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3GPP IP Multimedia CN Subsystem – Session establishment flows

tatus of this Memo

ostract

This document provides an overview by means of signalling flows of the methods by which 3GPP wishes to uses SIP for the specification of the IP Multimedia CN subsystem for the purposes of establishing sessions between user equipment.

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onventions used in this document

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC-2119 [2].

ntroduction

The Third Generation Partnership Project (3GPP) is described in draft-3GPP-collaboration-00.txt.

The IP Multimedia CN Subsystem provides session control capabilities to user equipment accessing the system using the General Packet Radio Service, which supports the use of IP and applications that can use IP.

The IP Multimedia CN subsystem will be defined in a number of 3GPP documents. Documents currently under development include:

TS 22.228: “3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Service requirements for the IP Multimedia Core Network Subsystem (Stage 1)”.

TS 23.228: “3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; IP Multimedia (IM) Subsystem - Stage 2”.
TS 24.228: “3rd Generation Partnership Project; Technical Specification Group Core Network; Signalling flows for the IP multimedia call control based on SIP and SDP”.

TS 24.229: “3rd Generation Partnership Project; Technical Specification Group Core Network; IP Multimedia Call Control Protocol based on SIP and SDP”.

TS 23.218: “3rd Generation Partnership Project; Technical Specification Group Core Network; IP Multimedia (IM) Session Handling; IP Multimedia (IM) call model”.

and these may be found as described in draft-3GPP-collaboration-00.txt

This document describes how 3GPP intend to apply SIP to the establishment of sessions between user equipment on the IM CN subsystem by means of diagrams showing the flow and contents of signalling information.

ecurity Considerations

None.

eferences

draft-3GPP-collaboration-00.txt "3GPP-IETF Standardization Collaboration" work in progress.

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nnex A

ignalling flows for session initiation

Editor's Note: This is informative text – a work in progress to be placed in Annex A.

Editor's note: The contact field of a flow from the remote network should contain the information of the originating/terminating network endpoint. This could be the P-CSCF or the S-CSCF of the originating/terminating network and which requires further study.

Editor's note: Example naming conventions for different entities need to be defined and used consistently throughout the document.

Editor's Note: The use of the term "Firewall" is FFS and may be changed at a future time.

Editor's Note: Change the element names to be consistent across all signalling flows. Originator, use pcscf1.visited1.net (MO#1), pcscf1.home1.net (MO#2), icscf1.home1.net (MO#1b). Termination, pcscf2.visited2.net, pcscf2.home2.net, icscf4.home2.net. S-S#1 (2 nets) cases, scscf1.home1.net, scscf2.home2.net, icscf2.home1.net (S-S#1b), icscf3.home2.net. For S-S#2 (single net), scscf1.home.net, scscf2.home.net, icscf3.home.net.

Editor's Note: Need to show ENUM interactions at the S-CSCF.

is section contains the overview description and list of individual procedures for the end-to-end call flows.
r an IP Multi-Media Subsystem session, the call flow procedures are shown in the following diagram.

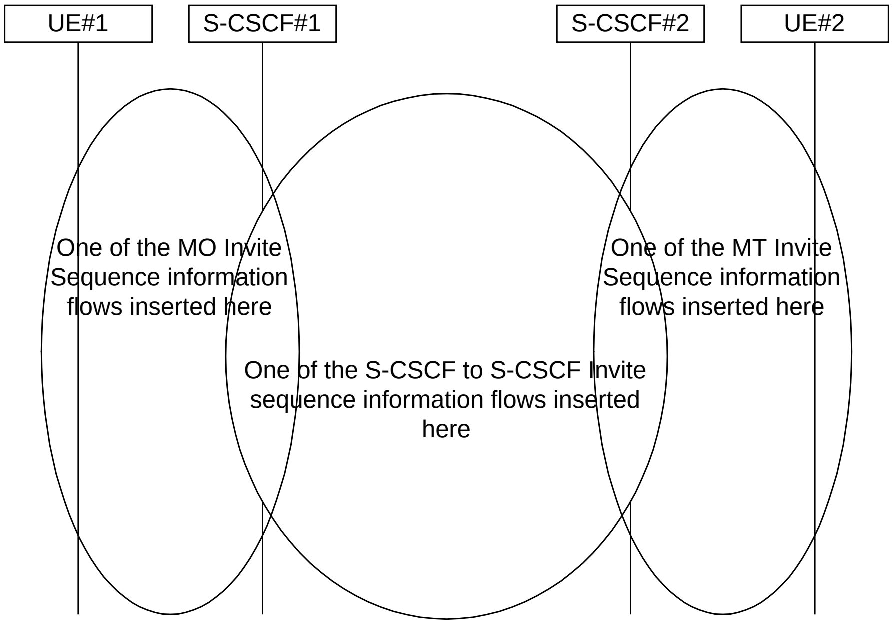


Figure 1: Overview of Call Flow Sections

e following procedures are defined:
r the origination sequence:

- (MO#1a) Mobile origination, roaming, without I-CSCF providing configuration independence
- (MO#1b) Mobile origination, roaming, with I-CSCF in home network providing configuration independence
- (MO#2) Mobile origination, located in home network
- (PSTN-O) PSTN origination

r the termination sequence

- (MT#1a) Mobile termination, roaming, without I-CSCF providing configuration independence
- (MT#1b) Mobile termination, roaming, with I-CSCF in home network providing configuration independence
- (MT#2) Mobile termination, located in home network
- (PSTN-T) PSTN termination

r Serving-CSCF/MGCF-to-Serving-CSCF/MGCF sequences:

- (S-S#1a) Call origination and termination are served by different network operators, without I-CSCF providing configuration independence.
- (S-S#1b) Call origination and termination are served by different network operators, with I-CSCF providing configuration independence.
- (S-S#2) Call origination and termination are served by the same operator.

- (S-S#3) PSTN termination performed by same operator as originator.
- (S-S#4) PSTN termination performed by different operator from originator.

r example, for a non-roaming subscriber calling another non-roaming subscriber, each a subscriber of the same network erator, it is possible to construct a complete end-to-end call flow from the following procedures:

- (MO#2) Mobile origination, located in home network
- (S-S#2) Single network operator
- (MT#2) Mobile termination, located in home network

here are a total of 44 end-to-end call flows defined by these procedures. They are built from combinations of origination, rving-serving, and termination procedures, as determined from the following table. For each row of the table, any one of the ted origination procedures can be combined with any one of the serving-serving procedures, which can be combined with any e of the termination procedures.

igination Procedure ck one)		Serving-CSCF-to-Serving-CSCF Procedure (pick one)		Termination Procedure (pick one)	
D#1a gination, SCF providing	Mobile roaming, without I- configuration independence.	S-S#1a operators and CSCF	Different network performing origination termination, without I- providing configuration independence.	MT#1a termination, CSCF providing	Mobile roaming, without I- configuration independence.
D#1b gination, SCF nfiguration	Mobile roaming, with I- providing independence.	S-S#1b operators and	Different network performing origination termination, with I-CSCF providing configuration independence.	MT#1b termination, CSCF	Mobile roaming, with I- providing configuration independence.
D#2 gination,	Mobile located in home service area.	S-S#2 and	Single network operator performing origination termination.	MT#2 termination,	Mobile located in home service area.
STN-O	PSTN origination.				
D#1a gination, SCF providing	Mobile roaming, without I- configuration independence.	S-S#3 same	PSTN Breakout within operator's network.	PSTN-T termination.	PSTN
D#1b gination, SCF nfiguration	Mobile roaming, with I- providing independence.	S-S#4 different	PSTN Breakout to a operator's network.		
D#2 gination,	Mobile located in home service area.				
STN-O	PSTN origination.				

Editor's note: These have been listed by procedure block, as defined in 23.228.

Editor's note: The following issues, contributed in N1-001094 issue 3, needs to be reflected in flows for INVITE, and for subsequent flows after INVITE.

The requirement of caller-id-blocking (aka calling-line-identification-blocking, CLIB), in an IP environment requires that the IP address of the caller be blocked as well. If it was not, a mere 'traceroute' would provide the called party essentially all the information of caller-id. The SIP 'Via' and 'Record-Route' and 'Route' headers would also provide identity information about the caller, and should also be blocked.

Hiding of 'Via' headers is discussed in RFC2543 section 6.40.5, though that text is likely to be deleted in future versions of draft-ietf-sip-rfc2543bis. The mechanism should be retained for 3GPP, as a recommended extension to SIP.

Hiding of 'Route' and 'Record-Route' headers is discussed in draft-byerly-sip-hide-route-00. The mechanism should be adopted for 3GPP.

In both of these cases, there are generally two alternatives for hiding this information from the UE.

1. The information in the 'Via', 'Record-Route', or 'Route' headers could be removed from the SIP message and stored in the P-CSCF. When needed for a response or future request, they can be inserted by P-CSCF.

2. The information in the 'Via', 'Record-Route', and 'Route' headers can be encrypted by P-CSCF and the encrypted form be given to the UE. In responses or future requests, the P-CSCF will decrypt the values and restore them to their original values.

Choice (1) clearly increases the storage requirements of the P-CSCF, while choice (2) clearly increases the bandwidth requirements of the air interface.

Editor's note: The following issues, contributed in N1-001094 issue 4, needs to be reflected in flows for INVITE.

If the caller requested their caller-id to be blocked, but the network operator desires to offer the return-call service (*69), some mechanism is needed to hide the caller identity from the UE but still allow it to be addressed in a future call attempt. The PacketCable DCS specification used a 'private-URL' for this purpose, encrypting the destination information. The format of such a 'private-URL' was typically

sip:somelongstringofjibberishthatcanbedecryptedbytheCSCF@S-CSCF;private

There are actually two alternatives for dealing with this type of information

1. The information to be hidden from the user, e.g. caller identity, could be stored in the P-CSCF or S-CSCF. When needed for the subsequent call attempt, it can be inserted by the CSCF.

2. The design followed by DCS could be used, and the hidden information could be encrypted and stored in the UE

Choice (1) clearly increases the storage requirements of the P-CSCF or S-CSCF, while choice (2) clearly increases the bandwidth requirements of the air interface.

Editor's note: The following issues, contributed in N1-001094 issue 5, needs to be reflected in flows for INVITE and subsequent flows.

In developing mechanisms for call features in the PacketCable DCS group, there were several situations where hidden information was given to an endpoint for immediate use in establishing a new call. The DCS design was to keep the SIP proxy stateless, and this information (which included typically special billing arrangements for the new call to be established) was encrypted and given to the endpoint. The 'private-URL' always contained a timeout value, which limited its useable lifetime.

There are actually two alternatives for dealing with this type of information

1. The information to be hidden from the user, e.g. special billing information for a call, could be stored in the P-CSCF or S-CSCF. When needed for the subsequent call attempt, it can be inserted by the CSCF.

2. The design followed by DCS could be used, and the hidden information could be encrypted and stored in the UE

Choice (1) clearly increases the storage requirements of the P-CSCF or S-CSCF, while choice (2) clearly increases the bandwidth requirements of the air interface.

Editor's note: Example naming conventions for different entities need to be defined and used consistently throughout the document.

1 *Origination Procedures*

iis section presents the detailed application level flows to define the Procedures for call originations.

ie call origination procedures specify the signalling path between the UE initiating a call attempt and the Serving-CSCF that is signed to perform the call origination service. This signalling path is determined at the time of UE registration, and remains ‹ed for the life of the registration.

UE always has a proxy (P-CSCF) associated with it. This P-CSCF is located in the same network as the UE, performs source authorization, and may have additional functions in handling of emergency calls. The P-CSCF is determined by the SCF discovery process.

; a result of the registration procedure, the P-CSCF determines the next hop toward the Serving-CSCF. This next hop may be rectly to the S-CSCF (MO#1a for the roaming case, MO#2 for the home case), or to an I-CSCF who forwards the request to the CSCF (MO#1b). These next-hop addresses could be IPv4/IPv6 addresses, or could be names that are translated via DNS to an v4/IPv6 address.

ills originated in the PSTN to a mobile destination are a special case of the Origination procedures. The MGCF uses 248/MEGACO to control a Media Gateway, and communicates with the SS7 network via the TSGW. The MGCF initiates the P request, and subsequent nodes consider the signalling as if it came from a S-CSCF.

litor's note: If an I-CSCF is to be used as a firewall I-CSCF then does it need to be statefull? According to the flows developed 23.228, the I-CSCF (e.g.,look at Figure 1, messages 2b1 and 2b2) does not have a look up shown to find the address of the SS. Does this imply statefulness of I-CSCFs

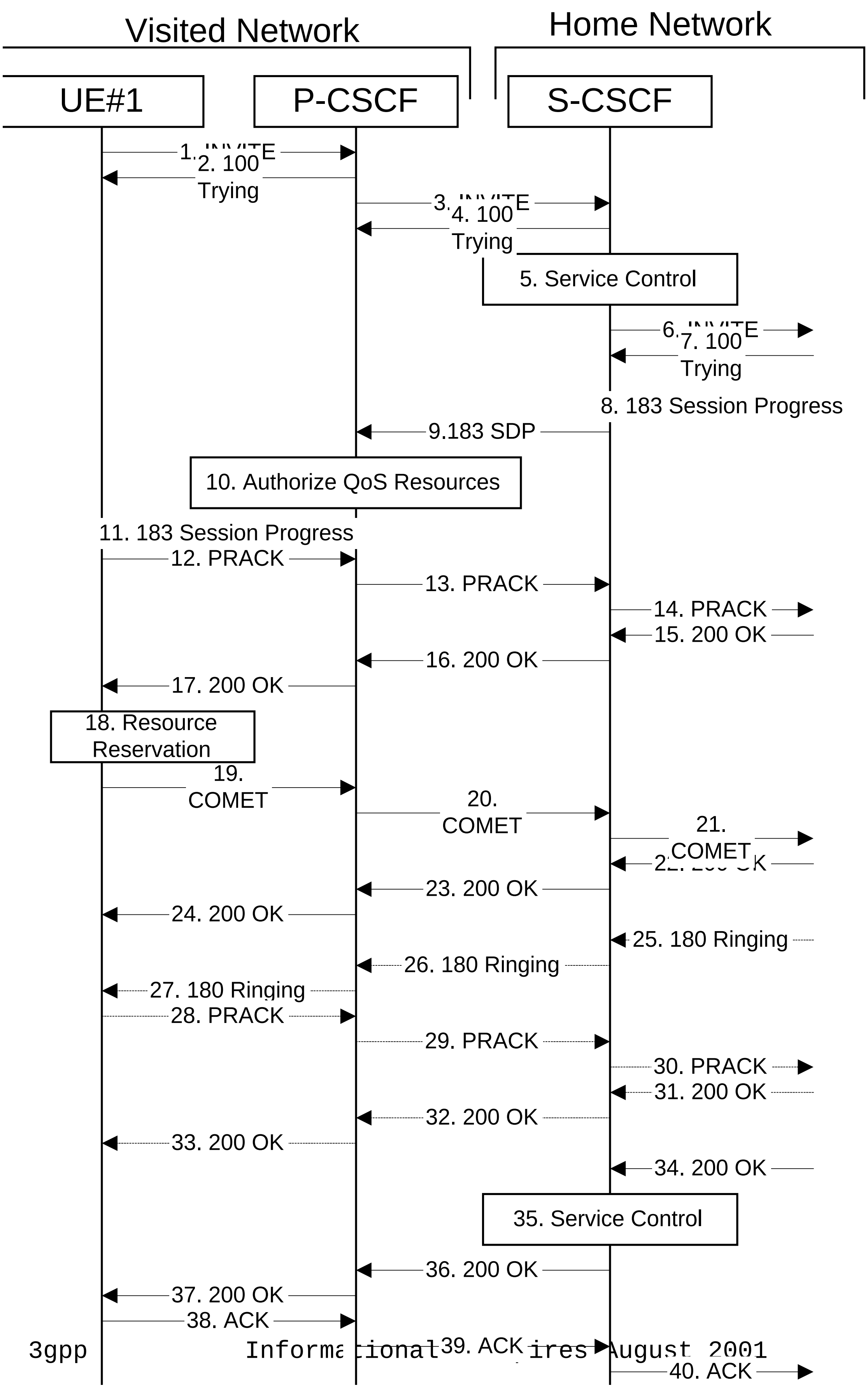
Editor's note: For all UE to P-CSCF flows, the contents of the Contact header within the INVITE would appear to be redundant, but it is a mandatory header. Need to agree what the UE should populate this field with. Current contents is not the most appropriate. This value will be inserted by the P-CSCF.

Editor's note: Contents of request-URI in INVITE flows other than that from the UE is for further study. Should it be as shown, or should it change to constrain the routeing of the method?

1.1 (MO#1a) Mobile origination, roaming, without I-CSCF in home network roviding configuration independence

iis origination procedure applies to roaming subscribers when the home network operator does not desire to keep its internal nfiguration hidden from the visited network. The UE is located in a visited network, and determines the P-CSCF via the SCF discovery procedure. During registration, the home network allocates a S-CSCF. The home network provides the S-SCF name/address as the entry point from the visited network.

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


Visited Network
Home Network
UE#1
P-CSCF
S-CSCF
1. INVITE
2. 100 Trying
3. INVITE
4. 100 Trying
5. Service Control
6. INVITE
7. 100 Trying
8. 183 Session Progress
9.183 SDP
10. Authorize QoS Resources
11. 183 Session Progress
12. PRACK
13. PRACK
14. PRACK
15. 200 OK
16. 200 OK
17. 200 OK
18. Resource Reservation
19. COMET
20. COMET
21. COMET
22. 200 OK
23. 200 OK
24. 200 OK
25. 180 Ringing
26. 180 Ringing
27. 180 Ringing
28. PRACK
29. PRACK
30. PRACK
31. 200 OK
32. 200 OK
33. 200 OK
34. 200 OK
35. Service Control
36. 200 OK
37. 200 OK
38. ACK
39. ACK
40. ACK

ocedure MO#1a is as follows:

INVITE (UE to P-CSCF)

UE sends the INVITE request, containing an initial SDP, to the P-CSCF determined via the CSCF discovery mechanism.

Editor's Note: Certain fields in the SDP carry no information. In particular the "o=", "s=" fields and "t=". These are, however, mandatory fields within SDP. Does 3GPP wish to define a non-standard version of SDP that removes these, and if so, how does this interwork with outside SIP networks that use standard SDP.

Table 8.1.1-1: INVITE (UE to P-CSCF)

```
VITE sip:+1-212-555-2222@home.net;user=phone SIP/2.0
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
pported: 100rel
mote-Party-ID: John Doe <tel:+1-212-555-1111>
onymity: Off
om: "Alien Blaster" <sip:B36(SHA-1(+1-212-555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 127 INVITE
ntact: sip:[5555::aaa:bbb:ccc:ddd]
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97 3 96
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
rtpmap:96 G726-32/8000
qos:mandatory sendrecv
```

Request-URI: contains the keyed number from the user.

Via: contains the IP address or FQDN of the originating UE.

Remote-Party-ID: contains the public identity of the UE. The Display name is optional.

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

Cseq: is a random starting number.

Contact: is the IP address or FQDN of the originating UE.

100 Trying (P-CSCF to UE)

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

Table 8.1.1-2: 100 Trying (P-CSCF to UE)

```
P/2.0 100 Trying
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-length: 0
```

INVITE (P-CSCF to S-CSCF)

P-CSCF remembers (from the registration procedure) the request routing for this UE. This becomes a Route header in the request. This next hop is the S-CSCF within the home network.

P-CSCF rewrites the Contact header, with a locally defined value that identifies the UE. P-CSCF adds itself to the Record-Route header, and adds a Via header.

The INVITE request is forwarded to the S-CSCF.

Table 8.1.1-3: INVITE (P-CSCF to S-CSCF)

```
VITE sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:+1-212-555-2222@home1.net;user=phone
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.visited.net
ntent-Type:
ntent-length:
```

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.

Editor's Note: Need to represent the ability of the P-CSCF to take part in the negotiation of the media streams (by removing entries) in some manner.

100 Trying (S-CSCF to P-CSCF)

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

Table 8.1.1-4: 100 Trying (S-CSCF to P-CSCF)

```
P/2.0 100 Trying
a: SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-length: 0
```

Service Control

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

INVITE (MO#1 to S-S)

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

Editor's Note: Need to represent the ability of the S-CSCF to take part in the negotiation of the media streams (by removing entries) in some manner.

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

Table 8.1.1-6: INVITE request (MO#1a to S-S)

```
VITE sip:+1-212-555-2222@home.net;user=phone SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

100 Trying (S-S to MO#1a)

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

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MT#2 are assumed.

Table 8.1.1-7: 100 Trying (S-S to MO#1a)

```
P/2.0 100 Trying
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-length: 0
```

183 Session Progress (S-S to MO#1a)

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.

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MT#2 are assumed.

Table 8.1.1-8: 183 Session Progress (S-S to MO#1a)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf2.home.net, sip:scscf.home.net
mote-Party-ID: John Smith <tel:+1-212-555-2222>
onymity: Off
om:
: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost; tag=314159
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
eq: 9021
ntent-Disposition: precondition
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::eee:fff:aaa:bbb
AS:64
907165275 0
audio 6544 RTP/AVP 97 3
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:mandatory sendrecv confirm
```

183 Session Progress (S-CSCF to P-CSCF)

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

Table 8.1.1-9: 183 Session Progress (S-SCSF to P-CSCF)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

Authorize QoS Resources

P-CSCF authorizes the resources necessary for this session.

183 Session Progress (P-CSCF to UE)

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

Table 8.1.1-11: 183 Session Progress (P-CSCF to UE)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
dia-Authorization: 9BV3072
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact: sip:token1@pcscf1.visited.net
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

P-CSCF removes the Record-Route and Contact 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:scscf.home.net, sip:scscf2.home.net,
     sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
```

Contact: a locally unique token to identify the saved routing information.

Media-Authorization: a P-CSCF generated authorization token

**.	PRACK (UE to P-CSCF)**

UE decides the final set of media streams for this session, and includes this information in the PRACK request to P-CSCF.

Table 8.1.1-12: PRACK (UE to P-CSCF)

```
ACK sip:token1@pcscf1.visited.net SIP/2.0
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om: “Alien Blaster” <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 128 PRACK
ntact: sip:[5555::aaa:bbb:ccc:ddd]
ck: 9021 127 INVITE
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:mandatory sendrecv
```

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

Via:, Contact: take the value of either the IP address of RQDN 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.

**.	PRACK (P-CSCF to S-CSCF)**

P-CSCF adds a Route header, with the saved value from the previous response. P-CSCF identifies the proper saved value by the Request-URI.

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

Table 8.1.1-13: PRACK (P-CSCF to S-CSCF)

```
ACK sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:scscf2.home.net, sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.visited.net
ck:
ntent-Type:
ntent-length:
```

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

Route: as saved from the previous response (with first element moved to Request-URI).

Contact: re-written by P-CSCF with a locally defined value that identifies the UE.

PRACK (MO#1a to S-S)

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

Table 8.1.1-14: PRACK (MO#1a to S-S)

```
ACK sip:scscf2.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-Type:
ntent-length:
```

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

200 OK (S-S to MO#1a)

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

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MT#2 are assumed.

Table 8.1.1-15: 200 OK (S-S to MO#1a)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf2.home.net, sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
ntent-Length: 0
```

. 200 OK (S-CSCF to P-CSCF)

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

Table 8.1.1-16: 200 OK (S-CSCF to P-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf2.home.net, sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Length:
```

. 200 OK (P-CSCF to UE)

P-CSCF forwards the 200 OK response to UE.

Table 8.1.1-17: 200 OK (P-CSCF to UE)

```
P/2.0 200 OK
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntact: sip:token2@pcscf1.visited.net
ntent-Length:
```

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

Contact: a locally unique token to identify the saved routing information

. Resource Reservation

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

'. COMET (UE to P-CSCF)

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

Table 8.1.1-19: COMET (UE to P-CSCF)

```
MET sip:token2@pcscf1.visited.net SIP/2.0
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 129 COMET
ntact: sip:[5555::aaa:bbb:ccc:ddd]
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:success sendonly
```

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

Via:, Contact: take the value of either the IP address or FQDN of the originating UE.

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

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

The SDP indicates that the resource reservation was successful.

'. COMET (P-CSCF to S-CSCF)

P-CSCF adds a Route header, with the saved value from the previous response. P-CSCF identifies the proper saved value by the Request-URI.

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

Table 8.1.1-20: COMET (P-CSCF to S-CSCF)

```
MET sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:scscf2.home.net, sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

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

Route: saved from the 183 Session Progress response (with first element moved to Request-URI).

Contact: a locally defined value that identifies the UE.

. **COMET (MO#1a to S-S)**

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

Table 8.1.1-21: COMET (MO#1a to S-S)

```
MET sip:scscf2.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
cord-Route: sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

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

. **200 OK (S-S to MO#1a)**

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

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MT#2 are assumed.

Table 8.1.1-22: 200 OK (S-S to MO#1a)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf2.home.net, sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
ntent-Length: 0
```

'. 200 OK (S-CSCF to P-CSCF)

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

Table 8.1.1-23: 200 OK (S-CSCF to P-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-Length:
```

'. 200 OK (P-CSCF to UE)

P-CSCF forwards the 200 OK response to UE.

Table 8.1.1-24: 200 OK (P-CSCF to UE)

```
P/2.0 200 OK
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntact: sip:token3@pcscf1.visited.net
ntent-Length:
```

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

Contact: a locally unique token to identify the saved routing information

'. 180 Ringing (S-S to MO#1a)

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.

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MT#2 are assumed.

Table 8.1.1-25: 180 Ringing (S-S to MO#1a)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf2.home.net, sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
eq: 9022
ntent-length: 0
```

. 180 Ringing (S-CSCF to P-CSCF)

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

Table 8.1.1-26: 180 Ringing (S-CSCF to P-CSCF)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-length:
```

. 180 Ringing (P-CSCF to UE)

P-CSCF removes the Record-Route and Contact headers, calculates the propoer Route header to add to future requests, and saves that information without passing it to UE. A Contact header is added with a locally unique token to identify the saved routing information.

P-CSCF forwards the 180 Ringing response to UE.

Table 8.1.1-27: 180 Ringing (P-CSCF to UE)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntact: sip:token4@pcscf1.visited.net
eq:
ntent-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.

. PRACK (UE to P-CSCF)

UE indicates to the originating subscriber that the destination is ringing. It responds to the 180 Ringing provisional response (27) with a PRACK request.

Table 8.1.1-28: PRACK (UE to P-CSCF)

```
ACK sip:token4@pcscf1.visited.net SIP/2.0
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 130 PRACK
ntact: sip:[5555::aaa:bbb:ccc:ddd]
ck: 9022 127 INVITE
ntent-length: 0
```

Request-URI: takes the value of the Contact header of the 180 Ringing response.

Via:, Contact: take the value of either the IP address or FQDN of the UE.

From:, To:, Call-ID: copied from the 180 Ringing response so that they include any revised tag parameters.

Cseq: takes a higher value than in the previous request.

PRACK (P-CSCF to S-CSCF)

P-CSCF adds a Route header, with the saved value from the previous response. P-CSCF identifies the proper saved value by the Request-URI.

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

Table 8.1.1-29: PRACK (P-CSCF to S-CSCF)

```
ACK sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:scscf2.home.net, sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.visited.net
ck:
ntent-length:
```

PRACK (MO#1a to S-S)

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

Table 8.1.1-30: PRACK (MO#1a to S-S)

```
ACK sip:scscf2.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
cord-Route: sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-length:
```

. 200 OK (S-S to MO#1a)

The destination endpoint responds to the PRACK request (30) with a 200 OK response.

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MT#2 are assumed.

Table 8.1.1-31: 200 OK (S-S to MO#1a)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf2.home.net, sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
ntent-Length: 0
```

. 200 OK (S-CSCF to P-CSCF)

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

Table 8.1.1-32: 200 OK (S-CSCF to P-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-Length:
```

. 200 OK (P-CSCF to UE)

P-CSCF forwards the 200 OK response to UE.

Table 8.1.1-33: 200 OK (P-CSCF to UE)

```
P/2.0 200 OK
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntact: sip:token5@pcscf1.visited.net
ntent-Length:
```

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

Contact: a locally unique token to identify the saved routing information

. 200 OK (S-S to MO#1a)

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 8.1.1-34: 200 OK (S-S to MO#1a)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf2.home.net, sip:scscf.home.net
om:
:
ll-ID:
eq: 127 INVITE
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
ntent-Length: 0
```

. Service Control

S-CSCF performs whatever service control is appropriate for the completed call

. 200 OK (S-CSCF to P-CSCF)

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

Table 8.1.1-36: 200 OK (S-CSCF to P-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf2.home.net, sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Length:
```

. 200 OK (P-CSCF to UE)

P-CSCF indicates the resources reserved for this session should now be committed, and forwards the 200 OK final response to the call originator.

Table 8.1.1-37: 200 OK (P-CSCF to UE)

```
P/2.0 200 OK
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntact: sip:token6@pcscf1.visited.net
ntent-Length:
```

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

Contact: a locally unique token to identify the saved routing information

. ACK (UE to P-CSCF)

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

Table 8.1.1-38: ACK (UE to P-CSCF)

```
K sip:token6@pcscf1.visited.net SIP/2.0
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 131 ACK
ntact: sip:[5555::aaa:bbb:ccc:ddd]
ntent-length: 0
```

. ACK (P-CSCF to S-CSCF)

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

Table 8.1.1-39: ACK (P-CSCF to S-CSCF)

```
K sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:scscf2.home.net, sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.visited.net
ntent-length:
```

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

The Route header is as saved from the 200 OK response (with first element moved to Request-URI).

Contact: a locally defined value that identifies the UE.

. ACK (MO#1a to S-S)

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

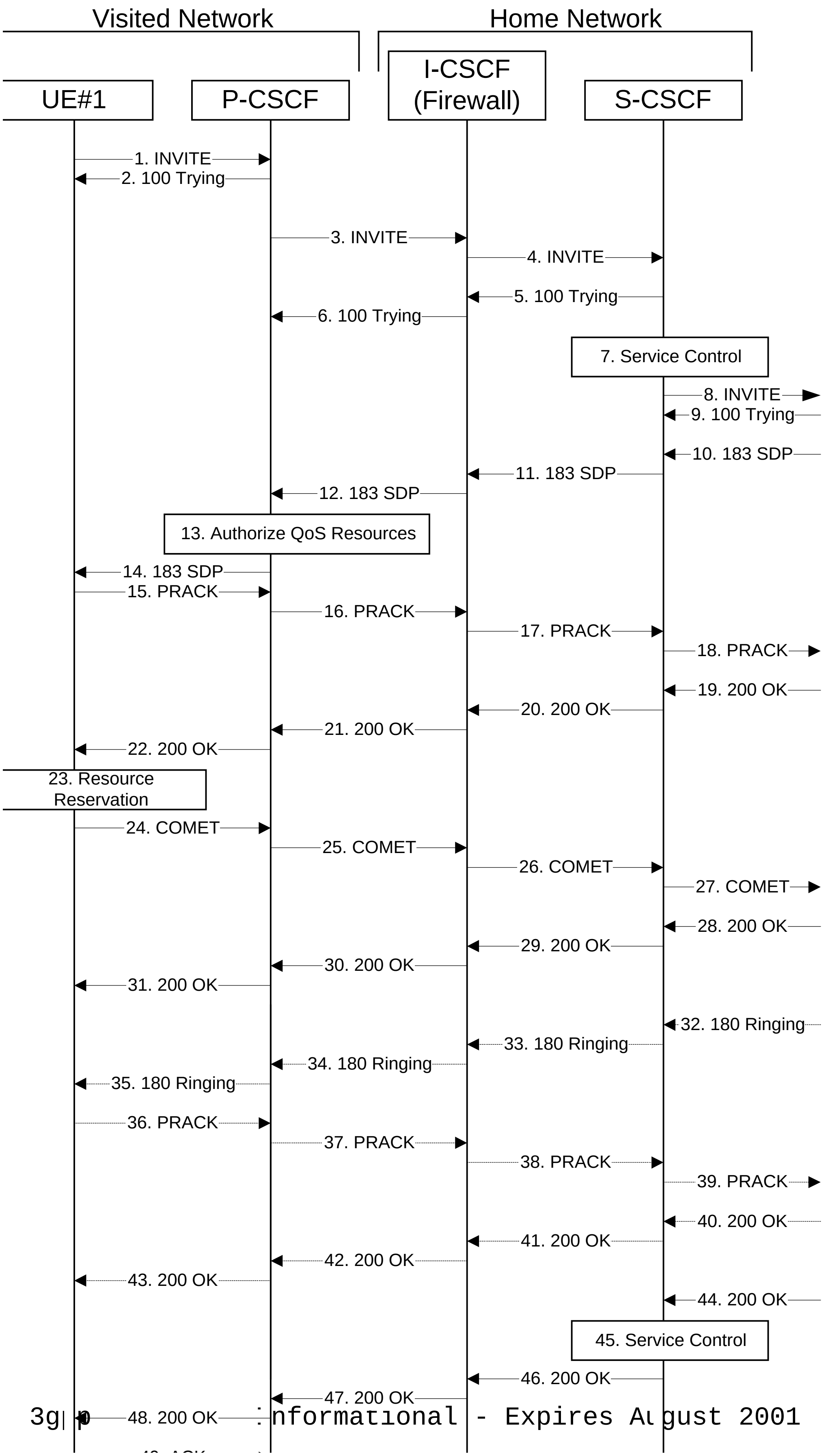
Table 8.1.1-40: ACK (MO#1a to S-S)

```
K sip:scscf2.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
cord-Route: sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Length:
```

1.2 (MO#1b) Mobile origination, roaming, with I-CSCF in home network roviding configuration independence

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

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


Visited Network
Home Network
UE#1
P-CSCF
I-CSCF (Firewall)
S-CSCF
1. INVITE
2. 100 Trying
3. INVITE
4. INVITE
5. 100 Trying
6. 100 Trying
7. Service Control
8. INVITE
9. 100 Trying
10. 183 SDP
11. 183 SDP
12. 183 SDP
13. Authorize QoS Resources
14. 183 SDP
15. PRACK
16. PRACK
17. PRACK
18. PRACK
19. 200 OK
20. 200 OK
21. 200 OK
22. 200 OK
23. Resource Reservation
24. COMET
25. COMET
26. COMET
27. COMET
28. 200 OK
29. 200 OK
30. 200 OK
31. 200 OK
32. 180 Ringing
33. 180 Ringing
34. 180 Ringing
35. 180 Ringing
36. PRACK
37. PRACK
38. PRACK
39. PRACK
40. 200 OK
41. 200 OK
42. 200 OK
43. 200 OK
44. 200 OK
45. Service Control
46. 200 OK
47. 200 OK
48. 200 OK

ocedure MO#1b is as follows:

INVITE (UE to P-CSCF)

UE sends the INVITE request, containing an initial SDP, to the P-CSCF determined via the CSCF discovery mechanism. An example is contained in table 8.1.2-1.

Editor's Note: Certain fields in the SDP carry no information. In particular the "o=", "s=" fields and "t=". These are, however, mandatory fields within SDP. Does 3GPP wish to define a non-standard version of SDP that removes these, and if so, how does this interwork with outside SIP networks that use standard SDP.

Table 8.1.2-1: INVITE (UE to P-CSCF)

```
VITE sip:+1-212-555-2222@home.net;user=phone SIP/2.0
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
pported: 100rel
mote-Party-ID: John Doe <tel:+1-212-555-1111>
onymity: Off
om: "Alien Blaster" <sip:B36(SHA-1(+1-212-555-1111;time=36123E5B;seq=72))@localhost>;
  tag=171828
: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 127 INVITE
ntact: sip:[5555::aaa:bbb:ccc:ddd]
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97 3 96
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
rtpmap:96 G726-32/8000
qos:mandatory sendrecv
```

Editor's Note: All tables need a sentence of text referencing the table. "An example is contained in table 8.w.x.y-z."

Request-URI: contains the keyed number from the user.

Via: contains the IP address or FQDN of the originating UE.

Remote-Party-ID: contains the public identity of the UE. The Display name is optional.

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

Cseq: is a random starting number.

Contact: is the IP address or FQDN of the originating UE.

100 Trying (P-CSCF to UE)

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

Table 8.1.2-2: 100 Trying (P-CSCF to UE)

```
P/2.0 100 Trying
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-length: 0
```

INVITE (P-CSCF to I-CSCF)

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

Table 8.1.2-3: INVITE (P-CSCF to I-CSCF)

```
VITE sip:icscf.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:Token(scscf.home.net), sip:+1-212-555-2222@home.net;user=phone
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.visited.net
ntent-Type:
ntent-length:
```

Route: P-CSCF remembers (from the registration procedure) the request routing for this UE. This becomes a Route header in the request. The initial Request-URI is appended to the Route header.

Contact: a locally defined value that identifies the UE.

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

Editor's Note: Need to represent the ability of the P-CSCF to take part in the negotiation of the media streams (by removing entries) in some manner.

INVITE (I-CSCF to S-CSCF)

I-CSCF adds itself to the Record-Route header, and adds a Via header.

I-CSCF determines the routing information contained in the request, and forwards the request to S-CSCF that is serving the UE.

Table 8.1.2-4: INVITE (I-CSCF to S-CSCF)

```
VITE sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
ute: sip:+1-212-555-2222@home.net;user=phone
cord-Route: sip:icscf.home.net
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

100 Trying (S-CSCF to I-CSCF)

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

Table 8.1.2-5: 100 Trying (S-CSCF to I-CSCF)

```
P/2.0 100 Trying
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-length: 0
```

100 Trying (I-CSCF to P-CSCF)

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

Table 8.1.2-6: 100 Trying (I-CSCF to P-CSCF)

```
P/2.0 100 Trying
a: SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-length:
```

Service Control

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

INVITE (MO#1b to S-S)

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

Editor's Note: Need to represent the ability of the S-CSCF to take part in the negotiation of the media streams (by removing entries) in some manner.

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

Table 8.1.2-8: INVITE (MO#1b to S-S)

```
VITE sip:+1-212-555-2222@home.net;user=phone SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP    pcscf1.visited.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net, sip:icscf.home.net
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

100 Trying (S-S to MO#1b)

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

ϽTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one these flows may produce. In this case, S-S#2 and MT#2 are assumed.

Table 8.1.2-9: 100 Trying (S-S to MO#1b)

```
P/2.0 100 Trying
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP    pcscf1.visited.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-length: 0
```

'. 183 Session Progress (S-S to MO#1b)

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

ϽTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one these flows may produce. In this case, S-S#2 and MT#2 are assumed.

Table 8.1.2-10: 183 Session Progress response (S-S to MO#1b)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP    pcscf1.visited.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf2.home.net, sip:scscf.home.net, sip:icscf.home.net
mote-Party-ID: John Smith <tel:+1-212-555-2222>
onymity: Off
om:
: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost; tag=314159
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
eq: 9021
ntent-Disposition: precondition
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::eee:fff:aaa:bbb
AS:64
907165275 0
audio 6544 RTP/AVP 97 3
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:mandatory sendrecv confirm
```

Editor's Note: Future contributions should address the alternative of P-CSCF not modifying the Contact header and instead inserting itself in the Record-Route.

. 183 Session Progress (S-CSCF to I-CSCF)

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

Table 8.1.2-11: 183 Session Progress (S-CSCF to I-CSCF)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
cord-Route:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

183 Session Progress (I-CSCF to P-CSCF)

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

Table 8.1.2-12: 183 Session Progress (I-CSCF to P-CSCF)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:Token(sip:scscf.home.net, sip:scscf2.home.net), sip:icscf.home.net
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

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

Editor's Note: Still need to decide the hiding mechanism for Record-Route.

Authorize QoS Resources

P-CSCF authorizes the resources necessary for this session

183 Session Progress (P-CSCF to UE)

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

Table 8.1.2-14: 183 Session Progress (P-CSCF to UE)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
dia-Authorization: 9BV3072
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact: sip:token1@pcscf1.visited.net
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

P-CSCF removes the Record-Route and Contact 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:icscf.home.net,
     sip:Token(sip:scscf.home.net, sip:scscf2.home.net),
     sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
```

Contact: a locally unique token to identify the saved routing information.

edia-Authorization: a P-CSCF generated authorization token

**.	PRACK (UE to P-CSCF)**

UE decides the final set of media streams for this session, and includes this information in the PRACK request to P-CSCF.

Table 8.1.2-15: PRACK (UE to P-CSCF)

```
ACK sip:token1@pcscf1.visited.net SIP/2.0
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om: “Alien Blaster” <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 128 PRACK
ntact: sip:[5555::aaa:bbb:ccc:ddd]
ck: 9021 127 INVITE
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:mandatory sendrecv
```

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

Via:, Contact: take the value of either the IP address of RQDN 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.

'. PRACK (P-CSCF to I-CSCF)

P-CSCF adds a Route header, with the saved value from the previous response. P-CSCF identifies the proper saved value by the Request-URI.

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

Table 8.1.2-16: PRACK (P-CSCF to I-CSCF)

```
ACK sip:icscf.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:Token(sip:scscf.home.net, sip:scscf2.home.net),
  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.visited.net
ck:
ntent-Type:
ntent-length:
```

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

Route: saved from the previous response (with first element moved to Request-URI).

Contact: a locally defined value that identifies the UE.

'. PRACK (I-CSCF to S-CSCF)

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

Table 8.1.2-17: PRACK (I-CSCF to S-CSCF)

```
ACK sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
ute: sip:scscf2.home.net, sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
cord-Route: sip:icscf.home.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-Type:
ntent-length:
```

:. PRACK (MO#1b to S-S)

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

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MT#2 are assumed.

Table 8.1.2-18: PRACK (MO#1b to S-S)

```
ACK sip:scscf2.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP    pcscf1.visited.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
cord-Route: sip:scscf.home.net, sip:iscsf.home.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-Type:
ntent-length:
```

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

200 OK (S-S to MO#1b)

The destination endpoint responds to the PRACK request (18) with a 200 OK response, per the S-CSCF to S-CSCF procedures.

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MT#2 are assumed.

Table 8.1.2-19: 200 OK (S-S to MO#1b)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP    pcscf1.visited.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf2.home.net, sip:scscf.home.net,  sip:icscf.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
ntent-Length: 0
```

200 OK (S-CSCF to I-CSCF)

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

Table 8.1.2-20: 200 OK (S-CSCF to I-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf2.home.net, sip:scscf.home.net,  sip:icscf.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Length:
```

. 200 OK (I-CSCF to P-CSCF)

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

Table 8.1.2-21: 200 OK (I-CSCF to P-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:Token(sip:scscf.home.net, sip:scscf2.home.net), sip:icscf.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Length:
```

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

. 200 OK (P-CSCF to UE)

P-CSCF forwards the 200 OK response to UE.

Table 8.1.2-22: 200 OK (P-CSCF to UE)

```
P/2.0 200 OK
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntact: sip:token2@pcscf1.visited.net
ntent-Length:
```

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

Contact: a locally unique token to identify the saved routing information

Editor's Note: The need to generate a new token for Record-Route and Contact information for a non-INVITE response is FFS.

. Resource Reservation

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

. COMET (UE to P-CSCF)

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

Table 8.1.2-24: COMET (UE to P-CSCF)

```
MET sip:token2@pcscf1.visited.net SIP/2.0
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 129 COMET
ntact: sip:[5555::aaa:bbb:ccc:ddd]
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:success sendonly
```

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

Via, Contact: take the value of either the IP address or FQDN of the originating UE.

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

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

The SDP indicates that the resource reservation was successful.

. COMET (P-CSCF to I-CSCF)

P-CSCF adds a Route header, with the saved value from the previous response. P-CSCF identifies the proper saved value by the Request-URI.

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

Table 8.1.2-25: COMET (P-CSCF to I-CSCF)

```
MET sip:icscf.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:Token(sip:scscf.home.net, sip:scscf2.home.net),
  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.visited.net
ntent-Type:
ntent-length:
```

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

Route: saved from the 183 Session Progress response (with first element moved to Request-URI).

Contact: a locally defined value that identifies the UE.

. COMET (I-CSCF to S-CSCF)

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

Table 8.1.2-26: COMET (I-CSCF to S-CSCF)

```
MET sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
ute: sip:scscf2.home.net, sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
cord-Route: sip:icscf.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

. COMET (MO#1b to S-S)

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

Table 8.1.2-27 COMET (MO#1b to S-S)

```
MET sip:scscf2.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP    pcscf1.visited.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
cord-Route: sip:scscf.home.net, sip:icscf.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

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

. 200 OK (S-S to MO#1b)

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

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MT#2 are assumed.

Table 8.1.2-28: 200 OK (S-S to MO#1b)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP    pcscf1.visited.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf2.home.net, sip:scscf.home.net,  sip:icscf.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
ntent-Length: 0
```

. 200 OK (S-CSCF to I-CSCF)

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

Table 8.1.2-28: 200 OK (S-CSCF to I-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-Length:
```

. 200 OK (I-CSCF to P-CSCF)

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

Table 8.1.2-30: 200 OK (I-CSCF to P-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:Token(sip:scscf.home.net, sip:scscf2.home.net),   sip:icscf.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Length:
```

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

. 200 OK (P-CSCF to UE)

P-CSCF forwards the 200 OK response to UE.

Table 8.1.2-31: 200 OK (P-CSCF to UE)

```
P/2.0 200 OK
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntact: sip:token3@pcscf1.visited.net
ntent-Length:
```

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

Contact: a locally unique token to identify the saved routing information

. 180 Ringing (S-S to MO#1b)

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

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MT#2 are assumed.

Table 8.1.2-32: 180 Ringing (S-S to MO#1b)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP    pcscf1.visited.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf2.home.net, sip:scscf.home.net,  sip:icscf.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
eq: 9022
ntent-length: 0
```

. 180 Ringing (S-CSCF to I-CSCF)

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

Table 8.1.2-33: 180 Ringing (S-CSCF to I-CSCF)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-length:
```

. 180 Ringing (I-CSCF to P-CSCF)

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

Table 8.1.2-34: 180 Ringing (I-CSCF to P-CSCF)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:Token(sip:scscf.home.net, sip:scscf2.home.net),   sip:icscf.home.net
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-length:
```

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

. 180 Ringing (P-CSCF to UE)

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

P-CSCF forwards the 180 Ringing response to UE.

Table 8.1.2-35: 180 Ringing (P-CSCF to UE)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntact: sip:token4@pcscf1.visited.net
eq:
ntent-length:
```

Contact: a locally unique token to identify the saved routing information

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.

. PRACK (UE to P-CSCF)

UE indicates to the originating subscriber that the destination is ringing. It acknowledges the 180 Ringing provisional response (35) with a PRACK request.

Table 8.1.2-36: PRACK (UE to P-CSCF)

```
ACK sip:token4@pcscf1.visited.net SIP/2.0
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 130 PRACK
ntact: sip:[5555::aaa:bbb:ccc:ddd]
ck: 9022 127 INVITE
ntent-length: 0
```

Request-URI: takes the value of the Contact header of the 180 Ringing response.

Via:, Contact: take the value of either the IP address or FQDN of the UE.

From:, To:, Call-ID: copied from the 180 Ringing response so that they include any revised tag parameters.

Cseq: takes a higher value than in the previous request.

. PRACK (P-CSCF to I-CSCF)

P-CSCF adds a Route header, with the saved value from the previous response. P-CSCF identifies the proper saved value by the Request-URI.

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

Table 8.1.2-37: PRACK (P-CSCF to I-CSCF)

```
ACK sip:icscf.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:Token(sip:scscf.home.net, sip:scscf2.home.net),
  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.visited.net
ck:
ntent-length:
```

. PRACK (I-CSCF to S-CSCF)

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

Table 8.1.2-38: PRACK (I-CSCF to S-CSCF)

```
ACK sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
ute: sip:scscf2.home.net, sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
cord-Route: sip:icscf.home.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-length:
```

. PRACK (MO#1b to S-S)

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

Table 8.1.2-39: PRACK (MO#1b to S-S)

```
ACK sip:scscf2.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP    pcscf1.visited.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
cord-Route: sip:scscf.home.net, sip:icscf.home.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-length:
```

. 200 OK (S-S to MO#1b)

The destination endpoint responds to the PRACK request (39) with a 200 OK response.

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MT#2 are assumed.

Table 8.1.2-40: 200 OK (S-S to MO#1b)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP    pcscf1.visited.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf2.home.net, sip:scscf.home.net,  sip:icscf.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
ntent-Length: 0
```

**.	200 OK (S-CSCF to I-CSCF)**

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

Table 8.1.2-41: 200 OK (S-CSCF to I-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-Length:
```

**.	200 OK (I-CSCF to P-CSCF)**

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

Table 8.1.2-42: 200 OK (I-CSCF to P-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:Token(sip:scscf.home.net, sip:scscf2.home.net),   sip:icscf.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Length:
```

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

**.	200 OK (P-CSCF to UE)**

P-CSCF forwards the 200 OK response to UE.

Table 8.1.2-43: 200 OK (P-CSCF to UE)

```
P/2.0 200 OK
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntact: sip:token5@pcscf1.visited.net
ntent-Length:
```

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

Contact: a locally unique token to identify the saved routing information

. 200 OK (S-S to MO#1b)

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

Table 8.1.2-44: 200 OK (S-S to MO#1b)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP    pcscf1.visited.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf2.home.net, sip:scscf.home.net,  sip:icscf.home.net
om:
:
ll-ID:
eq: 127 INVITE
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
ntent-Length: 0
```

. Service Control

S-CSCF performs whatever service control is appropriate for the completed call

. 200 OK (S-CSCF to I-CSCF)

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

Table 8.1.2-46: 200 OK (S-CSCF to I-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf2.home.net, sip:scscf.home.net,  sip:icscf.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Length:
```

. 200 OK (I-CSCF to P-CSCF)

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

Table 8.1.2-47: 200 OK (I-CSCF to P-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:Token(sip:scscf.home.net, sip:scscf2.home.net),
  sip:icscf.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Length:
```

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

200 OK (P-CSCF to UE)

P-CSCF indicates the resources reserved for this session should now be committed, and forwards the 200 OK final response to the call originator.

Table 8.1.2-48: 200 OK (P-CSCF to UE)

```
P/2.0 200 OK
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntact: sip:token6@pcscf1.visited.net
ntent-Length:
```

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

Contact: a locally unique token to identify the saved routing information

ACK (UE to P-CSCF)

UE starts the media flow for this session, and responds to the 200 OK (48) with an ACK request sent to P-CSCF.

Table 8.1.2-49: ACK (UE to P-CSCF)

```
K sip:token6@pcscf1.visited.net SIP/2.0
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 131 ACK
ntact: sip:[5555::aaa:bbb:ccc:ddd]
ntent-length: 0
```

ACK (P-CSCF to I-CSCF)

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

Table 8.1.2-50: ACK (P-CSCF to I-CSCF)

```
K sip:icscf.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:Token(sip:scscf.home.net, sip:scscf2.home.net),
  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.visited.net
ntent-length:
```

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

Route: saved from the 200 OK response (with first element moved to Request-URI).

Contact: a locally defined value that identifies the UE.

. ACK (I-CSCF to S-CSCF)

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

Table 8.1.2-51: ACK (I-CSCF to S-CSCF)

```
K sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP pcscf1.visited.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
ute: sip:scscf2.home.net, sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
cord-Route: sip:icscf.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Length:
```

. ACK (MO#1b to S-S)

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

Table 8.1.2-52: ACK (MO#1b to S-S)

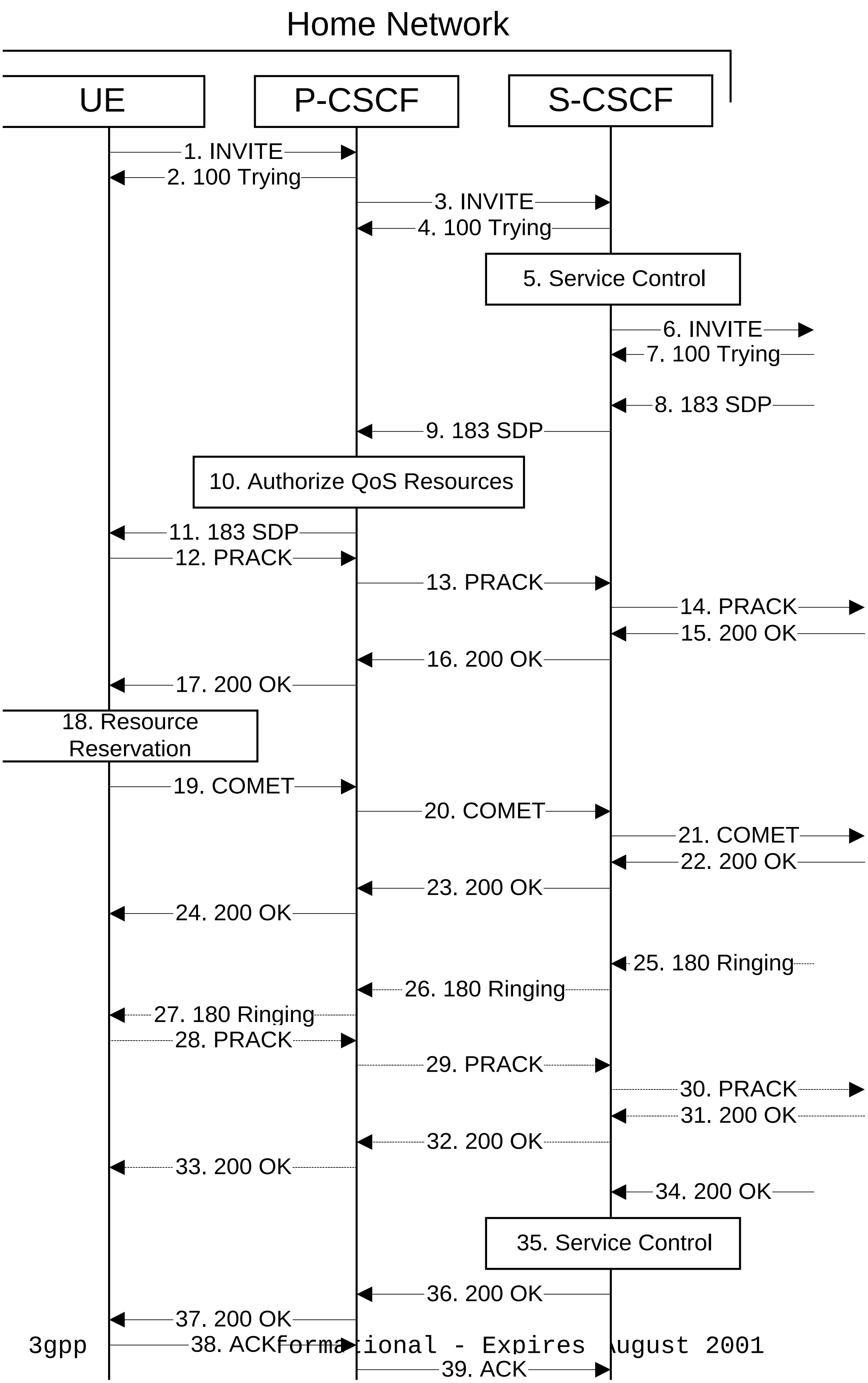
```
K sip:scscf2.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP    pcscf1.visited.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
cord-Route: sip:scscf.home.net, sip:icscf.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Length:
```

1.3 (MO#2) Mobile origination, located in home network

ıis origination procedure applies to subscribers located in their home service area.

ıe UE is located in the home network, and determines the P-CSCF via the CSCF discovery procedure. During registration, the ıme network allocates an S-CSCF in the home network.

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



Home Network
UE
P-CSCF
S-CSCF
1. INVITE
2. 100 Trying
3. INVITE
4. 100 Trying
5. Service Control
6. INVITE
7. 100 Trying
8. 183 SDP
9. 183 SDP
10. Authorize QoS Resources
11. 183 SDP
12. PRACK
13. PRACK
14. PRACK
15. 200 OK
16. 200 OK
17. 200 OK
18. Resource Reservation
19. COMET
20. COMET
21. COMET
22. 200 OK
23. 200 OK
24. 200 OK
25. 180 Ringing
26. 180 Ringing
27. 180 Ringing
28. PRACK
29. PRACK
30. PRACK
31. 200 OK
32. 200 OK
33. 200 OK
34. 200 OK
35. Service Control
36. 200 OK
37. 200 OK
38. ACK
39. ACK

ocedure MO#2 is as follows:

INVITE (UE to P-CSCF)

UE sends the INVITE request, containing an initial SDP, to the P-CSCF determined via the CSCF discovery mechanism.

Editor's Note: Certain fields in the SDP carry no information. In particular the "o=", "s=" fields and "t=". These are, however, mandatory fields within SDP. Does 3GPP wish to define a non-standard version of SDP that removes these, and if so, how does this interwork with outside SIP networks that use standard SDP.

Table 8.1.3-1: INVITE (UE to P-CSCF)

```
VITE sip:+1-212-555-2222@home.net;user=phone SIP/2.0
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
pported: 100rel
mote-Party-ID: John Doe <tel:+1-212-555-1111>
onymity: Off
om: "Alien Blaster" <sip:B36(SHA-1(+1-212-555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 127 INVITE
ntact: sip:[5555::aaa:bbb:ccc:ddd]
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97 3 96
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
rtpmap:96 G726-32/8000
qos:mandatory sendrecv
```

Request-URI: contains the keyed number from the user.

Via: contains the IP address or FQDN of the originating UE.

Remote-Party-ID: contains the public identity of the UE. The Display name is optional.

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

Cseq: a random starting number.

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

100 Trying (P-CSCF to UE)

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

Table 8.1.3-2: 100 Trying (P-CSCF to UE)

```
P/2.0 100 Trying
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-length: 0
```

INVITE (P-CSCF to S-CSCF)

P-CSCF remembers (from the registration procedure) the request routing for this UE. This becomes a Route header in the request. This next hop is the S-CSCF within the home network.

P-CSCF rewrites the Contact header, with a locally defined value that identifies the UE. P-CSCF adds itself to the Record-Route header, and adds a Via header.

The INVITE request is forwarded to the S-CSCF.

Table 8.1.3-3: INVITE (P-CSCF to S-CSCF)

```
VITE sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:+1-212-555-2222@home1.net;user=phone
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.home.net
ntent-Type:
ntent-length:
```

Request-URI: 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.

Editor's Note: Need to represent the ability of the P-CSCF to take part in the negotiation of the media streams (by removing entries) in some manner.

100 Trying (S-CSCF to P-CSCF)

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

Table 8.1.3-4: 100 Trying (S-CSCF to P-CSCF)

```
P/2.0 100 Trying
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-length: 0
```

Service Control

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

INVITE (MO#2 to S-S)

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

Editor's Note: Need to represent the ability of the S-CSCF to take part in the negotiation of the media streams (by removing entries) in some manner.

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

Table 8.1.3-6: INVITE (MO#2 to S-S)

```
VITE sip:+1-212-555-2222@home.net;user=phone SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

100 Trying (S-S to MO#2)

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

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MT#2 are assumed.

Table 8.1.3-7: 100 Trying (S-S to MO#2)

```
P/2.0 100 Trying
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-length: 0
```

183 Session Progress (S-S to MO#2)

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.

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MT#2 are assumed.

Table 8.1.3-8: 183 Session Progress (S-S to MO#2)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf2.home.net, sip:scscf.home.net
mote-Party-ID: John Smith <tel:+1-212-555-2222>
onymity: Off
om:
: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost; tag=314159
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
eq: 9021
ntent-Disposition: precondition
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::eee:fff:aaa:bbb
AS:64
907165275 0
audio 6544 RTP/AVP 97 3
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:mandatory sendrecv confirm
```

183 Session Progress (S-CSCF to P-CSCF)

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

Table 8.1.3-9: 183 Session Progress (S-CSCF to P-CSCF)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

Authorize QoS Resources

P-CSCF authorizes the resources necessary for this session

183 Session Progress (P-CSCF to UE)

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

Table 8.1.3-11: 183 Session Progress (P-CSCF to UE)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
dia-Authorization: 9BV3072
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact: sip:token1@pcscf1.home.net
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

P-CSCF removes the Record-Route and Contact 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:scscf.home.net, sip:scscf2.home.net,
        sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
```

Contact: a locally unique token to identify the saved routing information.

edia-Authorization: a P-CSCF generated authorization token

. PRACK (UE to P-CSCF)

UE decides the final set of media streams for this session, and includes this information in the PRACK request to P-CSCF.

Table 8.1.3-12: PRACK (UE to P-CSCF)

```
ACK sip:token1@pcscf1.home.net SIP/2.0
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 128 PRACK
ntact: sip:[5555::aaa:bbb:ccc:ddd]
ck: 9021 127 INVITE
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:mandatory sendrecv
```

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

Via:, Contact: take the value of either the IP address of RQDN 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.

. PRACK (P-CSCF to S-CSCF)

P-CSCF adds a Route header, with the saved value from the previous response. P-CSCF identifies the proper saved value by the Request-URI.

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

Table 8.1.3-13: PRACK (P-CSCF to S-CSCF)

```
ACK sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:scscf2.home.net, sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.home.net
ck:
ntent-Type:
ntent-length:
```

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

Route: saved from the previous response (with first element moved to Request-URI).

Contact: a locally defined value that identifies the UE.

. **PRACK (MO#2 to S-S)**

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

Table 8.1.3-14: PRACK (MO#2 to S-S)

```
ACK sip:scscf2.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-Type:
ntent-length:
```

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

. **200 OK (S-S to MO#2)**

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

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MT#2 are assumed.

Table 8.1.3-15: 200 OK (S-S to MO#2)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf2.home.net, sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
ntent-Length: 0
```

. 200 OK (S-CSCF to P-CSCF)

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

Table 8.1.3-16: 200 OK (S-CSCF to P-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-Length:
```

. 200 OK (P-CSCF to UE)

P-CSCF forwards the 200 OK response to UE.

Table 8.1.3-17: 200 OK (P-CSCF to UE)

```
P/2.0 200 OK
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntact: sip:token2@pcscf1.home.net
ntent-Length:
```

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

Contact: a locally unique token to identify the saved routing information

. Resource Reservation

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

'. COMET (UE to P-CSCF)

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

Table 8.1.3-19: COMET (UE to P-CSCF)

```
MET sip:token2@pcscf1.home.net SIP/2.0
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om: “Alien Blaster” <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 129 COMET
ntact: sip:[5555::aaa:bbb:ccc:ddd]
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:success sendonly
```

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

Via:, Contact: take the value of either the IP address or FQDN of the originating UE.

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

CSeq: takes a higher value than that in the previous request.

The SDP indicates that the resource reservation was successful.

'. COMET (P-CSCF to S-CSCF)

P-CSCF adds a Route header, with the saved value from the previous response. P-CSCF identifies the proper saved value by the Request-URI.

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

Table 8.1.3-20: COMET (P-CSCF to S-CSCF)

```
MET sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:scscf2.home.net, sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

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

Route: saved from the 183 Session Progress response (with first element moved to Request-URI).

Contact: a locally defined value that identifies the UE.

. **COMET (MO#2 to S-S)**

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

Table 8.1.3-21: COMET (MO#2 to S-S)

```
MET sip:scscf2.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

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

. **200 OK (S-S to MO#2)**

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

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MT#2 are assumed.

Table 8.1.3-22: 200 OK (S-S to MO#2)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf2.home.net, sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
ntent-Length: 0
```

. 200 OK (S-CSCF to P-CSCF)

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

Table 8.1.3-23: 200 OK (S-CSCF to P-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-Length:
```

. 200 OK (P-CSCF to UE)

P-CSCF forwards the 200 OK response to UE.

Table 8.1.3-24: 200 OK (P-CSCF to UE)

```
P/2.0 200 OK
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntact: sip:token3@pcscf1.home.net
ntent-Length:
```

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

Contact: a locally unique token to identify the saved routing information

. 180 Ringing (S-S to MO#2)

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.

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MT#2 are assumed.

Table 8.1.3-25: 180 Ringing (S-S to MO#2)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf2.home.net, sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
eq: 9022
ntent-length: 0
```

'. 180 Ringing (S-CSCF to P-CSCF)

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

Table 8.1.3-26: 180 Ringing (S-CSCF to P-CSCF)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-length:
```

'. 180 Ringing (P-CSCF to UE)

P-CSCF removes the Record-Route and Contact headers, calculates the propoer Route header to add to future requests, and saves that information without passing it to UE. A Contact header is added with a locally unique token to identify the saved routing information.

P-CSCF forwards the 180 Ringing response to UE.

Table 8.1.3-27: 180 Ringing (P-CSCF to UE)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntact: sip:token4@pcscf1.home.net
eq:
ntent-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.

'. PRACK (UE to P-CSCF)

UE indicates to the originating subscriber that the destination is ringing. It acknowledges the 180 Ringing provisional response (27) with a PRACK request.

Table 8.1.3-28: PRACK (UE to P-CSCF)

```
ACK sip:token4@pcscf1.home.net SIP/2.0
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 130 PRACK
ntact: sip:[5555::aaa:bbb:ccc:ddd]
ck: 9022 127 INVITE
ntent-length: 0
```

Request-URI: takes the value of the Contact header of the 180 Ringing response.

Via:, Contact: take the value of either the IP address or FQDN of the UE.

From:, To:, Call-ID: copied from the 180 Ringing response so that they include any revised tag parameters.

Cseq: takes a higher value than in the previous request.

. PRACK (P-CSCF to S-CSCF)

P-CSCF adds a Route header, with the saved value from the previous response. P-CSCF identifies the proper saved value by the Request-URI.

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

Table 8.1.3-29: PRACK (P-CSCF to S-CSCF)

```
ACK sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:scscf2.home.net, sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.home.net
ck:
ntent-length:
```

. PRACK (MO#2 to S-S)

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

Table 8.1.3-30: PRACK (MO#2 to S-S)

```
ACK sip:scscf2.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
cord-Route: sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-length:
```

. 200 OK (S-S to MO#2)

The destination endpoint responds to the PRACK request (30) with a 200 OK response.

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MT#2 are assumed.

Table 8.1.3-31: 200 OK (S-S to MO#2)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf2.home.net, sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
ntent-Length: 0
```

. 200 OK (S-CSCF to P-CSCF)

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

Table 8.1.3-32: 200 OK (S-CSCF to P-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf2.home.net, sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Length:
```

. 200 OK (P-CSCF to UE)

P-CSCF forwards the 200 OK response to UE.

Table 8.1.3-33: 200 OK (P-CSCF to UE)

```
P/2.0 200 OK
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntact: sip:token5@pcscf1.home.net
ntent-Length:
```

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

Contact: a locally unique token to identify the saved routing information

200 OK (S-S to MO#2)

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 8.1.3-34: 200 OK (S-S to MO#2)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf2.home.net, sip:scscf.home.net
om:
:
ll-ID:
eq: 127 INVITE
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
ntent-Length: 0
```

Service Control

S-CSCF performs whatever service control is appropriate for the completed call

200 OK (S-CSCF to P-CSCF)

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

Table 8.1.3-36: 200 OK (S-CSCF to P-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-Length:
```

200 OK (P-CSCF to UE)

P-CSCF indicates the resources reserved for this session should now be committed, and forwards the 200 OK final response to the call originator.

Table 8.1.3-37: 200 OK (P-CSCF to UE)

```
P/2.0 200 OK
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntact: sip:token6@pcscf1.home.net
ntent-Length:
```

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

Contact: a locally unique token to identify the saved routing information

. ACK (UE to P-CSCF)

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

Table 8.1.3-38: ACK (UE to P-CSCF)

```
K sip:token6@pcscf1.home.net SIP/2.0
a: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 131 ACK
ntact: sip:[5555::aaa:bbb:ccc:ddd]
ntent-length: 0
```

. ACK (P-CSCF to S-CSCF)

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

Table 8.1.3-39: ACK (P-CSCF to S-CSCF)

```
K sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:scscf2.home.net, sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.home.net
ntent-length:
```

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

Route: saved from the 200 OK response (with first element moved to Request-URI).

Contact: a locally defined value that identifies the UE.

. ACK (MO#2 to S-S)

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

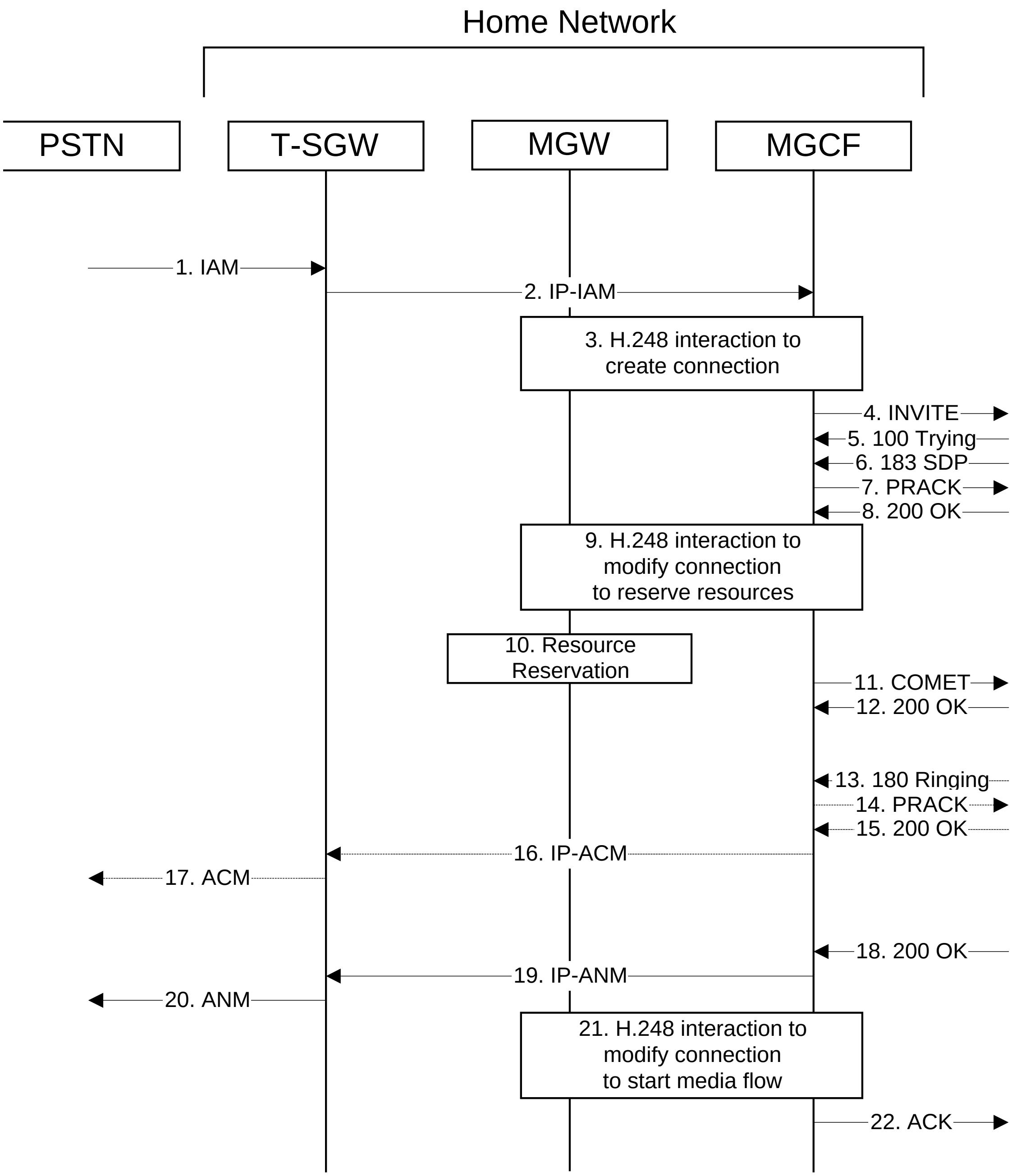
Table 8.1.3-40: ACK (MO#2 to S-S)

```
K sip:scscf2.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
cord-Route: sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Length:
```

1.4 (PSTN-O) PSTN origination

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

ıe to routing of calls within the PSTN, this origination procedure will only occur in the home network of the destination bscriber. However, the destination subscriber may be roaming in a different operator's network. Further, due to cases of call rwarding and electronic surveillance, the destination of the call through the IM subsystem may actually be another PSTN rmination.



ıe PSTN Origination procedure is as follows:

SS7 IAM

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

IP-IAM

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

H.248 Interaction

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

INVITE (PSTN-O to S-S)

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

Table 8.1.4-4: INVITE (PSTN-O to S-S)

```
VITE sip:+1-212-555-2222@home.net;user=phone SIP/2.0
a: SIP/2.0/UDP mgcf21.home.net
pported: 100rel
mote-Party-ID: John Doe <tel:+1-212-555-1111>
onymity: Off
om: <sip:B36(SHA-1(+1-212-555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 127 INVITE
ntact: sip:017/4@mgcf21.home.net
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97 3 96
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
rtpmap:96 G726-32/8000
qos:mandatory sendrecv
```

Request-URI: contains the keyed number from the user, as obtained from SS7 signalling.

Via: contains the IP address or FQDN of the originating MGCF.

Remote-Party-ID: contains the identity of the originator. The Display name is optional.

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

Cseq: a random starting number.

Contact: is the line identification and IP address or FQDN of the originating MGCF.

100 Trying (S-S to PSTN-O)

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

Table 8.1.4-5: 100 Trying (S-S to PSTN-O)

```
P/2.0 100 Trying
a: SIP/2.0/UDP mgcf21.home.net
om:
:
ll-ID:
eq:
ntent-Length: 0
```

183 Session Progress (S-S to PSTN-O)

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

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MT#2 are assumed.

Table 8.1.4-6: 183 Session Progress (S-S to PSTN-O)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP mgcf21.home.net
cord-Route: sip:pcscf2.home.net, sip:scscf2.home.net
mote-Party-ID: John Smith <tel:+1-212-555-2222>
onymity: Off
om:
: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost; tag=314159
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
eq: 9021
ntent-Disposition: precondition
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::eee:fff:aaa:bbb
AS:64
907165275 0
audio 6544 RTP/AVP 97 3
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:mandatory sendrecv confirm
```

PRACK (PSTN-O to S-S)

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

Table 8.1.4-7: PRACK (PSTN-O to S-S)

```
ACK sip:scscf2.home.net SIP/2.0
a: SIP/2.0/UDP mgcf21.home.net
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
om: <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 128 PRACK
ntact: sip:017/4@mgcf21.home.net
ck: 9021 127 INVITE
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:mandatory sendrecv
```

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 MGCF.

From:, To:, Call-ID: copied from the 183 Session Progress response so that they include any tag parameter.

Contact: is the line identification and IP address or FQDN of the originating MGCF.

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 MGCF and included in the SDP.

200 OK (S-S to PSTN-O)

The destination responds to the PRACK request (7) with a 200 OK response.

Table 8.1.4-8: 200OK (S-S to PSTN-O)

```
P/2.0 200 OK
a: SIP/2.0/UDP mgcf21.home.net
cord-Route: sip:scscf2.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
ntent-Length: 0
```

H.248 Interaction

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

Reserve Resources

MGW reserves the resources needed for the session

COMET (PSTN-O to S-S)

When the resource reservation is completed, MGCF sends the COMET request to the terminating endpoint, per the S-S procedures.

Table 8.1.4-11: COMET (PSTN-O to S-S)

```
MET sip:scscf2.home.net SIP/2.0
a: SIP/2.0/UDP mgcf21.home.net
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
om: “Alien Blaster” <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 129 COMET
ntact: sip:mgcf21.home.net
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:success sendonly
```

Request-URI: the first component of the Route header, built from the Record-Route response of the received 183 Session Progress response.

Via: contains the IP address or FQDN of the originating MGCF.

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

Contact: is the line identification and IP address or FQDN of the originating MGCF.

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

The SDP indicates that the resource reservation was successful.

. 200 OK (S-S to PSTN-O)

The destination endpoint responds to the COMET request (11) with a 200 OK response.

Table 8.1.4-12: 200 OK (S-S to PSTN-O)

```
P/2.0 200 OK
a: SIP/2.0/UDP mgcf21.home.net
cord-Route: sip:scscf2.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
ntent-Length: 0
```

. 180 Ringing (S-S to PSTN-O)

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

Table 8.1.4-13: 180 Ringing (S-S to PSTN-O)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP mgcf21.home.net
cord-Route: sip:scscf2.home.net
om:
:
ll-ID:
eq: 127 INVITE
eq: 9022
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
ntent-Length: 0
```

. PRACK (PSTN-O to S-S)

MGCF acknowledges the 180 Ringing provisional response (13) with a PRACK request.

Table 8.1.4-14: PRACK (PSTN-O to S-S)

```
ACK sip:scscf2.home.net SIP/2.0
a: SIP/2.0/UDP mgcf21.home.net
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
om:
:
ll-ID:
eq: 130 PRACK
ntact: sip:mgcf21.home.net
ck: 9022 127 INVITE
ntent-length: 0
```

. 200 OK (S-S to PSTN-O)

The destination endpoint responds to the PRACK request (14) with a 200 OK response.

Table 8.1.4-15: 200 OK (S-S to PSTN-O)

```
P/2.0 200 OK
a: SIP/2.0/UDP mgcf21.home.net
cord-Route: sip:scscf2.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
ntent-Length: 0
```

. IP-ACM

If alerting is being performed, the MGCF forwards an IP-ACM message to T-SGW

. ACM

If alerting is being performed, the T-SGW forwards a SS7 ACM message

. 200 OK (S-S to PSTN-O)

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

Table 8.1.4-18: 200 OK (S-S to PSTN-O)

```
P/2.0 200 OK
a: SIP/2.0/UDP mgcf21.home.net
cord-Route: sip:scscf2.home.net
om:
:
ll-ID:
eq: 127 INVITE
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
ntent-Length: 0
```

). IP-ANM

MGCF forwards an IP-ANM message to T-SGW

). ANM

T-SGW forwards an ANM message to the PSTN

. H.248 Interaction

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

:. ACK (PSTN-O to S-S)

MGCF acknowledges the 200 OK final response (18) with an ACK request.

Table 8.1.4-22: ACK (PSTN-O to S-S)

```
K sip:scscf2.home.net SIP/2.0
a: SIP/2.0/UDP mgcf21.home.net
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
om:
:
ll-ID:
eq: 131 ACK
ntact: sip:mgcf21.home.net
ntent-length: 0
```

2 Termination Procedures

ıis section presents the detailed application level flows to define the Procedures for call terminations.

ıe call termination procedures specify the signalling path between the Serving-CSCF assigned to perform the call termination rvice and the UE. This signalling path is determined at the time of UE registration, and remains fixed for the life of the gistration. This signalling path is the reverse of the call initiation signalling path of Section 8.1. Therefore there is a one-to-.e correspondence between the origination procedures of section 8.1 and the termination procedures of this section.

UE always has a proxy (P-CSCF) associated with it. This P-CSCF is located in the same network as the UE, and performs source authorization for the calls to the UE. The P-CSCF is determined by the CSCF discovery process, described in Section 2.1 (Local CSCF Discovery).

; a result of the registration procedure, the P-CSCF knows the address of the UE. The assigned S-CSCF, in the home network, ows the name/address of the P-CSCF. If the network operator owning the S-CSCF wants to keep their configuration private, e S-CSCF will have chosen an Interrogating-CSCF, I-CSCF, who will perform the firewall functions and pass messages to the CSCF (procedure MT#1b).

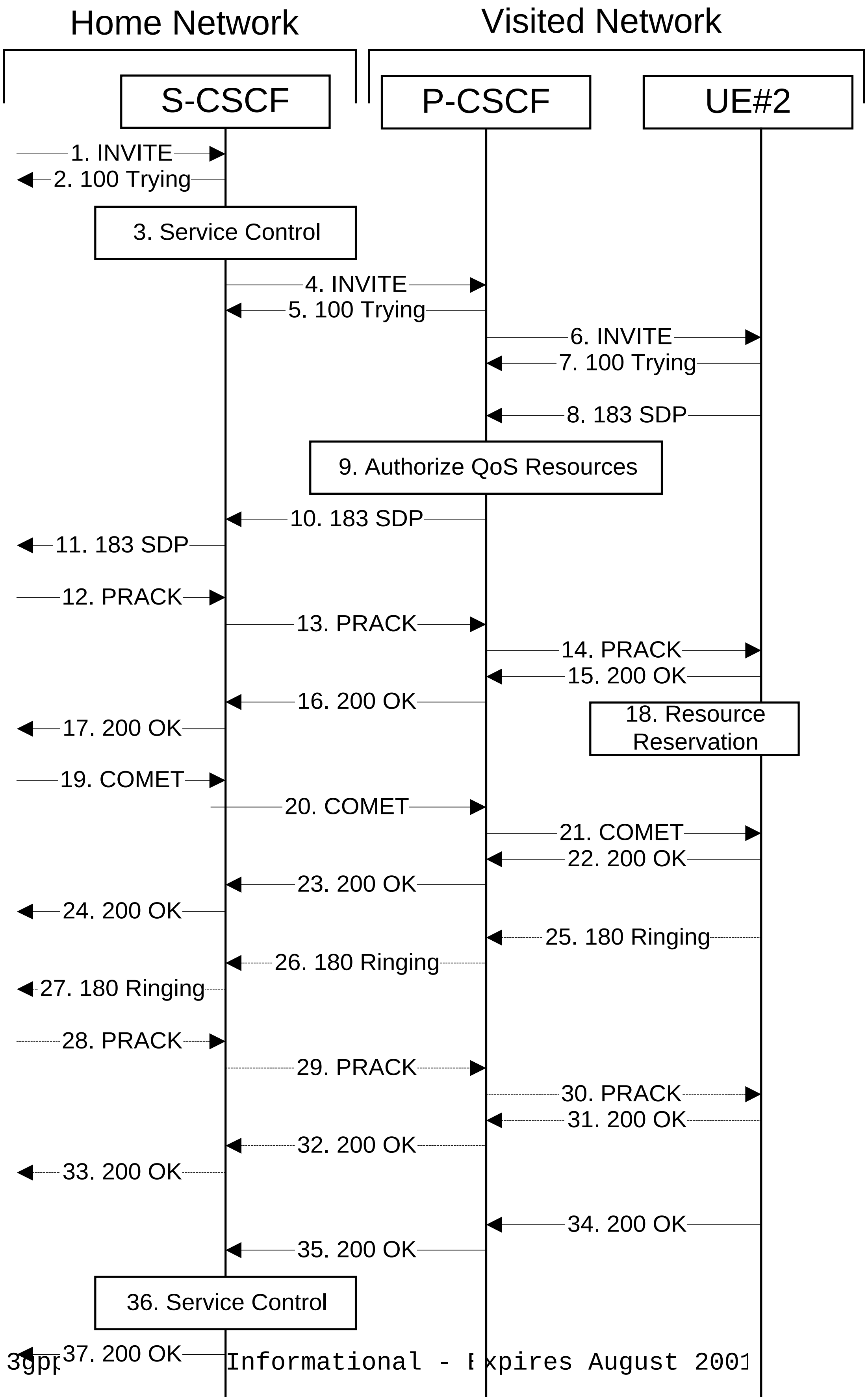
ılls destined to the PSTN are a special case of the Termination procedures. Two of the S-CSCF to S-CSCF procedures deal ecifically with PSTN termination, and route the call signalling through a BGCF that allocates a MGCF. The MGCF uses

248/MEGACO to control a Media Gateway, and communicates with the SS7 network via the T-SGW. The MGCF receives d processes SIP requests, and subsequent nodes consider the signalling as if it came from a S-CSCF.

2.1 (MT#1a) Mobile termination, roaming, without I-CSCF in home network providing onfiguration independence

is termination procedure applies to roaming subscribers when the home network operator does not desire to keep its internal nfiguration hidden from the visited network. The UE is located in a visited network, and determines the P-CSCF via the SCF discovery procedure. During registration, the home network allocates the S-CSCF.

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


Home Network
Visited Network
S-CSCF
P-CSCF
UE#2
1. INVITE
2. 100 Trying
3. Service Control
4. INVITE
5. 100 Trying
6. INVITE
7. 100 Trying
8. 183 SDP
9. Authorize QoS Resources
10. 183 SDP
11. 183 SDP
12. PRACK
13. PRACK
14. PRACK
15. 200 OK
16. 200 OK
17. 200 OK
18. Resource Reservation
19. COMET
20. COMET
21. COMET
22. 200 OK
23. 200 OK
24. 200 OK
25. 180 Ringing
26. 180 Ringing
27. 180 Ringing
28. PRACK
29. PRACK
30. PRACK
31. 200 OK
32. 200 OK
33. 200 OK
34. 200 OK
35. 200 OK
36. Service Control
37. 200 OK

ocedure MT#1a is as follows:

INVITE (S-S to MT#1a)

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 Serving-CSCF for the terminating subscriber.

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MO#2 are assumed.

Table 8.2.1-1: INVITE (S-S to MT#1a)

```
VITE sip:+1-212-555-2222@home.net;user=phone SIP/2.0
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf0.home.net
pported: 100rel
mote-Party-ID: John Doe <tel:+1-212-555-1111>
onymity: Off
om: “Alien Blaster” <sip:B36(SHA-1(+1-212-555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 127 INVITE
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf0.home.net
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97 3 96
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
rtpmap:96 G726-32/8000
qos:mandatory sendrecv
```

100 Trying (MT#1a to S-S)

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

Table 8.2.1-2: 100 Trying (MT#1a to S-S)

```
P/2.0 100 Trying
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-length: 0
```

Service Control

S-CSCF validates the service profile, and performs any termination service control required for this subscriber

INVITE (S-CSCF to P-CSCF)

S-CSCF remembers (from the registration procedure) the next hop CSCF for this UE. It forwards the INVITE to the P-CSCF.

Table 8.2.1-4: INVITE (S-CSCF to P-CSCF)

```
VITE sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.visited.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
ute:  sip:+1-212-555-2222@home.net;user=phone
cord-Route: sip:scscf.home.net, sip:scscf0.home.net
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

Route: built from the registration information, (pcscf and UE contact name), followed by the initial Request-URI from the incoming INVITE request. The first component of the Route header, pcscf, is moved to the Request-URI of the request.

Via:, Record-Route: S-CSCF adds itself

100 Trying (P-CSCF to S-CSCF)

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

Table 8.2.1-5: 100 Trying (P-CSCF to S-CSCF)

```
P/2.0 100 Trying
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-length: 0
```

INVITE (P-CSCF to UE)

P-CSCF determines the UE address from the value of the Request-URI (which was previously returned by P-CSCF as a contact header value in the registration procedure), and forwards the INVITE request to the UE.

Table 8.2.1-6: INVITE (P-CSCF to UE)

```
VITE sip:+1-212-555-2222@home.net;user=phone SIP/2.0
a: SIP/2.0/UDP pcscf.visited.net;branch=token1
dia-Authorization: 31S14621
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact: token1@pcscf.visited.net
ntent-Type:
ntent-length:
```

P-CSCF removes the Record-Route and Contact 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:scscf.home.net, sip:scscf0.home.net,
     sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf0.home.net
```

Contact: a locally unique token to identify the saved routing information.

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-Authorization: a P-CSCF generated authorization token

100 Trying (UE to P-CSCF)

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

Table 8.2.1-7: 100 Trying (UE to P-CSCF)

```
P/2.0 100 Trying
a: SIP/2.0/UDP pcscf.visited.net;branch=token1
om:
:
ll-ID:
eq:
ntent-length: 0
```

183 Session Progress (UE to P-CSCF)

UE determines the subset of the media flows proposed by the originating endpoint that it supports, and responds with a 183 Session Progress response containing SDP back to the originator. This response is sent to P-CSCF.

Table 8.2.1-8: 183 Session Progress (UE to P-CSCF)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP pcscf.visited.net;branch=token1
mote-Party-ID: John Smith <tel:+1-212-555-2222>
onymity: Off
om:
: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost; tag=314159
ll-ID:
eq:
ntact: sip:[5555::eee:fff:aaa:bbb]
eq: 9021
ntent-Disposition: precondition
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::eee:fff:aaa:bbb
AS:64
907165275 0
audio 6544 RTP/AVP 97 3
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:mandatory sendrecv confirm
```

Remote-Party-ID: identifies the answering subscriber. It contains the public identifier URL, and the name of the answering party.

To: A tag is added to the To header.

Contact: header identifies the IP address or FQDN of the UE.

SDP is attached to this response, giving the subset of proposed media streams supported by UE. It requests a confirmation of the QoS preconditions for establishing the session.

Authorize QoS Resources

P-CSCF authorizes the resources necessary for this session.

. 183 Session Progress (P-CSCF to S-CSCF)

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

Table 8.2.1-10: 183 Session Progress (P-CSCF to S-CSCF)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf.home.net, sip:scscf0.home.net
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.visited.net
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

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

Contact: a locally defined value that identifies the UE.

. 183 Session Progress (MT#1a to S-S)

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

Table 8.2.1-11: 183 Session Progress (MT#1a to S-S)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

. PRACK (S-S to MT#1a)

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.

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MO#2 are assumed.

Table 8.2.1-12: PRACK (S-S to MT#1a)

```
ACK sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.visited1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.visited.net
cord-Route: sip:scscf0.home.net
om: “Alien Blaster” <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 128 PRACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf0.home.net
ck: 9021 127 INVITE
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:mandatory sendrecv
```

. PRACK (S-CSCF to P-CSCF)

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

Table 8.2.1-13: PRACK (S-CSCF to P-CSCF)

```
ACK sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.visited.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-Type:
ntent-length:
```

. PRACK (P-CSCF to UE)

P-CSCF forwards the PRACK request to UE.

Table 8.2.1-14: PRACK (P-CSCF to UE)

```
ACK sip:[5555::eee:fff:aaa:bbb] SIP/2.0
a: SIP/2.0/UDP pcscf.visited.net;branch=token2
om:
:
ll-ID:
eq:
ntact: token2@pcscf.visited.net
ck:
ntent-Type:
ntent-length:
```

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

Contact: a locally unique token to identify the saved routing information.

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.

. 200 OK (UE to P-CSCF)

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

Table 8.2.1-15: 200 OK (UE to P-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf.visited.net;branch=token2
om:
:
ll-ID:
eq:
ntent-length: 0
```

. 200 OK (P-CSCF to S-CSCF)

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

Table 8.2.1-16: 200 OK (P-CSCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net, sip:scscf0.home.net,  sip:pcscf0.home.net
om:
:
ll-ID:
eq:
ntent-length:
```

. 200 OK (MT#1a to S-S)

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

Table 8.2.1-17: 200 OK (MT#1a to S-S)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntent-length:
```

. Resource Reservation

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

. COMET (S-S to MT#1a)

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

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MO#2 are assumed.

Table 8.2.1-19: COMET (S-S to MT#1a)

```
MET sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.visited1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.visited.net
cord-Route: sip:scscf0.home.net
om: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 129 COMET
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf0.home.net
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:success sendonly
```

. COMET (S-CSCF to P-CSCF)

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

Table 8.2.1-20: COMET (S-CSCF to P-CSCF)

```
MET sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.visited.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

. COMET (P-CSCF to UE)

P-CSCF forwards the COMET request to UE.

Table 8.2.1-21: COMET (P-CSCF to UE)

```
MET sip:[5555::eee:fff:aaa:bbb] SIP/2.0
a: SIP/2.0/UDP pcscf.visited.net;branch=token3
om:
:
ll-ID:
eq:
ntact: token3@pcscf.visited.net
ntent-Type:
ntent-length:
```

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

Contact: a locally unique token to identify the saved routing information.

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.

. 200 OK (UE to P-CSCF)

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

Table 8.2.1-22: 200 OK (UE to P-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf.visited.net;branch=token3
om:
:
ll-ID:
eq:
ntent-length: 0
```

. 200 OK (P-CSCF to S-CSCF)

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

Table 8.2.1-23: 200 OK (P-CSCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntent-length:
```

'. 200 OK (MT#1a to S-S)

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

Table 8.2.1-24: 200 OK (MT#1a to S-S)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntent-length:
```

'. 180 Ringing (UE to P-CSCF)

Before proceeding with session establishment, the UE waits for two events. First, the resource reservation initiated in step #18 must complete successfully. Second, the resource reservation initiated by the originating endpoint must complete successfully (which is indicated by message #21 received by UE). The UE may now immediately accept the session (and proceed with step #34), or alert the destination subscriber of an incoming call attempt; if the latter it indicates this to the calling party by a 180 Ringing provisional response sent to P-CSCF.

Table 8.2.1-25: 180 Ringing (UE to P-CSCF)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP pcscf.visited.net;branch=token1
om:
:
ll-ID:
eq:
ntact: sip:[5555::eee:fff:aaa:bbb]
eq: 9022
ntent-length: 0
```

'. 180 Ringing (P-CSCF to S-CSCF)

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

Table 8.2.1-26: 180 Ringing (P-CSCF to S-CSCF)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-length:
```

'. 180 Ringing (MT#1a to S-S)

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

Table 8.2.1-27: 180 Ringing (MT#1a to S-S)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-length:
```

. PRACK (S-S to MT#1a)

The originator acknowledges the 180 Ringing response (27) with a PRACK request.

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MO#2 are assumed.

Table 8.2.1-28: PRACK (S-S to MT#1a)

```
ACK sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.visited.net
cord-Route: sip:scscf0.home.net
om:
:
ll-ID:
eq: 130 PRACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf0.home.net
ck: 9022 127 INVITE
ntent-length: 0
```

. PRACK (S-CSCF to P-CSCF)

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

Table 8.2.1-29: PRACK (S-CSCF to P-CSCF)

```
ACK sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.visited.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-length:
```

. PRACK (P-CSCF to UE)

P-CSCF forwards the PRACK request to UE.

Table 8.2.1-30: PRACK (P-CSCF to UE)

```
ACK sip:[5555::eee:fff:aaa:bbb] SIP/2.0
a: SIP/2.0/UDP pcscf.visited.net;branch=token4
om:
:
ll-ID:
eq:
ntact: token4@pcscf.visited.net
ck:
ntent-length:
```

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

Contact: a locally unique token to identify the saved routing information.

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.

. 200 OK (UE to P-CSCF)

UE acknowledges the PRACK request (30) with a 200 OK response.

Table 8.2.1-31: 200 OK (UE to P-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf.visited.net;branch=token4
om:
:
ll-ID:
eq:
ntent-length: 0
```

. 200 OK (P-CSCF to S-CSCF)

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

Table 8.2.1-32: 200 OK (P-CSCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntent-length:
```

. 200 OK (MT#1a to S-S)

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

Table 8.2.1-33: 200 OK (MT#1a to S-S)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntent-length:
```

. 200 OK (UE to P-CSCF)

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 for this session.

Table 8.2.1-34: 200 OK (UE to P-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf.visited.net;branch=token1
om:
:
ll-ID:
eq: 127 INVITE
ntent-length: 0
```

. 200 OK (P-CSCF to S-CSCF)

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

Table 8.2.1-35: 200 OK (P-CSCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntent-length:
```

. Service Control

S-CSCF performs whatever service control is required for the call completion

. 200 OK (MT#1a to S-S)

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

Table 8.2.1-37: 200 OK (MT#1a to S-S)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntent-length:
```

ACK (S-S to MT#1a)

The calling party responds to the 200 OK final response (37) with an ACK request which is sent to S-CSCF via the S-CSCF to S-CSCF procedure.

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MO#2 are assumed.

Table 8.2.1-38: ACK (S-S to MT#1a)

```
K sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.visited1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.visited.net
cord-Route: sip:scscf0.home.net
om:
:
ll-ID:
eq: 131 ACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf0.home.net
ntent-length: 0
```

ACK (S-CSCF to P-CSCF)

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

Table 8.2.1-39: ACK (S-CSCF to P-CSCF)

```
K sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.visited.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

ACK (P-CSCF to UE)

P-CSCF forwards the ACK request to UE.

Table 8.2.1-40: ACK (P-CSCF to UE)

```
K sip:[5555::eee:fff:aaa:bbb] SIP/2.0
a: SIP/2.0/UDP pcscf.visited.net;branch=token5
om:
:
ll-ID:
eq:
ntact: token5@pcscf.visited.net
ntent-length:
```

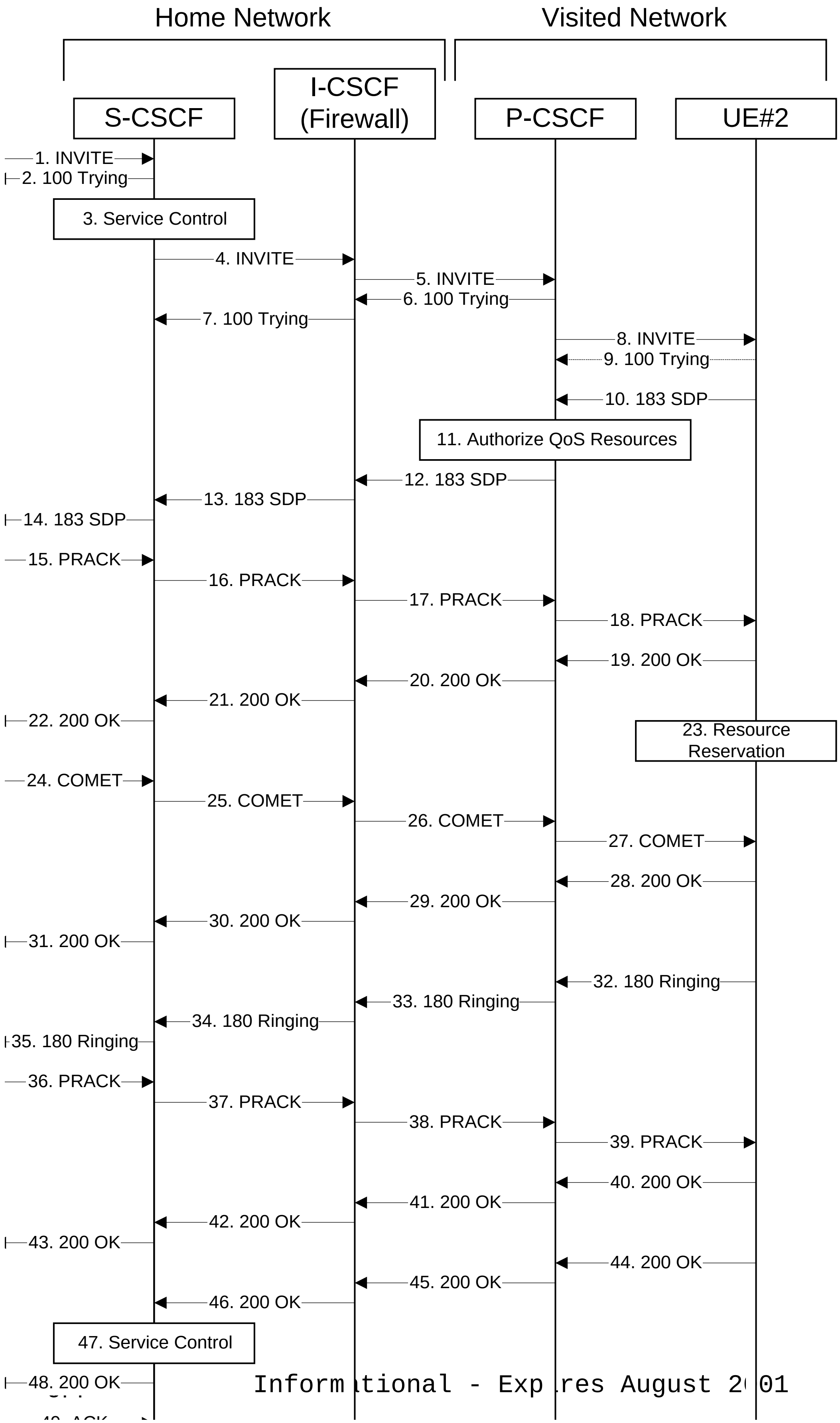
P-CSCF removes the Record-Route and Contact headers, calculates the proper Route header to add to future requests, and saves that information without passing it to UE.

Contact: a locally unique token to identify the saved routing information.

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.

2.2 (MT#1b) Mobile termination, roaming, with I-CSCF in home network ·oviding configuration independence

ıis termination procedure applies to roaming subscribers when the home network operator desires to keep its internal nfiguration hidden from the visited network. The UE is located in a visited network, and determines the P-CSCF via the ;CF discovery procedure. During registration, the home network allocates a S-CSCF. The home network advertises an I-;CF as the entry point from the visited network, who protects the S-CSCF identity and forwards requests to the P-CSCF. hen registration is complete, S-CSCF knows the name/address of its next hop in the signalling path toward the UE, the I-;CF. I-CSCF receives information in the request, which it translates and obtains the name/address of P-CSCF, and P-CSCF ows the name/address of the UE.


Home Network
Visited Network
S-CSCF
I-CSCF (Firewall)
P-CSCF
UE#2
1. INVITE
2. 100 Trying
3. Service Control
4. INVITE
5. INVITE
6. 100 Trying
7. 100 Trying
8. INVITE
9. 100 Trying
10. 183 SDP
11. Authorize QoS Resources
12. 183 SDP
13. 183 SDP
14. 183 SDP
15. PRACK
16. PRACK
17. PRACK
18. PRACK
19. 200 OK
20. 200 OK
21. 200 OK
22. 200 OK
23. Resource Reservation
24. COMET
25. COMET
26. COMET
27. COMET
28. 200 OK
29. 200 OK
30. 200 OK
31. 200 OK
32. 180 Ringing
33. 180 Ringing
34. 180 Ringing
35. 180 Ringing
36. PRACK
37. PRACK
38. PRACK
39. PRACK
40. 200 OK
41. 200 OK
42. 200 OK
43. 200 OK
44. 200 OK
45. 200 OK
46. 200 OK
47. Service Control
48. 200 OK

ocedure MT#1b is as follows:

INVITE (S-S to MT#1b)

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 Serving-CSCF for the terminating subscriber.

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MO#2 are assumed.

Table 8.2.2-1: INVITE (S-S to MT#1b)

```
VITE sip:+1-212-555-2222@home.net;user=phone SIP/2.0
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf0.home.net
pported: 100rel
mote-Party-ID: John Doe <tel:+1-212-555-1111>
onymity: Off
om: “Alien Blaster” <sip:B36(SHA-1(+1-212-555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 127 INVITE
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf0.home.net
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97 3 96
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
rtpmap:96 G726-32/8000
qos:mandatory sendrecv
```

100 Trying (MT#1b to S-S)

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

Table 8.2.2-2: 100 Trying (MT#1b to S-S)

```
P/2.0 100 Trying
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-length: 0
```

Service Control

S-CSCF validates the service profile, and performs any termination service control required for this subscriber

INVITE (S-CSCF to I-CSCF)

S-CSCF remembers (from the registration procedure) the next hop CSCF for this UE. It forwards the INVITE to the I-CSCF to perform the firewall functions.

Table 8.2.2-4: INVITE (S-CSCF to I-CSCF)

```
VITE sip:icscf.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.visited.net,                 sip:+1-212-555-
22@home.net;user=phone
cord-Route: sip:scscf.home.net, sip:scscf0.home.net
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

Route: built from the registration information, icscf, pcscf (and UE contact name), followed by the initial Request-URI from the incoming INVITE request. The first component of the Route header, icscf, is moved to the Request-URI of the request.

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

INVITE (I-CSCF to P-CSCF)

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

Table 8.2.2-5: INVITE (I-CSCF to P-CSCF)

```
VITE sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.visited.net SIP/2.0
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP Token(SIP/2.0/UDP scscf.home.net,  SIP/2.0/UDP
scf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd])
ute: sip:+1-212-555-2222@home.net;user=phone
cord-Route: sip:icscf.home.net, sip:Token(sip:scscf.home.net, sip:scscf0.home.net)
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

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

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

100 Trying (P-CSCF to I-CSCF)

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

Table 8.2.2-6: 100 Trying (P-CSCF to I-CSCF)

```
P/2.0 100 Trying
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP Token(SIP/2.0/UDP scscf.home.net,  SIP/2.0/UDP
scf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd])
om:
:
ll-ID:
eq:
ntent-length: 0
```

100 Trying (I-CSCF to S-CSCF)

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

Table 8.2.2-7: 100 Trying (I-CSCF to S-CSCF)

```
P/2.0 100 Trying
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-length:
```

INVITE (P-CSCF to UE)

P-CSCF determines the UE address from the value of the Request-URI (which was previously returned by P-CSCF as a contact header value in the registration procedure), and forwards the INVITE request to the UE.

Table 8.2.2-8: INVITE (P-CSCF to UE)

```
VITE sip:+1-212-555-2222@home.net;user=phone SIP/2.0
a: SIP/2.0/UDP pcscf.visited.net;branch=token1
dia-Authorization: 31S14621
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact: token1@pcscf.visited.net
ntent-Type:
ntent-length:
```

P-CSCF removes the Record-Route and Contact 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:icscf.home.net,
     sip:Token(sip:scscf.home.net, sip:scscf0.home.net),
     sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf0.home.net
```

Contact: a locally unique token to identify the saved routing information.

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-Authorization: a P-CSCF generated authorization token

100 Trying (UE to P-CSCF)

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

Table 8.2.2-9: 100 Trying (UE to P-CSCF)

```
P/2.0 100 Trying
a: SIP/2.0/UDP pcscf.visited.net;branch=token1
om:
:
ll-ID:
eq:
ntent-length: 0
```

. 183 Session Progress (UE to P-CSCF)

UE determines the subset of the media flows proposed by the originating endpoint that it supports, and responds with a 183 Session Progress response containing SDP back to the originator. This response is sent to P-CSCF.

Table 8.2.2-10: 183 Session Progress (UE to P-CSCF)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP pcscf.visited.net;branch=token1
mote-Party-ID: John Smith <tel:+1-212-555-2222>
onymity: Off
om:
: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost; tag=314159
ll-ID:
eq:
ntact: sip:[5555::eee:fff:aaa:bbb]
eq: 9021
ntent-Disposition: precondition
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::eee:fff:aaa:bbb
AS:64
907165275 0
audio 6544 RTP/AVP 97 3
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:mandatory sendrecv confirm
```

Remote-Party-ID: identifies the answering subscriber. It contains the public identifier URL, and the name of the answering party.

To: A tag is added to the To header.

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

SDP is attached to this response, giving the subset of proposed media streams supported by UE. It requests a confirmation of the QoS preconditions for establishing the session.

. Authorize QoS Resources

P-CSCF authorizes the resources necessary for this session.

. 183 Session Progress (P-CSCF to I-CSCF)

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

Table 8.2.2-12: 183 Session Progress (P-CSCF to I-CSCF)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP Token(SIP/2.0/UDP scscf.home.net,  SIP/2.0/UDP
scf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:icscf.home.net, sip:Token(sip:scscf.home.net, sip:scscf0.home.net)
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.visited.net
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

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

Contact: a locally defined value that identifies the UE.

183-Session-Progress (I-CSCF to S-CSCF)

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

Table 8.2.2-13: 183 Session Progress (I-CSCF to S-CSCF)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:icscf.home.net, sip:scscf.home.net, sip:scscf0.home.net
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

183 Session Progress (MT#1b to S-S)

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

Table 8.2.2-14: 183 Session Progress (MT#1b to S-S)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

PRACK (S-S to MT#1b)

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.

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MO#2 are assumed.

Table 8.2.2-15: PRACK (S-S to MT#1b)

```
ACK sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.visited1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
ute: sip:icscf.home.net, sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.visited.net
cord-Route: sip:scscf0.home.net
om: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 128 PRACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf0.home.net
ck: 9021 127 INVITE
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:mandatory sendrecv
```

. PRACK (S-CSCF to I-CSCF)

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

Table 8.2.2-16: PRACK (S-CSCF to I-CSCF)

```
ACK sip:icscf.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.visited.net
cord-Route: sip:scscf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-Type:
ntent-length:
```

. PRACK (I-CSCF to P-CSCF)

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

Table 8.2.2-17: PRACK (I-CSCF to P-CSCF)

```
ACK sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.visited.net SIP/2.0
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP Token(SIP/2.0/UDP scscf.home.net,  SIP/2.0/UDP
scf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:icscf.home.net, sip:Token(sip:scscf.home.net, sip:scscf0.home.net)
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-Type:
ntent-length:
```

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

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

. PRACK (P-CSCF to UE)

P-CSCF forwards the PRACK request to UE.

Table 8.2.2-18: PRACK (P-CSCF to UE)

```
ACK sip:[5555::eee:fff:aaa:bbb] SIP/2.0
a: SIP/2.0/UDP pcscf.visited.net;branch=token2
om:
:
ll-ID:
eq:
ntact: token2@pcscf.visited.net
ck:
ntent-Type:
ntent-length:
```

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

Contact: a locally unique token to identify the saved routing information.

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.

. 200 OK (UE to P-CSCF)

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

Table 8.2.2-19: 200 OK (UE to P-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf.visited.net;branch=token2
om:
:
ll-ID:
eq:
ntent-length: 0
```

. 200 OK (P-CSCF to I-CSCF)

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

Table 8.2.2-20: 200 OK (P-CSCF to I-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP Token(SIP/2.0/UDP scscf.home.net,  SIP/2.0/UDP
scf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:icscf.home.net, sip:Token(sip:scscf.home.net, sip:scscf0.home.net)
om:
:
ll-ID:
eq:
ntent-length:
```

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

. 200 OK (I-CSCF to S-CSCF)

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

Table 8.2.2-21: 200 OK (I-CSCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:icscf.home.net, sip:scscf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntent-length:
```

. 200 OK (MT#1b to S-S)

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

Table 8.2.2-22: 200 OK (MT#1b to S-S)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntent-length:
```

. Resource Reservation

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

. COMET (S-S to MT#1b)

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

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MO#2 are assumed.

Table 8.2.2-24: COMET (S-S to MT#1b)

```
MET sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.visited1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
ute: sip:icscf.home.net, sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.visited.net
cord-Route: sip:scscf0.home.net
om: “Alien Blaster” <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 129 COMET
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf0.home.net
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:success sendonly
```

. COMET (S-CSCF to I-CSCF)

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

Table 8.2.2-25: COMET (S-CSCF to I-CSCF)

```
MET sip:icscf.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.visited.net
cord-Route: sip:scscf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

. COMET (I-CSCF to P-CSCF)

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

Table 8.2.2-26: COMET (I-CSCF to P-CSCF)

```
MET sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.visited.net SIP/2.0
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP Token(SIP/2.0/UDP scscf.home.net,  SIP/2.0/UDP
scf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:icscf.home.net, sip:Token(sip:scscf.home.net, sip:scscf0.home.net)
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

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

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

. COMET (P-CSCF to UE)

P-CSCF forwards the COMET request to UE.

Table 8.2.2-27: COMET (P-CSCF to UE)

```
MET sip:[5555::eee:fff:aaa:bbb] SIP/2.0
a: SIP/2.0/UDP pcscf.visited.net;branch=token3
om:
:
ll-ID:
eq:
ntact: token3@pcscf.visited.net
ntent-Type:
ntent-length:
```

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

Contact: a locally unique token to identify the saved routing information.

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.

. 200 OK (UE to P-CSCF)

UE acknowledges the COMET request (27) with a 200 OK response.

Table 8.2.2-28: 200 OK (UE to P-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf.visited.net;branch=token3
om:
:
ll-ID:
eq:
ntent-length: 0
```

. 200 OK (P-CSCF to I-CSCF)

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

Table 8.2.2-29: 200 OK (P-CSCF to I-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP Token(SIP/2.0/UDP scscf.home.net,  SIP/2.0/UDP
scf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:icscf.home.net, sip:Token(sip:scscf.home.net, sip:scscf0.home.net)
om:
:
ll-ID:
eq:
ntent-length:
```

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

. 200 OK (I-CSCF to S-CSCF)

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

Table 8.2.2-30: 200 OK (I-CSCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:icscf.home.net, sip:scscf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntent-length:
```

. 200 OK (MT#1b to S-S)

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

Table 8.2.2-31: 200 OK (MT#1b to S-S)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntent-length:
```

. 180 Ringing (UE to P-CSCF)

Before proceeding with session establishment, the UE waits for two events. First, the resource reservation initiated in step #23 must complete successfully. Second, the resource reservation initiated by the originating endpoint must complete successfully (which is indicated by message #27 received by UE). The UE may now immediately accept the session (and proceed with step #44), or alert the destination subscriber of an incoming call attempt; if the latter it indicates this to the calling party by a 180 Ringing provisional response sent to P-CSCF.

Table 8.2.2-32: 180 Ringing (UE to P-CSCF)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP pcscf.visited.net;branch=token1
om:
:
ll-ID:
eq:
ntact: sip:[5555::eee:fff:aaa:bbb]
eq: 9022
ntent-length: 0
```

. 180 Ringing (P-CSCF to I-CSCF)

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

Table 8.2.2-33: 180 Ringing (P-CSCF to I-CSCF)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP Token(SIP/2.0/UDP scscf.home.net,  SIP/2.0/UDP
scf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:icscf.home.net, sip:Token(sip:scscf.home.net, sip:scscf0.home.net)
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.visited.net
eq:
ntent-length:
```

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

Contact: a locally defined value that identifies the UE.

180 Ringing (I-CSCF to S-CSCF)

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

Table 8.2.2-34: 180 Ringing (I-CSCF to S-CSCF)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:icscf.home.net, sip:scscf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-length:
```

180 Ringing (MT#1b to S-S)

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

Table 8.2.2-35: 180 Ringing (MT#1b to S-S)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-length:
```

PRACK (S-S to MT#1b)

The originator acknowledges the 180 Ringing response (35) with a PRACK request.

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MO#2 are assumed.

Table 8.2.2-36: PRACK (S-S to MT#1b)

```
ACK sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
ute: sip:icscf.home.net, sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.visited.net
cord-Route: sip:scscf0.home.net
om:
:
ll-ID:
eq: 130 PRACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf0.home.net
ck: 9022 127 INVITE
ntent-length: 0
```

'. PRACK (S-CSCF to I-CSCF)

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

Table 8.2.2-37: PRACK (S-CSCF to I-CSCF)

```
ACK sip:icscf.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.visited.net
cord-Route: sip:scscf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-length:
```

;. PRACK (I-CSCF to P-CSCF)

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

Table 8.2.2-38: PRACK (I-CSCF to P-CSCF)

```
ACK sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.visited.net SIP/2.0
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP Token(SIP/2.0/UDP scscf.home.net,  SIP/2.0/UDP
scf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:icscf.home.net, sip:Token(sip:scscf.home.net, sip:scscf0.home.net)
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-length:
```

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

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

'. PRACK (P-CSCF to UE)

P-CSCF forwards the PRACK request to UE.

Table 8.2.2-29: PRACK (P-CSCF to UE)

```
ACK sip:[5555::eee:fff:aaa:bbb] SIP/2.0
a: SIP/2.0/UDP pcscf.visited.net;branch=token4
om:
:
ll-ID:
eq:
ntact: token4@pcscf.visited.net
ck:
ntent-length:
```

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

Contact: a locally unique token to identify the saved routing information.

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.

. 200 OK (UE to P-CSCF)

UE acknowledges the PRACK request (39) with a 200 OK response.

Table 8.2.2-40: 200 OK (UE to P-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf.visited.net;branch=token4
om:
:
ll-ID:
eq:
ntent-length: 0
```

. 200 OK (P-CSCF to I-CSCF)

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

Table 8.2.2-41: 200 OK (P-CSCF to I-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP Token(SIP/2.0/UDP scscf.home.net,  SIP/2.0/UDP
scf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:icscf.home.net, sip:Token(sip:scscf.home.net, sip:scscf0.home.net)
om:
:
ll-ID:
eq:
ntent-length:
```

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

. 200 OK (I-CSCF to S-CSCF)

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

Table 8.2.2-42: 200 OK (I-CSCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:icscf.home.net, sip:scscf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntent-length:
```

. 200 OK (MT#1b to S-S)

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

Table 8.2.2-43: 200 OK (MT#1b to S-S)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntent-length:
```

. 200 OK (UE to P-CSCF)

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

Table 8.2.2-44: 200 OK (UE to P-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf.visited.net;branch=token1
om:
:
ll-ID:
eq: 127 INVITE
ntent-length: 0
```

. 200 OK (P-CSCF to I-CSCF)

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

Table 8.2.2-45: 200 OK (P-CSCF to I-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP Token(SIP/2.0/UDP scscf.home.net,  SIP/2.0/UDP
scf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:icscf.home.net, sip:Token(sip:scscf.home.net, sip:scscf0.home.net)
om:
:
ll-ID:
eq:
ntent-length:
```

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

. 200 OK (I-CSCF to S-CSCF)

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

Table 8.2.2-46: 200 OK (I-CSCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:icscf.home.net, sip:scscf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntent-length:
```

. Service Control

S-CSCF performs whatever service control is required for the call completion

. 200 OK (MT#1b to S-S)

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

Table 8.2.2-48: 200 OK (MT#1b to S-S)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntent-length:
```

. ACK (S-S to MT#1b)

The calling party responds to the 200 OK final response (48) with an ACK request which is sent to S-CSCF via the S-CSCF to S-CSCF procedure.

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MO#2 are assumed.

Table 8.2.2-49: ACK (S-S to MT#1b)

```
K sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.visited1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
ute: sip:icscf.home.net, sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.visited.net
cord-Route: sip:scscf0.home.net
om:
:
ll-ID:
eq: 131 ACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf0.home.net
ntent-length: 0
```

ACK (S-CSCF to I-CSCF)

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

Table 8.2.2-50: ACK (S-CSCF to I-CSCF)

```
K sip:icscf.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.visited.net
cord-Route: sip:scscf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

ACK (I-CSCF to P-CSCF)

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

Table 8.2.2-51: ACK (I-CSCF to P-CSCF)

```
K sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.visited.net SIP/2.0
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP Token(SIP/2.0/UDP scscf.home.net,  SIP/2.0/UDP
scf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:icscf.home.net, sip:Token(sip:scscf.home.net, sip:scscf0.home.net)
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

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

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

ACK (P-CSCF to UE)

P-CSCF forwards the ACK request to UE.

Table 8.2.2-52: ACK (P-CSCF to UE)

```
K sip:[5555::eee:fff:aaa:bbb] SIP/2.0
a: SIP/2.0/UDP pcscf.visited.net;branch=token5
om:
:
ll-ID:
eq:
ntact: token5@pcscf.visited.net
ntent-length:
```

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

Contact: a locally unique token to identify the saved routing information.

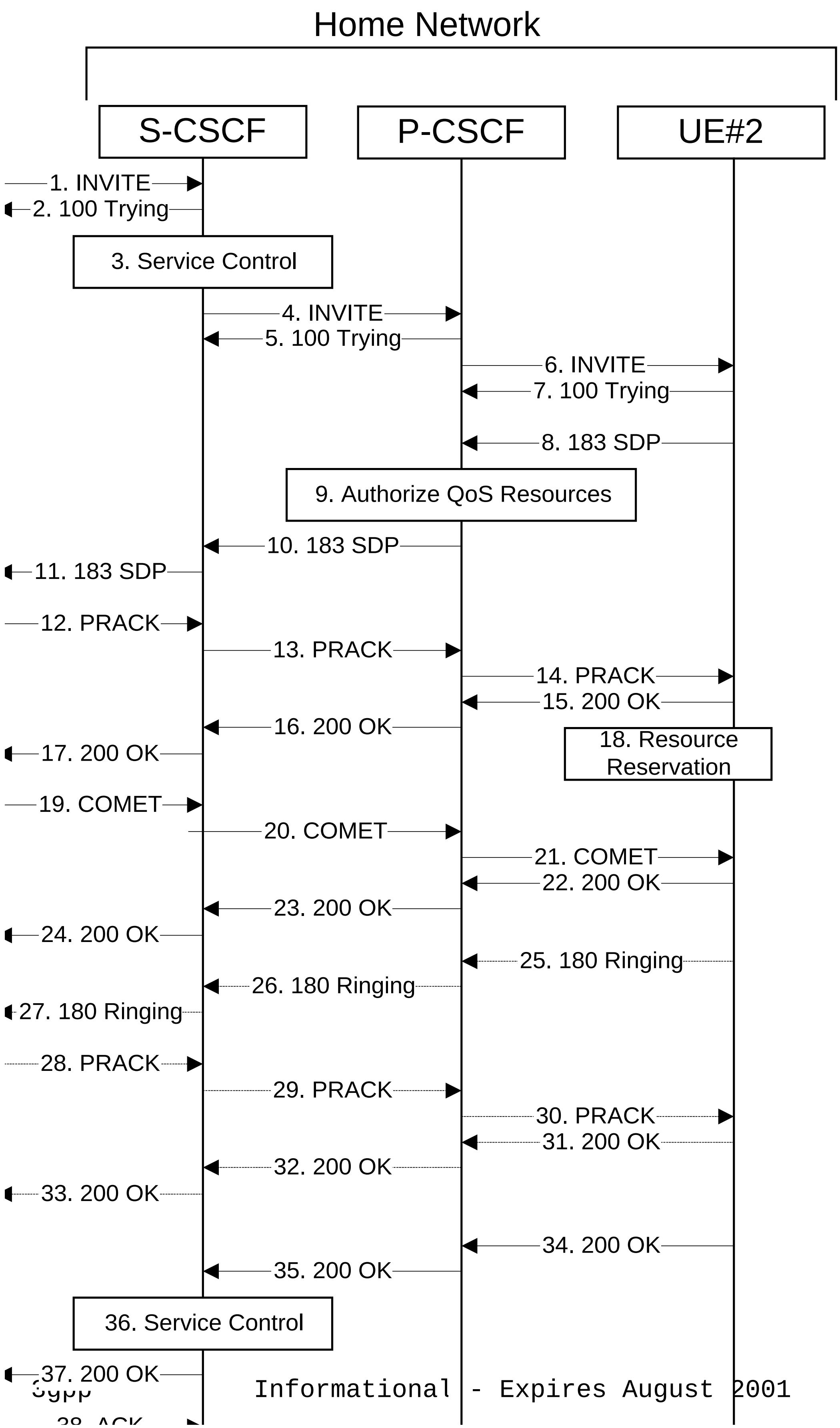
Via: P-CSCF removes the Via headers, and generates a locally unique token to identify the saved values. It inserts this as a branch value on its Via header.

2.3 (MT#2) Mobile termination, located in home network

is termination procedure applies to subscribers located in their home service area.

e UE is located in the home network, and determines the P-CSCF via the CSCF discovery procedure. During registration, the me network allocates a S-CSCF in the home network, S-CSCF.

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


Home Network
S-CSCF
P-CSCF
UE#2
1. INVITE
2. 100 Trying
3. Service Control
4. INVITE
5. 100 Trying
6. INVITE
7. 100 Trying
8. 183 SDP
9. Authorize QoS Resources
10. 183 SDP
11. 183 SDP
12. PRACK
13. PRACK
14. PRACK
15. 200 OK
16. 200 OK
17. 200 OK
18. Resource Reservation
19. COMET
20. COMET
21. COMET
22. 200 OK
23. 200 OK
24. 200 OK
25. 180 Ringing
26. 180 Ringing
27. 180 Ringing
28. PRACK
29. PRACK
30. PRACK
31. 200 OK
32. 200 OK
33. 200 OK
34. 200 OK
35. 200 OK
36. Service Control
37. 200 OK

ocedure MT#2 is as follows:

INVITE (S-S to MT#2)

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 Serving-CSCF for the terminating subscriber.

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MO#2 are assumed.

Table 8.2.3-1: INVITE (S-S to MT#2)

```
VITE sip:+1-212-555-2222@home.net;user=phone SIP/2.0
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf0.home.net
pported: 100rel
mote-Party-ID: John Doe <tel:+1-212-555-1111>
onymity: Off
om: "Alien Blaster" <sip:B36(SHA-1(+1-212-555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 127 INVITE
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf0.home.net
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97 3 96
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
rtpmap:96 G726-32/8000
qos:mandatory sendrecv
```

100 Trying (MT#2 to S-S)

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

Table 8.2.3-2: 100 Trying (MT#2 to S-S)

```
P/2.0 100 Trying
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-length: 0
```

Service Control

S-CSCF validates the service profile, and performs any termination service control required for this subscriber

INVITE (S-CSCF to P-CSCF)

S-CSCF remembers (from the registration procedure) the next hop CSCF for this UE. It forwards the INVITE request to the P-CSCF.

Table 8.2.3-4: INVITE (S-CSCF to P-CSCF)

```
VITE sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
ute:  sip:+1-212-555-2222@home.net;user=phone
cord-Route: sip:scscf.home.net, sip:scscf0.home.net
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

Route: built from the registration information, (pcscf and UE contact name), followed by the initial Request-URI from the incoming INVITE request. The first component of the Route header, pcscf, is moved to the Request-URI of the request.

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

100 Trying (P-CSCF to S-CSCF)

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

Table 8.2.3-5: 100 Trying (P-CSCF to S-CSCF)

```
P/2.0 100 Trying
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-length: 0
```

INVITE (P-CSCF to UE)

P-CSCF determines the UE address from the value of the Request-URI (which was previously returned by P-CSCF as a contact header value in the registration procedure), and forwards the INVITE request to the UE.

Table 8.2.3-6: INVITE (P-CSCF to UE)

```
VITE sip:+1-212-555-2222@home.net;user=phone SIP/2.0
a: SIP/2.0/UDP pcscf.home.net;branch=token1
dia-Authorization: 31S14621
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact: token1@pcscf.home.net
ntent-Type:
ntent-length:
```

P-CSCF removes the Record-Route and Contact 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:scscf.home.net, sip:scscf0.home.net,
     sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf0.home.net
```

Contact: a locally unique token to identify the saved routing information.

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-Authorization: a P-CSCF generated authorization token

100 Trying (UE to P-CSCF)

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

Table 8.2.3-7: 100 Trying (UE to P-CSCF)

```
P/2.0 100 Trying
a: SIP/2.0/UDP pcscf.home.net;branch=token1
om:
:
ll-ID:
eq:
ntent-length: 0
```

183 Session Progress (UE to P-CSCF)

UE determines the subset of the media flows proposed by the originating endpoint that it supports, and responds with a 183 Session Progress response containing SDP back to the originator. This response is sent to P-CSCF.

Table 8.2.3-8: 183 Session Progress (UE to P-CSCF)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP pcscf.home.net;branch=token1
mote-Party-ID: John Smith <tel:+1-212-555-2222>
onymity: Off
om:
: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost; tag=314159
ll-ID:
eq:
ntact: sip:[5555::eee:fff:aaa:bbb]
eq: 9021
ntent-Disposition: precondition
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::eee:fff:aaa:bbb
AS:64
907165275 0
audio 6544 RTP/AVP 97 3
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:mandatory sendrecv confirm
```

Remote-Party-ID: identifies the answering subscriber. It contains the public identifier URL, and the name of the answering party.

To: A tag is added to the To header.

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

SDP is attached to this response, giving the subset of proposed media streams supported by UE. It requests a confirmation of the QoS preconditions for establishing the session.

Authorize QoS Resources

P-CSCF authorizes the resources necessary for this session.

. 183 Session Progress (P-CSCF to S-CSCF)

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

Table 8.2.3-10: 183 Session Progress (P-CSCF to S-CSCF)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf.home.net, sip:scscf0.home.net
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home.net
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

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

Contact: a locally defined value that identifies the UE.

. 183 Session Progress (MT#2 to S-S)

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

Table 8.2.3-11: 183 Session Progress (MT#2 to S-S)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

:. PRACK (S-S to MT#2)

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.

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MO#2 are assumed.

Table 8.2.3-12: PRACK (S-S to MT#2)

```
ACK sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home.net
cord-Route: sip:scscf0.home.net
om: “Alien Blaster” <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 128 PRACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf0.home.net
ck: 9021 127 INVITE
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:mandatory sendrecv
```

'. PRACK (S-CSCF to P-CSCF)

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

Table 8.2.3-13: PRACK (S-CSCF to P-CSCF)

```
ACK sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-Type:
ntent-length:
```

. PRACK (P-CSCF to UE)

P-CSCF forwards the PRACK request to UE.

Table 8.2.3-14: PRACK (P-CSCF to UE)

```
ACK sip:[5555::eee:fff:aaa:bbb] SIP/2.0
a: SIP/2.0/UDP pcscf.home.net;branch=token2
om:
:
ll-ID:
eq:
ntact: token2@pcscf.home.net
ck:
ntent-Type:
ntent-length:
```

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

Contact: a locally unique token to identify the saved routing information.

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.

. 200 OK (UE to P-CSCF)

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

Table 8.2.3-15: 200 OK (UE to P-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf.home.net;branch=token2
om:
:
ll-ID:
eq:
ntent-length: 0
```

. 200 OK (P-CSCF to S-CSCF)

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

Table 8.2.3-16: 200 OK (P-CSCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntent-length:
```

. 200 OK (MT#2 to S-S)

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

Table 8.2.3-17: 200 OK (MT#2 to S-S)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntent-length:
```

. Resource Reservation

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

. COMET (S-S to MT#2)

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

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MO#2 are assumed.

Table 8.2.3-19: COMET (S-S to MT#2)

```
MET sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home.net
cord-Route: sip:scscf0.home.net
om: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 129 COMET
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf0.home.net
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:success sendonly
```

. COMET (S-CSCF to P-CSCF)

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

Table 8.2.3-20: COMET (S-CSCF to P-CSCF)

```
MET sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

. COMET (P-CSCF to UE)

P-CSCF forwards the COMET request to UE.

Table 8.2.3-21: COMET (P-CSCF to UE)

```
MET sip:[5555::eee:fff:aaa:bbb] SIP/2.0
a: SIP/2.0/UDP pcscf.home.net;branch=token3
om:
:
ll-ID:
eq:
ntact: token3@pcscf.home.net
ntent-Type:
ntent-length:
```

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

Contact: a locally unique token to identify the saved routing information.

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.

. 200 OK (UE to P-CSCF)

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

Table 8.2.3-22: 200 OK (UE to P-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf.home.net;branch=token3
om:
:
ll-ID:
eq:
ntent-length: 0
```

. 200 OK (P-CSCF to S-CSCF)

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

Table 8.2.3-23: 200 OK (P-CSCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntent-length: 0
```

. 200 OK (MT#2 to S-S)

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

Table 8.2.3-24: 200 OK (MT#2 to S-S)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntent-length:
```

. 180 Ringing (UE to P-CSCF)

Before proceeding with session establishment, the UE waits for two events. First, the resource reservation initiated in step #18 must complete successfully. Second, the resource reservation initiated by the originating endpoint must complete successfully (which is indicated by message #21 received by UE). The UE may now immediately accept the session (and proceed with step #34), or alert the destination subscriber of an incoming call attempt; if the latter it indicates this to the calling party by a 180 Ringing provisional response sent to P-CSCF.

Table 8.2.3-25: 180 Ringing (UE to P-CSCF)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP pcscf.home.net;branch=token1
om:
:
ll-ID:
eq:
ntact: sip:[5555::eee:fff:aaa:bbb]
eq: 9022
ntent-length: 0
```

. 180 Ringing (P-CSCF to S-CSCF)

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

Table 8.2.3-26: 180 Ringing (P-CSCF to S-CSCF)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-length:
```

. 180 Ringing (MT#2 to S-S)

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

Table 8.2.3-27: 180 Ringing (MT#2 to S-S)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-length:
```

. PRACK (S-S to MT#2)

The originator acknowledges the 180 Ringing response (27) with a PRACK request.

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MO#2 are assumed.

Table 8.2.3-28: PRACK (S-S to MT#2)

```
ACK sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home.net
cord-Route: sip:scscf0.home.net
om:
:
ll-ID:
eq: 130 PRACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf0.home.net
ck: 9022 127 INVITE
ntent-length: 0
```

. PRACK (S-CSCF to P-CSCF)

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

Table 8.2.3-29: PRACK (S-CSCF to P-CSCF)

```
ACK sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-length:
```

. PRACK (P-CSCF to UE)

P-CSCF forwards the PRACK request to UE.

Table 8.2.3-30: PRACK (P-CSCF to UE)

```
ACK sip:[5555::eee:fff:aaa:bbb] SIP/2.0
a: SIP/2.0/UDP pcscf.home.net;branch=token4
om:
:
ll-ID:
eq:
ntact: token4@pcscf.home.net
ck:
ntent-length:
```

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

Contact: a locally unique token to identify the saved routing information.

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.

. 200 OK (UE to P-CSCF)

UE acknowledges the PRACK request (30) with a 200 OK response.

Table 8.2.3-31: 200 OK (UE to P-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf.home.net;branch=token4
om:
:
ll-ID:
eq:
ntent-length: 0
```

. 200 OK (P-CSCF to S-CSCF)

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

Table 8.2.3-32: 200 OK (P-CSCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntent-length:
```

. 200 OK (MT#2 to S-S)

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

Table 8.2.3-33: 200 OK (MT#2 to S-S)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntent-length:
```

. 200 OK (UE to P-CSCF)

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 for this session.

Table 8.2.3-34: 200 OK (UE to P-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf.home.net;branch=token1
om:
:
ll-ID:
eq: 127 INVITE
ntent-length: 0
```

. 200 OK (P-CSCF to S-CSCF)

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

Table 8.2.3-35: 200 OK (P-CSCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntent-length:
```

. Service Control

S-CSCF performs whatever service control is required for the call completion

. 200 OK (MT#2 to S-S)

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

Table 8.2.3-37: 200 OK (MT#2 to S-S)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntent-length:
```

. ACK (S-S to MT#2)

The calling party responds to the 200 OK final response (37) with an ACK request which is sent to S-CSCF via the S-CSCF to S-CSCF procedure.

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#2 and MO#2 are assumed.

Table 8.2.3-38: ACK (S-S to MT#2)

```
K sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
ute: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home.net
cord-Route: sip:scscf0.home.net
om:
:
ll-ID:
eq: 131 ACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf0.home.net
ntent-length: 0
```

. ACK (S-CSCF to P-CSCF)

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

Table 8.2.3-39: ACK (S-CSCF to P-CSCF)

```
K sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP   pcscf0.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. ACK (P-CSCF to UE)

P-CSCF forwards the ACK request to UE.

Table 8.2.3-40: ACK (P-CSCF to UE)

```
K sip:[5555::eee:fff:aaa:bbb] SIP/2.0
a: SIP/2.0/UDP pcscf.home.net;branch=token5
om:
:
ll-ID:
eq:
ntact: token5@pcscf.home.net
ntent-length:
```

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

Contact: a locally unique token to identify the saved routing information.

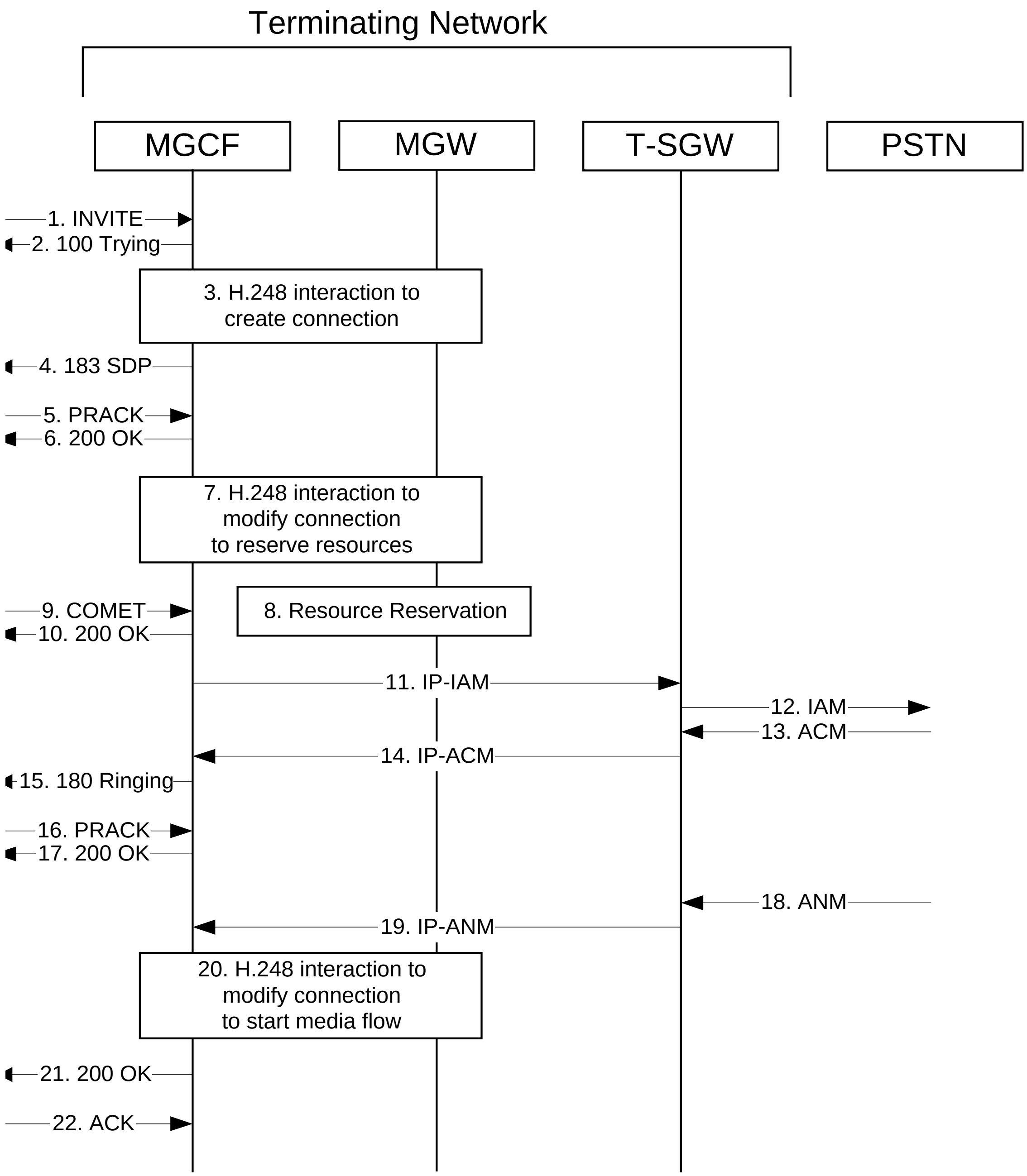
Via: P-CSCF removes the Via headers, and generates a locally unique token to identify the saved values. It inserts this as a branch value on its Via header.

2.4 (PSTN-T) PSTN termination

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

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

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



he PSTN termination procedure is as follows:

INVITE (S-S to PSTN-T)

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

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#3 and MO#2 are assumed.

Table 8.2.4-1: INVITE (S-S to PSTN-T)

```
VITE sip:+1-212-555-2222@home.net;user=phone SIP/2.0
a: SIP/2.0/UDP bgcf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net,       SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:bgcf.home.net, sip:scscf0.home.net
pported: 100rel
mote-Party-ID: John Doe <tel:+1-212-555-1111>
onymity: Off
om: "Alien Blaster" <sip:B36(SHA-1(+1-212-555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 127 INVITE
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf0.home.net
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97 3 96
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
rtpmap:96 G726-32/8000
qos:mandatory sendrecv
```

100 Trying (PSTN-T to S-S)

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

Table 8.2.4-2: 100 Trying (PSTN-T to S-S)

```
P/2.0 100 Trying
a: SIP/2.0/UDP bgcf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net,       SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-Length: 0
```

H.248 Interaction to Create Connection

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

183 Session Progress (PSTN-T to S-S)

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

Table 8.2.4-4: 183 Session Progress (PSTN-T to S-S)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP bgcf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net,       SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:bgcf.home.net, sip:scscf0.home.net
mote-Party-ID: <tel:+1-212-555-2222>
onymity: Off
om:
: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost; tag=314159
ll-ID:
eq:
ntact: sip:017/4@mgcf4.home.net
eq: 9021
ntent-Disposition: precondition
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::eee:fff:aaa:bbb
AS:64
907165275 0
audio 6544 RTP/AVP 97 3
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:mandatory sendrecv confirm
```

PRACK (S-S to PSTN-T)

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

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#3 and MO#2 are assumed.

Table 8.2.4-5: PRACK (S-S to PSTN-T)

```
ACK sip:mgcf.home.net SIP/2.0
a: SIP/2.0/UDP bgcf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net,       SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:bgcf.home.net, sip:scscf0.home.net
om: “Alien Blaster” <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 128 PRACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf0.home.net
ck: 9021 127 INVITE
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:mandatory sendrecv
```

200 OK (PSTN-T to S-S)

MGCF acknowledges the PRACK request (5) with a 200 OK response.

Table 8.2.4-6: 200 OK (PSTN-T to S-S)

```
P/2.0 200 OK
a: SIP/2.0/UDP bgcf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net,       SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntent-Length: 0
```

H.248 Interaction to Modify Connection

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

Resource Reservation

MGW reserved the resources necessary for the media streams.

COMET (S-S to PSTN-T)

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

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#3 and MO#2 are assumed.

Table 8.2.4-9: COMET (S-S to PSTN-T)

```
MET sip:mgcf.home.net SIP/2.0
a: SIP/2.0/UDP bgcf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net,       SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:bgcf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq: 129 COMET
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf0.home.net
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97 3 96
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
rtpmap:96 G726-32/8000
qos:success sendonly
```

200 OK (PSTN-T to S-S)

MGCF acknowledges the COMET request (9) with a 200 OK response.

Table 8.2.4-10: 200 OK (PSTN-T to S-S)

```
P/2.0 200 OK
a: SIP/2.0/UDP bgcf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net,       SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntent-Length: 0
```

. IP-IAM

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

. SS7 IAM

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

. SS7 ACM

The PSTN establishes the path to the destination. It may optionally alert the destination user before completing the call. If so, it responds with an SS7 ACM message

. IP-ACM

If the PSTN is alerting the destination user, T-SGW sends an IP-ACM message to MGCF

. 180 Ringing (PSTN-T to S-S)

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

Table 8.2.4-15: 180 Ringing (PSTN-T to S-S)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP bgcf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net,       SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:bgcf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq:
ntact: sip:017/4@mgcf4.home.net
eq: 9022
ntent-length: 0
```

. PRACK (S-S to PSTN-T)

The originator acknowledges the 180 Ringing provisional response (15) with a PRACK request.

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#3 and MO#2 are assumed.

Table 8.2.4-16: PRACK (S-S to PSTN-T)

```
ACK sip:mgcf.home.net SIP/2.0
a: SIP/2.0/UDP bgcf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net,       SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:bgcf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq: 130 PRACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf0.home.net
ck: 9022 127 INVITE
ntent-length: 0
```

'. 200 OK (PSTN-T to S-S)

MGCF acknowledges the PRACK request (16) with a 200 OK response.

Table 8.2.4-17: 200 OK (PSTN-T to S-S)

```
P/2.0 200 OK
a: SIP/2.0/UDP bgcf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net,       SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntent-length: 0
```

:. SS7 ANM

When the called party answers, the PSTN sends an SS7 ANM message to T-SGW

). IP-ANM

T-SGW sends an IP-ANM message to MGCF

). H.248 Interaction to Modify Connection

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

. 200 OK (PSTN-T to S-S)

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

Table 8.2.4-21: 200 OK (PSTN-T to S-S)

```
P/2.0 200 OK
a: SIP/2.0/UDP bgcf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net,       SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq: 127 INVITE
ntent-length: 0
```

:. ACK (S-S to PSTN-T)

The Calling party acknowledges the final response (21) with an ACK request.

NOTE: There are a number of different S-CSCF to S-CSCF flows, and the table represents a typical example of what one of these flows may produce. In this case, S-S#3 and MO#2 are assumed.

Table 8.2.4-22: ACK (S-S to PSTN-T)

```
K sip:mgcf.home.net SIP/2.0
a: SIP/2.0/UDP bgcf.home.net, SIP/2.0/UDP scscf0.home.net, SIP/2.0/UDP pcscf0.home.net,      SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:bgcf.home.net, sip:scscf0.home.net
om:
:
ll-ID:
eq: 131 ACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf0.home.net
ntent-length: 0
```

3 *Serving CSCF (MGCF) to Serving-CSCF (MGCF) Procedures*

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

ıis section contains five call flow procedures, showing variations on the signalling path between the Serving-CSCF (or MGCF) ıt handles call origination, and the Serving-CSCF (or MGCF) that handles call termination. This signalling path depends on:

- whether the originator and destination are served by the same network operator,
- whether the network operators have chosen to hide their internal configuration, and
- agreements between operators for optimum PSTN gateway location.

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

the analysis of the destination address determined that it belongs to a subscriber of a different operator, the request is ɾwarded (optionally through an I-CSCF within the originating operator's network) to a well-known entry point in the stination operator's network, the I-CSCF. The I-CSCF queries the HSS for current location information. The I-CSCF then ɾwards the request to the S-CSCF. This is call flow procedure S-S#1b (if a firewall is used) or S-S#1a (if no firewall is used).

the analysis of the destination address determines that it belongs to a subscriber of the same operator, the S-CSCF forwards the quest to a local I-CSCF, who queries the HSS for current location information. The I-CSCF then forwards the request to the S-ƧCF. This is call flow procedure S-S#2.

the analysis of the destination address determines that it is a PSTN destination, the S-CSCF forwards the request to a local GCF. Based on further analysis of the destination address, and on agreements between operators for PSTN termination, the GCF will either select a local MGCF to perform the termination (procedure S-S#3) or will forward the request to a BGCF in other operator's network who will select the MGCF to perform the termination (procedures S-S#4).

3.1 (S-S#1a) Different network operators performing origination and termination, without ɾewall between networks

ıe Serving-CSCF handling call origination (S-CSCF#1) performs an analysis of the destination address, and determines that it longs to a subscriber of a different operator. The originating network operator does not desire to keep their configuration dden, so forwards the request to a well-known entry point in the destination operator's network, I-CSCF. I-CSCF queries the SS for current location information, and finds the S-CSCF assigned to the subscriber (S-CSCF#2), and forwards the request to CSCF#2.

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

O#1a Mobile origination, roaming, without firewall. The "Originating Network" of S-S#1a is therefore a visited network.

O#1b Mobile origination, roaming, with firewall in home network. The "Originating Network" of S-S#1a is therefore a visited network.

O#2 Mobile origination, located in home service area. The "Originating Network" of S-S#1a is therefore the home network.

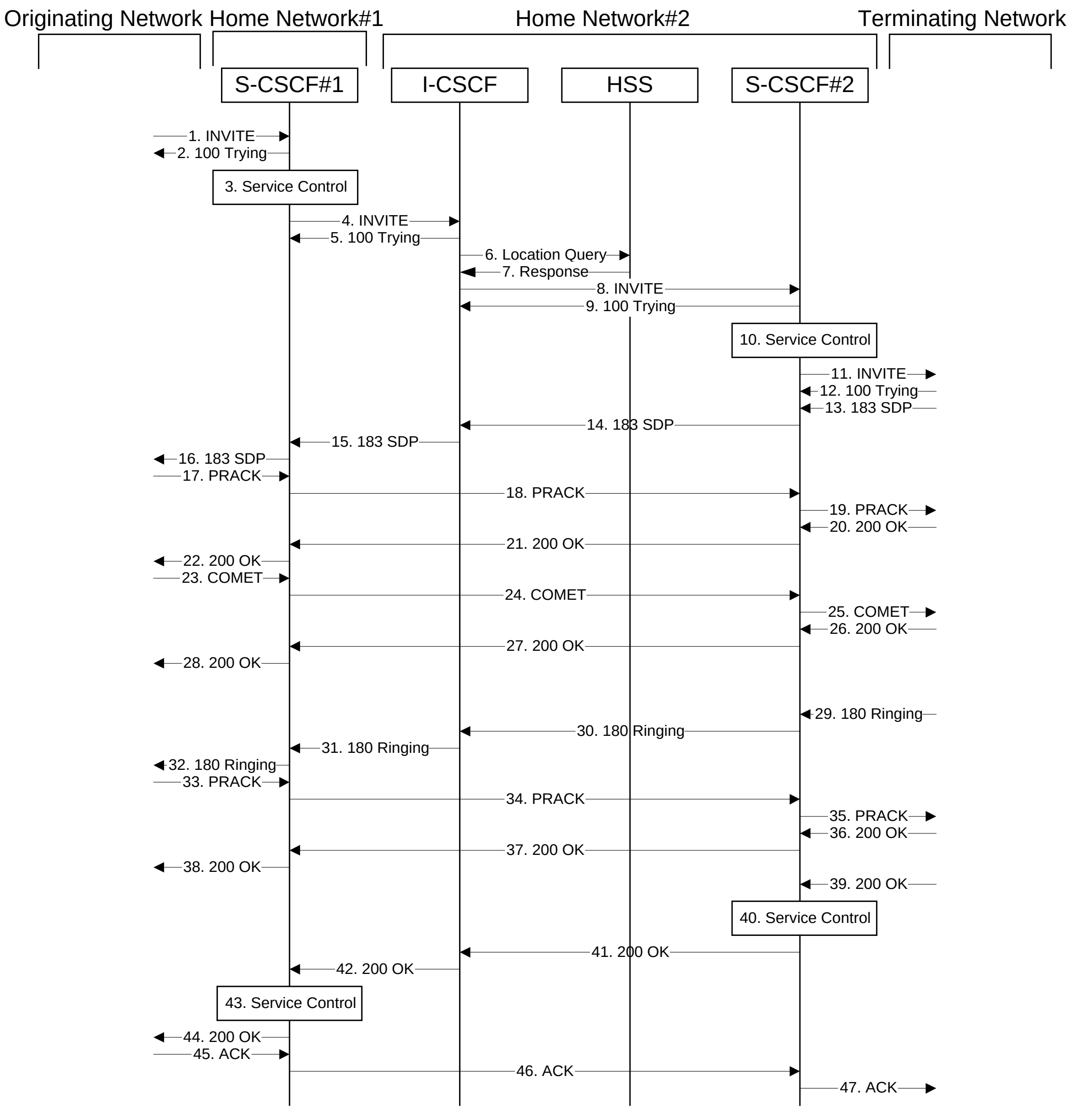
STN-O PSTN origination. The "Originating Network" of S-S#1a is the home network. The element labeled S-CSCF#1 is the MGCF of the PSTN-O procedure.

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

T#1a Mobile termination, roaming, without firewall. The "Terminating Network" of S-S#1a is a visited network.

T#1b Mobile termination, roaming, with firewall in home network. The "Terminating Network" of S-S#1a is a visited network.

T#2 Mobile termination, located in home service area. The "Terminating Network" of S-S#1a is the home network.



ocedure S-S#1a is as follows:

INVITE (MO to S-S#1a)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.1-1: INVITE (MO to S-S#1a)

```
VITE sip:scscf.home1.net SIP/2.0
a: SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:+1-212-555-2222@home2.net;user=phone
pported: 100rel
mote-Party-ID: John Doe <tel:+1-212-555-1111>
onymity: Off
om: “Alien Blaster” <sip:B36(SHA-1(+1-212-555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 127 INVITE
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf.home1.net
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97 3 96
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
rtpmap:96 G726-32/8000
qos:mandatory sendrecv
```

100 Trying (S-S#1a to MO)

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

Table 8.3.1-2: 100 Trying (S-S#1a to MO)

```
P/2.0 100 Trying
a: SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-length: 0
```

Service Control

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

INVITE (S-CSCF to I-CSCF)

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 to I-CSCF in the destination network.

Table 8.3.1-4: INVITE (S-CSCF to I-CSCF)

```
VITE sip:+1-212-555-2222@home2.net;user=phone SIP/2.0
a: SIP/2.0/UDP sip:scscf.home1.net SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home1.net
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

100 Trying (I-CSCF to S-CSCF)

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

Table 8.3.1-5: 100 Trying (I-CSCF to S-CSCF)

```
P/2.0 100 Trying
a: SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-length: 0
```

Location Query

I-CSCF (at the border of the terminating subscriber's network) queries the HSS for current location information. It will send "Cx-location-query" to the HSS to obtain the location information for the destination.

Location Response

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

INVITE (I-CSCF to S-CSCF)

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

Table 8.3.1-8: INVITE (I-CSCF to S-CSCF)

```
VITE sip:scscf.home2.net SIP/2.0
a: SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP  pcscf.home1.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd])
ute: sip:+1-212-555-2222@home2.net;user=phone
cord-Route: sip:scscf.home1.net
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

Editor's Note: The mechanism by which the INVITE is routed to S-CSCF, and the mechanism by which S-CSCF retrieves the initial Request URI (which identifies the real destination of the session) is FFS.

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

100 Trying (S-CSCF to I-CSCF)

S-CSCF#2 responds to the INVITE request (8) with a 100 Trying provisional response.

Table 8.3.1-9: 100 Trying (S-CSCF to I-CSCF)

```
P/2.0 100 Trying
a: SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP  pcscf.home1.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd])
om:
:
ll-ID:
eq:
ntent-Length: 0
```

Service Control

S-CSCF#2 performs whatever service control logic is appropriate for this call attempt

INVITE (S-S#1a to MT)

S-CSCF#2 forwards the INVITE request, as determined by the termination procedure.

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.1-11: INVITE (S-S#1a to MT)

```
VITE sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net SIP/2.0
a: SIP/2.0/UDP scscf.home2.net, SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP  scscf.home1.net, SIP/2.0/UDP
scf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
ute: sip:+1-212-555-2222@home2.net;user=phone
cord-Route:  sip:scscf.home2.net, sip:scscf.home1.net
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

. 100 Trying (MT to S-S#1a)

S-CSCF#2 receives a 100 Trying provisional response to the INVITE request (11), as specified by the termination procedures.

Table 8.3.1-12: 100 Trying (MT to S-S#1a)

```
P/2.0 100 Trying
a: SIP/2.0/UDP scscf.home2.net, SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP  scscf.home1.net, SIP/2.0/UDP
scf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
om:
:
ll-ID:
eq:
ntent-length: 0
```

. 183 Session Progress (MT to S-S#1a)

The media stream capabilities of the destination are returned along the signalling path, in a 183 Session Progress provisional response to the INVITE request (11), as per the termination procedure.

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.1-13: 183 Session Progress (MT to S-S#1a)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP scscf.home2.net, SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP  scscf.home1.net, SIP/2.0/UDP
scf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf.home2.net, sip:scscf.home1.net
mote-Party-ID: John Smith <tel:+1-212-555-2222>
onymity: Off
om:
: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost; tag=314159
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
eq: 9021
ntent-Disposition: precondition
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::eee:fff:aaa:bbb
AS:64
907165275 0
audio 6544 RTP/AVP 97 3
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:mandatory sendrecv confirm
```

. 183 Session Progress (S-CSCF to I-CSCF)

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

Table 8.3.1-14: 183 Session Progress (S-CSCF to I-CSCF)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP  pcscf.home1.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf.home2.net, sip:scscf.home1.net
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

. 183 Session Progress (I-CSCF to S-CSCF)

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

Table 8.3.1-15: 183 Session Progress (I-CSCF to S-CSCF)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf.home2.net,  sip:scscf.home1.net
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

. 183 Session Progress (S-S#1a to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.1-16: 183 Session Progress (S-S#1a to MO)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home2.net, sip:scscf.home1.net
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

. PRACK (MO to S-S#1a)

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.

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.1-17: PRACK (MO to S-S#1a)

```
ACK sip:scscf.home1.net SIP/2.0
a: SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:scscf.home2.net, sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
om: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 128 PRACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf.home1.net
ck: 9021 127 INVITE
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:mandatory sendrecv
```

. PRACK (S-CSCF to S-CSCF)

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

Table 8.3.1-18: PRACK (S-CSCF to S-CSCF)

```
ACK sip:scscf.home2.net SIP/2.0
a: SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
ute:  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
cord-Route: sip:scscf.home1.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-Type:
ntent-length:
```

. PRACK (S-S#1a to MT)

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

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.1-19: PRACK (S-S#1a to MT)

```
ACK sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net SIP/2.0
a: SIP/2.0/UDP scscf.home2.net, SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP  pcscf.home1.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route:  sip:scscf.home2.net, sip:scscf.home1.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-Type:
ntent-length:
```

. 200 OK (MT to S-S#1a)

The terminating endpoint responds to the PRACK request (19) with a 200 OK response.

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.1-20: 200 OK (MT to S-S#1a)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home2.net, SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP  pcscf.home1.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route:  sip:scscf.home2.net, sip:scscf.home1.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
ntent-length: 0
```

. 200 OK (S-CSCF to S-CSCF)

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

Table 8.3.1-21: 200 OK (S-CSCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. 200 OK (S-S#1a to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.1-22: 200 OK (S-S#1a to MO)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. COMET (MO to S-S#1a)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.1-23: COMET (MO to S-S#1a)

```
MET sip:scscf.home1.net SIP/2.0
a: SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:scscf.home2.net, sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
om: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 129 COMET
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf.home1.net
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:success sendonly
```

. COMET (S-CSCF to S-CSCF)

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

Table 8.3.1-24: COMET (S-CSCF to S-CSCF)

```
MET sip:scscf.home2.net SIP/2.0
a: SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
ute:  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
cord-Route: sip:scscf.home1.net
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

. COMET (S-S#1a to MT)

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

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.1-25: COMET (S-S#1a to MT)

```
MET sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net SIP/2.0
a: SIP/2.0/UDP scscf.home2.net, SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP  pcscf.home1.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd])
cord-Route:  sip:scscf.home2.net, sip:scscf.home1.net
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

. 200 OK (MT to S-S#1a)

The terminating endpoint responds to the COMET request (25) with a 200 OK response.

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.1-26: 200 OK (MT to S-S#1a)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home2.net, SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP  pcscf.home1.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd])
cord-Route:  sip:scscf.home2.net, sip:scscf.home1.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
ntent-length: 0
```

. 200 OK (S-CSCF to S-CSCF)

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

Table 8.3.1-27: 200 OK (S-CSCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd])
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. 200 OK (S-S#1a to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.1-28: 200 OK (S-S#1a to MO)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

180 Ringing (MT to S-S#1a)

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.

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.1-29: 180 Ringing (MT to S-S#1a)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP scscf.home2.net, SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP  scscf.home1.net, SIP/2.0/UDP
scf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf.home2.net, sip:scscf.home1.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
eq: 9022
ntent-length: 0
```

180 Ringing (S-CSCF to I-CSCF)

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

Table 8.3.1-30: 180 Ringing (S-CSCF to I-CSCF)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP  pcscf.home1.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home2.net, sip:scscf.home1.net
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-length:
```

180 Ringing (I-CSCF to S-CSCF)

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

Table 8.3.1-31: 180 Ringing (I-CSCF to S-CSCF)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home2.net,  sip:scscf.home1.net
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-length:
```

. 180 Ringing (S-S#1a to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.1-32: 180 Ringing (S-S#1a to MO)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-length:
```

. PRACK (MO to S-S#1a)

The originator acknowledges the 180 Ringing provisional response (32) with a PRACK request.

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.1-33: PRACK (MO to S-S#1a)

```
ACK sip:scscf.home1.net SIP/2.0
a: SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:scscf.home2.net, sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
om: “Alien Blaster” <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 130 PRACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf.home1.net
ck: 9022 127 INVITE
ntent-length: 0
```

. PRACK (S-CSCF to S-CSCF)

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

Table 8.3.1-34: PRACK (S-CSCF to S-CSCF)

```
ACK sip:scscf.home2.net SIP/2.0
a: SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
ute:  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
cord-Route: sip:scscf.home1.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-length:
```

. PRACK (S-S#1a to MT)

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

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.1-35: PRACK (S-S#1a to MT)

```
ACK sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net SIP/2.0
a: SIP/2.0/UDP scscf.home2.net, SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP  pcscf.home1.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route:  sip:scscf.home2.net, sip:scscf.home1.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-length:
```

. 200 OK (MT to S-S#1a)

The terminating endpoint responds to the PRACK request (35) with a 200 OK response.

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.1-36: 200 OK (MT to S-S#1a)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home2.net, SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP  pcscf.home1.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route:  sip:scscf.home2.net, sip:scscf.home1.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
ntent-length: 0
```

. 200 OK (S-CSCF to S-CSCF)

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

Table 8.3.1-37: 200 OK (S-CSCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd])
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. 200 OK (S-S#1a to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.1-38: 200 OK (S-S#1a to MO)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. 200 OK (MT to S-S#1a)

The final response to the INVITE request (11), 200 OK, is sent by the terminating endpoint over the signalling path. This is typically generated when the subscriber has accepted the incoming call attempt. The response is sent to S-CSCF#2 per the termination procedure.

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.1-39: 200 OK (MT to S-S#1a)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home2.net, SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP  scscf.home1.net, SIP/2.0/UDP
scf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf.home2.net, sip:scscf.home1.net
om:
:
ll-ID:
eq: 127 INVITE
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
ntent-length: 0
```

. Service Control

S-CSCF#2 performs whatever service control logic is appropriate for this call completion

. 200 OK (S-CSCF to I-CSCF)

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

Table 8.3.1-41: 200 OK (S-CSCF to I-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP  pcscf.home1.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. 200 OK (I-CSCF to S-CSCF)

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

Table 8.3.1-42: 200 OK (I-CSCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. Service Control

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

. 200 OK (S-S#1a to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.1-44: 200 OK (S-S#1a to MO)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. ACK (MO to S-S#1a)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.1-45: ACK (MO to S-S#1a)

```
K sip:scscf.home1.net SIP/2.0
a: SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:scscf.home2.net, sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
om: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 131 ACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf.home1.net
ntent-length: 0
```

. ACK (S-CSCF to S-CSCF)

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

Table 8.3.1-46: ACK (S-CSCF to S-CSCF)

```
K sip:scscf.home2.net SIP/2.0
a: SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
ute:  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
cord-Route: sip:scscf.home1.net
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. ACK (S-S#1a to MT)

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

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.1-47: ACK (S-S#1a to MT)

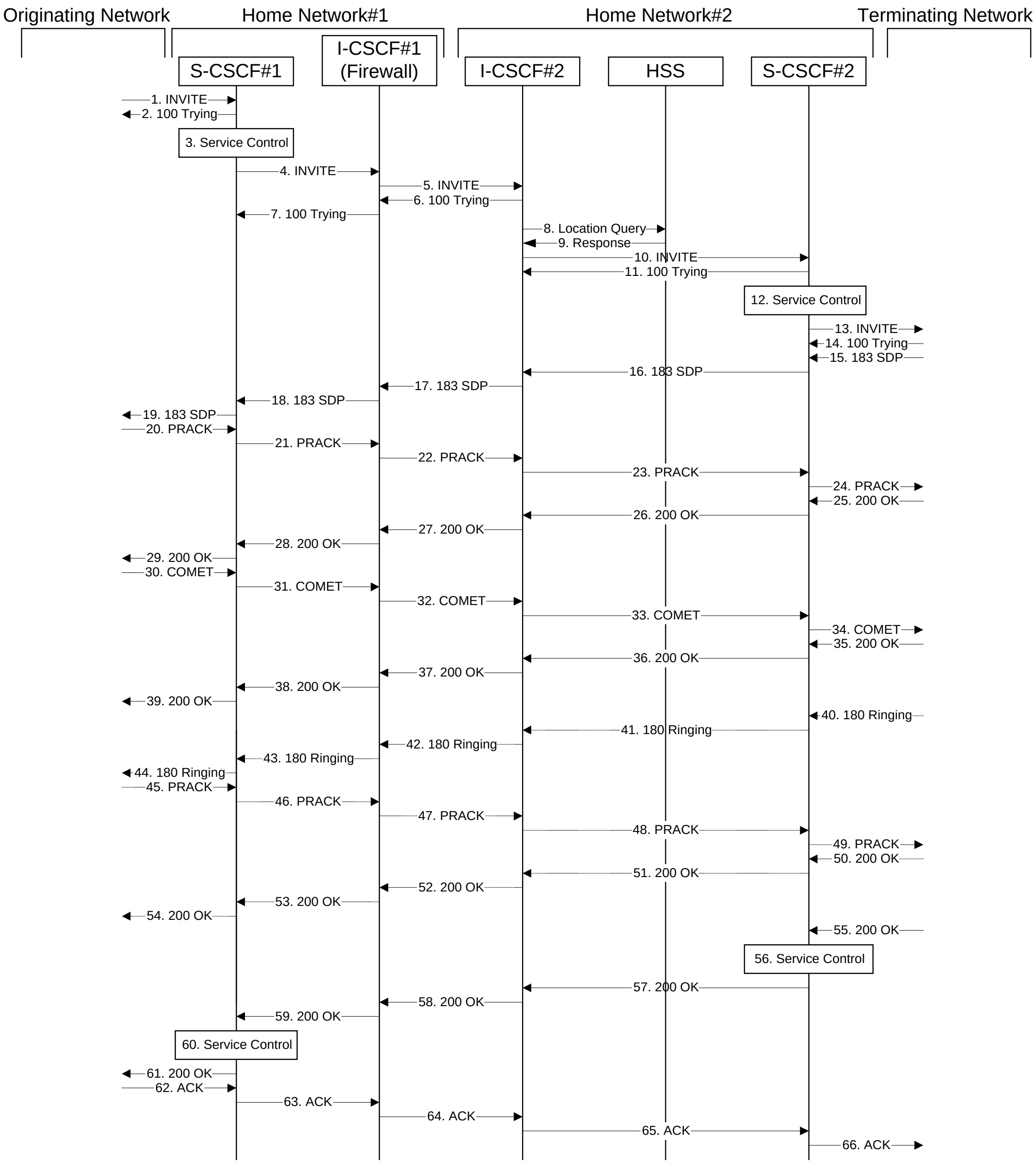
```
K sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net SIP/2.0
a: SIP/2.0/UDP scscf.home2.net, SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP  pcscf.home1.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route:  sip:scscf.home2.net, sip:scscf.home1.net
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

3.2 (S-S#1b) Different network operators performing origination and termination, with onfiguration hiding

ne Serving-CSCF handling call origination (S-CSCF#1) performs an analysis of the destination address, and determines that it longs to a subscriber of a different operator. The originating network operator desires to keep their configuration hidden, so rwards the request through an I-CSCF (I-CSCF#1) to a well-known entry point in the destination operator's network, I-SCF#2. I-CSCF#2 queries the HSS for current location information, and finds the S-CSCF assigned to the subscriber (S-SCF#2), and forwards the request to S-CSCF#2.

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

O#1a Mobile origination, roaming, without firewall. The “Originating Network” of S-S#1b is therefore a visited network.
O#1b Mobile origination, roaming, with firewall in home network. The “Originating Network” of S-S#1b is
erefore a visited network.
O#2 Mobile origination, located in home service area. The “Originating Network” of S-S#1b is therefore the home network.
;TN-O PSTN origination. The “Originating Network” of S-S#1b is the home network. The element labeled S-CSCF#1 is the MGCF of the PSTN-O procedure.
ermination sequences that share this common S-CSCF to S-CSCF procedure are:MT#1a Mobile termination, roaming, without firewall. The “Terminating Network” of S-S#1b is a visited network.
T#1b Mobile termination, roaming, with firewall in home network. The “Terminating Network” of S-S#1b is a visited network.
T#2 Mobile termination, located in home service area. The “Terminating Network” of S-S#1b is the home network.



ocedure S-S#1b is as follows:

INVITE (MO to S-S#1b)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.2-1: INVITE (MO to S-S#1b)

```
VITE sip:scscf.home1.net SIP/2.0
a: SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:+1-212-555-2222@home2.net;user=phone
pported: 100rel
mote-Party-ID: John Doe <tel:+1-212-555-1111>
onymity: Off
om: "Alien Blaster" <sip:B36(SHA-1(+1-212-555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 127 INVITE
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf.home1.net
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97 3 96
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
rtpmap:96 G726-32/8000
qos:mandatory sendrecv
```

100 Trying (S-S#1b to MO)

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

Table 8.3.2-2: 100 Trying (S-S#1b to MO)

```
P/2.0 100 Trying
a: SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-length: 0
```

Service Control

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

INVITE (S-CSCF to I-CSCF)

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 desires to keep their internal configuration hidden, S-CSCF#1 forwards the INVITE request to I-CSCF#1.

Table 8.3.2-4: INVITE (S-CSCF to I-CSCF)

```
VITE sip:icscf.home1.net SIP/2.0
a: SIP/2.0/UDP sip:scscf.home1.net SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
ute: sip:+1-212-555-2222@home2.net;user=phone
cord-Route: sip:scscf.home1.net
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

Request-URI: set to the I-CSCF that will perform the translation needed to maintain configuration independence.

Route: updated to cause I-CSCF to forward the request to the proper terminating network operator.

INVITE (I-CSCF to I-CSCF)

I-CSCF#1 forwards the INVITE request to I-CSCF#2.

Table 8.3.2-5: INVITE (I-CSCF to I-CSCF)

```
VITE sip:+1-212-555-2222@home2.net;user=phone SIP/2.0
a: SIP/2.0/UDP icscf.home1.net, SIP/2.0/UDP Token(SIP/2.0/UDP scscf.home1.net,
  SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:icscf.home1.net, sip:Token(sip:scscf.home1.net)
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

Via:, Record-Route: translated to maintain configuration independence of the home#1 operator.

100 Trying (I-CSCF to I-CSCF)

I-CSCF#2 respond to the INVITE request (5) with a 100 Trying provisional response.

Table 8.3.2-6: 100 Trying (I-CSCF to I-CSCF)

```
P/2.0 100 Trying
a: SIP/2.0/UDP icscf.home1.net, SIP/2.0/UDP Token(SIP/2.0/UDP scscf.home1.net,
  SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
om:
:
ll-ID:
eq:
ntent-length: 0
```

100 Trying (I-CSCF to S-CSCF)

I-CSCF#1 determines the Via header, and forwards the 100 Trying provisional response to S-CSCF#1.

Table 8.3.2-7: 100 Trying (I-CSCF to S-CSCF)

```
P/2.0 100 Trying
a: SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-length:
```

Location Query

I-CSCF#2 (at the border of the terminating subscriber's network) queries the HSS for current location information. It will send "Cx-location-query" to the HSS to obtain the location information for the destination.

Location Response

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

. INVITE (I-CSCF to S-CSCF)

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

Table 8.3.2-10: INVITE (I-CSCF to S-CSCF)

```
VITE sip:scscf.home2.net SIP/2.0
a: SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP icscf.home1.net, SIP/2.0/UDP  Token(SIP/2.0/UDP
scf.home1.net, SIP/2.0/UDP pcscf.home1.net,
  SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
ute: sip:+1-212-555-2222@home2.net;user=phone
cord-Route:  sip:icscf.home2.net, sip:icscf.home1.net, sip:Token(sip:scscf.home1.net)
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

Editor's Note: The mechanism by which the INVITE is routed to S-CSCF, and the mechanism by which S-CSCF retrieves the initial Request URI (which identifies the real destination of the session) is FFS.

. 100 Trying (S-CSCF to I-CSCF)

S-CSCF#2 responds to the INVITE request (10) with a 100 Trying provisional response.

Table 8.3.2-11: 100 Trying (S-CSCF to I-CSCF)

```
P/2.0 100 Trying
a: SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP icscf.home1.net, SIP/2.0/UDP  Token(SIP/2.0/UDP
scf.home1.net, SIP/2.0/UDP pcscf.home1.net,
  SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
om:
:
ll-ID:
eq:
ntent-length: 0
```

. Service Control

S-CSCF#2 performs whatever service control logic is appropriate for this call attempt

. INVITE (S-S#1b to MT)

S-CSCF#2 forwards the INVITE request, as determined by the termination procedure.

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.2-13: INVITE (S-S#1b to MT)

```
VITE sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net SIP/2.0
a: SIP/2.0/UDP scscf.home2.net, SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP  icscf.home1.net, SIP/2.0/UDP
ken(SIP/2.0/UDP scscf.home1.net,
  SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
ute: sip:+1-212-555-2222@home2.net;user=phone
cord-Route:  sip:scscf.home2.net, sip:icscf.home2.net, sip:icscf.home1.net,
  sip:Token(sip:scscf.home1.net)
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

. 100 Trying (MT to S-S#1b)

S-CSCF#2 receives a 100 Trying provisional response to the INVITE request (13), as specified by the termination procedures.

Table 8.3.2-14: 100 Trying (MT to S-S#1b)

```
P/2.0 100 Trying
a: SIP/2.0/UDP scscf.home2.net, SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP  icscf.home1.net, SIP/2.0/UDP
ken(SIP/2.0/UDP scscf.home1.net,
  SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
om:
:
ll-ID:
eq:
ntent-length: 0
```

. 183 Session Progress (MT to S-S#1b)

The media stream capabilities of the destination are returned along the signalling path, in a 183 Session Progress provisional response to the INVITE request (13), as per the termination procedure.

Editor's Note: Diagram for S-S#1 should show I-CSCF#2 as a firewall and gateway, making it consistent with I-CSCF#1.

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.2-15: 183 Session Progress (MT to S-S#1b)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP scscf.home2.net, SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP  icscf.home1.net, SIP/2.0/UDP
ken(SIP/2.0/UDP scscf.home1.net,
  SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf.home2.net, sip:icscf.home2.net, sip:icscf.home1.net,
  sip:Token(sip:scscf.home1.net)
mote-Party-ID: John Smith <tel:+1-212-555-2222>
onymity: Off
om:
: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost; tag=314159
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
eq: 9021
ntent-Disposition: precondition
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::eee:fff:aaa:bbb
AS:64
907165275 0
audio 6544 RTP/AVP 97 3
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:mandatory sendrecv confirm
```

. 183 Session Progress (S-CSCF to I-CSCF)

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

Table 8.3.2-16: 183 Session Progress (S-CSCF to I-CSCF)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP icscf.home1.net, SIP/2.0/UDP  Token(SIP/2.0/UDP
scf.home1.net, SIP/2.0/UDP pcscf.home1.net,
  SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf.home2.net, sip:icscf.home2.net, sip:icscf.home1.net,
  sip:Token(sip:scscf.home1.net)
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

'. 183 Session Progress (I-CSCF to I-CSCF)

I-CSCF#2 forwards the 183 Session Progress provisional response to I-CSCF#1.

Table 8.3.2-17: 183 Session Progress (I-CSCF to I-CSCF)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP icscf.home1.net, SIP/2.0/UDP Token(SIP/2.0/UDP scscf.home1.net,
  SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route:  sip:Token(sip:scscf.home2.net), sip:icscf.home2.net,     sip:icscf.home1.net,
p:Token(sip:scscf.home1.net)
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

Record-Route: formed by I-CSCF#2 reversing and translating all the entries to the left of its own entry.

. 183 Session Progress (I-CSCF to S-CSCF)

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

Table 8.3.2-18: 183 Session Progress (I-CSCF to S-CSCF)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:  sip:Token(sip:scscf.home2.net), sip:icscf.home2.net,     sip:icscf.home1.net,
p:scscf.home1.net
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

Record-Route: I-CSCF#1 determines the entry to the right of its own entry.

Via: determined by I-CSCF#1.

183 Session Progress (S-S#1b to MO)

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

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.2-19: 183 Session Progress (S-S#1b to MO)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:  sip:Token(sip:scscf.home2.net), sip:icscf.home2.net,     sip:icscf.home1.net,
p:scscf.home1.net
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

. PRACK (MO to S-S#1b)

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.

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.2-20: PRACK (MO to S-S#1b)

```
ACK sip:scscf.home1.net SIP/2.0
a: SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:icscf.home1.net, sip:icscf.home2.net, sip:Token(sip:scscf.home2.net),
  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
om: “Alien Blaster” <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 128 PRACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf.home1.net
ck: 9021 127 INVITE
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:mandatory sendrecv
```

. PRACK (S-CSCF to I-CSCF)

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

Table 8.3.2-21: PRACK (S-CSCF to I-CSCF)

```
ACK sip:icscf.home1.net SIP/2.0
a: SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
ute: sip:icscf.home2.net, sip:Token(sip:scscf.home2.net),
  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
cord-Route: sip:scscf.home1.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-Type:
ntent-length:
```

. PRACK (I-CSCF to I-CSCF)

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

Table 8.3.2-22: PRACK (I-CSCF to I-CSCF)

```
ACK sip:icscf.home2.net SIP/2.0
a: SIP/2.0/UDP icscf.home1.net, SIP/2.0/UDP Token(SIP/2.0/UDP scscf.home1.net,
  SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
ute: sip:Token(sip:scscf.home2.net),  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
cord-Route: sip:icscf.home1.net, sip:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-Type:
ntent-length:
```

Via:, Record-Route: translated to maintain configuration independence of the home#1 operator.

. PRACK (I-CSCF to S-CSCF)

I-CSCF#2 determines the routing information, and forwards the PRACK request to S-CSCF#2.

Table 8.3.2-23: PRACK (I-CSCF to S-CSCF)

```
ACK sip:scscf.home2.net SIP/2.0
a: SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP icscf.home1.net, SIP/2.0/UDP  Token(SIP/2.0/UDP
scf.home1.net, SIP/2.0/UDP pcscf.home1.net,
  SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
ute:  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
cord-Route:  sip:icscf.home2.net, sip:icscf.home1.net, sip:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-Type:
ntent-length:
```

. PRACK (S-S#1b to MT)

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

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.2-24: PRACK (S-S#1b to MT)

```
ACK sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net SIP/2.0
a: SIP/2.0/UDP scscf.home2.net, SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP  icscf.home1.net, SIP/2.0/UDP
ken(SIP/2.0/UDP scscf.home1.net,
  SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route:  sip:scscf.home2.net, sip:icscf.home2.net, sip:icscf.home1.net,
  sip:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-Type:
ntent-length:
```

. 200 OK (MT to S-S#1b)

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

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.2-25: 200 OK (MT to S-S#1b)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home2.net, SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP  icscf.home1.net, SIP/2.0/UDP
ken(SIP/2.0/UDP scscf.home1.net,
  SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf.home2.net, sip:icscf.home2.net, sip:icscf.home1.net,
  sip:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
ntent-length: 0
```

. 200 OK (S-CSCF to I-CSCF)

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

Table 8.3.2-26: 200 OK (S-CSCF to I-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP icscf.home1.net, SIP/2.0/UDP  Token(SIP/2.0/UDP
scf.home1.net, SIP/2.0/UDP pcscf.home1.net,
  SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf.home2.net, sip:icscf.home2.net, sip:icscf.home1.net,
  sip:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. 200 OK (I-CSCF to I-CSCF)

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

Table 8.3.2-27: 200 OK (I-CSCF to I-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP icscf.home1.net, SIP/2.0/UDP Token(SIP/2.0/UDP scscf.home1.net,
  SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route:  sip:Token(sip:scscf.home2.net), sip:icscf.home2.net,     sip:icscf.home1.net,
p:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

Record-Route: formed by I-CSCF#2 reversing and translating all the entries to the left of its own entry.

. 200 OK (I-CSCF to S-CSCF)

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

Table 8.3.2-28: 200 OK (I-CSCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:  sip:Token(sip:scscf.home2.net), sip:icscf.home2.net,     sip:icscf.home1.net,
p:scscf.home1.net
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

Record-Route: formed by I-CSCF#1 determining the entry to the right of its own entry.

Via: determined by I-CSCF#1.

. 200 OK (S-S#1b to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.2-29: 200 OK (S-S#1b to MO)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:  sip:Token(sip:scscf.home2.net), sip:icscf.home2.net,     sip:icscf.home1.net,
p:scscf.home1.net
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. COMET (MO to S-S#1b)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.2-30: COMET (MO to S-S#1b)

```
MET sip:scscf.home1.net SIP/2.0
a: SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:icscf.home1.net, sip:icscf.home2.net, sip:Token(sip:scscf.home2.net),
  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
om: “Alien Blaster” <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 129 COMET
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf.home1.net
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:success sendonly
```

. COMET (S-CSCF to I-CSCF)

S-CSCF#1 forwards the COMET request to I-CSCF#1.

Table 8.3.2-31: COMET (S-CSCF to I-CSCF)

```
MET sip:icscf.home1.net SIP/2.0
a: SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
ute: sip:icscf.home2.net, sip:Token(sip:scscf.home2.net),
  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
cord-Route: sip:scscf.home1.net
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

. COMET (I-CSCF to I-CSCF)

I-CSCF#1 forwards the COMET request to I-CSCF#2.

Table 8.3.2-32: COMET (I-CSCF to I-CSCF)

```
MET sip:icscf.home2.net SIP/2.0
a: SIP/2.0/UDP icscf.home1.net, SIP/2.0/UDP Token(SIP/2.0/UDP scscf.home1.net,
  SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
ute: sip:Token(sip:scscf.home2.net),  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
cord-Route: sip:icscf.home1.net, sip:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

Via:, Record-Route: translated to maintain configuration independence of the home#1 operator.

. COMET (I-CSCF to S-CSCF)

I-CSCF#2 forwards the COMET request to S-CSCF#2.

Table 8.3.2-33: COMET (I-CSCF to S-CSCF)

```
MET sip:scscf.home2.net SIP/2.0
a: SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP icscf.home1.net, SIP/2.0/UDP  Token(SIP/2.0/UDP
scf.home1.net, SIP/2.0/UDP pcscf.home1.net,
  SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
ute:  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
cord-Route:  sip:icscf.home2.net, sip:icscf.home1.net, sip:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

COMET (S-S#1b to MT)

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

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.2-34: COMET (S-S#1b to MT)

```
MET sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net SIP/2.0
a: SIP/2.0/UDP scscf.home2.net, SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP  icscf.home1.net, SIP/2.0/UDP
ken(SIP/2.0/UDP scscf.home1.net,
  SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route:  sip:scscf.home2.net, sip:icscf.home2.net, sip:icscf.home1.net,
  sip:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

200 OK (MT to S-S#1b)

The terminating endpoint responds to the COMET request (34) with a 200 OK response.

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.2-35: 200 OK (MT to S-S#1b)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home2.net, SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP  icscf.home1.net, SIP/2.0/UDP
ken(SIP/2.0/UDP scscf.home1.net,
  SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf.home2.net, sip:icscf.home2.net, sip:icscf.home1.net,
  sip:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
ntent-length: 0
```

. 200 OK (S-CSCF to I-CSCF)

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

Table 8.3.2-36: 200 OK (S-CSCF to I-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP icscf.home1.net, SIP/2.0/UDP  Token(SIP/2.0/UDP
scf.home1.net, SIP/2.0/UDP pcscf.home1.net,
  SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf.home2.net, sip:icscf.home2.net, sip:icscf.home1.net,
  sip:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. 200 OK (I-CSCF to I-CSCF)

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

Table 8.3.2-37: 200 OK (I-CSCF to I-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP icscf.home1.net, SIP/2.0/UDP Token(SIP/2.0/UDP scscf.home1.net,
  SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route:  sip:Token(sip:scscf.home2.net), sip:icscf.home2.net,     sip:icscf.home1.net,
p:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

Record-Route: formed by I-CSCF#2 reversing and translating all the entries to the left of its own entry.

. 200 OK (I-CSCF to S-CSCF)

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

Table 8.3.2-38: 200 OK (I-CSCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:  sip:Token(sip:scscf.home2.net), sip:icscf.home2.net,     sip:icscf.home1.net,
p:scscf.home1.net
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

Record-Route: formed by I-CSCF#1 determining the entry to the right of its own entry.

Via: determined by I-CSCF#1.

). 200 OK (S-S#1b to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.2-39: 200 OK (S-S#1b to MO)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:  sip:Token(sip:scscf.home2.net), sip:icscf.home2.net,     sip:icscf.home1.net,
p:scscf.home1.net
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

). 180 Ringing (MT to S-S#1b)

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.

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.2-40: 180 Ringing (MT to S-S#1b)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP scscf.home2.net, SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP  icscf.home1.net, SIP/2.0/UDP
ken(SIP/2.0/UDP scscf.home1.net,
  SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf.home2.net, sip:icscf.home2.net, sip:icscf.home1.net,
  sip:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
eq: 9022
ntent-length: 0
```

. 180 Ringing (S-CSCF to I-CSCF)

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

Table 8.3.2-41: 180 Ringing (S-CSCF to I-CSCF)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP icscf.home1.net, SIP/2.0/UDP  Token(SIP/2.0/UDP
scf.home1.net, SIP/2.0/UDP pcscf.home1.net,
  SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf.home2.net, sip:icscf.home2.net, sip:icscf.home1.net,
  sip:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-length:
```

. 180 Ringing (I-CSCF to I-CSCF)

I-CSCF#2 forwards the 180 Ringing response to I-CSCF#1.

Table 8.3.2-42: 180 Ringing (I-CSCF to I-CSCF)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP icscf.home1.net, SIP/2.0/UDP Token(SIP/2.0/UDP scscf.home1.net,
  SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route:  sip:Token(sip:scscf.home2.net), sip:icscf.home2.net,     sip:icscf.home1.net,
p:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-length:
```

Record-Route: formed by I-CSCF#2 reversing and translating all the entries to the left of its own entry.

. 180 Ringing (I-CSCF to S-CSCF)

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

Table 8.3.2-43: 180 Ringing (I-CSCF to S-CSCF)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:  sip:Token(sip:scscf.home2.net), sip:icscf.home2.net,     sip:icscf.home1.net,
p:scscf.home1.net
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-length:
```

Record-Route: formed by I-CSCF#1 determining the entry to the right of its own entry.

Via: determined by I-CSCF#1.

180 Ringing (S-S#1b to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.2-44: 180 Ringing (S-S#1b to MO)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:  sip:Token(sip:scscf.home2.net), sip:icscf.home2.net,     sip:icscf.home1.net,
p:scscf.home1.net
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-length:
```

PRACK (MO to S-S#1b)

The originator acknowledges the 180 Ringing provisional response (44) with a PRACK request.

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.2-45: PRACK (MO to S-S#1b)

```
ACK sip:scscf.home1.net SIP/2.0
a: SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:icscf.home1.net, sip:icscf.home2.net, sip:Token(sip:scscf.home2.net),
  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
om: “Alien Blaster” <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 130 PRACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf.home1.net
ck: 9022 127 INVITE
ntent-length: 0
```

PRACK (S-CSCF to I-CSCF)

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

Table 8.3.2-46: PRACK (S-CSCF to I-CSCF)

```
ACK sip:icscf.home1.net SIP/2.0
a: SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
ute: sip:icscf.home2.net, sip:Token(sip:scscf.home2.net),
  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
cord-Route: sip:scscf.home1.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-length:
```

'. PRACK (I-CSCF to I-CSCF)

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

Table 8.3.2-47: PRACK (I-CSCF to I-CSCF)

```
ACK sip:icscf.home2.net SIP/2.0
a: SIP/2.0/UDP icscf.home1.net, SIP/2.0/UDP Token(SIP/2.0/UDP scscf.home1.net,
  SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
ute: sip:Token(sip:scscf.home2.net),  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
cord-Route: sip:icscf.home1.net, sip:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-length:
```

Via:, Record-Route: translated to maintain configuration independence of the home#1 operator.

:. PRACK (I-CSCF to S-CSCF)

I-CSCF#2 determines the routing information, and forwards the PRACK request to S-CSCF#2.

Table 8.3.2-48: PRACK (I-CSCF to S-CSCF)

```
ACK sip:scscf.home2.net SIP/2.0
a: SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP icscf.home1.net, SIP/2.0/UDP  Token(SIP/2.0/UDP
scf.home1.net, SIP/2.0/UDP pcscf.home1.net,
  SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
ute:  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
cord-Route:  sip:icscf.home2.net, sip:icscf.home1.net, sip:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-length:
```

'. PRACK (S-S#1b to MT)

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

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.2-49: PRACK (S-S#1b to MT)

```
ACK sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net SIP/2.0
a: SIP/2.0/UDP scscf.home2.net, SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP  icscf.home1.net, SIP/2.0/UDP
ken(SIP/2.0/UDP scscf.home1.net,
  SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route:  sip:scscf.home2.net, sip:icscf.home2.net, sip:icscf.home1.net,
  sip:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-length:
```

. 200 OK (MT to S-S#1b)

The terminating endpoint responds to the PRACK request (49) with a 200 OK response.

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.2-50: 200 OK (MT to S-S#1b)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home2.net, SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP  icscf.home1.net, SIP/2.0/UDP
ken(SIP/2.0/UDP scscf.home1.net,
  SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf.home2.net, sip:icscf.home2.net, sip:icscf.home1.net,
  sip:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
ntent-length: 0
```

. 200 OK (S-CSCF to I-CSCF)

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

Table 8.3.2-51: 200 OK (S-CSCF to I-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP icscf.home1.net, SIP/2.0/UDP  Token(SIP/2.0/UDP
scf.home1.net, SIP/2.0/UDP pcscf.home1.net,
  SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf.home2.net, sip:icscf.home2.net, sip:icscf.home1.net,
  sip:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. 200 OK (I-CSCF to I-CSCF)

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

Table 8.3.2-52: 200 OK (I-CSCF to I-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP icscf.home1.net, SIP/2.0/UDP Token(SIP/2.0/UDP scscf.home1.net,
  SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route:  sip:Token(sip:scscf.home2.net), sip:icscf.home2.net,     sip:icscf.home1.net,
p:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

Record-Route: formed by I-CSCF#2 reversing and translating all the entries to the left of its own entry.

. 200 OK (I-CSCF to S-CSCF)

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

Table 8.3.2-53: 200 OK (I-CSCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:  sip:Token(sip:scscf.home2.net), sip:icscf.home2.net,     sip:icscf.home1.net,
p:scscf.home1.net
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

Record-Route: formed by I-CSCF#1 determining the entry to the right of its own entry.

Via: determined by I-CSCF#1.

. 200 OK (S-S#1b to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.2-54: 200 OK (S-S#1b to MO)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:  sip:Token(sip:scscf.home2.net), sip:icscf.home2.net,     sip:icscf.home1.net,
p:scscf.home1.net
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. 200 OK (MT to S-S#1b)

The final response to the INVITE (13), 200 OK, is sent by the terminating endpoint over the signalling path. This is typically generated when the subscriber has accepted the incoming call attempt. The response is sent to S-CSCF#2 per the termination procedure.

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.2-55: 200 OK (MT to S-S#1b)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home2.net, SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP  icscf.home1.net, SIP/2.0/UDP
ken(SIP/2.0/UDP scscf.home1.net,
  SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf.home2.net, sip:icscf.home2.net, sip:icscf.home1.net,
  sip:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq: 127 INVITE
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
ntent-length: 0
```

Service Control

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

200 OK (S-CSCF to I-CSCF)

The 200 OK response is forwarded to the I-CSCF#2.

Table 8.3.2-57: 200 OK (S-CSCF to I-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP icscf.home1.net, SIP/2.0/UDP  Token(SIP/2.0/UDP
scf.home1.net, SIP/2.0/UDP pcscf.home1.net,
  SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf.home2.net, sip:icscf.home2.net, sip:icscf.home1.net,
  sip:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

200 OK (I-CSCF to I-CSCF)

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

Table 8.3.2-58: 200 OK (I-CSCF to I-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP icscf.home1.net, SIP/2.0/UDP Token(SIP/2.0/UDP scscf.home1.net,
  SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route:  sip:Token(sip:scscf.home2.net), sip:icscf.home2.net,     sip:icscf.home1.net,
p:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

Record-Route: formed by I-CSCF#2 reversing and translating all the entries to the left of its own entry.

200 OK (I-CSCF to S-CSCF)

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

Table 8.3.2-59: 200 OK (I-CSCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:  sip:Token(sip:scscf.home2.net), sip:icscf.home2.net,     sip:icscf.home1.net,
p:scscf.home1.net
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

Record-Route: formed by I-CSCF#1 determining the entry to the right of its own entry.

Via: determined by I-CSCF#1.

Service Control

S-CSCF#1 performs whatever service control logic is appropriate for this call completion

200 OK (S-S#1b to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.2-61: 200 OK (S-S#1b to MO)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:  sip:Token(sip:scscf.home2.net), sip:icscf.home2.net,     sip:icscf.home1.net,
p:scscf.home1.net
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. ACK (MO to S-S#1b)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.2-62: ACK (MO to S-S#1b)

```
K sip:scscf.home1.net SIP/2.0
a: SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:icscf.home1.net, sip:icscf.home2.net, sip:Token(sip:scscf.home2.net),
  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
om: “Alien Blaster” <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 131 ACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf.home1.net
ntent-length: 0
```

. ACK (S-CSCF to I-CSCF)

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

Table 8.3.2-63: ACK (S-CSCF to I-CSCF)

```
K sip:icscf.home1.net SIP/2.0
a: SIP/2.0/UDP scscf.home1.net, SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
ute: sip:icscf.home2.net, sip:Token(sip:scscf.home2.net),
  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
cord-Route: sip:scscf.home1.net
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. ACK (I-CSCF to I-CSCF)

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

Table 8.3.2-64: ACK (I-CSCF to I-CSCF)

```
K sip:icscf.home2.net SIP/2.0
a: SIP/2.0/UDP icscf.home1.net, SIP/2.0/UDP Token(SIP/2.0/UDP scscf.home1.net,
  SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
ute: sip:Token(sip:scscf.home2.net),  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
cord-Route: sip:icscf.home1.net, sip:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

Via:, Record-Route: translated to maintain configuration independence of the home#1 operator.

. ACK (I-CSCF to S-CSCF)

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

Table 8.3.2-65: ACK (I-CSCF to S-CSCF)

```
K sip:scscf.home2.net SIP/2.0
a: SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP icscf.home1.net, SIP/2.0/UDP  Token(SIP/2.0/UDP
scf.home1.net, SIP/2.0/UDP pcscf.home1.net,
  SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
ute:  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net
cord-Route:  sip:icscf.home2.net, sip:icscf.home1.net, sip:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. ACK (S-S#1b to MT)

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

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.2-66: ACK (S-S#1b to MT)

```
K sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf.home2.net SIP/2.0
a: SIP/2.0/UDP scscf.home2.net, SIP/2.0/UDP icscf.home2.net, SIP/2.0/UDP  icscf.home1.net, SIP/2.0/UDP
ken(SIP/2.0/UDP scscf.home1.net,
  SIP/2.0/UDP pcscf.home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route:  sip:scscf.home2.net, sip:icscf.home2.net, sip:icscf.home1.net,
  sip:Token(sip:scscf.home1.net)
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

3.3 (S-S#2) Single network operator performing origination and termination

ıe Serving-CSCF handling call origination performs an analysis of the destination address, and determines that it belongs to a bscriber of the same operator. The request is therefore forwarded to a local I-CSCF. The I-CSCF queries the HSS for current cation information, and finds the S-CSCF assigned to the subscriber (S-CSCF#2), and forwards the request to S-CSCF#2.

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

O#1a Mobile origination, roaming, without firewall. The “Originating Network” of S-S#2 is therefore a visited network.

O#1b Mobile origination, roaming, with firewall in home network. The “Originating Network” of S-S#2 is therefore a visited network.

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

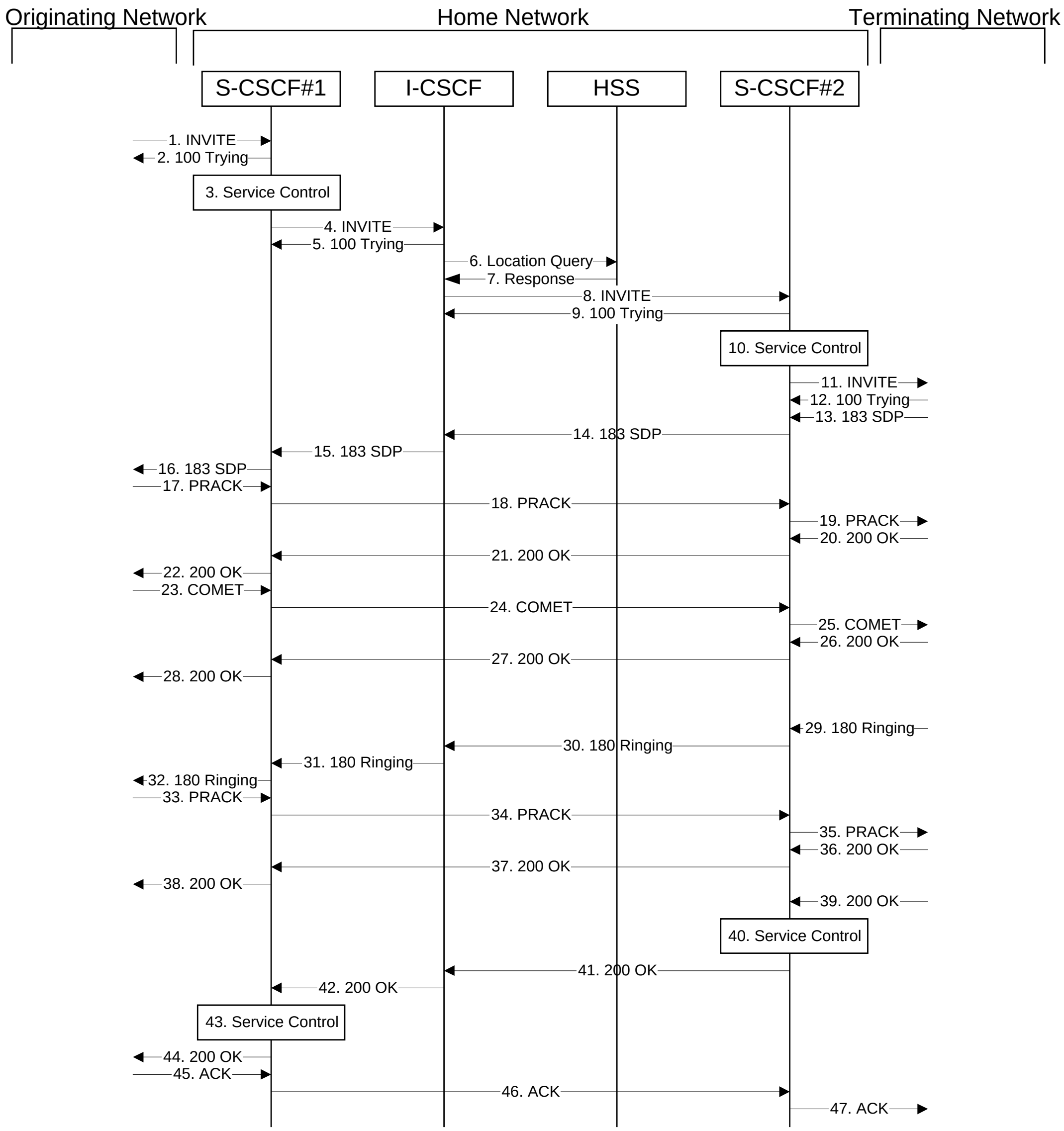
TN-O PSTN origination. The “Originating Network” of S-S#2 is the home network. The element labeled S-CSCF#1 is the MGCF of the PSTN-O procedure.

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

T#1a Mobile termination, roaming, without firewall. The “Terminating Network” of S-S#2 is a visited network.

T#1b Mobile termination, roaming, with firewall in home network. The “Terminating Network” of S-S#2 is a visited network.

T#2 Mobile termination, located in home service area. The “Terminating Network” of S-S#2 is the home network.



ocedure S-S#2 is as follows:

INVITE (MO to S-S#2)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.3-1: INVITE (MO to S-S#2)

```
VITE sip:scscf1.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:+1-212-555-2222@home2.net;user=phone
pported: 100rel
mote-Party-ID: John Doe <tel:+1-212-555-1111>
onymity: Off
om: “Alien Blaster” <sip:B36(SHA-1(+1-212-555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 127 INVITE
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.home.net
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97 3 96
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
rtpmap:96 G726-32/8000
qos:mandatory sendrecv
```

100 Trying (S-S#2 to MO)

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

Table 8.3.3-2: 100 Trying (S-S#2 to MO)

```
P/2.0 100 Trying
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-length: 0
```

Service Control

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

INVITE (S-CSCF to I-CSCF)

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 to I-CSCF in the destination network.

Table 8.3.2-4: INVITE (S-CSCF to I-CSCF)

```
VITE sip:+1-212-555-2222@home2.net;user=phone SIP/2.0
a: SIP/2.0/UDP sip:scscf1.home.net SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf1.home.net
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

100 Trying (I-CSCF to S-CSCF)

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

Table 8.3.3-5: 100 Trying (I-CSCF to S-CSCF)

```
P/2.0 100 Trying
a: SIP/2.0/UDP scscf1.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-length: 0
```

Location Query

I-CSCF (at the border of the terminating subscriber's network) queries the HSS for current location information. It will send "Cx-location-query" to the HSS to obtain the location information for the destination.

Location Response

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

INVITE (I-CSCF to S-CSCF)

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

Table 8.3.3-8: INVITE (I-CSCF to S-CSCF)

```
VITE sip:scscf2.home.net SIP/2.0
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP scscf1.home.net, SIP/2.0/UDP   pcscf1.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd])
ute: sip:+1-212-555-2222@home2.net;user=phone
cord-Route: sip:scscf1.home.net
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

Editor's Note: The mechanism by which the INVITE is routed to S-CSCF, and the mechanism by which S-CSCF retrieves the initial Request URI (which identifies the real destination of the session) is FFS.

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

100 Trying (S-CSCF to I-CSCF)

S-CSCF#2 responds to the INVITE request (8) with a 100 Trying provisional response.

Table 8.3.3-9: 100 Trying (S-CSCF to I-CSCF)

```
P/2.0 100 Trying
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP scscf1.home.net, SIP/2.0/UDP   pcscf1.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd])
om:
:
ll-ID:
eq:
ntent-Length: 0
```

Service Control

S-CSCF#2 performs whatever service control logic is appropriate for this call attempt

INVITE (S-S#2 to MT)

S-CSCF#2 forwards the INVITE request, as determined by the termination procedure.

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.3-11: INVITE (S-S#2 to MT)

```
VITE sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net SIP/2.0
a: SIP/2.0/UDP scscf2.home.net, SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP   scscf1.home.net, SIP/2.0/UDP
scf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
ute: sip:+1-212-555-2222@home2.net;user=phone
cord-Route:  sip:scscf2.home.net, sip:scscf1.home.net
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

. 100 Trying (MT to S-S#2)

S-CSCF#2 receives a 100 Trying provisional response to the INVITE request (11), as specified by the termination procedures.

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.3-12: 100 Trying (MT to S-S#2)

```
P/2.0 100 Trying
a: SIP/2.0/UDP scscf2.home.net, SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP   scscf1.home.net, SIP/2.0/UDP
scf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
om:
:
ll-ID:
eq:
ntent-length: 0
```

. 183 Session Progress (MT to S-S#2)

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

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.3-13: 183 Session Progress (MT to S-S#2)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP scscf2.home.net, SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP   scscf1.home.net, SIP/2.0/UDP
scf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf2.home.net, sip:scscf1.home.net
mote-Party-ID: John Smith <tel:+1-212-555-2222>
onymity: Off
om:
: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost; tag=314159
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
eq: 9021
ntent-Disposition: precondition
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::eee:fff:aaa:bbb
AS:64
907165275 0
audio 6544 RTP/AVP 97 3
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:mandatory sendrecv confirm
```

183 Session Progress (S-CSCF to I-CSCF)

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

Table 8.3.3-14: 183 Session Progress (S-CSCF to I-CSCF)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP scscf1.home.net, SIP/2.0/UDP   pcscf1.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf2.home.net, sip:scscf1.home.net
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

183 Session Progress (I-CSCF to S-CSCF)

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

Table 8.3.3-15: 183 Session Progress (I-CSCF to S-CSCF)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP scscf1.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf2.home.net,  sip:scscf1.home.net
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

. 183 Session Progress (S-S#2 to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.3-16: 183 Session Progress (S-S#2 to MO)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf2.home.net, sip:scscf1.home.net
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

. PRACK (MO to S-S#2)

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.

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.3-17: PRACK (MO to S-S#2)

```
ACK sip:scscf1.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:scscf2.home.net, sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
om: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 128 PRACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.home.net
ck: 9021 127 INVITE
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:mandatory sendrecv
```

. PRACK (S-CSCF to S-CSCF)

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

Table 8.3.3-18: PRACK (S-CSCF to S-CSCF)

```
ACK sip:scscf2.home.net SIP/2.0
a: SIP/2.0/UDP scscf1.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
ute:  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
cord-Route: sip:scscf1.home.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-Type:
ntent-length:
```

. PRACK (S-S#2 to MT)

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

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.3-19: PRACK (S-S#2 to MT)

```
ACK sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net SIP/2.0
a: SIP/2.0/UDP scscf2.home.net, SIP/2.0/UDP scscf1.home.net, SIP/2.0/UDP  pcscf1.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route:  sip:scscf2.home.net, sip:scscf1.home.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-Type:
ntent-length:
```

. 200 OK (MT to S-S#2)

The terminating endpoint responds to the PRACK request (19) with a 200 OK response.

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.3-20: 200 OK (MT to S-S#2)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf2.home.net, SIP/2.0/UDP scscf1.home.net, SIP/2.0/UDP  pcscf1.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route:  sip:scscf2.home.net, sip:scscf1.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
ntent-length: 0
```

. 200 OK (S-CSCF to S-CSCF)

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

Table 8.3.3-21: 200 OK (S-CSCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf1.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. 200 OK (S-S#2 to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.3-22: 200 OK (S-S#2 to MO)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. COMET (MO to S-S#2)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.3-23: COMET (MO to S-S#2)

```
MET sip:scscf1.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:scscf2.home.net, sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
om: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 129 COMET
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.home.net
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:success sendonly
```

COMET (S-CSCF to S-CSCF)

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

Table 8.3.3-24: COMET (S-CSCF to S-CSCF)

```
MET sip:scscf2.home.net SIP/2.0
a: SIP/2.0/UDP scscf1.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
ute:  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
cord-Route: sip:scscf1.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

COMET (S-S#2 to MT)

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

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.3-25: COMET (S-S#2 to MT)

```
MET sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net SIP/2.0
a: SIP/2.0/UDP scscf2.home.net, SIP/2.0/UDP scscf1.home.net, SIP/2.0/UDP  pcscf1.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd])
cord-Route:  sip:scscf2.home.net, sip:scscf1.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

. 200 OK (MT to S-S#2)

The terminating endpoint responds to the COMET request (25) with a 200 OK response.

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.3-26: 200 OK (MT to S-S#2)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf2.home.net, SIP/2.0/UDP scscf1.home.net, SIP/2.0/UDP  pcscf1.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd])
cord-Route:  sip:scscf2.home.net, sip:scscf1.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
ntent-length: 0
```

. 200 OK (S-CSCF to S-CSCF)

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

Table 8.3.3-27: 200 OK (S-CSCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf1.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd])
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. 200 OK (S-S#2 to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.3-28: 200 OK (S-S#2 to MO)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. 180 Ringing (MT to S-S#2)

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.

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.3-29: 180 Ringing (MT to S-S#2)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP scscf2.home.net, SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP   scscf1.home.net, SIP/2.0/UDP
scf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf2.home.net, sip:scscf1.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
eq: 9022
ntent-length: 0
```

. 180 Ringing (S-CSCF to I-CSCF)

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

Table 8.3.3-30: 180 Ringing (S-CSCF to I-CSCF)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP scscf1.home.net, SIP/2.0/UDP   pcscf1.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf2.home.net, sip:scscf1.home.net
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-length:
```

. 180 Ringing (I-CSCF to S-CSCF)

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

Table 8.3.3-31: 180 Ringing (I-CSCF to S-CSCF)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP scscf1.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf2.home.net,  sip:scscf1.home.net
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-length:
```

. 180 Ringing (S-S#2 to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.3-32: 180 Ringing (S-S#2 to MO)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-length:
```

. PRACK (MO to S-S#2)

The originator acknowledges the 180 Ringing provisional response (32) with a PRACK request.

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.3-33: PRACK (MO to S-S#2)

```
ACK sip:scscf1.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:scscf2.home.net, sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
om: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 130 PRACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.home.net
ck: 9022 127 INVITE
ntent-length: 0
```

. PRACK (S-CSCF to S-CSCF)

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

Table 8.3.3-34: PRACK (S-CSCF to S-CSCF)

```
ACK sip:scscf2.home.net SIP/2.0
a: SIP/2.0/UDP scscf1.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
ute:  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
cord-Route: sip:scscf1.home.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-length:
```

. PRACK (S-S#2 to MT)

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

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.3-35: PRACK (S-S#2 to MT)

```
ACK sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net SIP/2.0
a: SIP/2.0/UDP scscf2.home.net, SIP/2.0/UDP scscf1.home.net, SIP/2.0/UDP  pcscf1.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route:  sip:scscf2.home.net, sip:scscf1.home.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-length:
```

. 200 OK (MT to S-S#2)

The terminating endpoint responds to the PRACK request (35) with a 200 OK response.

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.3-36: 200 OK (MT to S-S#2)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf2.home.net, SIP/2.0/UDP scscf1.home.net, SIP/2.0/UDP  pcscf1.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route:  sip:scscf2.home.net, sip:scscf1.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
ntent-length: 0
```

. 200 OK (S-CSCF to S-CSCF)

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

Table 8.3.3-37: 200 OK (S-CSCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf1.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd])
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. 200 OK (S-S#2 to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.3-38: 200 OK (S-S#2 to MO)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. 200 OK (MT to S-S#2)

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

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.3-39: 200 OK (MT to S-S#2)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf2.home.net, SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP   scscf1.home.net, SIP/2.0/UDP
scf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf2.home.net, sip:scscf1.home.net
om:
:
ll-ID:
eq: 127 INVITE
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
ntent-length: 0
```

. Service Control

S-CSCF#2 performs whatever service control logic is appropriate for this call completion

. 200 OK (S-CSCF to I-CSCF)

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

Table 8.3.3-41: 200 OK (S-CSCF to I-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP icscf.home.net, SIP/2.0/UDP scscf1.home.net, SIP/2.0/UDP   pcscf1.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. 200 OK (I-CSCF to S-CSCF)

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

Table 8.3.3-42: 200 OK (I-CSCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf1.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. Service Control

S-CSCF#1 performs whatever service control logic is appropriate for this call completion

. 200 OK (S-S#2 to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.3-44: 200 OK (S-S#2 to MO)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. ACK (MO to S-S#2)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.3-45: ACK (MO to S-S#2)

```
K sip:scscf1.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:scscf2.home.net, sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
om: “Alien Blaster” <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 131 ACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.home.net
ntent-length: 0
```

. ACK (S-CSCF to S-CSCF)

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

Table 8.3.3-46: ACK (S-CSCF to S-CSCF)

```
K sip:scscf2.home.net SIP/2.0
a: SIP/2.0/UDP scscf1.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP  [5555::aaa:bbb:ccc:ddd]
ute:  sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
cord-Route: sip:scscf1.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. ACK (S-S#2 to MT)

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

NOTE: There are a number of different termination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 and MT#2 are assumed.

Table 8.3.3-47: ACK (S-S#2 to MT)

```
K sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net SIP/2.0
a: SIP/2.0/UDP scscf2.home.net, SIP/2.0/UDP scscf1.home.net, SIP/2.0/UDP  pcscf1.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route:  sip:scscf2.home.net, sip:scscf1.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

3.4 (S-S#3) PSTN Termination performed by home network of originator

ıe Serving-CSCF handling call origination performs an analysis of the destination address, and determines that it belongs will sult in a PSTN termination. The request is therefore forwarded to a local BGCF. The BGCF performs further analysis of the stination address, combined with information of agreements between operators for optimum Gateway selection, and decides to the PSTN termination locally. The BGCF therefore allocates a MGCF within the home network, and sends the request to it.
igination sequences that share this common S-CSCF to S-CSCF procedure are:
O#1a Mobile origination, roaming, without firewall. The “Originating Network” of S-S#3 is therefore a visited network.

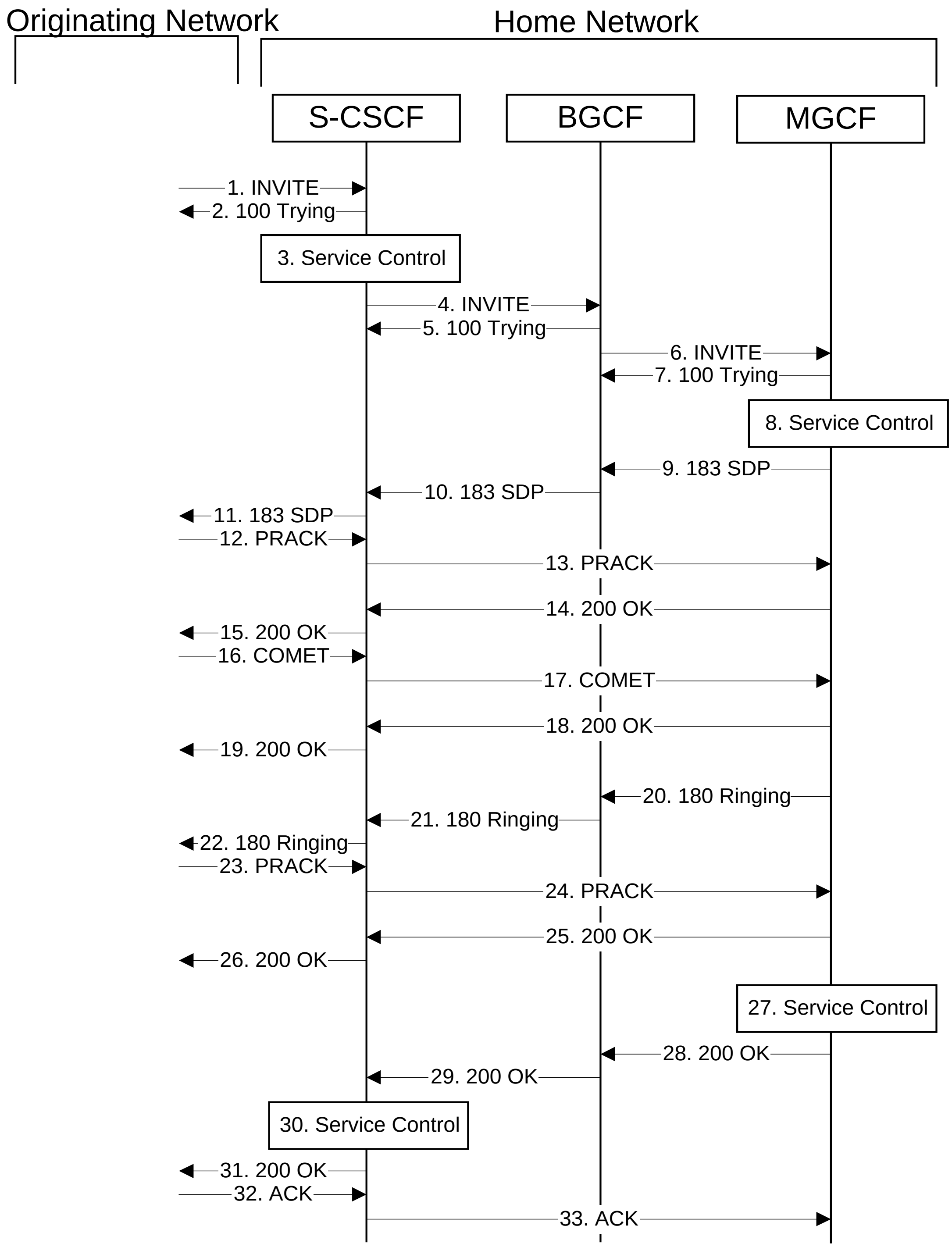
O#1b Mobile origination, roaming, with firewall in home network. The "Originating Network" of S-S#3 is therefore a visited network.

O#2 Mobile origination, located in home service area. The "Originating Network" of S-S#3 is therefore the home network.

;TN-O PSTN origination. The "Originating Network" of S-S#3 is the home network. The element labeled S-CSCF#1 is the MGCF of the PSTN-O procedure.

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

;TN-T PSTN termination.



ocedure S-S#3 is as follows:

INVITE (MO to S-S#3)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 is assumed.

Table 8.3.4-1: INVITE (MO to S-S#3)

```
VITE sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:+1-212-555-2222@home2.net;user=phone
pported: 100rel
mote-Party-ID: John Doe <tel:+1-212-555-1111>
onymity: Off
om: "Alien Blaster" <sip:B36(SHA-1(+1-212-555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 127 INVITE
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.home.net
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97 3 96
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
rtpmap:96 G726-32/8000
qos:mandatory sendrecv
```

100 Trying (S-S#3 to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 is assumed.

Table 8.3.4-2: 100 Trying (S-S#3 to MO)

```
P/2.0 100 Trying
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-length: 0
```

Service Control

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

INVITE (S-CSCF to BGCF)

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

Table 8.3.4-4: INVITE (S-CSCF to BGCF)

```
VITE sip:bgcf.home.net SIP/2.0
a: SIP/2.0/UDP sip:scscf.home.net SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
ute: sip:+1-212-555-2222@home2.net;user=phone
cord-Route: sip:scscf.home.net
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

100 Trying (BGCF to S-CSCF)

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

Table 8.3.4-5: 100 Trying (BGCF to S-CSCF)

```
P/2.0 100 Trying
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-length: 0
```

INVITE (BGCF to MGCF)

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

Table 8.3.4-5: INVITE (BGCF to MGCF)

```
VITE sip:mgcf39.home.net SIP/2.0
a: SIP/2.0/UDP bgcf.home.net, SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP     pcscf1.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd])
ute: sip:+1-212-555-2222@home2.net;user=phone
cord-Route: sip:scscf.home.net
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

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

100 Trying (MGCF to BGCF)

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

Table 8.3.4-7: 100 Trying (MGCF to BGCF)

```
P/2.0 100 Trying
a: SIP/2.0/UDP bgcf.home.net, SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP     pcscf1.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd])
om:
:
ll-ID:
eq:
ntent-length: 0
```

Service Control

MGCF performs whatever service control logic is appropriate for this call attempt

Editor's Note: Should the MGCF be performing service control or is this a copy-and-paste error?

183 Session Progress (MGCF to BGCF)

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

Table 8.3.4-9: 183 Session Progress (MGCF to BGCF)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP bgcf.home.net, SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net,    SIP/2.0/UDP
555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf.home.net
mote-Party-ID: John Smith <tel:+1-212-555-2222>
onymity: Off
om:
: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost; tag=314159
ll-ID:
eq:
ntact: sip:04/11@mgcf39.home.net
eq: 9021
ntent-Disposition: precondition
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::eee:fff:aaa:bbb
AS:64
907165275 0
audio 6544 RTP/AVP 97 3
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:mandatory sendrecv confirm
```

'. 183 Session Progress (BGCF to S-CSCF)

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

Table 8.3.4-10: 183 Session Progress (BGCF to S-CSCF)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
cord-Route:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

. 183 Session Progress (S-S#3 to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 is assumed.

Table 8.3.4-11: 183 Session Progress (S-S#3 to MO)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

. PRACK (MO to S-S#3)

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.

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 is assumed.

Table 8.3.4-12: PRACK (MO to S-S#3)

```
ACK sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:04/11@mgcf39.home.net
om: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 128 PRACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.home.net
ck: 9021 127 INVITE
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:mandatory sendrecv
```

. PRACK (S-CSCF to MGCF)

S-CSCF forwards the PRACK request to MGCF.

Table 8.3.4-13: PRACK (S-CSCF to MGCF)

```
ACK sip:04/11@mgcf39.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-Type:
ntent-length:
```

. 200 OK (MGCF to S-CSCF)

The MGCF responds to the PRACK request (13) with a 200 OK response.

Table 8.3.4-14: 200 OK (MGCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP    pcscf1.home.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact: sip:04/11@mgcf39.home.net
ntent-length: 0
```

200 OK (S-S#3 to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 is assumed.

Table 8.3.4-15: 200 OK (S-S#3 to MO)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

COMET (MO to S-S#3)

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

NOTE: There is a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 is assumed.

Table 8.3.4-16: COMET (MO to S-S#3)

```
MET sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:04/11@mgcf39.home.net
om: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 129 COMET
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.home.net
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:success sendonly
```

'. COMET (S-CSCF to MGCF)

S-CSCF forwards the COMET request to MGCF.

Table 8.3.4-17: COMET (S-CSCF to MGCF)

```
MET sip:mgcf39.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

. 200 OK (MGCF to S-CSCF)

The MGCF responds to the COMET request (17) with a 200 OK response.

Table 8.3.4-18: 200 OK (MGCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP    pcscf1.home.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact: sip:04/11@mgcf39.home.net
ntent-length: 0
```

. 200 OK (S-S#3 to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 is assumed.

Table 8.3.4-19: 200 OK (S-S#3 to MO)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. 180 Ringing (MGCF to BGCF)

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

Table 8.3.4-20: 180 Ringing (MGCF to BGCF)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP bgcf.home.net, SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net,    SIP/2.0/UDP
555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact: sip:04/11@mgcf39.home.net
eq: 9022
ntent-length: 0
```

. 180 Ringing (BGCF to S-CSCF)

BGCF forwards the 180 Ringing response to S-CSCF.

Table 8.3.4-21: 180 Ringing (BGCF to S-CSCF)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-length:
```

. 180 Ringing (S-S#3 to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 is assumed.

Table 8.3.4-22: 180 Ringing (S-S#3 to MO)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-length:
```

. PRACK (MO to S-S#3)

The originator acknowledges the 180 Ringing provisional response (22) with a PRACK request.

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 is assumed.

Table 8.3.4-23: PRACK (MO to S-S#3)

```
ACK sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:04/11@mgcf39.home.net
om: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 130 PRACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.home.net
ck: 9022 127 INVITE
ntent-length: 0
```

. PRACK (S-CSCF to MGCF)

S-CSCF forwards the PRACK request to MGCF.

Table 8.3.4-24: PRACK (S-CSCF to MGCF)

```
ACK sip:04/11@mgcf39.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-length:
```

. 200 OK (MGCF to S-CSCF)

The MGCF responds to the PRACK request (24) with a 200 OK response.

Table 8.3.4-25: 200 OK (MGCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP    pcscf1.home.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact: sip:%5b5555%3a%3aeee%3afff%3aaaa%3abbb%5d@pcscf2.home.net
ntent-length: 0
```

. 200 OK (S-S#3 to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 is assumed.

Table 8.3.4-26: 200 OK (S-S#3 to MO)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. Service Control

MGCF performs whatever service control is appropriate for a completed call.

. 200 OK (MGCF to BGCF)

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

Table 8.3.4-28: 200 OK (MGCF to BGCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP bgcf.home.net, SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net,    SIP/2.0/UDP
555::aaa:bbb:ccc:ddd])
cord-Route: sip:scscf.home.net
om:
:
ll-ID:
eq: 127 INVITE
ntact: sip:04/11@mgcf39.home.net
ntent-length: 0
```

. 200 OK (BGCF to S-CSCF)

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

Table 8.3.4-29: 200 OK (BGCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. Service Control

S-CSCF performs whatever service control logic is appropriate for this call completion

. 200 OK (S-S#3 to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 is assumed.

Table 8.3.4-31: 200 OK (S-S#3 to MO)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. ACK (MO to S-S#3)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 is assumed.

Table 8.3.4-32: ACK (MO to S-S#3)

```
K sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:04/11@mgcf39.home.net
om: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 131 ACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.home.net
ntent-length: 0
```

. ACK (S-CSCF to MGCF)

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

Table 8.3.4-33: ACK (S-CSCF to MGCF)

```
K sip:mgcf39.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

3.5 (S-S#4) PSTN Termination performed by different operator than origination

ıe Serving-CSCF handling call origination performs an analysis of the destination address, and determines that it belongs will sult in a PSTN termination. The request is therefore forwarded to a local BGCF (BGCF#1). BGCF#1 performs further analysis the destination address, combined with information of agreements between operators for optimum Gateway selection, and cides to do the PSTN termination in a different operator's network. BGCF#1 therefore forwards the request to a BGCF in the rminating operator's network, BGCF#2. BGCF#2 allocates a MGCF within the its network, and sends the request to it.

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

O#1a Mobile origination, roaming, without firewall. The "Originating Network" of S-S#4 is therefore a visited network.

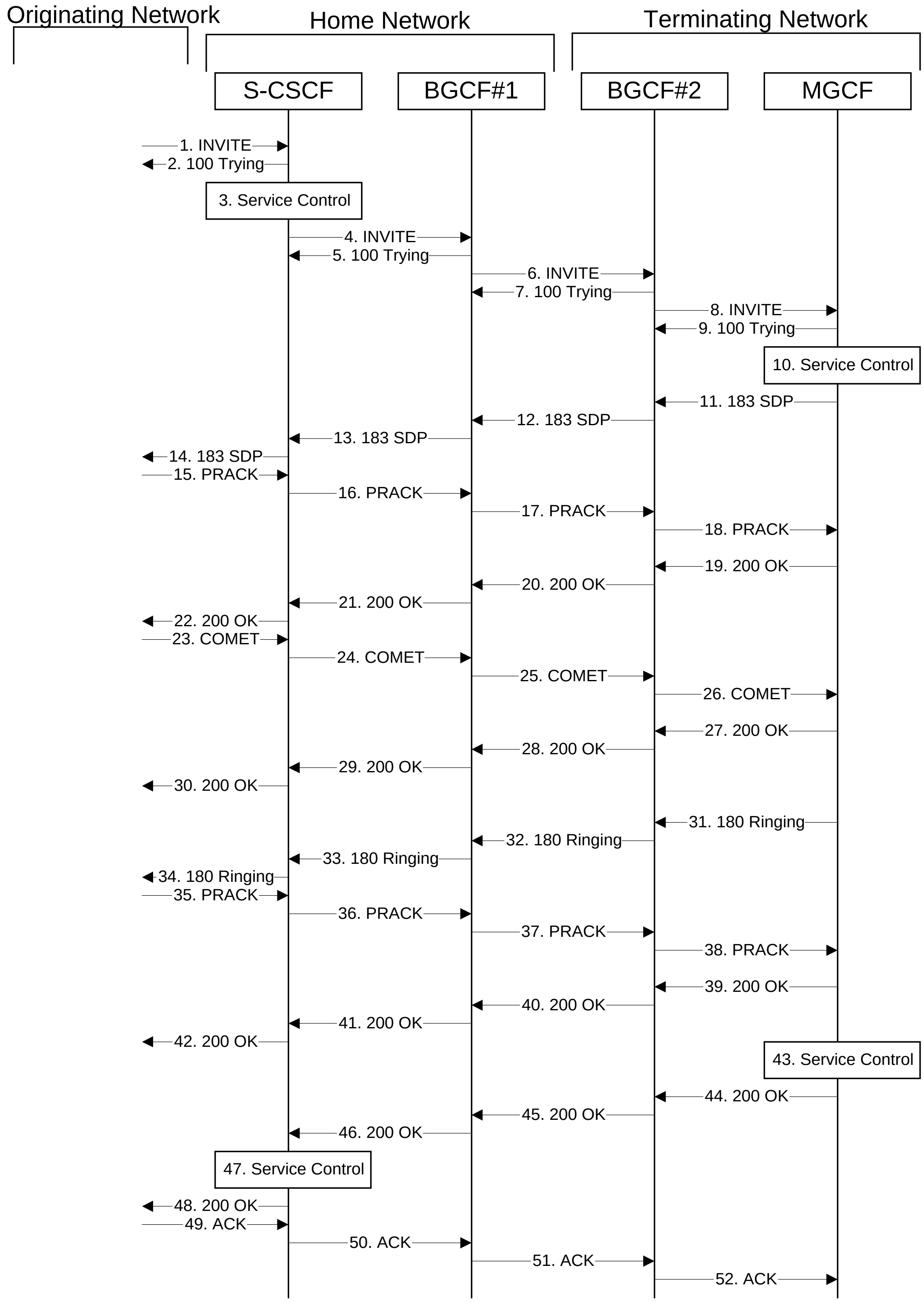
O#1b Mobile origination, roaming, with firewall in home network. The "Originating Network" of S-S#4 is therefore visited network.

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

TN-O PSTN origination. The "Originating Network" of S-S#4 is the home network. The element labeled S-CSCF#1 is the MGCF of the PSTN-O procedure.

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

TN-T PSTN termination.



ocedure S-S#4 is as follows:

INVITE (MO to S-S#4)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 is assumed.

Table 8.3.5-1: INVITE (MO to S-S#4)

```
VITE sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:+1-212-555-2222@home2.net;user=phone
pported: 100rel
mote-Party-ID: John Doe <tel:+1-212-555-1111>
onymity: Off
om: “Alien Blaster” <sip:B36(SHA-1(+1-212-555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 127 INVITE
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.home.net
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97 3 96
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
rtpmap:96 G726-32/8000
qos:mandatory sendrecv
```

100 Trying (S-S#4 to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 is assumed.

Table 8.3.5-2: 100 Trying (S-S#4 to MO)

```
P/2.0 100 Trying
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-length: 0
```

Service Control

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

INVITE (S-CSCF to BGCF)

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

Table 8.3.5-4: INVITE (S-CSCF to BGCF)

```
VITE sip:bgcf1.home.net SIP/2.0
a: SIP/2.0/UDP sip:scscf.home.net SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP    [5555::aaa:bbb:ccc:ddd]
ute: sip:+1-212-555-2222@home2.net;user=phone
cord-Route: sip:scscf.home.net
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

100 Trying (BGCF to S-CSCF)

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

Table 8.3.5-5: 100 Trying (BGCF to S-CSCF)

```
P/2.0 100 Trying
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
om:
:
ll-ID:
eq:
ntent-length: 0
```

INVITE (BGCF to BGCF)

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

Table 8.3.5-6: INVITE (BGCF to BGCF)

```
VITE sip:bgcf2.term.net SIP/2.0
a: SIP/2.0/UDP bgcf1.home.net, SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP    pcscf1.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd])
ute: sip:+1-212-555-2222@home2.net;user=phone
cord-Route: sip:bgcf1.home.net, sip:scscf.home.net
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

100 Trying (BGCF to BGCF)

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

Table 8.3.5-7: 100 Trying (BGCF to BGCF)

```
P/2.0 100 Trying
a: SIP/2.0/UDP bgcf1.home.net, SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP    pcscf1.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd])
om:
:
ll-ID:
eq:
ntent-length: 0
```

INVITE (BGCF to MGCF)

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

Table 8.3.5-8: INVITE (BGCF to MGCF)

```
VITE sip:mgcf72.term.net SIP/2.0
a: SIP/2.0/UDP bgcf2.term.net, SIP/2.0/UDP bgcf1.home.net, SIP/2.0/UDP    scscf.home.net, SIP/2.0/UDP
scf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
ute: sip:+1-212-555-2222@home2.net;user=phone
cord-Route:  sip:bgcf2.term.net, sip:bgcf1.home.net, sip:scscf.home.net
pported:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

100 Trying (MGCF to BGCF)

MGCF sends a 100 Trying provisional response.

Table 8.3.5-9: 100 Trying (MGCF to BGCF)

```
P/2.0 100 Trying
a: SIP/2.0/UDP bgcf2.term.net, SIP/2.0/UDP bgcf1.home.net, SIP/2.0/UDP    scscf.home.net, SIP/2.0/UDP
scf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd])
om:
:
ll-ID:
eq:
ntent-length: 0
```

. Service Control

MGCF performs whatever service control is necessary for this call termination attempt.

Editor's Note: Should the MGCF be performing service control or is this a copy-and-paste error?

. 183 Session Progress (MGCF to BGCF)

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

Table 8.3.5-11: 183 Session Progress (MGCF to BGCF)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP bgcf2.term.net, SIP/2.0/UDP bgcf1.home.net,  SIP/2.0/UDP scscf.home.net,   SIP/2.0/UDP
scf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:  sip:bgcf2.term.net, sip:bgcf1.home.net, sip:scscf.home.net
mote-Party-ID: John Smith <tel:+1-212-555-2222>
onymity: Off
om:
: sip:B36(SHA-1(+1-212-555-2222; time=36123E5B; seq=73))@localhost; tag=314159
ll-ID:
eq:
ntact: sip:04/11@mgcf72.term.net
eq: 9021
ntent-Disposition: precondition
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::eee:fff:aaa:bbb
AS:64
907165275 0
audio 6544 RTP/AVP 97 3
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:mandatory sendrecv confirm
```

. 183 Session Progress (BGCF to BGCF)

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

Table 8.3.5-12: 183 Session Progress (BGCF to BGCF)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP bgcf1.home.net, SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP    pcscf1.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

. 183 Session Progress (BGCF to S-CSCF)

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

Table 8.3.5-13: 183 Session Progress (BGCF to S-CSCF)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
cord-Route:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

183 Session Progress (S-S#4 to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 is assumed.

Table 8.3.5-14: 183 Session Progress (S-S#4 to MO)

```
P/2.0 183 Session Progress
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
mote-Party-ID:
onymity:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-Disposition:
ntent-Type:
ntent-length:
```

PRACK (MO to S-S#4)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 is assumed.

Table 8.3.5-15: PRACK (MO to S-S#4)

```
ACK sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:bgcf1.home.net, sip:bgcf2.term.net, sip:04/11@mgcf72.term.net
om: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 128 PRACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.home.net
ck: 9021 127 INVITE
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:mandatory sendrecv
```

. PRACK (S-CSCF to BGCF)

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

Table 8.3.5-16: PRACK (S-CSCF to BGCF)

```
ACK sip:bgcf1.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
ute:  sip:bgcf2.term.net, sip:04/11@mgcf72.term.net
cord-Route: sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-Type:
ntent-length:
```

. PRACK (BGCF to BGCF)

BGCF#1 forwards the PRACK request to BGCF#2.

Table 8.3.5-17: PRACK (BGCF to BGCF)

```
ACK sip:bgcf2.term.net SIP/2.0
a: SIP/2.0/UDP bgcf1.home.net, SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net,   SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
ute:  sip:04/11@mgcf72.term.net
cord-Route: sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-Type:
ntent-length:
```

. PRACK (BGCF to MGCF)

BGCF#2 forwards the PRACK request to the MGCF.

Table 8.3.5-18: PRACK (BGCF to MGCF)

```
ACK sip:04/11@mgcf72.term.net SIP/2.0
a: SIP/2.0/UDP bgcf2.term.net, SIP/2.0/UDP bgcf1.home.net,  SIP/2.0/UDP scscf.home.net,   SIP/2.0/UDP
scf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:  sip:bgcf2.term.net, sip:bgcf1.home.net, sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-Type:
ntent-length:
```

. 200 OK (MGCF to BGCF)

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

Table 8.3.5-19: 200 OK (MGCF to BGCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP bgcf2.term.net, SIP/2.0/UDP bgcf1.home.net,  SIP/2.0/UDP scscf.home.net,   SIP/2.0/UDP
scf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:bgcf2.term.net, sip:bgcf1.home.net, sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact: sip:04/11@mgcf72.term.net
ntent-length: 0
```

. 200 OK (BGCF to BGCF)

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

Table 8.3.5-20: 200 OK (BGCF to BGCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP bgcf1.home.net, SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP    pcscf1.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. 200 OK (BGCF to S-CSCF)

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

Table 8.3.5-21: 200 OK (BGCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. 200 OK (S-S#4 to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 is assumed.

Table 8.3.5-22: 200 OK (S-S#4 to MO)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. COMET (MO to S-S#4)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 is assumed.

Table 8.3.5-23: COMET (MO to S-S#4)

```
MET sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:bgcf1.home.net, sip:bgcf2.term.net, sip:04/11@mgcf72.term.net
om: “Alien Blaster” <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 129 COMET
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.home.net
ntent-Type: application/sdp
ntent-length: (…)

0
- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
-
 IN IP6 5555::aaa:bbb:ccc:ddd
AS:64
907165275 0
audio 3456 RTP/AVP 97
rtpmap:97 AMR
fmtp:97 mode-set=0,2,5,7; maxframes=2
qos:success sendonly
```

. COMET (S-CSCF to BGCF)

S-CSCF forwards the COMET request to BGCF#1.

Table 8.3.5-24: COMET (S-CSCF to BGCF)

```
MET sip:bgcf1.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
ute:  sip:bgcf2.term.net, sip:04/11@mgcf72.term.net
cord-Route: sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

'. COMET (BGCF to BGCF)

BGCF#1 forwards the COMET request to BGCF#2.

Table 8.3.3-25: COMET (BGCF to BGCF)

```
MET sip:bgcf2.term.net SIP/2.0
a: SIP/2.0/UDP bgcf1.home.net, SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net,   SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
ute:  sip:04/11@mgcf72.term.net
cord-Route: sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

'. COMET (BGCF to MGCF)

BGCF#2 forwards the COMET request to the MGCF.

Table 8.3.3-26: COMET (BGCF to MGCF)

```
MET sip:04/11@mgcf72.term.net SIP/2.0
a: SIP/2.0/UDP bgcf2.term.net, SIP/2.0/UDP bgcf1.home.net,  SIP/2.0/UDP scscf.home.net,   SIP/2.0/UDP
scf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:  sip:bgcf2.term.net, sip:bgcf1.home.net, sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-Type:
ntent-length:
```

'. 200 OK (MGCF to BGCF)

The MGCF responds to the COMET request (27) with a 200 OK response.

Table 8.3.3-27: 200 OK (MGCG to BGCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP bgcf2.term.net, SIP/2.0/UDP bgcf1.home.net,  SIP/2.0/UDP scscf.home.net,   SIP/2.0/UDP
scf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:bgcf2.term.net, sip:bgcf1.home.net, sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact: sip:04/11@mgcf72.term.net
ntent-length: 0
```

;. 200 OK (BGCF to BGCF)

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

Table 8.3.5-28: 200 OK (BGCF to BGCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP bgcf1.home.net, SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP    pcscf1.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

). 200 OK (BGCF to S-CSCF)

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

Table 8.3.5-29: 200 OK (BGCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. 200 OK (S-S#4 to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 is assumed.

Table 8.3.5-30: 200 OK (S-S#4 to MO)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. 180 Ringing (MGCF to BGCF)

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

Table 8.3.5-31: 180 Ringing (MGCF to BGCF)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP bgcf2.term.net, SIP/2.0/UDP bgcf1.home.net,  SIP/2.0/UDP scscf.home.net,   SIP/2.0/UDP
scf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:  sip:bgcf2.term.net, sip:bgcf1.home.net, sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact: sip:04/11@mgcf72.term.net
eq: 9022
ntent-length: 0
```

. 180 Ringing (BGCF to BGCF)

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

Table 8.3.5-32: 180 Ringing (BGCF to BGCF)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP bgcf1.home.net, SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP    pcscf1.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-length:
```

. 180 Ringing (BGCF to S-CSCF)

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

Table 8.3.5-33: 180 Ringing (BGCF to S-CSCF)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-length:
```

. 180 Ringing (S-S#4 to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 is assumed.

Table 8.3.5-34: 180 Ringing (S-S#4 to MO)

```
P/2.0 180 Ringing
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
eq:
ntent-length:
```

. PRACK (MO to S-S#4)

The originator acknowledges the 180 Ringing provisional response (34) with a PRACK request.

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 is assumed.

Table 8.3.5-35: PRACK (MO to S-S#4)

```
ACK sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:bgcf1.home.net, sip:bgcf2.term.net, sip:04/11@mgcf72.term.net
om: "Alien Blaster" <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 130 PRACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.home.net
ck: 9022 127 INVITE
ntent-length: 0
```

. PRACK (S-CSCF to BGCF)

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

Table 8.3.5-36: PRACK (S-CSCF to BGCF)

```
ACK sip:bgcf1.home.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
ute:  sip:bgcf2.term.net, sip:04/11@mgcf72.term.net
cord-Route: sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-length:
```

. PRACK (BGCF to BGCF)

BGCF#1 forwards the PRACK request to BGCF#2.

Table 8.3.5-37: PRACK (BGCF to BGCF)

```
ACK sip:bgcf2.term.net SIP/2.0
a: SIP/2.0/UDP bgcf1.home.net, SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net,   SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
ute:  sip:04/11@mgcf72.term.net
cord-Route: sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-length:
```

. PRACK (BGCF to MGCF)

BGCF#2 forwards the PRACK request to the MGCF.

Table 8.3.5-38: PRACK (BGCF to MGCF)

```
ACK sip:04/11@mgcf72.term.net SIP/2.0
a: SIP/2.0/UDP bgcf2.term.net, SIP/2.0/UDP bgcf1.home.net,  SIP/2.0/UDP scscf.home.net,   SIP/2.0/UDP
scf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:  sip:bgcf2.term.net, sip:bgcf1.home.net, sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact:
ck:
ntent-length:
```

. 200 OK (MGCF to BGCF)

The MGCF responds to the PRACK request (38) with a 200 OK response.

Table 8.3.5-39: 200 OK (MGCF to BGCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP bgcf2.term.net, SIP/2.0/UDP bgcf1.home.net,  SIP/2.0/UDP scscf.home.net,   SIP/2.0/UDP
scf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route: sip:bgcf2.term.net, sip:bgcf1.home.net, sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact: sip:04/11@mgcf72.term.net
ntent-length: 0
```

. 200 OK (BGCF to BGCF)

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

Table 8.3.5-40: 200 OK (BGCG to BGCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP bgcf1.home.net, SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP    pcscf1.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. 200 OK (BGCF to S-CSCF)

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

Table 8.3.5-41: 200 OK (BGCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. 200 OK (S-S#4 to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 is assumed.

Table 8.3.5-42: 200 OK (S-S#4 to MO)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. Service Control

MGCF performs whatever service control is appropriate for a completed call.

. 200 OK (MGCF to BGCF)

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

Table 8.3.5-44: 200 OK (MGCF to BGCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP bgcf2.term.net, SIP/2.0/UDP bgcf1.home.net,  SIP/2.0/UDP scscf.home.net,   SIP/2.0/UDP
scf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:  sip:bgcf2.term.net, sip:bgcf1.home.net, sip:scscf.home.net
om:
:
ll-ID:
eq: 127 INVITE
ntact: sip:04/11@mgcf72.term.net
ntent-length: 0
```

. 200 OK (BGCF to BGCF)

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

Table 8.3.5-45: 200 OK (BGCF to BGCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP bgcf1.home.net, SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP    pcscf1.home.net, SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

200 OK (BGCF to S-CSCF)

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

Table 8.3.5-46: 200 OK (BGCF to S-CSCF)

```
P/2.0 200 OK
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

Service Control

S-CSCF performs whatever service control logic is appropriate for this call completion

200 OK (S-S#4 to MO)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 is assumed.

Table 8.3.5-48: 200 OK (S-S#4 to MO)

```
P/2.0 200 OK
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

ACK (MO to S-S#4)

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

NOTE: There are a number of different origination flows, and the table represents a typical example of what one of these flows may produce. In this case, MO#2 is assumed.

Table 8.3.5-49: ACK (MO to S-S#4)

```
K sip:scscf.home.net SIP/2.0
a: SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
ute: sip:bgcf1.home.net, sip:bgcf2.term.net, sip:04/11@mgcf72.term.net
om: “Alien Blaster” <sip:B36(SHA-1(555-1111; time=36123E5B; seq=72))@localhost>;
  tag=171828
: <sip:B36(SHA-1(555-2222; time=36123E5B; seq=73))@localhost>;tag=314159
ll-ID: B36(SHA-1(555-1111;time=36123E5B;seq=72))@localhost
eq: 131 ACK
ntact: sip:%5b5555%3a%3aaaa%3abbb%3accc%3addd%5d@pcscf1.home.net
ntent-length: 0
```

. ACK (S-CSCF to BGCF)

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

Table 8.3.5-50: ACK (S-CSCF to BGCF)

```
K sip:bgcf2.term.net SIP/2.0
a: SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net, SIP/2.0/UDP   [5555::aaa:bbb:ccc:ddd]
ute:  sip:bgcf2.term.net, sip:04/11@mgcf72.term.net
cord-Route: sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. ACK (BGCF to BGCF)

BGCF#1 forwards the ACK request to BGCF#2.

Table 8.3.5-51: ACK (BGCF to BGCF)

```
K sip:bgcf2.term.net SIP/2.0
a: SIP/2.0/UDP bgcf1.home.net, SIP/2.0/UDP scscf.home.net, SIP/2.0/UDP pcscf1.home.net,   SIP/2.0/UDP
555::aaa:bbb:ccc:ddd]
ute:  sip:04/11@mgcf72.term.net
cord-Route: sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```

. ACK (BGCF to MGCF)

BGCF#2 forwards the ACK request to the MGCF.

Table 8.3.5-52: ACK (BGCF to MGCF)

```
K sip:04/11@mgcf72.term.net SIP/2.0
a: SIP/2.0/UDP bgcf2.term.net, SIP/2.0/UDP bgcf1.home.net,  SIP/2.0/UDP scscf.home.net,   SIP/2.0/UDP
scf1.home.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]
cord-Route:  sip:bgcf2.term.net, sip:bgcf1.home.net, sip:scscf.home.net
om:
:
ll-ID:
eq:
ntact:
ntent-length:
```