

## CHANGE REQUEST

⌘ **24.228 CR 004** ⌘ rev **5** ⌘ Current version: **5.0.0** ⌘

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

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

<b>Title:</b>	⌘ MO, S-S, MT #1a reference flow update	
<b>Source:</b>	⌘ Nokia, Ericsson, mmO2, Siemens, Nortel	
<b>Work item code:</b>	⌘ IMS-CCR	<b>Date:</b> ⌘ <del>2317-0518-0411-</del> 0425-03-2002
<b>Category:</b>	⌘ <b>F</b> Use <u>one</u> of the following categories: <b>F</b> (correction) <b>A</b> (corresponds to a correction in an earlier release) <b>B</b> (addition of feature), <b>C</b> (functional modification of feature) <b>D</b> (editorial modification) Detailed explanations of the above categories can be found in 3GPP <a href="#">TR 21.900</a> .	<b>Release:</b> ⌘ REL-5 Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) REL-4 (Release 4) REL-5 (Release 5)

<b>Reason for change:</b>	⌘ Provide a complete reference update flow for 24.228
<b>Summary of change:</b>	⌘ Update based on latest IETF RFCs and I-Ds, correction of mistakes
<b>Consequences if not approved:</b>	⌘ 24.228 call flows are not standard compliant

<b>Clauses affected:</b>	⌘ 2, 7.2.2.1, 7.3.2.1, 7.4.2.1
<b>Other specs affected:</b>	⌘ <input checked="" type="checkbox"/> Other core specifications ⌘ 24.229 <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications
<b>Other comments:</b>	⌘ <a href="#">Request-URI updated</a> <a href="#">Revision 2: Require: 100rel added to 180 Ringing</a> The updated flow contains the following major changes: - Reference RFC 3261 and privacy-04 added - Loose routing adopted (change of Request-URI, Route header fields) - UPDATE method + Manyfolks-05 adopted (change of the figures, SDP, Require, Supported header fields, place of the Resource Reservation- <b>Approval of QoS commit</b> _boxes, Content-disposition header field removed) - Max-Forwards header field added to every request - Branch parameters deleted from Route and Record-Route header fields - <del>To and From header fields updated to anonymous@localhost</del> - Storage information tables at P-CSCF/S-CSCF in MO/MT flows updated - Anonymity header fields deleted (privacy-04) - <a href="#">RPID-PrivacyPrivacy</a> header field added ( <a href="#">privacy-04draft-peterson-privacy-</a>

longterm)

- Remote-Party-ID has changed to AssertedP-Asserted-Identity (draft-jennings-nai-ietf-sip-asserted-identity)

- Media-Authorization header field changed to P-Media-Authorization (call-auth-04)

- ~~'Authorize QoS Resource'~~ deleted

- ~~'Service Control'~~ changed to 'Evaluation of initial filter criterias' for INVITE, deleted for 180 Ringing, 200 OK of INVITE deleted except for INVITE

- editorial corrections

mistakes

update of the description text

update of the header descriptions

SDP update (missing parameters added)

inconsistency between MO/S-S/MT flows corrected (output of MO = input of S-S; output of S-S = input of MT)

### How to create CRs using this form:

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

Below is a brief summary:

- 1) Fill out the above form. The symbols above marked ☒ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <ftp://ftp.3gpp.org/specs/>. For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

---

## 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 23.228: "IP multimedia subsystem; Stage 2".
- [3] IETF ~~2543bis~~[RFC 3261](#): "SIP: Session Initiation Protocol" (~~ietf-sip-rfc2543bis-05.txt~~)
- [4] IETF RFC 2782: "A DNS RR for specifying the location of services (DNS SRV)".
- [5] IETF RFC 2806: "URLs for Telephone Calls".
- [6] IETF RFC 2916: "E.164 number and DNS".
- [7] 3GPP TS 33.203: "Access security for IP based services".
- [8] 3GPP TS 23.060: "General Packet Radio Service (GPRS) Service description; Stage 2".
- [9] 3GPP TS 29.207: "End to end Quality of Service (QoS); stage 3".
- [10] 3GPP TS 29.060: "General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp Interface".
- [11] 3GPP TS 29.228: "IP Multimedia (IM) Subsystem Cx Interface; Signalling flows and message contents".
- [12] 3GPP TS 24.008: "Mobile radio interface layer 3 specification; Core Network Protocols; Stage 3".
- ~~[13] IETF Privacy draft: "SIP Extensions for Network-Asserted Caller Identity and Privacy within Trusted Networks" (draft-ietf-sip-privacy-04.txt)~~
- [x] [draft-ietf-sip-asserted-identity-00 \(May 2002\): "Extensions to the Session Initiation Protocol \(SIP\) for Network Asserted Identity within Trusted Networks"](#)
- [y] [draft-ietf-sip-privacy-general-00 \(May 2002\): "A Privacy Mechanism for the Session Initiation Protocol \(SIP\)"](#).

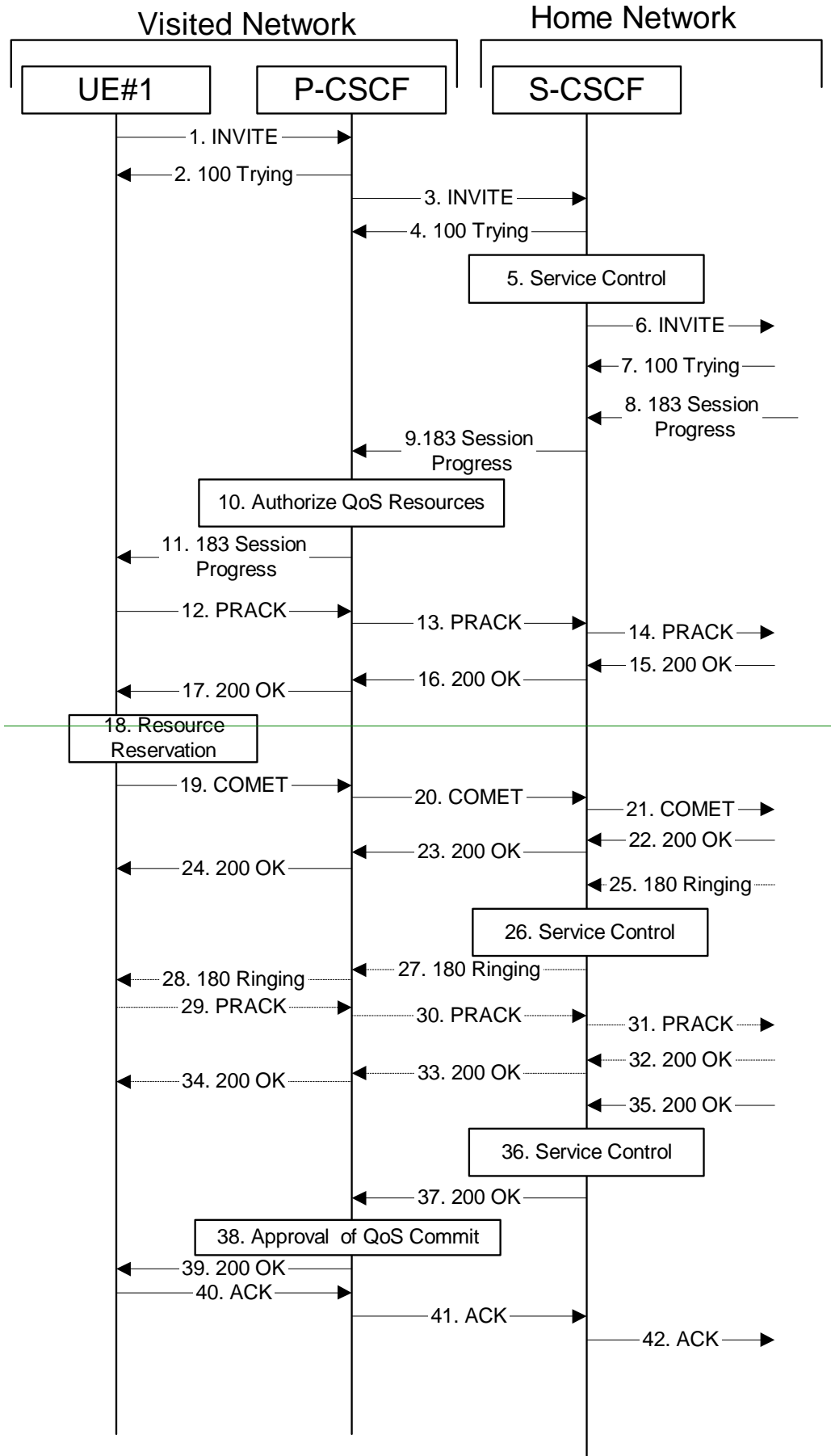
~~Editors Note: This reference to 2543 will need to be updated to reference the assigned RFC number, once the draft achieves RFC status within the IETF.~~

### 7.2.2 MO#1a

#### 7.2.2.1 (MO#1a) Mobile origination, roaming (S-S#1a, MT#1a assumed)

Figure 7.2.2.1-1 shows an origination procedure which applies to roaming subscribers when the home network operator does not desire 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 a S-CSCF. The home network provides the S-CSCF name/address as the entry point from the visited network.

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



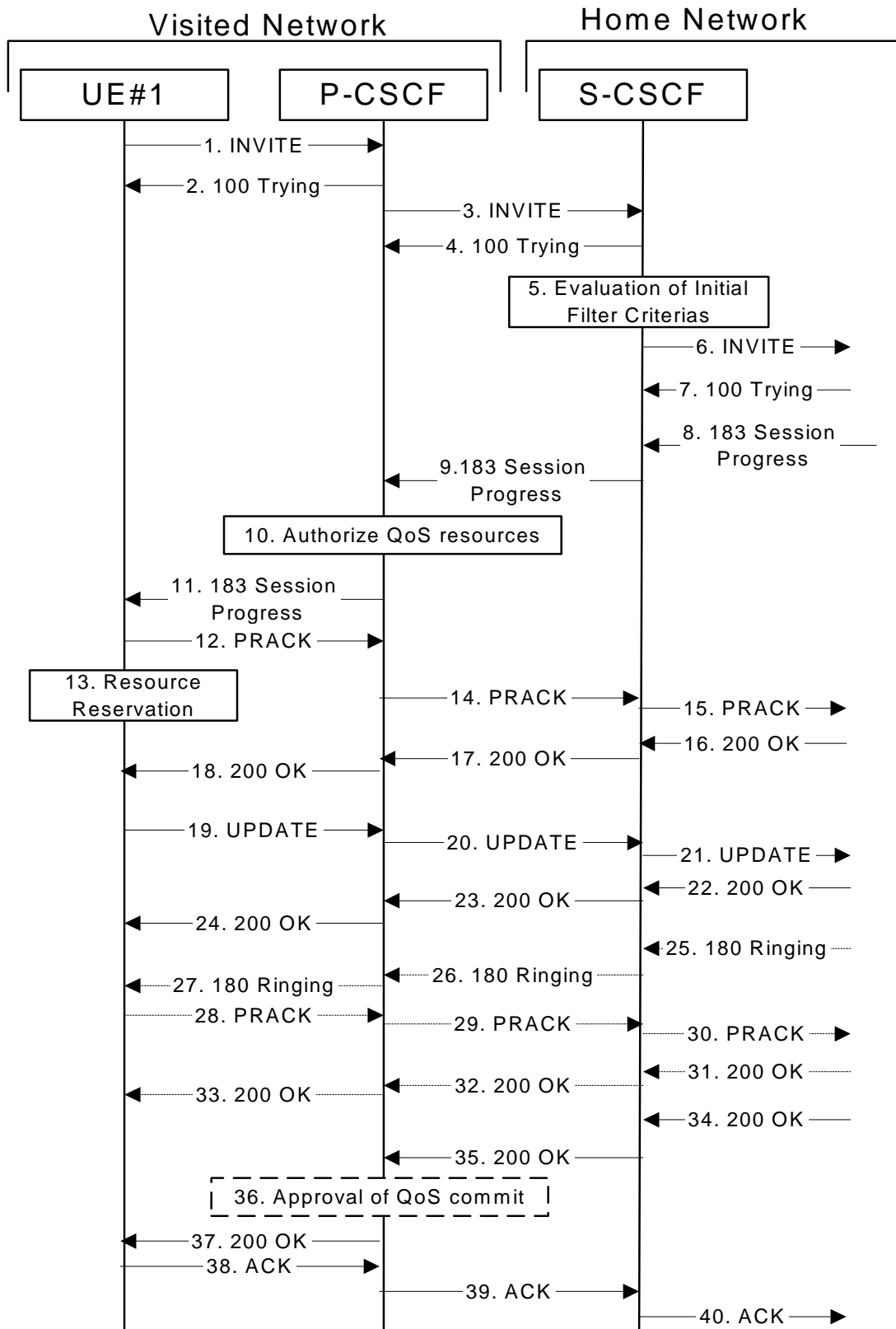


Figure 7.2.2.1-1: MO#1a

Procedure MO#1a is as follows:

1. INVITE (UE to P-CSCF) - see example in table 7.2.2.1-1

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. The initial SDP may represent one or more media for a multimedia session.

**Editor's Note:** Need to insure the codec negotiation procedures are compatible with the procedures brought into release 4 for CS domain services (BICC).

**Table 7.2.2.1-1: INVITE (UE to P-CSCF)**

```

INVITE sip:+1-212-555-2222@home1.net;user=phonetel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 70
Supported: 100rel
Require: precondition, update, 100rel
Remote-Party-ID: AssertedP-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net><tel:+1-212-555-1111>;privacy=off
RPID-Privacy: privacy=off;party=callingPrivacy: 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
Max-Forwards: 70
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=qos:mandatory sendrecv
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote 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=rtpmap:98 H261
a=rtpmap:99:MPV
a=qos:mandatory sendrecv
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:gos 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=gos:mandatory sendrecv

```

**Request-URI:** contains the 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:** ~~Asserted-Identity:~~ 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 SIP URL that contains the IP address or FQDN of the originating UE.

**SDP** The SDP contains a set 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 7.2.2.1-1b.

**Table 7.2.2.1-1b: Storage of information at P-CSCF**

```

Request-URI: sip:+1-212-555-2222@home1.net;user=phonetel:+1-212-555-2222
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
ContactRouteContact(2origlocal): sip:[5555::aaa:bbb:ccc:ddd]

```

**2. 100 Trying (P-CSCF to UE) - see example in table 7.2.2.1-2**

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

**Table 7.2.2.1-2: 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 S-CSCF) - see example in table 7.2.2.1-3**

P-CSCF remembers (from the registration procedure) the request routing for this UE. This becomes ~~the a~~ Route headerRequest-URI in the request. This next hop is the S-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 to the S-CSCF.

**Table 7.2.2.1-3: INVITE (P-CSCF to S-CSCF)**

```
INVITE sip:+1-212-555-2222@home1.net;user=phonetel:+1-212-555-2222scscf1.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
Require:
Record-Route: sip:pcscf1.visited1.net;lr
Route: sip:scscf1.home1.net;lr,+1-212-555-2222@home2.net;user=phone
Supported:
Remote-Party-ID:AssertedP-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>
RPID-Privacy+Privacy:
Anonymity:
From:
To:
Call-ID:
Cseq:
Max-Forwards: 69
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=qos:mandatory sendrecv
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote 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
```

**Request-URI:** is the first component in the remembered Path header from Registration.

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



**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).

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 7.2.2.1-3b.

**Table 7.2.2.1-3b: Storage of information at S-CSCF**

```
Request-URI: sip:+1-212-555-2222@home1.net;user=phonetel:+1-212-555-2222
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
RouteContact(2orig): sip:%5b5555%3a%3aaaa%3abb%3acc%3add%5d@pcscf1.visited1.net;
sip:[5555::aaa:bbb:ccc:ddd]
Contact(orig): sip:[5555::aaa:bbb:ccc:ddd]
```

**4. 100 Trying (S-CSCF to P-CSCF) - see example in table 7.2.2.1-4**

S-CSCF responds to the INVITE request (3) with a 100 Trying provisional response.

**Table 7.2.2.1-4: 100 Trying (S-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: 0
```

**5. Service ControlEvaluation of initial filter criterias**

S-CSCF validates the service profile of this subscriber, and evaluates the initial filter criterias. performs any origination service control required for this subscriber. For this example, assume no Application Server involvement.

— 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.

**6. INVITE (MO#1 to S-S) - see example in table 7.2.2.1-6**

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 7.2.2.1-6: INVITE request (MO#1a to S-S)**

```
INVITE sip:+1-212-555-2222@home2.net;user=phonesip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
Require:
Record-Route: sip:332b23.1@scscf1.home1.net;lr, sip:pcscf1.visited1.net;lr
Supported:
Remote-Party-ID: AssertedP-Asserted-Identity: "John Doe" <tel:+1-212-555-1111>;privacy=off;screen=yes "John Doe" <tel:+1-212-555-1111>
RPID-Privacy: Privacy:
```

P-Asserted-Identity: "John Doe" <tel:+1-212-555-1111>  
Privacy:  
~~Anonymity:~~  
From:  
To:  
Call-ID:  
Cseq:  
~~Max-Forwards: 68~~  
Require:  
Supported:  
Contact:  
Content-Type:  
Content-Length: (...)

v=0  
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd  
s=-  
c=IN IP6 5555::aaa:bbb:ccc:ddd  
t=907165275 0  
m=video 0 RTP/AVP 99  
b=AS:54.6  
~~a=qos:mandatory sendrecv~~  
a=curr:qos local none  
a=curr:qos remote none  
a=des:qos mandatory local sendrecv  
a=des:qos none remote sendrecv  
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 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

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

#### 7. 100 Trying (S-S to MO#1a) - see example in table 7.2.2.1-7 (related to table 7.2.2.1-6)

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

**Table 7.2.2.1-7: 100 Trying (S-S to MO#1a)**

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
```

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

## 8. 183 Session Progress (S-S to MO#1a) - see example in table 7.2.2.1-8 (related to table 7.2.2.1-6)

The media stream capabilities of the destination are returned along the signalling path, in a 183 Session Progress provisional response (to 6), per the S-CSCF to S-CSCF procedures.

**Table 7.2.2.1-8: 183 Session Progress (S-S to MO#1a)**

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route: sip:361k21.1@pcscf2.visited2.net;lr, sip:764z87.1@scscf2.home2.net;lr,
sip:332b23.1@scscf1.home1.net;lr, sip:240f34.1@pcscf1.visited1.net;lr
Remote-Party-ID:AssertedP-Asserted-Identity: "John Smith" <sip:user2_public1@home2.nettel:+1-
212-555-2222>;privacy=off;screen=yes
RPID-Privacy: privacy=off;party=calledPrivacy: none
P-Asserted-Identity: "John Smith" <tel:+1-212-555-2222>
Privacy: noneAnonymity: 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 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
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 7.2.2.1-8b.

**Table 7.2.2.1-8b: Storage of information at S-CSCF**

```
Request-URI: sip:+1-212-555-2222@home1.net;user=phonesip: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; tag=314159From:
"Anonymous" <sip:anonymous@localhost>; tag=171828
To: sip:anonymous@localhost; tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2dest): sip:scscf2.home2.net,sip:pcscf2.visited2.net,sip:[5555::eee:fff:aaa:bbb]
Route(2orig): sip:pcscf1.visited1.net,sip:[5555::aaa:bbb:ccc:ddd]
Contact(dest): sip:[5555::eee:fff:aaa:bbb]
Contact(orig): sip:[5555::aaa:bbb:ccc:ddd]
```

## 9. 183 Session Progress (S-CSCF to P-CSCF) - see example in table 7.2.2.1-9

S-CSCF forwards the 183 Session Progress response to P-CSCF.

**Table 7.2.2.1-9: 183 Session Progress (S-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:
Remote-Party-ID: AssertedP-Asserted-Identity:
RPID-Privacy: 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=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
a=
m=
```

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 - see example in table 7.2.2.1-9b.

**Table 7.2.2.1-9b: Storage of information at P-CSCF**

```
Request-URI: sip:+1-212-555-2222@home1.net;user=phonetel:+1-212-555-2222
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:scscf1.home1.net, sip:scscf2.home2.net, pcscf2.visited2.net
ContactRoute(2origlocal): sip:[5555::aaa:bbb:ccc:ddd]
Route(2dest): sip:332b23.1@scscf1.home1.net, sip:764z87.1@scscf2.home2.net,
pcscf2.visited2.net, sip:[5555::eee:fff:aaa:bbb]
Contact(dest): sip:[5555::eee:fff:aaa:bbb]
Contact(orig): sip:[5555::aaa:bbb:ccc:ddd]
```

## 10. 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.

## 11. 183 Session Progress (P-CSCF to UE) – see example in table 7.2.2.1-11

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

**Table 7.2.2.1-11: 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: 0020000100100101706366312e78797a2e6e6574000e02013942563330373200
Remote-Party-ID: AssertedP-Asserted-Identity:
RPID-Privacy: 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=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
m=
```

— 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 the UE. The saved value of the Route header is:

```
Route: sip:332b23.1@sescf1.home1.net, sip:764z87.1@sescf2.home2.net,
       sip:psescf2.visited2.net
```

**Media-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.

## 12. PRACK (UE to P-CSCF) - see example in table 7.2.2.1-12

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

For this example, assume UE#1 chooses AMR as the codec to use for the single audio stream.

UE includes this information in the PRACK request to P-CSCF.

**Editor's Note:** The use of three message codec negotiation (one round-trip to determine common capabilities, then originator picks the ones to use) is allowed by RFC2543, but will apparently not be supported by 2543bis. This inconsistency needs to be resolved.

**Table 7.2.2.1-12: 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
Require: precondition, 100rel, update
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: cb03a0s09a2sdfgklkj490333
Cseq: 128 PRACK
Require: preconditionMax-forwards: 70
Rack: 9021 127 INVITE
Content-Type: application/sdp
Content-Length: (...)

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

```

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

**Via:** takes 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.~~

### 123. Resource Reservation

~~After determining the final media streams in step #11, UE initiates the reservation procedures for the resources needed for this session.~~

### 134. PRACK (P-CSCF to S-CSCF) – see example in table 7.2.2.1-143

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

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

**Table 7.2.2.1-143: PRACK (P-CSCF to S-CSCF)**

```

PRACK sip:[5555::eee:fff:aaa:bbb] sescf1.home1.netSIP/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
Require:
Route: sip:scscf1.home1.net;lr, sip:764z87.1@scscf2.home2.net;lr,
sip:361k21.1@pcscf2.visited2.net;lr,sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Require:
Max-Forwards: 69
Rack:
Content-Type:
Content-Length:

```

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

#### 154. PRACK (MO#1a to S-S) – see example in table 7.2.2.1-154

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

**Table 7.2.2.1-154: PRACK (MO#1a to S-S)**

```
PRACK sip:[5555::eee:fff:aaa:bbb] scscf2.home2.netSIP/2.0  
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP  
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]  
Max-Forwards: 68  
Require:  
Route: sip:scscf2.home2.net;lr,  
sip:361k21.1@pcscf2.visited2.net;lr,sip:[5555::eee:fff:aaa:bbb]  
From:  
To:  
Call-ID:  
Cseq:  
Require:  
Max-Forwards: 68  
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.

#### 165. 200 OK (S-S to MO#1a) – see example in table 7.2.2.1-165 (related to table 7.2.2.1-154)

The destination endpoint responds to the PRACK request (14) with a 200 OK response, per the S-CSCF to S-CSCF procedures.

**Table 7.2.2.1-165: 200 OK (S-S to MO#1a)**

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

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

**176. 200 OK (S-CSCF to P-CSCF) - see example in table 7.2.2.1-176**

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

**Table 7.2.2.1-176: 200 OK (S-CSCF to P-CSCF)**

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

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

**187. 200 OK (P-CSCF to UE) - see example in table 7.2.2.1-187**

P-CSCF forwards the 200 OK response to UE.

**Table 7.2.2.1-187: 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=
```

## 18. Resource Reservation

— After determining the final media streams in step #11, UE initiates the reservation procedures for the resources needed for this session.

## 19. COMETUPDATE (UE to P-CSCF) – see example in table 7.2.2.1-19

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 7.2.2.1-19: 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
Max-Forwards: 70
Content-Type: application/sdp
Content-Length: (...)

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

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

**Via:** takes 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](#).

## 20. **COMETUPDATE** (P-CSCF to S-CSCF) – see example in table 7.2.2.1-20

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

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

**Table 7.2.2.1-20: **COMETUPDATE** (P-CSCF to S-CSCF)**

```
COMETUPDATE sip:[5555::eee:fff:aaa:bbb]sescf1.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:764z87.1@sescf2.home2.net,
sip:361k21.1@pcscf2.visited2.net,sip:[5555::eee:fff:aaa:bbb]Route: sip:scscf1.home1.net;lr,
sip:scscf2.home2.net;lr, sip:pcscf2.visited2.net;lr
From:
To:
Call-ID:
Cseq:
Max-Forwards: 69
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.

## 21. **COMETUPDATE** (MO#1a to S-S) - see example in table 7.2.2.1-21

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

**Table 7.2.2.1-21: **COMETUPDATE** (MO#1a to S-S)**

```
COMETUPDATE sip:[5555::eee:fff:aaa:bbb]sescf2.home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
Route: pcscf2.visited2.net,sip:[5555::eee:fff:aaa:bbb]Route: sip:scscf2.home2.net;lr,
sip:pcscf2.visited2.net;lr
From:
To:
Call-ID:
Cseq:
Max-Forwards: 68
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.

#### 22. 200 OK (S-S to MO#1a) – see example in table 7.2.2.1-22 (related to table 7.2.2.1-21)

The destination endpoint responds to the [COMETUPDATE](#) request (21) with a 200 OK, per the S-CSCF to S-CSCF procedures.

**Table 7.2.2.1-22: 200 OK (S-S to MO#1a)**

```
SIP/2.0 200 OK  
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP  
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]  
From:  
To:  
Call-ID:  
CSeq:  
Content-Length: 0  
Content-Type: application/sdp  
Content-Length: (...)  
  
v=0  
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd  
s=-  
c=IN IP6 5555::eee:fff:aaa:bbb  
t=907165275 0  
m=video 0 RTP/AVP 99  
m=video 0 RTP/AVP 99  
m=audio 6544 RTP/AVP 97  
b=AS:25.4  
a=curr:qos local sendrecv  
a=curr:qos remote sendrecv  
a=des:qos mandatory local sendrecv  
a=des:qos mandatory remote sendrecv  
a=rtptime:97 AMR  
a=fmtp:97 mode-set=0,2,5,7; maxframes=2  
m=audio 0 RTP/AVP 97 96 0 15
```

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

#### 23. 200 OK (S-CSCF to P-CSCF) - see example in table 7.2.2.1-23

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

**Table 7.2.2.1-23: 200 OK (S-CSCF to P-CSCF)**

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

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

### **23. Approval of QoS Commit**

The P-CSCF approves the commitment of the QoS resources.

### **24. 200 OK (P-CSCF to UE) – see example in table 7.2.2.1-24**

P-CSCF forwards the 200 OK response to UE.

**Table 7.2.2.1-24: 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=  
a=  
m=
```

### **25. 180 Ringing (S-S to MO#1a) – see example in table 7.2.2.1-25 (related to table 7.2.2.1-6)**

The called UE may optionally perform alerting. If so, it signals this to the calling party by a 180 Ringing provisional response to (6). This response is sent to S-CSCF per the S-CSCF to S-CSCF procedure.

**Table 7.2.2.1-25: 180 Ringing (S-S to MO#1a)**

```
SIP/2.0 180 Ringing  
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP  
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]  
Record-Route: sip:361k21.1@pcscf2.visited2.net;lr, sip:764z87.1@scscf2.home2.net;lr,  
sip:332b23.1@scscf1.home1.net;lr, sip:240f34.1@pcscf1.visited1.net;lr  
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
```

## 26. Service Control

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

### 276. 180 Ringing (S-CSCF to P-CSCF) – see example in table 7.2.2.1-276

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

**Table 7.2.2.1-276: 180 Ringing (S-CSCF to P-CSCF)**

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP pcsfc1.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:
```

### 287. 180 Ringing (P-CSCF to UE) - see example in table 7.1.1-278

P-CSCF removes the Record-Route headers.

P-CSCF forwards the 180 Ringing response to UE.

**Table 7.2.2.1-287: 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.~~

### 2928. PRACK (UE to P-CSCF) – see example in table 7.2.2.1-2829

UE indicates to the originating subscriber that the destination is ringing. It responds to the 180 Ringing provisional response (28) with a PRACK request.

**Table 7.2.2.1-2289: 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: cb03a0s09a2sdfg1kj490333
Cseq: 130 PRACK
Max-Forwards: 70
Rack: 9022 127 INVITE
Content-Length: 0
```

**Request-URI:** takes the value of the Contact header of the [received](#) 180 Ringing response.

**Via:** takes the value of either the IP address or FQDN of the [originating](#) 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.

### [2930](#). **PRACK (P-CSCF to S-CSCF)** – see example in table 7.2.2.1-[2930](#)

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

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

**Table 7.2.2.1-[2930](#): PRACK (P-CSCF to S-CSCF)**

```
PRACK sip:[5555::eee:fff:aaa:bbb]sescf1.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:764z87.1@sescf2.home2.net,
sip:361k21.1@pcscf2.visited2.net,sip:[5555::eee:fff:aaa:bbb]Route: sip:scscf1.home1.net;lr,
sip:scscf2.home2.net;lr, sip:pcscf2.visited2.net;lr
From:
To:
Call-ID:
Cseq:
Max-Forwards: 69
Rack:
Content-Length:
```

### [310](#). **PRACK (MO#1a to S-S)** - see example in table 7.2.2.1-[301](#)

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

**Table 7.2.2.1-[310](#): PRACK (MO#1a to S-S)**

```
PRACK sip:[5555::eee:fff:aaa:bbb]sescf2.home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
Route: sip:scscf2.home2.net;lr,
sip:361k21.1@pcscf2.visited2.net;lr,sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Max-Forwards: 68
Rack:
Content-Length:
```

### [321](#). **200 OK (S-S to MO#1a)** - see example in table 7.2.2.1-[321](#) (related to table 7.2.2.1-[310](#))

The destination endpoint responds to the PRACK request ([301](#)) with a 200 OK response.

**Table 7.2.2.1-[321](#): 200 OK (S-S to MO#1a)**

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

### [332](#). **200 OK (S-CSCF to P-CSCF)** - see example in table 7.2.2.1-[332](#)

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

**Table 7.2.2.1-332: 200 OK (S-CSCF to P-CSCF)**

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

**343. 200 OK (P-CSCF to UE) – see example in table 7.2.2.1-334**

P-CSCF forwards the 200 OK response to UE.

**Table 7.2.2.1-343: 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:
```

**354. 200 OK (S-S to MO#1a) – see example in table 7.2.2.1-354 (related to table 7.2.2.1-6)**

When the called party answers, the terminating endpoint sends a 200 OK final response to the INVITE request (6), as specified by the termination procedures and the S-CSCF to S-CSCF procedures, to S-CSCF.

**Table 7.2.2.1-354: 200 OK (S-S to MO#1a)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route: sip:361k21.1@pcscf2.visited2.net;lr, sip:764z87.1@scscf2.home2.net;lr,
sip:332b23.1@scscf1.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=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275-0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97
b=AS:25.4
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=qos:success-sendrecv
m=audio 0 RTP/AVP 97 96 0 15
```

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 7.2.2.1-35b.

**Table 7.2.2.1-35b: 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=314159
sip: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%3aceee%3affff%3aaaa%3abbb%5d@pcscf2.home1.net
Route(2orig): sip:%5b5555%3a%3aaaa%3abbb%3aceee%3add%5d@pcscf1.visited1.net

```

**36. Service Control**

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

**375. 200 OK (S-CSCF to P-CSCF) – see example in table 7.2.2.1-357**

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

**Table 7.2.2.1-375: 200 OK (S-CSCF to P-CSCF)**

```

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

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

```

**386. Approval of QoS Commit**

The P-CSCF approves the commitment of the QoS resources if it was not approved already in step (10).

**3976. 200 OK (P-CSCF to UE) – see example in table 7.2.2.1-3967**

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 7.2.2.1-3967: 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-Types:
Content-Length:

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

```



α=  
m=

—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.

#### 37840. ACK (UE to P-CSCF) – see example in table 7.2.2.1-373840

UE starts the media flow for this session, and responds to the 200 OK (37) with an ACK request sent to P-CSCF.

**Table 7.2.2.1-37840: ACK (UE to P-CSCF)**

```
ACK sip:[5555::eee:fff:aaa:bbb] SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 70
From: "Alien Blaster" <sip:B36(SHA-1(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
Max-Forwards: 70
Content-Length: 0
```

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

#### 38941. ACK (P-CSCF to S-CSCF) – see example in table 7.2.2.1-38941

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

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

**Table 7.2.2.1-3841: ACK (P-CSCF to S-CSCF)**

```
ACK sip:[5555::eee:fff:aaa:bbb]scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 69
Route: sip:scscf1.home1.net;lr, sip:764z87-1@scscf2.home2.net;lr,
sip:361k21-1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Max-Forwards: 69
Content-Length:
```

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

**Route:** saved from the 200 OK 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.

#### 394042. ACK (MO#1a to S-S) - see example in table 7.2.2.1-394042

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

**Table 7.2.2.1-394042: ACK (MO#1a to S-S)**

```
ACK sip:[5555::eee:fff:aaa:bbb]scscf2.home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
Route: sip:scscf2.home2.net;lr, sip:361k21-1@pcscf2.visited2.net;lr,
sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Max-Forwards: 68
```

## 7.3.2 S-S#1a

### 7.3.2.1 (S-S#1a) Different network operators performing origination and termination (MO#1a, MT#1a assumed)

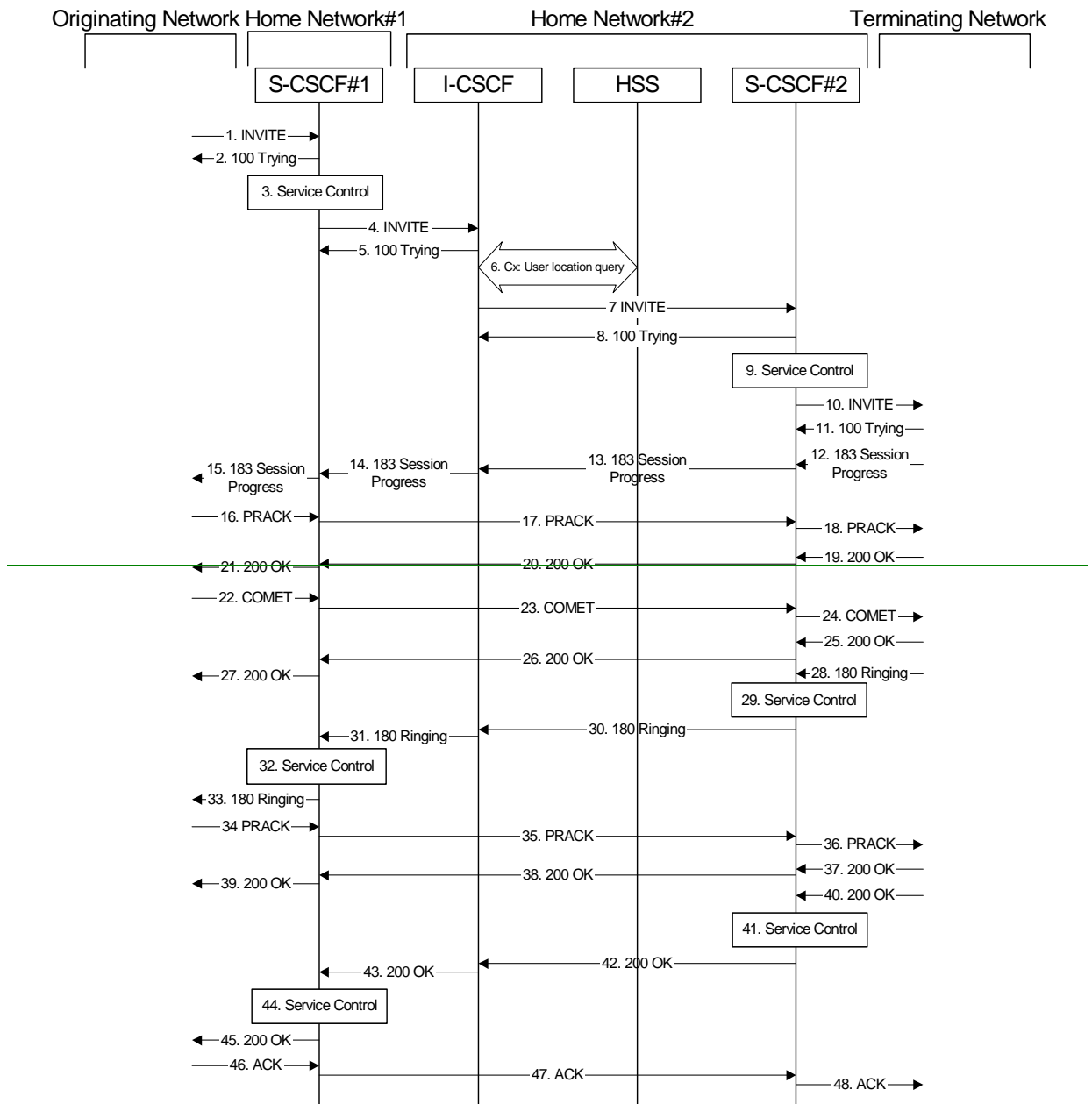
Figure 7.3.2.1-1 shows a S-CSCF handling session origination (S-CSCF#1), which performs an analysis of the destination address, and determines that it belongs to a subscriber of a different operator. The originating network operator does not desire to keep their configuration hidden, so it forwards the request to a well-known entry point in the destination operator's network, I-CSCF. I-CSCF queries the HSS for current location information, and finds the S-CSCF assigned to the subscriber (S-CSCF#2), and forwards the request to S-CSCF#2. The terminating network operator does not desire to keep their configuration hidden, so the I-CSCF does not insert itself into the signalling path for future exchanges. This example flow does not show Application Server involvement.

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

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

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

- MT#1a** Mobile termination, roaming, without a THIG. The "Terminating Network" of S-S#1a is a visited network.
- MT#1b** Mobile termination, roaming, with a THIG in home network. The "Terminating Network" of S-S#1a is a visited network.
- MT#2** Mobile termination, located in home service area. The "Terminating Network" of S-S#1a is the home network.



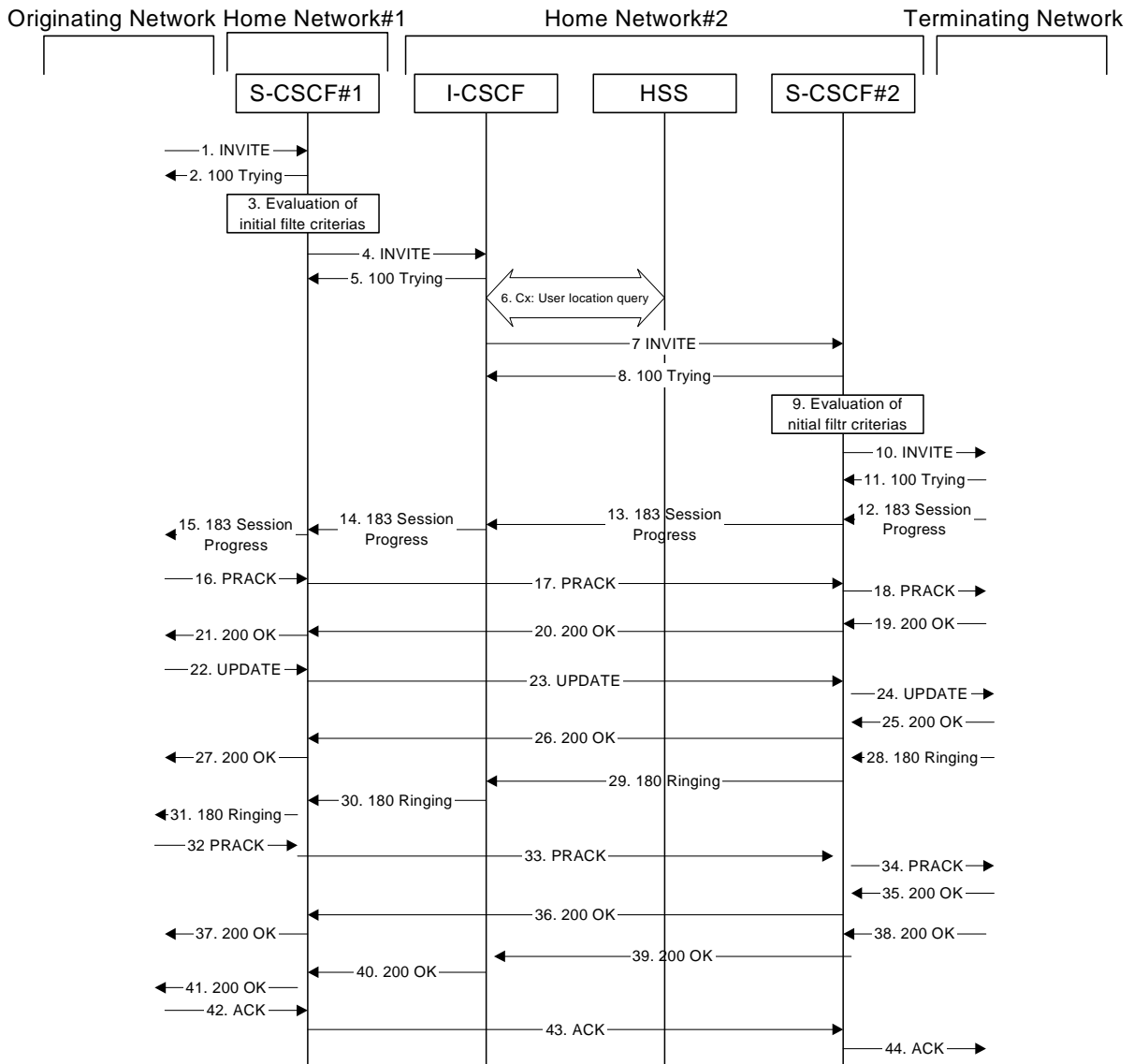


Figure 7.3.2.1-1: S-S#1a

Procedure S-S#1a is as follows:

1. INVITE (MO to S-S#1a) – see example in table 7.3.2.1-1

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

Table 7.3.2.1-1: INVITE (MO to S-S#1a)

```

INVITE sip:+1-212-555-2222@home1.net;user=phonetel:+1-212-555-2222scscf1.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
Require: precondition, update, 100rel
Record-Route: sip:240f34.1@pcscf1.visited1.net;lr
Route: sip:scscf1.home1.net;lr,+1-212-555-2222@home1.net;user=phone
Supported: 100rel
Remote-Party-ID:AssertedP-Asserted-Identity: "John Doe" <sip:user1_public1@home1.nettel:+1-212-555-1111>;privacy=off
RPID-Privacy: privacy=off;party=callingPrivacy: 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
Max-Forwards: 69
Contact: [5555::aaa:bbb:ccc:ddd]
Content-Type: application/sdp
Content-Length: (...)

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

```

2. **100 Trying (S-S#1a to MO)** – see example in table 7.3.2.1-2

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

**Table 7.3.2.1-2: 100 Trying (S-S#1a to MO)**

```

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: 0

```

3. **Service Control Evaluation of initial filter criterias**

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

- ~~S-CSCF#1 performs whatever service control logic is appropriate for this session attempt.~~
- ~~S-CSCF#1 examines the media parameters, and removes any choices that the subscriber does not have authority to request.~~

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

#### 4. INVITE (S-CSCF to I-CSCF) – see example in table 7.3.2.1-4

S-CSCF#1 performs an analysis of the destination address, and determines the network operator to whom the destination subscriber belongs. Since the originating operator does not desire to keep their internal configuration hidden, S-CSCF#1 forwards the INVITE request directly to I-CSCF in the destination network.

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

**Table 7.3.2.1-4: INVITE (S-CSCF to I-CSCF)**

```
INVITE sip:+1-212-555-2222@home2.net;user=phonesip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1 SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
Require:
Record-Route: sip:332b23.1@scscf1.home1.net;lr, sip:240f34.1@pcscf1.visited1.net;lr
Supported:
Remote-Party-ID: AssertedP-Asserted-Identity: "John Doe" <tel:+1-212-555-1111>;
privacy=off;screen=yes"John Doe" <tel:+1-212-555-1111>
RPID-Privacy: Privacy:
P-Asserted-Identity: "John Doe" <tel:+1-212-555-1111>
Privacy:
Anonymity:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Max-Forwards: 68
Contact:
Content-Type:
Content-Length: (...)

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

```
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
```

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

**P-Asserted-Identity:** S-CSCF inserts the TEL-URL of the user.

#### 5. 100 Trying (I-CSCF to S-CSCF) – see example in table 7.3.2.1-5

I-CSCF responds to the INVITE request (4) by sending a 100 Trying provisional response to S-CSCF#1.

**Table 7.3.2.1-5: 100 Trying (I-CSCF to S-CSCF)**

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

#### 6. Cx: User Location Query procedure

The I-CSCF sends a query to the HSS to find out the S-CSCF of the called user. The HSS responds with the address of the current S-CSCF for the terminating subscriber.

For detailed message flows see 3GPP TS 29.228 [11].

Table 6.3.2-6a provides the parameters in the SIP INVITE request (flow 4), which are sent to the HSS.

**Table 7.3.2.1-6a Cx: User registration status query procedure (I-CSCF to HSS)**

Message source & destination	Cx: Information element name	Information source in SIP INVITE	Description
I-CSCF to HSS	User Public Identity	Request-URI:	This information element indicates the public user identity

Table 7.3.2.1-6b provides the parameters sent from the HSS that need to be mapped to SIP INVITE (flow 7) and sent to S-CSCF.

**Table 7.3.2.1-6b Cx: User registration status query procedure (HSS to I-CSCF)**

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

#### 7. INVITE (I-CSCF to S-CSCF) – see example in table 7.3.2.1-7

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

**Table 7.3.2.1-7: INVITE (I-CSCF to S-CSCF)**

```
INVITE sip:+1-212-555-2222@home2.net;user=phonesip:user2_public1@home2.net;scscf2.home2.net SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
    SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
```





Call-ID:  
CSeq:  
Content-Length: 0

## 9. Service ControlEvaluation of initial filter criterias

- S-CSCF#2 performs whatever service control logic is appropriate for this session attempt. S-CSCF#2 validates the service profile of this subscriber and evaluates the initial filter criterias.
- S-CSCF#2 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.

## 10. INVITE (S-S#1a to MT) – see example in table 7.3.2.1-10

S-CSCF#2 forwards the INVITE request, as determined by the termination procedure. S-CSCF#2 remembers (from the registration procedure) the UE Contact address and the next hop CSCF for this UE.

S-CSCF#2 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 7.3.2.1-10: INVITE (S-S#1a to MT)**

```
INVITE sip:[5555::eee:fff:aaa:bbb]pcscf2.visited2.net SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1,
    SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 66
Require:
Route: sip:pcscf2.visited2.net sip:+1-212-555-2222@home2.net;user=phone
Record-Route: sip:764z87.1@scscf2.home2.net;lr, sip:332b23.1@scscf1.home1.net;lr,
sip:pcscf1.visited1.net;lr
Route: sip:pcscf2.visited2.net;lr
Supported+
Remote-Party-ID: AssertedP-Asserted-Identity:
RPID-Privacy: Privacy:
P-Asserted-Identity:
Privacy:
Anonymity+
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Max-Forwards: 66
Contact:
P-Called-Party-ID: <sip:+1-212-555-2222@home2.net;user=phone sip:user2_public1@home2.net>
Content-Type:
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=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 sendrecv
a=rtpmap:99:MPV
```

```

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

```

#### 11. 100 Trying (MT to S-S#1a) – see example in table 7.3.2.1-11 (related to table 7.3.2.1-10)

S-CSCF#2 receives a 100 Trying provisional response to the INVITE request (10), as specified by the termination procedures.

**Table 7.3.2.1-11: 100 Trying (MT to S-S#1a)**

```

SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=871y12.1556u87-1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
    SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0

```

#### 12. 183 Session Progress (MT to S-S#1a) – see example in table 7.3.2.1-12 (related to table 7.3.2.1-10)

The media stream capabilities of the destination are returned along the signalling path, in a 183 Session Progress provisional response to the INVITE request (10), as per the termination procedure.

**Table 7.3.2.1-12: 183 Session Progress (MT to S-S#1a)**

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1,
    SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route: sip:361k21.1@pcscf2.visited2.net;lr, sip:764z87.1@scscf2.home2.net;lr,
    sip:332b23.1@scscf1.home1.net;lr, sip:240f34.1@pcscf1.visited1.net;lr
Remote-Party-ID: AssertedP-Asserted-Identity: "John Smith" <sip:user2_public1@home2.nettel++1-212-
    555-2222>;privacy=off
RPID-Privacy: privacy=off;party=calledPrivacy: none
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 96
b=AS:25.4-3
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtptime:96 G726-32/8000
a=qos:mandatory-sendrecv-confirm
m=audio 0 RTP/AVP 97 96 0 15

```

### 13. 183 Session Progress (S-CSCF to I-CSCF) – see example in table 7.3.2.1-13

S-CSCF#2 forwards the 183 Session Progress provisional response to I-CSCF.

**Table 7.3.2.1-13: 183 Session Progress (S-CSCF to I-CSCF)**

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route:
Remote-Party-ID: AssertedP-Asserted-Identity: "John Smith" <tel:+1-212-555-
2222>;privacy=off;screen=yes
RPID-Privacy: Privacy+
P-Asserted-Identity: "John Smith" <tel:+1-212-555-2222>
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-Asserted-Identity: S-CSCF inserts the TEL-URL of the user.](#)

#### 14. 183 Session Progress (I-CSCF to S-CSCF) – see example in table 7.3.2.1-14

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

**Table 7.3.2.1-14: 183 Session Progress (I-CSCF to S-CSCF)**

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route:
Remote-Party-ID:AssertedP-Asserted-Identity:
P-Asserted-Identity:
RPID-Privacy: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=
```

#### 15. 183 Session Progress (S-S#1a to MO) – see example in table 7.3.2.1-15

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

**Table 7.3.2.1-15: 183 Session Progress (S-S#1a to MO)**

```
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:
Remote-Party-ID:AssertedP-Asserted-Identity:
P-Asserted-Identity:
RPID-Privacy: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=
```

#### 16. PRACK (MO to S-S#1a) – see example in table 7.3.2.1-16

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

**Table 7.3.2.1-16: PRACK (MO to S-S#1a)**

```
PRACK sip:[5555::eee:fff:aaa:bbb]scscf1.home1.net SIP/2.0  
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]  
Max-Forwards: 69  
Require:  
Route: sip:scscf1.home1.net;lr, sip:764z87-1@scscf2.home2.net;lr,  
sip:361k21-1@pcscf2.visited2.net;lr, [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  
Max-Forwards: 69  
Rack: 9021 127 INVITE  
Content-Type: application/sdp  
Content-Length: (...)  
  
v=0  
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd  
s=-  
c=IN IP6 5555::aaa:bbb:ccc:ddd  
t=907165275 0  
m=video 0 RTP/AVP 99  
m=video 0 RTP/AVP 99  
m=audio 3456 RTP/AVP 97  
b=AS:25.4  
a=curr:qos local none  
a=curr:qos remote none  
a=des:qos mandatory local sendrecv  
a=des:qos mandatory remote sendrecv  
a=rtptime:97 AMR  
a=fmtp:97 mode-set=0,2,5,7; maxframes=2  
a=qos:mandatory-sendrecv  
m=audio 0 RTP/AVP 97 96 0 15
```

#### 17. PRACK (S-CSCF to S-CSCF) – see example in table 7.3.2.1-17

S-CSCF#1 forwards the PRACK request to S-CSCF#2.

**Table 7.3.2.1-17: PRACK (S-CSCF to S-CSCF)**

```
PRACK sip:[5555::eee:fff:aaa:bbb]scscf2.home2.net SIP/2.0  
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,  
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]  
Max-Forwards: 68  
Require:  
Route: sip:scscf2.home2.net;lr, sip:361k21-1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]  
From:  
To:  
Call-ID:
```

```

Cseq:
Require:
Max-Forwards: 68
Rack:
Content-Type:
Content-Length:

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

```

**18. PRACK (S-S#1a to MT) – see example in table 7.3.2.1-18**

S-CSCF#2 forwards the PRACK request to the terminating endpoint, as per the termination procedure.

**Table 7.3.2.1-18: PRACK (S-S#1a to MT)**

```

PRACK sip:pcscf2.visited2.netsip:[5555::eee:fff:aaa:bbb] SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 67
Require:
Route: –sip:pcscf2.visited2.net;lrsip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Require:
Max-Forwards: 67
Rack:
Content-Type:
Content-Length:

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

```

**19. 200 OK (MT to S-S#1a) – see example in table 7.3.2.1-19 (related to table 7.3.2.1-18)**

The terminating endpoint responds to the PRACK request (18) with a 200 OK response.

**Table 7.3.2.1-19: 200 OK (MT to S-S#1a)**

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

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

**20. 200 OK (S-CSCF to S-CSCF) – see example in table 7.3.2.1-20**

S-CSCF#2 forwards the 200 OK response to S-CSCF#1.

**Table 7.3.2.1-20: 200 OK (S-CSCF to S-CSCF)**

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

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

**21. 200 OK (S-S#1a to MO) – see example in table 7.3.2.1-21**

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

**Table 7.3.2.1-21: 200 OK (S-S#1a to MO)**

```

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=

```

22. **COMETUPDATE** (MO to S-S#1a) – see example in table 7.3.2.1-22

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

**Table 7.3.2.1-22: COMETUPDATE (MO to S-S#1a)**

```

COMETUPDATE sip:[5555::eee:fff:aaa:bbb]scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 69
Route: sip:scscf1.home1.net;lr, sip:764z87-1@scscf2.home2.net;lr,
      sip:361k21-1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From: "Alien Blaster" <sip:B36(SHA-1(555-2222; time=36123E5B; seq=72))@localhost>;tag=171828
To: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
Call-ID: cb03a0s09a2sdfgklkj490333
Cseq: 129 COMETUPDATE
Max-Forwards: 69
Content-Type: application/sdp
Content-Length: (...)

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

```

23. **COMETUPDATE** (S-CSCF to S-CSCF) – see example in table 7.3.2.1-23

S-CSCF#1 forwards the **COMETUPDATE** request to S-CSCF#2.

**Table 7.3.2.1-23: COMETUPDATE (S-CSCF to S-CSCF)**

```

COMETUPDATE sip:[5555::eee:fff:aaa:bbb]sip:scscf2.home2.net SIP/2.0

```



```

Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
Route: sip:scscf2.home2.net;lr, sip:361k21-1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Max-Forwards: 68
Content-Type:
Content-Length:

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

```

24. **COMETUPDATE** (S-S#1a to MT) – see example in table 7.3.2.1-24

S-CSCF#2 forwards the **COMETUPDATE** request to the terminating endpoint, as per the termination procedure.

**Table 7.3.2.1-24: COMETUPDATE (S-S#1a to MT)**

```

COMETUPDATE sip:[5555::eee:fff:aaa:bbb]pcscf2.visited2.net SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 67
Route: sip:pcscf2.visited2.net;lr,sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Max-Forwards: 67
Content-Type:
Content-Length:

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

```

25. **200 OK** (MT to S-S#1a) – see example in table 7.3.2.1-25 (related to table 7.3.2.1-24)

The terminating endpoint responds to the **COMETUPDATE** request (24) with a 200 OK response.

**Table 7.3.2.1-25: 200 OK (MT to S-S#1a)**

```
SIP/2.0 200 OK
```

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

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

**26. 200 OK (S-CSCF to S-CSCF) – see example in table 7.3.2.1-26**

S-CSCF#2 forwards the 200 OK response to S-CSCF#1.

**Table 7.3.2.1-26: 200 OK (S-CSCF to S-CSCF)**

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

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

**27. 200 OK (S-S#1a to MO) – see example in table 7.3.2.1-27**

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

**Table 7.3.2.1-27: 200 OK (S-S#1a to MO)**

```
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:
Content-Type:
Content-Length:

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

**28. 180 Ringing (MT to S-S#1a) – see example in table 7.3.2.1-28 (related to table 7.3.2.1-10)**

The terminating endpoint may optionally send a 180 Ringing provisional response indicating alerting is in progress. This response is sent by the termination procedure to S-CSCF#2.

**Table 7.3.2.1-28: 180 Ringing (MT to S-S#1a)**

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1,
SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route: sip:361k21.1@pcscf2.visited2.net,sip:764z87.1@scscf2.home2.net,
sip:332b23.1@scscf1.home1.net,sip:240f34.1@pcscf1.visited1.netRecord-Route:
sip:pcscf2.visited2.net;lr, sip:scscf2.home2.net;lr, sip:scscf1.home1.net;lr,
sip:pcscf1.visited1.net;lr
Require:
From:
To:
Call-ID:
CSeq:
Require: 100rel
Contact: sip:[5555::eee:fff:aaa:bbb]
RSeq: 9022
Content-Length: 0
```

**29. Service Control**

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

**3029. 180 Ringing (S-CSCF to I-CSCF) – see example in table 7.3.2.1-2930**

S-CSCF#2 forwards the 180 Ringing response to I-CSCF.

**Table 7.3.2.1-2930: 180 Ringing (S-CSCF to I-CSCF)**

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route:
Require:
From:
To:
```

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

### 3031. 180 Ringing (I-CSCF to S-CSCF) – see example in table 7.3.2.1-301

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

**Table 7.3.2.1-310: 180 Ringing (I-CSCF to S-CSCF)**

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route:
Require:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

## 32. Service Control

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

### 331. 180 Ringing (S-S#1a to MO) – see example in table 7.3.2.1-313

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

**Table 7.3.2.1-331: 180 Ringing (S-S#1a to MO)**

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

### 324. PRACK (MO to S-S#1a) – see example in table 7.3.2.1-324

The originator acknowledges the 180 Ringing provisional response (331) with a PRACK request.

**Table 7.3.2.1-342: PRACK (MO to S-S#1a)**

```
PRACK sip:scscf1.home1.net PRACK sip:[5555::eee:fff:aaa:bbb]SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 69
Route: sip:scscf1.home1.net;lr, sip:764z87-1@scscf2.home2.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: 130 PRACK
Max-Forwards: 69
Rack: 9022 127 INVITE
Content-Length: 0
```

**353. PRACK (S-CSCF to S-CSCF) – see example in table 7.3.2.1-335**

S-CSCF#1 forwards the PRACK request to S-CSCF#2.

**Table 7.3.2.1-353: PRACK (S-CSCF to S-CSCF)**

```
PRACK sip:[5555::eee:fff:aaa:bbb]sip:scscf2.home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
Route: sip:scscf2.home2.net;lr, sip:361k21.1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Max-Forwards: 68
Rack:
Content-Length:
```

**364. PRACK (S-S#1a to MT) – see example in table 7.3.2.1-346**

S-CSCF#2 forwards the PRACK request to the terminating endpoint.

**Table 7.3.2.1-346: PRACK (S-S#1a to MT)**

```
PRACK sip:[5555::eee:fff:aaa:bbb]sip:pcscf2.visited2.net SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 67
Route: sip:pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Max-Forwards: 67
Rack:
Content-Length:
```

**375. 200 OK (MT to S-S#1a) – see example in table 7.3.2.1-375 (related to table 7.3.2.1-364)**

The terminating endpoint responds to the PRACK request (364) with a 200 OK response.

**Table 7.3.2.1-375: 200 OK (MT to S-S#1a)**

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

**368. 200 OK (S-CSCF to S-CSCF) – see example in table 7.3.2.1-368**

S-CSCF#2 forwards the 200 OK response to S-CSCF#1.

**Table 7.3.2.1-368: 200 OK (S-CSCF to S-CSCF)**

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

### 379. 200 OK (S-S#1a to MO) – see example in table 7.3.2.1-379

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

**Table 7.3.2.1-3937: 200 OK (S-S#1a to MO)**

```
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:
```

### 3840. 200 OK (MT to S-S#1a) – see example in table 7.3.2.1-3840 (related to table 7.3.2.1-10)

The final response to the INVITE request (10), 200 OK, is sent by the terminating endpoint over the signalling path. This is typically generated when the subscriber has accepted the incoming session attempt. The response is sent to S-CSCF#2 per the termination procedure.

**Table 7.3.2.1-3840: 200 OK (MT to S-S#1a)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1,
SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route: sip:361k21.1@pcscf2.visited2.net;lr, sip:764z87.1@scscf2.home2.net;lr,
sip:332b23.1@scscf1.home1.net;lr, sip:240f34.1@pcscf1.visited1.net;lr
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: sip:[5555::eee:fff:aaa:bbb]
Content-Type: application/sdp
Content-Length: 0 (...)
```

```
v=0
o=-2987933615-2987933615-IN-IP6-5555::aaa:bbb:ccc:ddd
s=
e=IN-IP6-5555::eee:fff:aaa:bbb
t=907165275-0
m=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
```

## 41. Service Control

— S-CSCF#2 performs whatever service control logic is appropriate for this session completion.

### 3942. 200 OK (S-CSCF to I-CSCF) – see example in table 7.3.2.1-3942

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

**Table 7.3.2.1-3942: 200 OK (S-CSCF to I-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Type:
Content-Length:
```

```

V=
O=
S=
E=
t=
m=
m=
m=
b=
a=
a=
a=
m=

```

**430. 200 OK (I-CSCF to S-CSCF) – see example in table 7.3.2.1-403**

The 200 OK response is forwarded to S-CSCF#1.

**Table 7.3.2.1-403: 200 OK (I-CSCF to S-CSCF)**

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP 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=

```

**44. Service Control**

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

**451. 200 OK (S-S#1a to MO) – see example in table 7.3.2.1-415**

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

**Table 7.3.2.1-451: 200 OK (S-S#1a to MO)**

```

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

V=
O=
S=
E=

```

```

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

```

**462. ACK (MO to S-S#1a) – see example in table 7.3.2.1-426**

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

**Table 7.3.2.1-462: ACK (MO to S-S#1a)**

```

ACK sip:[5555::eee:fff:aaa:bbb]sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 69
Route: sip:scscf1.home1.net;lr, sip:764z87.1@scscf2.home2.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: 127 ACK
Max-Forwards: 69
Content-Length: 0

```

**473. ACK (S-CSCF to S-CSCF) – see example in table 7.3.2.1-437**

S-CSCF#1 forwards the ACK request to S-CSCF#2.

**Table 7.3.2.1-473: ACK (S-CSCF to S-CSCF)**

```

ACK sip:[5555::eee:fff:aaa:bbb]sip:scscf2.home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
Route: sip:scscf2.home2.net;lr, sip:361k21.1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Max-Forwards: 68
Content-Length:

```

**448. ACK (S-S#1a to MT) – see example in table 7.3.2.1-448**

S-CSCF#2 forwards the ACK request to the terminating endpoint, as per the termination procedure.

**Table 7.3.2.1-448: ACK (S-S#1a to MT)**

```

ACK sip:[5555::eee:fff:aaa:bbb]sip:pcscf2.visited2.net SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 67
Route: sip:pcscf2.visited2.net;lr,sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Max-Forwards: 67
Content-Length:

```

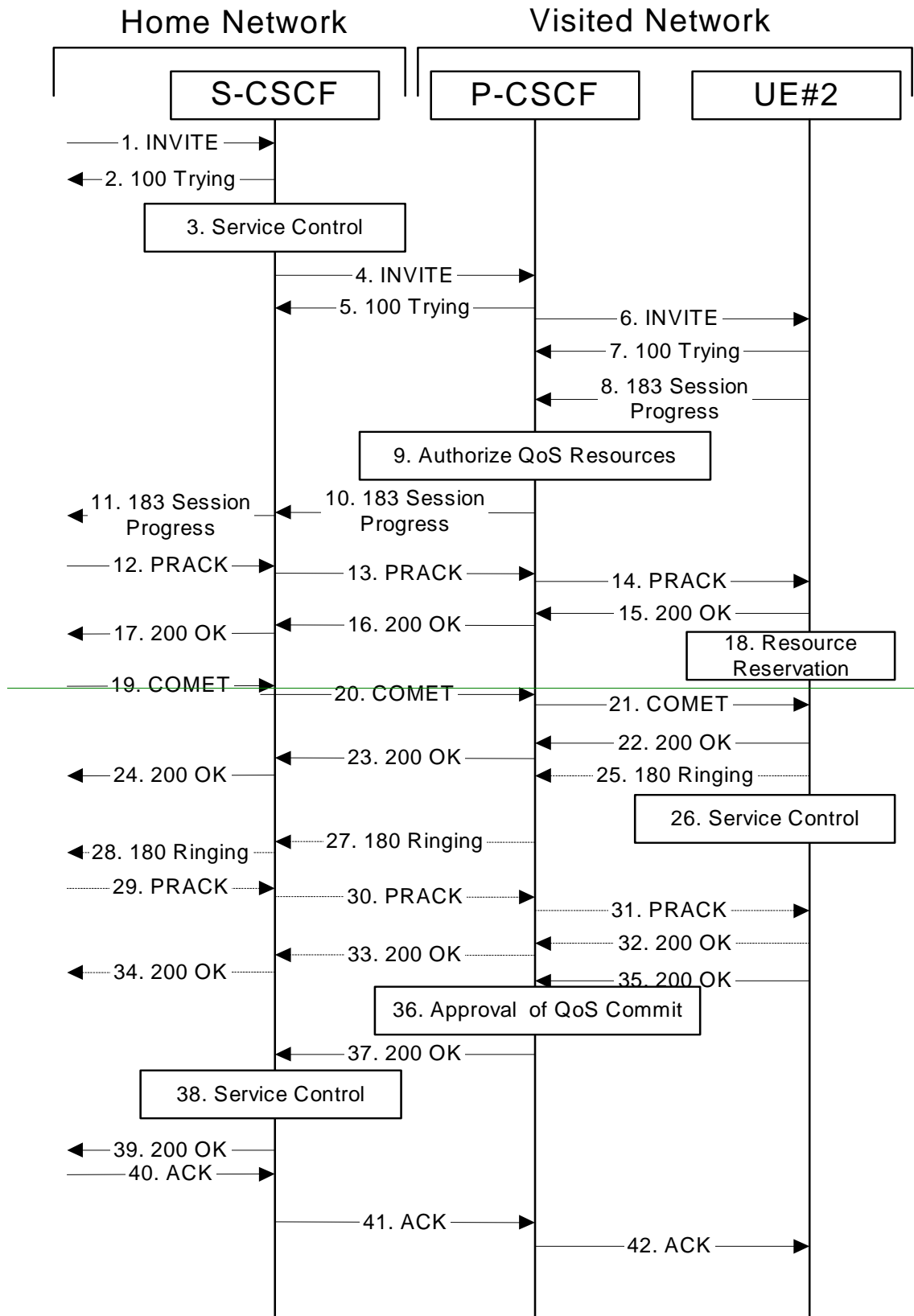
**7.4.2 MT#1a**

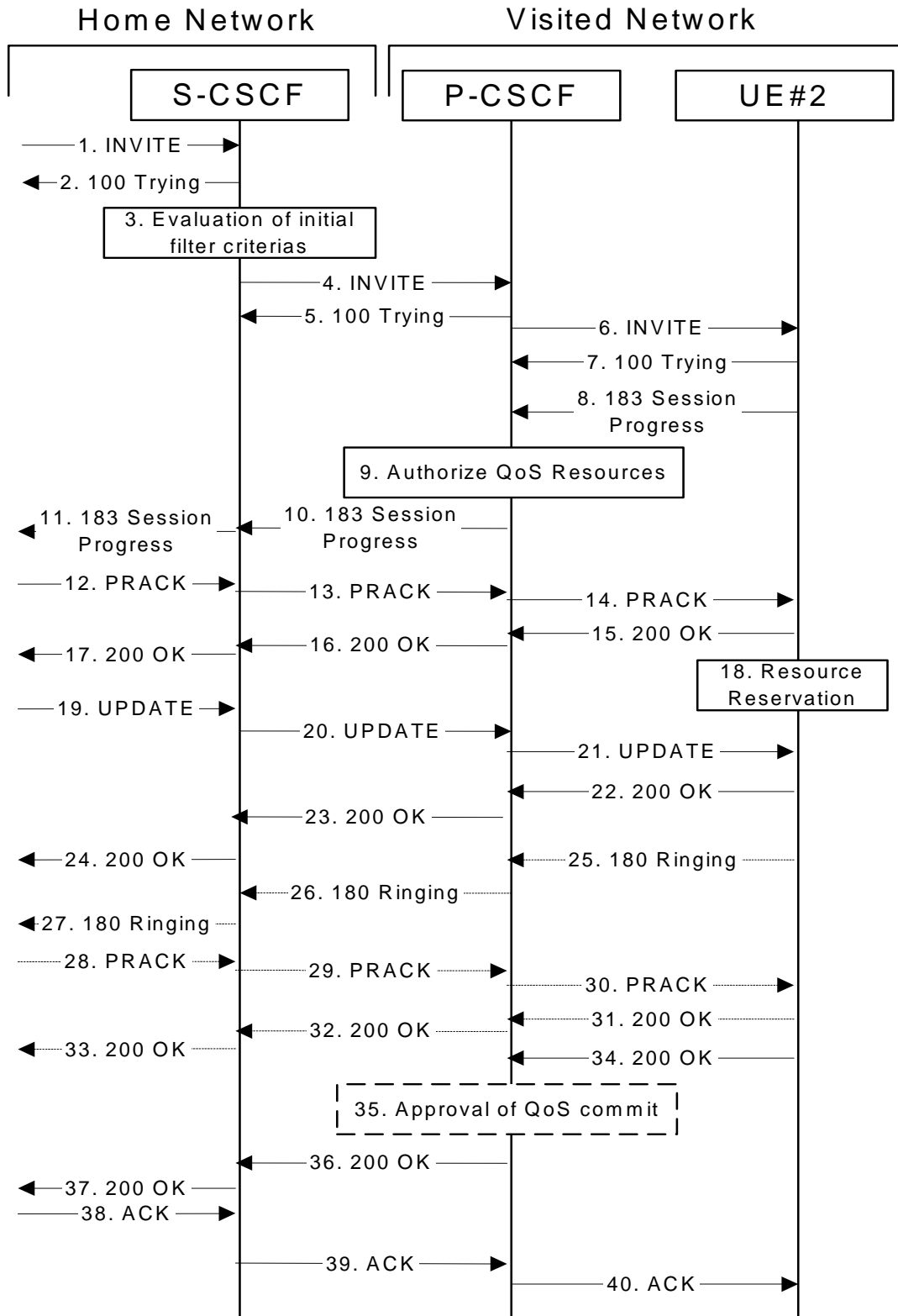


#### 7.4.2.1 (MT#1a) Mobile termination, roaming (MO#1a, S-S#1a assumed)

Figure 7.4.2.1 shows a termination procedure which applies to roaming subscribers when the home network operator does not desire 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 the S-CSCF.

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





**Figure 7.4.2.1-1: MT#1a**

Procedure MT#1a is as follows:

**1. INVITE (S-S to MT#1a) – see example in table 7.4.2.1-1**

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 7.4.2.1-1: INVITE (S-S to MT#1a)**

```

INVITE sip:+1-212-555-2222@home2.net/user=phonesip:user2_public1@home2.net sip:sescf2.home2.net
SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 67
Require: precondition, update, 100rel
Record-Route: sip:332b23.1@scscf1.home1.net;lr, sip:240f34.1@pcscf1.visited1.net;lr
Route: sip:scscf2.home2.net;lr; sip:+1-212-555-2222@home2.net;user=phone
Supported: 100rel
Remote-Party-ID: AssertedP-Asserted-Identity: "John Doe" <tel:+1-212-555-1111>;privacy=off;screen=yes"John Doe" <sip:user1_public1@home1.nettel:+1-212-555-1111>
P-Asserted-Identity: <tel:+1-212-555-1111>
RPID-Privacy: privacy=off;party=callingPrivacy: 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:
Max-Forwards: 67
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=qos:mandatory-sendrecv
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtptime:99:MPV
m=video 0 RTP/AVP 99
b=AS:54.6
a=qos:mandatory-sendrecv
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtptime:99:MPV
m=audio 3456 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtptime:96 G726-32/8000
a=qos:mandatory-sendrecv
m=audio 3458 RTP/AVP 97 96 0 15
b=AS:25.4
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=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtptime: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 7.4.2.1-1b.

**Table 7.4.2.1-1b: Storage of information at S-CSCF**

```
Request-URI: sip:+1-212-555-2222@home2.net;user=phonesip: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(2orig): sip:332b23.1@scscf1.home1.net, sip:240f34.1@pcscf1.visited1.net,
    sip:[5555::aaa:bbb:ccc:ddd]
Route(2dest): sip:pcscf2.visited2.net, sip:[5555::eee:fff:aaa:bbb]
Contact(orig): sip:[5555::aaa:bbb:ccc:ddd]
```

**2. 100 Trying (MT#1a to S-S) – see example in table 7.4.2.1-2**

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

**Table 7.4.2.1-2: 100 Trying (MT#1a to S-S)**

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
    SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

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

S-CSCF validates the service profile of this subscriber, and performs any termination service control required for this subscriber. evaluates the initial filter criterias. ~~For this example, assume no Application Server involvement.~~

~~— 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 P-CSCF) – see example in table 83.2-4**

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 P-CSCF.

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 7.4.2.1-4: INVITE (S-CSCF to P-CSCF)**

```
INVITE sip:[5555::eee:fff:aaa:bbb]sip:pcscf2.visited2.net SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1,
    SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 66
Require:
Route: sip:pcscf2.visited2.net;lr sip:[5555::eee:fff:aaa:bbb]
Record-Route: sip:764z87.1@scscf2.home2.net;lr, sip:332b23.1@scscf1.home1.net;lr,
    sip:240f34.1@pcscf1.visited1.net;lr
Supported:
Remote-Party-ID: AssertedP-Asserted-Identity:
P-Asserted-Identity:
RPID-Privacy+Privacy:
```

```

Anonymity+
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Max-Forwards: 66
Contact:
P-Called-Party-ID: sip:user2_public1@home2.net<sip:+1-212-555-2222@home1_2_.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:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtptime:99:MPV
m=video 0 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtptime:99:MPV
m=audio 3456 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=qos:mandatory-sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtptime:96 G726-32/8000
m=audio 0 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=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtptime:96 G726-32/8000

```

**Request-URI:** ~~———— Built from the registration information.~~

**Route:** Built from the Path header ~~Contact address~~ stored at registration.

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

**Via/Record-Route:** S-CSCF adds itself.

**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.

~~— Upon receipts of the INVITE, the P-CSCF removes the Record-Route and Via headers, calculates the proper Route header to add to future requests, and P-CSCF saves that information from the received INVITE request without passing it to UE. The saved value of the information for this session is – see example in table 7.4.2.1-4b.~~

**Table 7.4.2.1-4b: Storage of information at P-CSCF**

```
Request-URI: sip:[5555::eee:fff:aaa:bbb]
From: "Alien Blaster" <sip:B36(SHA-1(user1_public1@home1.net; time=36123E5B; seq=72))@localhost>; tag=171828
To: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost
Call-ID: cb03a0s09a2sdfglkj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2dest): sip:[5555::eee:fff:aaa:bbb]
Route(2orig): sip:764z87.1@scscf2.home2.net, sip:332b23.1@scscf1.home1.net, sip:240f34.1@pcscf1.visited1.net, sip:[5555::aaa:bbb+ccc:ddd]
Contact(orig): sip:[5555::aaa:bbb:ccc:ddd]
```

5. **100 Trying (P-CSCF to S-CSCF)** – see example in table 7.4.2.1-5

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

**Table 7.4.2.1-5: 100 Trying (P-CSCF to S-CSCF)**

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

6. **INVITE (P-CSCF to UE)** – see example in table 7.4.2.1-6

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.

**Table 7.4.2.1-6: 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
Media-Authorization: 0020000100100101706366322e78797a2e6e6574000c02013331533134363231
Supported:
Max-Forwards: 65
Remote-Party-ID: AssertedP-Asserted-Identity:
P-Asserted-Identity:
RPID-Privacy: Privacy:
Anonymity:
P-Media-Authorization: 0020000100100101706366322e78797a2e6e6574000c02013331533134363231
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Max-Forwards: 65
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:qos local none
```

```

a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
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 sendrecv
a=rtpmap:99:MPV
m=audio 3456 RTP/AVP 97 96 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
m=audio 0 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
v=0
o= 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=
e=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 96 15
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 0 RTP/AVP 97 96 0 15

```

— 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:764z87.1@scscf2.home2.net, sip:332b23.1@scscf1.home1.net,
sip:240f34.1@pcscf1.visited1.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.

**Media-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.

7. 100 Trying (UE to P-CSCF) – see example in table 7.4.2.1-7

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

**Table 7.4.2.1-7: 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

## 8. 183 Session Progress (UE to P-CSCF) – see example in table 7.4.2.1-8

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 7.4.2.1-8: 183 Session Progress (UE to P-CSCF)**

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1
Remote-Party-ID: Asserted-Identity: "John Smith" <tel:+1-212-555-2222>;privacy=off
RPID-Privacy: privacy=off;party=calledPrivacy: none
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 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=qos:mandatory sendrecv confirm
a=rtpmap:96 G726-32/8000
m=audio 0 RTP/AVP 97 96 0 15
```

~~Remote-Party-ID: Asserted-Identity:~~ 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:** ~~Header identifies~~ Contains a SIP URL with 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

Upon receipt of the 183 Session Progress, the P-CSCF stores the following information about this session, for use in providing enhanced services or in possible error recovery actions – see example in table 7.4.2.1-8b.

**Table 7.4.2.1-8b: Storage of information at P-CSCF**

```

Request-URI: sip:+1-212-555-2222@home2.net;user=sip:[5555::eee:fff:aaa:bbb]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=314159
From: "Anonymous" <sip:anonymous@localhost>; tag=171828
To: sip:anonymous@localhost; tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2dest): sip:[5555::eee:fff:aaa:bbb]
Route(2orig): sip:scscf2.home2.net, sip:scscf1.home1.net, sip:pcscf1.visited1.net,
sip:[5555::aaa:bbb:ccc:ddd]
Contact(dest): sip:[5555::eee:fff:aaa:bbb]
Contact(orig): sip:[5555::aaa:bbb:ccc:ddd]

```

9. 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 (34) based on operator local policy.

10. 183 Session Progress (P-CSCF to S-CSCF) – see example in table 7.4.2.1-10

P-CSCF forwards the 183 Session Progress response to S-CSCF.

**Table 7.4.2.1-10: 183 Session Progress (P-CSCF to S-CSCF)**

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1,
SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
Record-Route: sip:361k21-1@pcscf2.visited2.net;lr, sip:764z87-1@scscf2.home2.net;lr,
sip:332b23-1@scscf1.home1.net;lr, sip:240f34-1@pcscf1.visited1.net;lr
Remote-Party-ID: AssertedP-Asserted-Identity: "John Smith" <sip:user2_public1@home2.net>
RPID-Privacy: Privacy:
Anonymity:
Require:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Disposition:
Content-Type:
Content-Length:

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

```

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

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

Upon receipt of 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 7.4.2.1-10b.

**Table 7.4.2.1-109b: Storage of information at S-CSCF**

```
Request-URI: sip:+1-212-555-2222@home2.net/user=phonesip: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))@localhostFrom: "Anonymous"
<sip:anonymous@localhost>; tag=171828
To: sip:anonymous@localhost
Call-ID: cb03a0s09a2sdfglkj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2dest): sip:pcscf2.visited2.net, sip:[5555::eee:fff:aaa:bbb]
Route(2orig): sip:scscf1.home1.net, sip:pcscf1.visited1.net, sip:[5555::aaa:bbb:ccc:ddd]
Contact(dest): sip:[5555::eee:fff:aaa:bbb]
Contact(orig): sip:[5555::aaa:bbb:ccc:ddd]
```

**11. 183 Session Progress (MT#1a to S-S) – see example in table 7.4.2.1-11**

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

**Table 7.4.2.1-11: 183 Session Progress (MT#1a to S-S)**

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route:
Remote-Party-ID: AssertedP-Asserted-Identity: "John Smith" <tel:+1-212-555-2222>;privacy=off;screen=yes
P-Asserted-Identity: "John Smith" <tel:+1-212-555-2222>
RPID-Privacy: 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=
```

**12. PRACK (S-S to MT#1a) – see example in table 7.4.2.1-12**

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 7.4.2.1-12: PRACK (S-S to MT#1a)**

```
PRACK sip:[5555::eee:fff:aaa:bbb]sip:scscf2.home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
```

```

Max-Forwards: 68
Require:
Route: sip:scscf2.home2.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
Max-Forwards: 68
Rack: 9021 127 INVITE
Content-Type: application/sdp
Content-Length: (...)

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

```

### 13. PRACK (S-CSCF to P-CSCF) – see example in table 7.4.2.1-13

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

**Table 7.4.2.1-13: PRACK (S-CSCF to P-CSCF)**

```

PRACK sip:pcscf2.visited2.netPRACK sip:[5555::eee:fff:aaa:bbb] SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 67
Require:
Route: sip:pcscf2.visited2.net;lr; sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Max-Forwards: 67
Require:
Rack:
Content-Type:
Content-Length:

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

```

### 14. PRACK (P-CSCF to UE) – see example in table 7.4.2.1-14

P-CSCF forwards the PRACK request to UE.

**Table 7.4.2.1-14: 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: 66
Require:
From:
To:
Call-ID:
Cseq:
Require:
Max-Forwards: 66
Rack:
Content-Type:
Content-Length:

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

**15. 200 OK (UE to P-CSCF) – see example in table 7.4.2.1-15**

UE acknowledges the PRACK request (14) with a 200 OK response.

**Table 7.4.2.1-15: 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
Content-Type: application/sdp
Content-Length: (...)

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

**16. 200 OK (P-CSCF to S-CSCF) – see example in table 7.4.2.1-16**

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

**Table 7.4.2.1-16: 200 OK (P-CSCF to S-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
    SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
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=
```

**17. 200 OK (MT#1a to S-S) – see example in table 7.4.2.1-17**

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

**Table 7.4.2.1-17: 200 OK (MT#1a to S-S)**

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

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

**18. Resource Reservation**

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

**19. COMETUPDATE (S-S to MT#1a) – see example in table 7.4.2.1-19**

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 7.4.2.1-19: COMETUPDATE (S-S to MT#1a)**

```
COMETUPDATE sip:[5555::eee:fff:aaa:bbb]sip+scscf2.home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
Route: sip:scscf2.home2.net;lr, sip: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
Max-Forwards: 68
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 sendrecv
a=curr:gqos remote none
a=des:gqos mandatory local sendrecv
a=des:gqos mandatory 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
```

20. **COMETUPDATE** (S-CSCF to P-CSCF) – see example in table 7.4.2.1-20

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

**Table 7.4.2.1-20: COMETUPDATE (S-CSCF to P-CSCF)**

```
COMETUPDATE sip:[5555::eee:fff:aaa:bbb]sip+pcscf2.visited2.net SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 67
Route: sip:pcscf2.visited2.net;lrsip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Max-Forwards: 67
Contact:
Content-Type:
Content-Length:

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

## 21. COMETUPDATE (P-CSCF to UE) – see example in table 7.4.2.1-21

P-CSCF forwards the COMETUPDATE request to UE.

**Table 7.4.2.1-21: COMETUPDATE (P-CSCF to UE)**

<pre>COMETUPDATE sip:[5555::eee:fff:aaa:bbb] SIP/2.0 Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1 Max-Forwards: 66 From: To: Call-ID: Cseq: <del>Max-Forwards: 66</del> Content-Type: Content-Length:  v= o= s= c= t= m= m= m= b= a= a= a= a= a= a= a= m=</pre>
---

**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.

## 22. 200 OK (UE to P-CSCF) – see example in table 7.4.2.1-22

UE acknowledges the COMETUPDATE request (21) with a 200 OK response.

**Table 7.4.2.1-22: 200 OK (UE to P-CSCF)**

<pre>SIP/2.0 200 OK Via: SIP/2.0/UDP pcscf2.visited2.net;branch=361k21.1 From: To: Call-ID: CSeq: <del>Content-Length: 0</del> Content-Type: application/sdp Content-Length: (...)  v=0 o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd s=- c=IN IP6 5555::eee:fff:aaa:bbb t=907165275 0 m=video 0 RTP/AVP 99 m=video 0 RTP/AVP 99 m=audio 6544 RTP/AVP 97 b=AS:25.4 a=curr:qos local none a=curr:qos remote none a=des:qos mandatory local sendrecv a=des:qos mandatory remote sendrecv <del>a=conf:qos remote sendrecv</del> a=rtpmap:97 AMR a=fmtp:97 mode-set=0,2,5,7; maxframes=2 m=audio 0 RTP/AVP 97 96 0 15</pre>
--

## 22. Approval of QoS Commit





## 25. 180 Ringing (UE to P-CSCF) – see example in table 7.4.2.1-25

Before proceeding with session establishment, the UE waits for two events. First, the resource reservation initiated in step #178 must complete successfully. Second, the resource reservation initiated by the originating endpoint must complete successfully (which is indicated by message #240 received by UE). The UE may now immediately accept the session (and proceed with step #345), 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 7.4.2.1-25: 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:
Call-ID:
CSeq:
Require: 100rel
Contact: sip:[5555::eee:fff:aaa:bbb]
RSeq: 9022
Content-Length: 0
```

## 26. 180 Ringing (P-CSCF to S-CSCF) – see example in table 7.4.2.1-26

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

**Table 7.4.2.1-26: 180 Ringing (P-CSCF to S-CSCF)**

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1,
SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route: sip:361k21.1@pcscf2.visited2.net,sip:764z87.1@scscf2.home2.net,
sip:332b23.1@scscf1.home1.net, sip:240f34.1@pcscf1.visited1.netRecord-Route:
sip:pcscf2.visited2.net;lr,sip:scscf2.home2.net;lr, sip:scscf1.home1.net;lr,
sip:pcscf1.visited1.net;lr
Require:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

## 27. Service Control

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

## 28. 180 Ringing (MT#1a to S-S) – see example in table 7.4.2.1-28

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

**Table 7.4.2.1-28: 180 Ringing (MT#1a to S-S)**

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
SIP/2.0/UDP pcscf1.visited.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:

**2928. PRACK (S-S to MT#1a) – see example in table 7.4.2.1-2829**

The originator acknowledges the 180 Ringing response (2827) with a PRACK request.

**Table 7.4.2.1-2289: PRACK (S-S to MT#1a)**

```
PRACK sip:[5555::eee:fff:aaa:bbb]sip:scscf2.home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
Route: sip:scscf2.home2.net;lr, sip:361k21.1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq: 130 PRACK
Max-Forwards: 68
Rack: 9022 127 INVITE
Content-Length: 0
```

**3029. PRACK (S-CSCF to P-CSCF) – see example in table 7.4.2.1-3029**

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

**Table 7.4.2.1-3029: PRACK (S-CSCF to P-CSCF)**

```
PRACK sip:pcscf2.visited2.netPRACK sip:[5555::eee:fff:aaa:bbb] SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 67
Route: sip:pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Max-Forwards: 67
Rack:
Content-Length:
```

**310. PRACK (P-CSCF to UE) – see example in table 7.4.2.1-301**

P-CSCF forwards the PRACK request to UE.

**Table 7.4.2.1-310: 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: 66
From:
To:
Call-ID:
Cseq:
Max-Forwards: 66
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.

**321. 200 OK (UE to P-CSCF) – see example in table 7.4.2.1-312**

UE acknowledges the PRACK request (31) with a 200 OK response.

**Table 7.4.2.1-321: 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
```

**332. 200 OK (P-CSCF to S-CSCF) – see example in table 7.4.2.1-323**

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

**Table 7.4.2.1-323: 200 OK (P-CSCF to S-CSCF)**

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

**3433. 200 OK (MT#1a to S-S) – see example in table 7.4.2.1-334**

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

**Table 7.4.2.1-334: 200 OK (MT#1a to S-S)**

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

**354. 200 OK (UE to P-CSCF) – see example in table 7.4.2.1-345**

When the called party answers the UE sends a 200 OK final response to the INVITE request (6) to P-CSCF, and starts the media flow(s) for this session.

**Table 7.4.2.1-354: 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: 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
```

### 356. Approval of QoS Commit

The P-CSCF approves the commitment of the QoS resources if it was not approved already in step (9).

### 37365. 200 OK (P-CSCF to S-CSCF) – see example in table 7.4.2.1-37365

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

**Table 7.4.2.1-37365: 200 OK (P-CSCF to S-CSCF)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=764z87.1, SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1,
    SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route: sip:361k21.1@pcscf2.visited2.net;lr, sip:764z87.1@scscf2.home2.net;lr,
    sip:332b23.1@scscf1.home1.net;lr, sip:240f34.1@pcscf1.visited1.net;lr
From:
To:
Call-ID:
CSeq:
Contact:
Content-Type:
Content-Length:

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

### 38. Service Control

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

### 39376. 200 OK (MT#1a to S-S) – see example in table 7.4.2.1-39376

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 7.4.2.1-39376: 200 OK (MT#1a to S-S)**

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=871y12.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
    SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Record-Route:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Type:
Content-Length:

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

a=  
a=  
a=  
m=

**40387. ACK (S-S to MT#1a) – see example in table 7.4.2.1-40387**

The calling party responds to the 200 OK final response (39376) with an ACK request which is sent to S-CSCF via the S-CSCF to S-CSCF procedure.

**Table 7.4.2.1-40387: ACK (S-S to MT#1a)**

```
ACK sip:[5555::eee:fff:aaa:bbb]sip:scscf2.home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=332b23.1, SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 68
Route: sip:scscf2.home2.net;lr, sip:361k21.1@pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq: 127 ACK
Max-Forwards: 68
Content-Length: 0
```

**41398. ACK (S-CSCF to P-CSCF) – see example in table 7.4.2.1-41398**

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

**Table 7.4.2.1-41398: ACK (S-CSCF to P-CSCF)**

```
ACK sip:pcscf2.visited2.netACK sip:[5555::eee:fff:aaa:bbb] SIP/2.0
Via: SIP/2.0/UDP scscf1.home2.net;branch=764z87.1, SIP/2.0/UDP scscf1.home1.net;branch=332b23.1,
SIP/2.0/UDP pcscf1.visited1.net;branch=240f34.1, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
Max-Forwards: 67
Route: sip:pcscf2.visited2.net;lr, sip:[5555::eee:fff:aaa:bbb]
From:
To:
Call-ID:
Cseq:
Max-Forwards: 67
Content-Length:
```

**424039. ACK (P-CSCF to UE) – see example in table 7.4.2.1-424039**

P-CSCF forwards the ACK request to UE.

**Table 7.4.2.1-424039: 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
Max-Forwards: 66
From:
To:
Call-ID:
Cseq:
Max-Forwards: 66
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.