

CR-Form-v5

CHANGE REQUEST

⌘ **24.228 CR 61** ⌘ 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

Title:	⌘ MO#1b and MT#1b update		
Source:	⌘ Siemens, Nokia		
Work item code:	⌘ IMS-CCR	Date:	⌘ 16-05-2002
Category:	⌘ F	Release:	⌘ Rel-5
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)	2 (GSM Phase 2)	
	A (corresponds to a correction in an earlier release)	R96 (Release 1996)	
	B (addition of feature),	R97 (Release 1997)	
	C (functional modification of feature)	R98 (Release 1998)	
	D (editorial modification)	R99 (Release 1999)	
	Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		REL-4 (Release 4)
			REL-5 (Release 5)

Reason for change:	⌘ MO#1b and MT#1b, including failier causes update based on CR#004
Summary of change:	⌘ See CR#004
Consequences if not approved:	⌘ 24.228 call flows are not standard compliant

Clauses affected:	⌘ 17.2.2 and 17.4.2	
Other specs affected:	⌘ <input type="checkbox"/> Other core specifications	⌘
	<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. 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 Signalling flows for session initiation (hiding)

~~Editor's Note: The 200 OK responses for an INVITE should carry SDP. Future versions of this specification should correct these flows.~~

17.1 Introduction

See subclause 7.1.

17.2 Origination Procedures

17.2.1 Introduction

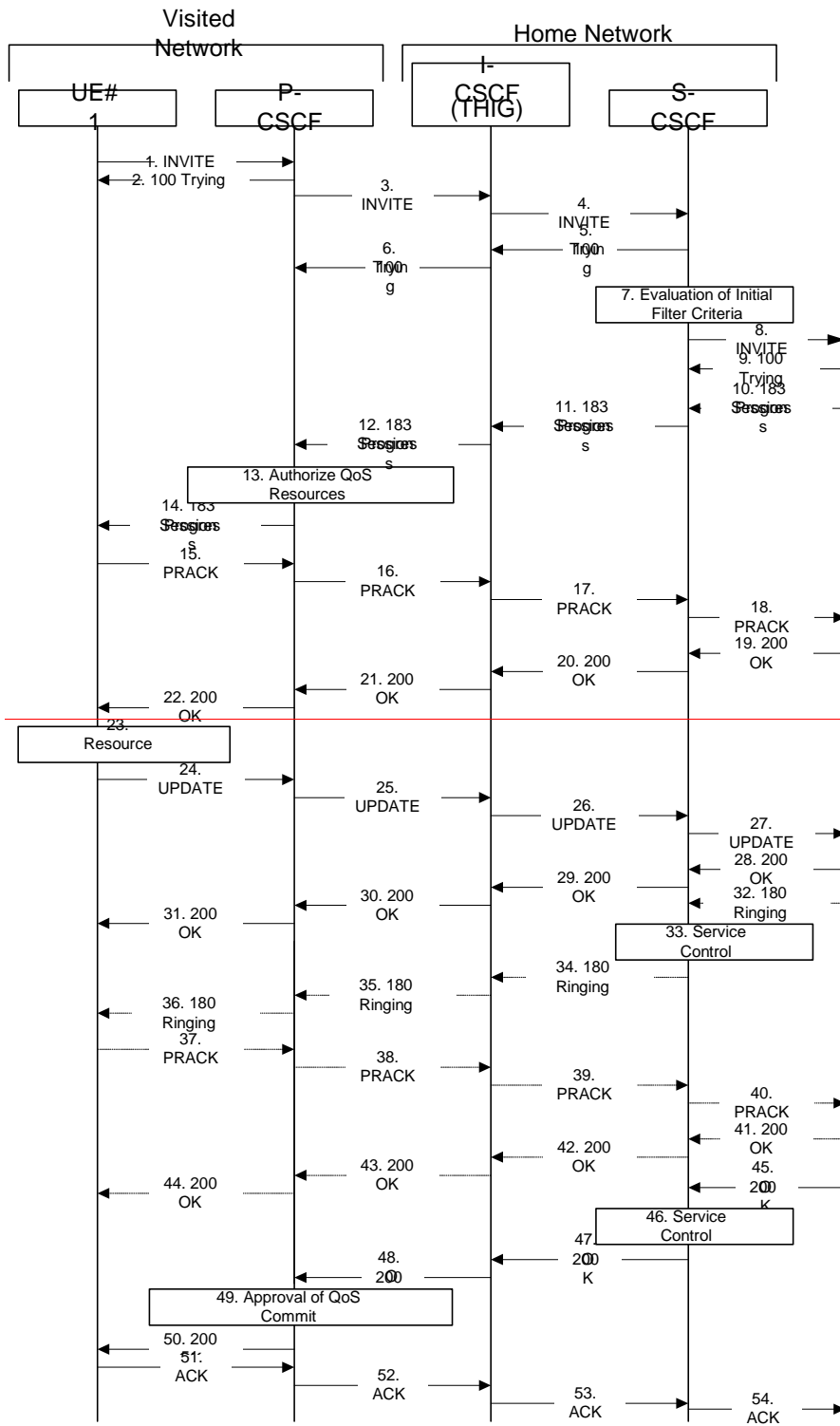
See subclause 7.2.1.

17.2.2 MO#1b

17.2.2.1 (MO#1b) Mobile origination, roaming (S-S#2, MT#2 assumed)

Figure 17.2.2.1-1 shows an origination procedure which applies to roaming subscribers when the home network operator desires to keep its internal configuration hidden from the visited network. The UE is located in a visited network, and determines the P-CSCF via the CSCF discovery procedure. During registration, the home network allocates an S-CSCF. The home network advertises an I-CSCF as the entry point from the visited network, who forwards requests to the S-CSCF.

When registration is complete, P-CSCF knows the name/address of the next hop in the signalling path toward the S-CSCF, the I-CSCF. I-CSCF receives information in the request, from which it determines the name/address of the proper S-CSCF.



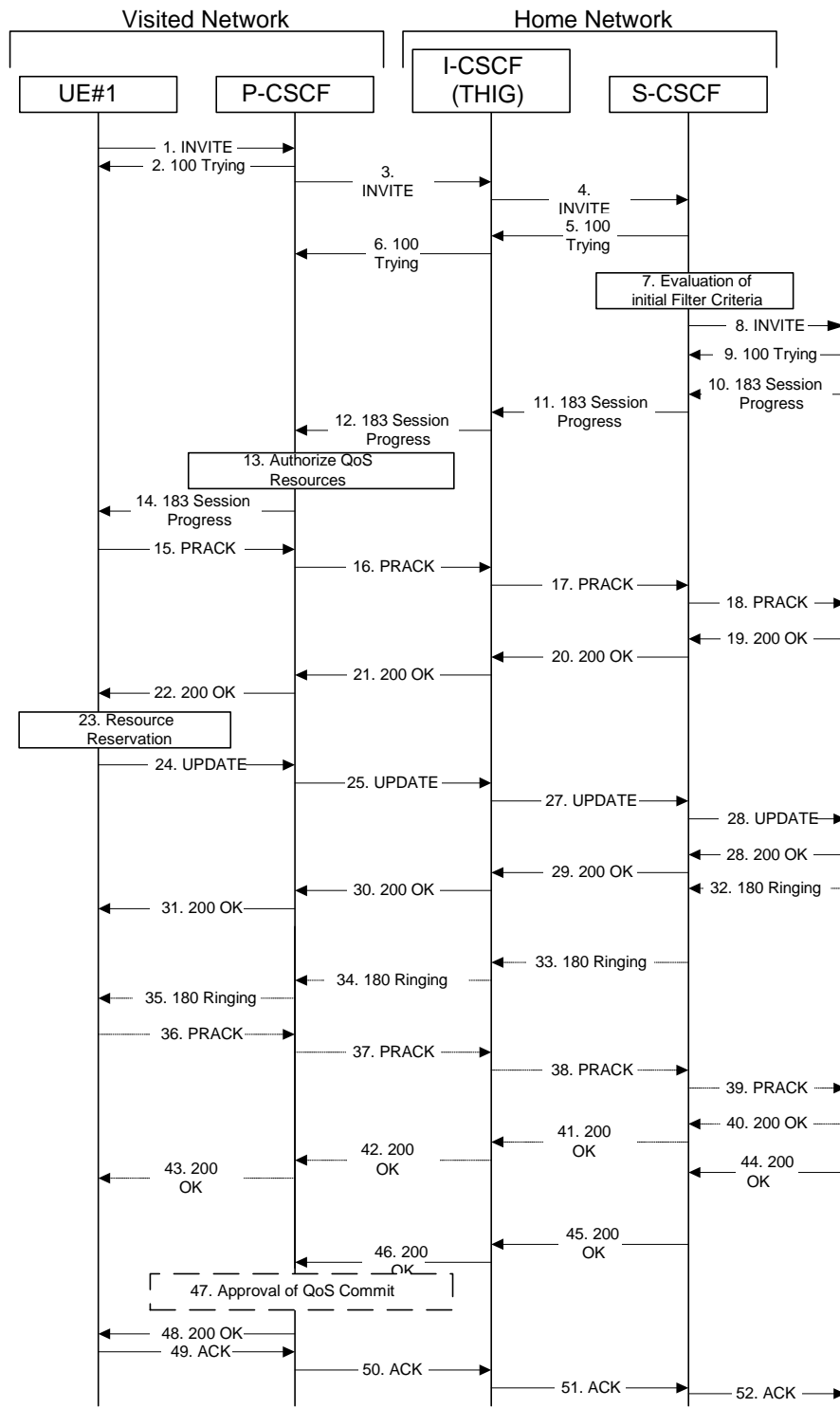


Figure 17.2.2.1-1: MO#1b

Procedure MO#1b is as follows:

1. INVITE (UE to P-CSCF) – see example in table 17.2.2.1-1

- UE#1 determines the complete set of codecs that it is capable of supporting for this session. It builds a SDP containing bandwidth requirements and characteristics of each, and assigns local port numbers for each possible media flow. Multiple media flows may be offered, and for each media flow (m= line in SDP), there may be multiple codec choices offered.
- For this example, assume UE#1 is capable of sending two simultaneous video streams, either H261 or MPV format, and two simultaneous audio streams, either AMR, G726-32, PCMU, or G728.

—UE sends the INVITE request, containing an initial SDP, to the P-CSCF determined via the CSCF discovery mechanism. An example is contained in table 17.2.2.1-1.

Table 17.2.2.1-1: INVITE (UE to P-CSCF)

```
INVITE sip:+1-212-555-2222user2_public1@home12.net;user=phone SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Supported: 100rel
Max-Forwards: 70
Remote-Party-IDP-Asserted-Identity: "John Doe" <tel:+1-212-555-1111>;privacy=off<sip:user1_public1@home1.net>
Privacy: none
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 98 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:98 H261
a=rtpmap:99:MPV
m=video 3402 RTP/AVP 98 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:98 H261
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-
```

- Request-URI:** Contains the public user identity of the called user, keyed number from the user. This is specified by the UE as sip:<keyed number>@home1.net. This is in accordance to standard IETF procedures for specifying dialled digits.
- Via:** Contains the IP address or FQDN of the originating UE.
- Remote-Party-ID:** Contains the originator's public user identity. The Display name is optional.

From:/To:/Call-ID: Follow the recommendations of draft-ietf-sip-privacy-01[13], even though anonymity is not being requested for this session.

Privacy: the user does not require privacy, therefore the Privacy header is set to the value “none” as specified in draft-ietf-sip-asserted-identity [x] and draft-ietf-sip-privacy-general [y].

P-Asserted-Identity: the user provides a hint about the identity to be used for this session.

Cseq: Is a random starting number.

Contact: Is the a IP address or FQDN of the originating UE.

SDP The SDP contains et of codecs supported by UE#1 and desired by the user at UE#1 for this session

— Upon receiving the INVITE, the P-CSCF stores the following information about this session, for use in possible error recovery actions – see example in table 17.2.2.1-1b:

Table 17.2.2.1-1b: Storage of information at P-CSCF

```
Request-URI: sip:+1-212-555-2222@home1.netuser2_public1@home2.net;user=phone
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
Contact(local): sip:[5555::aaa:bbb:ccc:ddd]
```

2. 100 Trying (P-CSCF to UE) – see example in table 17.2.2.1-2

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

Table 17.2.2.1-2: 100 Trying (P-CSCF to UE)

```
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-CSCF to I-CSCF) – see example in table 17.2.2.1-3

— P-CSCF remembers (from the registration procedure) the request routing for this UE. This becomes the topmost Route header~~Request-URI~~ in the request. This next hop is the I-CSCF within the home network of UE#1.

— P-CSCF adds itself to the Record-Route header and Via header.

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

— For this example, assume the network operator disallows H261 video encoding.

— The INVITE request is forwarded through this I-CSCF to the S-CSCF.

Table 17.2.2.1-3: INVITE (P-CSCF to I-CSCF)

```

INVITE sip:user2_public1@home1.net sip:iesef1_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
Record-Route: sip:240f34.1@pcscf1.visited1.net
Route: sip:icscf1_p.home1.net;lr, sip:Token(sip:scscf1.home1.net;lr)@home1.net;tokenized-
by=home1.net, sip:+1-212-555-2222@home1.net;user=phone
Record-Route: sip:pcscf1.visited1.net;lr
Supported:
Remote-Party-IDP-Asserted-Identity:
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 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=qos: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: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:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000

```

Route: Contains the **remaining** elements from the Path header from **rRegistration**, **with the initial Request-URI (received from the UE) appended as the final component.**

Request-URI: ~~The first component in the remembered Path header from Registration.~~

P-Asserted-Identity: The P-CSCF inserts this header based on the user's hint present in the incoming P-Asserted-Identity header.

SDP The SDP contains the restricted set of codecs allowed by the network operator. The "m=" lines for the video media streams no longer list code 98 (H261).

4. INVITE (I-CSCF to S-CSCF) – see example in table 17.2.2.1-4

- I-CSCF adds itself to the Record-Route header, and adds a Via header.
- I-CSCF determines the routing information contained in the request, and forwards the request to S-CSCF that is serving the UE.

Table 17.2.2.1-4: INVITE (I-CSCF to S-CSCF)

```
INVITE sip:user2_public1@home1.net 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]
Max-Forwards: 68
Route: sip:+1 212 555 2222@home1.net;user=phone
Record-Route: sip:351g45.1@icscf1_p.home1.net;lr, sip:240f34.1@pcscf1.visited1.net;lr
Route: sip:scscf1.home1.net;lr
Supported:
Remote-Party-IDP-Asserted-Identity:
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=
b=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
```

- Upon receiving the INVITE, the S-CSCF stores the following information about this session, for use in possible error recovery actions – see example in table 17.2.2.1-4b:

Table 17.2.2.1-4b: Storage of information at S-CSCF

```
Request-URI: sip:+1 212 555 2222@home1.netuser2_public1@home2.net;user=phone
```



```

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(2dest): 127 INVITE
CSeq(2orig): none
Route(2orig): sip:icscf1_p.home1.net;lr, sip:pcscf1.visited1.net;lr
Contact-(localorig): sip:[5555::aaa:bbb:ccc:ddd]

```

5. **100 Trying (S-CSCF to I-CSCF) – see example in table 17.2.2.1-5**

—S-CSCF responds to the INVITE request (4) with a 100 Trying provisional response.

Table 17.2.2.1-5: 100 Trying (S-CSCF to I-CSCF)

```

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: 0

```

6. **100 Trying (I-CSCF to P-CSCF) – see example in table 17.2.2.1-6**

—I-CSCF forwards the 100 Trying provisional response to P-CSCF.

Table 17.2.2.1-6: 100 Trying (I-CSCF to P-CSCF)

```

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 criteria**

- S-CSCF validates the service profile of this subscriber, and evaluates the initial filter criteria.~~performs any origination service control required for this subscriber.~~
- 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.~~

8. **INVITE (MO#1b to S-S) – see example in table 17.2.2.1-8**

— 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.

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

~~Editor's Note: Need for additional headers to transport e.g. Billing-Correlation-Identifier is FFS.~~

Table 17.2.2.1-8: INVITE (MO#1b to S-S)

```

INVITE sip:+1-212-555-2222user2_public1@home21.net;user=phone 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
Record-Route: sip:332b23.1@scscf1.home1.net;lr, sip:351g45.1@icscf1_p.home1.net;lr,
    sip:240f34.1@pcscf1.visited1.net;lr
Supported:-
Remote-Party-IDP-Asserted-Identity: "John Doe" <tel:+1-212-555-
llll>;privacy=off<sip:user1_public1@home1.net>

```

```

Privacy: none;screen=yes
P-Asserted-Identity: "John Doe" <tel:+1-212-555-1111>
Privacy: none
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
a=qos:mandatory-sendrecv
a=rtptime:99:MPV
m=video 0 RTP/AVP 99
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

```

SDP The SDP contains the restricted set of codecs allowed by the network operator. The "m=" lines for the video media streams show a port number zero, which removes them from the negotiation.

Request-URI: ~~In the case where the Route header 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.~~

9. 100 Trying (S-S to MO#1b) – see example in table 17.2.2.1-9 (related to 17.2.2.1-8)

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

Table 17.2.2.1-9: 100 Trying (S-S to MO#1b)

```

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 [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0

```

10. 183 Session Progress (S-S to MO#1b) – see example in table 17.2.2.1-10 (related to 17.2.2.1-8)

—The media stream capabilities of the destination are returned along the signalling path, in a 183 Session Progress provisional response (to (8)), per the S-CSCF to S-CSCF procedures.

Table 17.2.2.1-10: 183 Session Progress response (S-S to MO#1b)

```
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]
Record-Route: sip:pcscf2.home1.net;lr, sip:scscf2.home1.net;lr, sip:332b23.1@scscf1.home1.net;lr,
sip:351g45.1@icscf1_p.home1.net;lr, sip:240f34.1@pcscf1.visited1.net;lr
Remote-Party-IDP-Asserted-Identity: "John Smith" <tel:+1-212-555-2222>;privacy=off<sip:user2_public1@home1.net>
Privacy: none
P-Asserted-Identity: "John Smith" <tel:+1-212-555-2222>
Privacy: none;screen=yes
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: 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: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=qos:mandatory-sendrecv-confirm
m=audio 0 RTP/AVP 97 96 0 15
```

Upon receiving the 183 Session Progress, the S-CSCF stores the following information about this session, for use in providing enhanced services or in possible error recovery actions – see example in table 17.2.2.1-10b.

Table 17.2.2.1-10b: Storage of information at S-CSCF

```
Request-URI: sip:user2_public1@home2.net
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(2dest): 127 INVITE
CSeq(2orig): none
Route(2dest): sip:scscf2.home2.net;lr, sip:pcscf2.visited2.net;lr
Route(2orig): sip:icscf1_p.home1.net;lr, sip:pcscf1.visited1.net;lr
Contact(dest): sip:[5555::eee:fff:aaa:bbb]
Contact(orig): sip:[5555::aaa:bbb:ccc:ddd]
```

11. 183 Session Progress (S-CSCF to I-CSCF) – see example in table 17.2.2.1-11

—S-CSCF forwards the 183 Session Progress response to I-CSCF.

Table 17.2.2.1-11: 183 Session Progress (S-CSCF to I-CSCF)

```
SIP/2.0 183 Session Progress
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:
Remote-Party-IDP-Asserted-Identity:
Privacy:
```

```
P-Asserted-Identity:
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=
m=
```

12. 183 Session Progress (I-CSCF to P-CSCF) – see example in table 17.2.2.1-12

— I-CSCF forwards the 183 Session Progress response to P-CSCF.

Table 17.2.2.1-12: 183 Session Progress (I-CSCF to P-CSCF)

```
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]
Record-Route: sip:Token(sip:pcscf2.home1.net;lr, sip:Token(sip:scscf2.home1.net;lr,
scscf1.home1.net;lr)@home1.net;tokenized-by=home1.net, sip:351g45-1@icscf1_p.home1.net,
sip:240f34.1@pcscf1.visited1.net
Remote-Party-IDP-Asserted-Identity:
Privacy:
P-Asserted-Identity:
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=
m=
```

Record-Route: Header entries ~~to the left of I-CSCF's entry are reversed and translated of the home network of the I-CSCF are tokenized. The I-CSCF itself and the UE addresses are not subject to tokenization.~~

— Upon receiving the 183 Session Progress, the P-CSCF removes the Record-Route headers, calculates the proper Route header to add to future requests, and saves that information without passing it to UE. The saved value of the information for this session is as shown table 17.2.2.1-12b:

Table 17.2.2.1-12b: Storage of information at P-CSCF

```
Request-URI: sip:+1-212-555-2222@home1.netuser2_public1@home2.net;user=phone
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(2dest): 127 INVITE
CSeq(2orig): none
Route(2dest): sip:icscf1.p.home1.net;lr, sip:Token(sip:scscf1.home1.net;lr,
sip:scscf2.home1.net;lr, pcscf2.home1.net;lr);tokenized-by=home1.net
Contact(localorig): sip:[5555::aaa:bbb:ccc:ddd]
Contact(dest): sip:[5555::eee:fff:aaa:bbb]
Route: sip:351g45.1@iescf1.p.home1.net,
sip:Token(scscf1.home1.net, sip:scscf2.home1.net),
pcscf2.home1.net
```

13. Authorize QoS Resources

— P-CSCF authorizes the resources necessary for this session. The approval of QoS commitment either happens at this stage or after 200 OK of INVITE (35) based on operator local policy.

14. 183 Session Progress (P-CSCF to UE) – see example in table 17.2.2.1-14

— P-CSCF forwards the 183 Session Progress response to the originating endpoint.

Table 17.2.2.1-14: 183 Session Progress (P-CSCF to UE)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Media-Authorization: 0020000100100101706366312e78797a2e6e6574000c02013942563330373200
Remote-Party-IDP-Asserted-Identity:
Privacy:
P-Asserted-Identity:
Privacy:
Anonymity:
Require+P-Media-Authorization: 0020000100100101706366312e78797a2e6e6574000c02013942563330373200
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=
```

m=

P-Media-Authorization: A P-CSCF generated authorization token. This particular example shows a Policy-Element generated by “pcf1.xyz.net” with credentials “9BV3072”. “00” at the end of the authorization token is required to pad to a multiple of 4 bytes.

15. PRACK (UE to P-CSCF) – see example in table 17.2.2.1-15

—UE decides the **final** set of media streams for this session, and includes this information **as a new SDP offer** in the PRACK request to P-CSCF.

Table 17.2.2.1-15: PRACK (UE to P-CSCF)

```
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(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 none 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
```

Request-URI: Takes the value of the Contact header of the received 183 Session Progress response.

Via: Take the value of either the IP address or FQDN of the originating UE.

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 (14), is made by the originating UE and included in the SDP.

16. Resource Reservation

After determining the final media streams in step #15, UE initiates the reservation procedures for the resources needed for this session.

176. PRACK (P-CSCF to I-CSCF) – see example in table 17.2.2.1-176

P-CSCF adds the Route header corresponding to the session.

P-CSCF forwards the PRACK request to I-CSCF.

Table 17.2.2.1-176: PRACK (P-CSCF to I-CSCF)

```
PRACK sip:iesef1_p.home1.net-sip:[5555::eee:fff:aaa:bbb] 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:scscf1.home1.net;lr, sip:scscf2.home1.net;lr),
      sip:pcscf2.home1.net;lr}@home1.net;tokenized-by=home1.net,—sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Require: precondition
Rack:
Content-Type:
Content-Length:

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

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

Route: Saved from the Record-Route header of the 183 Session Progress response. (with first element moved to Request-URI) with the initial Request-URI (received from the UE) appended as the final component.

178. PRACK (I-CSCF to S-CSCF) – see example in table 17.2.2.1-187

I-CSCF determines the routing information, and forwards the PRACK request to S-CSCF.

Table 17.2.2.1-178: PRACK (I-CSCF to S-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]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]
Max-Forwards: 68
Route: sip:scscf1.home1.net;lr, sip:scscf2.home1.net;lr, sip:pcscf2.home1.net;lr,—
      sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Require: precondition
Rack:
Content-Type:
Content-Length:

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

198. PRACK (MO#1b to S-S) – see example in table 17.2.2.1-198

S-CSCF forwards the PRACK request to the terminating endpoint, as per the S-CSCF to S-CSCF procedure.

Table 17.2.2.1-198: PRACK (MO#1b to S-S)

```
PRACK sip:[5555::eee:fff:aaa:bbb] sip:scscf2.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:scscf2.home1.net;lr, sip:pcscf2.home1.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=
m=
m=
b=
a=
a=
a=
a=
a=
a=
m=
```

Request-URI: The first component of the Route header. This will vary according to which S-CSCF to S-CSCF signalling flow is used.

1920. 200 OK (S-S to MO#1b) – see example in table 17.2.2.1-1920 (related to 17.2.2.1-1918)

The destination endpoint responds to the PRACK request (198) with a 200 OK response, per the S-CSCF to S-CSCF procedures.

Table 17.2.2.1-1920: 200 OK (S-S to MO#1b)

```
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: 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=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
```


210. 200 OK (S-CSCF to I-CSCF) – see example in table 17.2.2.1-210

S-CSCF forwards the 200 OK response to I-CSCF.

Table 17.2.2.1-210: 200 OK (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]
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=
m=
```

212. 200 OK (I-CSCF to P-CSCF) – see example in table 17.2.2.1-212

I-CSCF forwards the 200 OK response to P-CSCF.

Table 17.2.2.1-212: 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]
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=
m=
```

223. 200 OK (P-CSCF to UE) – see example in table 17.2.2.1-223

P-CSCF forwards the 200 OK response to UE.

Table 17.2.2.1-23: 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-Type:
Content-Length:

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

23. Resource Reservation

— After determining the final media streams in step #14, UE initiates the reservation procedures for the resources needed for this session.

24. COMET UPDATE (UE to P-CSCF) – see example in table 17.2.2.1-24

— When the resource reservation is completed, UE sends the **COMETUPDATE** request to the terminating endpoint, via the signalling path established by the INVITE request. The request is sent first to P-CSCF.

Table 17.2.2.1-24: COMETUPDATE (UE to P-CSCF)

```
COMETUPDATE 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(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:gqos local none
a=curr:gqos remote none
a=des:gqos mandatory local sendrecv
a=des:gqos none remote sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=gqos-success-sendonly
m=audio 0 RTP/AVP 97 96 0 15
```

Request-URI: Takes the value of the Contact header of the received 183 Session Progress response.

Via: Take the value of either the IP address or FQDN of the originating UE.

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](#).

25. **COMETUPDATE** (P-CSCF to I-CSCF) – see example in table 17.2.2.1-25

- P-CSCF adds a Route header, with the saved value from the previous response. P-CSCF identifies the proper saved value by the Request-URI.
- P-CSCF forwards the **COMETUPDATE** request to I-CSCF.

Table 17.2.2.1-25: COMETUPDATE (P-CSCF to I-CSCF)

```
COMETUPDATE sip:[5555::eee:fff:aaa:bbb]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]
Max-Forwards: 69
Route: sip:icscf1_p.home1.net;lr, sip:Token(sip:scscf1.home1.net;lr, sip:scscf2.home1.net;lr),
sip:pcscf2.home1.net;lr}@home1.net;tokenized-by=home1.net,-sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

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

Route: Saved from the [Record-Route header of the](#) 183 Session Progress response, (with first element moved to Request-URI) with the initial Request-URI (received from the UE) appended as the final component.

26. **COMETUPDATE** (I-CSCF to S-CSCF) – see example in table 17.2.2.1-26

- I-CSCF determines the routing information, and forwards the request to S-CSCF.

Table 17.2.2.1-26: COMETUPDATE (I-CSCF to S-CSCF)

```
COMETUPDATE sip:[5555::eee:fff:aaa:bbb] sip: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:scscf2.home1.net;lr, sip:pcscf2.home1.net;lr
,-sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

v=
o=
s=
```

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

27. **COMETUPDATE** (MO#1b to S-S) – see example in table 17.2.2.1-27

—S-CSCF forwards the **COMETUPDATE** request to the terminating endpoint, as per the S-CSCF to S-CSCF procedure.

Table 17.2.2.1-27 COMETUPDATE (MO#1b to S-S)

```
COMETUPDATE sip:[5555::eee:fff:aaa:bbb] sip:sescf2.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:scscf2.home1.net;lr, sip:pcscf2.home1.net;lr, sip:[5555::eee:fff:aaa:bbb]  
From:  
To:  
Call-ID:  
Cseq:  
Content-Type:  
Content-Length:  
  
v=  
o=  
s=  
c=  
t=  
m=  
m=  
m=  
m=  
b=  
a=  
a=  
a=  
a=  
a=  
a=  
m=
```

Request-URI:—The first component of the Route header. This will vary according to which S-CSCF to S-CSCF signalling flow is used.

28. **200 OK** (S-S to MO#1b) – see example in table 17.2.2.1-28 (related to 17.2.2.1-27)

—The destination endpoint responds to the **COMETUPDATE** request (27) with a 200 OK, per the S-CSCF to S-CSCF procedures.

The SDP indicates that the resource reservation was successful both in the local and the remote segment.

Table 17.2.2.1-28: 200 OK (S-S to MO#1b)

```
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: application/sdp  
Content-Length: (...)0
```

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

29. 200 OK (S-CSCF to I-CSCF) – see example in table 17.2.2.1-29

—S-CSCF forwards the 200 OK response to I-CSCF.

Table 17.2.2.1-29 200 OK (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]
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=
m=

30. 200 OK (I-CSCF to P-CSCF) – see example in table 17.2.2.1-30

—I-CSCF forwards the 200 OK response to P-CSCF.

Table 17.2.2.1-30: 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]
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=

Record-Route: Entries to the left of I-CSCF's entry are reversed and translated.

31. 200 OK (P-CSCF to UE) – see example in table 17.2.2.1-31

—P-CSCF forwards the 200 OK response to UE.

Table 17.2.2.1-31: 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-Type:
Content-Length:
```

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

32. 180 Ringing (S-S to MO#1b) – see example in table 17.2.2.1-32 (related to 17.2.2.1-8)

—The called UE may optionally perform alerting. If so, it signals this to the calling party by a 180 Ringing provisional response to (8). This response is sent to S-CSCF per the S-CSCF to S-CSCF procedure.

Table 17.2.2.1-32: 180 Ringing (S-S to MO#1b)

```
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]
Record-Route: sip:pcscf2.home1.net;lr, sip:scscf2.home1.net;lr, sip:332b23.1@scscf1.home1.net;lr,
sip:351g45.1@icscf1_p.home1.net;lr, sip:240f34.1@pcscf1.visited1.net;lr
Require: 100rel
From:
To: sip:B36(SHA-1(+1-212-555-2222;-user2_public1@home2.net; time=36123E5B; seq=73))@localhost;
tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: sip:[5555::eee:fff:aaa:bbb]
RSeq: 9022
Content-Length: 0
```

33. Service Control

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

334. 180 Ringing (S-CSCF to I-CSCF) – see example in table 8.1.2-334

S-CSCF forwards the 180 Ringing response to I-CSCF.

Table 17.2.2.1-334: 180 Ringing (S-CSCF to I-CSCF)

```
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]
Record-Route:
Require:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

345. 180 Ringing (I-CSCF to P-CSCF) – see example in table 17.2.2.1-345

I-CSCF forwards the 180 Ringing response to P-CSCF.

Table 17.2.2.1-354: 180 Ringing (I-CSCF to P-CSCF)

```
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]
Record-Route: sip:Token(sip:pcscf2.home1.net;lr, sip:Token(scscf2.home1.net;lr,
    sip:scscf1.home1.net;lr)@home1.net;tokenized-by=home1.net, sip:351g45.1@icscf1_p.home1.net;lr,
    sip:240f34.1@pcscf1.visited1.net;lr
Require:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

Record-Route: Header Entries of the home network of the I-CSCF are tokenized. The I-CSCF itself and the UE addresses are not subject to tokenization~~to the left of I-CSCF's entry are reversed and translated.~~

356. 180 Ringing (P-CSCF to UE) – see example in table 17.2.2.1-356

P-CSCF removes the Record-Route headers.

P-CSCF forwards the 180 Ringing response to UE.

Table 17.2.2.1-356: 180 Ringing (P-CSCF to UE)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Require:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

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

367. PRACK (UE to P-CSCF) – see example in table 17.2.2.1-367

UE indicates to the originating subscriber that the destination is ringing. It acknowledges the 180 Ringing provisional response (356) with a PRACK request.

Table 17.2.2.1-367: PRACK (UE to P-CSCF)

```
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(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
```

- Request-URI:** Takes the value of the Contact header of the 180 Ringing response.
- Via:** Take the value of either the IP address or FQDN of the UE.
- From:/To:/Call-ID:** Copied from the 180 Ringing response so that they include any revised tag parameters.
- Cseq:** Takes a higher value than in the previous request.

387. PRACK (P-CSCF to I-CSCF) – see example in table 17.2.2.1-378

P-CSCF adds the Route header corresponding to the session, P-CSCF forwards the PRACK request to I-CSCF.

Table 17.2.2.1-378: PRACK (P-CSCF to I-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb] sip: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:scscf1.home1.net;lr, sip:scscf2.home1.net;lr, )
sip:pcscf2.home1.net;lr}@home1.net;tokenized-by=home1.net, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Rack:
Content-Length:
```

398. PRACK (I-CSCF to S-CSCF) – see example in table 17.2.2.1-389

I-CSCF forwards the PRACK request to S-CSCF.

Table 17.2.2.1-398: PRACK (I-CSCF to S-CSCF)

```
PRACK sip:scscf1.home1.net sip:[5555::eee:fff:aaa:bbb] 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:scscf2.home1.net;lr, sip:pcscf2.home1.net;lr
sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Rack:
Content-Length:
```

3940. PRACK (MO#1b to S-S) – see example in table 17.2.2.1-3940

S-CSCF forwards the PRACK request to the terminating endpoint, as per the S-CSCF to S-CSCF procedure.

Table 17.2.2.1-3940: PRACK (MO#1b to S-S)

```
PRACK sip:[5555::eee:fff:aaa:bbb] sip:scscf2.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:scscf2.home1.net;lr, sip:pcscf2.home1.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Rack:
Content-Length:
```

401. 200 OK (S-S to MO#1b) – see example in table 17.2.2.1-401 (related to 17.2.2.1-3940)

The destination endpoint responds to the PRACK request (3940) with a 200 OK response.

Table 17.2.2.1-401: 200 OK (S-S to MO#1b)

```
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: 0
```

412. 200 OK (S-CSCF to I-CSCF) – see example in table 17.2.2.1-412

S-CSCF forwards the 200 OK response to I-CSCF.

Table 17.2.2.1-412: 200 OK (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]
From:
To:
Call-ID:
CSeq:
Content-Length:
```

432. 200 OK (I-CSCF to P-CSCF) – see example in table 17.2.2.1-423

I-CSCF forwards the 200 OK response to P-CSCF.

Table 17.2.2.1-432: 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]
From:
To:
Call-ID:
CSeq:
Content-Length:
```

Record-Route: ~~Entries to the left of I-CSCF's entry are reversed and translated.~~

443. 200 OK (P-CSCF to UE) – see example in table 17.2.2.1-434

P-CSCF forwards the 200 OK response to UE.

Table 17.2.2.1-443: 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:
```

454. 200 OK (S-S to MO#1b) – see example in table 17.2.2.1-454 (related to 17.2.2.1-8)

When the called party answers, the terminating endpoint sends a 200 OK final response to the INVITE request (8), as specified by the termination procedures and the S-CSCF to S-CSCF procedures, to S-CSCF.

Table 17.2.2.1-454: 200 OK (S-S to MO#1b)

```
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]
Record-Route: sip:pcscf2.home1.net;lr, sip:scscf2.home1.net;lr, sip:332b23.1@scscf1.home1.net;lr,
    sip:351g45.1@icscf1_p.home1.net;lr, sip:240f34.1@pcscf1.visited1.net;lr
From:
To: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost; tag=314159
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=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
```

— Upon receiving the 200 OK, the S-CSCF stores the following information about this session, for use in providing enhanced services or in possible error recovery actions — see example in table 17.2.2.1-45b.

Table 17.2.2.1-45b: Storage of information at S-CSCF

```
Request-URI: sip:+1-212-555-2222@home1.net;user=phone
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=314159sip:B36(SHA-
1(+1-212-555-2222; time=36123E5B; seq=73))@localhost
Call-ID: eb03a0s09a2sdfg1kj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2dest):
sip:scscf2.home1.net,sip:%5b5555%3a%3aeec%3afff%3aaaa%3abbb%5d@pcscf2.home1.net
Route(2orig): sip:icscf1_p.home1.net;
sip:%5b5555%3a%3aaaa%3abbb%3aeec%3add%5d@pcscf1.visited1.net
```

46. Service Control

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

457. 200 OK (S-CSCF to I-CSCF) – see example in table 17.2.2.1-457

S-CSCF sends a 200 OK final response along the signalling path back to I-CSCF.

Table 17.2.2.1-457: 200 OK (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]
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=
```

468. 200 OK (I-CSCF to P-CSCF) – see example in table 17.2.2.1-468

I-CSCF sends the 200 OK final response to P-CSCF.

Table 17.2.2.1-468: 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(sip:pcscf2.home1.net;lr, sip:Token(scscf2.home1.net;lr,
    sip:scscf1.home1.net;lr)@home1.net;tokenized-by=home1.net, sip:351g45.1@icscf1_p.home1.net,
    sip:240f34.1@pcscf1.visited1.net
From:
To:
Call-ID:
CSeq:
Contact:
Content-Type:-
Content-Length:

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

Record-Route: Header Entries of the home network of the I-CSCF are tokenized. The I-CSCF itself and the UE addresses are not subject to tokenization~~to the left of I-CSCF's entry are reversed and translated.~~

479. Approval of QoS Commit

The P-CSCF approves the commitment of the QoS resources if it was not approved already in step (13).

4850. 200 OK (P-CSCF to UE) – see example in table 17.2.2.1-4850

P-CSCF ~~indicates the resources reserved for this session should now be committed, and~~ forwards the 200 OK final response to the session originator. UE can start the media flow(s) for this session.

Table 17.2.2.1-5048: 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:
Contact:
Content-Type:
Content-Length:

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

~~— P-CSCF removes the Record-Route, calculates the proper Route header to add to future requests, and saves that information without passing it to UE.~~

4951. ACK (UE to P-CSCF) – see example in table 17.2.2.1-4951

UE starts the media flow for this session, and responds to the 200 OK (5048) with an ACK request sent to P-CSCF.

Table 17.2.2.1-5149: ACK (UE to P-CSCF)

```
ACK sip:[5555::eee:fff:aaa:bbb]
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 70
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
```

Cseq: Is required to be the same value as Cseq contained in original INVITE request [3].

502. ACK (P-CSCF to I-CSCF) – see example in table 17.2.2.1-5052

P-CSCF adds the Route header corresponding to the session.

~~— P-CSCF forwards the ACK request to I-CSCF.~~

Table 17.2.2.1-5250: ACK (P-CSCF to I-CSCF)

```
ACK sip:[5555::eee:fff:aaa:bbb] sip:iescf1_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:scscf1.home1.net;lr, sip:scscf2.home1.net;lr),
      sip:pcscf2.home1.net;lr)@home1.net;tokenized-by=home1.net, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Content-Length:
```

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

Route: Saved from the [Record-Route header of the 183_200-OK-Session Progress](#) response. (with first element moved to Request-URI) with the initial Request-URI (received from the UE) appended as the final component.

531. ACK (I-CSCF to S-CSCF) – see example in table 17.2.2.1-513

I-CSCF determines the routing information, and forwards the ACK request to S-CSCF.

Table 17.2.2.1-531: ACK (I-CSCF to S-CSCF)

```
ACK sip:sescf1.home1.net-sip:[5555::eee:fff:aaa:bbb] 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:scscf2.home1.net;lr, sip:pcscf2.home1.net;lr,
    sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Content-Length:
```

542. ACK (MO#1b to S-S) – see example in table 17.2.2.1-524

S-CSCF forwards the ACK request to the terminating endpoint, per the S-CSCF to S-CSCF procedure.

Table 17.2.2.1-542: ACK (MO#1b to S-S)

```
ACK sip:[5555::eee:fff:aaa:bbb]sip:sescf2.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]
Route: sip:scscf2.home1.net;lr sip:pcscf2.home1.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Content-Length:
```

17.2.2.2 Failure in termination procedure

The roaming subscriber that initiated a session with procedure MO#1b 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 17.2.2.2-1, as optional messages 7-43 that may appear in this error procedure.

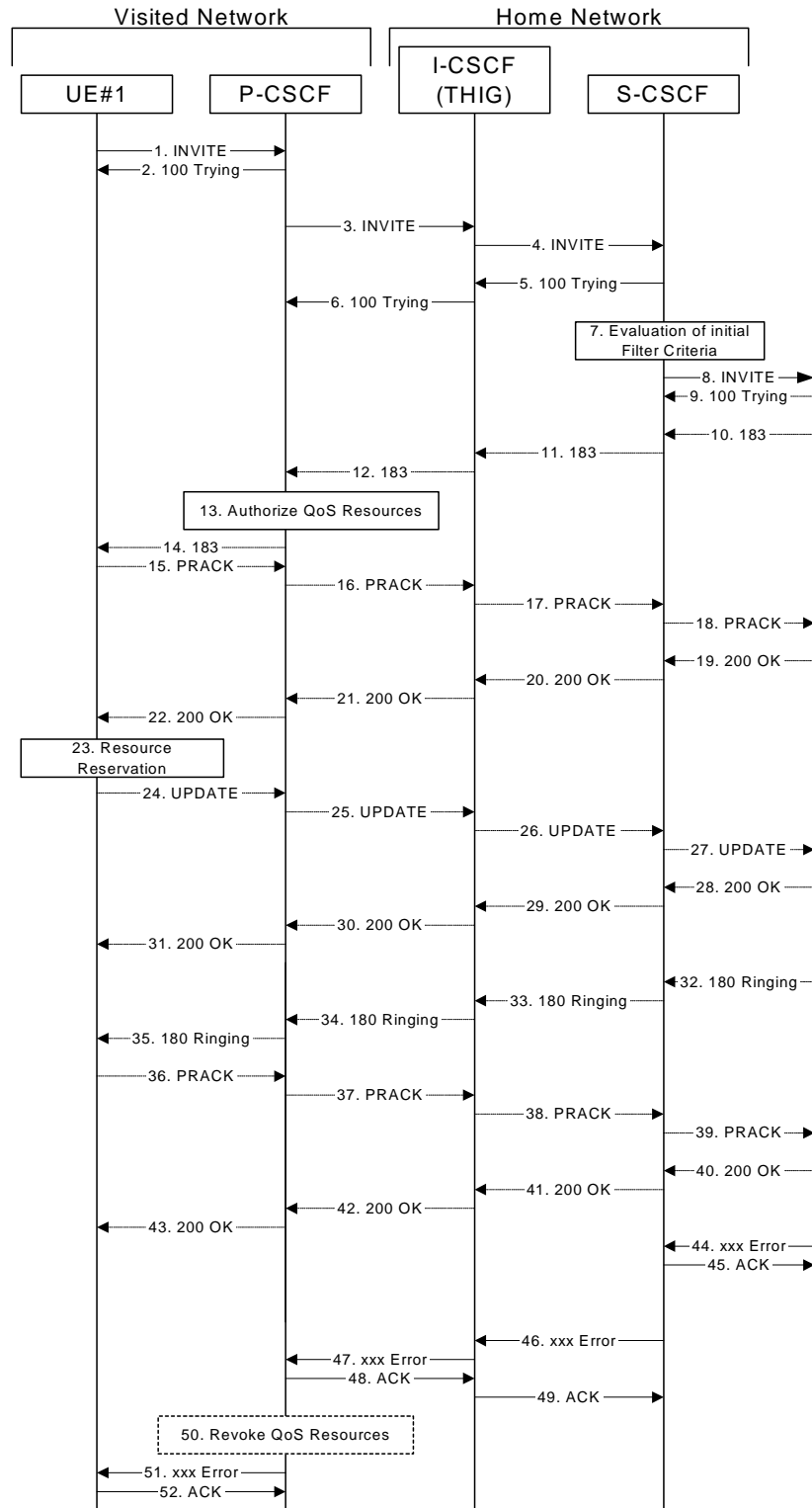


Figure 17.2.2.2-1: Failure in termination procedure

1-8. INVITE (UE to P-CSCF) et seq

UE#1 initiated a session, as described in subclause 117.2.2.1.

9-43. 100 Trying (S-S to MO#1b) et seq

Session initiation possibly continued, prior to detection of a failure condition, as described in subclause 117.2.2.1.

44. xxx Error (S-S to MO#1b) – see example in table 17.2.2.2-44 (related to 17.2.2.2-8)

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 17.2.2.2-44: 486 Busy Here (S-S to MO#1b)

```
SIP/2.0 486 Busy Here
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: "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:[5555::eee:fff:aaa:bbb]
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Retry-After: 3600
Content-Length: 0
```

45. ACK (MO#1a to S-S) – see example in table 17.2.2.2-45

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

Table 17.2.2.2-45: ACK (MO#1a to S-S)

```
ACK sip:+1-212-555-2222@home1.netuser2_public1@home1.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
```

46. Service Control

— S-CSCF performs whatever service control is appropriate for this failed session attempt.

47. xxx Error (S-CSCF to P-CSCF) – see example in table 17.2.2.2-47 (related to 17.2.2.2-44)

— The S-CSCF returned a SIP error response to I-CSCF.

NOTE 2: The error response may be, for example, "(486 Busy Here)", "403 (Service Denied)", "480 (Temporarily Unavailable)", or others. For this example, "486 (Busy Here)" is shown.

Table 17.2.2.2-47: 486 Busy Here (S-CSCF to I-CSCF)

```
SIP/2.0 486 Busy Here
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:
Contact: --
Call-ID:
CSeq:
Retry-After: 3600
Content-Length: 0
```

47. xxx Error (I-CSCF to P-CSCF) – see example in table 17.2.2.2-47

— The I-CSCF returned a SIP error response to P-CSCF.

NOTE 3: The error response may be, for example, "486 (Busy Here)", "403 (Service Denied)", "480 (Temporarily Unavailable)", or others. For this example, "486 (Busy Here)" is shown.

Table 17.2.2.2-478: 486 Busy Here (S-CSCF to I-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: 3600
Content-Length: 0
```

489. ACK (P-CSCF to I-CSCF) – see example in table 17.2.2.2-489

—Upon receive the 486 response from the I-CSCF, P-CSCF sends ACK.

Table 17.2.2.2-489: ACK (P-CSCF to I-CSCF)

```
ACK sip:+1-212-555-2222@home1.net;user=phone SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1
Route: sip:icscf1_p.home1.net;lr, sip:Token(sip:scscf1.home1.net;lr)@home1.net;tokenized-
by=home1.net
From:
To:
Call-ID:
CSeq: 127 ACK
Content-Length: 0
```

4950. ACK (I-CSCF to S-CSCF) – see example in table 17.2.2.2-4950

—Upon receive the 486 response from the P-CSCF, I-CSCF sends ACK.

Table 17.2.2.2-4950: ACK (I-CSCF to S-CSCF)

```
ACK sip:+1-212-555-2222@home1.net;user=phone SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1
Route: sip:scscf1.home1.net;lr
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

5051. Revoke QoS authorization

—P-CSCF removes the QoS authorization, if any, for this session.

512. xxx Error (P-CSCF to UE) – see example in table 17.2.2.2-512 (related to 17.2.2.2-478)

—The P-CSCF returned a SIP error response to UE.

NOTE 4: The error response may be, for example, "486 (Busy Here)", "403 (Service Denied)", "480 (Temporarily Unavailable)", or others. For this example, "486 (Busy Here)" is shown.

Table 17.2.2.2-512: 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: 3600
Content-Length: 0
```

523. ACK (UE to P-CSCF) – see example in table 17.2.2.2-523

— Upon receive the 486 response from the P-CSCF, UE sends ACK.

Table 17.2.2.2-523: ACK (UE to P-CSCF)

```
ACK sip:+1-212-555-2222@home1.netuser2_public1@home1.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
```

17.2.2.3 Session abandoned, or resource failure

The roaming subscriber that initiated a session with procedure MO#1b 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 17.2.2.3-1.

If the session is aborted due to failure to obtain resources, it will occur at step #23 in the signalling flow; steps 24-43 (marked as optional) will not be present. If the session is abandoned due to user command, it can happen at any point between steps 10-43.

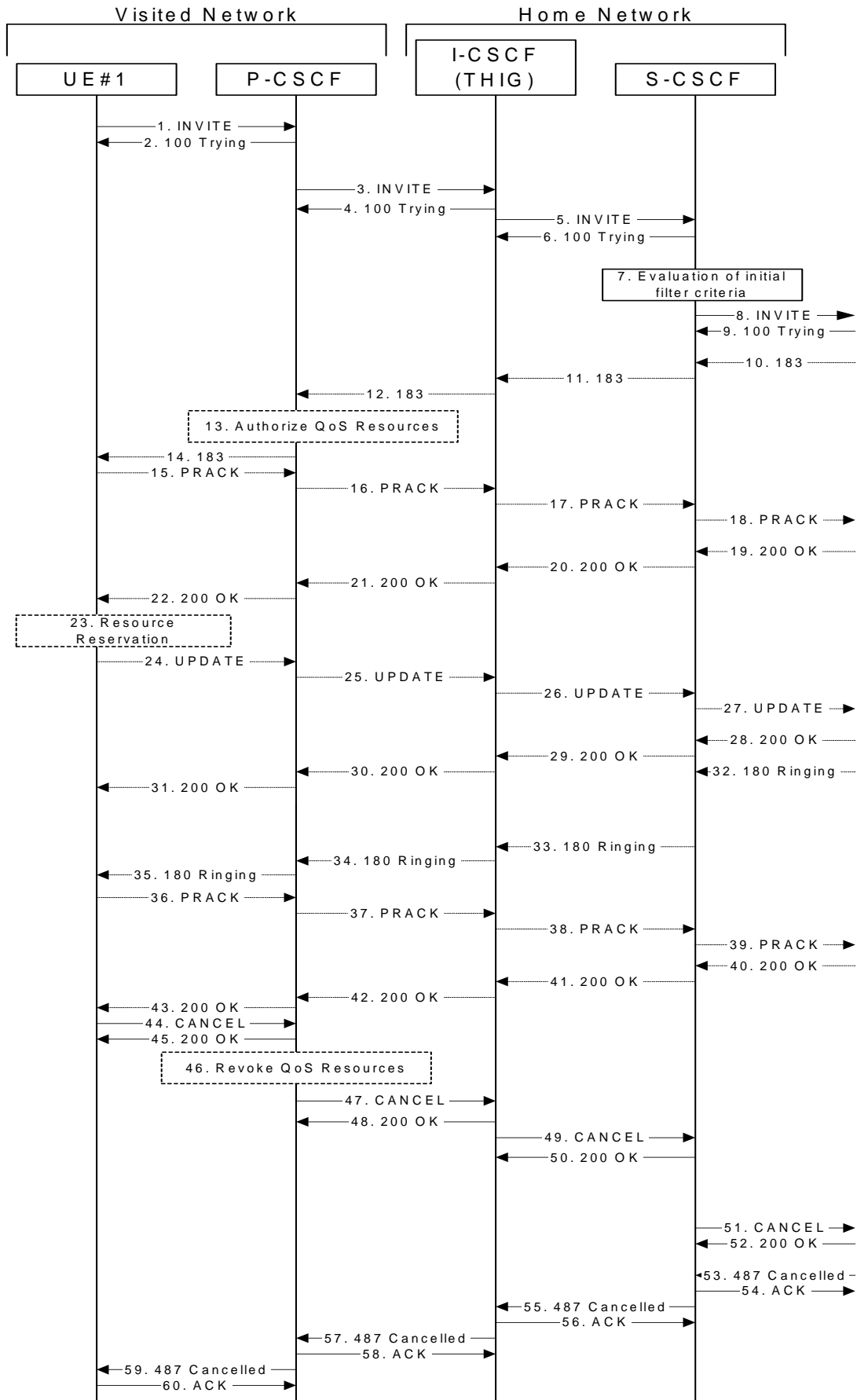


Figure 17.2.2.3-1: Session abandoned or resource failure

1-9. INVITE (UE to P-CSCF) et seq

UE#1 initiated a session, as described in subclause 17.2.2.1.

10-434. 183 SDP (S-S to MO#1b) et seq

Session initiation possibly continued, prior to detection of a failure condition, as described in subclause 17.2.2.1.

445. CANCEL (UE to P-CSCF) – see example in table 17.2.2.3-445

The UE cancelled the original INVITE request.

Table 17.2.2.3-445: CANCEL (UE to P-CSCF)

```
CANCEL sip:+1-212-555-2222@home1.net;user2_public1@home1.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: cb03a0s09a2sdfglkj490333
Cseq: 127 CANCEL
Content-Length: 0
```

456. 200 OK (P-CSCF to UE) – see example in table 17.2.2.3-456

— Upon receive the CANCEL request from the UE, P-CSCF sends 200 OK.

Table 17.2.2.3-456: 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
```

467. Revoke QoS authorization

— P-CSCF removes the QoS authorization, if any, for this session.

478. CANCEL (P-CSCF to I-CSCF) – see example in table 17.2.2.3-478 (related to table 17.2.2.3-445)

— The P-CSCF forwards the CANCEL request to I-CSCF.

Table 17.2.2.3-478: CANCEL (P-CSCF to I-CSCF)

```
CANCEL sip:iesef1_p.home1.net;user2_public1@home1.net SIP/2.0
Via: SIP/2.0/UDP pcsf1.visited1.net;branch=240f34.1
Route: sip:icscf1_p.home1.net;lr, sip:Token(sip:scscf1.home1.net;lr)@home1.net;tokenized-
by=home1.net
From:
To:
Call-ID:
Cseq:
Content-Length:
```

~~Editor's Note: Need to check whether P-CSCF should modify the Contact: header in the CANCEL.~~

489. 200 OK (I-CSCF to P-CSCF) – see example in table 17.2.2.3-489

— Upon receiving the 200-OK response from the P-CSCF, I-CSCF sends 200 OK.

Table 17.2.2.3-489: 200 OK (I-CSCF 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
```

4950. CANCEL (I-CSCF to S-CSCF) – see example in table 17.2.2.3-4950

—The I-CSCF forwards the CANCEL request to S-CSCF.

Table 17.2.2.3-4950: CANCEL (I-CSCF to S-CSCF)

```
CANCEL sip:esef1.home1.netuser2_public1@home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1
Route: sip: scscf1.home1.net;lr
From:
To:
Call-ID:
Cseq:
Content-Length:
```

~~Editor's Note: Need to check whether P-CSCF should modify the Contact: header in the CANCEL.~~

501. 200 OK (S-CSCF to I-CSCF) – see example in table 17.2.2.3-501

—Upon receiving the CANCEL request from the P-CSCF, S-CSCF sends 200 OK.

Table 17.2.2.3-501: 200 OK (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

52. Service Control

—S-CSCF performs whatever service control is appropriate for this failed session attempt.

513. CANCEL (S-CSCF to S-S) – see example in table 17.2.2.3-513 (related to table 17.2.2.3-4950)

—The S-CSCF forwards the CANCEL request to the appropriate S-CSCF-to-S-CSCF procedure.

Table 17.2.2.3-5153: CANCEL (S-CSCF to S-S)

```
CANCEL sip:+1-212-555-2222@home1.netuser2_public1@home1.net;user=phone SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1
From:
To:
Call-ID:
Cseq:
Content-Length:
```

~~Editor's Note: Need to check whether a proxy inserts a Record-Route in a CANCEL request.~~

524. 200 OK (S-S to S-CSCF) – see example in table 17.2.2.3-524

—Upon receive the CANCEL request from the S-CSCF, the next hop (whatever it is) sends 200 OK.

Table 17.2.2.3-524: 200 OK (S-S 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: 0
```

535. ~~487 Cancelled~~487 Request Terminated (S-S to MO#1b) – see example in table 17.2.2.3-535 (related to table 17.2.2.3-8)

—The termination procedure cancelled the request, and returned a SIP error response to the original INVITE request.

Table 17.2.2.3-535: ~~487 Cancelled~~487 Request Terminated (S-S to MO#1b)

```
SIP/2.0 487 Cancelled487 Request Terminated
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:
Contact: sip:[5555::eee:fff:aaa:bbb]
Call-ID:
CSeq: 127 INVITE
Content-Length: 0
```

564. ACK (MO#1b to S-S) – see example in table 17.2.2.3-546

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

Table 17.2.2.3-5654: ACK (MO#1b to S-S)

```
ACK sip:+1-212-555-2222user2_public1@home12.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
```

557. ~~487 Cancelled~~487 Request Terminated (S-CSCF to I-CSCF) – see example in table 17.2.2.3-557 (related to table 17.2.2.3-53)

—The S-CSCF returned the SIP error response to I-CSCF.

Table 17.2.2.3-557: ~~487 Cancelled~~487 Request Terminated (S-CSCF to I-CSCF)

```
SIP/2.0 487 Cancelled487 Request Terminated
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:
Contact:--
Call-ID:
CSeq:
Content-Length: 0
```

568. ACK (I-CSCF to S-CSCF) – see example in table 17.2.2.3-568

—Upon receive the ACK from the P-CSCF, I-CSCF sends ACK.

Table 17.2.2.3-568: ACK (I-CSCF to S-CSCF)

```
ACK sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=351g45.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

579. ~~487 Cancelled~~487 Request Terminated (I-CSCF to P-CSCF) – see example in table 17.2.2.3-579

—The I-CSCF returned the SIP error response to P-CSCF.

Table 17.2.2.3-579: ~~487 Cancelled~~487 Request Terminated (I-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
```

5860. ACK (P-CSCF to I-CSCF) – see example in table 17.2.2.3-5860

—Upon receive the 487 response from the S-CSCF, P-CSCF sends ACK.

Table 17.2.2.3-589: ACK (P-CSCF to I-CSCF)

```
ACK sip:icscf1_p.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net
From:
To:
Call-ID:
CSeq: 127 ACK
Content-Length: 0
```

5961. ~~487 Cancelled~~487 Request Terminated (P-CSCF to UE) – see example in table 17.2.2.3-5961 (~~related to table 17.2.2.3-56~~)

—The P-CSCF returned a SIP error response to UE.

Table 17.2.2.3-5961: ~~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:
Content-Length: 0
```

6062. ACK (UE to P-CSCF) – see example in table 17.2.2.3-6062

—Upon receive the 487 response from the P-CSCF, UE sends ACK.

Table 17.2.2.3-6062: ACK (UE to P-CSCF)

```
ACK sip:+1-212-555-2222@home1.net;user2_public1@home1.net;user=phone SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq: 127 ACK
```

17.4 Termination procedures

17.4.1 Introduction

See subclause 7.4.1.

17.4.2 MT#1b

17.4.2.1 (MT#1b) Mobile termination, roaming (MO#2, S-S#2 assumed)

Figure 17.4.2.1-1 shows a termination procedure which applies to roaming subscribers when the home network operator desires to keep its internal configuration hidden from the visited network. The UE is located in a visited network, and determines the P-CSCF via the P-CSCF discovery procedure. During registration, the home network allocates a S-CSCF. The home network advertises an I-CSCF as the entry point from the visited network, who protects the S-CSCF identity and forwards requests to the P-CSCF.

When registration is complete, S-CSCF knows the name/address of its next hop in the signalling path toward the UE, the I-CSCF, and the S-CSCF knows the UE Contact address. I-CSCF receives information in the request, which it translates and obtains the name/address of P-CSCF, and P-CSCF obtains the name/address of the UE.

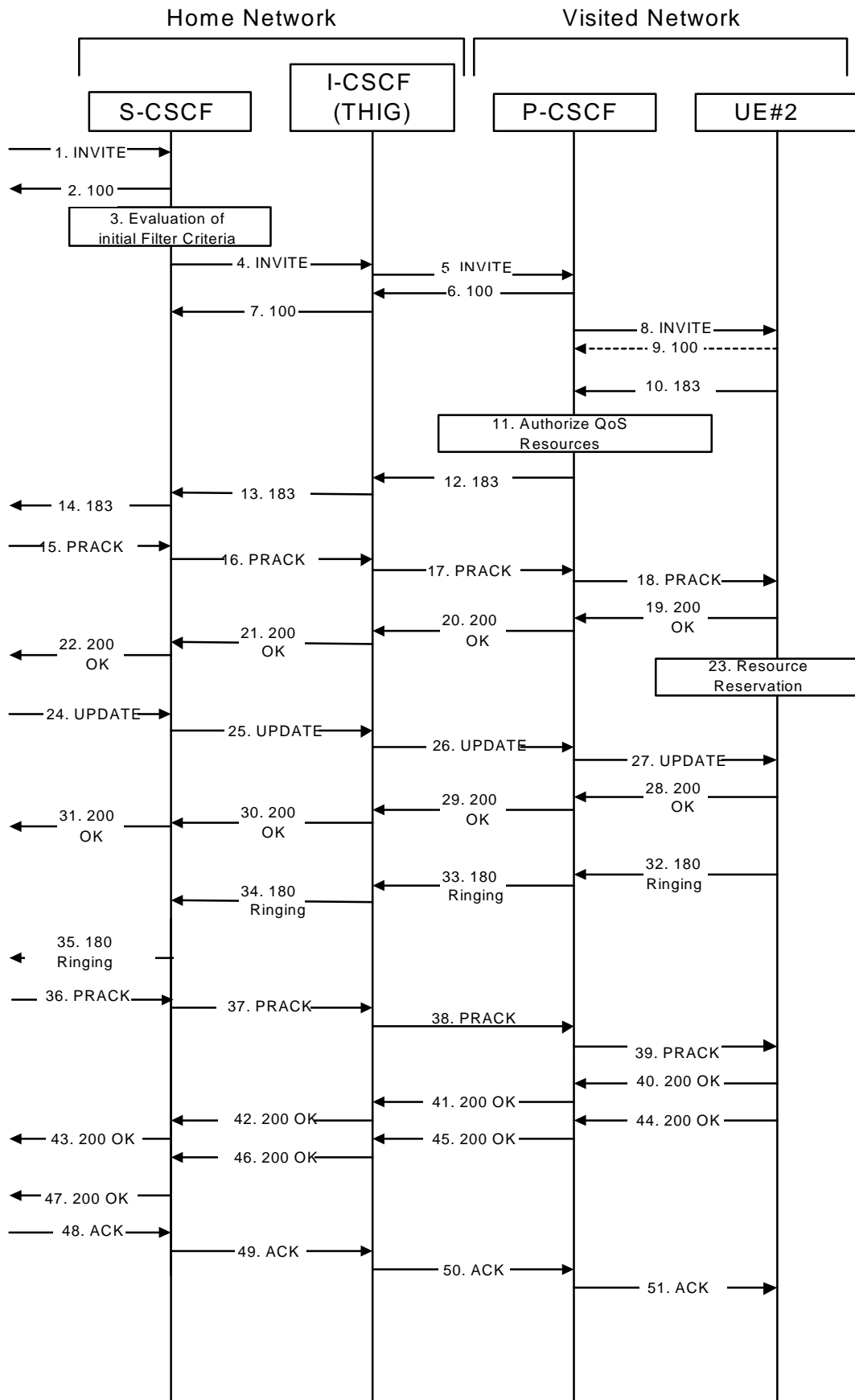


Figure 17.4.2.1-1: MT#1b

Procedure MT#1b is as follows:

1. INVITE (S-S to MT#1b) – see example in table 17.4.2.1-1

—The calling party sends the INVITE request, via one of the origination procedures and via one of the S-CSCF to S-CSCF procedures, to the S-CSCF for the terminating subscriber.

Table 17.4.2.1-1: INVITE (S-S to MT#1b)

```
INVITE sip:sesef2.homel.netuser2_public1@homel.net SIP/2.0
Via: SIP/2.0/UDP icscf2_s.homel.net;branch=871y12.1, SIP/2.0/UDP scscf1.homel.net;branch=332b23.1,
SIP/2.0/UDP pcscf1.homel.net;branch=431h23.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 67
Route: sip:scscf2.homel.net;lr
Record-Route: sip:332b23-1@scscf1.homel.net;lr, sip:431h23-1@pcscf1.homel.net;lr
Route: sip:+1-212-555-2222@homel.net;user=phone
Supported: 100rel
Remote-Party-IDP-Asserted-Identity: "John Doe" <tel:+1-212-555-
1111>;privacy=off<sip:user1_public1@homel.net>
Privacy: none;screen=yes
Anonymity: Off
From: "Alien Blaster" <sip:B36(SHA-1(user1_public1@homel.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: preconditions
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 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 sendrecvva=rtpmap:98 H261
a=rtpmap: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 sendrecvva=rtpmap:98 H261
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
```

SDP

The SDP contains the complete 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.

— Upon receipt of the INVITE, the S-CSCF stores the following information about this session, for use in providing enhanced services or in possible error recovery actions – see example in table 17.4.2.1-1b.

Table 17.4.2.1-1b: Storage of information at S-CSCF

```
Request-URI: sip:+1-212-555-2222@home1.net;user2_public1@home1.net;user=phone
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(2dest): 127 INVITE
CSeq(2orig): none
Route(2orig): sip:332b23.1@scscf1.home1.net;lr, sip:431h23.1@pcscf1.home1.net;lr,
sip:[5555::aaa:bbb:ccc:ddd]
Route(2dest): sip:icscf2_p.home1.net;lr, sip:pcscf2.visited2.net;lr,
sip:[5555::eee:fff:aaa:bbb]
```

2. 100 Trying (MT#1b to S-S) – see example in table 17.4.2.1-2

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

Table 17.4.2.1-2: 100 Trying (MT#1b to S-S)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf2_s.home1.net;branch=871y12.1, 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. ~~Service Control~~Evaluation of initial filter criteria

— S-CSCF validates the service profile of this subscriber, and ~~performs any termination service control required for this subscriber~~re-evaluates the initial filter criteria.

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

— ~~For this example, assume the destination subscriber is not allowed stereo, so only a single audio stream is permitted.~~

4. INVITE (S-CSCF to I-CSCF) – see example in table 17.4.2.1-4

— S-CSCF remembers (from the registration procedure) the UE Contact address and the next hop CSCF for this UE. It forwards the INVITE to the I-CSCF to perform the THIG functions.

S-CSCF examines the media parameters, and removes any choices that the destination subscriber does not have authority to request. For this example, assume the destination subscriber is not allowed stereo, so only a single audio stream is permitted.

Table 17.4.2.1-4: INVITE (S-CSCF to I-CSCF)

```
INVITE sip:[5555::eee:fff:aaa:bbb]@icscf2_p.home1.net SIP/2.0
Via: SIP/2.0/UDP scscf2.home1.net;branch=764z87.1, SIP/2.0/UDP icscf2_s.home1.net;branch=871y12.1,
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
Route: sip:icscf2_p.home1.net;lr, sip:pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
Record-Route: sip:764z87.1@scscf2.home1.net;lr, sip:332b23.1@scscf1.home1.net;lr,
sip:431h23.1@pcscf1.home1.net;lr
Supported:
Remote-Party-IDP-Asserted-Identity:
Privacy:
P-Asserted-Identity: "John Doe" <tel:+1-212-555-1111>
Privacy: none
Anonymity:
From:
```

```

To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
P-Called-Party-ID: <sip:+1-212-555-2222@home1.net;user2_public1@home2.net;user=phone>
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:goss local none
a=curr:goss remote none
a=des:goss mandatory local sendrecv
a=des:goss none remote sendrecv;rtpmap:98 H261
a=rtpmap:99:MPV
m=video 0 RTP/AVP 99
b=AS:54.6
a=curr:goss local none
a=curr:goss remote none
a=des:goss mandatory local sendrecv
a=des:goss none remote sendrecv;rtpmap:98 H261
a=rtpmap:99:MPV
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=goss 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 0 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

```

Via/Record-Route: S-CSCF adds itself in the Record-Route and Via headers.

SDP The SDP contains the restricted set of codecs allowed by the network operator. The "m=" lines for the second audio stream shows a port number zero, which removes it from the negotiation.

Request-URI: Built from the registration information.

Route: Built from the Contact address stored at registration.

P-Called-Party-ID: Includes the dialled URL with its parameters.

5. INVITE (I-CSCF to P-CSCF) – see example in table 17.4.2.1-5

— I-CSCF translates the Via headers in the request, and forwards the INVITE request to P-CSCF.

Table 17.4.2.1-5: INVITE (I-CSCF to P-CSCF)

```

INVITE sip:pcscf2.visited2.net;sip:[5555::eee:fff:aaa:bbb] SIP/2.0
Via: SIP/2.0/UDP icscf2_p.home1.net;branch=a9012.1,-, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net;branch=764z87.1,
SIP/2.0/UDP icscf2_s.home1.net;branch=871y12.1,-, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1),-,
SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1)@home1.net;tokenized-by=home1.net,-, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]
Max-Forwards: 65

```



```

Call-ID: cb03a0s09a2sdfglkj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2dest): sip:[5555::eee:fff:aaa:bbb]
Route(2orig): sip:a9012.1@icscf2_p.home1.net;lr,
sip:Token(sip:764z87.1@scscf2.home1.net;lr, sip:332b23.1@scscf1.home1.net;lr,
sip:431h23.1@pcscf1.home1.net;lr),sip:[5555::aaa:bbb:ccc:ddd]@home1.net;tokenized-
by=home1.net

```

6. 100 Trying (P-CSCF to I-CSCF) – see example in table 17.4.2.1-6

—P-CSCF responds to the INVITE request (5) with a 100 Trying provisional response.

Table 17.4.2.1-6: 100 Trying (P-CSCF to I-CSCF)

```

SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf2_p.home1.net;branch=a9012.1,SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net;branch=764z87.1,SIP/2.0/UDP icscf2_s.home1.net;branch=871y12.1,
SIP/2.0/UDP Token(scscf1.home1.net;branch=332b23.1)@home1.net;tokenized-by=home1.net,
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

```

7. 100 Trying (I-CSCF to S-CSCF) – see example in table 17.4.2.1-7

—I-CSCF determines the Via header, and forwards the 100 Trying provisional response to S-CSCF.

Table 17.4.2.1-7: 100 Trying (I-CSCF to S-CSCF)

```

SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf2.home1.net;branch=764z87.1, SIP/2.0/UDP icscf2_s.home1.net;branch=871y12.1,
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:

```

8. INVITE (P-CSCF to UE) – see example in table 17.4.2.1-8

—P-CSCF examines the media parameters, and removes any that the network operator decides, based on local policy, not to allow on the network.
 —For this example, assume the network operator does not allow 64 kb/s audio, so the PCMU codec is removed.

P-CSCF removes the Record-Route and Via headers, calculates the proper Route header to add to future requests, and saves that information without passing it to UE. The P-CSCF extract the UE address from the Route header value and place it into the Request-URI and forwards the INVITE request to the UE.
 17.4.2.1-8: INVITE (P-CSCF to UE).

Table 17.4.2.1-8: INVITE (P-CSCF to UE)

```

INVITE sip:[5555::eee:fff:aaa:bbb] SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1
Max-Forwards: 64
P-Media-Authorization: 0020000100100101706366322e78797a2e6e6574000c020133315331343363231
Supported:
Remote-Party-IDP-Asserted-Identity:
Privacy:
P-Asserted-Identity:
Privacy:
Anonymity:
From:
To:
Call-ID:

```

```

Cseq:
Require:
Supported:
Contact:
P-Called-Party-ID:
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:gosp local none
a=curr:gosp remote none
a=des:gosp mandatory local sendrecv
a=des:gosp none remote sendrecvva=rtpmap:98 H261
a=rtpmap:99:MPV
m=video 0 RTP/AVP 99
b=AS:54.6
a=curr:gosp local none
a=curr:gosp remote none
a=des:gosp mandatory local sendrecv
a=des:gosp none remote sendrecvva=rtpmap:98 H261
a=rtpmap:99:MPV
m=audio 3456 RTP/AVP 97
b=AS:25.4 96 15
a=curr:gosp local none
a=curr:gosp remote none
a=des:gosp mandatory local sendrecv
a=des:gosp none remote sendrecv
a=gosp 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 0 RTP/AVP 97 96 0 15
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

```

— P-CSCF removes the Record-Route and Via headers, calculates the proper Route header to add to future requests, and saves that information without passing it to UE. The saved value of the Route header is:

```

Route: sip:a9012.1@icscf2.p.homel.net, sip:Token(764z87.1@scscf2.homel.net,
scscf2.homel.net), sip:43lh23.1@pcscf1.homel.net

```

Via: P-CSCF removes the Via headers, and generates a locally unique token to identify the saves values. It inserts this as a branch value on its Via header.

P-Media-Authorization: A P-CSCF generated authorization token. This particular example shows a Policy-Element generated by "pcf2.xyz.net" with credentials "31S14621".

SDP The SDP contains the restricted set of codecs allowed by the network operator. The "m=" lines for the first audio stream no longer contains codec "0" (PCMU), which removes it from the negotiation.

9. **100 Trying (UE to P-CSCF)** – see example in table 17.4.2.1-9

— UE may optionally send a 100 Trying provisional response to P-CSCF.

Table 17.4.2.1-9: 100 Trying (UE to P-CSCF)

```

SIP/2.0 100 Trying
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1
From:

```

To:
Call-ID:
CSeq:
Content-Length: 0

10. 183 Session Progress (UE to P-CSCF) – see example in table 17.4.2.1-10

- UE#2 determines the complete set of codecs that it is capable of supporting for this session. It determines the intersection with those appearing in the SDP in the INVITE request. For each media flow that is not supported, UE#2 inserts a SDP entry for media (m= line) with port=0. For each media flow that is supported, UE#2 inserts a SDP entry with an assigned port and with the codecs in common with those in the SDP from UE#1.
- For this example, assume UE#2 supports both AMR and G726, but not G728 (code 15).
- UE responds with a 183 Session Progress response containing SDP back to the originator. This SDP may represent one or more media for a multimedia session. This response is sent to P-CSCF.

Table 17.4.2.1-10: 183 Session Progress (UE to P-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcsf2.visited2.net;branch=361k21.1
Remote-Party-ID-Asserted-Identity: "John Smith" <tel:+1-212-555-2222>;privacy=off<sip:user2_public1@home1.net>
Privacy: none
Anonymity: Off
Require: 100rel
From:
To: sip:B36(SHA-1(user2_public1@home1.net; 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=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97 96
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=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=qos:mandatory-sendrecv-confirm
a=rtptime:96 G726-32/8000
m=audio 0 RTP/AVP 97 96 0 15
```

Remote-Party-ID:—Identifies the answering subscriber. It contains the public user identity, and the name of the answering party.

To: A tag is added to the To header.

Contact: Identifies the IP address or FQDN of the UE.

SDP The SDP contains the subset of codecs supported by UE. It requests a confirmation of the QoS preconditions for establishing the session

11. Authorize QoS Resources

- P-CSCF authorizes the resources necessary for this session.

12. 183 Session Progress (P-CSCF to I-CSCF) – see example in table 17.4.2.1-12

—P-CSCF forwards the 183 Session Progress response to I-CSCF.

Table 17.4.2.1-12: 183 Session Progress (P-CSCF to I-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP icscf2_p.home1.net;branch=a9012.1,SIP/2.0/UDP Token(SIP/2.0/UDP
764z87.1@scscf2.home1.net,SIP/2.0/UDP icscf2_s.home1.net,SIP/2.0/UDP scscf1.home1.net),
SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1)@home1.net;tokenized-by=home1.net,SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]
Record-Route: sip:361k21.1@pcscf2.visited2.net;lr,sip:a9012.1@icscf2_p.home1.net;lr,
sip:Token(sip:764z87.1@scscf2.home1.net;lr,sip:332b23.1@scscf1.home1.net;lr),
sip:431h23.1@pcscf1.home1.net;lr)@home1.net;tokenized-by=home1.net
Remote-Party-IDP-Asserted-Identity:
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=
```

—P-CSCF restores the Via headers and Record-Route headers from the branch value in its Via.

13. 183-Session-Progress (I-CSCF to S-CSCF) – see example in table 17.4.2.1-13

—I-CSCF determines the Via and Record-Route headers, and forwards the response to S-CSCF.

Table 17.4.2.1-13: 183 Session Progress (I-CSCF to S-CSCF)

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf2.home1.net;branch=764z87.1, SIP/2.0/UDP icscf2_s.home1.net;branch=871y12.1,
    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:361k21.1@pcscf2.visited2.net;lr, sip:a9012.1@icscf2_p.home1.net;lr,
    sip:a9012.1@icscf2.home1.net;lr, sip:332b23.1@scscf1.home1.net;lr,
    sip:431h23.1@pcscf1.home1.net;lr
Remote-Party-IDP-Asserted-Identity:
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. 183 Session Progress (MT#1b to S-S) – see example in table 17.4.2.1-14

—S-CSCF forwards the 183 Session Progress response to the originator, per the S-CSCF to S-CSCF procedure.

Table 17.4.2.1-14: 183 Session Progress (MT#1b to S-S)

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP icscf2_s.home1.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]
Record-Route:
Remote-Party-IDP-Asserted-Identity: "John Smith" <tel;++1-212-555-
2222>;privacy=off<sip:user2_public1@home1.net>
Privacy: none
P-Asserted-Identity: "John Smith" <tel:+1-212-555-2222>
Privacy: none;screen=yes
Anonymity:-
Require:
From:
To:
Call-ID:
Require:
CSeq:
Contact:
RSeq:
Content-Disposition:-
Content-Type:
Content-Length:

v=
o=
s=
c=
t=

```

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

15. PRACK (S-S to MT#1b) – see example in table 17.4.2.1-15

—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 S-CSCF.

Table 17.4.2.1-15: PRACK (S-S to MT#1b)

```
PRACK sip:[5555::eee:fff:aaa:bbb] sip:scscf2.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:scscf2.home1.net;lr, sip:a9012.1@iicscf2_p.home1.net;lr,  
sip:361k21.1@pcscf2.visited2.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: 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 none remote sendrecv  
a=rtpmap: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
```

16. PRACK (S-CSCF to I-CSCF) – see example in table 17.4.2.1-16

—S-CSCF forwards the PRACK request to I-CSCF.

Table 17.4.2.1-16: PRACK (S-CSCF to I-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb] sip:icscf2_s.home1.net SIP/2.0  
Via: SIP/2.0/UDP scscf2.home1.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]  
Max-Forwards: 67  
Route: sip:icscf2_s.home1.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=
m=
m=
b=
a=
a=
a=
a=
a=
a=
m=

```

17. PRACK (I-CSCF to P-CSCF) – see example in table 17.4.2.1-17

—I-CSCF translates the Via headers in the PRACK request, and forwards the request to P-CSCF.

Table 17.4.2.1-17: PRACK (I-CSCF to P-CSCF)

```

PRACK sip:[5555::eee:fff:aaa:bbb] sip:pcscf2.visited2.net SIP/2.0
Via: SIP/2.0/UDP icscf2_p.home1.net;branch=a9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net;branch=764z87.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
pcscf1.home1.net;branch=431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]
Max-Forwards: 66
Route: sip: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=
m=
m=
b=
a=
a=
a=
a=
a=
a=
m=

```

Via: Translated to preserve configuration independence of the home network.

18. PRACK (P-CSCF to UE) – see example in table 17.4.2.1-18

—P-CSCF forwards the PRACK request to UE.

Table 17.4.2.1-18: PRACK (P-CSCF to UE)

```

PRACK sip:[5555::eee:fff:aaa:bbb] SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1
Max-Forwards: 65
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=
m=
```

Via: P-CSCF removes the Via headers, and generates a locally unique token to identify the saved values. It inserts this as a branch value on its Via header.

19. 200 OK (UE to P-CSCF) – see example in table 17.4.2.1-19

—UE acknowledges the PRACK request (18) with a 200 OK response.

Table 17.4.2.1-19: 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-Type: application/sdp
Content-Length: (...)0

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

20. 200 OK (P-CSCF to I-CSCF) – see example in table 17.4.2.1-20

—P-CSCF forwards the 200 OK response to I-CSCF.

Table 17.4.2.1-20: 200 OK (P-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_p.home1.net;branch=a9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net;branch=764z87.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
pcscf1.home1.net;branch=431h23.1)@home1.net;tokenized-by=home1.net, 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=

```

Via: P-CSCF restores the Via headers from saved values, based on the token value in the branch parameter of its Via.

21. 200 OK (I-CSCF to S-CSCF) – see example in table 17.4.2.1-21

— I-CSCF determines the Via and Record-Route headers, and forwards the 200 OK response to S-CSCF.

Table 17.4.2.1-21: 200 OK (I-CSCF to S-CSCF)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home1.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:
Content-Type:
Content-Length: _

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

```

22. 200 OK (MT#1b to S-S) – see example in table 17.4.2.1-22

— S-CSCF forwards the 200 OK response to the originator, per the S-CSCF to S-CSCF procedure.

Table 17.4.2.1-22: 200 OK (MT#1b 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-Type:
Content-Length: _

v=
o=
s=

```

C=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
m=

23. Resource Reservation

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

24. **COMETUPDATE** (S-S to MT#1b) – see example in table 17.4.2.1-24

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

Table 17.4.2.1-24: **COMETUPDATE (S-S to MT#1b)**

```
COMETUPDATE sip:[5555::eee:fff:aaa:bbb] sip:scscf2.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:scscf2.home1.net;lr, sip:a9012-1@icscf2_p.home1.net;lr,
sip:361k21-1@pcscf2.visited2.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: 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=rtpmap: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
```

25. **COMETUPDATE** (S-CSCF to I-CSCF) – see example in table 17.4.2.1-25

—S-CSCF forwards the **COMETUPDATE** request to I-CSCF.

Table 17.4.2.1-25: **COMETUPDATE (S-CSCF to I-CSCF)**

```
COMETUPDATE sip:[5555::eee:fff:aaa:bbb] sip:icscf2_p.home1.net-SIP/2.0
Via: SIP/2.0/UDP scscf2.home1.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]
Max-Forwards: 67
Route: sip:icscf2_p.home1.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=  
m=  
m=  
b=  
a=  
a=  
a=  
m=
```

26. **COMETUPDATE** (I-CSCF to P-CSCF) – see example in table 17.4.2.1-26

—I-CSCF translates the Via headers in the **COMETUPDATE** request, and forwards the request to P-CSCF.

Table 17.4.2.1-26: **COMETUPDATE (I-CSCF to P-CSCF)**

```
COMETUPDATE sip:[5555::eee:fff:aaa:bbb] sip:pcscf2.visited2.net SIP/2.0  
Via: SIP/2.0/UDP icscf2_p.home1.net;branch=a9012.1.1, SIP/2.0/UDP Token(SIP/2.0/UDP  
scscf2.home1.net;branch=764z87.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP  
pcscf1.home1.net;branch=431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP  
[5555::aaa:bbb:ccc:ddd]  
Max-Forwards: 66  
Route: sip: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=  
m=  
m=  
m=  
b=  
a=  
a=  
a=  
m=
```

Via: Translated to preserve configuration independence of the home network.

Record-Route: Translated to preserve configuration independence of the home network.

27. **COMETUPDATE** (P-CSCF to UE) – see example in table 17.4.2.1-27

—P-CSCF forwards the **COMETUPDATE** request to UE.

Table 17.4.2.1-27: **COMETUPDATE (P-CSCF to UE)**

```
COMETUPDATE 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:  
Content-Type:  
Content-Length:  
  
v=  
o=  
s=  
c=  
t=  
m=  
m=
```

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

Via: P-CSCF removes the Via headers, and generates a locally unique token to identify the saved values. It inserts this as a branch value on its Via header.

28. 200 OK (UE to P-CSCF) – see example in table 17.4.2.1-28

—UE acknowledges the [COMETUPDATE](#) request (27) with a 200 OK response.

Table 17.4.2.1-28: 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-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 none 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
```

29. 200 OK (P-CSCF to I-CSCF) – see example in table 17.4.2.1-29

—P-CSCF forwards the 200 OK response to I-CSCF.

Table 17.4.2.1-29: 200 OK (P-CSCF to I-CSCF)

```
SIP/2.0 200 OK  
Via: SIP/2.0/UDP icscf2_p.home1.net;branch=871y12.1, SIP/2.0/UDP Token(SIP/2.0/UDP  
scscf2.home1.net;branch=764z87.1, SIP/2.0/UDP scscf1.home1.net, SIP/2.0/UDP  
pcscf1.home1.net;branch=431h23.1)@home1.net;tokenized-by=home1.net, 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=
m=

—P-CSCF restores the Via headers from saved values, based on the token value in the branch parameter of its Via.

30. 200 OK (I-CSCF to S-CSCF) – see example in table 17.4.2.1-30

—I-CSCF determines the Via and Record-Route headers, and forwards the 200 OK to S-CSCF

Table 17.4.2.1-30: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home1.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:
Content-type:
Content-Length:

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

31. 200 OK (MT#1b to S-S) – see example in table 17.4.2.1-31

—S-CSCF forwards the 200 OK response to the originator, per the S-CSCF to S-CSCF procedure.

Table 17.4.2.1-31: 200 OK (MT#1b 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-type:
Content-Length:

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

32. 180 Ringing (UE to P-CSCF) – see example in table 17.4.2.1-32 (related to 17.4.2.1-8)

- Before proceeding with session establishment, the UE waits for two events. First, the resource reservation initiated in step #23 must complete successfully. Second, the resource reservation initiated by the originating endpoint must complete successfully (which is indicated by message #27 received by UE). The UE may now immediately accept the session (and proceed with step #45), or alert the destination subscriber of an incoming session attempt; if the latter it indicates this to the calling party by a 180 Ringing provisional response sent to P-CSCF.

Table 17.4.2.1-32: 180 Ringing (UE to P-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1
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-Length: 0
```

33. 180 Ringing (P-CSCF to I-CSCF) – see example in table 17.4.2.1-33

- P-CSCF forwards the 180 Ringing response to I-CSCF.

Table 17.4.2.1-33: 180 Ringing (P-CSCF to I-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP icscf2_p.home1.net;branch=a9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net;branch=764z87.1, SIP/2.0/UDP icscf2_s.home1.net;branch=871y12.1,
SIP/2.0/UDP scscf1.home1.net), SIP/2.0/UDP
pcscf1.home1.net;branch=431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]
Record-Route: sip:361k21.1@pcscf2.visited2.net;lr, sip:a9012.1@icscf2_p.home1.net;lr,
sip:Token(sip:764z87.1@scscf2.home1.net;lr, sip:332b23.1@scscf1.home1.net;lr,
sip:pcscf1.home1.net;lr)@home1.net;tokenized-by=home1.net, sip:431h23.1@pcscf1.home1.net
Require:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

34. 180 Ringing (I-CSCF to S-CSCF) – see example in table 17.4.2.1-34

- I-CSCF determines the Via and Record-Route headers, and forwards the 180 Ringing response to S-CSCF.

Table 17.4.2.1-34: 180 Ringing (I-CSCF to S-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf2.home1.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]
Record-Route: sip:361k21.1@pcscf2.visited2.net;lr, sip:871y12.1@icscf2_s.home1.net;lr,
sip:764z87.1@scscf2.home1.net;lr, sip:332b23.1@scscf1.home1.net;lr,
sip:431h23.1@pcscf1.home1.net;lr
Require:
From:
To:
Call-ID:
```

```
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

35. Service Control

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

356. 180 Ringing (MT#1b to S-S) – see example in table 17.4.2.1-356

—S-CSCF forwards the 180 Ringing response to the originating endpoint, per the S-CSCF to S-CSCF procedure.

Table 17.4.2.1-356: 180 Ringing (MT#1b to S-S)

```
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:
```

367. PRACK (S-S to MT#1b) – see example in table 17.4.2.1-367

—The originator acknowledges the 180 Ringing response (36) with a PRACK request.

Table 17.4.2.1-367: PRACK (S-S to MT#1b)

```
PRACK sip:[5555::eee:fff:aaa:bbb] sip:scscf2.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:scscf2.home1.net, sip:a9012.1@icscf2_p.home1.net;lr, sip:361k21.1@pcscf2.visited2.net;lr,
    sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq: 130 PRACK
Rack: 9022 127 INVITE
Content-Length: 0
```

378. PRACK (S-CSCF to I-CSCF) – see example in table 17.4.2.1-378

—S-CSCF forwards the PRACK request to I-CSCF.

Table 17.4.2.1-378: PRACK (S-CSCF to I-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb] sip:icscf2_s.home1.net SIP/2.0
Via: SIP/2.0/UDP scscf2.home1.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]
Max-Forwards: 67
Route: sip:icscf2_s.home1.net;lr, sip:361k21.1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Rack:
Content-Length:
```

389. PRACK (I-CSCF to P-CSCF) – see example in table 17.4.2.1-389

—I-CSCF translates the Via headers in the PRACK request, and forwards the request to P-CSCF.

Table 17.4.2.1-389: PRACK (I-CSCF to P-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb] sip:pcscf2.visited2.net SIP/2.0
Via: SIP/2.0/UDP icscf2_p.home1.net;branch=a9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net;branch=764z87.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
pcscf1.home1.net;branch=431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]
Max-Forwards: 66
Route: sip:pcscf2.visited2.net;lr sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Rack:
Content-Length:
```

Via: Translated to preserve configuration independence of the home network.

Record-Route: Translated to preserve configuration independence of the home network.

3940. PRACK (P-CSCF to UE) – see example in table 17.4.2.1-3940

—P-CSCF forwards the PRACK request to UE.

Table 17.4.2.1-3940: PRACK (P-CSCF to UE)

```
PRACK sip:[5555::eee:fff:aaa:bbb] SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1
Max-Forwards: 65
From:
To:
Call-ID:
Cseq:
Rack:
Content-Length:
```

Via: P-CSCF removes the Via headers, and generates a locally unique token to identify the saved values. It inserts this as a branch value on its Via header.

401. 200 OK (UE to P-CSCF) – see example in table 17.4.2.1-401

—UE acknowledges the PRACK request (3940) with a 200 OK response.

Table 17.4.2.1-401: 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
```

412. 200 OK (P-CSCF to I-CSCF) – see example in table 17.4.2.1-412

—P-CSCF forwards the 200 OK to I-CSCF.

Table 17.4.2.1-412: 200 OK (P-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_p.home1.net;branch=a9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net;branch=764z87.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1), SIP/2.0/UDP
pcscf1.home1.net;branch=431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]
```

```
From:
To:
Call-ID:
CSeq:
Content-Length:
```

423. 200 OK (I-CSCF to S-CSCF) – see example in table 17.4.2.1-423

—I-CSCF determines the Via and Record-Route headers, and forwards the 200 OK response to S-CSCF.

Table 17.4.2.1-423: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home1.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:
Content-Length:
```

434. 200 OK (MT#1b to S-S) – see example in table 17.4.2.1-434

—S-CSCF forwards the 200 OK to the session originator, per the S-CSCF to S-CSCF procedures.

Table 17.4.2.1-434: 200 OK (MT#1b 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:
```

445. 200 OK (UE to P-CSCF) – see example in table 17.4.2.1-445 (related to 17.4.2.1-8)

—When the called party answers, the UE sends a 200 OK final response to the INVITE request (8) to P-CSCF, and starts the media flow(s) for this session.

Table 17.4.2.1-445: 200 OK (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1
From:
To: sip:B36(SHA-1(+1-212-555-2222;-user2_public1@home1.net; time=36123E5B; seq=73))@localhost;
tag=314159
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=video-0 RTP/AVP-99
m=video-0 RTP/AVP-99
m=audio-6544 RTP/AVP-97
b=AS:25.4
a=rtptime: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
```

456. 200 OK (P-CSCF to I-CSCF) – see example in table 17.4.2.1-456

—P-CSCF indicates the resources reserved for this session should now be committed, and sends the 200 OK final response to I-CSCF.

Table 17.4.2.1-456: 200 OK (P-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_p.home1.net;branch=a9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net;branch=764z87.1, SIP/2.0/UDP icscf2_s.home1.net;branch=871y12.1,
SIP/2.0/UDP scscf1.home1.net), SIP/2.0/UDP
pcscf1.home1.net;branch=431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]
Record-Route: sip:361k21.1@pcscf2.visited2.net;lr, sip:871y12.1@icscf2_s.home1.net;lr,
sip:Token(sip:764z87.1@scscf2.home1.net;lr, sip:scscf1.home1.net;lr),
sip:431h23.1@pcscf1.home1.net;lr)@home1.net;tokenized-by=home1.net
From:
To:
Call-ID:
CSeq:
Contact:
Content-Type:
Content-Length:

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

467. 200 OK (I-CSCF to S-CSCF) – see example in table 17.4.2.1-467

—I-CSCF determines the Via and Record-Route headers, and forwards the 200 OK response to S-CSCF.

Table 17.4.2.1-467: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home1.net;branch=764z87.1, SIP/2.0/UDP icscf2_s.home1.net;branch=871y12.1,
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:361k21.1@pcscf2.visited2.net;lr, sip:a9012.1@icscf2_p.home1.net;lr,
sip:764z87.1@icscf2.home1.net;lr, sip:332b23.1@scscf1.home1.net;lr,
sip:431h23.1@pcscf1.home1.net;lr
From:
To:
Call-ID:
CSeq:
Contact:
Content-Type:
Content-Length:

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

48. Service Control

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

479. 200 OK (MT#1b to S-S) – see example in table 17.4.2.1-479

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

Table 17.4.2.1-479: 200 OK (MT#1b to S-S)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home1.net;branch=871y12.1, 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:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Type:
Content-Length:

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

4850. ACK (S-S to MT#1b) – see example in table 17.4.2.1-4850

— The calling party responds to the 200 OK final response (479) with an ACK request which is sent to S-CSCF via the S-CSCF to S-CSCF procedure.

Table 17.4.2.1-4850: ACK (S-S to MT#1b)

```
ACK sip:[5555::eee:fff:aaa:bbb] sip:scscf2.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:scscf2.home1.net;lr, sip:a9012.1@icscf2_p.home1.net;lr,
    sip:361k21.1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq: 127 ACK
Content-Length: 0
```

4951. ACK (S-CSCF to I-CSCF) – see example in table 17.4.2.1-4951

— S-CSCF forwards the ACK request to I-CSCF.

Table 17.4.2.1-4951: ACK (S-CSCF to I-CSCF)

```
ACK sip:[5555::eee:fff:aaa:bbb] sip:icscf2_s.home1.net SIP/2.0
Via: SIP/2.0/UDP scscf2.home1.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]
Route: sip:icscf2_s.home1.net;lr, sip:361k21.1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Content-Length:
```

502. ACK (I-CSCF to P-CSCF) – see example in table 17.4.2.1-502

— I-CSCF forwards the ACK request to P-CSCF.

Table 17.4.2.1-502: ACK (I-CSCF to P-CSCF)

```
ACK sip:[5555::eee:fff:aaa:bbb]sip:pcscf2-visited2.net SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home1.net;branch=871y12.1 SIP/2.0/UDP
Token(sip:scscf2.home1.net;branch=764z87.1 SIP/2.0/UDP pcscf1.home1.net;branch=332b23.1) SIP/2.0/UDP pcscf1.home1.net;branch=431h23.1 SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]
Route: sip:pcscf2.visited2.net;lr sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Contact:
Content-Length:
```

Via: Translated to preserve configuration independence of the home network.

513. ACK (P-CSCF to UE) – see example in table 17.4.2.1-513

— P-CSCF forwards the ACK request to UE.

Table 17.4.2.1-513: ACK (P-CSCF to UE)

```
ACK 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:
Content-Length:
```

Via: P-CSCF removes the Via headers, and generates a locally unique token to identify the saved values. It inserts this as a branch value on its Via header.

17.4.2.2 UE-detected failure/resource failure (not provided)

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

17.4.2.3 Origination failure (not provided)

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