>one</u> of the following categories: <b>F</b> (correction) <b>A</b> (corresponds to a correction in an earlier release) <b>B</b> (addition of feature), <b>C</b> (functional modification of feature) <b>D</b> (editorial modification) Detailed explanations of the above categories can be found in 3GPP <a href="#">TR 21.900</a> .		Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) REL-4 (Release 4) REL-5 (Release 5)

**Reason for change:** ⌘ After registration, the UE subscribes to the registration event package in order to get notified of its implicitly registered public user ids and in order to enable the network to request re-authentication and notify the user about de-registered public user ids.

Currently the presence event package is used for that purpose. At the CN WG1 adhoc in Madrid it was decided that a separate event package shall be created for that purpose. An informational Internet Draft (draft-beckmann-sip-reg-event-00) was submitted to IETF. This CR aligns 24.228 with the proposed new event package.

Please note that the xml body describing the status "re-authenticate" is already based on the data format as it is specified in draft-ietf-imp-p-cpim-pidf-03, which is different from the one in the previous version which was used as a basis for draft-beckmann-sip-reg-event-00. However, the draft-beckmann-sip-reg-event-01 which is distributed in N1-021271 is in line with this change.

**Summary of change:** ⌘

1. Occurrences of the "Event: Presence" headers in the procedure to subscribe to the registration event package are replaced by "Event: Registration-state"
2. The message body of the NOTIFY messages are corrected according to the data format as described in draft-beckmann-sip-reg-event-01
3. Description of the Presence data format is removed and the draft is referenced
4. Reference to the [Internet-Draft 3GPP TS 24.229](#) is added

**Consequences if not approved:** ⌘ Additional complexity in later releases when subscribing to the registration event package.  
 No clear distinction between presence and registration state event package.

**Clauses affected:** ⌘ 2; 6.5; 6.6; 6.7.1; 6.7.2; 6.7.3; 6.8; 16.5; 16.6; 16.8

**Other specs** ⌘  Other core specifications ⌘

**affected:**

- Test specifications
- O&M Specifications

**Other comments:**

⌘ ~~Please note that this CR does NOT reflect the decision from the CN-WG1 adhoc in Madrid that P-CSCF no longer subscribes the registration state event.~~

### How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at <http://www.3gpp.org/specs/CR.htm>.

Below is a brief summary:

- 1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <ftp://ftp.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

---

## 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 23.228: "IP multimedia subsystem; Stage 2".
- [3] IETF 2543bis: "SIP: Session Initiation Protocol" (ietf-sip-rfc2543bis-05.txt)
- [4] IETF RFC 2782: "A DNS RR for specifying the location of services (DNS SRV)".
- [5] IETF RFC 2806: "URLs for Telephone Calls".
- [6] IETF RFC 2916: "E.164 number and DNS".
- [7] 3GPP TS 33.203: "Access security for IP based services".
- [8] 3GPP TS 23.060: "General Packet Radio Service (GPRS) Service description; Stage 2".
- [9] 3GPP TS 29.207: "End to end Quality of Service (QoS); stage 3".
- [10] 3GPP TS 29.060: "General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp Interface".
- [11] 3GPP TS 29.228: "IP Multimedia (IM) Subsystem Cx Interface; Signalling flows and message contents".
- [12] 3GPP TS 24.008: "Mobile radio interface layer 3 specification; Core Network Protocols; Stage 3".

**Editors Note:** This reference to 2543 will need to be updated to reference the assigned RFC number, once the draft achieves RFC status within the IETF.

[\[X\]](#) [3GPP TS 24.229: "IP Multimedia Call Control Protocol based on SIP and SDP; Stage3" draft-beckmann-sip-reg-event-01 \(May 2002\): "Registration event package"](#)

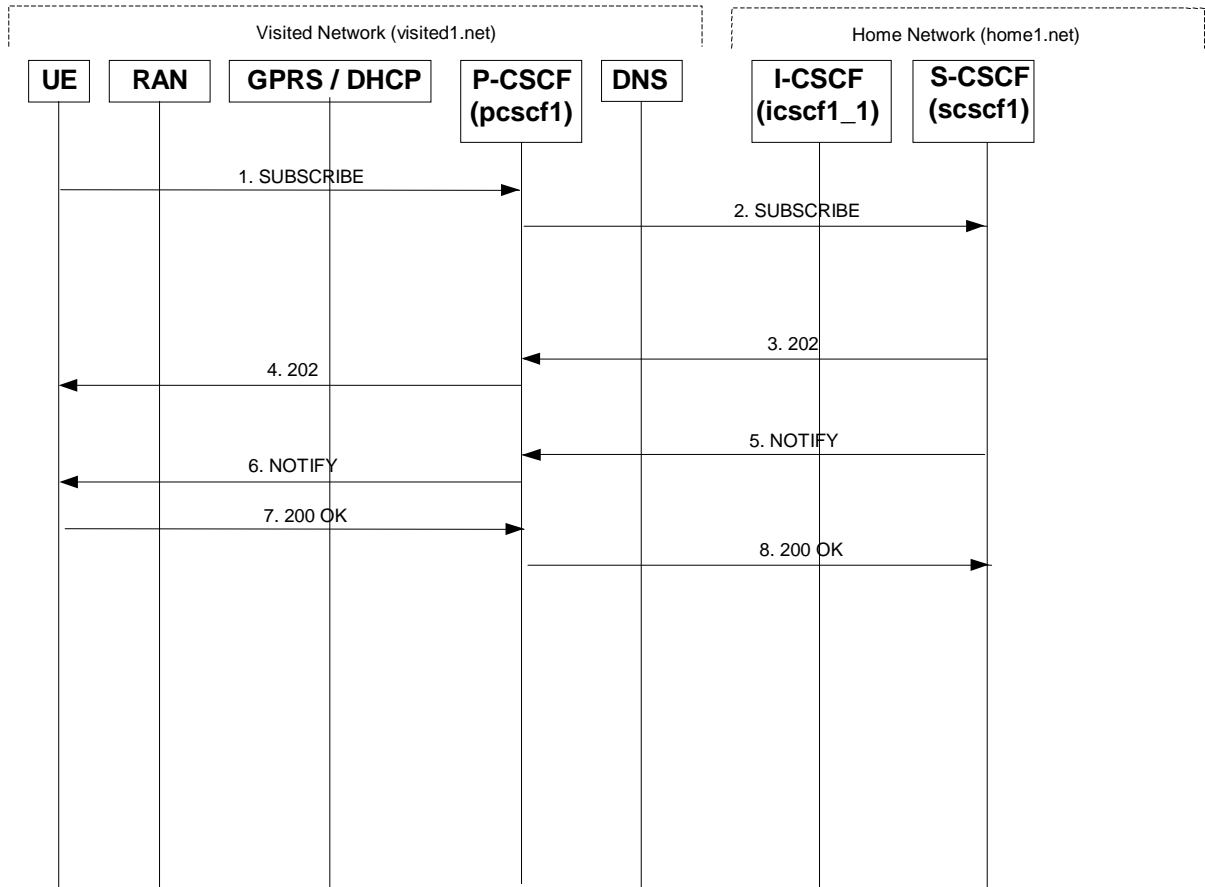
~~**Editor's note:** The above document cannot be formally referenced until it is published as an RFC.~~

### 6.5 UE subscription for the registration state event package

This subclause describes the subscription procedure for the registration state event, whereby the UE requests to be notified by the S-CSCF when the event has occurred. This is done using the information structure [specified as indicated for the 'presence' package in 3GPP TS 24.229 \[X\]](#).

It is assumed that the user has registered prior to initiating subscription of an event. Also, the subscriber is considered to be roaming and the home network operator does not desire to keep its internal configuration hidden from the visited

network. For this example the trigger point at the P-CSCF for sending out the SUBSCRIBE request is the 200 OK response of the users registration.



**Figure 6.5-1: UE subscription for the registration state event package (without I-CSCF providing configuration independence)**

**1. SUBSCRIBE request (UE to P-CSCF) - see example in table 6.5-1**

The UE sends SUBSCRIBE request for the registration-state event package.

**Table 6.5-1: SUBSCRIBE request (UE to P-CSCF)**

```

SUBSCRIBE sip:user1_public1@home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From: <sip:user1_public1@home1.net>;tag=31415
To: <sip:user1_public1@home1.net>
Call-ID: b89rjhnedlrfjflslj40a222
CSeq: 61 SUBSCRIBE
Event: presenceregistration-state
Expires: 7200
Accept: application/cpim-pidf+xml
Contact: <sip:[5555::aaa:bbb:ccc:ddd]>
Content-Length: 0
    
```

- From:** This field is populated with logical representation (FQDN) for the entity sending the SUBSCRIBE.
- Event:** This field is populated with the value '~~presence~~'registration-state' to specify the use of the registration state~~presence~~ package.
- Accept:** This field is populated with the value 'application/cpim-pidf+xml'. ~~in keeping with the use of the 'presence' 'registration-state' package.~~

## 2. SUBSCRIBE request (P-CSCF to S-CSCF) - see example in table 6.5-2

P-CSCF looks up the serving network information for the public user identity that was stored during the registration procedure. The SUBSCRIBE request is forwarded to S-CSCF.

**Table 6.5-2: SUBSCRIBE request (P-CSCF to S-CSCF)**

```
SUBSCRIBE sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Route: sip:user1_public1@home1.net
Record-Route: sip:431h23.1@pcscf1.home1.net
From:
To:
Call-ID:
CSeq:
Event:
Expires:
Accept:
Contact:
Content-Length:
```

**Route:** The Route: header is populated with the Request-URI received from the UE in the SUBSCRIBE.

## 3. 202 Accepted response (S-CSCF to P-CSCF) - see example in table 6.5-3

The S-CSCF sends an acknowledgement towards the UE indicating that the subscription was successful. This response will traverse the path that the SUBSCRIBE request took as described in the Via list.

NOTE 1: If the S-CSCF can process the SUBSCRIBE request and send the NOTIFY request immediately, it can send a 200 OK response instead of a 202 Accepted response.

**Table 6.5-3: 202 Accepted response (S-CSCF to P-CSCF)**

```
SIP/2.0 202 Accepted
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route: scscf1.home1.net, pcscf1.home1.net
Remote-Party-ID: "Registrar" <sip:registrar.home1.net>
From:
To: <sip:user1_public1@home1.net>;tag=151170
Call-ID:
CSeq:
Event:
Expires:
Content-Length:
```

**Expires:** If the value of the Expires header in SUBSCRIBE request is different from the one received in REGISTER method, then the value of Expires header in 202 Accepted is set to match the value of Expires header in REGISTER method.

## 4. 202 Accepted response (P-CSCF to UE) - see example in table 6.5-4

P-CSCF sends the response to UE.

**Table 6.5-4: 202 Accepted response (P-CSCF to UE)**

```
SIP/2.0 202 Accepted
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Remote-Party-ID:
From:
To:
Call-ID:
CSeq:
Event:
Expires:
Content-Length:
```

## 5. NOTIFY request (S-CSCF to P-CSCF) - see example in table 6.5-5

The S-CSCF sends a first NOTIFY request towards the UE in order to inform the UE about the registration status of the monitored user.

In the example below, the NOTIFY specifies the following public user identity as registered (i.e. status=open): sip:user1\_public1@home1.net, tel: +498972233114.

The following public user identity has been de-registered (i.e. status=closed) sip:user1\_public2@home1.net. They are arranged in the preferred order of priority in this example.

The Route header is constructed from the information saved at registration.

**Table 6.5-5: NOTIFY request (S-CSCF to P-CSCF)**

```
NOTIFY sip:pcscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
Route: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Remote-Party-ID:
From: <sip:user1_public1@home1.net>;tag=31415
To: <sip:user1_public1@home1.net>;tag=151170
Call-ID:
CSeq: 42 NOTIFY
Expires:
Event: presenceregistration-state
Content-Type: application/cpim-pidf+xml
Content-Length: (...)

<presence xmlns="urn:ietf:params:xml:ns:cpim-pidf:"xmlns="http://www.ietf.org/ns/cpim-pidf-xml-1.0">

  <tuple name="sip:user1_public1@home1.net">
    <status><valuebasic>open</valuebasic></status>
  </tuple>

  <tuple name="sip:user1_public2@home1.net">
    <status><valuebasic>closed</valuebasic></status>
  </tuple>

  <tuple name="tel:+498972233114">
    <status><valuebasic>open</valuebasic></status>
  </tuple>

</presence>
```

**From:** The tag of this field matches that of the To; field in the received 200/202 for the SUBSCRIBE.

**Content-Type:** Set to the value of the Accept: header received in the subscribe or 'application/cpim-pidf+xml' if Accept: was not present in the SUBSCRIBE.

The message body in the NOTIFY request that carries the subscriber's registration state is [formed as indicated described in \[X\]3GPP TS 24.229 \[X\]](#) of the following form:

- ~~— The registration state is expressed in XML with the information enclosed in the root <presence> element, enclosed between <presence> and </presence> tags.~~
- ~~— The <presence> element consist of one or more <tuple> elements and an optional <timestamp>. It contains a mandatory xmlns attribute that specifies the namespace for this version of the registration information payload.~~
- ~~— Each <tuple> element carries the registration state of a single public user identity and carries a mandatory 'name' attribute. The <tuple> element carries mandatory <status> element and optional <contact> and <note> elements.~~
- ~~— The <status> element carries a mandatory <value> = open|closed and an optional <detail> element. The <contact> element carries any updated contact information (with priority). The <note> is human readable for extra details.~~

**NOTE 2:** The registration states in 3GPP are mapped as follows to the status values in the presence package:

- ~~— Open (status value) is mapped to Registered (3GPP).~~

~~— Closed (status value) is mapped to De Registered (3GPP).~~

~~Editor's Note: further mappings of status values to 3GPP are for future study~~

~~— The optional <detail> element carries a mandatory 'type' attribute and an optional schema that is usually a DTD related to the specified 'type'.~~

#### 6. NOTIFY request (P-CSCF to UE) - see example in table 6.5-6

The P-CSCF forwards the NOTIFY request to the UE.

**Table 6.5-6: NOTIFY request (P-CSCF to UE)**

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd] SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1
Remote-Party-ID:
From:
To:
Call-ID:
CSeq:
Expires:
Event:
Content-Type:
Content-Length:
```

#### 7. 200 OK response (UE to P-CSCF) – see example in table 6.5-7

The UE generates a 200 OK response to the NOTIFY.

**Table 6.5-7 200 OK response (UE to P-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1
From:
To:
Call-ID:
CSeq:Content-Length: 0
```

#### 8. 200 OK response (P-CSCF to S-CSCF) - see example in table 6.5-8

P-CSCF forwards the 200 OK to S-CSCF.

**Table 6.5-8: 200 OK response (P-CSCF to S-CSCF)**

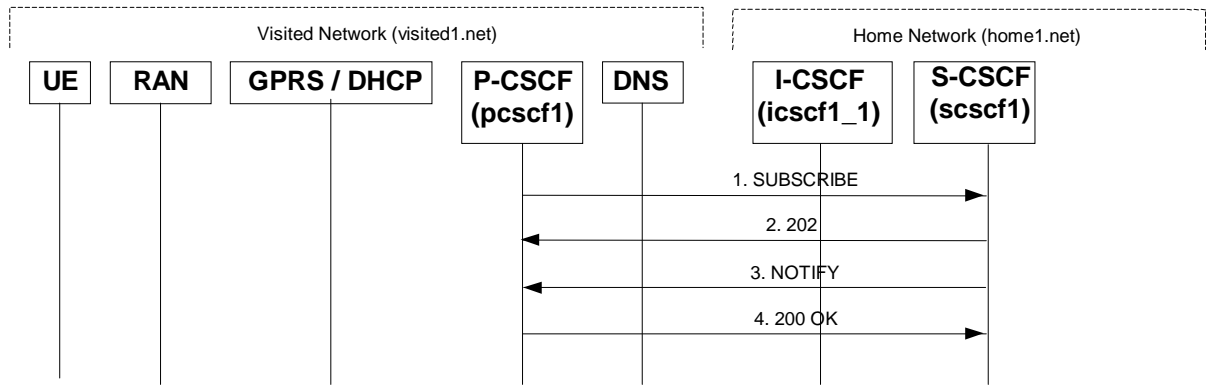
```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
From:
To:
Call-ID:
CSeq:
Content-Length:
```

## 6.6 P-CSCF subscription for the registration state event package (without I-CSCF providing configuration independence)

This section describes the subscription procedure for the network initiated deregistration event, whereby the P-CSCF requests to be notified by the S-CSCF when the event has occurred. This is done using the ~~'presence'~~ ['registration-state'](#) package [as described in 3GPP TS 24.229 \[X\]](#).

It is assumed that the user has registered prior to initiating subscription of an event. Also, the subscriber is considered to be roaming and the home network operator does not desire to keep its internal configuration hidden from the visited

network. For this example the trigger point at the P-CSCF for sending out the SUBSCRIBE request is the 200 OK response of the users registration.



**Figure 6.6-1: P-CSCF subscription for the registration state event package (without I-CSCF providing configuration independence)**

**1. SUBSCRIBE request (P-CSCF to S-CSCF) - see example in table 6.6-1**

The P-CSCF sends SUBSCRIBE request for the registration-state event package.

**Table 6.6-1: SUBSCRIBE request (P-CSCF to S-CSCF)**

```

SUBSCRIBE scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1
From: <sip:pcscf1.visited1.net>;tag=31415
To: <sip:user1_public1@home1.net>
Call-ID: 223456789@pcscf1.visited1.net
CSeq: 61 SUBSCRIBE
Event: presenceregistration-state
Expires: 7200
Accept: application/cpim-pidf+xml
Contact: <sip:pcscf1.visited1.net>
Content-Length: 0
    
```

- From:** This header is populated with the SIP URI that identifies the P-CSCF.
- Contact:** This is where the NOTIFY requests for this subscription will be sent. It consists of the SIP URL-escaped public user identity at the P-CSCF.
- Event:** This field shall be set to the value '~~presence~~'registration-state' to specify the use of the ~~presence~~ registration-state package.
- Accept:** This field shall be set to the value 'application/cpim-pidf+xml' ~~in keeping with the use of the~~ 'presence' package.

**2. 202 Accepted response (S-CSCF to P-CSCF) - see example in table 6.6-2**

The S-CSCF sends an acknowledgement towards the P-CSCF indicating that the subscription was successful. This response will traverse the path that the SUBSCRIBE request took as described in the Via list.

NOTE 1: If the S-CSCF can process the SUBSCRIBE request and send the NOTIFY request immediately, it can send a 200 OK response instead of a 202 Accepted response.

**Table 6.6-2: 202 Accepted response (S-CSCF to P-CSCF)**

```

SIP/2.0 202 Accepted
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Remote-Party-ID: "Registrar" <sip:registrar.home1.net>
From:
To: <sip:user1_public1@home1.net>;tag=151170
Call-ID:
CSeq:
Event:
    
```



```
Expires:
Content-Length:
```

**Expires:** If value of the Expires header in SUBSCRIBE request is different from the one received in REGISTER method, then the value of Expires header in 202 Accepted is set to match the value of Expires header in REGISTER method.

### 3. NOTIFY request (S-CSCF to P-CSCF) - see example in table 6.6-3

The S-CSCF sends a first NOTIFY request towards the P-CSCF in order to inform the P-CSCF about the registration status of monitored user.

**Table 6.6-3: NOTIFY request (S-CSCF to P-CSCF)**

```
NOTIFY sip:pcscf1.visited1.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
Remote-Party-ID: "Registrar" <sip:user1_public1@registrar.home1.net>
From: <sip:user1_public1@home1.net>;tag=151170
To: <sip:user1_public1@pcscf1.visited1.net>;tag=31415
Call-ID: 223456789@pcscf1.visited1.net
CSeq: 42 NOTIFY
Event: presenceregistration-state
Content-Type: application/cpim-pidf+xml
Content-Length: (...)

<presence xmlns="urn:ietf:params:xml:ns:cpim-pidf:"xmlns="http://www.ietf.org/ns/cpim-pidf-
xml-1.0">

  <tuple name="sip:user1_public1@home1.net">
    <status><valuebasic>closed</valuebasic></status>
  </tuple>

</presence>
```

**From:** The tag of this field matches that of the To; field in the received 200/202 for the SUBSCRIBE.

**Content-Type:** Set to the value of the Accept: header received in the subscribe or 'application/cpim-pidf+xml' if Accept: was not present in the SUBSCRIBE.

The message body in the NOTIFY request that carries the subscriber's registration state [is formed as indicated in 3GPP TS24.229 \[X\]](#), is of the following form:

- ~~The registration state is expressed in XML with the information enclosed in the root <presence> element, enclosed between <presence> and </presence> tags.~~
- ~~The <presence> element consist of one or more <tuple> elements and an optional <timestamp>. It contains a mandatory xmlns attribute that specifies the namespace for this version of the registration information payload.~~
- ~~Each <tuple> element carries the registration state of a single public user identity and carries a mandatory 'name' attribute. The <tuple> element carries mandatory <status> element and optional <contact> and <note> elements.~~
- ~~The <status> element carries a mandatory <value> = open|closed and an optional <detail> element. The <contact> element carries any updated contact information (with priority). The <note> is human readable for extra details.~~

~~NOTE 2: The registration states in 3GPP are mapped as follows to the status values in the presence package:~~

- ~~Open (status value) is mapped to Registered (3GPP).~~
- ~~Closed (status value) is mapped to De Registered (3GPP).~~

~~Editor's Note: further mappings of status values to 3GPP are for future study~~

- ~~The optional <detail> element carries a mandatory 'type' attribute and an optional schema that is usually a DTD related to the specified 'type'.~~

#### 4. 200 OK response (P-CSCF to S-CSCF) - see example in table 6.6-4

P-CSCF forwards the 200 OK to S-CSCF.

**Table 6.6-4: 200 OK response (P-CSCF to S-CSCF)**

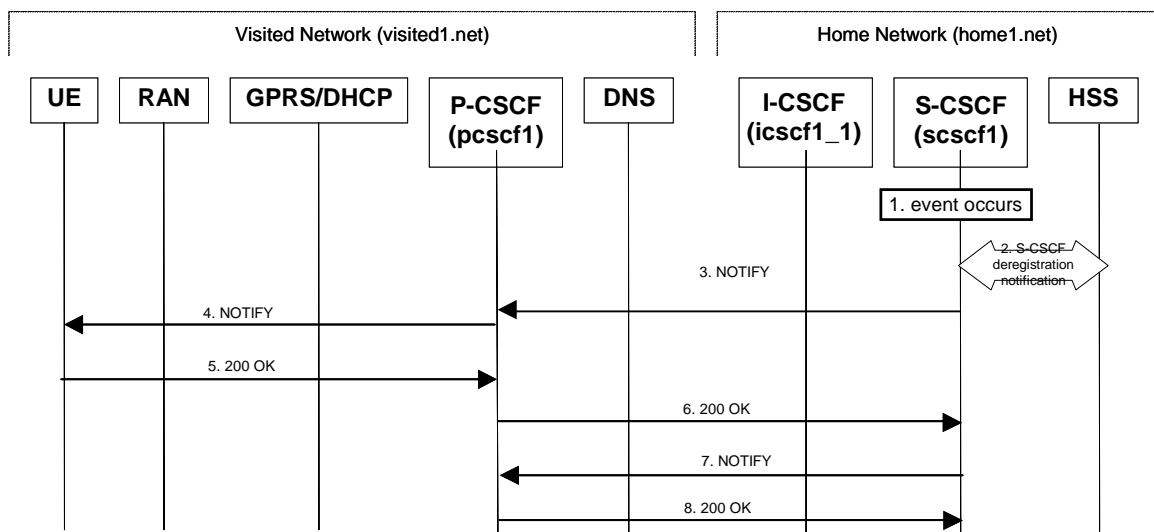
```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length: 0
```

## 6.7 Notifying of the network initiated deregistration event

### 6.7.1 Network Initiated Deregistration event occurs in the S-CSCF

Figure 6.7.1-1 assumes that the UE and the P-CSCF both have subscribed for the Users registration state event package according to subclause 6.5 and shows how the UE and the P-CSCF are notified when the Network Initiated Deregistration event occurs in the S-CSCF.

Also, it is assumed that the home network does not have network configuration hiding active.



**Figure 6.7.1-1: Network Initiated Deregistration event occurs in the S-CSCF**

#### 1. Network Initiated Deregistration event occurs in the S-CSCF

#### 2. S-CSCF deregistration notification

When the Network Initiated Deregistration Event occurs in the S-CSCF, the S-CSCF sends an update to the HSS to remove itself as the registered S-CSCF for this UE. And HSS sends response to confirm.

For detailed message flows see 3GPP TS 29.228.

#### 3 SIP NOTIFY (S-CSCF to P-CSCF) - see example in table 6.7.1-3

After the S-CSCF deregistration notification procedure the S-CSCF immediately sends a NOTIFY towards the UE in order to inform about the network initiated deregistration. The same Request URI, To, From, Call-ID are used as in the first NOTIFY. CSeq is incremented since this is the second NOTIFY request sent towards the UE.

**Table 6.7.1-3: SIP NOTIFY (S-CSCF to P-CSCF)**

```
NOTIFY sip:pcscf1.homel.net SIP/2.0
Via: SIP/2.0/UDP scscf1.homel.net;branch=332b23.1
Route: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From: <sip:user1_public1@homel.net>;tag=151170
To: <sip:user1_public1@homel.net>;tag=31415
Call-ID: b89rjhnedlrfjflslj40a222
CSeq: 43 NOTIFY
Expires: 7200
Event: presenceregistration-state
Content-Type: application/cpim-pidf+xml
Content-Length: (...)

<presence xmlns="urn:ietf:params:xml:ns:cpim-pidf:"xmlns="http://www.ietf.org/ns/cpim-pidf-xml-1.0">

  <tuple name="sip:user1_public1@homel.net">
    <status><valuebasic>closed</valuebasic>
    <detailnote>
      reason-phrase: "You have been deregistered from the network, please register
again";
      registrar: registrar.homel.net
    </detailnote>
  </status>
</tuple>

  <tuple name="sip:user1_public2@homel.net">
    <status><valuebasic>closed</valuebasic></status>
  </tuple>

  <tuple name="tel:+498972233114">
    <status><valuebasic>closed</valuebasic>
    <detailnote>
      reason-phrase: "This ID has been automatically de-registered";
      registrar: registrar.homel.net
    </detailnote>
  </status>
</tuple>

</presence>
```

**4. SIP NOTIFY (P-CSCF to UE) - see example in table 6.7.1-4**

P-CSCF forwards the NOTIFY request to the UE.

**Table 6.7.1-4: SIP NOTIFY (P-CSCF to UE)**

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd] SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1
From:
To:
Call-ID:
CSeq:
Expires:
Event:
Content-Length:
```

**5. 200 OK (UE to P-CSCF) - see example in table 6.7.1-5**

**Table 6.7.1-5: SIP 200 OK (UE to P-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1
From:
To:
Call-ID:
CSeq:
Content-Length:
```

## 6. SIP 200 OK (P-CSCF to S-CSCF) - see example in table 6.7.1-6

**Table 6.7.1-6: SIP 200 OK (P-CSCF to S-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
From:
To:
Call-ID:
CSeq:
Content-Length:
```

## 7 SIP NOTIFY (S-CSCF to P-CSCF) - see example in table 6.7.1-7

After sending the Cx.Put request the S-CSCF also immediately sends a NOTIFY towards the P-CSCF to which the UE is attached to, in order to inform about the network initiated deregistration. The same Request URI, To, From, Call-ID are used as in the first NOTIFY. CSeq is incremented since this is the second NOTIFY request sent towards the P-CSCF.

**Table 6.7.1-7: SIP NOTIFY (S-CSCF to P-CSCF)**

```
NOTIFY sip:pcscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
From: <sip:user1_public1@home1.net>;tag=151170
To: <sip:pcscf1.visisted1.net>;tag=31415
Call-ID: 1234567890@[5555::aaa:bbb:ccc:ddd]
CSeq: 43 NOTIFY
Expires: 7200
Event: presenceregistration-state
Content-Type: application/cpim-pidf+xml
Content-Length: (...)

<presence xmlns="urn:ietf:params:xml:ns:cpim-pidf:"xmlns="http://www.ietf.org/ns/cpim-pidf-xml-1.0">

  <tuple name="sip:user1_public1@home1.net">
    <status><valuebasic>closed</valuebasic>
      <detailnote>
        reason-phrase: "This public ID has been de-registered by the network";
        registrar: registrar.home1.net
      </detailnote>
    </status>
  </tuple>

  <tuple name="sip:user1_public2@home1.net">
    <status><del>valuebasic</del><closed</valuebasic></del></status>
  </tuple>

  <tuple name="tel:+498972233114">
    <status><valuebasic>closed</valuebasic>
      <detailnote>
        reason-phrase: "This ID has been automatically de-registered";
        registrar: registrar.home1.net
      </detailnote>
    </status>
  </tuple>

</presence>
```

## 8. SIP 200 OK (P-CSCF to S-CSCF) - see example in table 6.7.1-8

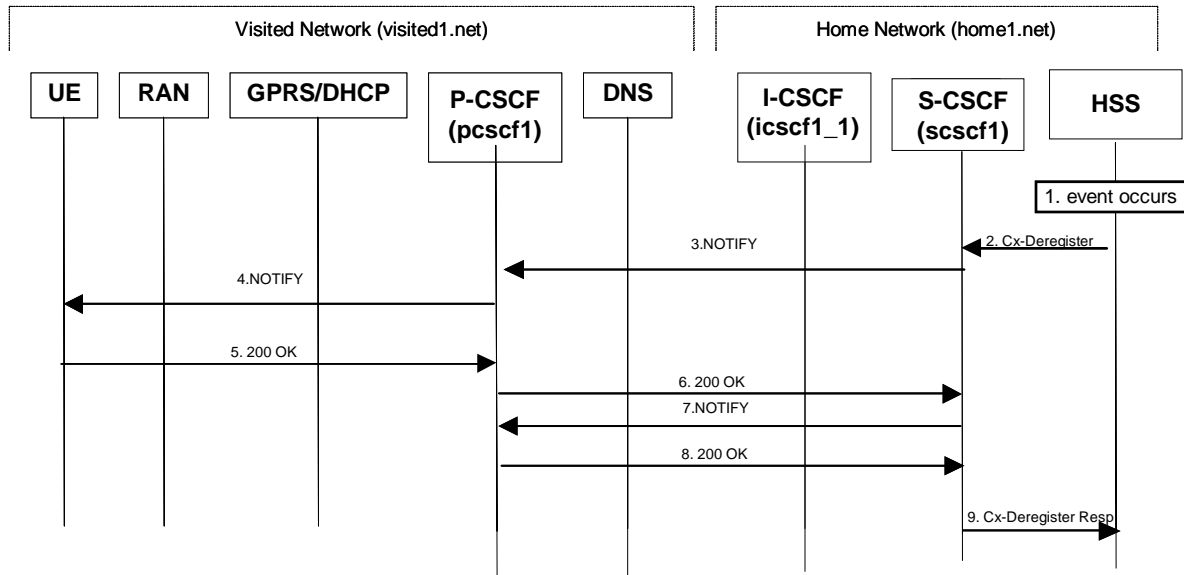
**Table 6.7.1-8: SIP 200 OK (P-CSCF to S-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
From:
To:
Call-ID:
CSeq:
Content-Length:
```

## 6.7.2 Network Initiated Deregistration event occurs in the HSS

Figure 6.7.2-1 assumes that the UE and the P-CSCF both have subscribed for the Users registration state event package according to subclause 6.5 and shows how the UE and the P-CSCF are notified when the Network Initiated Deregistration event occurs in the HSS.

Also, it is assumed that the home network does not have network configuration hiding active.



**Figure 6.7.2-1: Network Initiated Deregistration event occurs in the HSS**

### 1. Network Initiated Deregistration event occurs in the HSS

### 2. Cx-Deregister

HSS initiates the de-registration, sending a Cx-Deregister (subscriber identity). For detailed message information see 3GPP TS 29.228.

### 3. SIP NOTIFY (S-CSCF to P-CSCF) - see example in table 6.7.2-3

After getting the Cx-Deregister message the S-CSCF immediately sends a NOTIFY towards the UE order to inform about the network initiated deregistration. The same Request URI, To, From, Call-ID are used as in the first NOTIFY. CSeq is incremented since this is the second NOTIFY request sent towards the UE.

**Table 6.7.2-3: SIP NOTIFY (S-CSCF to P-CSCF)**

```
NOTIFY sip:pcscf1.homel.net SIP/2.0
Via: SIP/2.0/UDP scscf1.homel.net;branch=332b23.1
Route: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From: <sip:user1_public1@homel.net>;tag=151170
To: <sip:user1_public1@homel.net>;tag=31415
Call-ID: b89rjhnedlrfjflslj40a222
CSeq: 43 NOTIFY
Expires: 7200
Event: presenceregistration-state
Content-Type: application/cpim-pidf+xml
Content-Length: (...)

<presence xmlns="urn:ietf:params:xml:ns:cpim-pidf:"xmlns="http://www.ietf.org/ns/cpim-pidf-xml-1.0">

  <tuple name="sip:user1_public1@homel.net">
    <status><valuebasic>closed</valuebasic>
    - <detailnote>
      reason-phrase: "You have been deregistered from the network, please register
again";
      registrar: registrar.homel.net
    - </detailnote>
  </status>
  </tuple>

  <tuple name="sip:user1_public2@homel.net">
    <status><del>valuebasic</del>closed</del>valuebasic</del></status>
  </tuple>

  <tuple name="tel:+498972233114">
    <status><valuebasic>closed</valuebasic>
    - <detailnote>
      reason-phrase: "This ID has been automatically de-registered";
      registrar: registrar.homel.net
    - </detailnote>
  </status>
  </tuple>

</presence>
```

**4. SIP NOTIFY (P-CSCF to UE) - see example in table 6.7.2-4**

P-CSCF forwards the NOTIFY response to the UE.

**Table 6.7.2-4: SIP NOTIFY (P-CSCF to UE)**

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd] SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1
From:
To:
Call-ID:
CSeq:
Expires:
Event:
Content-Length:
```

**5. 200 OK (UE to P-CSCF) - see example in table 6.7.2-5**

**Table 6.7.2-5: SIP 200 OK (UE to P-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1
From:
To:
Call-ID:
CSeq:
Content-Length:
```

## 6. SIP 200 OK (P-CSCF to S-CSCF) - see example in table 6.7.2-6

**Table 6.7.2-6: SIP 200 OK (P-CSCF to S-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
From:
To:
Call-ID:
CSeq:
Content-Length:
```

## 7 SIP NOTIFY (S-CSCF to P-CSCF) - see example in table 6.7.2-7

After receiving the 200 OK from the UE the S-CSCF also immediately sends a NOTIFY towards the P-CSCF to which the UE is attached to, in order to inform about the network initiated deregistration. The same Request URI, To, From, Call-ID are used as in the first NOTIFY. CSeq is incremented since this is the second NOTIFY request sent towards the P-CSCF.

**Table 6.7.2-7: SIP NOTIFY (S-CSCF to P-CSCF)**

```
NOTIFY sip:pcscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
From: <sip:user1_public1@home1.net>;tag=151170
To: <sip:pcscf1.visisted1.net>;tag=31415
Call-ID: 1234567890@[5555::aaa:bbb:ccc:ddd]
CSeq: 43 NOTIFY
Expires: 7200
Event: presenceregistration-state
Content-Type: application/cpim-pidf+xml
Content-Length: (...)

<presence xmlns="urn:ietf:params:xml:ns:cpim-pidf:"xmlns="http://www.ietf.org/ns/cpim-pidf-xml-1.0">

  <tuple name="sip:user1_public1@home1.net">
    <status><valuebasic>closed</valuebasic>
      <detailnote>
        reason-phrase: "This public ID has been de-registered by the network";
        registrar: registrar.home1.net
      </detailnote>
    </status>
  </tuple>

  <tuple name="sip:user1_public2@home1.net">
    <status><del>valuebasic</del><closed</valuebasic></del></status>
  </tuple>

  <tuple name="tel:+498972233114">
    <status><valuebasic>closed</valuebasic>
      <detailnote>
        reason-phrase: "This ID has been automatically de-registered";
        registrar: registrar.home1.net
      </detailnote>
    </status>
  </tuple>

</presence>
```

## 8. SIP 200 OK (P-CSCF to S-CSCF) - see example in table 6.7.2-8

**Table 6.7.2-8 SIP 200 OK (P-CSCF to S-CSCF)**

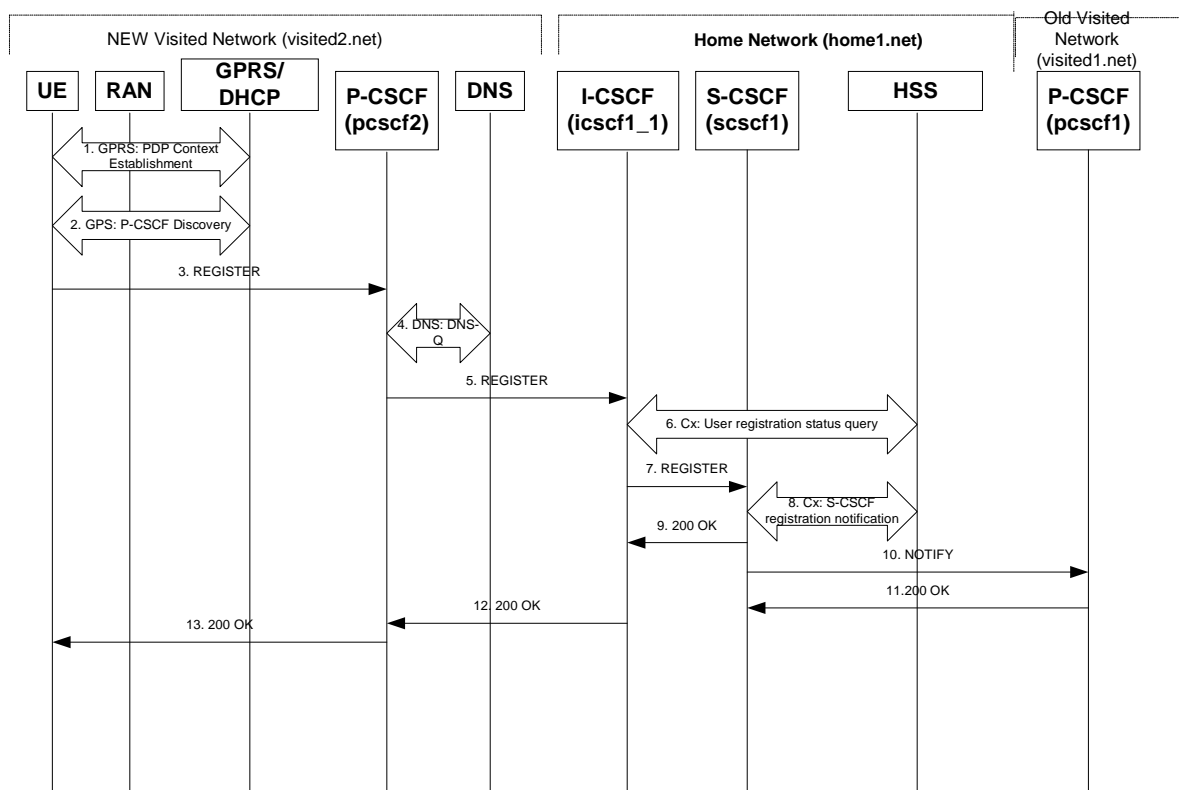
```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
From:
To:
Call-ID:
CSeq:
Content-Length:
```

## 9. Cx-Deregister Resp

After receiving the 200 OK from the P-CSCF, the S-CSCF sends Cx-Deregister Resp to the HSS. For detailed message information see 3GPP TS 29.228.

### 6.7.3 Network Initiated De-Registration Upon UE Roaming and Registration to a New Network. Assumes that the previous registration has not expired

This shows the registration signalling flow for the scenario that the UE loses the GPRS attachment in current visited access network and roams to makes a new GPRS attachment in a new visited access network without de-registration from its previous network the IMS. The GGSN and P-CSCF are assumed to be in the visited network. When the UE starts registration in via the new visited access network and P-CSCF, the home S-CSCF in the home IMS network initiates the de-registration to its the P-CSCF in the previous visited IMS network. It is assumed that the old P-CSCF has subscribed the event package to the S-CSCF and the subscription has not expired. For the reason of simplicity, the authentication procedure is not shown because it has no technical impact on this flow.



**Figure 6.7.3-1: Network Initiated De-registration upon UE roaming without De-registration**

Flows from 1 to 5 are the same as those in subclause 6.2.

#### 6. Cx: User Registration Status Query

The I-CSCF shall send the Cx-Query signalling flow to the HSS (Visited Network Identifier, subscriber identity, home domain name,). Because user has not de-registered with its previous network, so that HSS finds a S-CSCF assigned for that user and treats this as a re-registration procedure. Therefore, the HSS returns the S-CSCF name to the I-CSCF. For detailed message flows see 3GPP TS 29.228.

For the parameters in the REGISTER request (flow 5) which need to be sent to HSS, see table 6.2-5a.

Table 6.3-15a provides the parameters in the REGISTER (flow 7) message which are obtained from the information sent back from the HSS.



## 7. REGISTER (I-CSCF to S-CSCF)

The I-CSCF forwards the REGISTER to S-CSCF assigned to that user.

## 8. Cx-S-CSCF Registration Notification

The S-CSCF shall notify the HSS to update its location information for that subscriber. The HSS sends a response to the S-CSCF to acknowledge the update of location information and also with the user profile.

## 10. NOTIFY (S-CSCF to Old P-CSCF) - see example in table 6.7.3-10

Upon receiving flow 7, the S-CSCF found that the P-CSCF address in that message is different with the one in its database, so that the S-CSCF knows that the UE has left its previous P-CSCF without de-register itself. And the old P-CSCF has subscribed with the registration event package for that user, therefore, the S-CSCF sends a NOTIFY to that P-CSCF.

**Table 6.7.3-10: SIP NOTIFY (S-CSCF to Old P-CSCF)**

```
NOTIFY sip:pcscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
From: <sip:user1_public1@home1.net>;tag=151170
To: <sip:pcscf1.visisted1.net>;tag=31415
Call-ID: 1234567890@[5555::aaa:bbb:ccc:ddd]
CSeq: 43 NOTIFY
Expires: 7200
Event: presenceregistration-state
Content-Type: application/cpim-pidf+xml
Content-Length: (...)

<presence xmlns="urn:ietf:params:xml:ns:cpim-pidf:"xmlns="http://www.ietf.org/ns/cpim-pidf-xml-1.0">

  <tuple name="sip:user1_public1@home1.net">
    <status><valuebasic>closed</valuebasic>
      <detailnote>
        reason-phrase: "This public ID has been de-registered by the network";
        registrar: registrar.home1.net
      </detailnote>
    </status>
  </tuple>

  <tuple name="sip:user1_public2@home1.net">
    <status><del>valuebasic</del><closed</del></valuebasic></del></status>
  </tuple>

  <tuple name="tel:+498972233114">
    <status><valuebasic>closed</valuebasic>
      <detailnote>
        reason-phrase: "This ID has been automatically de-registered";
        registrar: registrar.home1.net
      </detailnote>
    </status>
  </tuple>

</presence>
```

## 11. SIP 200 OK (Old P-CSCF to S-CSCF) - see example in table 6.7.3-11

Upon receiving the NOTIFY, the P-CSCF discards any information binding with that user.

**Table 6.7.3-11: SIP 200 OK (Old P-CSCF to S-CSCF)**

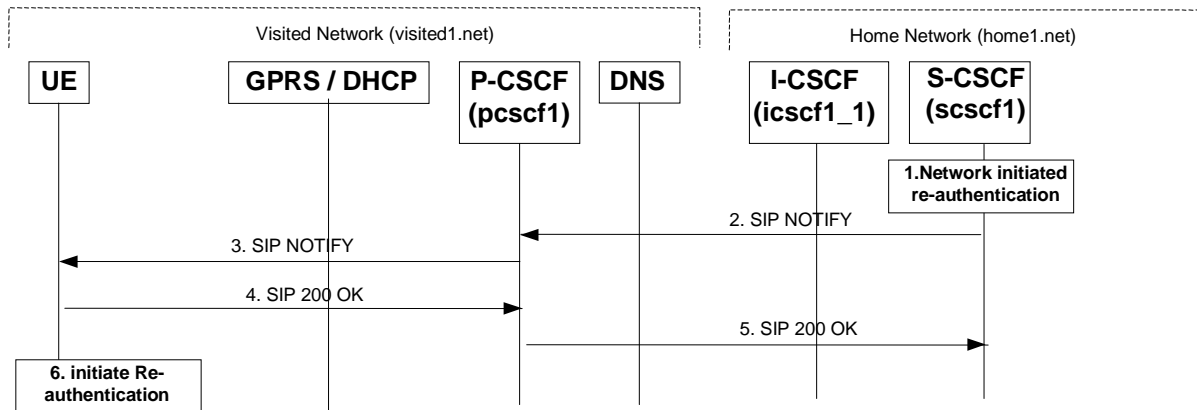
```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
From:
To:
Call-ID:
CSeq:
Content-Length:
```

## 6.8 Network initiated re-authentication

This subclause describes the notification of a user ~~about the re-authentication event~~ that occurs when at the S-CSCF assigned to that user requests re-authentication.

It is assumed that user has registered and also subscribed to the registration state event before. Also, the subscriber is considered to be roaming and the home network operator does not desire to keep its internal configuration hidden from the visited network.

After this procedure the users UE might automatically initiated re-registration procedures. If the user fails to re-register, the public user id for which re-authentication is requested, the public user id may be de-registered by S-CSCF.



**Figure 6.8-1: S-CSCF informs UE about network initiated re-authentication event (without I-CSCF providing configuration independence)**

### 1. Network initiated re-authentication (S-CSCF)

The network initiated re-authentication event for the private user identity of the user occurs at the S-CSCF. As the user has subscribed to the registration state event package this is the trigger point for the S-CSCF to notify the user about the event occurrence.

### 2. SIP NOTIFY request (S-CSCF to P-CSCF) - see example in table 6.8-2

The S-CSCF sends a NOTIFY request towards the UE in order to inform the UE about the occurrence of the network initiated re-authentication event.

The Route header is constructed from the information saved at registration.

**Table 6.8-2: SIP NOTIFY request (S-CSCF to P-CSCF)**

```
NOTIFY sip:pcscf1.visited1.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
Route: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Remote-Party-ID:
From: <sip:user1_public1@home1.net>;tag=31415
To: <sip:user1_public1@home1.net>;tag=151170
Call-ID:
CSeq: 43 NOTIFY
Expires:
Event: presenceregistration-state
Content-Type: application/cpim-pidf+xml
Content-Length: (...)

<presence xmlns="urn:ietf:params:xml:ns:cpim-pidf:"
          xmlns:registration="urn:ietf:params:xml:ns:cpim-pidf:registration"
          xmlns="http://www.ietf.org/ns/cpim-pidf-xml-1.0">

  <tuple name="sip:user1_public1@home1.net">
    <status>
      <basic>open</basic>
      <registrationvalue>re-authenticate</valueregistration>
```

```
</status>
</tuple>
</presence>
```

**From:** The tag of this field matches that of the To; field in the received 200/202 for the SUBSCRIBE.

**Content-Type:** Set to the value of the Accept: header received in the subscribe or 'application/cpim-pdf+xml' if Accept: was not present in the SUBSCRIBE.

The message body in NOTIFY that carries the subscriber's registration state is ~~of the following form~~formed as indicated~~described in 3GPP TS 24.229~~ [\[X\]](#):

- ~~— The registration state is expressed in XML with the information enclosed in the root <presence> element, enclosed between <presence> and </presence> tags.~~
- ~~— The <presence> element consist of only one <tuple> element and an optional <timestamp>. It contains a mandatory xmlns attribute that specifies the namespace for this version of the registration information payload.~~
- ~~— The <tuple> element carries the registration state the public user identity and carries a mandatory 'name' attribute. The <tuple> element carries mandatory <status> element and optional <contact> and <note> elements.~~
- ~~— The <status> element carries the <value> = re-authenticate and an optional <detail> element. The <contact> element carries any updated contact information (with priority). The <note> is human-readable for extra details.~~
- ~~— The optional <detail> element carries a mandatory 'type' attribute and an optional schema that is usually a DTD related to the specified 'type'.~~

### 3. SIP NOTIFY request (P-CSCF to UE) - see example in table 6.8-3

P-CSCF forwards the NOTIFY message to UE.

**Table 6.8-3: SIP NOTIFY request (P-CSCF to UE)**

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd] SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1
Remote-Party-ID:
From:
To:
Call-ID:
CSeq:
Expires:
Event:
Content-Type:
Content-Length:
```

### 4. SIP 200 OK response (UE to P-CSCF) - see example in table 6.8-4

The UE generates a 200 OK response to the NOTIFY.

**Table 6.8-4: SIP 200 OK response (UE to P-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1
From:
To:
Call-ID:
CSeq:Content-Length: 0
```

### 5. SIP 200 OK response (P-CSCF to S-CSCF) - see example in table 6.8-5

P-CSCF forwards the 200 OK to S-CSCF.

**Table 6.8-5: SIP 200 OK response (P-CSCF to S-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
From:
To:
Call-ID:
CSeq:
Content-Length:
```

## 6. Re-authentication (UE)

The UE shall now initiate re-authentication procedures.

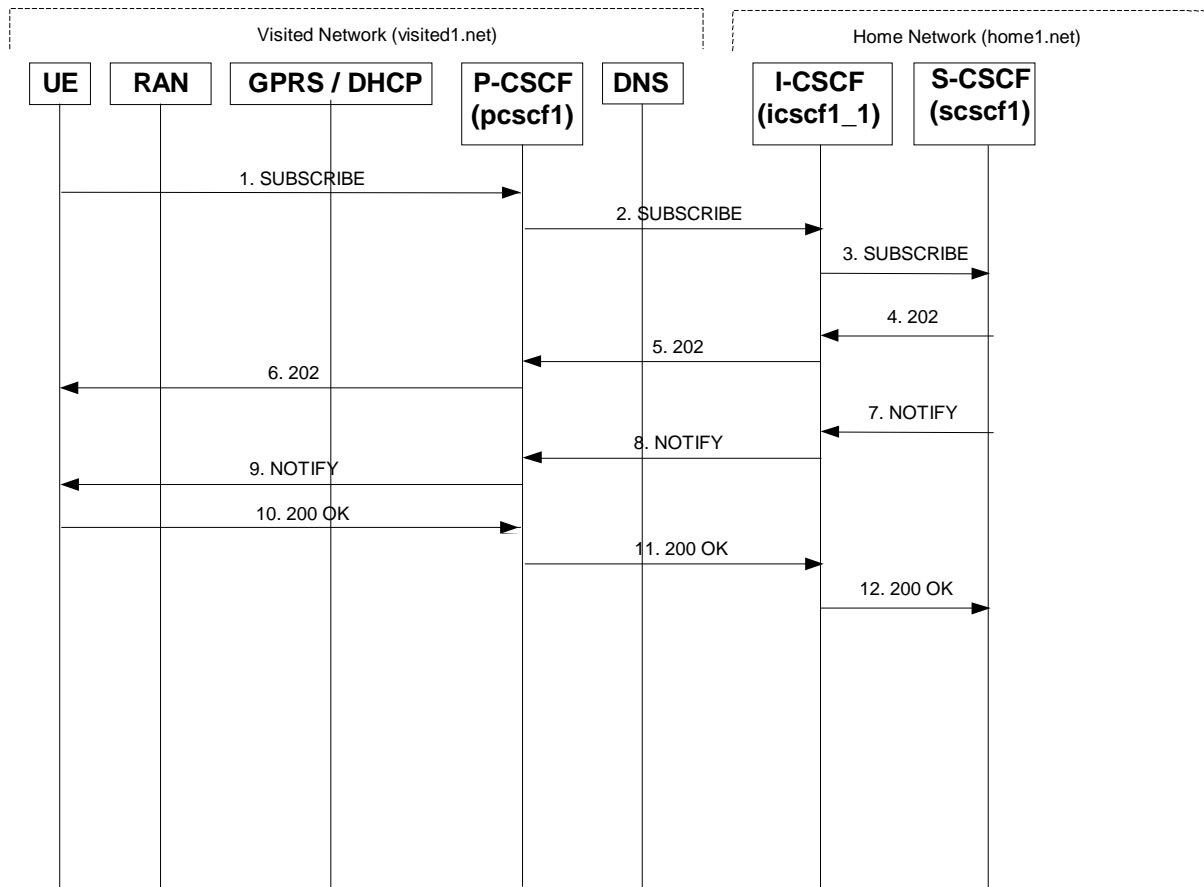
## 16.5 UE subscription for the registration state event package

This section describes the subscription procedure for the registration states event package, whereby the UE requests to be notified by the S-CSCF when the event has occurred. This is done using the information structure [specified as indicated in ~~for the 'presence' package in \[X\]3GPP TS 24.229 \[X\]~~](#).

It is assumed that the user has registered prior to initiating subscription of an event. Also, the subscriber is considered to be roaming and the home network has network configuration hiding active. For this example the trigger point at the UE for sending out the SUBSCRIBE request is the 200 OK response of the users registration.

**Editor's Note:** The interaction between the explicit subscription procedure for the Event: registration-state event package and the registration procedures needs further consideration. For example: What are the appropriate timer values of Expires header for these procedures considering the signalling is over the radio interface? What is the status of the ongoing explicit subscription procedure (Event: registration-state event package) when the registration timer has expired? etc.

**Editor's Note:** Further clarification with IETF on the setting of Request URI, Remote-Party-ID and To header has to be done. The values of these headers in the SUBSCRIBE and NOTIFY messages, as well as in their responses, as indicated in sections 16.5, 6.5, 16.6 and 6.6 of 24.228 has to be aligned to the outcome of this clarification.



**Figure 16.5-1: UE subscription for the registration state event package (with I-CSCF providing configuration independence)**

**1. SUBSCRIBE request (UE to P-CSCF) – see example in table 16.5-1**

The UE generates a SUBSCRIBE request in order to subscribe for the registration-state event package.

The From and To fields both will contain the UE's public address.

**Table 16.5-1 SUBSCRIBE request (UE to P-CSCF)**

```

SUBSCRIBE sip:user1_public1@home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From: <sip:user1_public1@home1.net>;tag=31415
To: <sip: user1_public1@home1.net>
Call-ID: b89rjhnedlrfjflslj40a222
CSeq: 61 SUBSCRIBE
Event: presenceregistration-state
Expires: 7200
Accept: application/cpim-pidf+xml
Contact: <sip:[5555::aaa:bbb:ccc:ddd]>
Content-Length: 0

```

**Request URI:** Public user identity whose events the subscriber subscribes to". In this case the subscribing user and the monitored user are identical.

**From:** This field is populated with logical representation (FQDN) for the entity sending the SUBSCRIBE.

**Event:** This field is populated with the value '~~presence~~registration-state' to specify the use of the presence package.

**Accept:** This field is populated with the value 'application/cpim-pidf+xml'. ~~in keeping with the use of the 'presence' package.~~

**To:** Same as the Request-URI.  
**Contact:** The contact information of the subscribing user.

## 2. SUBSCRIBE request (P-CSCF to I-CSCF) – see example in table 16.5-2

P-CSCF looks up the serving network information for the public user identity that was stored during the registration procedure. The SUBSCRIBE request is forwarded to I-CSCF. A Route header is inserted into SUBSCRIBE request. The information for the Route header is taken from the path header as gathered during registration.

**Table 16.5-2 SUBSCRIBE request (P-CSCF to I-CSCF)**

```
SUBSCRIBE sip:icscf1_p.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Route: sip: token(scscf1.home1.net), sip:user1_public1@home1.net
Record-Route: sip:240f34.1@pcscf1.visited1.net
From:
To:
Call-ID:
CSeq:
Event:
Expires:
Accept:
Contact:
Content-Length:
```

**Route:** The Route: header is populated with the remaining elements from the Path header from Registration, with the initial Request-URI (received from the UE) appended as the final component.

## 3. SUBSCRIBE (I-CSCF to S-CSCF) – see example in table 16.5-3

I-CSCF determines the S-CSCF name in the Route header field to retrieve the routing information. I-CSCF then forwards the SUBSCRIBE request to S-CSCF.

**Table 16.5-3 SUBSCRIBE (I-CSCF to S-CSCF)**

```
SUBSCRIBE sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
      pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Route: sip:user1_public1@home1.net
Record-Route: sip:351g45.1@icscf1_p.home1.net, sip:240f34.1@pcscf1.visited1.net
From:
To:
Call-ID:
CSeq:
Event:
Expires:
Accept:
Contact:
Content-Length:
```

## 4. 202 Accepted response (S-CSCF to I-CSCF) – see example in table 16.5-4

The S-CSCF sends an acknowledgement towards the UE indicating that the subscription was successful. This response will traverse the path that the SUBSCRIBE request took as described in the Via list.

NOTE 1: If the S-CSCF can process the SUBSCRIBE request and send the NOTIFY request immediately, it can send a 200 OK response instead of a 202 Accepted response.

**Table 16.5-4 202 Accepted response (S-CSCF to I-CSCF)**

```
SIP/2.0 202 Accepted
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route: sip:332b23.1@scscf1.home1.net, sip:351g45.1@icscf1_p.home1.net,
    sip:240f34.1@pcscf1.visited1.net
From:
To: <sip:user1_public1@home1.net>;tag=151170
Call-ID:
CSeq:
Contact: sip:user1_public1@scscf1.home1.net
Event:
Expires:
Content-Length:
```

**Expires:** If value of the Expires header in SUBSCRIBE request is different from the one received in REGISTER method, then the value of Expires header in 202 Accepted is set to match the value of Expires header in REGISTER method.

**Contact:** This is populated with a identifier generated within the S-CSCF that will help it correlate refreshes for the SUBSCRIBE. It is assumed to be the public-id 'user1\_public1' in this case.

**5. 202 Accepted response (I-CSCF to P-CSCF) – see example in table 16.5-5**

I-CSCF forwards 202 Accepted response to P-CSCF.

**Table 16.5-5 202 Accepted response (I-CSCF to P-CSCF)**

```
SIP/2.0 202 Accepted
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route: sip:token(scscf1.home1.net), sip:351g45.1@icscf1_p.home1.net,
    sip:240f34.1@pcscf1.visited1.net
From:
To:
Call-ID:
CSeq:
Event:
Contact: sip:token(user1_public1@scscf1.home1.net)Expires:
Content-Length:
```

**6. 202 Accepted response (P-CSCF to UE) – see example in table 16.5-6**

P-CSCF sends the response to UE.

**Table 16.5-6 202 Accepted response (P-CSCF to UE)**

```
SIP/2.0 202 Accepted
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Event:
Contact:
Expires:
Content-Length:
```

**7. NOTIFY request (S-CSCF to I-CSCF) – see example in table 16.5-7**

The S-CSCF sends a first NOTIFY request towards the UE in order to inform the UE about the registration status of the monitored user.

In the example below, the NOTIFY specifies the following public user identities as registered (i.e. status=open): sip:user1\_public1@home1.net, tel: +498972233114;

The following public user identity has been de-registered (i.e. status=closed) sip:user1\_public2@home1.net. They are arranged in the preferred order of priority in this example.

The Route header is constructed from the information saved at registration.

**Table 16.5-7 NOTIFY request (S-CSCF to I-CSCF)**

```
NOTIFY sip:icscf1_p.home1.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
Route: sip:240f34.1@pcscf1.visited1.net, sip:[5555::aaa:bbb:ccc:ddd]
From: <sip:user1_public1@home1.net>;tag=151170
To: <sip:user1_public1@home1.net>;tag=31415
Call-ID:
CSeq: 42 NOTIFY
Contact: sip:user1_public1@scscf1.home1.netExpires:
Event: presenceregistration-state
Content-Type: application/cpim-pidf+xml
Content-Length: (...)

<presence xmlns="urn:ietf:params:xml:ns:cpim-pidf:"xmlns="http://www.ietf.org/ns/epim-pidf-xml-1.0">

  <tuple name="sip:user1_public1@home1.net">
    <status><valuebasic>open</valuebasic></status>
  </tuple>

  <tuple name="sip:user1_public2@home1.net">
    <status><del>valuebasic</del>closed</valuebasic> </status>
  </tuple>

  <tuple name="tel:+498972233114">
    <status><valuebasic>open</valuebasic></status>
  </tuple>

</presence>
```

**From:** The tag of this field matches that of the To; field in the received 200/202 for the SUBSCRIBE

**Content-Type:** Set to the value of the Accept: header received in the subscribe or 'application/cpim-pidf+xml' if Accept: was not present in the SUBSCRIBE:

- The message body in the NOTIFY request that carries the subscriber's registration state is [described as indicated in \[X\]3GPP TS 24.229 \[X\]](#) of the following form.

~~The registration state is expressed in XML with the information enclosed in the root <presence> element, enclosed between <presence> and </presence> tags.~~

~~The <presence> element consist of one or more <tuple> elements and an optional <timestamp>. It contains a mandatory xmlns attribute that specifies the namespace for this version of the registration information payload.~~

~~Each <tuple> element carries the registration state of a single public id and carries a mandatory 'name' attribute. The <tuple> element carries mandatory <status> element and optional <contact> and <note> elements.~~

~~The <status> element carries a mandatory <value> = open|closed and an optional <detail> element. The <contact> element carries any updated contact information (with priority). The <note> is human readable for extra details.~~

~~NOTE 2: The registration states in 3GPP are mapped as follows to the status values in the presence package:~~

~~Open (status value) is mapped to Registered (3GPP).~~

~~Closed (status value) is mapped to De Registered (3GPP).~~

~~Editor's Note: further mappings of status values to 3GPP are for future study~~

~~The optional <detail> element carries a mandatory 'type' attribute and an optional schema that is usually a DTD related to the specified 'type'.~~

## 8. NOTIFY request (I-CSCF to P-CSCF) – see example in table 16.5-8

I-CSCF translates the S-CSCF address in the Via header and forwards NOTIFY to P-CSCF.



**Table 16.5-8 NOTIFY request (I-CSCF to P-CSCF)**

```
NOTIFY sip:pcscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP token(scscf1.home1.net)
Route: sip:[5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
Cseq:
Contact: sip:token(user1_public1@scscf1.home1.net)Expires:
Event:
Content-Type:
Content-Length:
```

**9. NOTIFY request (P-CSCF to UE) – see example in table 16.5-9**

P-CSCF sends NOTIFY to the user.

**Table 16.5-9 NOTIFY request (P-CSCF to UE)**

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd] SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1
From:
To:
Call-ID:
CSeq: Contact:
Expires:
Event:
Content-Type:
Content-Length:
```

**10. 200 OK response (UE to P-CSCF) – see example in table 16.5-10**

UE responds with 200 OK.

**Table 16.5-10 200 OK response (UE to P-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

**11. 200 OK response (P-CSCF to I-CSCF) – see example in table 16.5-11**

P-CSCF forwards the 200 OK to I-CSCF.

**Table 16.5-11 200 OK response (P-CSCF to I-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP token(scscf1.home1.net)
From:
To:
Call-ID:
CSeq:
Content-Length:
```

**12. 200 OK response (I-CSCF to S-CSCF) – see example in table 16.5-12**

I-CSCF determines the request and forwards response to S-CSCF. This confirms that notification is reached to the user.

**Table 16.5-12 200 OK response (I-CSCF to S-CSCF)**

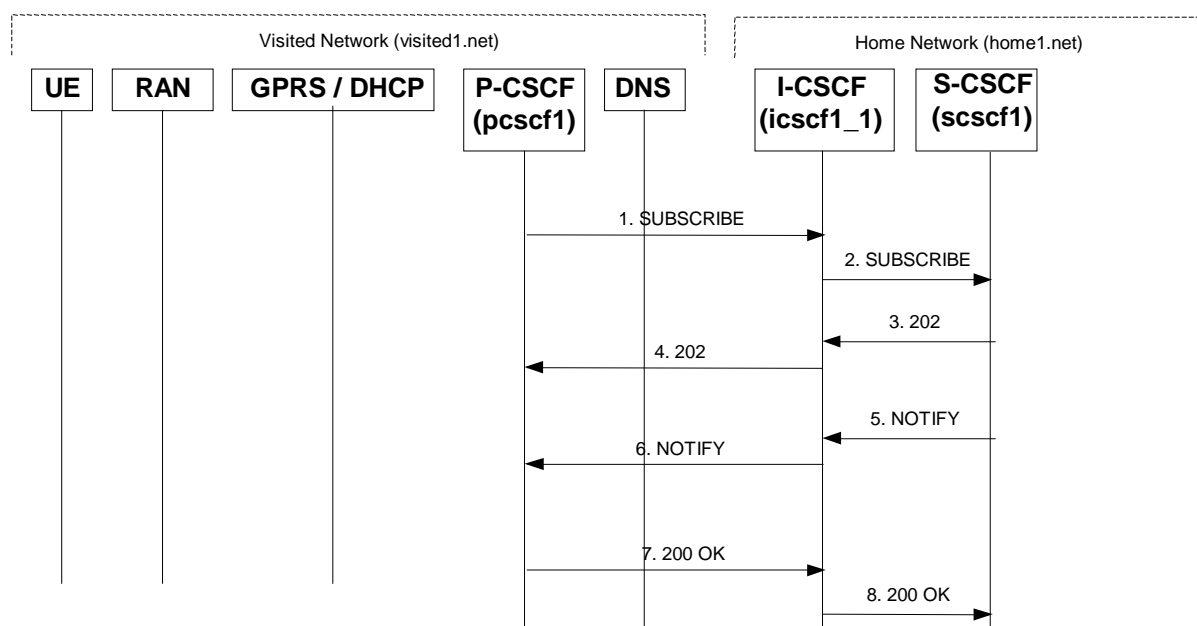
```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
From:
To:
Call-ID:
CSeq:
Content-Length:
```

## 16.6 P-CSCF subscription for the registration state event package

This subclause describes the subscription procedure for the registration state event package, whereby the P-CSCF requests to be notified by the S-CSCF when the event has occurred. This is done using the ~~'presence'~~'[registration-state](#)' package.

It is assumed that the user has registered prior to initiating subscription of an event. Also, the subscriber is considered to be roaming and the home network has network configuration hiding active. For this example the trigger point at the P-CSCF for sending out the SUBSCRIBE request is the 200 OK response of the users registration.

**Editor's Note:** The interaction between the explicit subscription procedure for the `Event: registration-state event package` and the registration procedures needs further consideration. For example: What are the appropriate timer values of Expires header for these procedures considering the signalling is over the radio interface? What is the status of the ongoing explicit subscription procedure (`Event: registration-state event package`) when the registration timer has expired? etc.



**Figure 16.6-1: P-CSCF subscription for the registration state event package (with I-CSCF providing configuration independence)**

### 1. SUBSCRIBE request (P-CSCF to S-CSCF) – see example in table 16.6-1

The P-CSCF generates a SUBSCRIBE request in order to subscribe for the registration-state event package.

The route is constructed from the monitored users path header as constructed during registration.

**Table 16.6-1 SUBSCRIBE request (P-CSCF to I-CSCF)**

```
SUBSCRIBE sip:icscf1_p.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1
Route: sip:token(scscf1.home1.net)
From: <sip:pcscf1.visited1.net>;tag=31415
To: <sip:user1_public1@home1.net>
Call-ID: 223456789@pcscf1.visited1.net
CSeq: 61 SUBSCRIBE
Event: presenceregistration-state
Expires: 7200
Accept: application/cpim-pidf+xml
Contact: <sip:user1_public1%40home1.net@pcscf1.visited1.net>
Content-Length: 0
```

**Request URI:** The next hop on the route to the destination as recorded in the path information for the monitored user during registration.

**Route:** The token containing a representation of the S-CSCF allocated to this user, based on the registration information.

**From:** This header is populated with the SIP URI that identifies the P-CSCF.

**To:** The SIP-URI of the entity which provides information about the monitored users registration states. In this case this is the address of the registrar of user1\_public1.

**Contact:** This is where the NOTIFY requests for this subscription will be sent. It consists of the SIP URL-escaped public user identity at the P-CSCF.

**Event:** This field shall be set to the value '~~presence~~'registration-state' to specify the use of the ~~presence~~ registration-state package

**Accept:** This field shall be set to the value 'application/cpim-pidf+xml' ~~in keeping with the use of the~~ 'presence' package.

## 2. SUBSCRIBE (I-CSCF to S-CSCF) – see example in table 16.6-2

I-CSCF determines the S-CSCF name in the Route header field to retrieve the routing information. I-CSCF then forwards the SUBSCRIBE request to S-CSCF.

**Table 16.6-2 SUBSCRIBE (I-CSCF to S-CSCF)**

```
SUBSCRIBE sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1
Record-Route: sip:351g45.1@icscf1_p.home1.net
From:
To:
Call-ID:
CSeq:
Event:
Expires:
Accept:
Contact:
Content-Length:
```

**Record-Route:** The ICSCF adds a route header as it wants to stay on the routing path for network hiding purposes.

## 3. 202 Accepted response (S-CSCF to I-CSCF) – see example in table 16.6-3

The S-CSCF sends an acknowledgement towards the P-CSCF indicating that the subscription was successful. This response will traverse the path that the SUBSCRIBE request took as described in the Via list.

NOTE 1: If the S-CSCF can process the SUBSCRIBE request and send the NOTIFY request immediately, it can send a 200 OK response instead of a 202 Accepted response.

**Table 16.6-3 202 Accepted response (S-CSCF to I-CSCF)**

```
SIP/2.0 202 Accepted
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1
Record-Route: sip:332b23.1@scscf1.home1.net, sip:351g45.1@icscf1_p.home1.net,
  sip:240f34.1@pcscf1.visited1.net
From:
To: <sip:user1_public1@home1.net>;tag=151170
Call-ID:
CSeq:
Contact: sip:user1_public1@scscf1.home1.netEvent:
Expires:
Content-Length:
```

**4. 202 Accepted response (I-CSCF to P-CSCF) – see example in table 16.6-4**

I-CSCF forwards 202 Accepted response to P-CSCF.

**Table 16.6-4 202 Accepted response (I-CSCF to P-CSCF)**

```
SIP/2.0 202 Accepted
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1
Record-Route: sip:token(scscf1.home1.net), sip:351g45.1@icscf1_p.home1.net
From:
To:
Call-ID:
CSeq:
Contact: sip:token(user1_public1@scscf1.home1.net)Event:
Expires:
Content-Length:
```

**5. NOTIFY request (S-CSCF to I-CSCF) – see example in table 16.6-5**

The S-CSCF sends a first NOTIFY request towards the P-CSCF in order to inform the P-CSCF about the registration status of the monitored user.

The Route header is constructed from the Record-Route header as constructed during subscription.

**Table 16.6-5 NOTIFY request (S-CSCF to I-CSCF)**

```
NOTIFY sip:user1_public1%40home1.net@pcscf1.visited1.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
Route: sip:240f34.1@pcscf1.visited1.net
From: <sip:user1_public1@home1.net>;tag=151170
To: <sip:user1_public1@pcscf1.visited1.net>;tag=31415
Call-ID:
CSeq: 42 NOTIFY
Contact: sip:user1_public1@scscf1.home1.netExpires:
Event: presenceregistration-state
Content-Type: application/cpim-pidf+xml
Content-Length: (...)

<presence xmlns="urn:ietf:params:xml:ns:cpim-pidf:" xmlns="http://www.ietf.org/ns/cpim-pidf-xml-1.0">
  <tuple name="sip:user1_public1@home1.net">
    <status><valuebasic>closed</valuebasic></status>
  </tuple>
</presence>
```

**Request-URI:** The contents are the same as the Contact header in the SUBSCRIBE.

**From:** The tag of this field matches that of the To; field in the received 200/202 for the SUBSCRIBE

**Content-Type:** Set to the value of the Accept: header received in the subscribe or 'application/cpim-pidf+xml' if Accept: was not present in the SUBSCRIBE

The message body in the NOTIFY request that carries the subscriber's registration state is [described as indicated in 3GPP TS 24.229 \[X\]](#) of the following form:

- ~~— The registration state is expressed in XML with the information enclosed in the root <presence> element, enclosed between <presence> and </presence> tags.~~
- ~~— The <presence> element consist of one or more <tuple> elements and an optional <timestamp>. It contains a mandatory xmlns attribute that specifies the namespace for this version of the registration information payload.~~
- ~~— Each <tuple> element carries the registration state of a single public id and carries a mandatory 'name' attribute. The <tuple> element carries mandatory <status> element and optional <contact> and <note> elements.~~
- ~~— The <status> element carries a mandatory <value> = open|closed and an optional <detail> element. The <contact> element carries any updated contact information (with priority). The <note> is human readable for extra details.~~

~~NOTE 2: the registration states in 3GPP are mapped as follows to the status values in the presence package:~~

- ~~— Open (status value) is mapped to Registered (3GPP).~~
- ~~— Closed (status value) is mapped to De-Registered (3GPP).~~

~~Editor's Note: further mappings of status values to 3GPP are for future study~~

- ~~— The optional <detail> element carries a mandatory 'type' attribute and an optional schema that is usually a DTD related to the specified 'type'.~~

#### 6. NOTIFY request (I-CSCF to P-CSCF) – see example in table 16.6-6

I-CSCF translates the S-CSCF address in the Via header and forwards NOTIFY to P-CSCF.

**Table 16.6-6 NOTIFY request (I-CSCF to P-CSCF)**

```
NOTIFY sip:user1_public1%40home1.net@pcscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP token(scscf1.home1.net)
From:
To:
Call-ID:
Cseq:
Contact:
Expires:
Event:
Content-Type:
Content-Length:
```

#### 7. 200 OK response (P-CSCF to I-CSCF) – see example in table 16.6-7

P-CSCF forwards the 200 OK to I-CSCF.

**Table 16.6-7 200 OK response (P-CSCF to I-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP token(scscf1.home1.net)
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

#### 8. 200 OK response (I-CSCF to S-CSCF) – see example in table 16.6-8

I-CSCF determines the request and forwards response to S-CSCF. This confirms that notification is reached to the user.

**Table 16.6-8 200 OK response (I-CSCF to S-CSCF)**

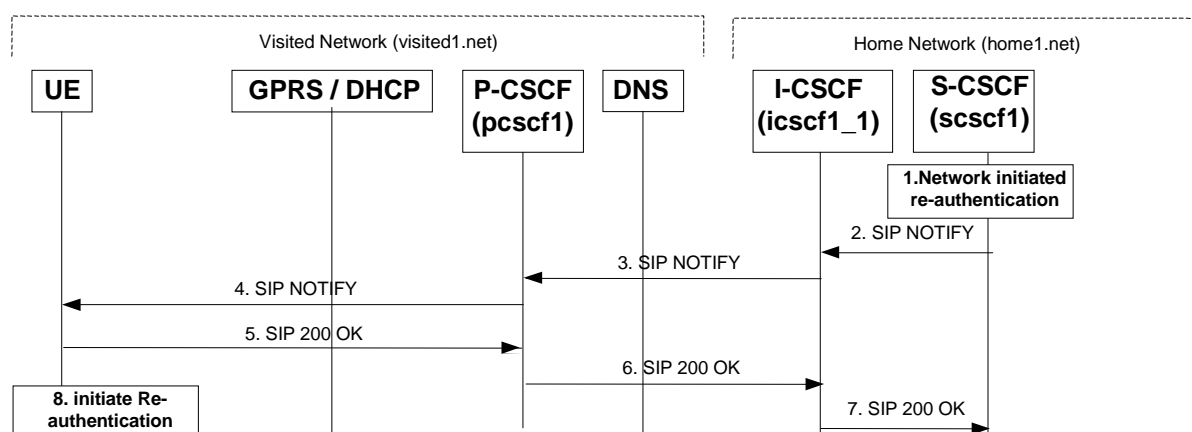
```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
From:
To:
Call-ID:
CSeq:
Content-Length:
```

## 16.8 Network initiated re-authentication

This subclause describes the notification ~~of a user about the re-authentication event~~ that occurs at-when the S-CSCF assigned to that user requests re-authentication in the case where the users home network provides network configuration hiding.

It is assumed that user has registered and also subscribed to the registration state event before. Also, the subscriber is considered to be roaming and the home network operator does not desire to keep its internal configuration hidden from the visited network.

After this procedure the users UE might automatically initiated re-registration procedures. If the user fails to re-register the public user id for which re-authentication was requested, the public user id may be de-registered by S-CSCF



**Figure 16.8-1: S-CSCF informs UE that network initiated re-authentication is needed (with I-CSCF providing configuration independence)**

### 1. Network initiated re-authentication (S-CSCF)

The network-initiated re-authentication event for the private user identity user occurs at the S-CSCF. As the user has subscribed to the registration state event package this is the trigger point for the S-CSCF to notify the user about the event occurrence.

### 2. SIP NOTIFY request (S-CSCF to I-CSCF) – see example in table 16.8-2

The S-CSCF sends a NOTIFY request towards the UE in order to inform the UE about the occurrence of the network initiated re-authentication event.

The Route header is constructed from the information saved at registration.

**Table 16.8-2 SIP NOTIFY request (S-CSCF to I-CSCF)**

```
NOTIFY sip:icscf1_p.home1.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
Route: sip:240f34.1@pcscf1.visited1.net, sip:[5555::aaa:bbb:ccc:ddd]
Remote-Party-ID:
From: <sip:user1_public1@home1.net>;tag=151170
To: <sip:user1_public1@home1.net>;tag=31415
Call-ID: 223456789@[5555::aaa:bbb:ccc:ddd]
CSeq: 43 NOTIFY
```

```
Expires: 7200
Event: presenceregistration-state
Content-Type: application/cpim-pidf+xml
Content-Length: (...)

<presence xmlns="urn:ietf:params:xml:ns:cpim-pidf:"
  xmlns:registration="urn:ietf:params:xml:ns:cpim-
  pidf:registration"xmlns="http://www.ietf.org/ns/cpim-pidf-xml-1.0">

  <tuple name="sip:user1_public1@home1.net">
    <status>
      <basic>open</basic>
      <value>registration</value>re-authenticate</value>registration</value>
    </status>
  </tuple>
</presence>
```

**From:** The tag of this field matches that of the To; field in the received 200/202 for the SUBSCRIBE

**Content-Type:** Set to the value of the Accept: header received in the subscribe or 'application/cpim-pidf+xml' if Accept: was not present in the SUBSCRIBE

The message body in the NOTIFY request that carries the subscriber's registration state is ~~of the following form:~~ described as indicated in ~~[X]3GPP TS 24.229 [X]~~

- ~~— The registration state is expressed in XML with the information enclosed in the root <presence> element, enclosed between <presence> and </presence> tags.~~
- ~~— The <presence> element consist of only one <tuple> element and an optional <timestamp>. It contains a mandatory xmlns attribute that specifies the namespace for this version of the registration information payload.~~
- ~~— The <tuple> element carries the registration state the public id and carries a mandatory 'name' attribute. The <tuple> element carries mandatory <status> element and optional <contact> and <note> elements.~~
- ~~— The <status> element carries the <value>= re-authenticate and an optional <detail> element. The <contact> element carries any updated contact information (with priority). The <note> is human readable for extra details.~~
- ~~— The optional <detail> element carries a mandatory 'type' attribute and an optional schema that is usually a DTD related to the specified 'type'.~~

### 3. SIP NOTIFY request (I-CSCF to P-CSCF) – see example in table 16.8-3

I-CSCF translates the S-CSCF address in the Via header and forwards NOTIFY to P-CSCF.

**Table 16.8-3 SIP NOTIFY request (I-CSCF to P-CSCF)**

```
NOTIFY sip:pcscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP token(SIP/2.0/UDP
  scscf1.home1.net;branch=332b23.1)
Route: sip:[5555::aaa:bbb:ccc:ddd]
Remote-Party-ID:
From:
To:
Call-ID:
Cseq:
Expires:
Event:
Content-Type:
Content-Length:
```

### 4. SIP NOTIFY request (P-CSCF to UE) – see example in table 16.8-4

P-CSCF sends NOTIFY to the user.

**Table 16.8-4 SIP NOTIFY request (P-CSCF to UE)**

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd] SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1
From:
```

```
To:
Call-ID:
CSeq: Expires:
Event:
Content-Type:
Content-Length:
```

**5. SIP 200 OK response (UE to P-CSCF) – see example in table 16.8-5**

UE responds with 200 OK.

**Table 16.8-5 SIP 200 OK response (UE to P-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

**6. SIP 200 OK response (P-CSCF to I-CSCF) – see example in table 16.8-6**

P-CSCF forwards the 200 OK to I-CSCF.

**Table 16.8-6 SIP 200 OK response (P-CSCF to I-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf1.home1.net;branch=332b23.1)
From:
To:
Call-ID:
CSeq:
Content-Length:
```

**7. SIP 200 OK response (I-CSCF to S-CSCF) – see example in table 16.8-7**

I-CSCF determines the request and forwards response to S-CSCF. This confirms that notification is reached to the user.

**Table 16.8-7 SIP 200 OK response (I-CSCF to S-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
From:
To:
Call-ID:
CSeq:
Content-Length:
```

**8. Re-authentication (UE)**

The UE shall now initiate the re-authentication procedures.



## CHANGE REQUEST

⌘ 24.228 CR 031 ⌘ rev 1- ⌘ 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

<b>Title:</b>	⌘ Addition of further Media Streams Flow Update		
<b>Source:</b>	⌘ AT&T Wireless		
<b>Work item code:</b>	⌘ IMS-CCR	<b>Date:</b>	⌘ 03-05-2002
<b>Category:</b>	⌘ <b>F</b> Use <u>one</u> of the following categories: <b>F</b> (correction) <b>A</b> (corresponds to a correction in an earlier release) <b>B</b> (addition of feature), <b>C</b> (functional modification of feature) <b>D</b> (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900.	<b>Release:</b>	⌘ REL-5 Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) REL-4 (Release 4) REL-5 (Release 5)

<b>Reason for change:</b>	⌘ Update based on the latest IETF RFCs and I-Ds, correction of mistakes
<b>Summary of change:</b>	⌘ The updated flow contains the following major changes: <ul style="list-style-type: none"><li>- Loose routing adopted (change of Request-URI, Route header fields)</li><li>- UPDATE method + Manyfolks-05 adopted (change of the figures, SDP, Require and Supported header fields; Content-disposition header field removed)</li><li>- Max-Forwards header field added to every request</li><li>- Branch parameters deleted from Route and Record-Route header fields</li><li>- Anonymity header fields deleted (privacy-04)</li><li>- RPID-Privacy header field added (privacy-04)</li><li>- Media-Authorization header field changed to P-Media-Authorization (call-auth-04)</li><li>- 'Service Control' changed to 'Evaluation of initial filter criterias' for INVITE,</li><li>- The encrypted string is transformed into a SIP URL</li><li>- editorial corrections<ul style="list-style-type: none"><li>mistakes</li><li>update of the description text</li><li>update of the header descriptions</li><li>SDP update (missing parameters added)</li></ul></li></ul>
<b>Consequences if not approved:</b>	⌘ 24.228 call flows are not standard compliant

<b>Clauses affected:</b>	⌘ 17.5
<b>Other specs affected:</b>	⌘ <input checked="" type="checkbox"/> Other core specifications ⌘ 24.229 <input type="checkbox"/> Test specifications <input type="checkbox"/> 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](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.

## 17.5 Sample multimedia signalling flows: addition of further media streams

### 17.5.1 Introduction

See subclause 7.5.1.

### 17.5.2 Sample multimedia signalling flow - addition of further media originator and terminator are both roaming and operated by different networks

Figure 17.5.2-1 shows a multimedia signalling flow for the addition of another media where the originator and terminator are both roaming and operated by different networks. Both networks are with I-CSCF providing configuration independence. The UE has already established an IM CN session carrying voice and is generating an INVITE request to add video media to the already established IM session.



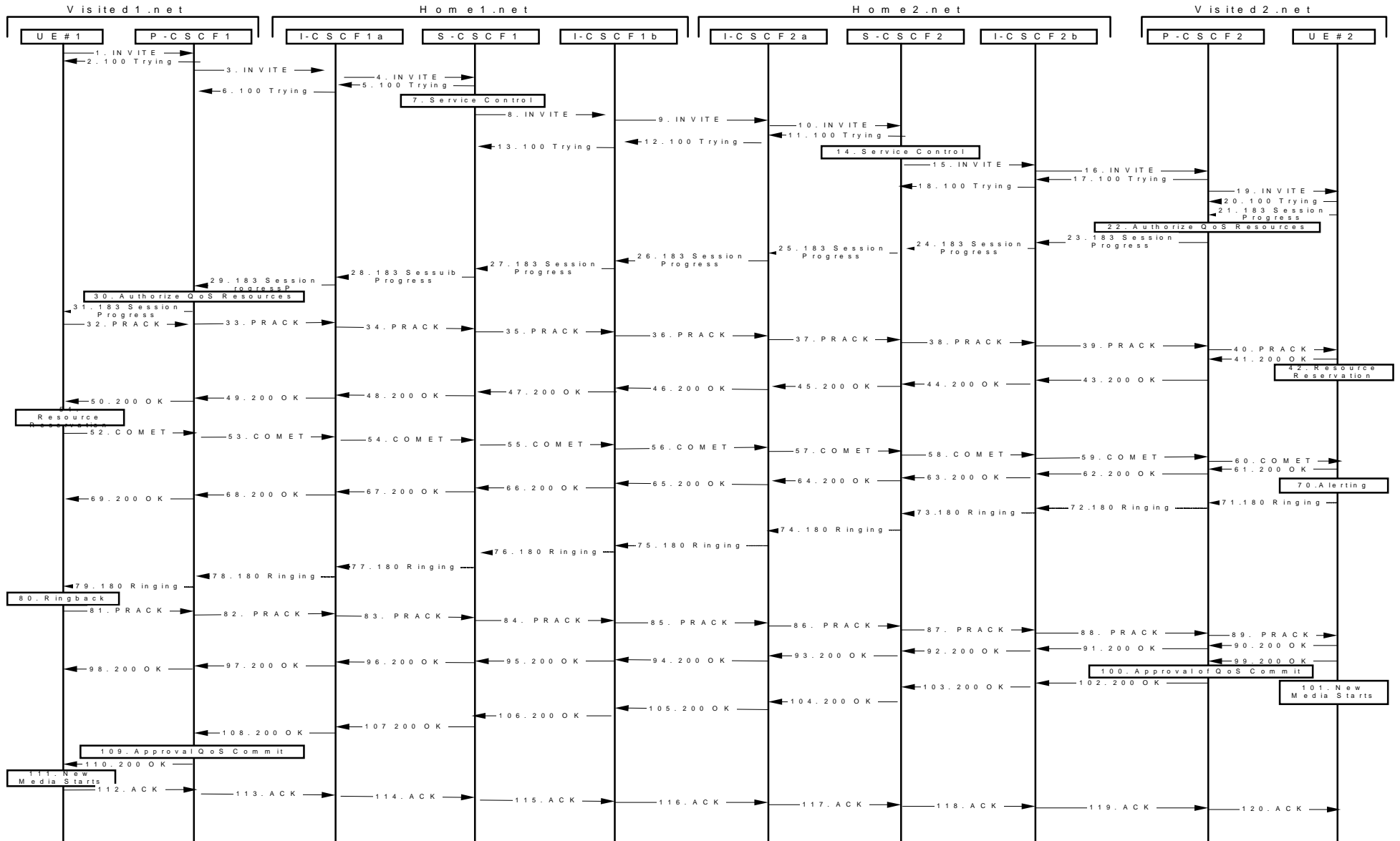


Figure 17.5.2-1: Sample multimedia signalling flow - additional of further media with I-CSCF (THIG)

## 1. INVITE (UE1 to P-CSCF1) - see example in table 17.5.2-1

UE sends the Re-INVITE request, containing another media description in SDP, to the P-CSCF determined via the CSCF discovery mechanism. An example is contained in table 17.5.2-1.

**Table 17.5.2-1: INVITE (UE1 to P-CSCF1)**

```
INVITE sip:[5555::eee:fff:aaa:bbb] SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 70
Supported: 100rel
Remote-Party-ID: "John Doe" <tel:+1-212-555-1111>;privacy=off;
RPID-Privacy: privacy=off
Anonymity: Off
From: "Alien Blaster" <sip:B36(SHA-
  1(user1_public1@home1.net;time=36123E5B;seq=72))@localhost>;tag=171828
To: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost; tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
CSeq: 132 INVITE
Require: precondition
Supported: 100rel
Contact: sip:[5555::aaa:bbb:ccc:ddd]
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907166275 0
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=qos:mandatory-sendrecv
m=video 9544 RTP/AVP 31
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:31 H261/90000
a=qos:mandatory-sendrecv
```

<b>Request-URI:</b>	Contains the keyed number from the user. <u>This is specified by the UE as sip:&lt;keyed number&gt;@home1.net. This is in accordance to standard IETF procedure for specifying dialled digits.</u>
<b>Via:</b>	Contains the IP address or FQDN of the originating UE.
<b>Remote-Party-ID:</b>	Contains the <u>originator's</u> public user identity. The Display name is optional.
<b>From:/To:/Call-ID:</b>	Follow the recommendations of draft-ietf-sip-privacy [13]-04, even though anonymity is not being requested for this session.
<b>Cseq:</b>	Is a random starting number.
<b>Contact:</b>	Is a <u>SIP URL that contains</u> the IP address or FQDN of the originating UE.

## 2. 100 Trying (P-CSCF1 to UE1) - see example in table 17.5.2-2

P-CSCF responds to the INVITE request (1) with a 100 Trying provisional response.

**Table 17.5.2-2: 100 Trying (P-CSCF1 to UE1)**

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

**3. INVITE (P-CSCF1 to I-CSCF1a) - see example in table 17.5.2-3**

P-CSCF1 forwards the INVITE to the next hop name/address, as determined from previous response messages.

**Table 17.5.2-3: INVITE (P-CSCF1 to I-CSCF1a)**

```
INVITE sip:[5555::eee:fff:aaa:bbb]icscf1_p.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 69
Route: sip:icscf1_p.home1.net;lr, sip:token(sip:332b23-1@scscf1.home1.net;lr),
      sip:312a32-1@icscf1_s.home1.net;lr}@home1.net;tokenized-by=home1.net,
      sip:871y12-1@icscf2_s.home2.net;lr, sip:token(sip:764z87-1@scscf2.home2.net;lr),
      sip:556u87-1@icscf2_p.home2.net;lr}@home2.net;tokenized-by=home2.net,
      sip:361k21-1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
Supported:
Remote-Party-ID:
RPID-privacy:
Anonymity:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length: (...)

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
```

**Route:** P-CSCF remembers (from the previous response messages) the request routing for this UE. This becomes a Route header in the request. ~~The initial Request URI is appended to the Route header.~~

**Contact:** ~~\_\_\_\_\_~~ A locally defined value that identifies the UE.

**Request-URI:** ~~\_\_\_\_\_~~ The first component in the remembered Path header from Registration.

#### 4. INVITE (I-CSCF1a to S-CSCF1) - see example in table 17.5.2-4

I-CSCF1a performs the THIG function and forwards the invite to S-CSCF1.

**Table 17.5.2-4: INVITE (I-CSCF1a to S-CSCF1)**

```
INVITE sip:[5555::eee:fff:aaa:bbb]scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
Route: sip:scscf1.home1.net;lr, sip:312a32-1@icscf1_s.home1.net;lr,
    sip:871y12-1@icscf2_s.home2.net;lr, sip:token(sip:764z87-1@scscf2.home2.net;lr),
    sip:556u87-1@icscf2_p.home2.net;lr)@home2.net;tokenized-by=home2.net,
    sip:361k21-1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
Remote-Party-ID:
RPID-Privacy:
Anonymity+
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
```

#### 5. 100 Trying (S-CSCF1 to I-CSCF1a) - see example in table 17.5.2-5

S-CSCF1 sends the 100 Trying provisional response to P-CSCF1 through I-CSCF1a.

**Table 17.5.2-5: 100 Trying (S-CSCF1 to I-CSCF1a)**

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length:
```



6. **100 Trying (I-CSCF1a to P-CSCF1) - see example in table 17.5.2-6**

I-CSCF1a forwards the 100 Trying provisional response to P-CSCF1.

**Table 17.5.2-6: 100 Trying (I-CSCF1a to P-CSCF1)**

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length:
```

7. **Service Control Evaluation of initial filter criterias**

S-CSCF validates the service profile of this subscriber and evaluates the initial filter criterias.

~~S-CSCF1 validates the service profile, and performs any origination service control required for this subscriber.~~

8. **INVITE (S-CSCF1 to I-CSCF1b) - see example in table 17.5.2-8**

S-CSCF1 recognizes that this invite applies to an existing session. It therefore forwards the INVITE along the existing path to I-CSCF1b.

**Table 17.5.2-8: INVITE (S-CSCF1 to I-CSCF1b)**

```
INVITE sip:[5555::eee:fff:aaa:bbb]@icscf1_s.home1.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 67
Route: sip:icscf1_s.home1.net;lr, sip:871y12-1@icscf2_s.home2.net;lr,
    sip:token(sip:764z87-1@scscf2.home2.net;lr),
    sip:556u87-1@icscf2_p.home2.net;lr}@home2.net;tokenized-by=home2.net,
    sip:361k21-1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
Supported:
Remote-Party-ID: "John Doe" <tel:+1 212 555 1111>;privacy=off;screen=yes
RPID-Privacy: privacy=off;screen=yes
Anonymity:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length: (...)

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
```

```

a=
m=
b=
a=
a=
a=
a=
a=
a=

```

**9. INVITE (I-CSCF1b to I-CSCF2a) - see example in table 17.5.2-9**

I-CSCF1b forwards the INVITE request to the next hop I-CSCF2a and performs the THIG function.

**Table 17.5.2-9: INVITE (I-CSCF1b to I-CSCF2a)**

```

INVITE sip:[5555::eee:fff:aaa:bbb]icscf2_s.home2.net SIP/2.0
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP pcscaf1.visited1.net;branch=240f34.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 66
Route: sip:icscf2_s.home2.net;lr, sip:token(sip:764z87.1@scscf2.home2.net;lr),
sip:556u87.1@icscf2_p.home2.net;lr)@home2.net;tokenized-by=home2.net,
sip:361k21.1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
Supported:
Remote-Party-ID:
RPID-Privacy:
Anonymity:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=

```

**10. INVITE (I-CSCF2a to S-CSCF2) - see example in table 17.5.2-10**

I-CSCF2a forwards the INVITE request to S-CSCF2.

**Table 17.5.2-10: INVITE (I-CSCF2a to S-CSCF2)**

```

INVITE sip:[5555::eee:fff:aaa:bbb]scscf2.home2.net SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
    scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    icsef1_p.home1.net;branch=351g45.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 65
Route: sip:scscf2.home2.net;lr, sip:556u87.1@icscf2_p.home2.net;lr,
    sip:361k21.1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
Supported:
Remote-Party-ID:
RPID-Privacy:
Anonymity:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=

```

**11.100 Trying (S-CSCF2 to I-CSCF2a) - see example in table 17.5.2-11**

S-CSCF2 sends a 100 Trying provisional response back to S-CSCF1 through I-CSCF2a.

**Table 17.5.2-11: 100 Trying (S-CSCF2 to I-CSCF2a)**

```

SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
    scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    icsef1_p.home1.net;branch=351g45.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
    SIP/2.0/UDP, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0

```

## 12. 100 Trying (I-CSCF2a to I-CSCF1b) - see example in table 17.5.2-12

I-CSCF2a forwards a 100 Trying provisional response to the upstream next hop I-CSCF1b.

**Table 17.5.2-12: 100 Trying (I-CSCF2a to I-CSCF1b)**

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
iesef1_p.home1.net;branch=351g45.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
SIP/2.0/UDP, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

## 13. 100 Trying (I-CSCF1b to S-CSCF1) - see example in table 17.5.2-13

I-CSCF forwards a 100 Trying provisional response to the S-CSCF1.

**Table 17.5.2-13: 100 Trying (I-CSCF1b to S-CSCF1)**

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
SIP/2.0/UDP, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

## 14. ~~Service Control~~ Evaluation of initial filter criterias

S-CSCF validates the service profile of this subscriber and evaluates the initial filter criterias.

~~S-CSCF2 validates the service profile, and performs any origination service control required for this subscriber.~~

## 15. INVITE (S-CSCF2 to I-CSCF2b) - see example in table 17.5.2-15

S-CSCF2 recognizes that this invite applies to an existing session. It therefore forwards the INVITE along the existing path to I-CSCF2b.

**Table 17.5.2-15: INVITE (S-CSCF2 to I-CSCF2b)**

```
INVITE sip:[5555::eee:fff:aaa:bbb] SIP/2.0iesef2_p.home2.net
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP
icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP icscf1_s.home1.net;branch=312a32.1,
SIP/2.0/UDP token(SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
iesef1_p.home1.net;branch=351g45.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 64
Route: sip:icscf2_p.home2.net;lr, sip:361k21.1@pcscf2.visited2.net;lr,
sip:[5555::eee:fff:aaa:bbb]
Supported:
Remote-Party-ID:
RPID-Privacy:
Anonymity:
From:
```

```
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length: (...)
```

```
v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
```

#### 16. INVITE (I-CSCF2b to P-CSCF2) - see example in table 17.5.2-16

I-CSCF2b performs the THIG function and forwards the INVITE request to P-CSCF2.

**Table 17.5.2-16: INVITE (I-CSCF2 to P-CSCF2)**

```
INVITE sip:sip:pcscf2.visited2.net, sip:[5555::eee:fff:aaa:bbb] SIP/2.0
Via: SIP/2.0/UDP icscf2_p.home2.net;branch=556u87.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf2.home2.net;branch=764z87.1), SIP/2.0/UDP
icscf2_s.home2.net;branch=871y12.1)@home2.net;tokenized-by=home2.net, SIP/2.0/UDP
icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 63
Route: sip:pcscf2.visited2.net;lruuser2_public1@home2.net
Supported:
Remote-Party-ID:
RPID-Privacy:
Anonymity:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
```

```
a=  
a=  
a=  
a=  
a=  
m=  
b=  
a=  
a=  
a=  
a=  
a=
```

### 17. 100 Trying (P-CSCF2 to I-CSCF2b) - see example in table 17.5.2-17

P-CSCF2 sends a 100 Trying provisional response back to S-CSCF2 through I-CSCF2b.

**Table 17.5.2-17: 100 Trying (P-CSCF2 to I-CSCF2b)**

```
SIP/2.0 100 Trying  
Via: SIP/2.0/UDP icscf2_p.home2.net;branch=556u87.1, SIP/2.0/UDP token(SIP/2.0/UDP  
scscf2.home2.net;branch=764z87.1), SIP/2.0/UDP  
icscf2_s.home2.net;branch=871y12.1)@home2.net;tokenized-by=home2.net, SIP/2.0/UDP  
icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP  
scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP  
icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP  
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]  
From:  
To:  
Call-ID:  
CSeq:  
Content-Length: 0
```

### 18. 100 Trying (I-CSCF2b to S-CSCF2) - see example in table 17.5.2-18

I-CSCF2b forwards a 100 Trying provisional response back to S-CSCF2.

**Table 17.5.2-18: 100 Trying (I-CSCF2b to S-CSCF2)**

```
SIP/2.0 100 Trying  
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP  
icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP icscf1_s.home1.net;branch=312a32.1,  
SIP/2.0/UDP token(SIP/2.0/UDP scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP  
icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP  
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]  
From:  
To:  
Call-ID:  
CSeq:  
Content-Length: 0
```

### 19. INVITE (P-CSCF2 to UE2) - see example in table 17.5.2-19

P-CSCF determines the UE address from the value of the Request-URI (which was previously returned by P-CSCF as a contact header value in the registration procedure), and forwards the INVITE request to the UE.

**Table 17.5.2-19: INVITE (P-CSCF2 to UE2)**

```
INVITE sip:[5555::eee:fff:aaa:bbb]user2_public1@home2.net SIP/2.0  
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1+branch=token2  
Max-Forwards: 62
```

```

P-Media-Authorization: 0020000100100101706366322e78797a2e6e6574000c020133315331343363233
Supported:
Remote-Party-ID:
RPID-Privacy:
Anonymity:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=

```

**P-Media-Authorization:** A P-CSCF generated authorization token. This particular example shows a Policy-Element generated by "pcf2.xyz.net" with credentials "31S14623".

**20. 100 Trying (UE2 to P-CSCF2) - see example in table 17.5.2-20**

UE2 sends a 100 Trying provisional response back to P-CSCF2.

**Table 17.5.2-20: 100 Trying (UE2 to P-CSCF2)**

```

SIP/2.0 100 Trying
Via: pcf2.visited2.net;branch=token2 SIP/2.0/UDP
From:
To:
Call-ID:
CSeq:

```

**21. 183 Session Progress (UE2 to P-CSCF2) - see example in table 17.5.2-21**

The media stream capabilities of the destination are returned along the signalling path, in a 183 Session Progress provisional response.

**Table 17.5.2-21: 183 Session Progress response (UE2 to P-CSCF2)**

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcf2.visited2.net;branch=361k21.1;branch=token2
Remote-Party-ID: "John Smith" <tel:+1-212-555-2222>;privacy=off
RPID-Privacy: privacy=off;party=called
Anonymity: Off

```

```

Require: 100rel
From:
To: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost; tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: sip:[5555::eee:fff:aaa:bbb]
RSeq: 9022
Content-Disposition: precondition
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907166275 0
m=audio 6544 RTP/AVP 97
b=AS:25.4 3
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=qos:mandatory sendrecv confirm
m=video 7544 RTP/AVP 31
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:31 H261/90000
a=qos:mandatory sendrecv confirm

```

## 22. Authorize QoS Resources

P-CSCF2 authorizes the resources necessary for this new media.

### 23. 183 Session Progress (P-CSCF2 to I-CSCF2b) - see example in table 17.5.2-23

P-CSCF forwards the 183 Session Progress response to P-CSCF.

**Table 17.5.2-23: 183 Session Progress (P-CSCF2 to I-CSCF2b)**

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP icscf2_p.home2.net;branch=556u87.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf2.home2.net;branch=764z87.1), SIP/2.0/UDP
icscf2_s.home2.net;branch=871y12.1)@home2.net;tokenized-by=home2.net, SIP/2.0/UDP
icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]

Remote-Party-ID:
RPID-Privacy:
Anonymity:
Require:
From:
To:
Call-ID:
CSeq:
Require:
Contact: sip:pcscf2.visited2.net, sip:[5555::eee:fff:aaa:bbb]
RSeq:
Content-Disposition:
Content-Type:

```



```

Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=

```

**24. 183 Session Progress (I-CSCF2b to S-CSCF2) - see example in table 17.5.2-24**

I-CSCF2b forwards the 183 Session Progress response to S-CSCF2.

**Table 17.5.2-24: 183 Session Progress (I-CSCF2b to S-CSCF2)**

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP icscf1_s.home1.net;branch=312a32.1,
    SIP/2.0/UDP token(SIP/2.0/UDP scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]

Remote-Party-ID:
RPID-Privacy:
Anonymity+
Require+
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Disposition:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=

```

```
a=  
a=  
a=  
a=  
a=  
a=  
a=
```

### 25. 183 Session Progress (S-CSCF2 to I-CSCF2a) - see example in table 17.5.2-25

S-CSCF2 forwards the 183 Session Progress response to I-CSCF2a.

**Table 17.5.2-25: 183 Session Progress (S-CSCF2 to I-CSCF2a)**

```
SIP/2.0 183 Session Progress  
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP  
    icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP  
    scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP  
    icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP  
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]  
Remote-Party-ID: "John Smith" <tel:+1-212-555-2222>;privacy=off;screen=yes  
RPID-Privacy: privacy=off;screen=yes  
Anonymity:  
Require:  
From:  
To:  
Call-ID:  
CSeq:  
Require:  
Contact:  
RSeq:  
Content-Disposition:  
Content-Type:  
Content-Length:  
  
v=  
o=  
s=  
c=  
t=  
m=  
b=  
a=  
a=  
a=  
a=  
a=  
a=  
a=  
m=  
b=  
a=  
a=  
a=  
a=  
a=  
a=  
a=
```

### 26. 183 Session Progress (I-CSCF2a to I-CSCF1b) - see example in table 17.5.2-26

I-CSCF2a forwards the 183 Session Progress response to I-CSCF1b.

**Table 17.5.2-26: 183 Session Progress (I-CSCF2a to I-CSCF1b)**

```
SIP/2.0 183 Session Progress  
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP  
    scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
```

```

        icscf1_p.home1.net;branch=351g45.1}@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
        pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Remote-Party-ID:
RPID-Privacy:
Anonymity:
Require:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Disposition:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=

```

**27. 183 Session Progress (I-CSCF1b to S-CSCF1) - see example in table 17.5.2-27**

I-CSCF1b forwards the 183 Session Progress response to the S-CSCF1.

**Table 17.5.2-27: 183 Session Progress (I-CSCF1b to S-CSCF1)**

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
        icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
        SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Remote-Party-ID:
RPID-Privacy:
Anonymity:
Require:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Disposition:
Content-Type:
Content-Length:

v=
o=
s=

```

```

c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=

```

**28. 183 Session Progress (S-CSCF1 to I-CSCF1a) - see example in table 17.5.2-28**

S-CSCF1 forwards the 183 Session Progress response to I-CSCF1a.

**Table 17.5.2-28: 183 Session Progress (S-CSCF1 to I-CSCF1a)**

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP icscf1_p.homel.net;branch=351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Remote-Party-ID:
RPID-Privacy:
Anonymity:
Require:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Disposition:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=

```

**29. 183 Session Progress (I-CSCF1a to P-CSCF1) - see example in table 17.5.2-29**

I-CSCF1a forwards the 183 Session Progress response to P-CSCF1.

**Table 17.5.2-29: 183 Session Progress (I-CSCF1a to P-CSCF1)**

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Remote-Party-ID:
RPID-Privacy:
Anonymity+
Require+
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Disposition+
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
```

**30. Authorize QoS Resources**

P-CSCF1 authorizes the resources necessary for this new media.

**31. 183 Session Progress (P-CSCF1 to UE1) - see example in table 17.5.2-31**

P-CSCF1 forwards the 183 Session Progress response to the originating endpoint.

**Table 17.5.2-31: 183 Session Progress (P-CSCF1 to UE1)**

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
P-Media-Authorization: 0020000100100101706366312e78797a2e6e6574000c02013942563330373400
Remote-Party-ID:
RPID-Privacy:
Anonymity:
Require:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Disposition:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=

```

**P-Media-Authorization:** A P-CSCF generated authorization token. This particular example shows a Policy-Element generated by "pcf1.xyz.net" with credentials "9BV3074".

**32. PRACK (UE1 to P-CSCF1) - see example in table 17.5.2-32**

The originator decides the final set of media streams for this media addition, and sends the Final SDP to P-CSCF1.

**Table 17.5.2-32: PRACK (UE1 to P-CSCF1)**

```

PRACK sip:[5555::eee:fff:aaa:bbb]token3@pcscf1.visited1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 70
From: "Alien Blaster" <sip:B36(SHA-1(user1_public1@home1.net;time=36123E5B;seq=72))@localhost>;tag=171828
To: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost; tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 133 PRACK
Require: precondition
Rack: 9022 132 Invite
Content-Type: application/sdp
Content-Length: (...)

v=0

```

```

o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907166275 0
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=qos:mandatory-sendrecv
m=video 9544 RTP/AVP 31
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:31 H261/90000
a=qos:mandatory-sendrecv

```

### 33. PRACK (P-CSCF1 to I-CSCF1a) - see example in table 17.5.2-33

The PRACK request is forwarded through this I-CSCF to the S-CSCF.

**Table 17.5.2-33: PRACK (P-CSCF1 to I-CSCF1a)**

```

PRACK sip:[5555::eee:fff:aaa:bbb]@icscf1_p.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 69
Route: sip:icscf1_p.home1.net;lr, sip:token(sip:332b23.1@scscf1.home1.net;lr),
      sip:312a32.1@icscf1_s.home1.net;lr,@home1.net;tokenized-by=home1.net,
      sip:871y12.1@icscf2_s.home2.net;lr, sip:token(sip:764z87.1@scscf2.home2.net;lr),
      sip:556u87.1@icscf2_p.home2.net;lr,@home2.net;tokenized-by=home2.net,
      sip:361k21.1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Require:
Rack:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=

```

### 34. PRACK (I-CSCF1a to S-CSCF1) - see example in table 17.5.2-34

The PRACK request is forwarded through this I-CSCF1a to the S-CSCF1.

**Table 17.5.2-34: PRACK (I-CSCF1a to S-CSCF1)**

```
PRACK sip:[5555::eee:fff:aaa:bbb]sescf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
Route: sip:scscf1.home1.net;lr, sip:312a32-1@icscf1_s.home1.net;lr,
    sip:871y12-1@icscf2_s.home2.net;lr, sip:token(sip:764z87-1@scscf2.home2.net;lr),
    sip:556u87-1@icscf2_p.home2.net;lr}@home2.net;tokenized-by=home2.net,
    sip:361k21-1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Require:
Rack:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
```

**35. PRACK (S-CSCF1 to I-CSCF1b) - see example in table 17.5.2-35**

S-CSCF1 forwards the PRACK request to I-CSCF1b.

**Table 17.5.2-35: PRACK (S-CSCF1 to I-CSCF1b)**

```
PRACK sip:[5555::eee:fff:aaa:bbb]icscf1_s.home1.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 67
Route: sip:icscf1_s.home1.net;lr, sip:871y12-1@icscf2_s.home2.net;lr,
    sip:token(sip:764z87-1@scscf2.home2.net;lr),
    sip:556u87-1@icscf2_p.home2.net;lr}@home2.net;tokenized-by=home2.net,
    sip:361k21-1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Require:
Rack:
Content-Type:
Content-Length:

v=
```



```

o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=

```

**36. PRACK (I-CSCF1b to I-CSCF2a) - see example in table 17.5.2-36**

I-CSCF1b forwards the PRACK request to I-CSCF2a.

**Table 17.5.2-36: PRACK (I-CSCF1b to I-CSCF2a)**

```

PRACK sip:[5555::eee:fff:aaa:bbb]@icscf2_s.home2.net SIP/2.0
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 66
Route: sip:icscf2_s.home2.net;lr, sip:token(sip:764z87.1@scscf2.home2.net;lr),
sip:556u87.1@icscf2_p.home2.net;lr)@home2.net;tokenized-by=home2.net,
sip:361k21.1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Require:
Rack:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=

```

**37. PRACK (I-CSCF2a to S-CSCF2) - see example in table 17.5.2-37**

I-CSCF2a forwards the PRACK request to S-CSCF2.

**Table 17.5.2-37: PRACK (I-CSCF2a to S-CSCF2)**

```
PRACK sip:[5555::eee:fff:aaa:bbb]sescf2.home2.net SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
    scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 65
Route: sip:scscf2.home2.net;lr, sip:556u87.1@icscf2_p.home2.net;lr,
    sip:361k21.1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Require:
Rack:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
```

**38. PRACK (S-CSCF2 to I-CSCF2b) - see example in table 17.5.2-38**

S-CSCF2 forwards the PRACK request to I-CSCF2b.

**Table 17.5.2-38: PRACK (S-CSCF2 to I-CSCF2b)**

```
PRACK sip:[5555::eee:fff:aaa:bbb] SIP/2.0iescf2_p.home2.net
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP icscf1_s.home1.net;branch=312a32.1,
    SIP/2.0/UDP token(SIP/2.0/UDP scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 64
Route: sip:icscf2_p.home2.net;lr, sip:361k21.1@pcscf2.visited2.net;lr,
    sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Require:
Rack:
Content-Type:
Content-Length:
```



#### 40. PRACK (P-CSCF2 to UE2) - see example in table 17.5.2-40

P-CSCF2 and forwards the PRACK request to the UE2.

**Table 17.5.2-40: PRACK (P-CSCF2 to UE2)**

```
PRACK sip:[5555::eee:fff:aaa:bbb]user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1;branch=token3
Max-Forwards: 62
From:
To:
Call-ID:
Cseq:
Require:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
```

#### 41. 200 OK (UE2 to P-CSCF2) - see example in table 17.5.2-41

UE2 acknowledges the PRACK request with a 200 OK response.

**Table 17.5.2-41: 200 OK (UE2 to P-CSCF2)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1;branch=token3
From:
To:
Call-ID:
CSeq: 133 Prack
Content-Type: application/sdp
Content-Length: (...)#

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907166275 0
m=audio 6544 RTP/AVP 97
b=AS:25.4 3
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
```





```

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=

```

**46. 200 OK (I-CSCF2a to I-CSCF1b) - see example in table 17.5.2-46**

I-CSCF2a forwards the 200 OK response to I-CSCF1b.

**Table 17.5.2-46: 200 OK (I-CSCF2a to I-CSCF1b)**

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=

```

**47. 200 OK (I-CSCF1b to S-CSCF1) - see example in table 17.5.2-47**

S-CSCF forwards the 200 OK response to S-CSCF1.

**Table 17.5.2-47: 200 OK (I-CSCF1b to S-CSCF1)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
```

**48. 200 OK (S-CSCF1 to I-CSCF1a) - see example in table 17.5.2-48**

S-CSCF1 forwards the 200 OK response to I-CSCF1a.

**Table 17.5.2-48: 200 OK (S-CSCF1 to I-CSCF1a)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length: 0

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
```







53. COMETUPDATE (P-CSCF1 to I-CSCF1a) - see example in table 17.5.2-53

The COMETUPDATE request is forwarded through this P-CSCF1 to the I-CSCF1a.

**Table 17.5.2-53: COMETUPDATE (P-CSCF1 to I-CSCF1a)**

```
COMETUPDATE sip:[5555::eee:fff:aaa:bbb]icscf1_p.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 69
Route: sip:icscf1_p.home1.net;lr, sip:token(sip:332b23.1@scscf1.home1.net;lr),
      sip:312a32.1@icscf1_s.home1.net;lr}@home1.net;tokenized-by=home1.net,
      sip:871y12.1@icscf2_s.home2.net;lr, sip:token(sip:764z87.1@scscf2.home2.net;lr),
      sip:556u87.1@icscf2_p.home2.net;lr}@home2.net;tokenized-by=home2.net,
      sip:361k21.1@pcscf2.visited2.net, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
```

54. UPDATECOMET (I-CSCF1a to S-CSCF1) - see example in table 17.5.2-54

The UPDATECOMET request is forwarded through this I-CSCF1a to the S-CSCF1.

**Table 17.5.2-54: UPDATECOMET (I-CSCF1a to S-CSCF1)**

```
COMETUPDATE sip:[5555::eee:fff:aaa:bbb]scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
      pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
Route: sip:scscf1.home1.net;lr, sip:312a32.1@icscf1_s.home1.net;lr,
      sip:871y12.1@icscf2_s.home2.net;lr, sip:token(sip:764z87.1@scscf2.home2.net;lr),
      sip:556u87.1@icscf2_p.home2.net;lr}@home2.net;tokenized-by=home2.net,
      sip:361k21.1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

v=
o=
```



**Table 17.5.2-56: COMETUPDATE (I-CSCF1b to I-CSCF2a)**

```

COMETUPDATE sip:[5555::eee:fff:aaa:bbb]icscf2_s.home2.net SIP/2.0
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
    scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Route: sip:icscf2_s.home2.net;lr, sip:token(sip:764z87.1@scscf2.home2.net;lr),
    sip:556u87.1@icscf2_p.home2.net;lr)@home2.net;tokenized-by=home2.net,
    sip:361k21.1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=

```

**57. COMETUPDATE (I-CSCF2a to S-CSCF2) - see example in table 17.5.2-57**

I-CSCF2a forwards the COMETUPDATE request to S-CSCF2.

**Table 17.5.2-57: COMETUPDATE (I-CSCF2a to S-CSCF2)**

```

COMETUPDATE sip:[5555::eee:fff:aaa:bbb]scscf2.home2.net SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
    scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 65
Route: sip:scscf2.home2.net;lr, sip:556u87.1@icscf2_p.home2.net;lr,
    sip:361k21.1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=

```



**Table 17.5.2-59: COMETUPDATE (I-CSCF2b to P-CSCF2)**

```
COMETUPDATE sip:sip:pcscf2.visited2.net, sip:[5555::eee:fff:aaa:bbb] SIP/2.0
Via: SIP/2.0/UDP icscf2_p.home2.net;branch=556u87.1, SIP/2.0/UDP token(SIP/2.0/UDP
      scscf2.home2.net;branch=764z87.1), SIP/2.0/UDP
      icscf2_s.home2.net;branch=871y12.1)@home2.net;tokenized-by=home2.net, SIP/2.0/UDP
      icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
      scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
      icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
      pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 63
Route: user2_public1@home2.net;ip:pcscf2.visited2.net;lr
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
```

**60. COMETUPDATE (P-CSCF2 to UE2) - see example in table 17.5.2-60**

P-CSCF2 determines the UE address from the value of the Request-URI and forwards the COMETUPDATE request to the UE2.

**Table 17.5.2-60: COMETUPDATE (P-CSCF2 to UE2)**

```
COMETUPDATE sip:[5555::eee:fff:aaa:bbb]user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1;branch=token4
Max-Forwards: 62
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
```

```
a=  
a=  
m=  
b=  
a=  
a=  
a=  
a=  
a=  
a=
```

**61. 200 OK (UE2 to P-CSCF2) - see example in table 17.5.2-61**

UE2 acknowledges the ~~COMET~~UPDATE request with a 200 OK response.

**Table 17.5.2-61: 200 OK (UE2 to P-CSCF2)**

```
SIP/2.0 200 OK  
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1;branch=token4  
From:  
To:  
Call-ID:  
CSeq: 134 CometUPDATE  
Content-Length: 0
```

**62. 200 OK (P-CSCF2 to I-CSCF2b) - see example in table 17.5.2-62**

**Table 17.5.2-62: 200 OK (P-CSCF2 to I-CSCF2b)**

```
SIP/2.0 200 OK  
Via: SIP/2.0/UDP icscf2_p.home2.net;branch=556u87.1, SIP/2.0/UDP token(SIP/2.0/UDP  
scscf2.home2.net;branch=764z87.1), SIP/2.0/UDP  
icscf2_s.home2.net;branch=871y12.1)@home2.net;tokenized-by=home2.net, SIP/2.0/UDP  
icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP  
scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP  
icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP  
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]  
From:  
To:  
Call-ID:  
CSeq:  
Content-Length:
```

**63. 200 OK (I-CSCF2b to S-CSCF2) - see example in table 17.5.2-63**

**Table 17.5.2-63: 200 OK (I-CSCF2b to S-CSCF2)**

```
SIP/2.0 200 OK  
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP  
icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP icscf1_s.home1.net;branch=312a32.1,  
SIP/2.0/UDP token(SIP/2.0/UDP scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP  
icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP  
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]  
From:  
To:  
Call-ID:  
CSeq:  
Content-Length:
```

**64. 200 OK (S-CSCF2 to I-CSCF2a) - see example in table 17.5.2-64**

**Table 17.5.2-64: 200 OK (S-CSCF2 to I-CSCF2a)**



```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
    scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length:
```

**65. 200 OK (I-CSCF2a to I-CSCF1b) - see example in table 17.5.2-65**

**Table 17.5.2-65: 200 OK (I-CSCF2a to I-CSCF1b)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
    scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length:
```

**66. 200 OK (I-CSCF1b to S-CSCF1) - see example in table 17.5.2-66**

**Table 17.5.2-66: 200 OK (I-CSCF1b to S-CSCF1)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length:
```

**67. 200 OK (S-CSCF1 to I-CSCF1a) - see example in table 17.5.2-67**

**Table 17.5.2-67: 200 OK (S-CSCF1 to I-CSCF1a)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

**68. 200 OK (I-CSCF1a to P-CSCF1) - see example in table 17.5.2-68**

**Table 17.5.2-68: 200 OK (I-CSCF1a to P-CSCF1)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
```

```
To:
Call-ID:
CSeq:
Content-Length:
```

#### 69. 200 OK (P-CSCF1 to UE1) - see example in table 17.5.2-69

**Table 17.5.2-69: 200 OK (P-CSCF1 to UE1)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length:
```

#### 70. Alerting

UE2 may optionally delay the session establishment in order to alert the subscriber to the incoming additional media.

#### 71. 180 Ringing (UE2 to P-CSCF2) - see example in table 17.5.2-71

If UE2 performs alerting, it sends a ringing indication to the originator via the signalling path. The response is sent first to P-CSCF2.

**Table 17.5.2-71: 180 Ringing (UE2 to P-CSCF2)**

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1;branch=token2
Require: 100rel
From:
To:
Call-ID:
CSeq: 132 INVITE
Contact: sip:[5555::eee:fff:aaa:bbb]
Rseq: 9023
Content-Length: 0
```

#### 72. 180 Ringing (P-CSCF2 to I-CSCF2b) - see example in table 17.5.2-72

**Table 17.5.2-72: 180 Ringing (P-CSCF2 to I-CSCF2b)**

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP icscf2_p.home2.net;branch=556u87.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf2.home2.net;branch=764z87.1), SIP/2.0/UDP
icscf2_s.home2.net;branch=871y12.1)@home2.net;tokenized-by=home2.net, SIP/2.0/UDP
icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Require:
From:
To:
Call-ID:
CSeq:
Contact:
Rseq:
Content-Length:
```

**73. 180 Ringing (I-CSCF2b to S-CSCF2) - see example in table 17.5.2-73**

**Table 17.5.2-73: 180 Ringing (I-CSCF2b to S-CSCF2)**

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP icscf1_s.home1.net;branch=312a32.1,
    SIP/2.0/UDP token(SIP/2.0/UDP scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Require:
From:
To:
Call-ID:
CSeq:
Contact:
Rseq:
Content-Length:
```

**74. Service Control**

— ~~S-CSCF2 performs whatever service control is appropriate for this ringing.~~

**745. 180 Ringing (S-CSCF2 to I-CSCF2a) - see example in table 17.5.2-745**

**Table 17.5.2-745: 180 Ringing (S-CSCF2 to I-CSCF2a)**

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
    scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Require:
From:
To:
Call-ID:
CSeq:
Contact:
Rseq:
Content-Length:
```

**756. 180 Ringing (I-CSCF2a to I-CSCF1b) - see example in table 17.5.2-756**

**Table 17.5.2-756: 180 Ringing (I-CSCF2a to I-CSCF1b)**

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
    scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Require:
From:
To:
Call-ID:
CSeq:
Rseq:
Contact:
Content-Length:
```

**767. 180 Ringing (I-CSCF1b to S-CSCF1) - see example in table 17.5.2-767**

**Table 17.5.2-767: 180 Ringing (I-CSCF1b to S-CSCF1)**

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Require:
From:
To:
Call-ID:
CSeq:
Contact:
Rseq:
Content-Length:
```

**78. Service Control**

— ~~S-CSCF1 performs whatever service control is appropriate for this ringing.~~

~~779. 180 Ringing (S-CSCF1 to I-CSCF1a) - see example in table 17.5.2-779~~

**Table 17.5.2-779: 180 Ringing (S-CSCF1 to I-CSCF1a)**

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Require:
From:
To:
Call-ID:
CSeq:
Contact:
Rseq:
Content-Length: 0
```

~~7880. 180 Ringing (I-CSCF1a to P-CSCF1) - see example in table 17.5.2-7880~~

**Table 17.5.2-7880: 180 Ringing (I-CSCF1a to P-CSCF1)**

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Require:
From:
To:
Call-ID:
CSeq:
Contact:
Rseq:
Content-Length:
```

~~7984. 180 Ringing (P-CSCF1 to UE1) - see example in table 17.5.2-7984~~

**Table 17.5.2-7984: 180 Ringing (P-CSCF1 to UE1)**

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Require:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

**802. Ringback**

UE#1 indicates to the originator that the media addition is being delayed due to alerting. Typically this involves playing a ringback sequence.

**813. PRACK (UE1 to P-CSCF1) - see example in table 17.5.2-813**

The originator sends ACK to the terminator for the Ringing response.

**Table 17.5.2-813: PRACK (UE1 to P-CSCF1)**

```
PRACK sip:[5555::eee:fff:aaa:bbb] SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 70
From: "Alien Blaster" <sip:B36(SHA-1(user1_public1@home1.net;time=36123E5B;seq=72))@localhost>;tag=171828
To: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost; tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 135 PRACK
Rack: 9023 132 Invite
Content-Length:
```

**824. PRACK (P-CSCF1 to I-CSCF1a) - see example in table 17.5.2-824**

The PRACK request is forwarded through this I-CSCF1 to the S-CSCF.

**Table 17.5.2-824: PRACK (P-CSCF1 to I-CSCF1a)**

```
PRACK sip:[5555::eee:fff:aaa:bbb]@pcscf1_p.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 69
Route: sip:icscf1_p.home1.net;lr, sip:token(sip:332b23-1@scscf1.home1.net;lr),
      sip:312a32-1@icscf1_s.home1.net;lr, sip:token(sip:764z87-1@scscf2.home2.net;lr),
      sip:871y12-1@icscf2_s.home2.net;lr, sip:token(sip:764z87-1@scscf2.home2.net;lr),
      sip:556u87-1@icscf2_p.home2.net;lr, sip:token(sip:764z87-1@scscf2.home2.net;lr),
      sip:361k21-1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Rack:
Content-Length:
```

**835. PRACK (I-CSCF1a to S-CSCF1) - see example in table 17.5.2-835**

The PRACK request is forwarded through this I-CSCF1a to the S-CSCF1.

**Table 17.5.2-835: PRACK (I-CSCF1a to S-CSCF1)**

```
PRACK sip:[5555::eee:fff:aaa:bbb]@scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
      pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
Route: sip:scscf1.home1.net;lr, sip:312a32-1@icscf1_s.home1.net;lr,
      sip:871y12-1@icscf2_s.home2.net;lr, sip:token(sip:764z87-1@scscf2.home2.net;lr),
      sip:556u87-1@icscf2_p.home2.net;lr, sip:token(sip:764z87-1@scscf2.home2.net;lr),
      sip:361k21-1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
```

Rack:  
Content-Length:

**846. PRACK (S-CSCF1 to I-CSCF1b) - see example in table 17.5.2-846**

S-CSCF1 forwards the PRACK request to I-CSCF1b.

**Table 17.5.2-846: PRACK (S-CSCF1 to I-CSCF1b)**

```
PRACK sip:[5555::eee:fff:aaa:bbb]icscf1_s.home1.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 67
Route: sip:icscf1_s.home1.net;lr, sip:871y12.1@icscf2_s.home2.net;lr,
    sip:token(sip:764z87.1@scscf2.home2.net;lr),
    sip:556u87.1@icscf2_p.home2.net;lr}@home2.net;tokenized-by=home2.net,
    sip:361k21.1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Rack:
Content-Length:
```

**857. PRACK (I-CSCF1b to I-CSCF2a) - see example in table 17.5.2-857**

I-CSCF1b forwards the PRACK request to I-CSCF2a.

**Table 17.5.2-857: PRACK (I-CSCF1b to I-CSCF2a)**

```
PRACK sip:[5555::eee:fff:aaa:bbb]icscf2_s.home2.net SIP/2.0
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
    scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1}@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 66
Route: sip:icscf2_s.home2.net;lr, sip:token(sip:764z87.1@scscf2.home2.net;lr),
    sip:556u87.1@icscf2_p.home2.net;lr}@home2.net;tokenized-by=home2.net,
    sip:361k21.1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Rack:
Content-Length:
```

**868. PRACK (I-CSCF2a to S-CSCF2) - see example in table 17.5.2-868**

I-CSCF2a forwards the PRACK request to S-CSCF2.

**Table 17.5.2-868: PRACK (I-CSCF2a to S-CSCF2)**

```
PRACK sip:[5555::eee:fff:aaa:bbb]scscf2.home2.net SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
    scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1}@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 65
Route: sip:scscf2.home2.net;lr, sip:556u87.1@icscf2_p.home2.net;lr,
    sip:361k21.1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
```

```
To:
Call-ID:
Cseq:
Rack:
Content-Length:
```

**879. PRACK (S-CSCF2 to I-CSCF2b) - see example in table 17.5.2-879**

S-CSCF2 forwards the PRACK request to I-CSCF2b.

**Table 17.5.2-879: PRACK (S-CSCF2 to I-CSCF2b)**

```
PRACK sip:[5555::eee:fff:aaa:bbb] SIP/2.0icscf2_p.home2.net
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP icscf1_s.home1.net;branch=312a32.1,
    SIP/2.0/UDP token(SIP/2.0/UDP scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    pcsf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 64
Route: sip:icscf2_p.home2.net;lr, sip:361k21.1@pcscf2.visited2.net;lr,
sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Rack:
Content-Length:
```

**8890. PRACK (I-CSCF2b to P-CSCF2) - see example in table 17.5.2-8890**

I-CSCF2b forwards the PRACK request to P-CSCF2.

**Table 17.5.2-8890: PRACK (I-CSCF2b to P-CSCF2)**

```
PRACK sip:sip:pcscf2.visited2.net, sip:[5555::eee:fff:aaa:bbb] SIP/2.0
Via: SIP/2.0/UDP icscf2_p.home2.net;branch=556u87.1, SIP/2.0/UDP token(SIP/2.0/UDP
    scscf2.home2.net;branch=764z87.1), SIP/2.0/UDP
    icscf2_s.home2.net;branch=871y12.1)@home2.net;tokenized-by=home2.net, SIP/2.0/UDP
    icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
    scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    pcsf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 63
Route: sip:pcscf2.visited2.net;lruser2_public1@home2.net
From:
To:
Call-ID:
Cseq:
Rack:
Content-Length:
```

**8994. PRACK (P-CSCF2 to UE2) - see example in table 17.5.2-8994**

P-CSCF2 and forwards the PRACK request to the UE2.

**Table 17.5.2-8994: PRACK (P-CSCF2 to UE2)**

```
PRACK sip:[5555::eee:fff:aaa:bbb]user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1+branch=token6
Max-Forwards: 62
From:
To:
Call-ID:
```

```
Cseq:
Content-Length:
```

**902. 200 OK (UE2 to P-CSCF2) - see example in table 17.5.2-902**

UE2 acknowledges the PRACK request with a 200 OK response.

**Table 17.5.2-902: 200 OK (UE2 to P-CSCF2)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1+branch=token6
From:
To:
Call-ID:
CSeq: 135 PRACK
Content-Length: 0
```

**913. 200 OK (P-CSCF2 to I-CSCF2b) - see example in table 17.5.2-913**

P-CSCF2 forwards the 200 OK response to I-CSCF2b.

**Table 17.5.2-913: 200 OK (P-CSCF2 to I-CSCF2b)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_p.home2.net;branch=556u87.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf2.home2.net;branch=764z87.1+), SIP/2.0/UDP
icscf2_s.home2.net;branch=871y12.1)@home2.net;tokenized-by=home2.net, SIP/2.0/UDP
icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf1.home1.net;branch=332b23.1+), SIP/2.0/UDP
icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length:
```

**924. 200 OK (I-CSCF2b to S-CSCF2) - see example in table 17.5.2-924**

I-CSCF2b forwards the 200 OK response to S-CSCF2.

**Table 17.5.2-924: 200 OK (I-CSCF2b to S-CSCF2)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP
icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP icscf1_s.home1.net;branch=312a32.1,
SIP/2.0/UDP token(SIP/2.0/UDP scscf1.home1.net;branch=332b23.1+), SIP/2.0/UDP
icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length:
```

**935. 200 OK (S-CSCF2 to I-CSCF2a) - see example in table 17.5.2-935**

S-CSCF2 forwards the 200 OK response to I-CSCF2a.



**Table 17.5.2-935: 200 OK (S-CSCF2 to I-CSCF2a)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
    scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length:
```

**946. 200 OK (I-CSCF2a to I-CSCF1b) - see example in table 17.5.2-946**

I-CSCF2a forwards the 200 OK response to I-CSCF1b.

**Table 17.5.2-946: 200 OK (I-CSCF2a to I-CSCF1b)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
    scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length:
```

**957. 200 OK (I-CSCF1b to S-CSCF1) - see example in table 17.5.2-957**

S-CSCF forwards the 200 OK response to S-CSCF1.

**Table 17.5.2-957: 200 OK (I-CSCF1b to S-CSCF1)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length:
```

**968. 200 OK (S-CSCF1 to I-CSCF1a) - see example in table 17.5.2-968**

S-CSCF1 forwards the 200 OK response to I-CSCF1a.

**Table 17.5.2-968: 200 OK (S-CSCF1 to I-CSCF1a)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

**979. 200 OK (I-CSCF1a to P-CSCF1) - see example in table 17.5.2-979**

I-CSCF1 forwards the 200 OK response to P-CSCF1.

**Table 17.5.2-979: 200 OK (I-CSCF1a to P-CSCF1)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length:
```

**98100. 200 OK (P-CSCF1 to UE1) - see example in table 17.5.2-98100**

P-CSCF1 forwards the 200 OK response to the originator.

**Table 17.5.2-98100: 200 OK (P-CSCF1 to UE1)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length:
```

**99101. 200 OK (UE2 to P-CSCF2) - see example in table 17.5.2-99101**

UE acknowledges the Invite request with a 200 OK response.

**Table 17.5.2-99101: 200 OK (UE2 to P-CSCF2)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1;branch=token2
From:
To:
Call-ID:
CSeq: 132 INVITE
Contact: sip:[5555::eee:fff:aaa:bbb]
Content-Type: application/sdp
Content-length: 0<...>

v=0
o=2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=
e=IN IP6 5555::aaa:bbb:ccc:ddd
t=907166275 0
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=qos:success sendrecv
m=video 9544 RTP/AVP 31
b=AS:54.6
a=rtpmap:31 H261/90000
a=qos:success sendrecv
```

**1002. Approval of QoS Commitment**

P-CSCF2 approves the commitment of the QoS resources for this additional media.

1013. UE2 can start the new media

1024. 200 OK (P-CSCF2 to I-CSCF2b) - see example in table 17.5.2-1024

P-CSCF2 forwards the 200 OK response to I-CSCF2b.

**Table 17.5.2-1024: 200 OK (P-CSCF2 to I-CSCF2b)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_p.home2.net;branch=556u87.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf2.home2.net;branch=764z87.1), SIP/2.0/UDP
icscf2_s.home2.net;branch=871y12.1)@home2.net;tokenized-by=home2.net, SIP/2.0/UDP
icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Contact:
Content-Type:
Content-length:

v=
o=
s=
e=
t=
m=
b=
a=
a=
a=
m=
b=
a=
a=
```

1035. 200 OK (I-CSCF2b to S-CSCF2) - see example in table 17.5.2-1035

I-CSCF2b forwards the 200 OK response to S-CSCF2.

**Table 17.5.2-1035: 200 OK (I-CSCF2b to S-CSCF2)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP icscf1_s.home1.net;branch=312a32.1,
    SIP/2.0/UDP token(SIP/2.0/UDP scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Contact:
Content-Type:
Content-length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
m=
b=
a=
a=
```

**106. Service Control**

~~S-CSCF2 performs whatever service control is required for the session completion.~~

**1047. 200 OK (S-CSCF2 to I-CSCF2a) - see example in table 17.5.2-1047**

S-CSCF2 forwards the 200 OK response to I-CSCF2a.

**Table 17.5.2-1047: 200 OK (S-CSCF2 to I-CSCF2a)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
    scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
    icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Contact:
Content-Type:
Content-length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
m=
b=
```

```
a=  
a=
```

**1058. 200 OK (I-CSCF2a to I-CSCF1b) - see example in table 17.5.2-1058**

S-CSCF forwards the 200 OK response to I-CSCF1b.

**Table 17.5.2-1058: 200 OK (I-CSCF2a to I-CSCF1b)**

```
SIP/2.0 200 OK  
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP  
scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP  
icscf1_p.home1.net;branch=351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP  
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]  
From:  
To:  
Call-ID:  
CSeq:  
Contact:  
Content-Type:  
Content-length:  
  
v=  
o=  
s=  
e=  
t=  
m=  
b=  
a=  
a=  
a=  
m=  
b=  
a=  
a=
```

**1069. 200 OK (I-CSCF1b to S-CSCF1) - see example in table 17.5.2-1069**

I-CSCF1b forwards the 200 OK response to S-CSCF1.

**Table 17.5.2-1069: 200 OK (I-CSCF2a to I-CSCF1b)**

```
SIP/2.0 200 OK  
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP  
icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,  
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]  
From:  
To:  
Call-ID:  
Contact:  
Content-Type:  
Content-length:  
  
v=  
o=  
s=  
e=  
t=  
m=  
b=  
a=  
a=  
a=  
m=  
b=
```

a=  
a=

~~110. Service Control~~

~~— S-CSCF1 performs whatever service control is required for the session completion.~~

~~10744. 200 OK (S-CSCF1 to I-CSCF1a) - see example in table 17.5.2-10744~~

S-CSCF1 forwards the 200 OK response to I-CSCF1a.

**Table 17.5.2-10744: 200 OK (S-CSCF1 to I-CSCF1a)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Contact:
Content-Type:
Content-length:
```

v=  
o=  
s=  
e=  
t=  
m=  
b=  
a=  
a=  
a=  
m=  
b=  
a=  
a=

~~10842. 200 OK (I-CSCF1a to P-CSCF1) - see example in table 17.5.2-10842~~

I-CSCF1a forwards the 200 OK response to P-CSCF1.

**Table 17.5.2-10842: 200 OK (I-CSCF1a to P-CSCF1)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Contact:
Content-Type:
Content-length:
```

v=  
o=  
s=  
c=  
t=  
m=  
b=  
a=  
a=  
a=

```
m=  
b=  
a=  
a=
```

### 10913. Approval of QoS Commit

P-CSCF1 approves the commitment of the QoS resources for this additional media.

### 1104. 200 OK (P-CSCF1 to UE1) - see example in table 17.5.2-1104

S-CSCF forwards the 200 OK response to UE1.

**Table 17.5.2-1104: 200 OK (P-CSCF1 to UE1)**

```
SIP/2.0 200 OK  
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]  
From:  
To:  
Call-ID:  
CSeq:  
Contact:  
Content-Type:  
Content-length:
```

```
v=  
o=  
s=  
e=  
t=  
m=  
b=  
a=  
a=  
a=  
m=  
b=  
a=  
a=
```

### 1115. UE1 can start new media

### 1126. ACK (UE1 to P-CSCF1) - see example in table 17.5.2-1126

UE1 responds to the final response with a SIP ACK request, which is passed to the destination via the signalling path. The request is sent first to P-CSCF1.

**Table 17.5.2-1126: ACK (UE1 to P-CSCF1)**

```
ACK sip: [5555::eee:fff:aaa:bbb] SIP/2.0  
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]  
Max-Forwards: 70  
From: "Alien Blaster" <sip:B36(SHA-  
1(user1_public1@home1.net;time=36123E5B;seq=72))@localhost>;tag=171828  
To: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost; tag=314159  
Call-ID: cb03a0s09a2sdfglkj490333  
Cseq: 132 ACK  
Content-Length: 0(…)
```

### 1137. ACK (P-CSCF1 to I-CSCF1a) - see example in table 17.5.2-1137

**Table 17.5.2-1137: ACK (P-CSCF1 to I-CSCF1a)**

```
ACK sip:[5555::eee:fff:aaa:bbb]icscf1_p.home1.net SIP/2.0
Via: SIP/2.0/UDP pcsf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 69
Route: sip:icscf1_p.home1.net;lr, sip:token(sip:332b23.1@scscf1.home1.net;lr),
      sip:312a32.1@icscf1_s.home1.net;lr}@home1.net;tokenized-by=home1.net,
      sip:871y12.1@icscf2_s.home2.net;lr, sip:token(sip:764z87.1@scscf2.home2.net;lr),
      sip:556u87.1@icscf2_p.home2.net;lr}@home2.net;tokenized-by=home2.net,
      sip:361k21.1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Content-length: 0
```

**1148. ACK (I-CSCF1a to S-CSCF1) - see example in table 17.5.2-1148**

**Table 17.5.2-1148: ACK (I-CSCF1a to S-CSCF1)**

```
ACK sip:[5555::eee:fff:aaa:bbb]scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP
      pcsf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
Route: sip:scscf1.home1.net;lr, sip:312a32.1@icscf1_s.home1.net;lr,
      sip:871y12.1@icscf2_s.home2.net;lr, sip:token(sip:764z87.1@scscf2.home2.net;lr),
      sip:556u87.1@icscf2_p.home2.net;lr}@home2.net;tokenized-by=home2.net,
      sip:361k21.1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Content-Length:
```

**1159. ACK (S-CSCF1 to I-CSCF1b) - see example in table 17.5.2-1159**

**Table 17.5.2-1159: ACK (S-CSCF1 to I-CSCF1b)**

```
ACK sip:[5555::eee:fff:aaa:bbb]icscf1_s.home1.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
      icscf1_p.home1.net;branch=351g45.1, SIP/2.0/UDP pcsf1.visited1.net;branch=240f34.1,
      SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 67
Route: sip:icscf1_s.home1.net;lr, sip:871y12.1@icscf2_s.home2.net;lr,
      sip:token(sip:764z87.1@scscf2.home2.net;lr),
      sip:556u87.1@icscf2_p.home2.net;lr}@home2.net;tokenized-by=home2.net,
      sip:361k21.1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Content-Length:
```

**11620. ACK (I-CSCF1b to I-CSCF2a) - see example in table 17.5.2-11620**

**Table 17.5.2-11620: ACK (I-CSCF1b to I-CSCF2a)**

```
ACK sip:[5555::eee:fff:aaa:bbb]icscf2_s.home2.net SIP/2.0
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
      scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
      icscf1_p.home1.net;branch=351g45.1}@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
      pcsf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 66
```



```
Route: sip:icscf2_s.home2.net;lr, sip:token(sip:764z87.1@scscf2.home2.net;lr),
      sip:556u87.1@icscf2_p.home2.net;lr}@home2.net;tokenized-by=home2.net,
      sip:361k21.1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Content-Length:
```

**11721.ACK (I-CSCF2a to S-CSCF2) - see example in table 17.5.2-11721**

**Table 17.5.2-11721: ACK (I-CSCF2a to S-CSCF2)**

```
ACK sip:[5555::eee:fff:aaa:bbb]scscf2.home2.net SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP
     icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
     scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
     icscf1_p.home1.net;branch=351g45.1}@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
     pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 65
Route: sip:scscf2.home2.net;lr, sip:556u87.1@icscf2_p.home2.net;lr,
      sip:361k21.1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Content-Length:
```

**11822.ACK (S-CSCF2 to I-CSCF2b) - see example in table 17.5.2-11822**

**Table 17.5.2-11822: ACK (S-CSCF2 to I-CSCF2b)**

```
ACK sip:[5555::eee:fff:aaa:bbb] SIP/2.0icscf2_p.home2.net
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP
     icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP icscf1_s.home1.net;branch=312a32.1,
     SIP/2.0/UDP token(SIP/2.0/UDP scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
     icscf1_p.home1.net;branch=351g45.1}@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
     pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 64
Route: sip:icscf2_p.home2.net;lr, sip:361k21.1@pcscf2.visited2.net;lr,
      sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Content-Length:
```

**11923.ACK (I-CSCF2b to P-CSCF2) - see example in table 17.5.2-11923**

**Table 17.5.2-11923: ACK (S-CSCF2 to I-CSCF2b)**

```
ACK sip:sip:pcscf2.visited2.net, sip:[5555::eee:fff:aaa:bbb] SIP/2.0
Via: SIP/2.0/UDP icscf2_p.home2.net;branch=556u87.1, SIP/2.0/UDP token(SIP/2.0/UDP
     scscf2.home2.net;branch=764z87.1), SIP/2.0/UDP
     icscf2_s.home2.net;branch=871y12.1}@home2.net;tokenized-by=home2.net, SIP/2.0/UDP
     icscf1_s.home1.net;branch=312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
     scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
     icscf1_p.home1.net;branch=351g45.1}@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
     pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 63
Route: sip:pcscf2.visited2.net;lruser2_public1@home2.net
From:
To:
Call-ID:
```

Cseq:  
Content-Length:

**1204. ACK (P-CSCF2 to UE2) - see example in table 17.5.2-1204**

**Table 17.5.2-1204: ACK (P-CSCF2 to UE2)**

```
ACK sip:[5555::eee:fff:aaa:bbb]user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP pcsf2.visited2.net;branch=361k21.1;branch=token3
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:
```

CR-Form-v5

## CHANGE REQUEST

⌘ 24.228 CR 034 ⌘ rev 2 ⌘ Current version: 5.0.0 ⌘  
~~1~~

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

<b>Title:</b>	⌘ MO#1a failures update		
<b>Source:</b>	⌘ Nokia		
<b>Work item code:</b>	⌘ IMS-CCR	<b>Date:</b>	⌘ 04-05-2002
<b>Category:</b>	⌘ <b>F</b>	<b>Release:</b>	⌘ Rel-5
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	<b>F</b> (correction)		2 (GSM Phase 2)
	<b>A</b> (corresponds to a correction in an earlier release)		R96 (Release 1996)
	<b>B</b> (addition of feature),		R97 (Release 1997)
	<b>C</b> (functional modification of feature)		R98 (Release 1998)
	<b>D</b> (editorial modification)		R99 (Release 1999)
	Detailed explanations of the above categories can be found in 3GPP <a href="#">TR 21.900</a> .		REL-4 (Release 4)
			REL-5 (Release 5)

<b>Reason for change:</b>	⌘ MO#1a failures update based on CR#004
<b>Summary of change:</b>	⌘ See CR#004
<b>Consequences if not approved:</b>	⌘ 24.228 call flows are not standard compliant

<b>Clauses affected:</b>	⌘ 7.2.2.2, 7.2.2.3	
<b>Other specs affected:</b>	⌘ <input type="checkbox"/> Other core specifications	⌘
	<input type="checkbox"/> Test specifications	
	<input type="checkbox"/> O&M Specifications	
<b>Other comments:</b>	⌘	

### How to create CRs using this form:

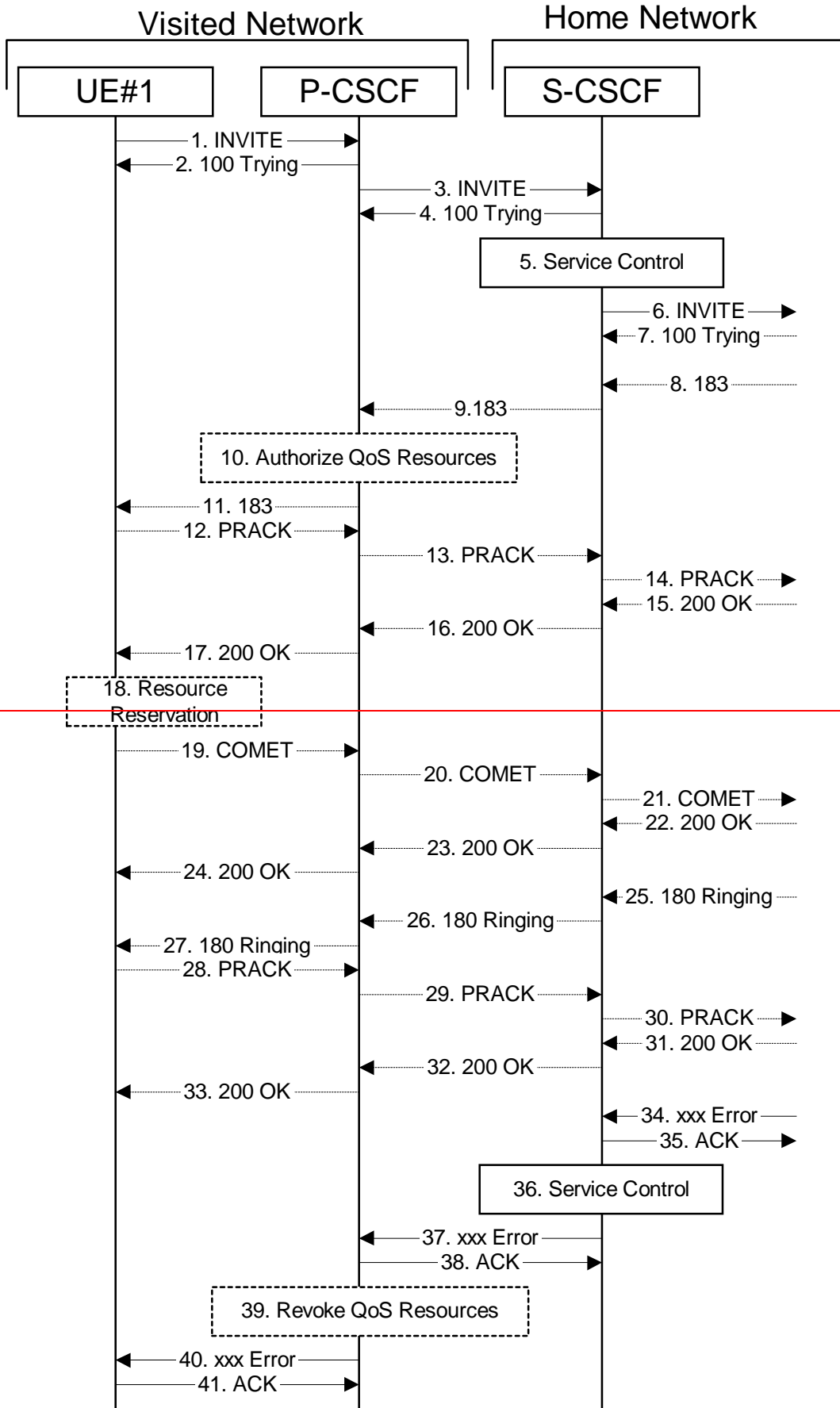
Comprehensive information and tips about how to create CRs can be found at: [http://www.3gpp.org/3G\\_Specs/CRs.htm](http://www.3gpp.org/3G_Specs/CRs.htm). Below is a brief summary:

- 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.

## 7.2.2.2 Failure in termination procedure

The roaming subscriber that initiated a session with procedure MO#1a had the attempt fail due to an error detected in the Termination procedure or in the S-CSCF-to-S-CSCF procedure. This could be due to, for example, destination busy (error code 486), destination service denied (error code 403), destination currently out of coverage (error code 480), or some other error.

Depending on the exact error that causes the session initiation failure, and when the error situation was detected, UE#1 could be at many different stages in the session establishment procedure. This is shown in figure 7.2.2.2-1, as optional messages 7-33 that may appear in this error procedure.



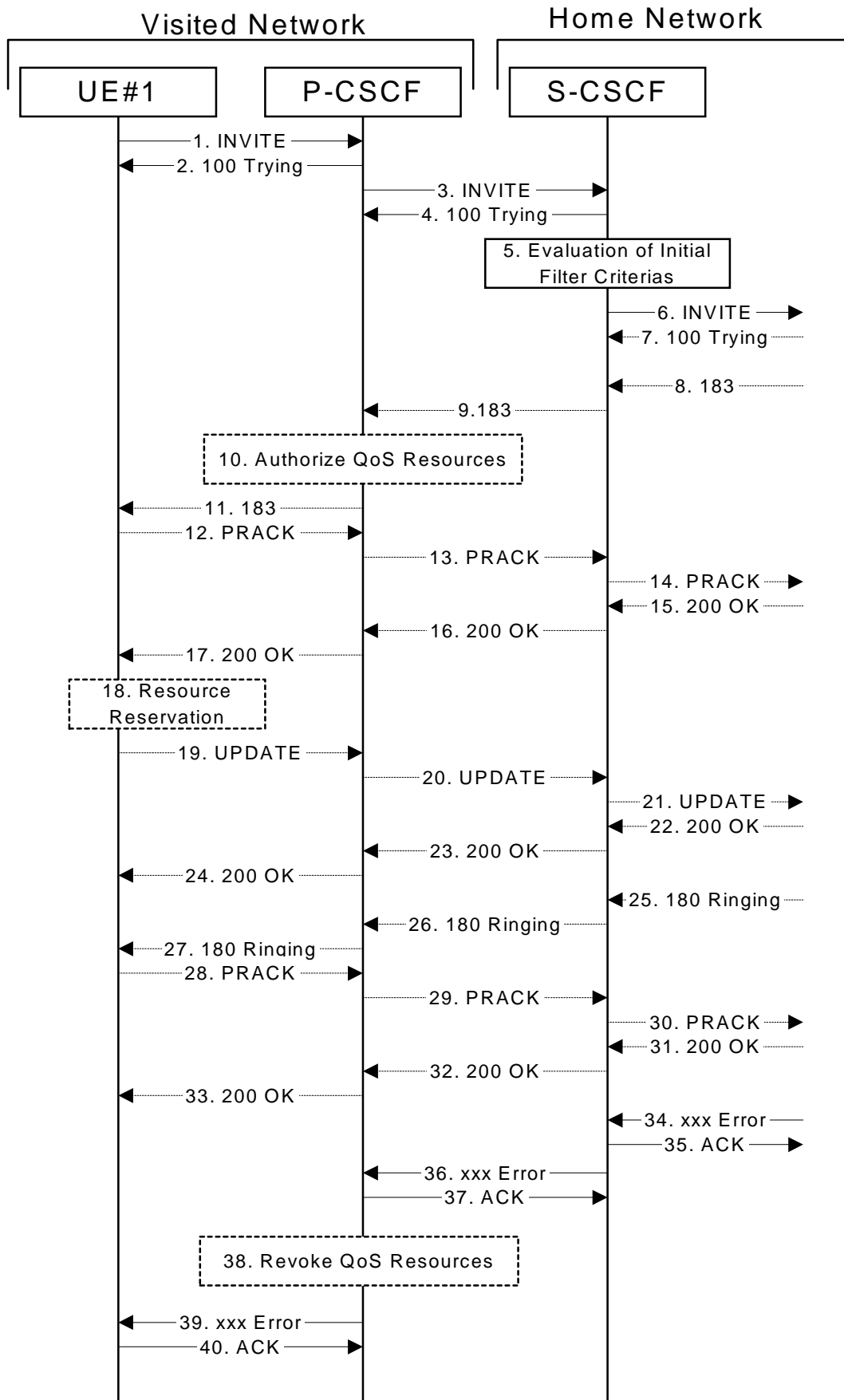


Figure 7.2.2.2-1: Failure in termination procedure

1-6. INVITE (UE to P-CSCF) et seq

UE#1 initiated a session, as described in subclause 7.2.2.1.

### 7-33.100 Trying (S-S to MO#1a) et seq

Session initiation possibly continued, prior to detection of a failure condition, as described in subclause 7.2.2.1.

### 34. xxx Error (S-S to MO#1a) – see example in table 7.2.2.2-34

The termination procedure detected some error situation, and returned a SIP error response.

NOTE 1: The error response may be, for example, "~~486 Busy~~", "~~403 Service Denied~~", "~~480 Temporarily Unavailable~~", or others. For this example, "~~486 Busy~~" is shown 486 (Busy Here)", "~~403 (Forbidden)~~", "~~480 (Temporarily Unavailable)~~", or others. For this example, "486 (Busy Here)" is shown.

**Table 7.2.2.2-34: 486 Busy Here (S-S to MO#1a)**

```
SIP/2.0 486 Busy Here
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From: "Alien Blaster" <sip:B36(SHA-1(user1_public1@home1.net; time=36123E5B;
seq=72))@localhost>; tag=171828
To: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost; tag=314159
Contact+ :sip:%5b5555%3a%3aeeee%3affff%3aaaa%3abbb%5d@pcscf2.home2.net
Call-ID:
CSeq: 127 INVITE
Retry-After:Retry-After: 3600
Content-Length: 0
```

### 35. ACK (MO#1a to S-S) - see example in table 7.2.2.2-35

Upon receive the 486 response from the S-S procedure, S-CSCF sends ACK.

**Table 7.2.2.2-35: ACK (MO#1a to S-S)**

```
ACK sip:+1-212-555-2222@home2.net;user=phone SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
From:
To:
Call-ID:
CSeq: 127 ACK
Content-Length: 0
```

### ~~36. Service Control~~

~~—S-CSCF performs whatever service control is appropriate for this failed session attempt.~~

### ~~37.6.~~ xxx Error (S-CSCF to P-CSCF) – see example in table 7.2.2.2-~~37.6~~ (related to table 7.2.2.2-34)

The S-CSCF returned a SIP error response to P-CSCF.

NOTE 2: The error response may be, for example, "486 (Busy Here)", "403 (Forbidden)~~Service Denied~~", "480 (Temporarily Unavailable)", or others. For this example, "486 (Busy Here)" is shown.

**Table 7.2.2.2-~~37.6~~36: 486 Busy Here (S-CSCF to P-CSCF)**

```
SIP/2.0 486 Busy Here
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Contact+
Call-ID:
CSeq:
Retry-After:Retry-After: 3600
Content-Length: 0
```

### ~~38.37.~~ ACK (P-CSCF to S-CSCF) – see example in table 7.2.2.2-~~38.37~~

Upon receive the 486 response from the S-CSCF procedure, P-CSCF sends ACK.

**Table 7.2.2.2-~~3837~~: ACK (P-CSCF to S-CSCF)**

```
ACK sip:+1-212-555-2222@home2.net;user=phone SIP/2.0
Via: SIP/2.0/UDP pcscf1.homevisited1.net
Route: sip:scscf1.home1.net;lr
From:
To:
Call-ID:
CSeq: 127 ACK
Content-Length: 0
```

### ~~3938~~. Revoke QoS authorization

P-CSCF removes the QoS authorization, if any, for this session.

### ~~4039~~. xxx Error (P-CSCF to UE) – see example in table 7.2.2.2-~~4039~~ (related to table 7.2.2.2-~~3736~~)

The P-CSCF returned a SIP error response to UE.

NOTE 3: The error response may be, for example, "~~486 Busy~~", "~~403 Service Denied~~", "~~480 Temporarily Unavailable~~", or others. For this example, "~~486 Busy~~" is shown 486 (Busy Here)", "403 (Forbidden)", "480 (Temporarily Unavailable)", or others. For this example, "486 (Busy Here)" is shown.

**Table 7.2.2.2-40: 486 Busy Here (P-CSCF to UE)**

```
SIP/2.0 486 Busy Here
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Contact-
Call-ID:
CSeq:
Retry-After:Retry-After: 3600
Content-Length: 0
```

### ~~4140~~. ACK (P-CSCF to S-CSCF) – see example in table 7.2.2.2-~~4140~~

Upon receive the 486 response from the P-CSCF, UE sends ACK.

**Table 7.2.2.2-~~4140~~: ACK (UE to P-CSCF)**

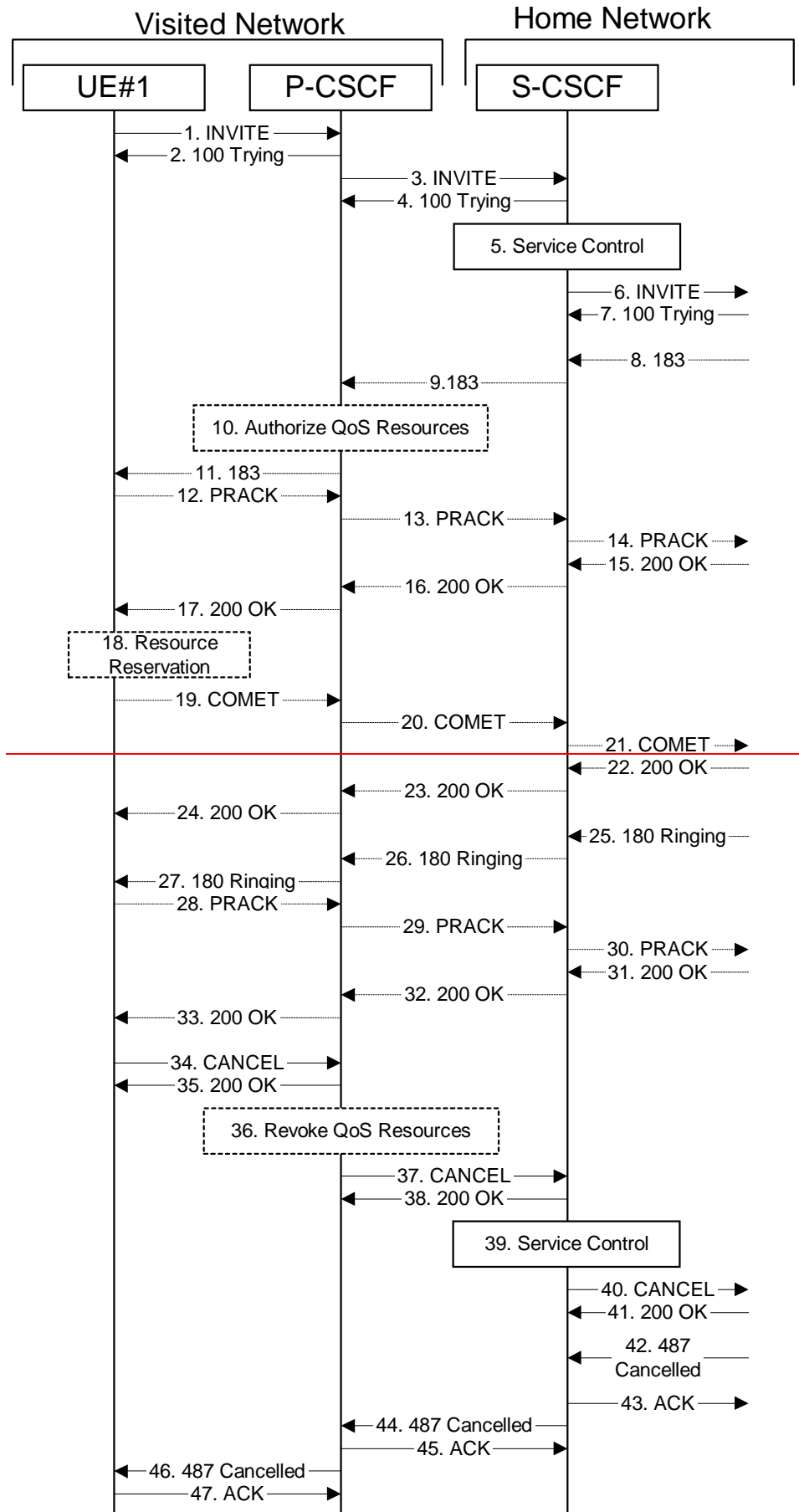
```
ACK sip:+1-212-555-2222@home2.net;user=phone SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq: 127 ACK
Content-Length: 0
```

## 7.2.2.3 Session abandoned, or resource failure

The roaming subscriber that initiated a session with procedure MO#1a either abandoned the attempt, or was unable to obtain the resources necessary for the session. The signalling flow for this error handling is shown in figure 7.2.2.3-1.

If the session is aborted due to failure to obtain resources, it will occur at step #18 in the signalling flow; steps 19-33 (marked as optional) will not be present. If the session is abandoned due to user command, it can happen at any point between steps 8-33.





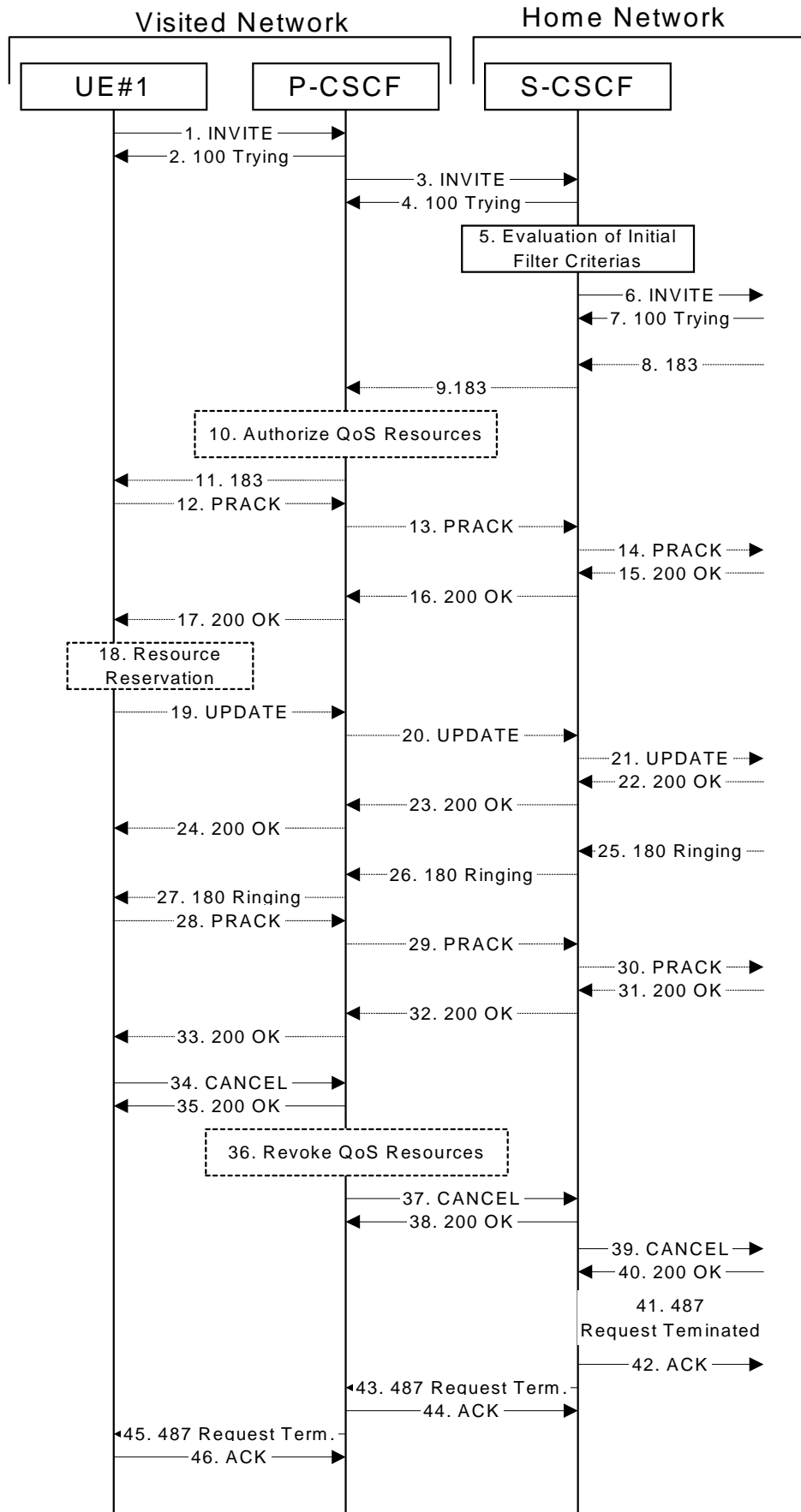


Figure 7.2.2.3-1: Session abandoned or resource failure

### 1-7. INVITE (UE to P-CSCF) et seq

UE#1 initiated a session, as described in subclause 7.2.2.1.

### 8-33.183 Session Progress (S-S to MO#1a) et seq

Session initiation possibly continued, prior to detection of a failure condition, as described in subclause 7.2.2.1.

### 34. CANCEL (UE to P-CSCF) – see example in table 7.2.2.3-34

The UE cancelled the original INVITE request.

**Table 7.2.2.3-34: CANCEL (UE to P-CSCF)**

```
CANCEL sip:[5555::eee:fff:aaa:bbb] sip:+1-212-555-2222@home2.net;user=phone SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From: "Alien Blaster" <sip:B36(SHA-1(user1_public1@home1.net; time=36123E5B;
seq=72))@localhost>;tag=171828
To: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 127 CANCEL
Contact: sip:[5555::aaa:bbb:ccc:ddd]
Content-Length: 0
```

### 35. 200 OK (P-CSCF to UE) – see example in table 7.2.2.3-35

Upon receive the CANCEL request from the UE, P-CSCF sends 200 OK.

**Table 7.2.2.3-35: 200 OK (P-CSCF to UE)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

### 36. Revoke QoS authorization

P-CSCF removes the QoS authorization, if any, for this session.

### 37. CANCEL (P-CSCF to S-CSCF) – see example in table 7.2.2.3-37

The P-CSCF forwards the CANCEL request to S-CSCF.

**Table 7.2.2.3-37: CANCEL (P-CSCF to S-CSCF) (related to table 7.2.2.3-34)**

```
CANCEL sip:[5555::eee:fff:aaa:bbb] sip:sescf1.home1.net SIP/2.0
Via: SIP/2.0/UDP pcsf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Route: sip:+1-212-555-2222@home1.net;user=phone
Route: sip:scscf1.home1.net;lr
From:
To:
Call-ID:
Cseq:
Contact: sip:%5b5555%3a%3aaa%3abb%3acc%3add%5d@pscf1.visited1.net
Content-Length:
```

~~Editor's Note: Need to check whether P-CSCF should modify the Contact: header in the CANCEL.~~

~~Editor's Note: Need to check whether P-CSCF should insert a Route: header in the CANCEL~~

### 38. 200 OK (S-CSCF to P-CSCF) – see example in table 7.2.2.3-38

Upon receiving the CANCEL request from the P-CSCF, S-CSCF sends 200 OK.

**Table 7.2.2.3-38: 200 OK (S-CSCF to P-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

**39. Service Control**

~~—S-CSCF performs whatever service control is appropriate for this failed session attempt.~~

**39.40. CANCEL (S-CSCF to S-S) – see example in table 7.2.2.3-4039 (related to table 7.2.2.3-37)**

The S-CSCF forwards the CANCEL request to the appropriate S-CSCF-to-S-CSCF procedure.

**Table 7.2.2.3-4039: CANCEL (S-CSCF to S-S)**

```
CANCEL sip:[5555::eee:fff:aaa:bbb] sip:+1-212-555-2222@home1.net;user=phone SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
Cseq:
Contact:
Content-Length:
```

~~Editor's Note: Need to check whether a proxy inserts a Record Route in a CANCEL request.~~

**41. 200 OK (S-S to S-CSCF) – see example in table 7.2.2.3-401**

Upon receive the CANCEL request from the S-CSCF, the next hop (whatever it is) sends 200 OK.

**Table 7.2.2.3-404: 200 OK (S-S to S-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

**42. ~~487-Cancelled~~487 Request Terminated (S-S to MO#1a) – see example in table 7.2.2.3-412**

The termination procedure cancelled the request, and returned a SIP error response to the original INVITE request.

**Table 7.2.2.3-421: ~~487-Cancelled~~487 Request Terminated (S-S to MO#1a)**

```
SIP/2.0 487-Cancelled487 Request Terminated
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Contact: sip:%5b5555%3a%3aeec%3afff%3aaaa%3abbb%5d@pcscf2.home2.net
Call-ID:
CSeq: 127 INVITE
Content-Length: 0
```

**43. ACK (MO#1a to S-S) - see example in table 7.2.2.3-423**

Upon receive the 487 response from the S-S procedure, S-CSCF sends ACK.

**Table 7.2.2.3-432: ACK (MO#1a to S-S)**

```
ACK sip:+1-212-555-2222@home2.net;user=phone SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
From:
To:
Call-ID:
CSeq: 127 ACK
Content-Length: 0
```

**443. ~~487-Cancelled~~487 Request Terminated** (S-CSCF to P-CSCF) - see example in table 7.2.2.3-443 (related to table 7.2.2.3-412)

The S-CSCF returned the SIP error response to P-CSCF.

**Table 7.2.2.3-434: ~~487-Cancelled~~487 Request Terminated** (S-CSCF to P-CSCF)

```
SIP/2.0 487-Cancelled487 Request Terminated
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Contact+
Call-ID:
CSeq:
Content-Length: 0
```

**454. ACK (P-CSCF to S-CSCF)** - see example in table 7.2.2.3-445

Upon receive the 487 response from the S-CSCF, P-CSCF sends ACK.

**Table 7.2.2.3-445: ACK (P-CSCF to S-CSCF)**

```
ACK sip:+1-212-555-2222@home2.net;user=phone SIP/2.0
Via: SIP/2.0/UDP pcscf1.homevisited1.net
Route: sip:scscf1.home1.net;lr
From:
To:
Call-ID:
CSeq: 127 ACK
Content-Length: 0
```

**465. ~~487-Cancelled~~487 Request Terminated** (P-CSCF to UE) - see example in table 7.2.2.3-456 (related to table 7.2.2.3-443)

The P-CSCF returned a SIP error response to UE.

**Table 7.2.2.3-456: ~~487-Cancelled~~487 Request Terminated** (P-CSCF to UE)

```
SIP/2.0 487-Cancelled487 Request Terminated
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Contact+
Call-ID:
CSeq:
Retry-After:Retry-After: 3600
Content-Length: 0
```

**476. ACK (UE to P-CSCF) – see example in table 7.2.2.3-467**

Upon receive the 487 response from the P-CSCF, UE sends ACK.

**Table 7.2.2.3-476: ACK (UE to P-CSCF)**

```
ACK sip:[5555::eee:fff:aaa:bbb]sip:+1-212-555-2222@home2.net;user=phone SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq: 127 ACK
Content-Length: 0
```

CR-Form-v5	
<b>CHANGE REQUEST</b>	
⌘ <b>24.228 CR 035</b> ⌘ rev <b>2</b> ⌘	Current version: <b>5.0.0</b> ⌘
<div style="border: 1px solid black; display: inline-block; padding: 2px;"> <span style="color: red; font-weight: bold; font-size: 1.2em;">1-</span> </div>	

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

<b>Title:</b>	⌘ MT#1a failures update		
<b>Source:</b>	⌘ Nokia		
<b>Work item code:</b>	⌘ IMS-CCR	<b>Date:</b>	⌘ 04-05-2002
<b>Category:</b>	⌘ <b>F</b>	<b>Release:</b>	⌘ Rel-5
	Use <u>one</u> of the following categories: <b>F</b> (correction) <b>A</b> (corresponds to a correction in an earlier release) <b>B</b> (addition of feature), <b>C</b> (functional modification of feature) <b>D</b> (editorial modification) Detailed explanations of the above categories can be found in 3GPP <a href="#">TR 21.900</a> .		Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) REL-4 (Release 4) REL-5 (Release 5)

<b>Reason for change:</b>	⌘ MT#1a failures update based on CR#004
<b>Summary of change:</b>	⌘ See CR#004
<b>Consequences if not approved:</b>	⌘ 24.228 call flows are not standard compliant

<b>Clauses affected:</b>	⌘ 7.4.2.2, 7.4.2.3		
<b>Other specs affected:</b>	<input type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications	⌘	
<b>Other comments:</b>	⌘		

**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](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.

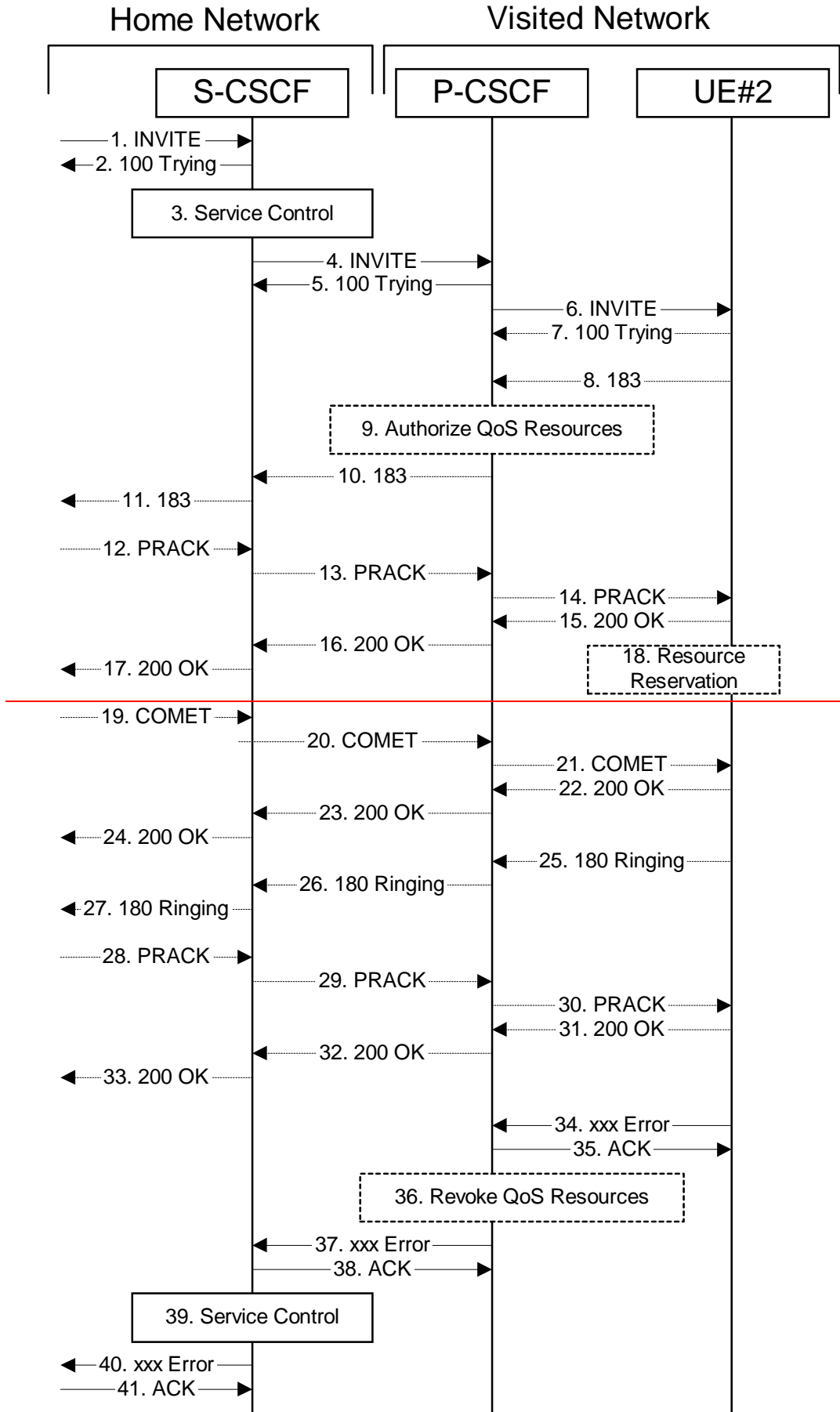
## 7.4.2.2 UE-detected failure/resource failure

The subscriber that initiated a session with one of the MO procedures had the attempt fail due to an error detected in the Termination procedure. This could be due to, for example, destination busy (error code 486), or some other error.

Depending on the exact error that causes the session initiation failure, and when the error situation was detected, MT#1a could be at many different stages in the session establishment procedure. This is shown in figure 7.4.2.2-1, as optional messages 7-33 that may appear in this error procedure.

This subclause also includes the procedures for the terminating UE to indicate a failure to allocate required resources for the session. This is detected in step #18 and reported with a 580-Precondition-Failure error response.





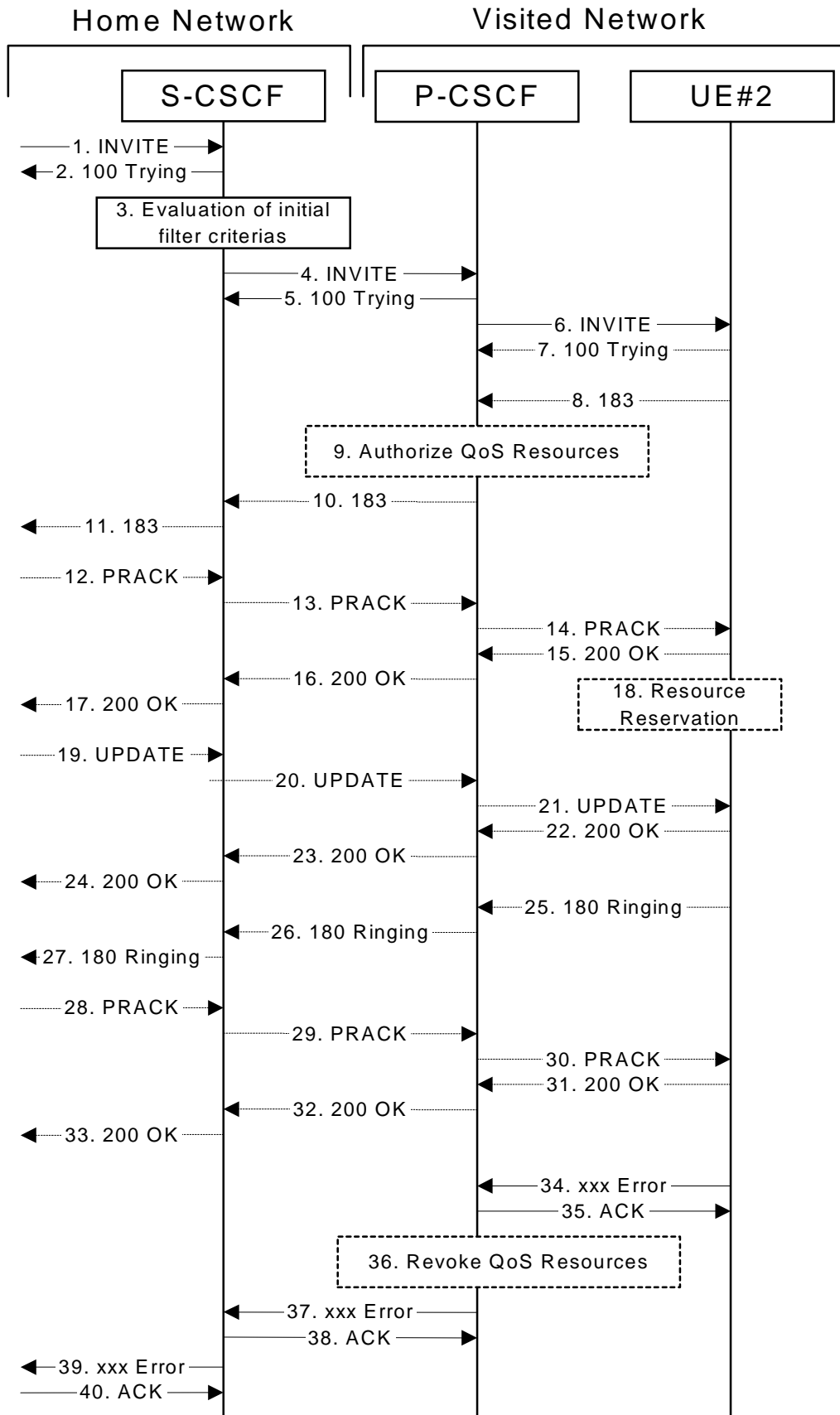


Figure 7.4.2.2-1: Failure in termination procedure

1-6. INVITE (S-S to S-CSCF) et seq

UE#1 initiated a session, as described in subclause 7.4.2.1.

### 7-33.100 Trying (S-CSCF to S-S) et seq

Session initiation possibly continued, prior to detection of a failure condition, as described in subclause 7.4.2.1.

### 34. xxx Error (UE to P-CSCF) – see example in table 7.4.2.2-34

The termination procedure detected some error situation, and returned a SIP error response.

NOTE 1: The error response may be, for example, "486 Busy", "403 Service Denied", "480 Temporarily Unavailable", "580 Precondition Failure", or others. For this example, "486 Busy" is shown.

**Table 7.4.2.2-34: 486 Busy Here (UE to P-CSCF)**

```
SIP/2.0 486 Busy Here
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1
From: "Alien Blaster" <sip:B36(SHA-1(user1_public1@home1.net; time=36123E5B; seq=72))@localhost>;
tag=171828
To: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost; tag=1234
Contact: sip:[5555::eee:fff:aaa:bbb]
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Retry-After: Retry-After: 3600
Content-Length: 0
```

### 35. ACK (P-CSCF to UE) – see example in table 7.4.2.2-35

Upon receive the 486 response from the UE, P-CSCF sends ACK.

**Table 7.4.2.2-35: ACK (P-CSCF to UE)**

```
ACK sip:+1-212-555-2222@home2.net;user=phone sip:[5555::eee:fff:aaa:bbb] SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1
From:
To:
Call-ID:
CSeq: 127 ACK
Content-Length: 0
```

### 36. Revoke QoS authorization

P-CSCF removes the QoS authorization, if any, for this session.

### 37. xxx Error (P-CSCF to S-CSCF) – see example in table 7.4.2.2-37 (related to table 7.4.2.2-34)

The P-CSCF returned a SIP error response to S-CSCF.

NOTE 2: The error response may be, for example, "~~486 Busy~~", "~~403 Service Denied~~", "~~480 Temporarily Unavailable~~", or others. For this example, "~~486 Busy~~" is shown: "486 (Busy Here)", "403 (Forbidden)", "480 (Temporarily Unavailable)", or others. For this example, "486 (Busy Here)" is shown.

**Table 7.4.2.2-37: 486 Busy Here (P-CSCF to S-CSCF)**

```
SIP/2.0 486 Busy Here
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Contact: sip:[5555::eee:fff:aaa:bbb]
Retry-After: Retry-After: 3600
Content-Length: 0
```

### 38. ACK (S-CSCF to P-CSCF) – see example in table 7.4.2.2-38

Upon receive the 486 response from the P-CSCF procedure, S-CSCF sends ACK.

**Table 7.4.2.2-38: ACK (S-CSCF to P-CSCF)**

```
ACK sip:+1-212-555-2222@home2.net;user=phone sip:pcscf2-visited2.net SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1
Route: sip:pcscf2.visited2.net;lr
From:
To:
Call-ID:
CSeq: 127 ACK
Content-Length: 0
```

### 39. Service Control

~~S-CSCF performs whatever service control is appropriate for this failed session attempt.~~

### 4039. xxx Error (S-CSCF to S-S) – see example in table 7.4.2.2-4039 (related to table 7.4.2.2-37)

The S-CSCF returned a SIP error response to the appropriate S-S procedure.

NOTE 3: The error response may be, for example, ~~"486 Busy", "403 Service Denied", "480 Temporarily Unavailable", or others. For this example, "486 Busy" is shown~~ "486 (Busy Here)", "403 (Forbidden)", "480 (Temporarily Unavailable)", or others. For this example, "486 (Busy Here)" is shown.

**Table 7.4.2.2-3940: 486 Busy Here (S-CSCF to S-S)**

```
SIP/2.0 486 Busy Here
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Contact:
Call-ID:
CSeq:
Retry-After: Retry-After: 3600
Content-Length: 0
```

### 4140. ACK (S-S to S-CSCF) – see example in table 7.4.2.2-4140

Upon receive the 486 response from the S-CSCF, the S-S procedure sends ACK.

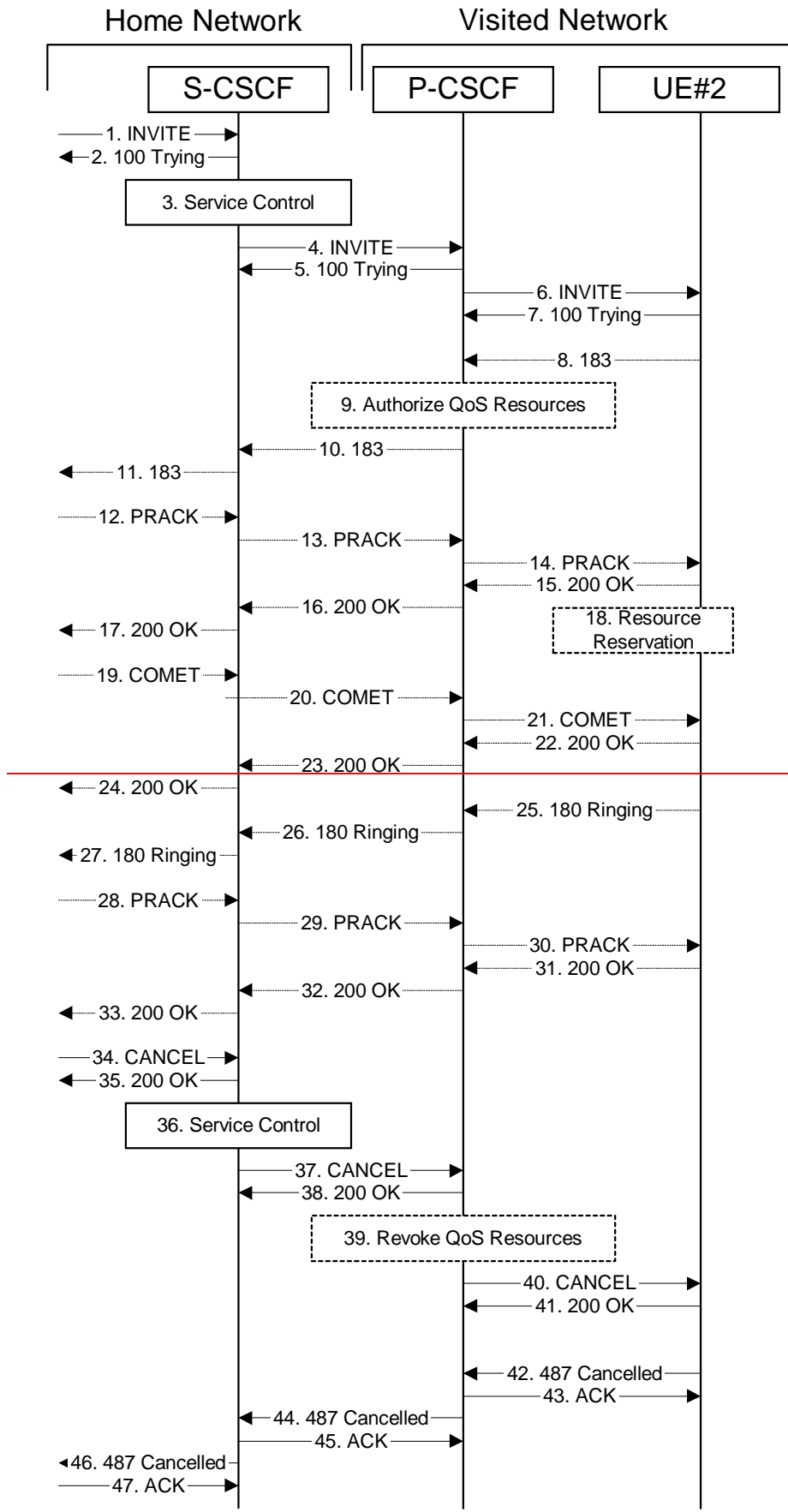
**Table 7.4.2.2-4140: ACK (S-S to S-CSCF)**

```
ACK sip:+1-212-555-2222@home2.net;user=phone sip:scscf2.home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
Route: sip:scscf2.home2.net;lr
From:
To:
Call-ID:
CSeq: 127 ACK
Content-Length: 0
```

## 7.4.2.3 Origination failure

After sending the initial INVITE for a multimedia session, the originating endpoint either abandoned the attempt or was unable to obtain the resources necessary for the session. The termination procedure is informed of this by a CANCEL request from the originator, which is shown in figure 7.4.2.3-1.

If the session is aborted due to failure to obtain resources by the originator, it will occur prior to step #19; steps 19-33 (marked as optional) will not be present. If the session is abandoned due to user command, it can happen at any point between steps 8-33.



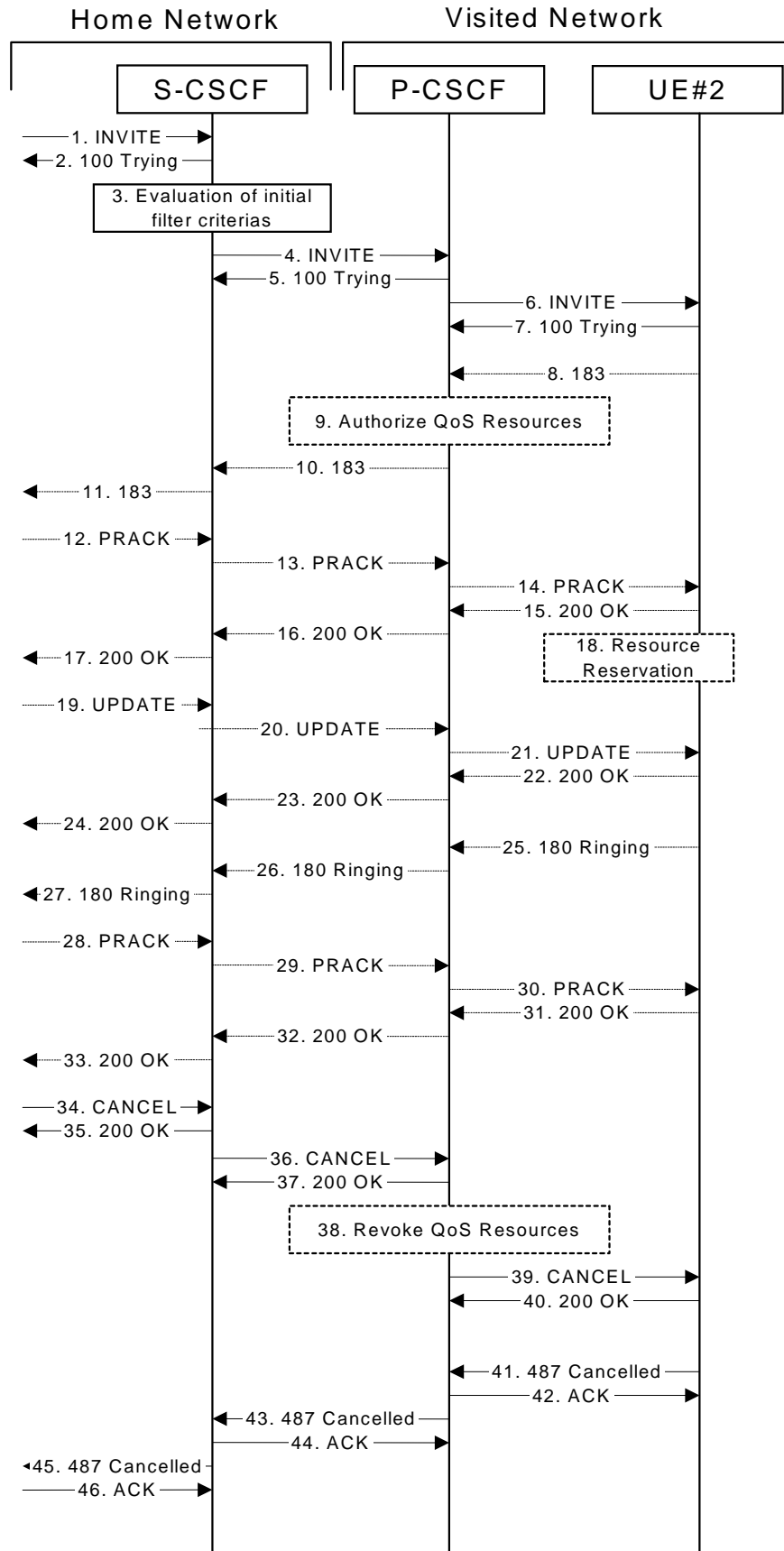


Figure 7.4.2.3-1: Failure in origination procedure

1-7. INVITE (S-S to S-CSCF) et seq

UE#1 initiated a session, as described in subclause 7.4.2.1.

### 8-33.183 **Session ProgressDP** (UE to S-CSCF) et seq

Session initiation possibly continued, prior to detection of a failure condition, as described in subclause 7.4.2.1.

### 34. CANCEL (S-S to S-CSCF) – see example in table 7.4.2.3-34

The originator, through the S-S procedure, cancelled the original INVITE request.

**Table 7.4.2.3-34: CANCEL (S-S to S-CSCF)**

```
CANCEL sip:[5555::eee:fff:aaa:bbb] sip:sescf2.home2.net-SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
Route: sip:scscf2.home2.net;lr
From: "Alien Blaster" <sip:B36(SHA-1(user1_public1@home1.net; time=36123E5B;
seq=72))@localhost>;tag=171828
To: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 CANCEL
Contact: sip:[5555::aaa:bbb:ccc:ddd]
Content-Length: 0
```

### 35. 200 OK (S-CSCF to S-S) – see example in table 7.4.2.3-35

Upon receive the CANCEL request from the S-S procedure, S-CSCF sends 200 OK.

**Table 7.4.2.3-35: 200 OK (S-CSCF to S-S)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

### 36. Service Control

~~— S-CSCF performs whatever service control is appropriate for this failed session attempt.~~

### ~~37~~36. CANCEL (S-CSCF to P-CSCF) – see example in table 7.4.2.3-~~37~~36

The S-CSCF forwards the CANCEL request to P-CSCF.

**Table 7.4.2.3-~~37~~36: CANCEL (S-CSCF to P-CSCF) (related to 7.4.2.3-34)**

```
CANCEL sip:[5555::eee:fff:aaa:bbb] sip:pscf2.visited2.net-SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1
Route: sip:[5555::eee:fff:aaa:bbb]
Route: sip:pscf2.visited2.net;lr
From:
To:
Call-ID:
Cseq:
Contact: sip:[5555::aaa:bbb:ccc:ddd]
Content-Length:
```

### ~~38~~37. 200 OK (P-CSCF to S-CSCF) – see example in table 7.4.2.3-~~38~~37

Upon receiving the CANCEL request from the S-CSCF, P-CSCF sends 200 OK.

**Table 7.4.2.3-3837: 200 OK (P-CSCF to S-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

**3938. Revoke QoS authorization**

P-CSCF removes the QoS authorization, if any, for this session.

**3940. CANCEL (P-CSCF to UE) – see example in table 7.4.2.3-3940 (related to table 7.4.2.3-376)**

The P-CSCF forwards the CANCEL request to the UE.

**Table 7.4.2.3-4039: CANCEL (P-CSCF to UE)**

```
CANCEL sip:[5555::eee:fff:aaa:bbb] SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1
From:
To:
Call-ID:
Cseq:
Contact:
Content-Length:
```

**4140. 200 OK (UE to P-CSCF) – see example in table 7.4.2.3-4140**

Upon receive the CANCEL request from the P-CSCF, the UE sends 200 OK.

**Table 7.4.2.3-4140: 200 OK (UE to P-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

**4241. ~~487 Cancelled~~487 Request Terminated (UE to P-CSCF) – see example in table 7.4.2.3-4241**

The termination procedure performed the cancel operation, and returned a SIP error response to the initial INVITE request.

**Table 7.4.2.3-4241: ~~487 Cancelled~~487 Request Terminated (UE to P-CSCF)**

```
SIP/2.0 487 Cancelled487 Request Terminated
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1
From: "Alien Blaster" <sip:B36(SHA-1(user1_public1@home1.net; time=36123E5B; seq=72))@localhost>;
tag=171828
To: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost; tag=1234
Contact: sip:[5555::eee:fff:aaa:bbb]
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 127 INVITE
Retry-After: Retry-After: 3600
Content-Length: 0
```

**4342. ACK (P-CSCF to UE) – see example in table 7.4.2.3-4342**

Upon receive the 487 response from the UE, P-CSCF sends ACK.



### Table 7.4.2.3-4342: ACK (P-CSCF to UE)

```
ACK sip:+1-212-555-2222@home2.net;user=phone sip:scscf2.home2.net SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1
From:
To:
Call-ID:
CSeq: 127 ACK
Content-Length: 0
```

### 4443. ~~487 Cancelled~~487 Request Terminated (P-CSCF to S-CSCF) – see example in table 7.4.2.3-4443 (related to table 7.4.2.3-4241)

The P-CSCF returns ~~the~~a SIP error response to S-CSCF.

### Table 7.4.2.3-4443: ~~487 Cancelled~~487 Request Terminated (P-CSCF to S-CSCF)

```
SIP/2.0 487 Cancelled487 Request Terminated
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Contact: sip:[5555::eee:fff:aaa:bbb]
Retry-After: Retry-After: 3600
Content-Length: 0
```

### 4544. ACK (S-CSCF to P-CSCF) – see example in table 7.4.2.3-4544

Upon receive the 487 response from the P-CSCF procedure, S-CSCF sends ACK.

### Table 7.4.2.3-4544: ACK (S-CSCF to P-CSCF)

```
ACK sip:+1-212-555-2222@home2.net;user=phone sip:pcscf2.visited2.net SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1
Route: sip:pcscf2.visited2.net;lr
From:
To:
Call-ID:
CSeq: 127 ACK
Content-Length: 0
```

### 4645. ~~487 Cancelled~~487 Request Terminated (S-CSCF to S-S) – see example in table 7.4.2.3-4645 (related to table 7.4.2.3-4443)

The S-CSCF returns ~~the~~a SIP error response to the appropriate S-S procedure.

### Table 7.4.2.3-4645: ~~487 Cancelled~~487 Request Terminated (S-CSCF to S-S)

```
SIP/2.0 487 Cancelled487 Request Terminated
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Contact:
Call-ID:
CSeq:
Retry-After: Retry-After: 3600
Content-Length: 0
```

### 4746. ACK (S-S to S-CSCF) – see example in table 7.4.2.3-4746

Upon receive the 487 response from the S-CSCF, the S-S procedure sends ACK.

**Table 7.4.2.3-4746: ACK (S-S to S-CSCF)**

```
ACK sip:+1-212-555-2222@home2.net;user=phone sip:scscf2.home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
Route: sip:scscf2.home2.net;lr
From:
To:
Call-ID:
CSeq: 127 ACK
Content-Length: 0
```