

Source: TSG CN WG 1
Title: CRs to Rel-5 on Work Item IMS-CCR towards 23.218 and 24.228
Agenda item: 8.1
Document for: APPROVAL

Introduction:

This document contains 8 CRs, **Rel-5** to Work Item "IMS-CCR", that have been agreed by **TSG CN WG1** in **CN1#32 meeting**, and are forwarded to TSG CN Plenary meeting #22 for approval.

TDoc #	Tdoc Title	Spec	CR #	Rev	CAT	C_Version	Rel
N1-031630	Flow number corrections in Annex B	23.218	053	3	F	5.6.0	Rel-5
N1-031446	Correction to description or RES/XRES usage	24.228	119		F	5.6.0	Rel-5
N1-031638	'Roaming' word and CS-O sessions	24.228	120	1	F	5.6.0	Rel-5
N1-031639	Corrections regarding SDP handling	24.228	121	1	F	5.6.0	Rel-5
N1-031487	Correction of reregistration flow	24.228	122		F	5.6.0	Rel-5
N1-031620	Correction of flow in 6.9.3	24.228	123	1	F	5.6.0	Rel-5
N1-031708	Corrections to the P-Access-Network-Info header (Part 1)	24.228	124	1	F	5.6.0	Rel-5
N1-031709	Corrections to the P-Access-Network-Info header (Part 2)	24.228	125	1	F	5.6.0	Rel-5

CHANGE REQUEST

⌘ **23.218 CR 053** ⌘ rev **3** ⌘ Current version: **5.6.0** ⌘

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

Proposed change affects: UICC apps ⌘ ME Radio Access Network Core Network

Title:	⌘ Flow number corrections in Annex B		
Source:	⌘ Lucent Technologies		
Work item code:	⌘ IMS-CCR	Date:	⌘ 01/10/2003
Category:	⌘ F	Release:	⌘ Rel-5
	Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)

Reason for change:	⌘ In annex B, all flows in the figures are identified by numbers, which in many cases have been omitted from the description of the flows in the text. These flow numbers were originally there in the text, and it is assumed that due to some error with autonumbering (which should not be done), they have been removed. <ul style="list-style-type: none"> • B.1.4.1 is an example where the numbers for a single text relating to multiple flows have been retained, whereas those for a single text relating to a single flow have disappeared. • B.2.1 final text item shows where what was originally a range of flow numbers has now become only related to flow 30). Additionally: <ul style="list-style-type: none"> • In subclause 6.9.2.3, there is reference to information being sent to a particular application, when it is clear that what is meant is the endpoint of the reference point and therefore the functional entity, which is the application server. • In subclause 7.2.2, "user profile" should be followed by the word "information" in this instance.
Summary of change:	⌘ The CR replaces the flow numbers in the text of Annex B in accordance with the appropriate numbers to the steps in the figures. In subclause 6.9.2.3, "application" is changed to "application server". In subclause 7.2.2, "user profile" is changed to "user profile information" in this instance.
Consequences if not approved:	⌘ Many of the textual descriptions will be meaningless as they cannot be related to the figures. Unclear terminology elsewhere

Clauses affected: ⌘ 6.9.2.3, 7.2.2, B.1.3, B.1.4, B.2.1, B.2.2, B.2.3, B.3.1, B.3.2

Other specs affected:		Y	N	
	⌘		X	Other core specifications ⌘
			X	Test specifications
			X	O&M Specifications
Other comments:	⌘			

How to create CRs using this form:

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

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

PROPOSED CHANGE

6.9.2.3 Trigger point

Trigger Points are the information the S-CSCF receives from the HSS that defines the relevant SPTs for a particular application. They define the subset of initial SIP requests received by the S-CSCF that should be sent or proxied to a particular application [server](#). When the S-CSCF receives an initial SIP request, it evaluates the filter criteria one by one. If the initial SIP request matches the filter criteria, the S-CSCF proxies the SIP request to the corresponding SIP AS/IM-SSF/OSA SCS.

PROPOSED CHANGE

7.2.2 HSS - Application Server (Sh) interface

The Sh interface is between the HSS and the SIP Application Servers and the OSA SCS and may be used for transferring User Profile [information](#) such as user service related information or user location information or charging function addresses. Requirements for the Sh interface are specified in 3GPP TS 23.228 [3].

The protocol used between the HSS and AS (Sh Interface) is specified in 3GPP TS 29.328 [18] and 3GPP TS 29.329 [19].

PROPOSED CHANGE

Annex B (informative): Information flows for example services

This annex contains some informative example information flows that show the possible flow of information for some example services. These examples are intended only to help aid the understanding of the behaviour of the S-CSCF, MRFC and Application Servers for service provision for the IM CN subsystem and are not intended to recommend or specify how to create such services, (indeed the examples given may not even be a good idea for a practical implementation).

The following modes of operation are shown in these examples:

- Third Party Registration to Application Server Clause B.3.2;
- Application Server in Originating UA mode Clause B.3.2;
- Application Server in Redirect mode Clause B.1.3;
- Application Server in Terminating UA mode Clause B.3.1;
- Application Server in Proxy mode Clause B.1.4;
- Application Server in Third Party Call Control/B2BUA mode Clauses B.2.1, B.2.2, and B.2.3;
- Application Server with no involvement Clause B.1.4.

B.1 Call forwarding example

B.1.1 Call forwarding through Application Servers

Figure B.1.1.1 presents the network configuration for a call-forwarding scenario. Some interfaces between nodes have been omitted purely for clarity. In this configuration, the UE1 originates a call to the UE2. The UE2 is subscribed to a Call Forwarding (CF) service based on the Calling Line Identification (CLI). The CF service logic resides in an Application Server interfacing to the IM CN subsystem via the ISC interface. The Application Server is programmed to detect all incoming calls or terminating sessions with UE1's CLI and to instruct the S-CSCF to forward the calls/sessions to another destination, UE3, either directly or via the UE1. These two session forwarding scenarios are shown by the red and blue coloured flows. When the session redirection is carried out directly by the S-CSCF of the UE2, the network may notify the UE1 of its call/session redirection.

As shown in figure B.1.1.1, the Application Server may be a SIP AS, or an OSA AS or a CAMEL CSE. The latter two Application Servers interface the S-CSCF via the OSA SCS and IM SSF gateways, respectively.

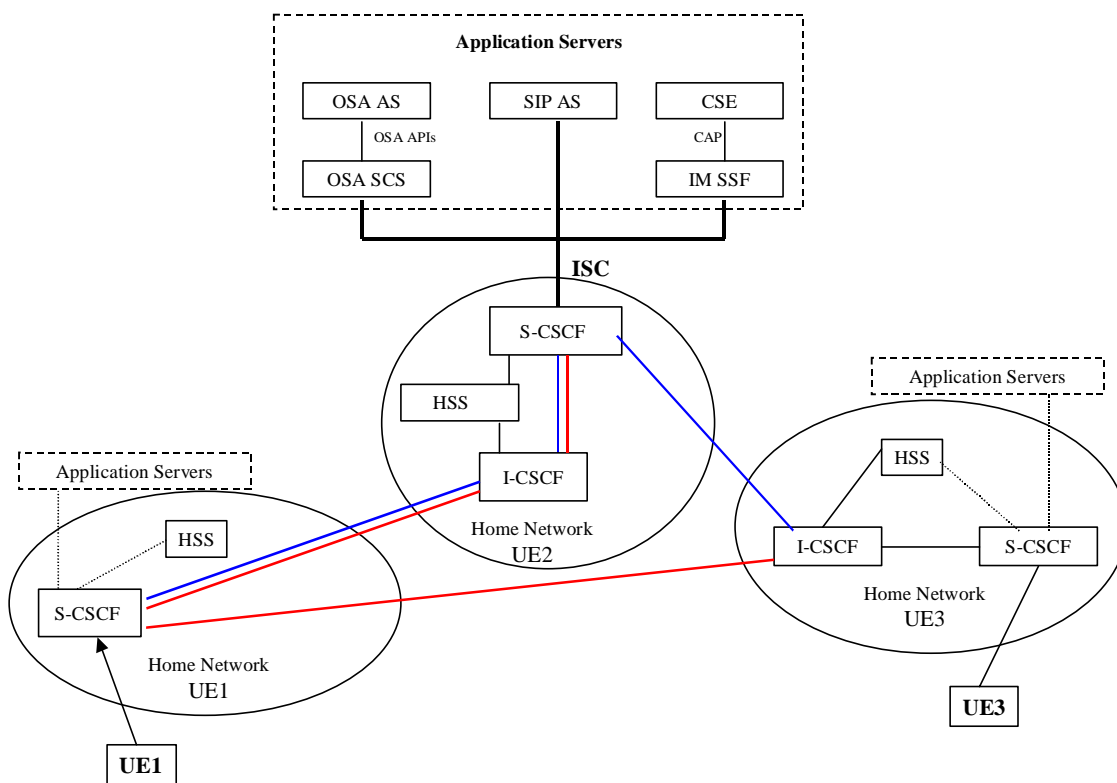


Figure B.1.1.1: Network configuration for the call forwarding examples

In this configuration, the originating UE1 and the terminating UE3 are assumed to be in their respective home network. The UE2, not shown in figure B.1.1.1, may be either at its home network or roaming in a visited network.

The CF feature is invoked based on the detection of the originating party's CLI "pre-activated" for call forwarding. Upon invocation of the CFonCLI feature, the call will be forwarded to a pre-specified destination. These two steps and a few underlying assumptions are briefly described below:

B.1.1.1 Service activation and programming

The UE2 activates its CFonCLI service and programs it with a Forward-to Number which is UE3's number, conditioning it to the originating party's line identity, CLI.

B.1.1.2 Service invocation and control

The UE1 makes a call to the UE2. The CFonCLI is invoked and the call is forwarded to the UE3 following a "Session Redirection" that is initiated by either the S-CSCF or the UE1.

NOTE: 3GPP TS 23.228 [3] lists six redirection procedures as follows:

NOTE 1: Session Redirection initiated by S-CSCF to IMS;

NOTE 2: Session Redirection initiated by S-CSCF to CS-domain;

NOTE 3: Session Redirection initiated by S-CSCF to general endpoint;

NOTE 4: Session Redirection initiated by P-CSCF;

NOTE 5: Session Redirection initiated by UE;

NOTE 6: Session Redirection initiated after Bearer Establishment.

B.1.2 Assumptions

For the CFonCLI service invocation and service control procedure, the following are assumed to hold:

- Normal case scenario, showing successful cases only;
- Subscriber data of all three UE1, UE2 and UE3 are stored in their respective HSS;
- All call/session control for the UE1, UE2, and UE3 is done in their respective home network S-CSCF;
- The UE2 has already subscribed to the CFonCLI service with a service provider operating an Application Server where the service control logic resides;
- The pre-selected numbers (e.g., UE3) to which the originated calls are forwarded, are stored by the CFonCLI service control logic upon activation of the feature by the UE2.

B.1.3 UE redirect based call flows

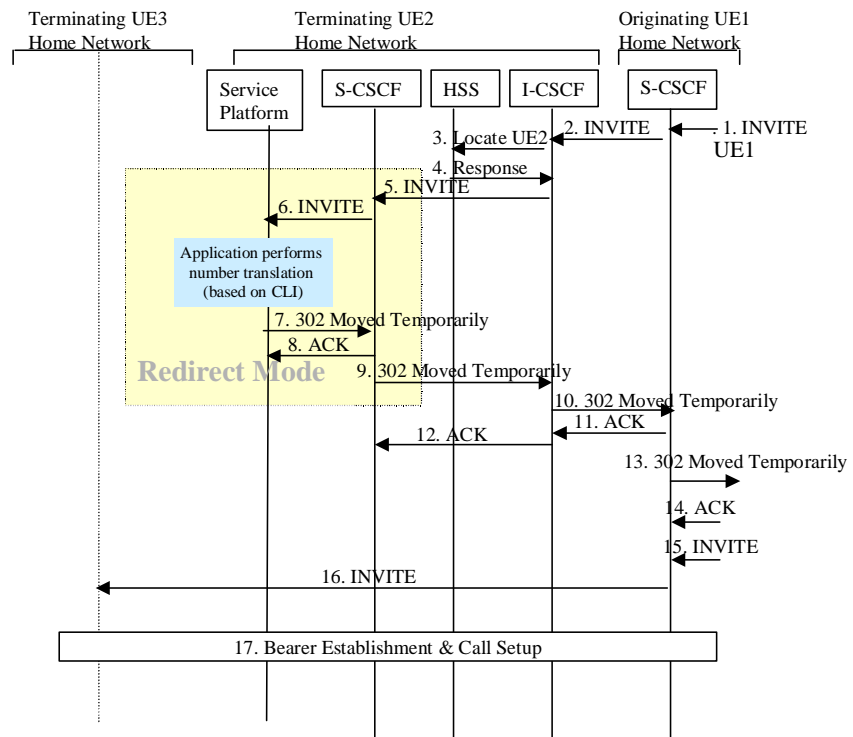


Figure B.1.3.1: CFonCLI information flows with UE re-redirect

Figure B.1.3.1 presents the information flow diagram for the invocation and control of the CFonCLI service based on the configuration of figure B.1.1.1.

The UE1 initiates a call to UE2. The CFonCLI service logic is invoked in the Application Server when the S-CSCF for UE2 detects that service invocation is required. The call is forwarded to the UE3 by the UE1 according to the "Session Redirection initiated by UE" procedure. The UE3 accepts the (forwarded) call. A detailed description for each flow is given below:

- 1) The S-CSCF of UE1 receives a SIP invite request form UE1.
- 2) The I-CSCF of the UE2 receives a SIP INVITE request form the S-CSCF of the originating user, UE1. UE1's CLI is included in this INVITE request.
- 3) The I-CSCF of the UE2 queries the HSS to obtain the S-CSCF of the UE2.
- 4) The HSS returns the S-CSCF location.
- 5) The I-CSCF forwards the INVITE to the S-CSCF of UE2.
- 6) Based on the information obtained from the UE2 Service Profile (during registration), the S-CSCF of the UE2 detects that the criteria for certain pre-defined triggers are met. The INVITE request is forwarded to the Application Server. The service logic is invoked in the Application Server.
- 7) Based on the outcome of the execution of the service logic, the Application Server instructs the S-SCSF to REDIRECT the session to UE3. The behaviour of the Application Server follows the description of a 'redirect server'. It sends the 302 Move Temporary response with UE3 as the redirect address to UE1. The Application Server plays no further part in the session establishment.
- 8) S-CSCF of UE2 sends ACK back to the Application Server to acknowledge the receiving of the 302 response.
- 9) S-CSCF of UE2 forwards the 302 Move Temporary to the I-CSCF of UE2.

- 10) The I-CSCF of UE2 forwards the 302 Move Temporary to the S-CSCF of UE1.
- 11) The S-CSCF of UE1 sends ACK to acknowledge the receiving of the 302 Move Temporary.
- 12) The I-CSCF of UE2 forwards the ACK to the S-CSCF of UE2.
- 13) The S-CSCF of UE1 forwards the 302 Move Temporary response to the next downstream hop.
- 14) The S-CSCF of UE1 receives the ACK for that 302 response from the downstream hop.
- 15) The UE1 re-issues an INVITE with UE3 as the destination.
- 16) The originating S-CSCF redirects the SIP INVITE request to the UE3's home network.
- 17) Bearer establishment & call setup between from the UE1 to the UE3 is performed following the procedure described in the basic call flow sections for originating, inter-network and terminating segments.

B.1.4 S-CSCF based redirect call flows

Figure B.1.4.1 presents the information flow diagram for the invocation and control of the CFonCLI service based on the configuration of figure B.1.1.1, where redirection is made by the S-CSCF after instructions from the service logic in the Application Servers.

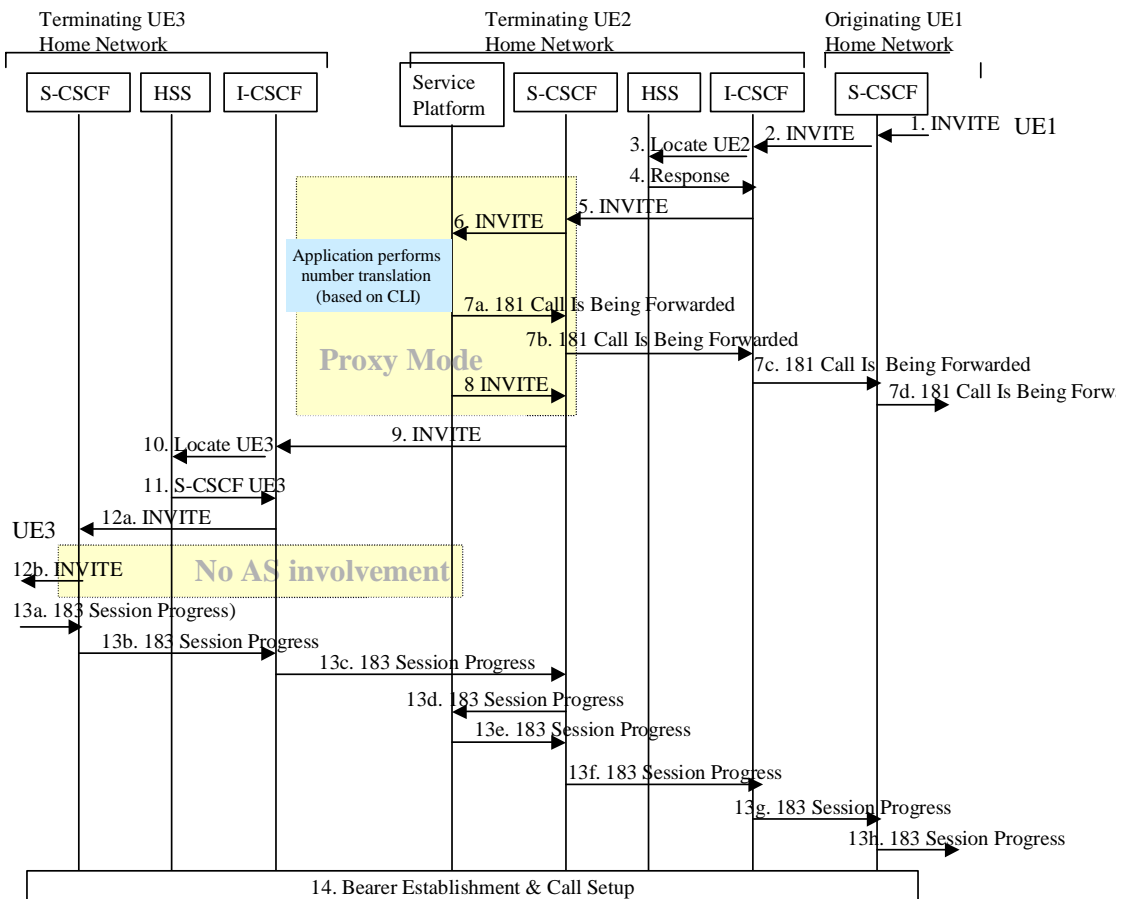


Figure B.1. 4.1: CFonCLI information flow with S-CSCF redirect

The UE1 (located in the originating visited network) makes a call to UE2. The CFonCLI is invoked and the CFonCLI service logic is executed by an application residing in the Application Server.

The call is forwarded to the UE3 by the S-CSCF of UE2 according to the "Session Redirection" instructed by the Application Server. The S-CSCF sends a SIP 181Call Is Being Forwarded to UE1 and a SIP Invite request to UE3. The UE3 accepts the (forwarded) call. A detailed description for each flow is given below:

- 1) - 6) are identical to flows by the same number in the UE Redirect example provided in B.1.3.
- (7a, 7b, 7c and 7d) The Application Server notifies the UE1 that the call is being forwarded, by sending a 181 Call Is Being Forwarded response.
- 8) The service logic forwards the INVITE request back to S-CSCF modifies the destination address by inserting the identity of the UE3. The Application Server is in SIP proxy mode.
- 9) The S-CSCF of UE2 forwards the modified INVITE request it received from the Application Server to the I-CSCF of UE3.
- 10) The I-CSCF of the UE3 queries the HSS to obtain the S-CSCF of the UE3.
- 11) The HSS returns UE3's S-CSCF location.
- (12a and 12b) The I-CSCF forwards the SIP INVITE request the UE3 via its S-CSCF.
- (13a, 13b, 13c, 13d, 13e, 13f, 13g, 13h and 13g) The UE3 accepts the incoming call and sends an 183 Session Progress back to UE1.
- 14) Bearer establishment & call setup between the UE1 to the UE3 is performed following the procedure described in the basic call flow clauses for originating, inter-network and terminating segments.

B.2 Announcement, conferencing and transcoding examples using MRFC

B.2.1 Example information flow for a mobile originated IP multimedia session that results in playing an announcement

The following diagram shows an example of playing an announcement for a mobile originated IP multimedia session. An AS (acting as B2BUA) performs third party call control with the MRFC, where the S-CSCF is in the signalling path.

The "[x]" notation in the diagram is an indicator of a unique SIP dialog. The "dot" notation on the AS line indicates B2BUA actions are taking place along with AS service logic. The 100 Trying responses are not shown in the diagram, but it is assumed that 100 Trying is sent in response to each INVITE request.

The B2BUA AS interacts with the UE as usual to establish the dialog. The B2BUA AS interacts with the MRFC using a third party control model to establish the dialog. The B2BUA AS manages the interactions between the two dialogs.

The offer/answer model as defined in IETF RFC 3264 [15] is used for SDP negotiation between the AS/S-CSCF and the MRFC. The MRFC should always grant the requests from the AS (unless there is a resource problem). The MRFC responds to the INVITE request with a 200 response indicating the selected codec in the SDP. The MRFC will also reserve the requested local resources at that time. The selected codec is included by the B2BUA AS in the 183 response to the UE. The receipt of the ACK at the MRFC triggers the playing of the tone or announcement.

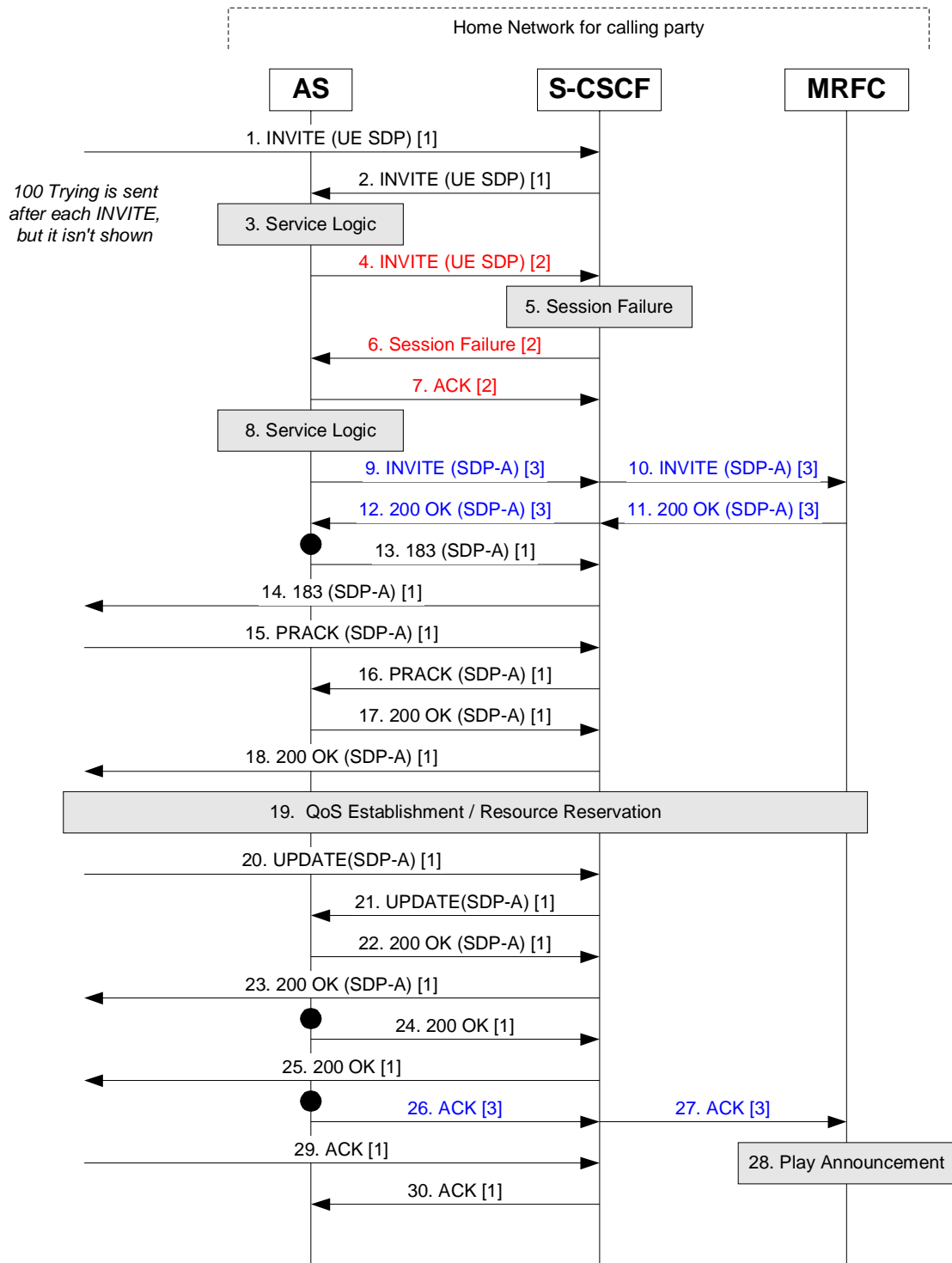


Figure B.2.1.1: Tones and announcements call flow

Notes for figure B.2.1.1:

- 1) INVITE request is received at the S-CSCF [Call-ID 1].
- 2) INVITE request is forwarded to an AS, based on the filter criteria.
- 3) The AS service logic determines to proceed with the call.
- 4) New INVITE request is sent towards destination, via the S-CSCF, to establish a new dialog [Call-ID 2].
- 5) S-CSCF experiences a failure, such as not being able to determine the next hop for the SIP URL.

- 6) Session failure returned to the AS.
- 7) ACK returned to complete this dialog [Call-ID 2].
- 8) The AS service logic determines to play an announcement to the calling party.
- 9) New INVITE request is sent to the MRFC, via the S-CSCF, to establish a new dialog for playing an announcement [Call-ID 3]. Sufficient information is included to specify the details for the announcement.
- 10) S-CSCF relays INVITE to the MRFC.
- 11) The MRFC allocates the requested resource and returns 200 OK, with SDP-A indicating selected media.
- 12) S-CSCF relays 200 OK to the AS.
- 13- - 30) - The B2BUA AS manages the dialog for Call-ID 1 as normal, with the SDP-A supplied from the MRFC. The MRFC is instructed to play the announcement using the ACK request at flow 26 for Call-ID 3.

B.2.2 Example information flow for a mobile originated IP multimedia ad hoc conferencing session (multiparty call)

The following diagram shows an example of an ad hoc conference (multiparty call). An AS (acting as B2BUA) performs third party call control with the MRFC, where the S-CSCF is in the signalling path.

The "[x]" notation in the diagram is an indicator of a unique SIP dialog. The "dot" notation on the AS line indicates B2BUA actions are taking place along with AS service logic. The 100 Trying responses are not shown in the diagram, but it is assumed that 100 Trying is sent in response to each INVITE request.

The Application Server is in control of the ad hoc conference, is aware of the MRFC capabilities and is also operating as a B2BUA performing third party call control.

An INVITE request is generated from UE-1 indicating a desire to start a multiparty call (ad hoc conference) by taking the existing sessions, between UE-1 to UE-2 and UE-1 to UE-3, and bringing them together. The AS uses third party call control to request the conference facilities from the MRFC. A separate dialog is established from the AS to the MRFC for each of the three parties (UE-1, UE-2, UE-3). New dialogs are also established between the AS and each of the UE endpoints. The media from each UE is connected at the conferencing resource at the MRFP. The first INVITE request to the MRFC should receive a response that includes the conference identifier. The same conference identifier will be used for subsequent INVITE requests to add or drop parties to the conference.

The offer/answer model as defined in IETF RFC 3264 [15] is used for SDP negotiation between the AS/S-CSCF and the MRFC. The MRFC should always grant the requests from the AS (unless there is a resource problem). The MRFC responds to the INVITE request with a 200 response indicating the selected media in the SDP. The MRFC will also reserve the requested local resources at that time and return the appropriate resource identifiers in the 200 response.

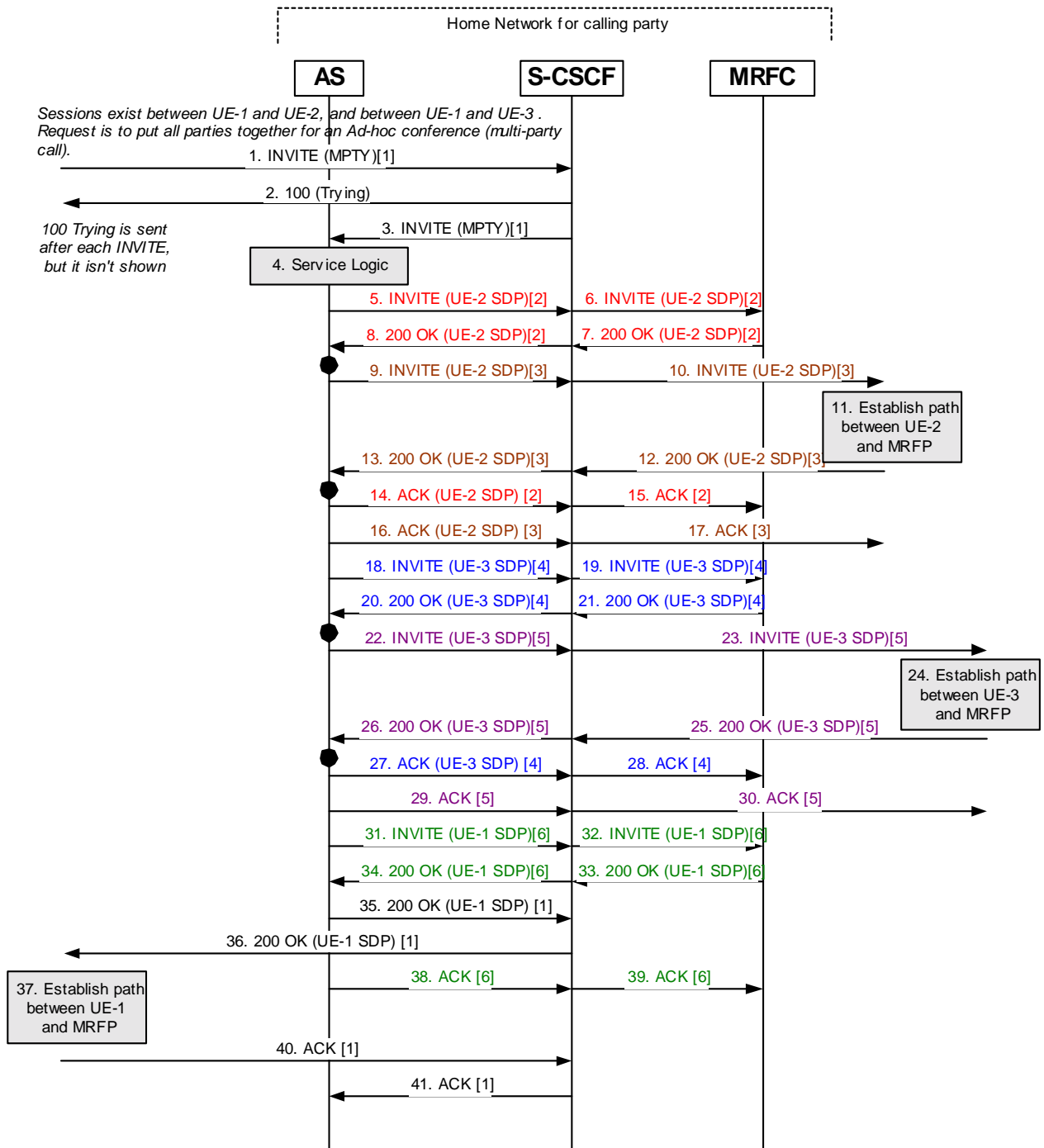


Figure B.2.2.1: Ad hoc conference call flow

Notes for figure B.2.2.1:

- 1) INVITE request received at S-CSCF from UE-1 indicating desire to start ad hoc conference (multiparty call) for the existing sessions between UE-1 to UE-2 and UE-1 to UE-3.
- 2) 100 Trying returned.
- 3) INVITE forwarded to AS.
- 4) AS performs service logic and allows attempt to start ad hoc conference.
- 5-8) New INVITE request sent to MRFC to initiate multiparty call, get conference identifier and prepare dialog for UE-2 [Call-ID 2].
- 9-13) Re-INVITE sent to UE-2 to establish dialog between AS and UE-2 [Call-ID 3].

- 14-17) ACK sent for Call-ID 2 and Call-ID 3.
- 18-21) New INVITE request sent to MRFC using the same conference identifier and prepare dialog for UE-3 [Call-ID 4].
- 22-26) Re-INVITE sent to UE-3 to establish dialog between AS and UE-3 [Call-ID 5].
- 27-30) ACK sent for Call-ID 4 and Call-ID 5.
- 31-34) New INVITE request sent to MRFC using the same conference identifier and prepare dialog for UE-1 [Call-ID 6].
- 35-36) 200 OK returned to UE-1 with SDP.
- 37) The session is established.
- 38-41) ACK sent for Call-ID 1 and Call-ID 6.

B.2.3 Example information flows for a mobile originated IP multimedia session that requires transcoding

The two figures B.2.3.1 and B.2.3.2 that follow illustrate the MRFC providing transcoding for a mobile originated session, where the MRFC is receiving directions from the AS operating as a B2BUA.

The "[x]" notation in the diagram is an indicator of a unique SIP dialog. The "dot" notation on the AS line indicates B2BUA actions are taking place along with AS service logic. The 100 Trying responses are not shown in the diagram, but it is assumed that 100 Trying is sent in response to each INVITE request.

The B2BUA AS interacts with the originating UE as usual to establish the dialog. The B2BUA AS interacts with the MRFC using a third party control model to establish the dialog with the called party after receiving the initial failure indication. The B2BUA AS manages the interactions between the two dialogs.

An INVITE request is generated from a UE. A 606 "Not Acceptable" response is received from the called party. The AS uses third party call control to request transcoding facilities from the MRFC. A separate dialog is established from the AS to the MRFC for each of the two parties. New dialogs are also established between the AS and each of the UE endpoints. The media from each UE is connected at the transcoding resource at the MRFP.

In the first figure B.2.3.1 below, the called party returns an indication of an acceptable codec. For this case, the request to the MRFC will include the appropriate codec for the called party and the offer/answer model as defined in IETF RFC 3264 [15] with the MRFC is used. In figure B.2.3.2 below, the called party does not indicate any SDP, which means that more steps will be required on the subsequent INVITE request to set up transcoding with the MRFC. An INVITE without SDP is sent to the MRFC to get the list of codecs it supports. The AS then sends that list of codecs in the new INVITE that it sends to the called party. The B2BUA function of the AS matches up the responses.

The offer/answer model is used for SDP negotiation between the AS/S-CSCF and the MRFC. The MRFC should always grant the requests from the AS (unless there is a resource problem). The MRFC responds to the INVITE request with a 200 response indicating the selected codec in the SDP. The MRFC will also reserve the requested local resources at that time. The selected codec is included by the B2BUA AS in the 183 response to the UE. The receipt of the ACK at the MRFC triggers the playing of the tone or announcement.



Figure B.2.3.1: Transcoding call flow (called party indicates codec)

Notes for figure B.2.3.1:

- 1) INVITE request received at S-CSCF from UE [Call-ID 1].
- 2) 100 Trying returned.
- 3) INVITE forwarded to an AS, based on filter criteria.
- 4) AS service logic determines to proceed with the call.
- 5) New INVITE request is sent towards destination, via the S-CSCF, to establish a new dialog [Call-ID 2].
- 6) S-CSCF forwards the INVITE.
- 7) Called UA returns 606 Not Acceptable in response to the INVITE request. Included in the response is an indicator that the offered codec is not acceptable plus information on what codec would be acceptable.
- 8) An ACK is sent to the called UA to complete the dialog for Call-ID 2.
- 9) 606 response is forwarded to the AS.
- 10) AS service logic determines that there is an MRFC that can perform the transcoding.
- 11) ACK sent to S-CSCF to complete the dialog for Call-ID 2.
- 12-17) New INVITE request sent to MRFC to establish transcoding for called UA [Call-ID 3].
- 18-25) New INVITE request sent to called UA to establish session between UA and MRF [Call-ID 4].
- 26-29) New INVITE request sent to MRFC to establish transcoding for calling UE [Call-ID 5].
- 30-53) Normal call establishment procedures from here on, with B2BUA AS performing the appropriate signalling translations between the associated dialogs.

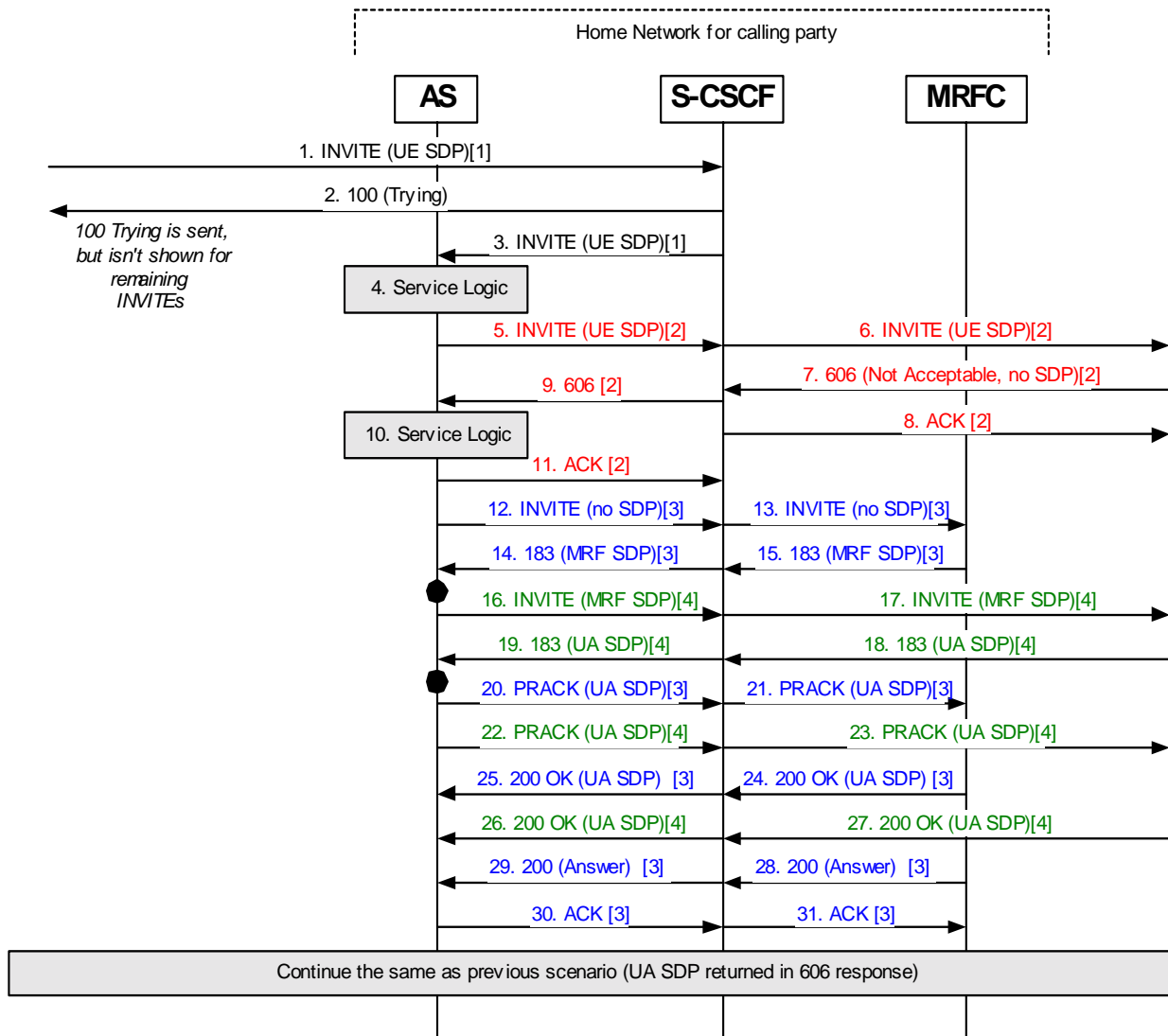


Figure B.2.3.2: Transcoding call flow (called party codec negotiated)

Notes for figure B.2.3.2:

- 1) INVITE request received at S-CSCF from UE [Call-ID 1].
- 2) 100 Trying returned.
- 3) INVITE forwarded to an AS, based on filter criteria.
- 4) AS service logic determines to proceed with the call.
- 5) New INVITE request is sent towards destination, via the S-CSCF, to establish a new dialog [Call-ID 2].
- 6) S-CSCF forwards the INVITE.
- 7) Called UA returns 606 Not Acceptable in response to the INVITE request. Included in the response is an indicator that the offered codec is not acceptable but there is no information on what codec would be acceptable (no SDP).
- 8) ACK sent to called UA to complete the dialog for Call-ID 2.
- 9) 606 response is forwarded to the AS.
- 10) AS service logic determines that there is an MRFC that can perform the transcoding.
- 11) ACK sent to S-CSCF to complete the dialog for Call-ID 2.

- 12-15) New INVITE request sent to MRFC to establish transcoding for called UA and to get the list codecs supported by the MRF [Call-ID 3].
- 16-19) New INVITE request sent to called UA with SDP for all codecs supported by the MRF to establish session between UA and MRF [Call-ID 4]. UA returns SDP with acceptable codecs.
- 20-23) A new offer with the codecs provided by the UA is sent in PRACK and the 200 OK response indicates the selected codec.
- 24-31) Acknowledgements sent to complete Call-ID 3.

Call establishment procedures from here on are common with the previous transcoding call flow.

B.3 Example information flows for a voicemail service

B.3.1 User out of coverage message recording

Figure B.3.1.1 shows a possible scenario of an Application Server, which acting as a terminating UA performs the function of a Voicemail Server in order to terminate a call and record a message on behalf of a UE that is out of coverage or powered off.

A S-CSCF is forwarded the initial INVITE destined for a UE that is not currently IMS registered. The Default Filter Criteria in the S-CSCF indicates that for the case of an unregistered user the INVITE should be forwarded to the Voicemail and Announcement Server.

Upon receiving the INVITE request the Voicemail and Announcement Server determines that the destination UE has subscribed to the Voicemail Service (possibly by downloading some subscriber profile information via the Sh interface). The Voicemail and Announcement Server therefore in addition to playing an announcement to inform the caller that the called party is either powered off or out of coverage also informs the caller that he may leave a message for the called party.

The calling party leaves a message for the called party and then hangs up the call by sending a BYE.

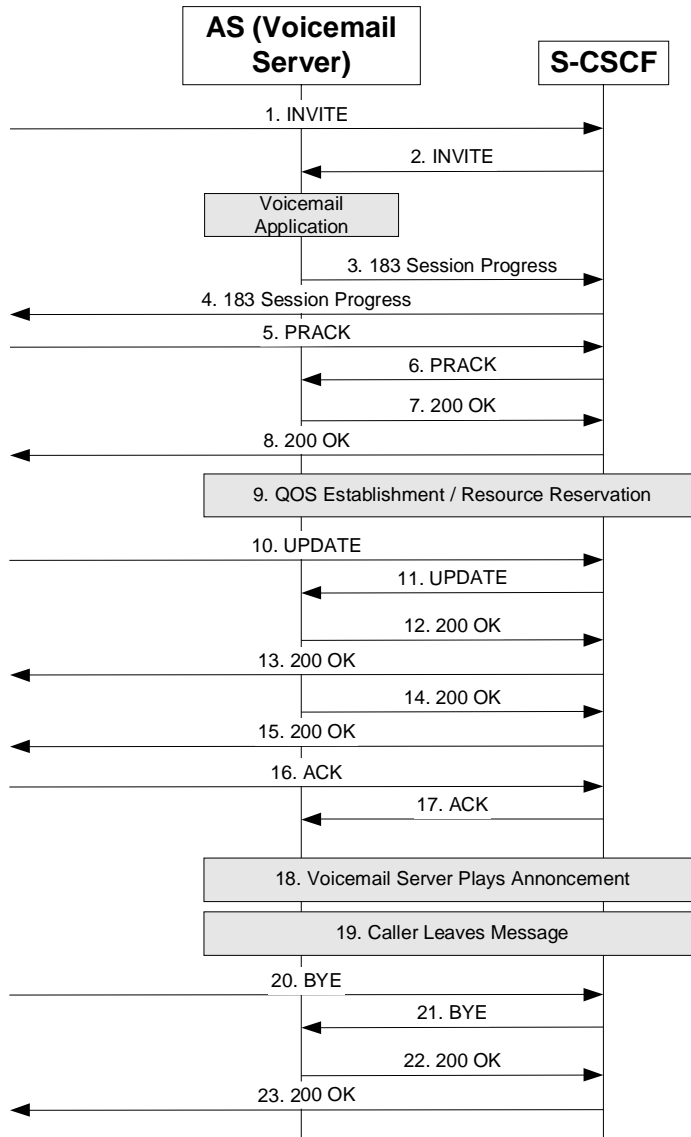


Figure B.3.1.1: Voicemail server records messages

Notes for figure B.3.1.1:

NOTE: For simplicity the 100 Trying response returned or received by the S-CSCF in response to requests is omitted from figure B.3.1.1.

- 1) _INVITE request destined for an unregistered user is received at the S-CSCF.
- 2) _Based on trigger point of the initial Filter Criteria S-CSCF proxies the INVITE request to the AS (Voicemail Server).
- 3-4) _The AS starts the voicemail application and responds with a 183 Session Progress containing SDP which is proxied back to the caller by the S-CSCF.
- 5-8) _The caller responds with a PRACK containing SDP, which the S-CSCF proxies to the AS and the AS responds with a 200 OK containing SDP which the S-CSCF proxies back to the caller.
- 9) QoS establishment and resource reservation takes place.
- 10-13) _After completing resource reservation the caller sends a UPDATE containing SDP which is proxied by the S-CSCF to the AS which responds with a 200 OK containing SDP which is proxied back to the caller by the S-CSCF.

- 14-15) The AS then sends a 200 OK to the initial INVITE which the S-CSCF proxies to the caller.
- 16-17) The caller returns an ACK to the 200 OK.
- 18) The AS plays an announcement using the session established indicating that the caller is powered off but that the caller may leave a message.
- 19) The caller leaves a message using the session established.
- 20-21) The caller hangs up by sending a BYE which the S-CSCF proxies to the AS.
- 22-23) The AS responds with a 200 OK, which the S-CSCF proxies back to the caller.

B.3.2 User IMS registers voice mail service plays back messages

Figure B.3.2.1 shows the scenario when the UE that has subscribed to a voicemail service with a feature enabled that contacts the user upon registration informing him of any recorded messages.

The Filter Criteria downloaded by the S-CSCF indicates that a third party REGISTER request should be sent to the Voicemail Server. Upon receiving the third party registration of the UE, the Voicemail Server acting as an originating UA contacts the UE by sending an INVITE request to inform him that he has voicemail messages recorded while he was not registered.

The user listens to the messages played back by the voicemail server, (only streaming class QOS is required for this session) and then terminates the session with a BYE.

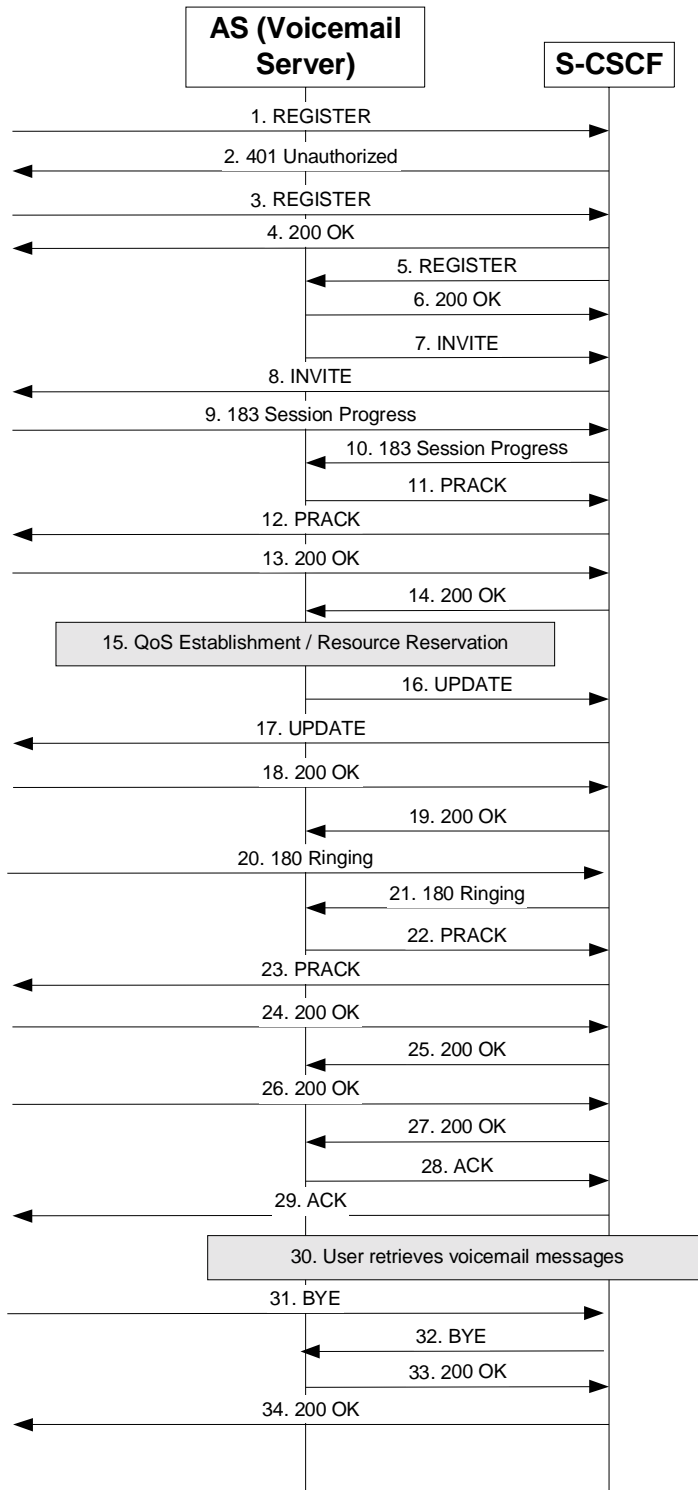


Figure B.3.2.1: Upon registration voicemail server replays messages

Notes for figure B.3.2.1:

NOTE: For simplicity the 100 Trying response returned or received by the S-CSCF in response to requests is omitted from figure B.3.2.1.

- 1-4) —The UE sends a REGISTER request to the S-CSCF which authenticates with a 401 Unauthorized response challenge with the authentication response being supplied in a second REGISTER request. The registration completes with a 200 OK from the S-CSCF to the UE.
- 5-6) —The S-CSCF downloads Filter Criteria for the UE from the HSS which indicates the S-CSCF should send a third party REGISTER request on behalf of the UE to an AS that performs a voicemail service. The AS responds to the REGISTER request with a 200 OK.
- 7-8) The AS downloads subscriber data for the subscriber (possibly from the HSS via the Sh interface) that indicates that the subscriber has enabled a feature that has the voicemail application contact the subscriber upon registration to deliver recorded messages. The AS sends an INVITE request containing SDP for the UE to the S-CSCF which proxies it to the UE.
- 9-10) The UE responds with 183 Session Progress containing SDP which the S-CSCF proxies to the AS.
- 11-14) The AS sends a PRACK, which the S-CSCF proxies to the UE and the UE respond with a 200 OK which the S-CSCF proxies to the AS.
- 15) QoS establishment and resource reservation takes place.
- 16-19) The AS sends an UPDATE, which the S-CSCF proxies to the UE and the UE responds with a 200 OK which the S-CSCF proxies to the AS.
- 20-21) —The UE sends a 180 Ringing indicating that it is alerting the user which the S-CSCF proxies to the AS.
- 22-25) —The AS to indicate receipt of the 180 response sends a PRACK which the S-CSCF proxies to the UE and the UE responds with a 200 OK which the S-CSCF proxies to the AS.
- 26-27) —When the subscriber answers the UE sends a 200 OK to the initial INVITE which the S-CSCF proxies to the AS.
- 28-29) —The AS acknowledges the 200 OK with an ACK which the S-CSCF proxies to the UE.
- 30) —The AS plays an announcement indicating the number of messages stored and then plays back the messages to the UE using the session established.
- 31-32) —The UE hangs up by sending a BYE, which the S-CSCF proxies to the AS.
- 33-34) —The AS responds with a 200 OK, which the S-CSCF proxies back to the UE.

CHANGE REQUEST

⌘ **24.228 CR 119** ⌘ rev - ⌘ Current version: **5.6.0** ⌘

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

Proposed change affects: UICC apps ⌘ ME Radio Access Network Core Network

Title:	⌘ Correction to description or RES/XRES usage		
Source:	⌘ 3, Nokia, Vodafone		
Work item code:	⌘ IMS-CCR	Date:	⌘ 14/10/2003
Category:	⌘ F	Release:	⌘ Rel 5
	Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)

Reason for change:	⌘ The RES parameter is not sent in an authentication challenge response but is used to calculate the authentication response (along with other parameters). The RES is used as the key for the process of generating the response as defined in RFC3310. RFC3310 states that this is so that the key used for generating the response is not sent in clear text and so avoiding a possible security risk. The CRs also align with the changes agreed by SA3 in S3-030601.
Summary of change:	⌘ Text is changed to say that the response calculated using RES (and other parameters) is sent from the UE to the S-CSCF rather than RES itself. It is also clarified that the response is checked against an expected response calculated from XRES in a similar fashion. RES and XRES are replaced with the term 'authentication challenge response' and 'expected challenge response' in a number of places, and the generation of the response and expected response is noted to be as per RFC3310 using RES/XRES in the appropriate places. Reference to RFC3310 is used in added text and therefore it is added to list of references in section 2.
Consequences if not approved:	⌘ The text will not be inline with RFC 3310. Implementations may be incorrect as they may include RES rather than the result of the calculation based on RES (and other parameters). This would result in a security risk due to the transmission of RES in clear text. The specification will not be aligned with the CRs agreed by SA3 (S3-030601).

Clauses affected: ⌘ 2, 6.2, 6.9.3, 16.2

Other specs affected:		Y	N		
	⌘	X		Other core specifications	⌘ 24.229 (CR 525)
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

How to create CRs using this form:

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

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

2 References

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

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

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 23.228: "IP multimedia subsystem; Stage 2".
- [3] IETF RFC 3261: "SIP: Session Initiation Protocol"
- [4] IETF RFC 2782: "A DNS RR for specifying the location of services (DNS SRV)".
- [5] IETF RFC 2806: "URLs for Telephone Calls".
- [6] IETF RFC 2916: "E.164 number and DNS".
- [7] 3GPP TS 33.203: "Access security for IP based services".
- [8] 3GPP TS 23.060: "General Packet Radio Service (GPRS) Service description; Stage 2".
- [9] 3GPP TS 29.207: "End to end Quality of Service (QoS); stage 3".
- [10] 3GPP TS 29.060: "General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp Interface".
- [11] 3GPP TS 29.228: "IP Multimedia (IM) Subsystem Cx Interface; Signalling flows and message contents".
- [12] 3GPP TS 24.008: "Mobile radio interface layer 3 specification; Core Network Protocols; Stage 3".
- [13] IETF RFC 3323: "A Privacy Mechanism for the Session Initiation Protocol (SIP)".
- [14] IETF RFC 3263: "SIP: Locating SIP Servers"
- [15A] draft-ietf-dhc-dhcpv6-23 (February 2002): "Dynamic Host Configuration Protocol for IPv6 (DHCPv6)"

Editor's note: The above document cannot be formally referenced until it is published as an RFC.

- [15B] draft-ietf-sip-dhcpv6-00 (April 2002): "DHCPv6 options for SIP servers".

Editor's note: The above document cannot be formally referenced until it is published as an RFC.

- [16] 3GPP TS 24.229: "IP Multimedia Call Control Protocol based on SIP and SDP; Stage3"
- [17] IETF RFC 3325: "Private Extensions to the Session Initiation Protocol (SIP) for Network Asserted Identity within Trusted Networks"
- [18] [RFC 3310 \(September 2002\): "Hypertext Transfer Protocol \(HTTP\) Digest Authentication Using Authentication and Key Agreement \(AKA\)".](#)

6.2 Registration signalling: user not registered

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

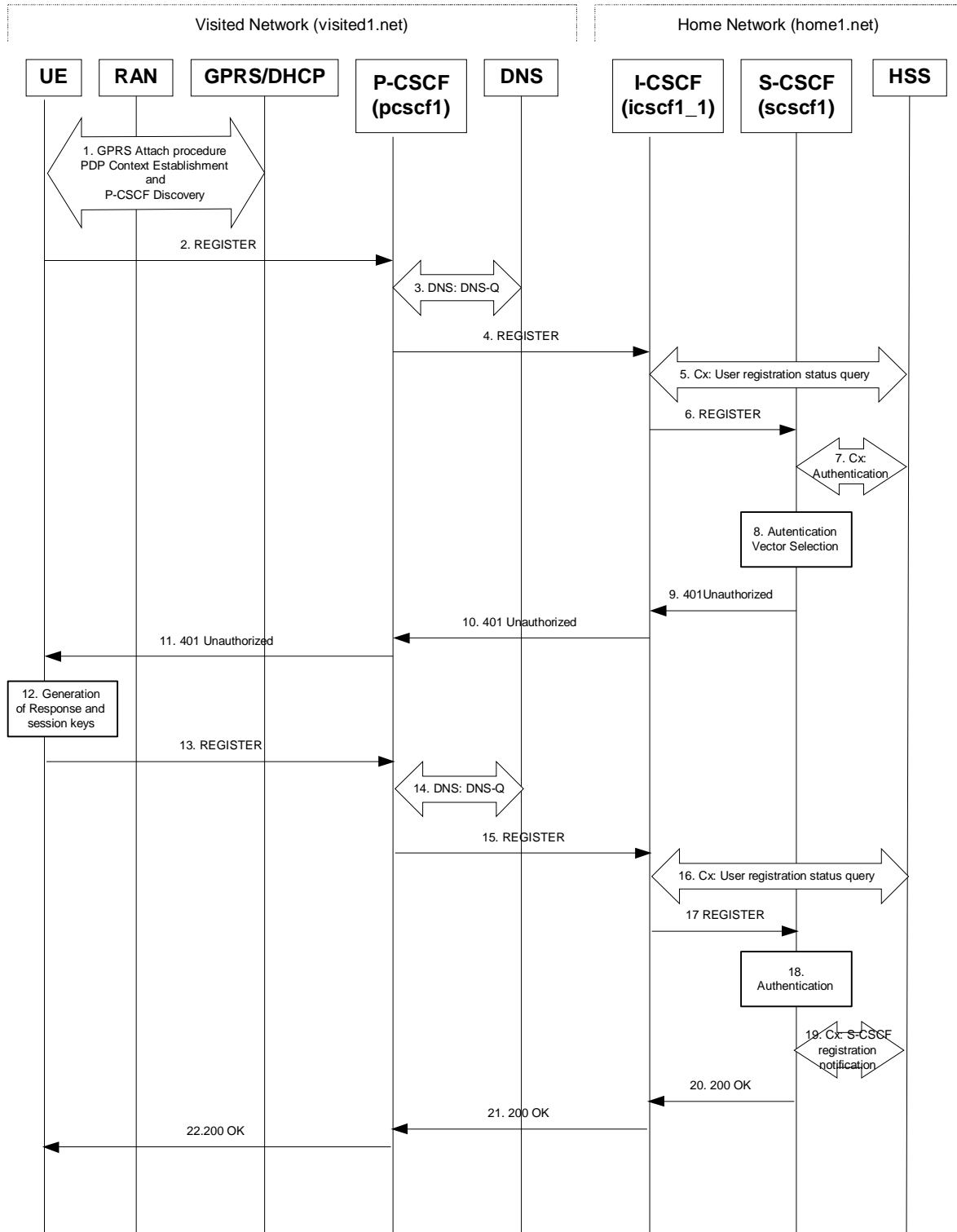


Figure 6.2-1: Registration signalling: user not registered

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

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

See subclause 5.2 for details.

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

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

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

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd];comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>;tag=4fa3
To: <sip:user1_public1@home1.net>
Contact: <sip:[5555::aaa:bbb:ccc:ddd];comp=sigcomp>;expires=600000
Call-ID: apb03a0s09dkjdfglkj49111
Authorization: Digest username="user1_private@home1.net", realm="registrar.home1.net",
nonce="", uri="sip:registrar.home1.net", response=""
Security-Client: ipsec-3gpp; alg= hmac-sha-1-96; spi-c=23456789; spi-s=12345678; port-c=2468;
port-s=1357
Require: sec-agree
Proxy-Require: sec-agree
CSeq: 1 REGISTER
Supported: path
Content-Length: 0
```

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

Via: IPv6 address of the UE allocated during the PDP Context Activation process.

Max-Forwards: Set to 70 by the UE and used to prevent loops.

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

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

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

Authorization: It carries authentication information. The private user identity (user1_private@home1.net) is carried in the username field of the Digest AKA protocol. The uri parameter (directive) contains the same value as the Request-URI. The realm parameter (directive) contains the network name where the username is authenticated. The Request-URI and the realm parameter (directive) value are obtained from the same field in the USIM and therefore, are identical. In this example, it is assumed that a new UICC card was just inserted into the terminal, and there is no other cached information to send. Therefore, nonce and response parameters (directives) are empty.

Security-Client: Lists the supported algorithm(s) by the UE.

Supported: This header is included to indicate to the recipient that the UE supports the Path header.

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network as specified in sub-clause "Additional coding rules for P-Access-Network-Info header", in 3GPP TS 24.229 [16].

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

3. DNS: DNS-Q

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

The P-CSCF sends the REGISTER request - after local processing - to the address indicated in the Request-URI. When forwarding the REGISTER request the P-CSCF needs to specify the protocol, port number and IP address of the I-CSCF server in the home network to which to send the REGISTER request. The P-CSCF tries to find this information by querying the DNS. Since the Request-URI does not specify a numeric IP address, and the transport protocol and port number are not indicated, the P-CSCF performs an NAPTR query for the domain specified in the Request-URI.

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

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

The DNS records are retrieved according to RFC 3263 [14].

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

```
OPCODE=SQUERY, RESPONSE, AA
QNAME=registrar.home1.net, QCLASS=IN, QTYPE=NAPTR

registrar.home1.net      0 IN NAPTR 50  50 "s" "SIP+D2U"  ""
  _sip._udp.registrar.home1.net
                        0 IN NAPTR 90  50 "s" "SIP+D2T"  ""
  _sip._tcp.registrar.home1.net
NAPTR 100  50 "s" "SIPS+D2T"  ""  _sips._tcp.registrar.home1.net      0 IN
```

Based on the order and preference of the NAPTR record and the local preference, UDP is preferred and the P-CSCF finds the I-CSCF by a DNS SRV lookup according to RFC 2782 [4].

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

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

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

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

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

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

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

In the Answer field of the query-response each I-CSCF is identified by its host domain name. The returned SRV Resource Records (RRs) are merged and ordered, and the selection technique (employing the Priority and Weight parameters returned in the RRs) as specified in RFC 2782 [4] is used to select

the I-CSCF (i.e. the icscf1_p.home1.net). Since the Additional Data field of the query-response also contains the IP address of the selected I-CSCF (i.e. 5555::aba:dab:aaa:daa), a new query to the DNS is not required.

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

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

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

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

The P-CSCF adds also the P-Visited-Network-ID header with the contents of the identifier of the P-CSCF network. This may be the visited network domain name or any other identifier that identifies the visited network at the home network.

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

The P-CSCF removes the Security-Client header and associated "sec-agree" option-tags prior to forwarding the request. As the Proxy-Require header is empty, it removes this header completely.

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

```
REGISTER sip:registrar.home1.net SIP/2.0
  Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd];comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info:
Path: <sip:term@pcscf1.visited1.net;lr>
Require: path
P-Visited-Network-ID: "Visited Network Number 1"
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
From:
To:
Contact:
Call-ID:
Authorization: Digest username="user1_private@home1.net", realm="registrar.home1.net",
nonce="", uri="sip:registrar.home1.net", response="", integrity-protected="no"
CSeq:
Supported:
Content-Length:
```

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

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

P-Visited-Network-ID: It contains the identifier of the P-CSCF network at the home network.

P-Access-Network-Info: this header contains information from the UE.

P-Charging-Vector: The P-CSCF inserts this header and populates the icid parameters with a globally unique value.

5. Cx: User registration status query procedure

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

For detailed message flows see 3GPP TS 29.228.

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

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

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

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

I-CSCF does not modify the Path header.

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

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

```
REGISTER sip:scscf1.home1.net SIP/2.0
  Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
      pcsf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
      [5555::aaa:bbb:ccc:ddd];comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
P-Access-Network-Info:
Path:
Require:
P-Visited-Network-ID:
P-Charging-Vector:
From:
To:
Contact:
Call-ID:
Authorization:
CSeq:
Supported:
Content-Length:
```

Path: The S-CSCF stores the contents of the Path header and uses the URI for routing mobile terminated requests.

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

7. Cx: Authentication procedure

As the REGISTER request arrived without integrity protection to the P-CSCF, the S-CSCF shall challenge it. For this, the S-CSCF requires at least one authentication vector to be used in the challenge to the user. If a valid AV is not available, then the S-CSCF requests at least one AV from the HSS.

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

For detailed message flows see 3GPP TS 29.228.

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

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

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

8. Authentication vector selection

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

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

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

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

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

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

```
SIP/2.0 401 Unauthorized
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555:aaa:bbb:ccc:ddd];comp=sigcomp;branch=z9hG4bKnashds7
From: <sip:user1_public1@home1.net>;tag=4fa3
To: <sip:user1_public1@home1.net>;tag=5ef4
Call-ID: apb03a0s09dkjdfglkj49111
WWW-Authenticate: Digest realm="registrar.home1.net", nonce=base64(RAND + AUTN + server
specific data), algorithm=AKAv1-MD5, ik="00112233445566778899aabbccddeeff",
ck="ffeeddccbbaa11223344556677889900"
CSeq: 1 REGISTER
Content-Length: 0
```

WWW-Authenticate: The S-CSCF challenges the user. The nonce includes the quoted string, base64 encoded value of the concatenation of the AKA RAND, AKA AUTN and server specific data. The S-CSCF appends also the Integrity Key (IK) and the Cyphering key (CK).

NOTE 2: The actual nonce value in the WWW-Authenticate header field is encoded in base64, and it may look like: nonce="A34Cm+Fva37UYWpGNB34JP"

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

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

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

```
SIP/2.0 401 Unauthorized
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd];comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
WWW-Authenticate:
CSeq:
Content-Length:
```

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

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

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

```
SIP/2.0 401 Unauthorized
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd];comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
WWW-Authenticate: Digest realm="registrar.home1.net", nonce=base64(RAND + AUTN + server
specific data), algorithm=AKAv1-MD5
Security-Server: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-
c=8642; port-s=7531
CSeq:
Content-Length:
```

WWW-Authenticate: The P-CSCF removes the ik and ck parameters (directives) from the header.

Security-Server: q is the preference value, 0.1 means IPsec is the first preferred choice. The q value represents only relative degradation of all mechanisms listed here. The lower value, the higher priority.

12. Generation of response and session keys at UE

Upon receiving the Unauthorised response, the UE extracts the MAC and the SQN from the AUTN. The UE calculates the XMAC and checks that XMAC matches the received MAC and that the SQN is in the correct range. If both these checks are successful the UE calculates the [authentication challenge response](#); (using RES and other parameters as defined in RFC3310 [18]), and also computes the session keys IK and CK. The [RES-authentication challenge response](#) is put into the Authorization header and sent back to the registrar in the REGISTER request.

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

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

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>;tag=4fa3
To: <sip:user1_public1@home1.net>
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>;expires=600000
Call-ID: apb03a0s09dkjdfg1kj49111
Authorization: Digest username="user1_private@home1.net", realm="registrar.home1.net",
nonce=base64(RAND + AUTN + server specific data), algorithm=AKAv1-MD5,
uri="sip:registrar.home1.net", response="6629fae49393a05397450978507c4ef1"
Security-Client: ipsec-3gpp; alg=hmac-sha-1-96; spi-c=23456789; spi-s=12345678; port-c=2468;
port-s=1357
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-
c=8642; port-s=7531
Require: sec-agree
Proxy-Require: sec-agree
CSeq: 2 REGISTER
```

Supported: path
Content-Length: 0

Authorization: This carries the response to the authentication challenge received in step 11 along with the private user identity, the realm, the nonce, the URI and the algorithm.

This message is protected by the IPsec SA negotiated.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

14. DNS: DNS-Q

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

The P-CSCF sends the REGISTER request - after local processing - to the address indicated in the Request-URI. When forwarding the REGISTER request the P-CSCF needs to specify the protocol, port number and IP address of the I-CSCF server in the home network to which to send the REGISTER request. The P-CSCF tries to find this information by querying the DNS. Since the Request-URI does not specify a numeric IP address, and the transport protocol and port number are not indicated, the P-CSCF performs an NAPTR query for the domain specified in the Request-URI.

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

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

The DNS records are retrieved according to RFC 3263 [14].

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

```
OPCODE=SQUERY, RESPONSE, AA
QNAME=registrar.home1.net, QCLASS=IN, QTYPE=NAPTR

registrar.home1.net      0 IN NAPTR 50  50 "s" "SIP+D2U"  ""
  _sip._udp.registrar.home1.net
                           0 IN NAPTR 90  50 "s" "SIP+D2T"  ""
  _sip._tcp.registrar.home1.net                               0 IN NAPTR 100 50 "s" "SIPS+D2T" ""  _sips._tc
```

Based on the order and preference of the NAPTR record and the local preference, UDP is preferred and the P-CSCF finds the I-CSCF by an DNS SRV lookup according to RFC 2782 [4].

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

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

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

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

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

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

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


In the Answer field of the query-response each I-CSCF is identified by its host domain name. The returned SRV Resource Records (RRs) are merged and ordered, and the selection technique (employing the Priority and Weight parameters returned in the RRs) as specified in RFC2782 [4] is used to select the I-CSCF (i.e. the icscf1_p.home1.net). Since the Additional Data field of the query-response also contains the IP address of the selected I-CSCF (i.e. 5555::aba:dab:aaa:daa), a new query to the DNS is not required.

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

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

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

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Proxy-Require header is empty, it removes this header completely.

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

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKKnashds7
Max-Forwards: 69
P-Access-Network-Info:
Path: <sip:term@pcscf1.visited1.net;lr>
Require: path
P-Visited-Network-ID: "Visited Network Number 1"
P-Charging-Vector: icid-value="AyretyU0dm+602IrT5tAFrbHLso=023551024"
From:
To:
Contact:
Call-ID:
Authorization: Digest username="user1_private@home1.net", realm="registrar.home1.net",
nonce=base64(RAND + AUTN + server specific data), algorithm=AKAv1-MD5,
uri="sip:registrar.home1.net", response="6629fae49393a05397450978507c4ef1", integrity-
protected="yes"
CSeq:
Supported:
Content-Length:
```

Path: This is the P-CSCF URI and it is included to inform the S-CSCF where to route terminating requests.

16. Cx: User registration status query procedure

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

For detailed message flows see 3GPP TS 29.228.

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

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

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

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

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

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

```
REGISTER sip:scscf1.home1.net SIP/2.0
  Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
      pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
      [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
P-Access-Network-Info:
Path:
Require:
P-Visited-Network-ID:
P-Charging-Vector:
From:
To:
Contact:
Call-ID:
Authorization:
CSeq:
Supported:
Content-Length:
```

Path: The S-CSCF stores the contents of the Path header and uses this URI for routing mobile terminated requests.

P-Charging-Vector: The S-CSCF stores the contents of the icid parameters for possible charging activities.

18. Authentication

Upon receiving an integrity protected REGISTER request carrying the authentication [challenge response](#), **RES**, the S-CSCF checks that the [user's active expected response \(calculated by the S-CSCF using XRES and other parameter as defined in RFC3310 \[18\]\)](#) matches the received **RES** [challenge response](#). If the check is successful then the user has been authenticated and the public user identity is registered in the S-CSCF.

19. Cx: S-CSCF registration notification procedure

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

For detailed message flows see 3GPP TS 29.228.

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

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

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

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

The S-CSCF sends a 200 (OK) response to the I-CSCF indicating that Registration was successful.

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

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKdashds7
Path: <sip:term@pcscf1.visited1.net;lr>
Service-Route: <sip:orig@scscf1.home1.net;lr>
From:
To:
Call-ID:
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>;expires=600000
CSeq:
Date: Wed, 11 July 2001 08:49:37 GMT
P-Associated-URI: <sip:user1_public2@home1.net>, <sip:user1_public3@home1.net>, <sip:+1-212-555-1111@home1.net;user=phone>
Content-Length:
```

Service-Route: The S-CSCF inserts the Service-Route header that includes its own URI including a character string in the user part to differentiate mobile originating requests from mobile terminating requests.

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

The I-CSCF forwards the 200 (OK) response from the S-CSCF to the P-CSCF indicating that the registration was successful.

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

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKdashds7
Path:
Service-Route:
From:
To:
Call-ID:
Contact:
CSeq:
Date:
P-Associated-URI:
Content-Length:
```

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

The P-CSCF saves the value of the Service-Route header and associates it with the UE. The P-CSCF then forwards the 200 (OK) response from the I-CSCF to the UE indicating that the registration was successful.

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

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Path:
Service-Route:
From:
To:
Call-ID:
Contact:
CSeq:
Date:
P-Associated-URI:
Content-Length:
```

6.9.3 Registration failure – user authentication failure

This clause (see figure 6.9.3-1) shows the signalling flow with user authentication failure at step 19 of subclause 6.2 "Signalling flows for REGISTER" and a final failure of the authentication at step 30.

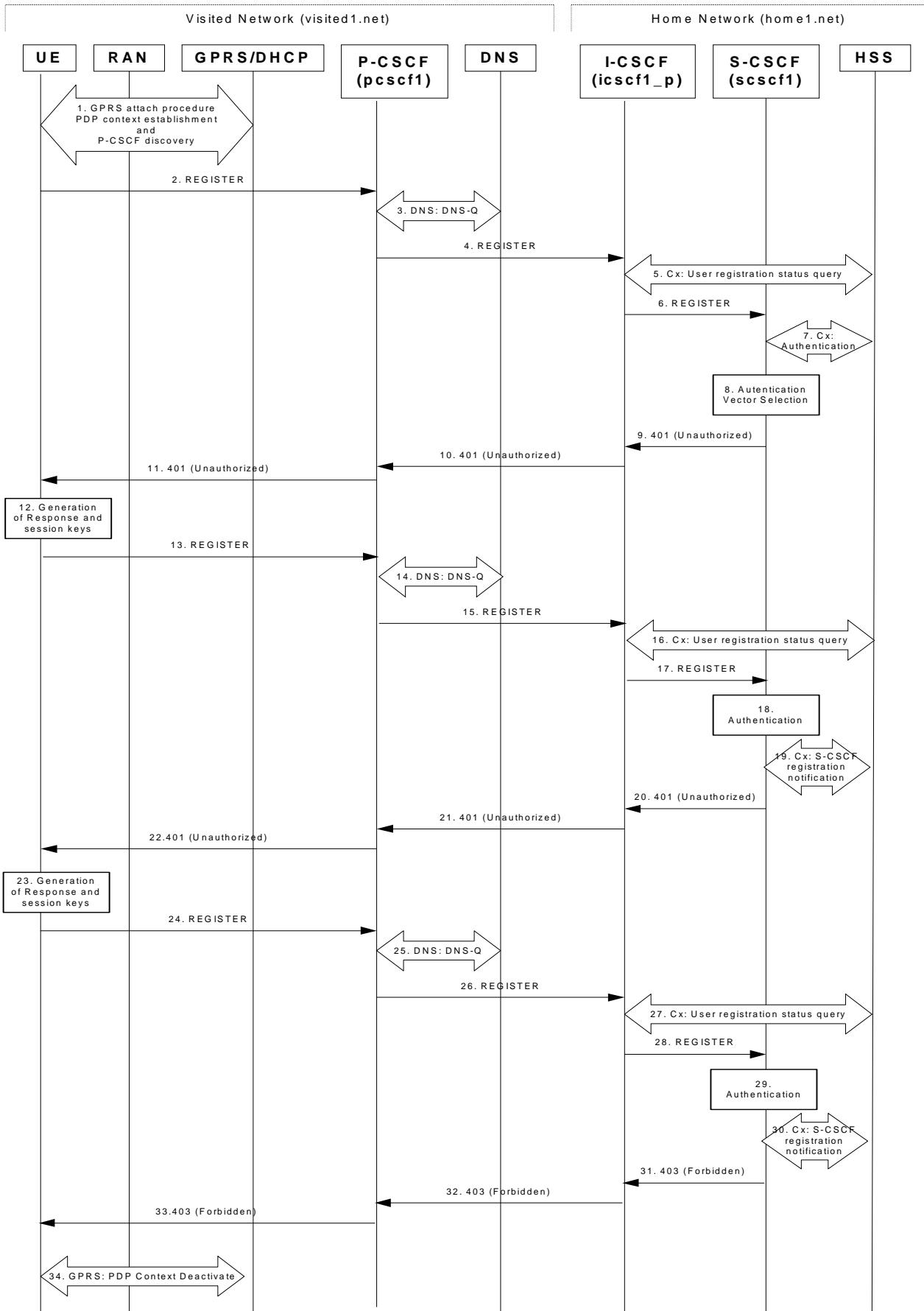


Figure 6.9.3-1: User authentication failure

Steps 1 through 17 are the same as the signalling flow in subclause 6.2.

18. Authentication: User authentication fails

Upon receiving the REGISTER request carrying the authentication [challenge](#) response, ~~RES~~, the S-CSCF checks that the ~~user's active XRES~~ [expected response \(calculated by the S-CSCF using XRES and other parameters as defined in RFC3310 \[18\]\)](#) matches the received ~~RES~~ [challenge response](#). If the check is unsuccessful then this authentication challenge fails and the public user identity is not yet registered in the S-CSCF.

At this point the S-CSCF has the option of repeating a number of authentication challenges as given in step 18 through 28. For the purposes of this flow, only one repetition is shown.

19. Cx. S-CSCF registration notification

The S-CSCF selects new authentication vectors as specified in step 9, either from the list already within the S-CSCF, or by requesting new vectors from the HSS.

20. 401 (Unauthorized) response (S-CSCF to I-CSCF) - see example in table 6.9.3-20

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

Table 6.9.3-20: 401 (Unauthorized) response (S-CSCF to I-CSCF)

```
SIP/2.0 401 Unauthorized
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
pcscf1.visited1.net;comp=sigcomp;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd];branch=z9hG4bKdashds7
From: <sip:user1_public1@home1.net>;tag=4fa3
To: <sip:user1_public1@home1.net>;tag=5ef4
Call-ID: apb03a0s09dkjdfgk49111
WWW-Authenticate: Digest realm="registrar.home1.net", nonce=base64(RAND + AUTN + server specific
data), algorithm=AKAv1-MD5, ik="00112233445566778899aabbccddeeff",
ck="ffeeddccbbaa11223344556677889900"
CSeq: 2 REGISTER
Content-Length: 0
```

NOTE: The actual nonce value in the WWW-Authenticate header field is encoded in base64, and it may look like: nonce="AY+3fUYo021Qi1Mnv3C6qAzEp4502"

21. 401 (Unauthorized) response (I-CSCF to P-CSCF) - see example in table 6.9.3-21

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

Table 6.9.3-21: 401 (Unauthorized) response (I-CSCF to P-CSCF)

```
SIP/2.0 401 Unauthorized
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd];comp=sigcomp;branch=z9hG4bKdashds7
From:
To:
Call-ID:
WWW-Authenticate:
CSeq:
Content-Length:
```

22. 401 (Unauthorized) response (P-CSCF to UE) - see example in table 6.9.3-22

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

Table 6.9.3-22: 401 (Unauthorized) response (P-CSCF to UE)

```
SIP/2.0 401 Unauthorized
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd];comp=sigcomp;branch=z9hG4bKdashds7
From:
To:
Call-ID:
```

```
WWW-Authenticate: Digest realm="registrar.home1.net", nonce=base64(RAND + AUTN + server specific
data), algorithm=AKAv1-MD5
Security-Server: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-c=8642;
port-s=7531
CSeq:
Content-Length:
```

WWW-Authenticate: The P-CSCF removes the ik and ck parameters (directives) from the header.

Security-Server: q is the preference value, 0.1 means IPsec is the first preferred choice. The q value represents only relative degradation of all mechanisms listed here. The lower value, the higher priority.

23. Generation of response and session keys at UE

Upon receiving the Unauthorised response, the UE extracts the MAC and the SQN from the AUTN. The UE calculates the XMAC and checks that XMAC matches the received MAC and that the SQN is in the correct range. If both these checks are successful the UE calculates the [authentication challenge](#) response, (using RES and other parameters as defined in RFC3310 [18]), and also computes the session keys IK and CK. The [RES-authentication challenge response](#) is put into the Authorization header and sent back to the registrar in the REGISTER request.

24. REGISTER request (UE to P-CSCF) - see example in table 6.9.3-24

Table 6.9.3-24: REGISTER request (UE to P-CSCF)

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Max-Forwards: 70
From: <sip:user1_public1@home1.net>;tag=4fa3
To: <sip:user1_public1@home1.net>
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>;expires=600000
Call-ID: apb03a0s09dkjdfglkj49111
Authorization: Digest username="user1_private@home1.net", realm="registrar.home1.net",
nonce=base64(RAND + AUTN + server specific data), algorithm=AKAv1-MD5,
uri="sip:registrar.home1.net", response="0alb04c89e54f09ab45e84d30e29f83a"
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-c=8642;
port-s=7531
Require: sec-agree
Proxy-Require: sec-agree
CSeq: 3 REGISTER
Supported: path
Content-Length: 0
```

Authorization: This carries the response to the authentication challenge received in step 12 along with the private user identity, the realm, the nonce, the URI and the algorithm.

25. DNS: DNS-Q

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

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

Table 6.9.3-25a DNS: DNS Query (P-CSCF to DNS)

```
-----
OPCODE=SQUERY
QNAME=registrar.home1.net, QCLASS=IN, QTYPE=NAPTR
-----
```

The DNS records are retrieved according to RFC 3263 [14].

Table 6.9.3-25b DNS Query Response (DNS to P-CSCF)

```

OPCODE=SQUERY, RESPONSE, AA
QNAME=registrar.home1.net, QCLASS=IN, QTYPE=NAPTR

registrar.home1.net      0 IN NAPTR 50   50 "s" "SIP+D2U"   ""  _sip._udp.registrar.home1.net
                        0 IN NAPTR 90   50 "s" "SIP+D2T"   ""  _sip._tcp.registrar.home1.net
                        0 IN NAPTR 100  50 "s" "SIPS+D2T"  ""  _sips._tcp.registrar.home1.net

```

Since the UDP is preferred, the P-CSCF finds the I-CSCF by a DNS SRV lookup according to RFC 2782 [4].

Table 6.9.3-25c: DNS: DNS Query (P-CSCF to DNS)

```

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

```

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

Table 6.9.3-25d: DNS Query Response (DNS to P-CSCF)

```

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

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

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

```

In the Answer field of the query-response each I-CSCF is identified by its host domain name. The returned SRV Resource Records (RRs) are merged and ordered, and the selection technique (employing the Priority and Weight parameters returned in the RRs) as specified in RFC 2782 [4] is used to select the I-CSCF (i.e. the icscf1_p.home1.net). Since the Additional Data field of the query-response also contains the IP address of the selected I-CSCF (i.e. 5555::aba:dab:aaa:daa), a new query to the DNS is not required.

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

26. REGISTER request (P-CSCF to I-CSCF) - see example in table 6.9.3-26

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

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Proxy-Require header is empty, it removes this header completely.

Table 6.9.3-26: REGISTER request (P-CSCF to I-CSCF)

```

REGISTER sip:registrar.home1.net SIP/2.0
  Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
      [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
Max-Forwards: 69
Path: <sip:term@pcscf1.visited1.net;lr>
Require: path
P-Visited-Network-ID: "Visited Network Number 1"
P-Charging-Vector: icid-value="AyretyU0dm+602IrT5tAFrbHLso=023551024"
From:
To:
Contact:
Call-ID:
  Authorization: Digest username="user1_private@home1.net", realm="registrar.home1.net",
  nonce=base64(RAND + AUTN + server specific data), algorithm=AKAv1-MD5,
  uri="sip:registrar.home1.net", response="0a1b04c89e54f09ab45e84d30e29f83a",
  integrity-protected="yes"

CSeq:
Supported:

```

Content-Length:

Path: This is the P-CSCF URI and is included to inform the S-CSCF where to route terminating requests.

27. Cx: User registration status query procedure

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

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

Table 6.9.3-27a provides the parameters in the REGISTER request (flow 5) which need to be sent to HSS.

Table 6.9.3-27a Cx: User registration status query procedure (I-CSCF to HSS)

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

28. REGISTER request (I-CSCF to S-CSCF) - see example in table 6.9.3-28

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

Table 6.9.3-28: REGISTER request (I-CSCF to S-CSCF)

```
REGISTER sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
Max-Forwards: 68
Path:
Require:
P-Visited-Network-ID:
P-Charging-Vector:
From:
To:
Contact:
Call-ID:
Authorization:
CSeq:
Supported:
Content-Length:
```

Path: The S-CSCF stores the contents of the Path header and uses this URI for routing mobile terminated sessions.

29. Authentication

Upon receiving the REGISTER request carrying the authentication [challenge](#) response, ~~RES~~, the S-CSCF checks that the ~~user's active, XRES~~ [expected response \(calculated by the S-CSCF using XRES and other parameters as defined in RFC3310 \[18\]\)](#) matches the received ~~RES~~ [challenge response](#). If the check is

unsuccessful, and no more authentication challenges are to be made, then the authentication has failed and the public user identity is not registered in the S-CSCF.

30. Cx: S-CSCF registration notification procedure

Upon user authentication failure the S-CSCF informs the HSS that the user has not been registered at this instance. The HSS clears the S-CSCF name for that subscriber.

For detailed message flows see 3GPP TS 29.229.

Table 6.9.3-30 provides the parameters in the REGISTER request (flow 18) which needs to be sent to HSS.

Table 6.9.3-30 Cx: S-CSCF registration notification procedure (S-CSCF to HSS)

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

31. 403 (Forbidden) response (S-CSCF to I-CSCF) - see example in table 6.9.3-31

The S-CSCF sends an 403 (Forbidden) response to the I-CSCF indicating that authentication failed. No security parameters are included in this response. The S-CSCF will insert a warning header in the response, indicating to the UE the reason of refusing the Registration request. The Warning header will contain the name of the network inserting the warning header (warn-agent = home1.net) and in addition it may contain a warn-text. The warn-code inserted into the Warning header is 399.

Table 6.9.3-31: 403 (Forbidden) response (S-CSCF to I-CSCF)

```
SIP/2.0 403 Forbidden
  Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
      pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
      [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
  Warning: 399 home1.net "Authentication failed"
From: <sip:user1_public1@home1.net>;tag=4fa3
To: <sip:user1_public1@home1.net>; tag=5ef4
Call-ID: apb03a0s09dkjdfgk49111
CSeq: 3 REGISTER
Content-Length: 0
```

32. 403 (Forbidden) response (I-CSCF to P-CSCF) - see example in table 6.9.3-32

The I-CSCF forwards the 403 (Forbidden) response from the S-CSCF to the P-CSCF indicating that authentication was unsuccessful.

Table 6.9.3-32: 403 (Forbidden) response (I-CSCF to P-CSCF)

```
SIP/2.0 403 Forbidden
  Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
      [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
  Warning: 399 home1.net "Authentication failed"
From:
To:
Call-ID:
CSeq:
Content-Length:
```

33. **403 (Forbidden) response (P-CSCF to UE) - see example in table 6.9.3-33**

The P-CSCF forwards the 403 (Forbidden) response to the UE.

Table 6.9.3-33: 403 (Forbidden) response (P-CSCF to UE)

```
SIP/2.0 403 Forbidden
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Warning: 399 home1.net "Authentication failed"
From:
To:
Call-ID:
CSeq:
Content-Length:
```

34. **PDP Context Deactivate**

On receiving the 403 (Forbidden) response the UE ceases registration and authentication attempts. In this case, if the PDP context on which the SIP signalling was being conducted is not being used for other purposes, the UE deactivates the signalling PDP context.

16.2 Registration signalling: user not registered

Figure 16.2-1 shows the registration signalling flow for the scenario when the user is not registered. For the purpose of this signalling flow, the subscriber is considered to be roaming. This flow also shows the authentication of the private user identity. In this signalling flow, the home network has network configuration hiding active.

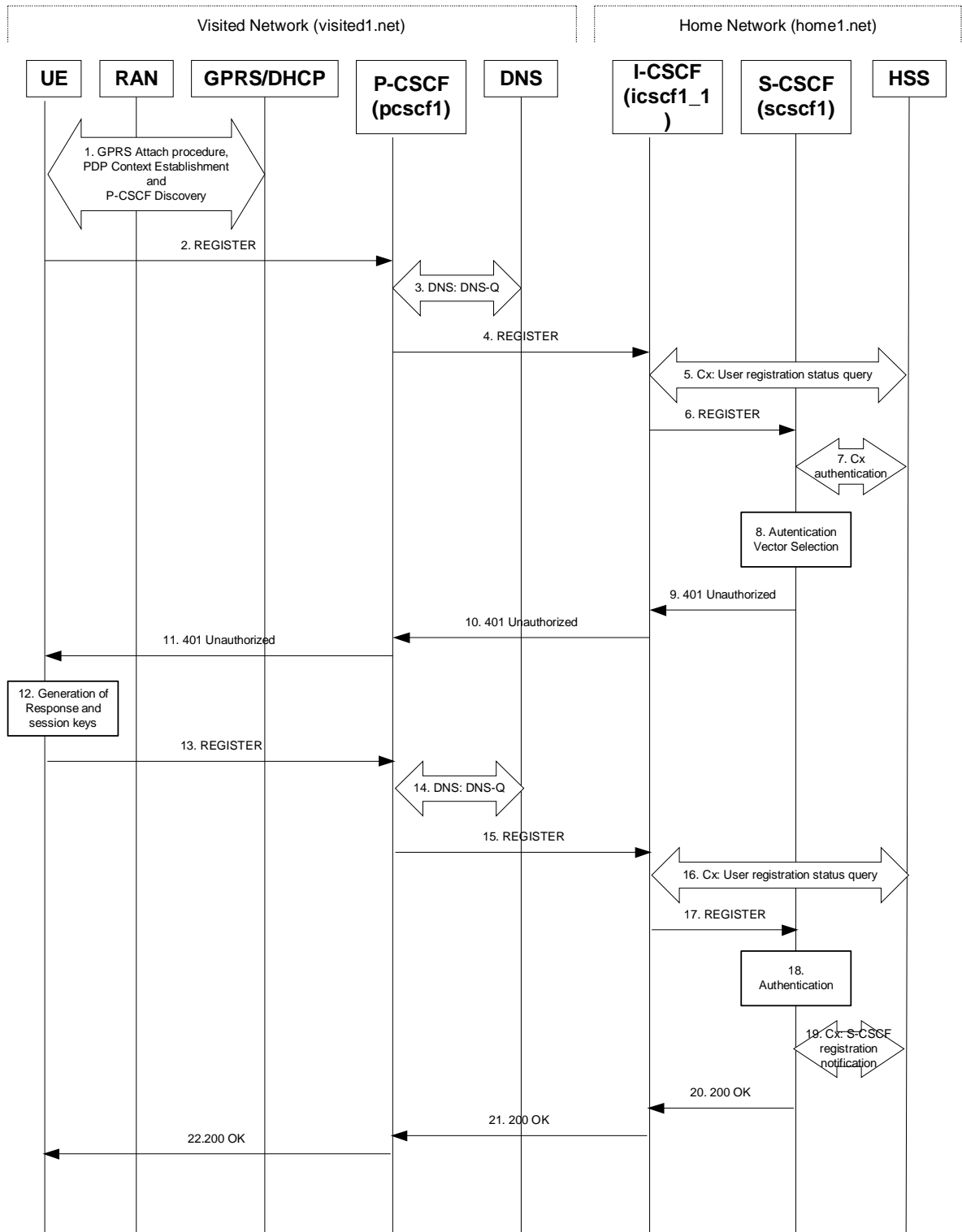


Figure 16.2-1: Registration when UE roaming

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

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

See subclause 5.2 for details.

2. REGISTER request (UE to P-CSCF) – see example in table 16.2-2

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

Table 16.2-2 REGISTER request (UE to P-CSCF)

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd];comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11'
From: <sip:user1_public1@home1.net>;tag=4fa3
To: <sip:user1_public1@home1.net>
Contact: <sip:[5555::aaa:bbb:ccc:ddd];comp=sigcomp>;expires=600000
Call-ID: apb03a0s09dkjdfglkj49111
Authorization: Digest username="user1_private@home1.net", realm="registrar.home1.net", nonce="",
uri="sip:registrar.home1.net", response=""
Security-Client: ipsec-3gpp; alg=hmac-sha-1-96; spi-c=23456789; spi-s=12345678; port-c=2468; port-
s=1357
Require: sec-agree
Proxy-Require: sec-agree
CSeq: 1 REGISTER
Supported: path
Content-Length: 0
```

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

Via: IPv6 address of UE allocated during the PDP Context Activation process.

Max-Forwards: Set to 70 by the UE and used to prevent loops.

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

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

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

Authorization: It carries authentication information. The private user identity (user1_private@home1.net) is carried in the username field of the Digest AKA protocol. The uri parameter (directive) contains the same value as the Request-URI. The realm parameter (directive) contains the network name where the username is authenticated. The Request-URI and the realm parameter (directive) value are obtained from the same field in the USIM, and therefore, are identical. In this example, it is assumed that a new UICC card was just inserted into the terminal, and there is no other cached information to send. Therefore, nonce and response parameters (directives) are empty.

Security-Client: Lists the supported algorithm(s) by the UE.

Supported: This header is included to indicate to the recipient that the UE supports the Path header.

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network as specified in sub-clause "Additional coding rules for P-Access-Network-Info header", in 3GPP TS 24.229 [16].

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

3. DNS: DNS-Q

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

The P-CSCF sends the REGISTER request - after local processing - to the address indicated in the Request-URI. When forwarding the REGISTER request the P-CSCF needs to specify the protocol, port number and IP address of the I-CSCF server in the home network to which to send the REGISTER request. The P-CSCF tries to find this information by querying the DNS. Since the Request-URI does not specify a numeric IP address, and the transport protocol and port are not indicated, the P-CSCF performs an NAPTR query for the domain specified in the Request-URI.

Table 16.2-3a DNS: DNS Query (P-CSCF to DNS)

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

The DNS records are retrieved according to RFC 3263 [14].

Table 16.2-3b DNS Query Response (DNS to P-CSCF)

```
OPCODE=SQUERY, RESPONSE, AA
QNAME=registrar.home1.net, QCLASS=IN, QTYPE=NAPTR

registrar.home1.net      0 IN NAPTR 50 50 "s" "SIP+D2U"  ""  _sip._udp.registrar.home1.net
                        0 IN NAPTR 90 50 "s" "SIP+D2T"  ""  _sip._tcp.registrar.home1.net
                        0 IN NAPTR 100 50 "s" "SIPS+D2T" ""  _sips._tcp.registrar.home1.net
```

Based on the order and preference of the NAPTR record and the local preference, UDP is preferred and the P-CSCF finds the I-CSCF by a DNS SRV lookup according to RFC 2782 [4].

Table 16.2-3c DNS: DNS Query (P-CSCF to DNS)

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

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

Table 16.2-3d DNS: DNS Query Response (DNS to P-CSCF)

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

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

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

In the Answer field of the query-response each I-CSCF is identified by its host domain name. The returned SRV Resource Records (RRs) are merged and ordered, and the selection technique (employing the Priority and Weight parameters returned in the RRs) as specified in RFC 2782 [4] is used to select the I-CSCF (i.e. the icscf1_p.home1.net). Since the Additional Data field of the query-response also contains the IP address of the selected I-CSCF (i.e. 5555::aba:dab:aaa:daa), a new query to the DNS is not required.

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

4. REGISTER request (P-CSCF to I-CSCF) – see example in table 16.2-4

The P-CSCF removes the Security-Client header and associated "sec-agree" option-tags prior to forwarding the request. As the Proxy-Require header is empty, it removes this header completely.

The P-CSCF needs to be in the path for all terminating requests for this user. To ensure this, the P-CSCF adds itself to the path for future requests.

The P-CSCF adds also the P-Visited-Network-ID header with the contents of the identifier of the P-CSCF network. This may be the visited network domain name or any other identifier that identifies the visited network at the home network.

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

Table 16.2-4 REGISTER request (P-CSCF to I-CSCF)

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd];comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info:
Path: <sip:term@pcscf1.visited1.net;lr>
Require: path
P-Visited-Network-ID: "Visited Network Number 1"
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
From:
To:
Contact:
Call-ID:
Authorization: Digest username="user1_private@home1.net", realm="registrar.home1.net", nonce="",
uri="sip:registrar.home1.net", response="", integrity-protected="no"
CSeq:
Supported:
Content-Length:
```

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

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

P-Visited-Network-ID: It contains the identifier of the P-CSCF network at the home network.

P-Access-Network-Info: this header contains information from the UE.

5. Cx: User registration status query procedure

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

For detailed message flows see 3GPP TS 29.228.

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

6. REGISTER request (I-CSCF to S-CSCF) – see example in table 16.2-6

I-CSCF adds a proper I-CSCF URI to the Path header.

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

Table 16.2-6 REGISTER request (I-CSCF to S-CSCF)

```
REGISTER sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd];comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
P-Access-Network-Info:
Path: <sip:icscf1_p.home1.net;lr>, <sip:term@pcscf1.visited1.net;lr>
Require:
P-Visited-Network-ID:
P-Charging-Vector:
From:
To:
Contact:
Call-ID:
Authorization:
CSeq:
Supported: path
Content-Length:
```

Path: The S-CSCF stores the contents of the Path header and uses these URIs for routing mobile terminated requests.

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

7. Cx: S-CSCF authentication procedure

As the REGISTER request arrived without integrity protection to the P-CSCF, the S-CSCF shall challenge it. For this, the S-CSCF requires at least one authentication vector to be used in the challenge to the user. If a valid AV is not available, then the S-CSCF requests at least one AV from the HSS.

For detailed message flows see 3GPP TS 29.228.

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

8. Authentication vector selection

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

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

$AV = RAND_n || AUTN_n || XRES_n || CK_n || IK_n$ where:

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

9. 401 Unauthorized response (S-CSCF to I-CSCF) – see example in table 16.2-9

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

Table 16.2-9: 401 Unauthorized response (S-CSCF to I-CSCF)

```
SIP/2.0 401 Unauthorized
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd];comp=sigcomp;branch=z9hG4bKnashds7
From:
To: <sip:user1_public1@home1.net>;tag=5ef4
```

```

Call-ID:
WWW-Authenticate: Digest realm="registrar.home1.net", nonce=base64(RAND + AUTN + server specific
data), algorithm=AKAv1-MD5, ik="00112233445566778899aabbccddeeff",
ck="ffeeddccbbaa11223344556677889900"
CSeq:
Content-Length:

```

WWW-Authenticate: The S-CSCF challenges the user. The nonce includes the quoted string, base64 encoded value of the concatenation of the AKA RAND, AKA AUTN and server specific data. The S-CSCF appends also the Integrity Key (IK) and the Cyphering key (CK).

NOTE: The actual nonce value in the WWW-Authenticate header field is encoded in base64, and it may look like: nonce="A34Cm+Fva37UYWpGNB34JP"

10. 401 Unauthorized response (I-CSCF to P-CSCF) – see example in table 16.2-10

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

Table 16.2-10: 401 Unauthorized response (I-CSCF to P-CSCF)

```

SIP/2.0 401 Unauthorized
Via: SIP/2.0/UDP pcsf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd];comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
WWW-Authenticate:
CSeq:
Content-Length:

```

11. 401 Unauthorized response (P-CSCF to UE) – see example in table 16.2-11

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

Table 16.2-11: 401 Unauthorized response (P-CSCF to UE)

```

SIP/2.0 401 Unauthorized
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd];comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
WWW-Authenticate: Digest realm="registrar.home1.net", nonce=base64(RAND + AUTN + server specific
data), algorithm=AKAv1-MD5
Security-Server: ipsec-3gpp; q=0.1; alg= hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-c=8642;
port-s=7531
CSeq:
Content-Length:

```

WWW-Authenticate: The P-CSCF removes the ik and ck parameters (directives) from the header.

12. Generation of response and session keys at UE

Upon receiving the Unauthorized response, the UE extracts the MAC and the SQN from the AUTN. The UE calculates the XMAC and checks that XMAC matches the received MAC and that the SQN is in the correct range. If both these checks are successful the UE calculates the response, [\(using RES and other parameters as defined in RFC3310 \[18\]\)](#), and also computes the session keys IK and CK. The ~~RES~~ [authentication challenge response](#) is put into the Authorization header and sent back to the registrar in the REGISTER request.

13. REGISTER request (UE to P-CSCF) – see example in table 16.2-13

Table 16.2-13 REGISTER request (UE to P-CSCF)

```

REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70

```

```

P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>;tag=4fa3
To: <sip:user1_public1@home1.net>; tag=5ef4
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>;expires=600000
Call-ID: apb03a0s09dkjdfg1kj49111
Authorization: Digest username="user1_private@home1.net", realm="registrar.home1.net",
nonce=base64(RAND + AUTN + server specific data), algorithm=AKAv1-MD5,
uri="sip:registrar.home1.net", response="6629fae49393a05397450978507c4ef1"
Require: sec-agree
Proxy-Require: sec-agree
Security-Client: ipsec-3gpp; alg=hmac-sha-1-96; spi-c=23456789; spi-s=12345678; port-c=2468; port-
s=1357
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-c=8642;
port-s=7531
CSeq: 2 REGISTER
Supported: path
Content-Length: 0

```

Authorization: This carries the response to the authentication challenge received in step 11 along with the private user identity, the realm, the nonce, the URI and the algorithm.

14. DNS: DNS-Q

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

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

Table 16.2-14a DNS: DNS Query (P-CSCF to DNS)

```

-----
OPCODE=SQUERY
QNAME=registrar.home1.net, QCLASS=IN, QTYPE=NAPTR
-----

```

The DNS records are retrieved according to RFC 3263 [14].

Table 16.2-14b DNS Query Response (DNS to P-CSCF)

```

-----
OPCODE=SQUERY, RESPONSE, AA
QNAME=registrar.home1.net, QCLASS=IN, QTYPE=NAPTR
-----
registrar.home1.net      0 IN NAPTR 50   50 "s" "SIP+D2U"   ""  _sip._udp.registrar.home1.net
                        0 IN NAPTR 90   50 "s" "SIP+D2T"   ""  _sip._tcp.registrar.home1.net
                        0 IN NAPTR 100  50 "s" "SIPS+D2T"  ""  _sips._tcp.registrar.home1.net
-----

```

Based on the order and preference of the NAPTR record and the local preference, UDP is preferred and the P-CSCF finds the I-CSCF by a DNS SRV lookup according to RFC 2782 [4].

Table 16.2-14c DNS: DNS Query (P-CSCF to DNS)

```

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

```

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

Table 16.2-14d DNS Query Response (DNS to P-CSCF)

```

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

```

_sip_udp.registrar.home1.net	0	IN	SRV	1	10	5060	icscf1_p.home1.net
	0	IN	SRV	1	0	5060	icscf7_p.home1.net
icscf1_p.home1.net	0	IN	AAAA			5555::aba:dab:aaa:daa	
icscf7_p.home1.net	0	IN	AAAA			5555::a1a:b2b:c3c:d4d	

In the Answer field of the query-response each I-CSCF is identified by its host domain name. The returned SRV Resource Records (RRs) are merged and ordered, and the selection technique (employing the Priority and Weight parameters returned in the RRs) as specified in RFC 2782 [4] is used to select the I-CSCF (i.e. the icscf1_p.home1.net). Since the Additional Data field of the query-response also contains the IP address of the selected I-CSCF (i.e. 5555::aba:dab:aaa:daa), a new query to the DNS is not required.

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

15. REGISTER request (P-CSCF to I-CSCF) – see example in table 16.2-15

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Proxy-Require header is empty, it removes this header completely.

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

Table 16.2-15 REGISTER request (P-CSCF to I-CSCF)

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info:
Path: <sip:term@pcscf1.visited1.net;lr>
Require: path
P-Visited-Network-ID: "Visited Network Number 1"
P-Charging-Vector: icid-value="AyretyU0dm+602IrT5tAFrbHLso=023551024"
From:
To:
Contact:
Call-ID:
Authorization: Digest username="user1_private@home1.net", realm="registrar.home1.net",
nonce=base64(RAND + AUTN + server specific data), algorithm=AKAv1-MD5,
uri="sip:registrar.home1.net", response="6629fae49393a05397450978507c4ef1", integrity-
protected="yes"
CSeq:
Supported:
Content-Length:
```

Path: This is the P-CSCF URI and is included to inform the S-CSCF where to route terminating requests.

16. Cx: User registration status query procedure

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

For detailed message flows see 3GPP TS 29.228.

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

17. REGISTER request (I-CSCF to S-CSCF) – see example in table 16.2-17

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

Table 16.2-17 REGISTER request (I-CSCF to S-CSCF)

```
REGISTER sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
```

```

Max-Forwards: 68
P-Access-Network-Info:
Path: <sip:icscf1_p.home1.net;lr>, <sip:term@pcscf1.visited1.net;lr>
Require:
P-Visited-Network-ID:
P-Charging-Vector:
From:
To:
Contact:
Call-ID:
Authorization:
CSeq:
Supported:
Content-Length:

```

Path: The I-CSCF adds an I-CSCF(THIG) to the list of URIs in the Path header. The S-CSCF stores the contents of the Path headers and uses these addresses for routing mobile terminated requests.

18. Authentication

Upon receiving an integrity protected REGISTER request, carrying the authentication [challenge](#) response, ~~RES~~, the S-CSCF checks that the [expected response](#) ~~user's active~~ (calculated by the S-CSCF using XRES and other parameters as defined in RFC3310 [18]) matches the received ~~RES~~ challenge response. If the check is successful then the user has been authenticated and the public user identity is registered in the S-CSCF.

19. Cx: S-CSCF registration notification procedure

On registering a user the S-CSCF informs the HSS that the user has been registered at this instance. The HSS stores the S-CSCF name for that subscriber. For a positive response, the HSS will include the user profile in the response sent to the S-CSCF.

For detailed message flows see 3GPP TS 29.228.

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

20. 200 OK response (S-CSCF to I-CSCF) – see example in table 16.2-20

The S-CSCF sends a 200 (OK) response to the I-CSCF indicating that Registration was successful. This response will traverse the path that the REGISTER request took as described in the Via list.

Table 16.2-20 200 OK response (S-CSCF to I-CSCF)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Path: <sip:icscf1_p.home1.net;lr>, <sip:term@pcscf1.visited1.net;lr>
Service-Route: <sip:icscf1_p.home1.net;lr>, <sip:orig@scscf1.home1.net;lr>
From:
To:
Call-ID:
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>;expires=600000
CSeq:
Date: Wed, 11 July 2001 08:49:37 GMT
P-Associated-URI: <sip:user1_public2@home1.net>, <sip:user1_public3@home1.net>, <sip:+1-212-555-
1111@home1.net;user=phone>
Content-Length:

```

Service-Route: The S-CSCF inserts the Service-Route header that includes its own URI including a character string in the user part to differentiate mobile originating requests from mobile terminating requests.

21. 200 OK response (I-CSCF to P-CSCF) – see example in table 16.2-21

The I-CSCF translates the S-CSCF name in the Service-Route header. The I-CSCF forwards the 200 (OK) response from the S-CSCF to the P-CSCF indicating that the registration was successful. This response will traverse the path that the REGISTER request took as described in the Via list.

Table 16.2-21 200 OK response (I-CSCF to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Path:
Service-Route: <sip:icscf1_p.home1.net;lr>,
<sip:token(orig@scscf1.home1.net;lr)@home1.net;tokenized-by=home1.net>
From:
To:
Call-ID:
Contact:
CSeq:
Date:
P-Associated-URI:
Content-Length:
```

22. 200 OK response (P-CSCF to UE) – see example in table 16.2-22

The P-CSCF saves the value of the Service-Route header and associates it with the UE. The P-CSCF then forwards the 200 (OK) response from the I-CSCF to the UE indicating the registration was successful.

Table 16.2-22 200 OK response (P-CSCF to UE)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Path:
Service-Route:
From:
To:
Call-ID:
Contact:
CSeq:
Date:
P-Associated-URI:
Content-Length:
```

CHANGE REQUEST

⌘ 24.228 CR 120 ⌘ rev 1 ⌘ Current version: 5.6.0 ⌘

For [HELP](#) on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ 'Roaming' word used in TS24.228 and CS-O sessions		
Source:	⌘ Orange		
Work item code:	⌘ IMS-CCR	Date:	⌘ 10/10/2003
Category:	⌘ F Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .	Release:	⌘ Rel-5 Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)

Reason for change: ⌘ In roaming situation, P-CSCF can be in the home network or in the visited network. In all examples of TS24.228, P-CSCF is in the visited network. It should be indicated that P-CSCF can also be in the home network to avoid confusion. Sections 17.3.2.1, 17.3.3.1 and 17.3.4.1 do not describe CS-Originating session as indicated.
Also minor changes are made in those sections and to section 7.4.9.3.

Summary of change: ⌘

- addition of §4.2.5 'User Roaming Procedures' (in §4.2 'Notation Conventions') indicating that in this specification user roaming procedures apply to cases where P-CSCF is in the visited network, and that procedures for roaming cases where P-CSCF is in the home network are similar to procedures for non-roaming cases.
- sections 17.3.2.1, 17.3.3.1, 17.3.4.1 cannot apply to CS-O session as these paragraphs deal with cases where different network operators perform origination and termination of the session: The MGCF that handles the session origination (ie call coming from CS domain) always belongs to the same network operator as the S-CSCF handling the session termination. (same change already agreed for section 7.3.2.1 – CR114rev1)
- in figure 1 of section 17.3.2.1, flow 8 is indicated towards S-CSCF instead of HSS.
- Minor changes in section 17.3.2.1, 17.3.3.1 and 17.3.4.1
- In section 7.4.9.3, one name of message is wrong (User registration status query instead of User location query) and some other corrections are made.

Consequences if not approved:	⌘	- It can be understood that in roaming situation P-CSCF is always in the visited network which is not true (4.2.5). - Description of sections 17.3.2.1, 17.3.3.1, and 17.3.4.1 do not apply CS-Originating case, contrary to what is indicated. - Wrong figure will stay in section 17.3.2.1 - Wrong figure and wrong statements will stay in section 7.4.9.3
--------------------------------------	---	--

Clauses affected:	⌘	4.2.5, 7.4.9.3, 17.3.2.1, 17.3.3.1, 17.3.4.1										
Other specs affected:	⌘	<table border="1"> <tr> <td>Y</td> <td>N</td> </tr> <tr> <td></td> <td>X</td> </tr> <tr> <td></td> <td>X</td> </tr> <tr> <td></td> <td>X</td> </tr> </table>	Y	N		X		X		X	Other core specifications	⌘
		Y	N									
			X									
			X									
	X											
	X	Test specifications										
	X	O&M Specifications										
Other comments:	⌘											

How to create CRs using this form:

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

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

4.2.4 Configuration hiding

Where the I-CSCF(THIG) provides configuration hiding, some headers are tokenized. The encoding caused by this tokenization, and its reverse operation is not explicitly shown, but is indicated by preceding the tokenized string by "Token" and enclosing the tokenized string within parentheses. An example is:

```
Via: SIP/2.0/UDP icscf1_s.home1.net,
SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net, SIP/2.0/UDP
pcscf1.home1.net)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]
```

4.2.5 User Roaming Procedures

In this document, user roaming procedures apply to cases where P-CSCF is located in the visited network. Procedures for cases where the user is roaming and the P-CSCF is located in the home network are similar to procedures for a non-roaming user.

4.3 Document Structure

To improve readability, the document is structured at the highest level based on network configuration hiding. Each clause 'x' for the non-hiding scenario is mirrored for hiding, in a subsequent clause 'x+10'.

For example:

- | | |
|---|---|
| Clause 6: Signaling flows for REGISTER (non-hiding) | Clause 16: Signalling flows for REGISTER (hiding) |
| Clause 7: ... (non hiding) | Clause 17: ... (hiding) |
| etc. | |

7.4.9.3 Mobile termination, unregistered subscriber, services related to unregistered state

In the example information flow the subscriber is unregistered and the subscriber has services related to unregistered state. This is shown in the following information flow (figure 7.4.9.3-1).

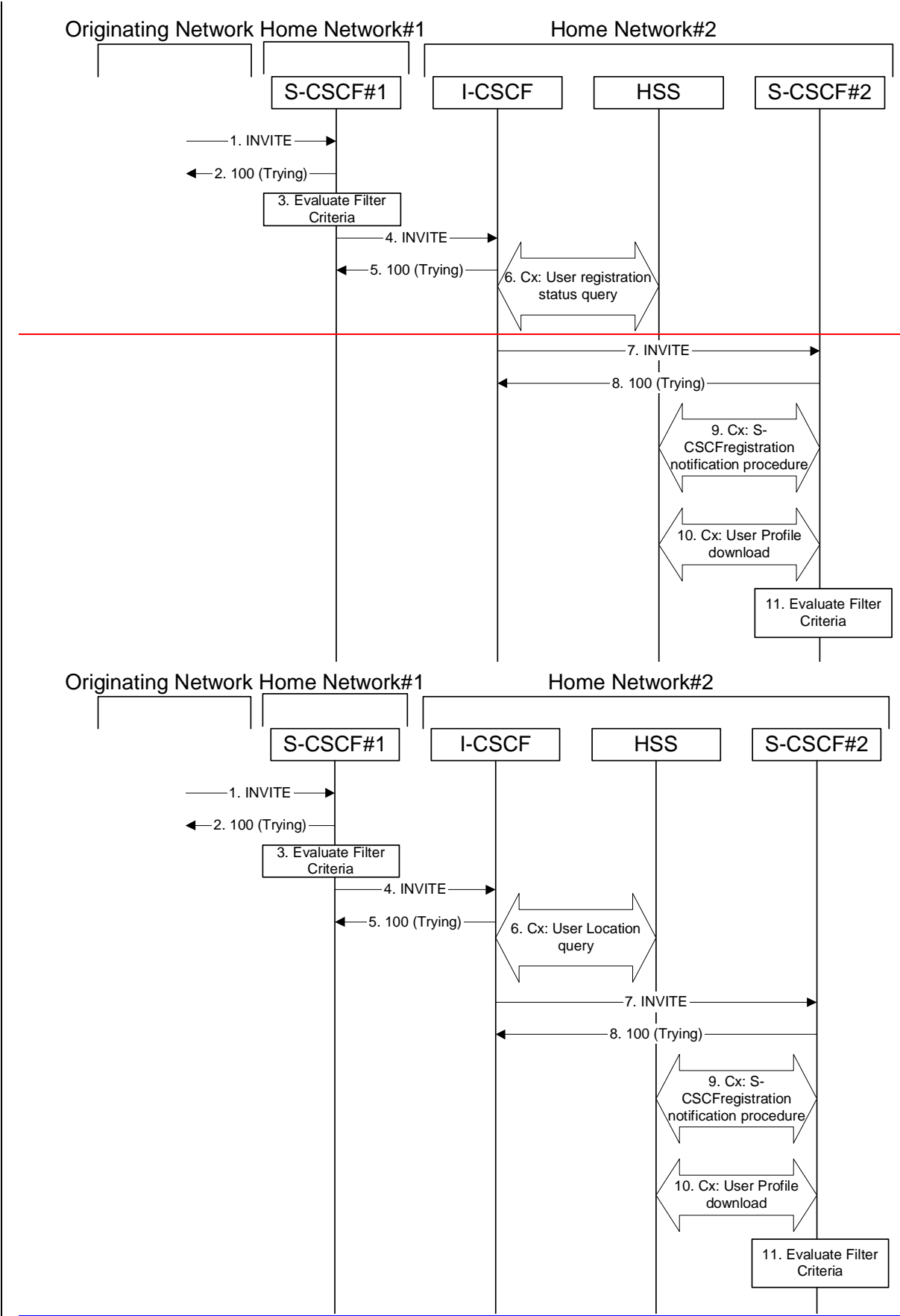


Figure 7.4.9.3-1: Mobile termination, unregistered subscriber with services

1. INVITE (MO to S-S#1a) – see example in table 7.4.9.3-1

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

Table 7.4.9.3-1: INVITE (MO to S-S#1a)

```
INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>
Record-Route: <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: precondition
Supported: 100rel
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H263
a=rtpmap:99 MP4V-ES
a=ftmp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event
```

2. 100 Trying (S-S#1a to MO) – see example in table 7.4.9.3-2

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

Table 7.4.9.3-2: 100 Trying (S-S#1a to MO)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

3. Evaluation of initial filter criterias

S-CSCF#1 validates the service profile of this subscriber and evaluates the initial filter criterias.

For this example, assume no Application Server involvement.

4. INVITE (S-CSCF to I-CSCF) – see example in table 7.4.9.3-4

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

As the S-CSCF does not know whether the I-CSCF at home2.net is a loose router or not, it does not introduce a Route header.

Table 7.4.9.3-4: INVITE (S-CSCF to I-CSCF)

```

INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net, <tel:+1-212-555-1111>
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"; orig-ioi=home1.net
Privacy:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Allow:
Content-Type:
Content-Length: (...)

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

```

5. 100 Trying (I-CSCF to S-CSCF) – see example in table 7.4.9.3-5

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

Table 7.4.9.3-5: 100 Trying (I-CSCF to S-CSCF)

```

SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0

```

6. Cx: User [Location](#)~~Registration~~~~Status~~ Query procedure

The I-CSCF sends a query to the HSS to find out the S-CSCF of the called user. The HSS responds with the information that the user is not currently registered, but the user has services when the user is not registered.

For detailed message flows see 3GPP TS 29.228.

Table 7.3.2.1-6a provides the parameters in the SIP INVITE request (flow 4), which are sent to the HSS.

Based on the CX response the I-CSCF selects an appropriate S-CSCF.

7. INVITE (I-CSCF to S-CSCF) – see example in table 7.4.9.3-7

[The I-CSCF forwards the REGISTER request to the S-CSCF selected.](#)

Table 7.4.9.3-7: INVITE (I-CSCF to S-CSCF)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKKnashds7)
Max-Forwards: 67
Route: <sip:scscf2.home2.net;lr>
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity:
P-Charging-Vector:
Privacy:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Allow:
Content-Type:
Content-Length:

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

8. 100 Trying (**I**S-CSCF to **I**S-CSCF) – see example in table 7.4.9.3-8

[The **I**S-CSCF#2](#) responds to the INVITE request (4) by sending a 100 Trying provisional response to **I**S-CSCF#1.

Table 7.4.9.3-8: 100 Trying (S-CSCF to I-CSCF)

```

SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0

```

9. Cx: S-CSCF registration notification procedure

The S-CSCF#2 sends a query to the HSS to record the S-CSCF of the called user.

For detailed message flows see 3GPP TS 29.228.

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

10. Cx: User Profile Download procedure

The S-CSCF#2 sends a query to the HSS to determine the subscriber profile of the callee. The HSS responds with the profile.

For detailed message flows see 3GPP TS 29.228.

Table 6.2-9a provides the parameters in the SIP INVITE request (flow 7), which are sent to the HSS.

11. Evaluation of initial filter criterias

S-CSCF#2 validates the service profile of this subscriber and evaluates the initial filter criterias.

12. Successful session setup continues (not shown in the flow)

The rest of the terminating session is setup as described in subclause 7.4.2 with the INVITE being transmitted from the S-CSCF#2 to the appropriate network entity (e.g. the INVITE may be forwarded to an application server).

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX NEXT CHANGE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

17.3.2.1 (S-S#1b) Different network operators performing origination and termination, with configuration hiding by both network operators (MO#2, MT#2 assumed)

Figure 17.3.2.1-1 shows a S-CSCF handling session origination (S-CSCF#1) which performs an analysis of the destination address, and determines that it belongs to a subscriber of a different operator. The originating network operator desires to keep their configuration hidden, so forwards the request through an I-CSCF (I-CSCF#1) to a well-known entry point in the destination operator's network, I-CSCF#2. I-CSCF#2 queries the HSS for current location information, and finds the S-CSCF assigned to the subscriber (S-CSCF#2), and forwards the request to S-CSCF#2. The terminating network operator also desires to keep their configuration hidden, so I-CSCF#2 inserts itself into the signalling path for future exchanges.

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

- MO#1a** Mobile origination, roaming, without a THIG. The "Originating Network" of S-S#1b is therefore a visited network.
- MO#1b** Mobile origination, roaming, with a THIG in home network. The "Originating Network" of S-S#1b is therefore a visited network.

MO#2 Mobile origination, located in home service area. The "Originating Network" of S-S#1b is therefore the home network.

~~**CS-O** CS Networks origination. The "Originating Network" of S-S#1b is the home network. The element labelled S-CSCF#1 is the MGCF of the CS-O procedure.~~

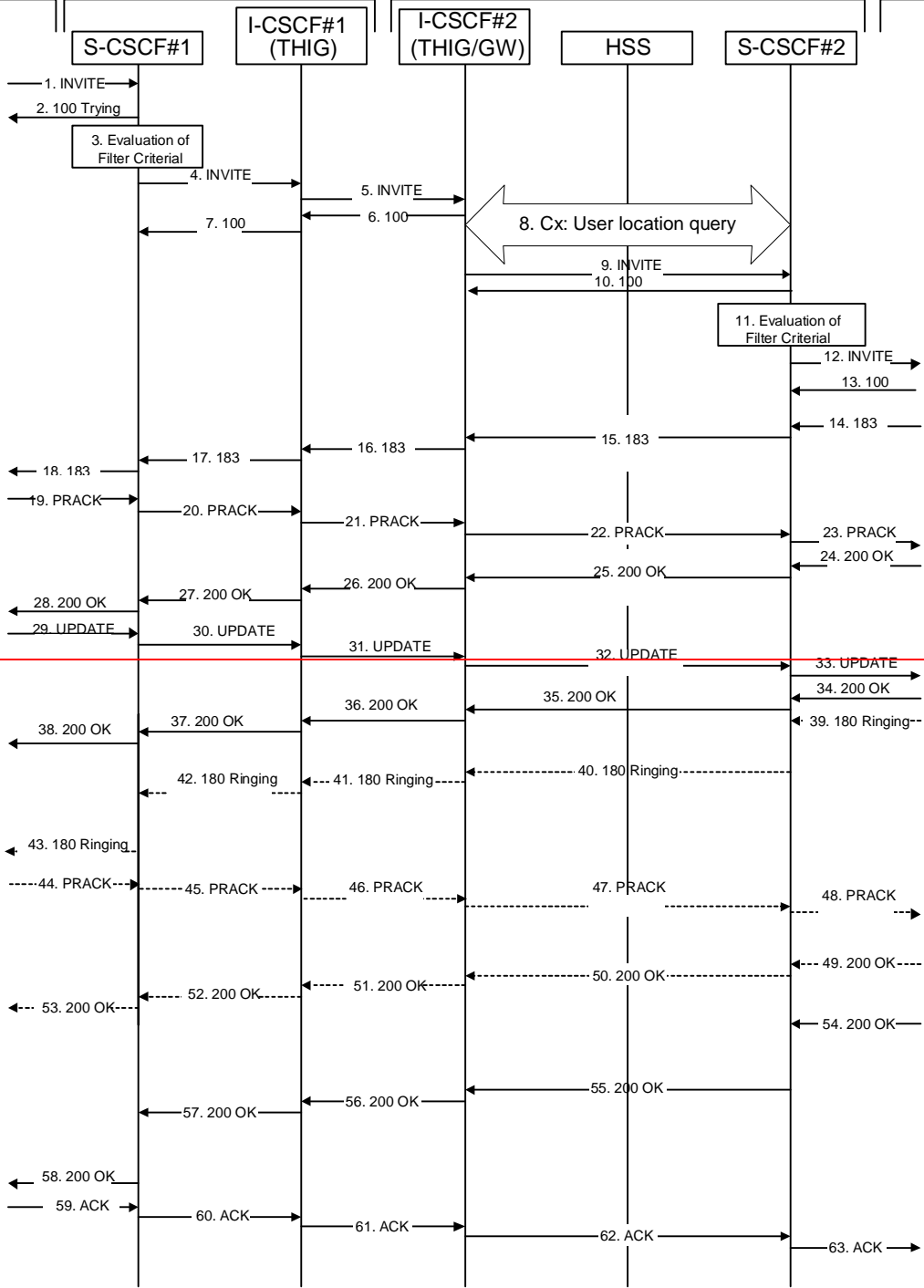
Termination sequences that share this common S-CSCF to S-CSCF procedure are:

MT#1a Mobile termination, roaming, without a THIG. The "Terminating Network" of S-S#1b is a visited network.

MT#1b Mobile termination, roaming, with a THIG in home network. The "Terminating Network" of S-S#1b is a visited network.

MT#2 Mobile termination, located in home service area. The "Terminating Network" of S-S#1b is the home network.

Originating Network Home Network#1 Home Network#2 Terminating Network



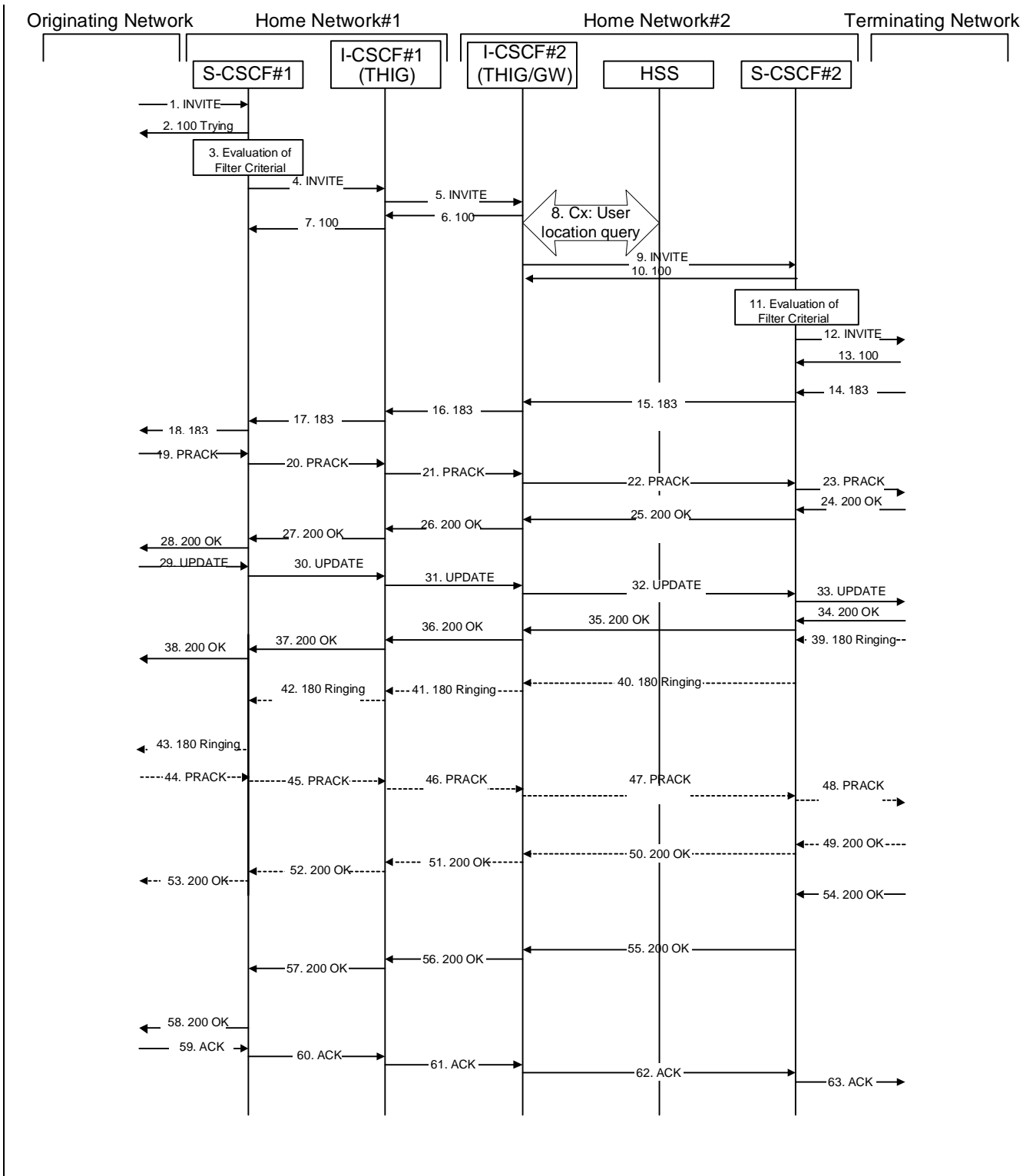


Figure 17.3.2.1-1: S-S#1b

Procedure S-S#1b is as follows:

1. INVITE (MO to S-S#1b) – see example in table 17.3.2.1-1

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

Table 17.3.2.1-1: INVITE (MO to S-S#1b)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
  [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Record-Route: <sip:pcscf1.home1.net;lr>
Route: <sip:scscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: precondition
Supported: 100rel
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Type: application/sdp
Content-Length: (...)

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

2. 100 Trying (S-S#1b to MO) – see example in table 17.3.2.1-2

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

Table 17.3.2.1-2: 100 Trying (S-S#1b to MO)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
  [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

3. Evaluation of initial filter criterias

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

4. INVITE (S-CSCF to I-CSCF) – see example in table 17.3.2.1-4

S-CSCF#1 performs an analysis of the destination address, and determines the network operator to whom the destination subscriber belongs. Since the originating operator desires to keep their internal configuration hidden, S-CSCF#1 forwards the INVITE request to I-CSCF#1 adding I-CSCF#1 to the top of the Route Header.

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

Table 17.3.2.1-4: INVITE (S-CSCF to I-CSCF)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
Route: <sip:icscf1_s.home1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>, <tel:+1-212-555-1111>
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net
Privacy:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length: (...)

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

P-Charging-Vector: The S-CSCF adds the identifier of its own network to the originating Inter Operator Identifier (IOI) parameter of this header.

Route: Updated to cause I-CSCF to forward the request to an I-CSCF in the terminating operator's network. The topmost Route header is set to the I-CSCF (THIG) for configuration hiding.

5. INVITE (I-CSCF to I-CSCF) – see example in table 17.3.2.1-5

I-CSCF#1 finds the entry point in home2.net and forwards the INVITE request to I-CSCF#2.

As the [SI-CSCF#1](#) does not know whether the I-CSCF#2 at home2.net is a loose router or not, it does not introduce a Route header.

Table 17.3.2.1-5: INVITE (I-CSCF to I-CSCF)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Record-Route: <sip:icscf1_s.home1.net;lr>, <sip:Token(<sip:scscf1.home1.net;lr>,
<sip:pcscf1.home1.net;lr>)@home1.net;tokenized-by=home1.net>
P-Asserted-Identity:
P-Charging-Vector:
Privacy:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length:

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

Via/Record-Route: I-CSCF#1 Encrypts all the entries that belong to its own network to maintain configuration independence of the home#1 operator.

6. 100 Trying (I-CSCF to I-CSCF) – see example in table 17.3.2.1-6

I-CSCF#2 responds to the INVITE request (5) with a 100 Trying provisional response.

Table 17.3.2.1-6: 100 Trying (I-CSCF to I-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

7. 100 Trying (I-CSCF to S-CSCF) – see example in table 17.3.2.1-7

I-CSCF#1 decrypts the Via header entries that are tokenised and belong to its own network, and forwards the 100 Trying provisional response to S-CSCF#1.

Table 17.3.2.1-7: 100 Trying (I-CSCF to S-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

8. Cx: User Location Query procedure

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

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

Table 7.3.2-6a provides the parameters in the SIP INVITE request (flow 5) which are sent to the HSS.

Table 7.3.2-6b provides the parameters sent from the HSS that need to be mapped to the SIP INVITE request (flow 9) and sent to the S-CSCF.

9. INVITE (I-CSCF to S-CSCF) – see example in table 17.3.2.1-9

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

Table 17.3.2.1-9: INVITE (I-CSCF to S-CSCF)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Record-Route: <sip:icscf2_s.home2.net;lr>, <sip:icscf1_s.home1.net;lr>,
<sip:Token(<sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>)@home1.net;tokenized-
by=home1.net>
Route: <sip:scscf2.home2.net;lr>
P-Asserted-Identity:
P-Charging-Vector:
Privacy:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length:

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

10. 100 Trying (S-CSCF to I-CSCF) – see example in table 17.3.2.1-10

S-CSCF#2 responds to the INVITE request (9) with a 100 Trying provisional response.

Table 17.3.2.1-10: 100 Trying (S-CSCF to I-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

11. Evaluation of initial filter criterias

S-CSCF#2 validates the service profile of this subscriber and evaluates the initial filter criterias.

12. INVITE (S-S#1b to MT) – see example in table 17.3.2.1-12

S-CSCF#2 forwards the INVITE request, as determined by the termination procedure.

Table 17.3.2.1-12: INVITE (S-S#1b to MT)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 65
Record-Route: <sip:scscf2.home2.net;lr>, <sip:icscf2_s.home2.net;lr>,
    <sip:icscf1_s.home1.net;lr>, <sip:Token(<sip:scscf1.home1.net;lr>,
    <sip:pcscf1.home1.net;lr>)>@home1.net;tokenized-by=home1.net>
Route: <sip:pcscf2.home2.net;lr>
P-Asserted-Identity:
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"
Privacy:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
P-Called-Party-ID: <sip:user2_public1@home2.net>
Content-Type:
Content-Length: (...)

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

13. 100 Trying (MT to S-S#1b) – see example in table 17.3.2.1-13

S-CSCF#2 receives a 100 Trying provisional response to the INVITE request (12), as specified by the termination procedures.

Table 17.3.2.1-13: 100 Trying (MT to S-S#1b)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

14. 183 Session Progress (MT to S-S#1b) – see example in table 17.3.2.1-14

The media stream capabilities of the destination are returned along the signalling path, in a 183 Session Progress provisional response to the INVITE request (12), as per the termination procedure.

Table 17.3.2.1-14: 183 Session Progress (MT to S-S#1b)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf2_s.home2.net;lr>, <sip:icscf1_s.home1.net;lr>,
    <sip:Token(<sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>)@home1.net;tokenized-
    by=home1.net>
P-Asserted-Identity: "John Smith" <sip:user2_public1@home2.net>
P-Charging-Vector: icid-value="AyretyU0dm+602IrT5tAFrbHLso=023551024"
Privacy:
From:
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 9021
Content-Type: application/sdp
Content-Length: (...)

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

15. 183 Session Progress (S-CSCF to I-CSCF) – see example in table 17.3.2.1-15

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

Table 17.3.2.1-15: 183 Session Progress (S-CSCF to I-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity: "John Smith" <sip:user2_public1@home2.net>, <tel:+1-212-555-2222>
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net;
    term-ioi=home2.net
P-Charging-Function-Addresses: ccf=[5555::b99:c88:d77:e66]; ccf=[5555::a55:b44:c33:d22];
    ecf=[5555::1ff:2ee:3dd:4cc]; ecf=[5555::6aa:7bb:8cc:9dd]
Privacy:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

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

P-Asserted-Identity: The S-CSCF adds the corresponding TEL URL to the P-Asserted-Identity header in order that the TEL URL is known to the destination network in case the INVITE is forwarded to a MGCF.

P-Charging-Vector: The S-CSCF adds the identifier of its own network to the terminating Inter Operator Identifier (IOI) parameter of this header.

P-Charging-Function-Addresses: The S-CSCF passes this header to the I-CSCF for charging.

16. 183 Session Progress (I-CSCF to I-CSCF) – see example in table 17.3.2.1-16

I-CSCF#2 forwards the 183 Session Progress provisional response to I-CSCF#1.

Table 17.3.2.1-16: 183 Session Progress (I-CSCF to I-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:Token(<sip:pcscf2.home2.net;lr>,
<sip:scscf2.home2.net;lr>)@home2.net;tokenized-by=home2.net>, <sip:icscf2_s.home2.net;lr>,
<sip:icscf1_s.home1.net;lr>, <sip:Token(<sip:scscf1.home1.net;lr>,
<sip:pcscf1.home1.net;lr>)@home1.net;tokenized-by=home1.net>
P-Asserted-Identity:
P-Charging-Vector:
Privacy:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

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

Record-Route: The I-CSCF#2 encrypts all the entries belonging to its own network (home#2).

17. 183 Session Progress (I-CSCF to S-CSCF) – see example in table 17.3.2.1-17

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

Table 17.3.2.1-17: 183 Session Progress (I-CSCF to S-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:Token(<sip:pcscf2.home2.net;lr>,
    <sip:scscf2.home2.net;lr>@home2.net;tokenized-by=home2.net>, <sip:icscf2_s.home2.net;lr>,
    <sip:icscf1_s.home1.net;lr>, <sip:Token(<sip:scscf1.home1.net;lr>,
    <sip:pcscf1.home1.net;lr>@home1.net;tokenized-by=home1.net>
P-Asserted-Identity:
P-Charging-Vector:
Privacy:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

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

Via/Record-Route: I-CSCF#1 decrypts all the entries that are tokenised and belong to its own network.

18. 183 Session Progress (S-S#1b to MO) – see example in table 17.3.2.1-18

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

Table 17.3.2.1-18: 183 Session Progress (S-S#1b to MO)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcscfl.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

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

19. PRACK (MO to S-S#1b) – see example in table 17.3.2.1-19

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

Table 17.3.2.1-19: PRACK (MO to S-S#1b)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
    <sip:Token(<sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>)>@home2.net;tokenized-
    by=home2.net>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfgklkj490333
Cseq: 128 PRACK
Require: precondition
RAck: 9021 127 INVITE
Content-Type: application/sdp
Content-Length: (...)

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

20. PRACK (S-CSCF to I-CSCF) – see example in table 17.3.2.1-20

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

Table 17.3.2.1-20: PRACK (S-CSCF to I-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:icscf1_s.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
    <sip:Token(<sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>)>@home2.net;tokenized-
    by=home2.net>
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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


21. PRACK (I-CSCF to I-CSCF) – see example in table 17.3.2.1-21

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

Table 17.3.2.1-21: PRACK (I-CSCF to I-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:icscf2_s.home2.net;lr>, <sip:Token(<sip:scscf2.home2.net;lr>,
<sip:pcscf2.home2.net;lr>@home2.net;tokenized-by=home2.net>
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

Via: I-CSCF#1 encrypts all the entries that belong to its own network to maintain configuration independence of the home#1 operator.

22. PRACK (I-CSCF to S-CSCF) – see example in table 17.3.2.1-22

I-CSCF#2 decrypts all the tokenized route entries belonging to its own network to recover the routing information, and forwards the PRACK request to S-CSCF#2.

Table 17.3.2.1-22: PRACK (I-CSCF to S-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

23. PRACK (S-S#1b to MT) – see example in table 17.3.2.1-23

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

Table 17.3.2.1-23: PRACK (S-S#1b to MT)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 65
Route: <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

24. 200 OK (MT to S-S#1b) – see example in table 17.3.2.1-24

The terminating endpoint responds to the PRACK request (23) with a 200 OK response.

Table 17.3.2.1-24: 200 OK (MT to S-S#1b)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

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

25. 200 OK (S-CSCF to I-CSCF) – see example in table 17.3.2.1-25

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

Table 17.3.2.1-25: 200 OK (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

26. 200 OK (I-CSCF to I-CSCF) – see example in table 17.3.2.1-26

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

Table 17.3.2.1-26: 200 OK (I-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

27. 200 OK (I-CSCF to S-CSCF) – see example in table 17.3.2.1-27

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

Table 17.3.2.1-27: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

Via: I-CSCF#1 decrypts all the tokenised entries belonging to its own network.

28. 200 OK (S-S#1b to MO) – see example in table 17.3.2.1-28

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

Table 17.3.2.1-28: 200 OK (S-S#1b to MO)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

29. UPDATE (MO to S-S#1b) – see example in table 17.3.2.1-29

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

Table 17.3.2.1-29: UPDATE (MO to S-S#1b)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
    <sip:Token(<sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>@home2.net;tokenized-
        by=home2.net>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 129 UPDATE
Content-Type: application/sdp
Content-Length: (...)

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

30. UPDATE (S-CSCF to I-CSCF) – see example in table 17.3.2.1-30

S-CSCF#1 forwards the UPDATE request to I-CSCF#1.

Table 17.3.2.1-30: UPDATE (S-CSCF to I-CSCF)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:icscf1_s.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
    <sip:Token(<sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>@home2.net;tokenized-
        by=home2.net>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

31. UPDATE (I-CSCF to I-CSCF) – see example in table 17.3.2.1-31

I-CSCF#1 forwards the UPDATE request to I-CSCF#2.

Table 17.3.2.1-31: UPDATE (I-CSCF to I-CSCF)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:icscf2_s.home2.net;lr>, <sip:Token(<sip:scscf2.home2.net;lr>,
<sip:pcscf2.home2.net;lr>@home2.net;tokenized-by=home2.net>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

Via:: I-CSCF#1 encrypts all the entries belonging to its own network to maintain configuration independence of the home#1 operator.

32. UPDATE (I-CSCF to S-CSCF) – see example in table 17.3.2.1-32

I-CSCF#2 decrypts all the tokenised Route entries belonging to its own network and forwards the UPDATE request to S-CSCF#2.

Table 17.3.2.1-32: UPDATE (I-CSCF to S-CSCF)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

33. UPDATE (S-S#1b to MT) – see example in table 17.3.2.1-33

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

Table 17.3.2.1-33: UPDATE (S-S#1b to MT)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 65
Route: <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

34. 200 OK (MT to S-S#1b) – see example in table 17.3.2.1-34

The terminating endpoint responds to the UPDATE request (33) with a 200 OK response.

Table 17.3.2.1-34: 200 OK (MT to S-S#1b)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

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

35. 200 OK (S-CSCF to I-CSCF) – see example in table 17.3.2.1-35

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

Table 17.3.2.1-35: 200 OK (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

36. 200 OK (I-CSCF to I-CSCF) – see example in table 17.3.2.1-36

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

Table 17.3.2.1-36: 200 OK (I-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

37. 200 OK (I-CSCF to S-CSCF) – see example in table 17.3.2.1-37

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

Table 17.3.2.1-37: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

Via: I-CSCF#1 decrypts all the tokenised entries belonging to its own network.

38. 200 OK (S-S#1b to MO) – see example in table 17.3.2.1-38

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

Table 17.3.2.1-38: 200 OK (S-S#1b to MO)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

39. 180 Ringing (MT to S-S#1b) – see example in table 17.3.2.1-39

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

Table 17.3.2.1-39: 180 Ringing (MT to S-S#1b)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
<sip:icscf2_s.home2.net;lr>, <sip:icscf1_s.home1.net;lr>,
<sip:Token(<sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>)@home1.net;tokenized-
by=home1.net>
From:
To:
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 9022
Content-Length: 0
```

40. 180 Ringing (S-CSCF to I-CSCF) – see example in table 17.3.2.1-40

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

Table 17.3.2.1-40: 180 Ringing (S-CSCF to I-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

41. 180 Ringing (I-CSCF to I-CSCF) – see example in table 17.3.2.1-41

I-CSCF#2 forwards the 180 Ringing response to I-CSCF#1.

Table 17.3.2.1-41: 180 Ringing (I-CSCF to I-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:Token(<sip:pcscf2.home2.net;lr>,
<sip:scscf2.home2.net;lr>)@home2.net;tokenized-by=home2.net>, <sip:icscf2_s.home2.net;lr>,
<sip:icscf1_s.home1.net;lr>, <sip:Token(<sip:scscf1.home1.net;lr>,
<sip:pcscf1.home1.net;lr>)@home1.net;tokenized-by=home1.net>
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

Record-Route: I-CSCF#2 encrypts all the entries belonging to its own network.

42. 180 Ringing (I-CSCF to S-CSCF) – see example in table 17.3.2.1-42

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

Table 17.3.2.1-42: 180 Ringing (I-CSCF to S-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:Token(<sip:pcscf2.home2.net;lr>,
    <sip:scscf2.home2.net;lr>)>@home2.net;tokenized-by=home2.net>, <sip:icscf2_s.home2.net;lr>,
    <sip:icscf1_s.home1.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

Record-Route: I-CSCF#1 decrypts all the entries belonging to its own network.

Via: I-CSCF#1 decrypts all the tokenised entries belonging to its own network.

43. 180 Ringing (S-S#1b to MO) – see example in table 17.3.2.1-43

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

Table 17.3.2.1-43: 180 Ringing (S-S#1b to MO)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

44. PRACK (MO to S-S#1b) – see example in table 17.3.2.1-44

The originator acknowledges the 180 Ringing provisional response (43) with a PRACK request.

Table 17.3.2.1-44: PRACK (MO to S-S#1b)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
    <sip:Token(<sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>)>@home2.net;tokenized-
    by=home2.net>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 130 PRACK
RAck: 9022 127 INVITE
Content-Length: 0
```

45. PRACK (S-CSCF to I-CSCF) – see example in table 17.3.2.1-45

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

Table 17.3.2.1-45: PRACK (S-CSCF to I-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:icscf1_s.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
<sip:Token(<sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>@home2.net;tokenized-
by=home2.net>
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:
```

46. PRACK (I-CSCF to I-CSCF) – see example in table 17.3.2.1-46

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

Table 17.3.2.1-46: PRACK (I-CSCF to I-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:icscf2_s.home2.net;lr>, <sip:Token(<sip:scscf2.home2.net;lr>,
<sip:pcscf2.home2.net;lr>@home2.net;tokenized-by=home2.net>
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:
```

Via: I-CSCF#1 encrypts all the entries belonging to its own network maintain configuration independence of the home#1 operator.

47. PRACK (I-CSCF to S-CSCF) – see example in table 17.3.2.1-47

I-CSCF#2 determines the routing information, and forwards the PRACK request to S-CSCF#2.

Table 17.3.2.1-47: PRACK (I-CSCF to S-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:
```

48. PRACK (S-S#1b to MT) – see example in table 17.3.2.1-48

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

Table 17.3.2.1-48: PRACK (S-S#1b to MT)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 65
Route: <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:
```

49. 200 OK (MT to S-S#1b) – see example in table 17.3.2.1-49

The terminating endpoint responds to the PRACK request (48) with a 200 OK response.

Table 17.3.2.1-49: 200 OK (MT to S-S#1b)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

50. 200 OK (S-CSCF to I-CSCF) – see example in table 17.3.2.1-50

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

Table 17.3.2.1-50: 200 OK (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

51. 200 OK (I-CSCF to I-CSCF) – see example in table 17.3.2.1-51

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

Table 17.3.2.1-51: 200 OK (I-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

52. 200 OK (I-CSCF to S-CSCF) – see example in table 17.3.2.1-52

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

Table 17.3.2.1-52: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

Via: I-CSCF#1 decrypts all tokenised entries that belong to its network..

53. 200 OK (S-S#1b to MO) – see example in table 17.3.2.1-53

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

Table 17.3.2.1-53: 200 OK (S-S#1b to MO)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

54. 200 OK (MT to S-S#1b) – see example in table 17.3.2.1-54

The final response to the INVITE (12), 200 OK, is sent by the terminating endpoint over the signalling path. This is typically generated when the subscriber has accepted the incoming session attempt. The response is sent to S-CSCF#2 per the termination procedure.

Table 17.3.2.1-54: 200 OK (MT to S-S#1b)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf2_s.home2.net;lr>, <sip:icscf1_s.home1.net;lr>,
    <sip:Token(<sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>)@home1.net;tokenized-
    by=home1.net>
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Content-Length: 0
```

55. 200 OK (S-CSCF to I-CSCF) – see example in table 17.3.2.1-55

The 200 OK response is forwarded to the I-CSCF#2.

Table 17.3.2.1-55: 200 OK (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

56. 200 OK (I-CSCF to I-CSCF) – see example in table 17.3.2.1-56

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

Table 17.3.2.1-56: 200 OK (I-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:Token(<sip:pcscf2.home2.net>, <sip:scscf2.home2.net>)@home2.net;tokenized-
    by=home2.net>, <sip:icscf2_s.home2.net>, <sip:icscf1_s.home1.net>,
    <sip:Token(<sip:scscf1.home1.net>, <sip:pcscf1.home1.net>)@home1.net;tokenized-
    by=home1.net>
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

Record-Route: I-CSCF#2 encrypts all the entries that belong to its network.

57. 200 OK (I-CSCF to S-CSCF) – see example in table 17.3.2.1-57

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

Table 17.3.2.1-57: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:Token(<sip:pcscf2.home2.net;lr>,
    <sip:scscf2.home2.net;lr>@home2.net;tokenized-by=home2.net>, <sip:icscf2_s.home2.net;lr>,
    <sip:icscf1_s.home1.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

Record-Route: I-CSCF#1 decrypts all the tokenised entries belonging to its own network.

Via: I-CSCF#1 decrypts all the tokenised entries that belong to its own network.

58. 200 OK (S-S#1b to MO) – see example in table 17.3.2.1-58

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

Table 17.3.2.1-58: 200 OK (S-S#1b to MO)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

59. ACK (MO to S-S#1b) – see example in table 17.3.2.1-59

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

Table 17.3.2.1-59: ACK (MO to S-S#1b)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
    <sip:Token(<sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>@home2.net;tokenized-
    by=home2.net>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 127 ACK
Content-Length: 0
```

60. ACK (S-CSCF to I-CSCF) – see example in table 17.3.2.1-60

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

Table 17.3.2.1-60: ACK (S-CSCF to I-CSCF)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:icscf1_s.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
<sip:Token(<sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>@home2.net;tokenized-
by=home2.net>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

61. ACK (I-CSCF to I-CSCF) – see example in table 17.3.2.1-61

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

Table 17.3.2.1-61: ACK (I-CSCF to I-CSCF)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:icscf2_s.home2.net;lr>, <sip:Token(<sip:scscf2.home2.net;lr>,
<sip:pcscf2.home2.net;lr>@home2.net;tokenized-by=home2.net>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

Via:: I-CSCF#1 encrypts all the entries that belong to its own network to maintain configuration independence of the home#1 operator.

62. ACK (I-CSCF to S-CSCF) – see example in table 17.3.2.1-62

I-CSCF#2 decrypts all the tokenised Route entries that belong to its own network and forwards the ACK request to S-CSCF#2.

Table 17.3.2.1-62: ACK (I-CSCF to S-CSCF)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

63. ACK (S-S#1b to MT) – see example in table 17.3.2.1-63

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

Table 17.3.2.1-63: ACK (S-S#1b to MT)

```

ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 65
Route: <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:

```

~~XXXXXXXXXXXXXXXXXXXXXXXXXXXX NEXT CHANGE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX~~

17.3.3.1 (S-S#1c) Different network operators performing origination and termination, with configuration hiding by originating network operator (MO#2, MT#2 assumed)

Figure 17.3.3.1-1 shows a S-CSCF handling session origination (S-CSCF#1) which performs an analysis of the destination address, and determines that it belongs to a subscriber of a different operator. The originating network operator desires to keep their configuration hidden, so forwards the request through an I-CSCF (I-CSCF#1) to a well-known entry point in the destination operator's network, I-CSCF#2. I-CSCF#2 queries the HSS for current location information, and finds the S-CSCF assigned to the subscriber (S-CSCF#2), and forwards the request to S-CSCF#2. The terminating network operator does not desire to keep their configuration hidden, so I-CSCF#2 does not insert itself into the signalling path for future exchanges.

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

- MO#1a** Mobile origination, roaming, without a THIG. The "Originating Network" of S-S#1c is therefore a visited network.
- MO#1b** Mobile origination, roaming, with a THIG in home network. The "Originating Network" of S-S#1c is therefore a visited network.
- MO#2** Mobile origination, located in home service area. The "Originating Network" of S-S#1c is therefore the home network.

~~**CS-O** — CS Networks origination. The "Originating Network" of S-S#1c is the home network. The element labeled S-CSCF#1 is the MGCF of the CS-O procedure.~~

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

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

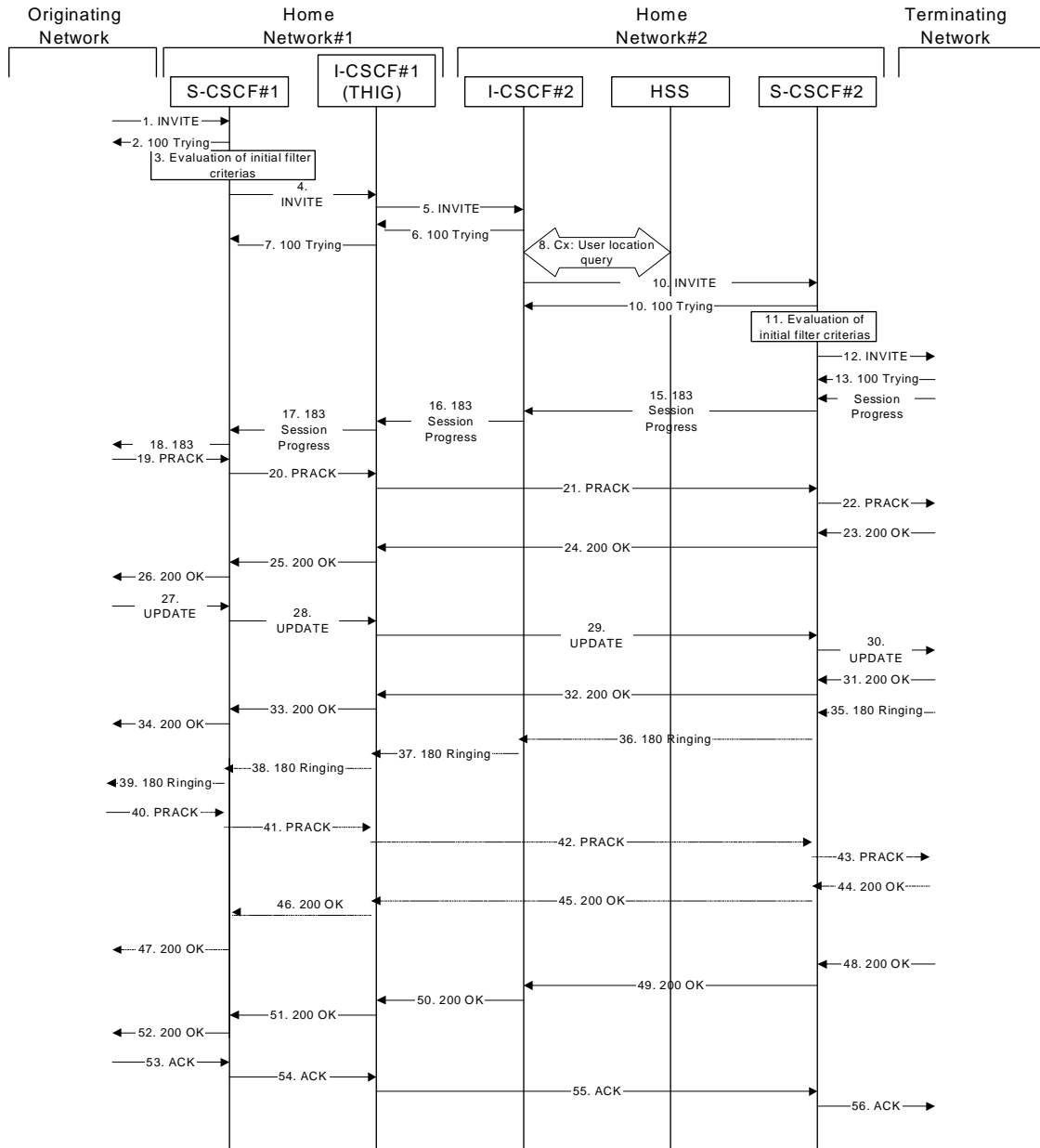


Figure 17.3.3.1-1: S-S#1c

Procedure S-S#1c is as follows:

1. INVITE (MO to S-S#1c) – see example in table 17.3.3.1-1

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

Table 17.3.3.1-1: INVITE (MO to S-S#1c)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
  [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>
Record-Route: <sip:pcscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>
Privacy: none
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: precondition
Supported: 100rel
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Type: application/sdp
Content-Length: (...)

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

2. 100 Trying (S-S#1c to MO) – see example in table 17.3.3.1-2

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

Table 17.3.3.1-2: 100 Trying (S-S#1c to MO)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
  [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

3. Evaluation of Filter Criteria

S-CSCF#1 validates the service profile of this subscriber, and evaluates the initial filter criterias.

4. INVITE (S-CSCF to I-CSCF) – see example in table 17.3.3.1-4

S-CSCF#1 performs an analysis of the destination address, and determines the network operator to whom the destination subscriber belongs. Since the originating operator desires to keep their internal configuration hidden, S-CSCF#1 forwards the INVITE request to I-CSCF#1.

Table 17.3.3.1-4: INVITE (S-CSCF to I-CSCF)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:icscf1_s.home1.net;lr>
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>, <tel:+1-212-555-1111>
Privacy: none
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net
From:
To:
Call-ID:
Cseq:
Required:
Supported:
Contact:
Content-Type:
Content-Length: (...)

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

Route: Topmost Route header set to the I-CSCF that will perform the translation needed to maintain configuration independence.

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

P-Charging-Vector: The S-CSCF adds the identifier of its own network to the originating Inter Operator Identifier (IOI) parameter of this header.

5. INVITE (I-CSCF to I-CSCF) – see example in table 17.3.3.1-5

I-CSCF#1 finds the entry point in home2.net and forwards the INVITE request to I-CSCF#2.

Table 17.3.3.1-5: INVITE (I-CSCF to I-CSCF)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP icscfl_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net, SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-
by=home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Record-Route: <sip:Token(<sip:scscf1.home1.net;lr>,
<sip:pcscf1.home1.net;lr>@home1.net;tokenized-by=home1.net>
P-Asserted-Identity:
Privacy:
P-Charging-Vector:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length:

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

Via/Record-Route: Translated to maintain configuration independence of the home#1 operator.

6. 100 Trying (I-CSCF to I-CSCF) – see example in table 17.3.3.1-6

I-CSCF#2 responds to the INVITE request (5) with a 100 Trying provisional response.

Table 17.3.3.1-6: 100 Trying (I-CSCF to I-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
  scscf1.home1.net, SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-
  by=home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

7. 100 Trying (I-CSCF to S-CSCF) – see example in table 17.3.3.1-7

I-CSCF#1 determines the Via header, and forwards the 100 Trying provisional response to S-CSCF#1.

Table 17.3.3.1-7: 100 Trying (I-CSCF to S-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
  pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
  [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

8. Cx: User Location Query procedure

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

For detailed message flows see 3GPP TS 29.228.

Table 7.3.2-6a provides the parameters in the SIP INVITE request (flow 5), which are sent to the HSS.

Table 7.3.2-6b provides the parameters sent from the HSS that are mapped to the SIP INVITE request (flow 9) and sent to the S-CSCF.

9. INVITE (I-CSCF to S-CSCF) – see example in table 17.3.3.1-9

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

Table 17.3.3.1-9: INVITE (I-CSCF to S-CSCF)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
    SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:scscf2.home2.net;lr>
Record-Route:
P-Asserted-Identity:
Privacy:
P-Charging-Vector:
From:
To:
Call-ID:
Cseq:
Required:
Supported:
Contact:
Content-Type:
Content-Length:

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

10. 100 Trying (S-CSCF to I-CSCF) – see example in table 17.3.3.1-10

S-CSCF#2 responds to the INVITE request with a 100 Trying provisional response.

Table 17.3.3.1-10: 100 Trying (S-CSCF to I-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
    SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

11. Evaluation of initial filter criteria

S-CSCF#2 validates the service profile of this subscriber and evaluates the initial filter criterias.t

12. INVITE (S-S#1c to MT) – see example in table 17.3.3.1-12

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

Table 17.3.3.1-12: INVITE (S-S#1c to MT)

```
INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
    SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 65
Route: <sip:pcscf2.home2.net;lr>
Record-Route: <sip:scscf2.home2.net;lr>, <sip:icscf1_s.home1.net;lr>,
    <sip:Token(<sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>)@home1.net;tokenized-
    by=home1.net>
P-Asserted-Identity:
Privacy:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
From:
To:
Call-ID:
Cseq:
Required:
Supported:
Contact:
P-Called-Party-ID: <sip:user2_public1@home2.net>
Content-Type:
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 3456 RTP/AVP 97 96 0 15
b=AS:25.4
a=qos:mandatory sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
m=audio 0 RTP/AVP 97 96 0 15
```

13. 100 Trying (MT to S-S#1c) – see example in table 17.3.3.1-13

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

Table 17.3.3.1-13: 100 Trying (MT to S-S#1c)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
    SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

14. 183 Session Progress (MT to S-S#1c) – see example in table 17.3.3.1-14 (related to 17.3.3.1-12)

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

Table 17.3.3.1-14: 183 Session Progress (MT to S-S#1c)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
    SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf1_s.home1.net;lr>, <sip:Token(<sip:scscf1.home1.net;lr>,
    <sip:pcscf1.home1.net;lr>)@home1.net;tokenized-by=home1.net>
P-Asserted-Identity: "John Smith" <sip:user2_public1@home1.net>
Privacy: none
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
From:
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 9021
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97
b=AS:25.4 3
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=qos:mandatory sendrecv confirm
m=audio 0 RTP/AVP 97 96 0 15
```

15. 183 Session Progress (S-CSCF to I-CSCF) – see example in table 17.3.3.1-15

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

Table 17.3.3.1-15: 183 Session Progress (S-CSCF to I-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
    SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity: "John Smith" <sip:user2_public1@home1.net>, <tel:+1-212-555-2222>
Privacy: none
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net;
    term-ioi=home2.net
P-Charging-Function-Addresses: ccf=[5555::b99:c88:d77:e66]; ccf=[5555::a55:b44:c33:d22];
    ecf=[5555::1ff:2ee:3dd:4cc]; ecf=[5555::6aa:7bb:8cc:9dd]
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

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

P-Charging-Vector: The S-CSCF adds the identifier of its own network to the terminating Inter Operator Identifier (IOI) parameter of this header.

P-Charging-Function-Addresses: The S-CSCF passes this header to the I-CSCF for charging.

16. 183 Session Progress (I-CSCF to I-CSCF) – see example in table 17.3.3.1-16

I-CSCF#2 forwards the 183 Session Progress provisional response to I-CSCF#1.

Table 17.3.3.1-16: 183 Session Progress (I-CSCF to I-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
  scscf1.home1.net, SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-
  by=home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity:
Privacy:
P-Charging-Vector:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

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

17. 183 Session Progress (I-CSCF to S-CSCF) – see example in table 17.3.3.1-17

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

Table 17.3.3.1-17: 183 Session Progress (I-CSCF to S-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf1_s.home1.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
P-Asserted-Identity:
Privacy:
P-Charging-Vector:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

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

Record-Route: I-CSCF#1 determines the entry to the right of its own entry.

Via: determined by I-CSCF#1.

18. 183 Session Progress (S-S#1c to MO) – see example in table 17.3.3.1-18

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

Table 17.3.3.1-18: 183 Session Progress (S-S#1c to MO)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity:
Privacy:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

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

19. PRACK (MO to S-S#1c) – see example in table 17.3.3.1-19

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

Table 17.3.3.1-19: PRACK (MO to S-S#1c)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:pcscf2.home2.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Require: precondition
Cseq: 128 PRACK
RAck: 9021 127 INVITE
Content-Type: application/sdp
Content-Length: (...)

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


20. PRACK (S-CSCF to I-CSCF) – see example in table 17.3.3.1-20

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

Table 17.3.3.1-20: PRACK (S-CSCF to I-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:icscf1_s.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

21. PRACK (I-CSCF to S-CSCF) – see example in table 17.3.3.1-21

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

Table 17.3.3.1-21: PRACK (I-CSCF to S-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net, SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-
    by=home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

22. PRACK (S-S#1c to MT) – see example in table 17.3.3.1-22

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

Table 17.3.3.1-22: PRACK (S-S#1c to MT)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
    SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

23. 200 OK (MT to S-S#1c) – see example in table 17.3.3.1-23

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

Table 17.3.3.1-23: 200 OK (MT to S-S#1c)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
    SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

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

24. 200 OK (S-CSCF to I-CSCF) – see example in table 17.3.3.1-24

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

Table 17.3.3.1-24: 200 OK (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
      scscf1.home1.net, SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-
      by=home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

25. 200 OK (I-CSCF to S-CSCF) – see example in table 17.3.3.1-25

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

Table 17.3.3.1-25: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
      pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
      [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

Via: Determined by I-CSCF#1.

26. 200 OK (S-S#1c to MO) – see example in table 17.3.3.1-26

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

Table 17.3.3.1-26: 200 OK (S-S#1c to MO)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

27. UPDATE (MO to S-S#1c) – see example in table 17.3.3.1-27

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

Table 17.3.3.1-27: UPDATE (MO to S-S#1c)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:pcscf2.home2.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 129 UPDATE
Content-Type: application/sdp
Content-Length: (...)

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

28. UPDATE (S-CSCF to I-CSCF) – see example in table 17.3.3.1-28

S-CSCF#1 forwards the UPDATE request to I-CSCF#1.

Table 17.3.3.1-28: UPDATE (S-CSCF to I-CSCF)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:icscf1_s.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

29. UPDATE (I-CSCF to S-CSCF) – see example in table 17.3.3.1-29

I-CSCF#1 forwards the UPDATE request to S-CSCF#2.

Table 17.3.3.1-29: UPDATE (I-CSCF to S-CSCF)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net, SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-
    by=home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

30. UPDATE (S-S#1c to MT) – see example in table 17.3.3.1-30

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

Table 17.3.3.1-30: UPDATE (S-S#1c to MT)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
    SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

31. 200 OK (MT to S-S#1c) – see example in table 17.3.3.1-31

The terminating endpoint responds to the UPDATE request with a 200 OK response.

Table 17.3.3.1-31: 200 OK (MT to S-S#1c)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
    SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

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

32. 200 OK (S-CSCF to I-CSCF) – see example in table 17.3.3.1-32

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

Table 17.3.3.1-32: 200 OK (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
  scscf1.home1.net, SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-
  by=home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

33. 200 OK (I-CSCF to S-CSCF) – see example in table 17.3.3.1-33

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

Table 17.3.3.1-33: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
  pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
  [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

Via: Determined by I-CSCF#1.

34. 200 OK (S-S#1c to MO) – see example in table 17.3.3.1-34

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

Table 17.3.3.1-34: 200 OK (S-S#1c to MO)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

35. 180 Ringing (MT to S-S#1c) – see example in table 17.3.3.1-35 (related to table 17.3.3.1-12)

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

Table 17.3.3.1-35: 180 Ringing (MT to S-S#1c)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
    SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf1_s.home1.net;lr>, <sip:Token(<sip:scscf1.home1.net;lr>,
    <sip:pcscf1.home1.net;lr>)@home1.net;tokenized-by=home1.net>
From:
To:
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 9022
Content-Length: 0
```

36. 180 Ringing (S-CSCF to I-CSCF) – see example in table 17.3.3.1-36

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

Table 17.3.3.1-36: 180 Ringing (S-CSCF to I-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
    SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```


37. 180 Ringing (I-CSCF to I-CSCF) – see example in table 17.3.3.1-37

I-CSCF#2 forwards the 180 Ringing response to I-CSCF#1.

Table 17.3.3.1-37: 180 Ringing (I-CSCF to I-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net, SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-
    by=home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

38. 180 Ringing (I-CSCF to S-CSCF) – see example in table 17.3.3.1-38

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

Table 17.3.3.1-38: 180 Ringing (I-CSCF to S-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf1_s.home1.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

Record-Route: Formed by I-CSCF#1 determining the entry to the right of its own entry.

Via: Determined by I-CSCF#1.

39. 180 Ringing (S-S#1c to MO) – see example in table 17.3.3.1-39

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

Table 17.3.3.1-39: 180 Ringing (S-S#1c to MO)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

40. PRACK (MO to S-S#1c) – see example in table 17.3.3.1-40

The originator acknowledges the 180 Ringing provisional response (39) with a PRACK request.

Table 17.3.3.1-40: PRACK (MO to S-S#1c)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:pcscf2.home2.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfgk490333
Cseq: 130 PRACK
RAck: 9022 127 INVITE
Content-Length: 0
```

41. PRACK (S-CSCF to I-CSCF) – see example in table 17.3.3.1-41

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

Table 17.3.3.1-41: PRACK (S-CSCF to I-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:icscf1_s.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:
```

42. PRACK (I-CSCF to S-CSCF) – see example in table 17.3.3.1-42

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

Table 17.3.3.1-42: PRACK (I-CSCF to S-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net, SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-
    by=home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Length:
```

43. PRACK (S-S#1c to MT) – see example in table 17.3.3.1-43

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

Table 17.3.3.1-43: PRACK (S-S#1c to MT)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
  icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
  SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
  SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:
```

44. 200 OK (MT to S-S#1c) – see example in table 17.3.3.1-44

The terminating endpoint responds to the PRACK request (43) with a 200 OK response.

Table 17.3.3.1-44: 200 OK (MT to S-S#1c)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
  icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
  SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
  SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

45. 200 OK (S-CSCF to I-CSCF) – see example in table 17.3.3.1-45

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

Table 17.3.3.1-45: 200 OK (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
  scscf1.home1.net, SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-
  by=home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

46. 200 OK (I-CSCF to S-CSCF) – see example in table 17.3.3.1-46

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

Table 17.3.3.1-46: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
  pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
  [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

Via: Determined by I-CSCF#1.

47. 200 OK (S-S#1c to MO) – see example in table 17.3.3.1-47

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

Table 17.3.3.1-47: 200 OK (S-S#1c to MO)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

48. 200 OK (MT to S-S#1c) – see example in table 17.3.3.1-48 (related to 17.3.3.1-13)

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 session attempt. The response is sent to S-CSCF#2 per the termination procedure.

Table 17.3.3.1-48: 200 OK (MT to S-S#1c)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf1_s.home1.net;lr>, <sip:Token(<sip:scscf1.home1.net;lr>,
    <sip:pcscf1.home1.net;lr>)@home1.net;tokenized-by=home1.net>
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Content-Length: (...)
```

49. 200 OK (S-CSCF to I-CSCF) – see example in table 17.3.3.1-49

The 200 OK response is forwarded to the I-CSCF#2.

Table 17.3.3.1-49: 200 OK (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

50. 200 OK (I-CSCF to I-CSCF) – see example in table 17.3.3.1-50

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

Table 17.3.3.1-50: 200 OK (I-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP
    Token(sip:scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

51. 200 OK (I-CSCF to S-CSCF) – see example in table 17.3.3.1-51

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

Table 17.3.3.1-51: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf1_s.home1.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

Record-Route: Formed by I-CSCF#1 determining the entry to the right of its own entry.

Via: Determined by I-CSCF#1.

52. 200 OK (S-S#1c to MO) – see example in table 17.3.3.1-52

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

Table 17.3.3.1-52: 200 OK (S-S#1c to MO)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

53. ACK (MO to S-S#1c) – see example in table 17.3.3.1-53

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

Table 17.3.3.1-53: ACK (MO to S-S#1c)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:pcscf2.home2.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfgklkj490333
Cseq: 127 ACK
Content-Length: 0
```

54. ACK (S-CSCF to I-CSCF) – see example in table 17.3.3.1-54

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

Table 17.3.3.1-54: ACK (S-CSCF to I-CSCF)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:icscf1_s.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

55. ACK (I-CSCF to S-CSCF) – see example in table 17.3.3.1-55

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

Table 17.3.3.1-55: ACK (I-CSCF to S-CSCF)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

56. ACK (S-S#1c to MT) – see example in table 17.3.3.1-56

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

Table 17.3.3.1-56: ACK (S-S#1c to MT)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Route: <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

XXXXXXXXXXXXXXXXXXXXXXXXXXXXX NEXT CHANGE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

17.3.4.1 (S-S#1d) Different network operators performing origination and termination, with configuration hiding by terminating network operator (MO#2, MT#2 assumed)

Figure 17.3.4.1-1 shows a S-CSCF handling session origination (S-CSCF#1) which performs an analysis of the destination address, and determines that it belongs to a subscriber of a different operator. S-CSCF#1 forwards the request to a well-known entry point in the destination operator's network, I-CSCF#2. I-CSCF#2 queries the HSS for current location information, and finds the S-CSCF assigned to the subscriber (S-CSCF#2), and forwards the request to S-CSCF#2. The terminating network operator desires to keep their configuration hidden, so I-CSCF#2 inserts itself into the signalling path for future exchanges.

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

- MO#1a** Mobile origination, roaming, without a THIG. The "Originating Network" of S-S#1d is therefore a visited network.
- MO#1b** Mobile origination, roaming, with a THIG in home network. The "Originating Network" of S-S#1d is therefore a visited network.
- MO#2** Mobile origination, located in home service area. The "Originating Network" of S-S#1d is therefore the home network.

~~**CS-O** — CS Networks origination. The "Originating Network" of S-S#1d is the home network. The element labeled S-CSCF#1 is the MGCF of the CS-O procedure.~~

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

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

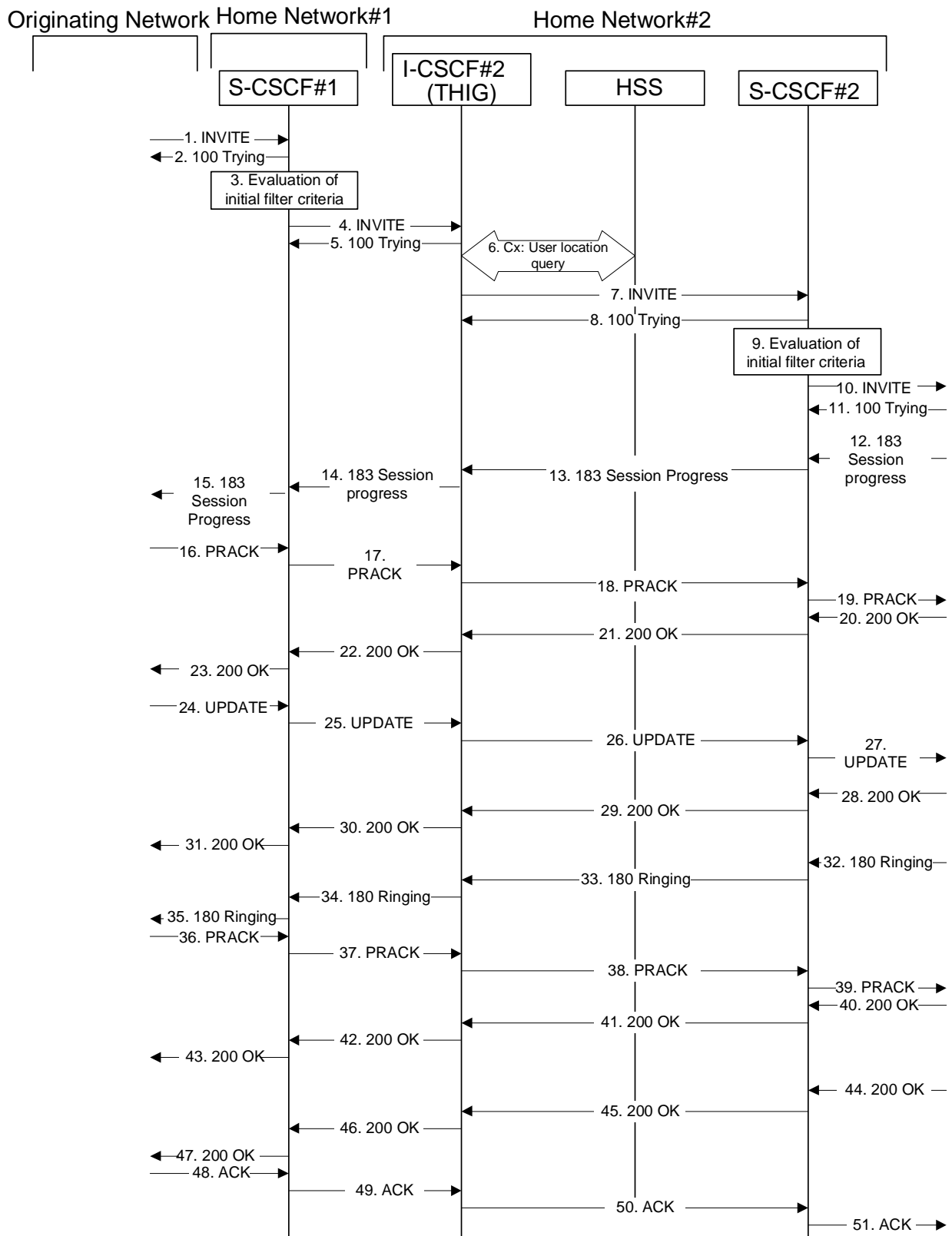


Figure 17.3.4.1-1: S-S#1d

Procedure S-S#1d is as follows:

1. INVITE (MO to S-S#1d) – see example in table 17.3.4.1-1

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

Table 17.3.4.1-1: INVITE (MO to S-S#1d)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>
Record-Route: <sip:pcscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <tel:+1-212-555-1111>
Privacy: none
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: precondition
Supported: 100rel
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Type: application/sdp
Content-Length: (...)

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

2. 100 Trying (S-S#1d to MO) – see example in table 17.3.4.1-2

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

Table 17.3.4.1-2: 100 Trying (S-S#1d to MO)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

3. Evaluation of initial filter criterias

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

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

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

4. INVITE (S-CSCF to I-CSCF) – see example in table 17.3.4.1-4

S-CSCF#1 performs an analysis of the destination address, and determines the network operator to whom the destination subscriber belongs. S-CSCF#1 forwards the INVITE request to I-CSCF#2, the well-known entry point of the destination network.

Table 17.3.4.1-4: INVITE (S-CSCF to I-CSCF)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>, <tel:+1-212-555-1111>
Privacy:
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"; orig-ioi=home1.net
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length: (...)

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

P-Asserted-Identity: The S-CSCF adds the corresponding TEL URL to the P-Asserted-Identity header in order that the TEL URL is known to the destination network in case the INVITE is forwarded to a MGCF.

P-Charging-Vector: The S-CSCF adds the identifier of its own network to the originating Inter Operator Identifier (IOI) parameter of this header.

5. 100 Trying (I-CSCF to I-CSCF) – see example in table 17.3.4.1-5

I-CSCF#2 responds to the INVITE request (4) with a 100 (Trying) provisional response.

Table 17.3.4.1-5: 100 Trying (I-CSCF to S-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

6. Cx: User Location Query procedure

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

For detailed message flows see 3GPP TS 29.228.

Table 7.3.2.1-6a provides the parameters in the SIP INVITE message (flow 4) which need to be sent to HSS.

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

7. INVITE (I-CSCF to S-CSCF) – see example in table 17.3.4.1-7

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

Table 17.3.4.1-7: INVITE (I-CSCF to S-CSCF)

```

INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf1.home2.net;lr>
Record-Route: <sip:icscf2_s.home2.net;lr>, <sip:scscf1.home1.net;lr>,
    <sip:pcscf1.home1.net;lr>
P-Asserted-Identity:
Privacy:
P-Charging-Vector:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length:

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

```

8. 100 Trying (S-CSCF to I-CSCF) – see example in table 17.3.4.1-8

S-CSCF#2 responds to the INVITE request (7) with a 100 (Trying) provisional response.

Table 17.3.4.1-8: 100 Trying (S-CSCF to I-CSCF)

```

SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0

```

9. Evaluation of initial filter criterias

S-CSCF#2 validates the service profile of this subscriber and evaluates the initial filter criterias. For this example, assume no Application Server involvement

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

S-CSCF#2 examines the media parameters, and removes any choices that the destination subscriber does not have authority to request.

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

10. INVITE (S-S#1d to MT) – see example in table 17.3.4.1-10

S-CSCF#2 forwards the INVITE request, as determined by the termination procedure.

Table 17.3.4.1-10: INVITE (S-S#1d to MT)

```

INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:pcscf2.home2.net;lr>
Record-Route: <sip:scscf2.home2.net;lr>, <sip:icscf2_s.home2.net;lr>,
    <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
P-Asserted-Identity:
Privacy:
P-Charging-Vector: icid-value="AyretyU0dm+602Irt5tAFrbHLso=023551024"
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
P-Called-Party-ID: <sip:user2_public1@home2.net>
Content-Type:
Content-Length: (...)

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

```

11.100 Trying (MT to S-S#1d) – see example in table 17.3.4.1-11

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

Table 17.3.4.1-11: 100 Trying (MT to S-S#1d)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

12. 183 Session Progress (MT to S-S#1d) – see example in table 17.3.4.1-12

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

Table 17.3.4.1-12: 183 Session Progress (MT to S-S#1d)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf2_s.home2.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity: "John Smith" <sip:user2_public1@home2.net>
Privacy: none
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
From:
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 9021
Content-Type: application/sdp
Content-Length: (...)

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

13. 183 Session Progress (S-CSCF to I-CSCF) – see example in table 17.3.4.1-13

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

Table 17.3.4.1-13: 183 Session Progress (S-CSCF to I-CSCF)

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity:
Privacy:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net;
    term-ioi=home2.net
P-Charging-Function-Addresses: ccf=[5555::b99:c88:d77:e66]; ccf=[5555::a55:b44:c33:d22];
    ecf=[5555::1ff:2ee:3dd:4cc]; ecf=[5555::6aa:7bb:8cc:9dd]
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

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

```

P-Charging-Vector: The S-CSCF adds the identifier of its own network to the terminating Inter Operator Identifier (IOI) parameter of this header.

P-Charging-Function-Addresses: The S-CSCF passes this header to the I-CSCF for charging.

14. 183 Session Progress (I-CSCF to S-CSCF) – see example in table 17.3.4.1-14

I-CSCF#2 forwards the 183 (Session Progress) provisional response to S-CSCF#1.

Table 17.3.4.1-14: 183 Session Progress (I-CSCF to S-CSCF)


```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555:aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:token(<sip:pcscf2.home2.net;lr>,
    <sip:scscf2.home2.net;lr>@home2.net;tokenized-by=home2.net>, <sip:icscf2_s.home2.net;lr>,
    <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity:
Privacy:
P-Charging-Vector:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

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

```

Record-Route: The I-CSCF#2 tokenizes the entries of its own network

15. 183 Session Progress (S-S#1d to MO) – see example in table 17.3.4.1-15

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

Table 17.3.4.1-15: 183 Session Progress (S-S#1d to MO)

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity:
Privacy:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

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

```

16. PRACK (MO to S-S#1d) – see example in table 17.3.4.1-16

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

Table 17.3.4.1-16: PRACK (MO to S-S#1d)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
    <sip:token(<sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>@home2.net;tokenized-
    by=home2.net)>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 128 PRACK
Require: precondition
RAck: 9021 127 INVITE
Content-Type: application/sdp
Content-Length: (...)

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

```

17. PRACK (S-CSCF to I-CSCF) – see example in table 17.3.4.1-17

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

Table 17.3.4.1-17: PRACK (S-CSCF to I-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:icscf2_s.home2.net;lr>, <sip:token(<sip:pcscf2.home2.net;lr>,
    <sip:scscf2.home2.net;lr>@home2.net;tokenized-by=home2.net)>
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

18. PRACK (I-CSCF to S-CSCF) – see example in table 17.3.4.1-18

I-CSCF#2 determines the routing information, and forwards the PRACK request to S-CSCF#2.

Table 17.3.4.1-18: PRACK (I-CSCF to S-CSCF)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

```

19. PRACK (S-S#1d to MT) – see example in table 17.3.4.1-19

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

Table 17.3.4.1-19: PRACK (S-S#1d to MT)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

```

20. 200 OK (MT to S-S#1d) – see example in table 17.3.4.1-20

The terminating endpoint responds to the PRACK request (19) with a 200 (OK) response.

Table 17.3.4.1-20: 200 OK (MT to S-S#1d)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

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

21. 200 OK (S-CSCF to I-CSCF) – see example in table 17.3.4.1-21

S-CSCF#2 forwards the 200 (OK) response to I-CSCF#2.

Table 17.3.4.1-21: 200 OK (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

22. 200 OK (I-CSCF to S-CSCF) – see example in table 17.3.4.1-22

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

Table 17.3.4.1-22: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

23. 200 OK (S-S#1d to MO) – see example in table 17.3.4.1-23

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

Table 17.3.4.1-23: 200 OK (S-S#1d to MO)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

24. UPDATE (MO to S-S#1d) – see example in table 17.3.4.1-24

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

Table 17.3.4.1-24: UPDATE (MO to S-S#1d)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
<sip:token(<sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>@home2.net;tokenized-
by=home2.net>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 129 UPDATE
Content-Type: application/sdp
Content-Length: (...)

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

25. UPDATE (S-CSCF to I-CSCF) – see example in table 17.3.4.1-25

S-CSCF#1 forwards the UPDATE request to I-CSCF#2.

Table 17.3.4.1-25: UPDATE (S-CSCF to I-CSCF)

```

UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:icscf2_s.home2.net;lr>, <sip:token(<sip:pcscf2.home2.net;lr>,
    <sip:scscf2.home2.net;lr>)>@home2.net;tokenized-by=home2.net>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

```

26. UPDATE (I-CSCF to S-CSCF) – see example in table 17.3.4.1-26

I-CSCF#2 forwards the UPDATE request to S-CSCF#2.

Table 17.3.4.1-26: UPDATE (I-CSCF to S-CSCF)

```

UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

```

27. UPDATE (S-S#1d to MT) – see example in table 17.3.4.1-27

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

Table 17.3.4.1-27: UPDATE (S-S#1d to MT)


```

UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

```

28. 200 OK (MT to S-S#1d) – see example in table 17.3.4.1-28

The terminating endpoint responds to the UPDATE request (27) with a 200 (OK) response.

Table 17.3.4.1-28: 200 OK (MT to S-S#1d)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: (...)

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

```

29. 200 OK (S-CSCF to I-CSCF) – see example in table 17.3.4.1-29

S-CSCF#2 forwards the 200 (OK) response to I-CSCF#2.

Table 17.3.4.1-29: 200 OK (S-CSCF to I-CSCF)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

```

30. 200 OK (I-CSCF to S-CSCF) – see example in table 17.3.4.1-30

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

Table 17.3.4.1-30: 200 OK (I-CSCF to S-CSCF)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

```

31. 200 OK (S-S#1d to MO) – see example in table 17.3.4.1-31

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

Table 17.3.4.1-31: 200 OK (S-S#1d to MO)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

```

32. 180 Ringing (MT to S-S#1d) – see example in table 17.3.4.1-32

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

Table 17.3.4.1-32: 180 Ringing (MT to S-S#1d)

```

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf2_s.home2.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 9022
Content-Length: 0

```

33. 180 Ringing (S-CSCF to I-CSCF) – see example in table 17.3.4.1-33

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

Table 17.3.4.1-33: 180 Ringing (S-CSCF to I-CSCF)

```

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:

```

34. 180 Ringing (I-CSCF to S-CSCF) – see example in table 17.3.4.1-34

I-CSCF#2 forwards the 180 (Ringing) response to S-CSCF#1.

Table 17.3.4.1-34: 180 Ringing (I-CSCF to S-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:token(<sip:pcscf2.home2.net;lr>,
    <sip:scscf2.home2.net;lr>@home2.net;tokenized-by=home2.net>, <sip:icscf2_s.home2.net;lr>,
    <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

35. 180 Ringing (S-S#1d to MO) – see example in table 17.3.4.1-35

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

Table 17.3.4.1-35: 180 Ringing (S-S#1d to MO)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

36. PRACK (MO to S-S#1d) – see example in table 17.3.4.1-36

The originator acknowledges the 180 (Ringing) provisional response (35) with a PRACK request.

Table 17.3.4.1-36: PRACK (MO to S-S#1d)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
    <sip:token(<sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>@home2.net;tokenized-
    by=home2.net>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 130 PRACK
RAck: 9022 127 INVITE
Content-Length: 0
```

37. PRACK (S-CSCF to I-CSCF) – see example in table 17.3.4.1-37

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

Table 17.3.4.1-37: PRACK (S-CSCF to I-CSCF)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:icscf2_s.home2.net;lr>, <sip:token(<sip:pcscf2.home2.net;lr>,
    <sip:scscf2.home2.net;lr>)>@home2.net;tokenized-by=home2.net>
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:

```

38. PRACK (I-CSCF to S-CSCF) – see example in table 17.3.4.1-38

I-CSCF#2 determines the routing information, and forwards the PRACK request to S-CSCF#2.

Table 17.3.4.1-38: PRACK (I-CSCF to S-CSCF)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:

```

39. PRACK (S-S#1d to MT) – see example in table 17.3.4.1-39

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

Table 17.3.4.1-39: PRACK (S-S#1d to MT)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP scscf1.home1.net, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:

```

40. 200 OK (MT to S-S#1d) – see example in table 17.3.4.1-40

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

Table 17.3.4.1-40: 200 OK (MT to S-S#1d)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

41. 200 OK (S-CSCF to I-CSCF) – see example in table 17.3.4.1-41

S-CSCF#2 forwards the 200 (OK) response to I-CSCF#2.

Table 17.3.4.1-41: 200 OK (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

42. 200 OK (I-CSCF to S-CSCF) – see example in table 17.3.4.1-42

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

Table 17.3.4.1-42: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

43. 200 OK (S-S#1d to MO) – see example in table 17.3.4.1-43

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

Table 17.3.4.1-43: 200 OK (S-S#1d to MO)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

44. 200 OK (MT to S-S#1d) – see example in table 17.3.4.1-44

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

Table 17.3.4.1-44: 200 OK (MT to S-S#1d)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home2.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf2_s.home2.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Content-Length: 0

```

45. 200 OK (S-CSCF to I-CSCF) – see example in table 17.3.4.1-45

The 200 (OK) response is forwarded to the I-CSCF#2.

Table 17.3.4.1-45: 200 OK (S-CSCF to I-CSCF)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:

```

46. 200 OK (I-CSCF to S-CSCF) – see example in table 17.3.4.1-46

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

Table 17.3.4.1-46: 200 OK (I-CSCF to S-CSCF)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:token(<sip:pcscf2.home2.net;lr>,
    <sip:scscf2.home2.net;lr>@home2.net;tokenized-by=home2.net>, <sip:icscf2_s.home2.net;lr>,
    <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:

```

47. 200 OK (S-S#1d to MO) – see example in table 17.3.4.1-47

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

Table 17.3.4.1-47: 200 OK (S-S#1d to MO)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

48. ACK (MO to S-S#1d) – see example in table 17.3.4.1-48

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

Table 17.3.4.1-48: ACK (MO to S-S#1d)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
    <sip:token(<sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>@home2.net;tokenized-
    by=home2.net>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 127 ACK
Content-Length: 0
```

49. ACK (S-CSCF to I-CSCF) – see example in table 17.3.4.1-49

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

Table 17.3.4.1-49: ACK (S-CSCF to I-CSCF)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:icscf2_s.home2.net;lr>, <sip:token(<sip:pcscf2.home2.net;lr>,
    <sip:scscf2.home2.net;lr>@home2.net;tokenized-by=home2.net>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

50. ACK (I-CSCF to S-CSCF) – see example in table 17.3.4.1-50

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

Table 17.3.4.1-50: ACK (I-CSCF to S-CSCF)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```


51. ACK (S-S#1d to MT) – see example in table 17.3.4.1-51

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

Table 17.3.4.1-51: ACK (S-S#1d to MT)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

CR-Form-v7

CHANGE REQUEST

⌘ **24.228 CR 121** ⌘ rev **1** ⌘ Current version: **5.6.0** ⌘

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

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ Corrections regarding SDP handling		
Source:	⌘ Orange		
Work item code:	⌘ IMS-CCR	Date:	⌘ 10/10/2003
Category:	⌘ F	Release:	⌘ Rel-5
	Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)

Reason for change:	⌘ The main objective of this CR is to align SDP check procedure with the decision made end of year 2002 that the change or removal of SDP parameters cannot be made by CSCF and that this is done using message 488 (Not Acceptable Here). The relevant changes were already made in section 7, but not in sections 10 and 17. Some minor correctioning in SDP are done at the same time
Summary of change:	⌘ - Changes so that there is no more references to removal of SDP by CSCF and descriptions of SDP parameters in the messages is done accordingly (sections 10 and 17). SDP content is also corrected and aligned with content of section 7. - minor changes to SDP are also made (7.4.2.1)
Consequences if not approved:	⌘ - The specification is not consistent between its different paragraphs and is not in line with CSCF behaviours as defined by TS24.229

Clauses affected:	⌘ 7.4.2.1, 10.4.2, 10.4.3, 10.4.4, 17.2.2, 17.3.2.1, 17.3.3.1, 17.3.4.1, 17.4.2.1										
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;">⌘</td> <td style="text-align: center;">X</td> </tr> <tr> <td style="text-align: center;">⌘</td> <td style="text-align: center;">X</td> </tr> <tr> <td style="text-align: center;">⌘</td> <td style="text-align: center;">X</td> </tr> </table> Other core specifications Test specifications O&M Specifications	Y	N	⌘	X	⌘	X	⌘	X	⌘	
Y	N										
⌘	X										
⌘	X										
⌘	X										
Other comments:	⌘										

How to create CRs using this form:

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

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

XXXXXXXXXXXXXXXXXXXXXXXXXXXX NEXT CHANGE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

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

Figure 7.4.2.1 shows a termination procedure which applies to roaming subscribers when the home network operator does not desire to keep its internal configuration hidden from the visited network. The UE is located in a visited network, and determines the P-CSCF via the P-CSCF discovery procedure. During registration, the home network allocates the S-CSCF.

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

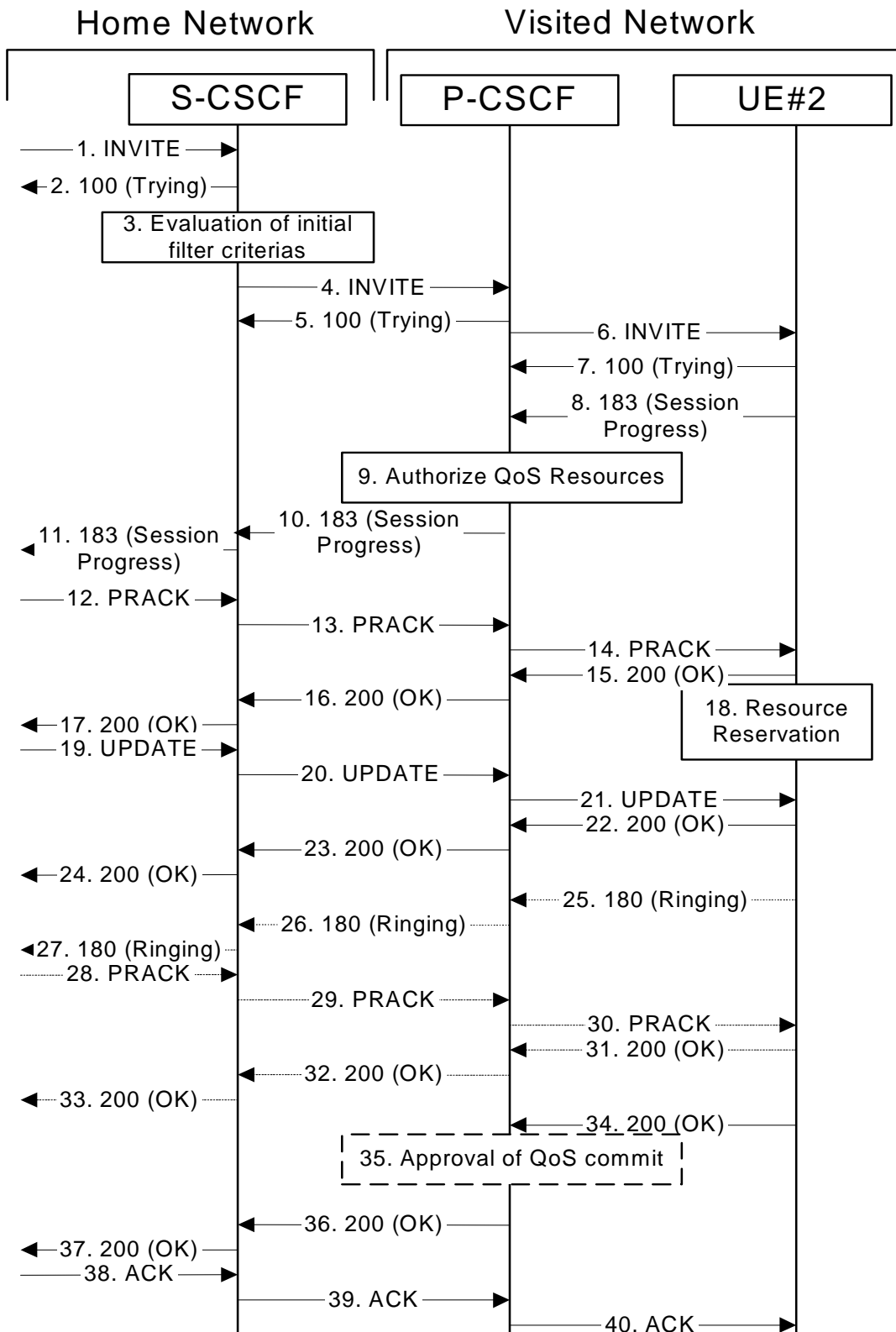


Figure 7.4.2.1-1: MT#1a

Procedure MT#1a is as follows:

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

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

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

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf2.home2.net;lr>
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>, <tel:+1-212-555-1111>
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"; orig-ioi=home1.net
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfgklkj490333
Cseq: 127 INVITE
Require: precondition
Supported:
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event
```

SDP The SDP contains the complete set of supported and desired codecs from the session originator.

Upon receipt of the INVITE, the S-CSCF stores the following information about this session, for use in providing enhanced services, charging or in possible error recovery actions – see example in table 7.4.2.1-1b.

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

```
Request-URI: sip:user2_public1@home2.net
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfgklkj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2orig): <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
```

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

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

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

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

3. Evaluation of initial filter criterias

S-CSCF validates the service profile of this subscriber, and evaluates the initial filter criterias.

4. INVITE (S-CSCF to P-CSCF) – see example in table 7.4.2.1-4

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

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

```

INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:pcscf2.visited2.net;lr>
Record-Route: <sip:scscf2.home2.net;lr>, <sip:scscf1.home1.net;lr>,
    <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity:
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"
Privacy:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Allow:
P-Called-Party-ID: <sip:user2_public1@home2.net>
Content-Type:
Content-Length: (...)

v=
o=
s=
c=
t=
m=
b=AS:75
a=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=

```

Route: Built from the Path header stored at registration.

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

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

P-CSCF saves information from the received INVITE request. The saved value of the information for this session is – see example in table 7.4.2.1-4b.

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

```

Request-URI: sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfg1kj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2orig): <sip:scscf2.home2.net;lr>, <sip:scscf1.home1.net;lr>,
    <sip:pcscf1.visited1.net;lr>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>

```

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

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

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

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

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

Table 7.4.2.1-6: INVITE (P-CSCF to UE)

```
INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
    scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 65
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>,
    <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity:
Privacy:
P-Media-Authorization: 0020000100100101706466312e686f6d65312e6e6574000c02013331533134363231
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Allow:
P-Called-Party-ID:
Content-Type:
Content-Length: (...)

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

Via: The P-CSCF adds the port number negotiated during the security agreement and the comp=sigcomp parameter to its Via header.

Record-Route: The P-CSCF adds the port number negotiated during the security agreement and the comp=sigcomp parameter to its own URI.

P-Media-Authorization: A P-CSCF generated authorization token. This particular example shows a Policy-Element generated by "pdf1.home1.net" with credentials "31S14621".

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

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

Table 7.4.2.1-7: 100 Trying (UE to P-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP pscsf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k2l.1, SIP/2.0/UDP
    scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pscsf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

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

UE#2 determines the complete set of codecs that it is capable of supporting for this session. It determines the intersection with those appearing in the SDP in the INVITE request.

UE responds with a 183 Session Progress response containing SDP back to the originator. This response is sent to P-CSCF.

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

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>,
<sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From:
To: <tel:+1-212-555-2222>;tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
RSeq: 9021
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933623 2987933623 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event
```

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network as specified in sub-clause "Additional coding rules for P-access-network-info header", in 3GPP TS 24.229 [16].

To: A tag is added to the To header.

Contact: Contains a SIP URI with the IP address or FQDN of the UE. It includes the comp=sigcomp parameter.

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

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

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

```
Request-URI: sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2orig): <sip:scscf2.home2.net;lr>, <sip:scscf1.home1.net;lr>,
<sip:pcscf1.visited1.net;lr>
Contact(dest): <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
```

9. Authorize QoS Resources

P-CSCF authorizes the resources necessary for this session. The approval of QoS commitment either happens at this stage or after 200 OK of INVITE (34) based on operator local policy.

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

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

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

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7)
Record-Route: <sip:pcscf2.visited2.net;lr>, <sip:scscf2.home2.net;lr>,
<sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity: "John Smith" <sip:user2_public1@home2.net>
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
Allow:
RSeq:
Content-Type:
Content-Length:

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

Record-Route: The P-CSCF rewrites the Record-Route header field value to remove the port number used for the security association and the comp=sigcomp parameter from its own URI

P-Asserted-Identity: P-CSCF inserts the default SIP URI of the user in the P-Asserted-Identity header field.

P-Access-Network-Info: this header contains information from the UE.

Upon receipt of the 183 Session Progress, the S-CSCF stores the following information about this session, for use in providing enhanced services or in possible error recovery actions – see example in table 7.4.2.1-10b.

Table 7.4.2.1-10b: Storage of information at S-CSCF

```
Request-URI: sip:user2_public1@home2.net
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2dest): <sip:pcscf2.visited2.net;lr>
Route(2orig): <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
Contact(dest): <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
```

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

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

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

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity: "John Smith" <sip:user2_public1@home2.net>, <tel:+1-212-555-2222>
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"; orig-ioi=home1.net;
    term-ioi=home2.net
P-Charging-Function-Addresses: ccf=[5555::b99:c88:d77:e66]; ccf=[5555::a55:b44:c33:d22];
    ecf=[5555::1ff:2ee:3dd:4cc]; ecf=[5555::6aa:7bb:8cc:9dd]
Privacy:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
Allow:
RSeq:
Content-Type:
Content-Length:

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

```

P-Asserted-Identity: S-CSCF inserts the TEL URI of the user in the P-Asserted-Identity header field.

P-Charging-Vector: The S-CSCF adds the identifier of its own network to the terminating Inter Operator Identifier (IOI) parameter of this header and puts back the originating IOI parameter.

P-Charging-Function-Addresses: The S-CSCF passes this header to the I-CSCF for charging.

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

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

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

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfgklkj490333
Cseq: 128 PRACK
Require: precondition
RAck: 9021 127 INVITE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933616 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event
```

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

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

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

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

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

P-CSCF forwards the PRACK request to UE.

Table 7.4.2.1-14: PRACK (P-CSCF to UE)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

Via: The P-CSCF adds the port number negotiated during the security agreement and the comp=sigcomp parameter to its own entry in the Via header.

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

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

Table 7.4.2.1-15: 200 OK (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k2l.1, SIP/2.0/UDP
scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933623 2987933624 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event
```

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network as specified in sub-clause 'Additional coding rules for P-access-network-info header', in 3GPP TS 24.229 [16].

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

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

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

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
     scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
     pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
     [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

P-Access-Network-Info: this header contains information from the UE.

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

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

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

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

18. Resource Reservation

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

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

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

Table 7.4.2.1-19: UPDATE (S-S to MT#1a)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfgk490333
Cseq: 129 UPDATE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933617 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event
```

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

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

Table 7.4.2.1-20: UPDATE (S-CSCF to P-CSCF)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq:
Contact:
Content-Type:
Content-Length:

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

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

P-CSCF forwards the UPDATE request to UE.

Table 7.4.2.1-21: UPDATE (P-CSCF to UE)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

Via: The P-CSCF adds the port number negotiated in the security agreement and the comp=sigcomp parameter to its own entry in the Via header.

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

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

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

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933623 2987933625 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98
b=AS:75
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event
```

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network as specified in sub-clause 'Additional coding rules for P-access-network-info header', in 3GPP TS 24.229 [16].

23. 200 OK (P-CSCF to S-CSCF) – see example in table 7.4.2.1-23

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

Table 7.4.2.1-23: 200 OK (P-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

P-Access-Network-Info: this header contains information from the UE.

24. 200 OK (MT#1a to S-S) – see example in table 7.4.2.1-24

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

Table 7.4.2.1-24: 200 OK (MT#1a to S-S)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

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

Before proceeding with session establishment, the UE waits for two events. First, the resource reservation initiated in step #17 must complete successfully. Second, the resource reservation initiated by the originating endpoint must complete successfully (which is indicated by message #20 received by UE). The UE may now immediately accept the session (and proceed with step #34), or alert the destination subscriber of an incoming session attempt; if the latter it indicates this to the calling party by a 180 Ringing provisional response sent to P-CSCF.

Table 7.4.2.1-25: 180 Ringing (UE to P-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
    scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>,
    <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
RSeq: 9022
Content-Length: 0
```

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network as specified in sub-clause 'Additional coding rules for P-access-network-info header', in 3GPP TS 24.229 [16].

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

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

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

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024";
    ggsn=[5555::d6d:c7c:b8b:a9a]; pdp-sig=no; gcid=309685742; auth-token=86243614; flow-id=3
From:
To:
Call-ID:
CSeq:
Require:
Contact:
Allow:
RSeq:
Content-Length:
```

P-Access-Network-Info: this header contains information from the UE.

Record-Route: The P-CSCF rewrites the Record-Route header field value to remove the port number and the comp=sigcomp parameter from its own entry.

Upon receipt of the 180, the S-CSCF stores the following information about this session, for use in charging – see example in table 7.4.2.1-26b.

Table 7.4.2.1-26b: Storage of information at S-CSCF

```
Request-URI: sip:user2_public1@home2.net
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2dest): <sip:pcscf2.visited2.net;lr>
Route(2orig): <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
Contact(dest): <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
```

27. 180 Ringing (MT#1a to S-S) – see example in table 7.4.2.1-27

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

Table 7.4.2.1-27: 180 Ringing (MT#1a to S-S)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
Allow:
RSeq:
Content-Length:
```

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

The originator acknowledges the 180 Ringing response (27) with a PRACK request.

Table 7.4.2.1-28: PRACK (S-S to MT#1a)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq: 130 PRACK
RAck: 9022 127 INVITE
Content-Length: 0
```

29. PRACK (S-CSCF to P-CSCF) – see example in table 7.4.2.1-29

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

Table 7.4.2.1-29: PRACK (S-CSCF to P-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:
```

30. PRACK (P-CSCF to UE) – see example in table 7.4.2.1-30

P-CSCF forwards the PRACK request to UE.

Table 7.4.2.1-30: PRACK (P-CSCF to UE)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcsf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
    scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcsf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:
```

Via: The P-CSCF adds the port number negotiated during the security agreement and the parameter comp=sigcomp to its own entry in the Via header.

31. 200 OK (UE to P-CSCF) – see example in table 7.4.2.1-31

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

Table 7.4.2.1-31: 200 OK (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcsf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
    scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcsf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

32. 200 OK (P-CSCF to S-CSCF) – see example in table 7.4.2.1-32

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

Table 7.4.2.1-32: 200 OK (P-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcsf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024";
    ggsn=[5555::d6d:c7c:b8b:a9a]; pdp-sig=no; gcid=309685742; auth-token=86243614; flow-id=3
From:
To:
Call-ID:
CSeq:
Content-Length:
```

Upon receipt of the 200, the S-CSCF stores the following information about this session (unless already done if information received with the 180), for use in charging – see example in table 7.4.2.1-32b.

Table 7.4.2.1-32b: Storage of information at S-CSCF

```

Request-URI: sip:user2_public1@home2.net
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2dest): <sip:pcscf2.visited2.net;lr>
Route(2orig): <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
Contact(dest): <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>

```

33. 200 OK (MT#1a to S-S) – see example in table 7.4.2.1-33

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

Table 7.4.2.1-33: 200 OK (MT#1a to S-S)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:

```

34. 200 OK (UE to P-CSCF) – see example in table 7.4.2.1-34

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

Table 7.4.2.1-34: 200 OK (UE to P-CSCF)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>,
<sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Length: 0

```

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network as specified in sub-clause 'Additional coding rules for P-access-network-info header', in 3GPP TS 24.229 [16].

35. Approval of QoS Commit

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

36. 200 OK (P-CSCF to S-CSCF) – see example in table 7.4.2.1-36

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

Table 7.4.2.1-36: 200 OK (P-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Contact:
Allow:
Content-Length:
```

P-Access-Network-Info: this header contains information from the UE.

Record-Route: The P-CSCF rewrites the Record-Route header field value to remove the port number and the comp=sigcomp parameter from its own URI.

37. 200 OK (MT#1a to S-S) – see example in table 7.4.2.1-37

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

Table 7.4.2.1-37: 200 OK (MT#1a to S-S)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Contact:
Allow:
Content-Length:
```

38. ACK (S-S to MT#1a) – see example in table 7.4.2.1-38

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.

Table 7.4.2.1-38: ACK (S-S to MT#1a)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq: 127 ACK
Content-Length: 0
```

39. ACK (S-CSCF to P-CSCF) – see example in table 7.4.2.1-39

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

Table 7.4.2.1-39: ACK (S-CSCF to P-CSCF)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

40. ACK (P-CSCF to UE) – see example in table 7.4.2.1-40

P-CSCF forwards the ACK request to UE.

Table 7.4.2.1-40: ACK (P-CSCF to UE)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
From:
To:
Call-ID:
Cseq:
Content-Length:
```

XXXXXXXXXXXXXXXXXXXXXXXXXXXX NEXT CHANGE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

10.4.2 Session redirection initiated by S-CSCF to IM CN subsystem (MO#2, MT#2 assumed)

One of the entities in a basic session that may initiate a redirection is the S-CSCF of the destination subscriber. The subscriber profile information obtained from the HSS by the 'Cx-pull' during registration may contain complex logic and triggers causing session redirection. S-CSCF#2 sends the SIP INVITE request to the I-CSCF for the new destination (I-CSCF#F in the figure), who forwards it to S-CSCF#F, who forwards it to the new destination.

In cases when the destination subscriber is not currently registered in the IM CN subsystem, the I-CSCF may assign a temporary S-CSCF to perform the service control on behalf of the intended destination. This temporary S-CSCF takes the role of S-CSCF#2 in figure 10.4.2-1.

The service implemented by figure 10.4.2-1 is typically "Session Forward Unconditional", "Session Forward Variable" or "Selective Session Forwarding". S-CSCF#2 may also make use of knowledge of current sessions in progress at the UE, and implement "Session Forwarding Busy" in this way.

There are 9 distinct signalling flows for this session redirection, as follows:

- Single network operator performing origination, forwarding, and termination.
- One network operator performing origination and forwarding, separate network operator performing termination, with a THIG between to maintain configuration independence.
- One network operator performing origination and forwarding, separate network operator performing termination, without a THIG between.
- One network operator performing origination, second network operator performing forwarding and termination, with a THIG between to maintain configuration independence.

- One network operator performing origination, second network operator performing forwarding and termination, without a THIG between.
- One network operator performing origination, second network operator performing forwarding, and third network operator performing termination, without any THIGs between them.
- One network operator performing origination, second network operator performing forwarding, and third network operator performing termination, with a THIG between first two to maintain configuration independence
- One network operator performing origination, second network operator performing forwarding, and third network operator performing termination, with a THIG between second and third to maintain configuration independence.
- One network operator performing origination, second network operator performing forwarding, and third network operator performing termination, with a THIG between all three to maintain configuration independence.

Further, it is possible that a session will be redirected multiple times, so the above list generalizes to include multiple forwarding elements.

All of these Session-Redirection procedures can be combined with MO#1a, MO#1b, or MO#2 for session origination, and with MT#1a, MT#1b, or MT#2 for session termination.

Only the first case is shown here, with a single network operator performing origination, forwarding, and termination. The additional cases can be derived from the procedures shown here and in S-S#1a, and S-S#1b.

This case is shown in the signalling flow in figure 10.4.2-1.

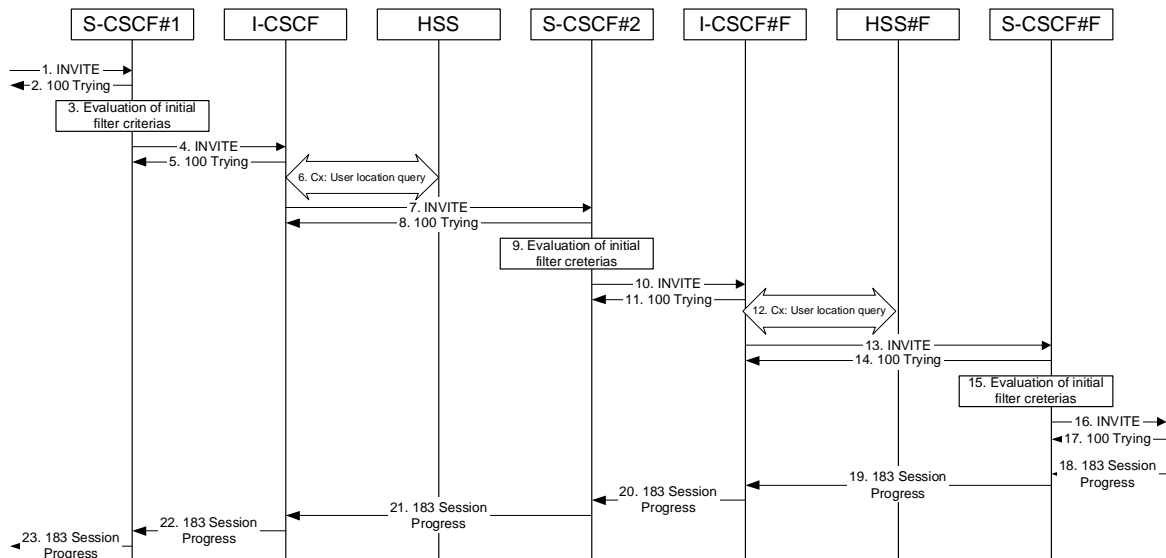


Figure 10.4.2-1: Session redirection initiated by S-CSCF to IM CN subsystem

The IM CN subsystem - Session Redirection Procedure is as follows:

1. INVITE (MO to S-CSCF) – see example in table 10.4.2-1

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

Table 10.4.2-1: INVITE (MO to S-CSCF)

```
INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
 [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Record-Route: <sip:pcscf1.home1.net;lr>
Route: <sip:scscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <tel:+1-212-555-1111>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfgk490333
Cseq: 127 INVITE
Require: precondition
Supported: 100rel
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Type: application/sdp
Content-Length: (...)
```

```
v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-eventv=0
e=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
e=IN IP6 5555::aaa:bbb:ccc:ddd-
t=907165275 0
m=video 3400 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:99 MPV
m=video 3402 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:99 MPV
m=audio 3456 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR-
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
m=audio 3458 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
```

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

2. 100 Trying (S-CSCF to MO) – see example in table 10.4.2-2

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

Table 10.4.2-2: 100 Trying (S-CSCF to MO)

```
SIP/2.0 100 Trying  
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP  
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7  
From:  
To:  
Call-ID:  
CSeq:  
Content-Length: 0
```

3. Evaluation of initial filter criterias

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

4. INVITE (S-CSCF to I-CSCF) – see example in table 10.4.2-4

S-CSCF#1 performs an analysis of the destination address, and determines the network operator to whom the destination subscriber belongs. Since it is a destination served by the same network operator, S-CSCF#1 forwards the INVITE request directly to I-CSCF in the same network.

~~S-CSCF examines the media parameters, and removes any choices that the subscriber does not have authority to request. For this example, assume the subscriber is not allowed video. S-CSCF removes the stream by setting the port number for that stream to zero.~~

Table 10.4.2-4: INVITE (S-CSCF to I-CSCF)

```

INVITE sip:user2_public1@home1.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <tel:+1-212-555-1111>
Privacy:
P-Charging-Vector:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length:

```

```

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

```

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

5. 100 Trying (I-CSCF to S-CSCF) – see example in table 10.4.2-5

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

Table 10.4.2-5: 100 Trying (I-CSCF to S-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

6. Cx: User Location Query procedure

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

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

Table 7.3.2.1-6a provides the parameters in the SIP INVITE request (flow 4), which are sent to the HSS.

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

7. INVITE (I-CSCF to S-CSCF) – see example in table 10.4.2-7

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

Table 10.4.2-8: 100 Trying (S-CSCF to I-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

9. Evaluation of initial filter criterias

S-CSCF#2 validates the service profile of this subscriber and evaluates the initial filter criterias. Based on some service-specific criterion, S-CSCF#2 decides to redirect this session attempt to a new IM CN subsystem destination, at the URL sip:user3_public1@home1.net.

10. INVITE (S-CSCF to I-CSCF) – see example in table 10.4.2-10

S-CSCF#2 performs an analysis of the destination address, and determines the new destination is served by the same network operator. S-CSCF#2 forwards the INVITE request directly to I-CSCF#3 (which may be different than I-CSCF#1 consulted earlier).

Table 10.4.2-11: 100 Trying (I-CSCF to S-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

12. Cx: User Location Query procedure

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

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

Table 7.3.2.1-6a provides the parameters in the SIP INVITE request (flow 10), which are sent to the HSS.

Table 7.3.2.1-6b provides the parameters sent from the HSS that need to be mapped to SIP INVITE (flow 13) and sent to S-CSCF.

13. INVITE (I-CSCF to S-CSCF) – see example in table 10.4.2-13

I-CSCF forwards the INVITE request to the S-CSCF (S-CSCF#3) that will handle the session termination.

Table 10.4.2-14: 100 Trying (S-CSCF to I-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf3_s.home1.net;branch=z9hG4bK87rr82.1, SIP/2.0/UDP
    scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home1.net;branch=z9hG4bK09a238.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

15. Evaluation of initial filter criterias

S-CSCF#3 validates the service profile of this subscriber and evaluates the initial filter criterias.

16. INVITE (S-CSCF to MT) – see example in table 10.4.2-16

S-CSCF#3 forwards the INVITE request, as determined by the termination procedure. S-CSCF#3 remembers (from the registration procedure) the UE Contact address and the next hop CSCF for this UE.

~~S-CSCF#3 examines the media parameters, and removes any choices that the destination subscriber does not have authority to request. For this example, assume the destination subscriber is not allowed stereo, so only a single audio stream is permitted.~~

Table 10.4.2-16: INVITE (S-CSCF to MT)

```
INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf3.home1.net;branch=z9hG4bKyiiir82.4, SIP/2.0/UDP
  icscf3_s.home1.net;branch=z9hG4bK87rr82.1, SIP/2.0/UDP
  scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
  icscf2_s.home1.net;branch=z9hG4bK09a238.1, SIP/2.0/UDP
  scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
  pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
  [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 64
Record-Route: <sip:scscf3.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:scscf1.home1.net;lr>,
  <sip:pcscf1.home1.net;lr>
Route: <sip:pcscf3.home1.net;lr>
P-Asserted-Identity:
Privacy:
P-Charging-Vector:
P-Called-Party-ID: <sip:user3_public1@home1.net>
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length:

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

17. 100 Trying (MT to S-CSCF) – see example in table 10.4.2-17

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

Table 10.4.2-17: 100 Trying (MT to S-S#2)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf3.home1.net;branch=z9hG4bKyiiir82.4, SIP/2.0/UDP
    icscff.home1.net;branch=z9hG4bK87rr82.1, SIP/2.0/UDP
    scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home1.net;branch=z9hG4bK09a238.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

18. 183 Session Progress (MT to S-CSCF) – see example in table 10.4.2-18

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.

Table 10.4.2-18: 183 Session Progress (MT to S-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf3.homel.net;branch=z9hG4bKyiiir82.4, SIP/2.0/UDP
  icscf3_s.homel.net;branch=z9hG4bK87rr82.1, SIP/2.0/UDP
  scscf2.homel.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
  icscf2_s.homel.net;branch=z9hG4bK09a238.1, SIP/2.0/UDP
  scscf1.homel.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
  pcscf1.homel.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
  [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf3.homel.net;lr>, <sip:scscf3.homel.net;lr>, <sip:scscf2.homel.net;lr>,
  <sip:scscf1.homel.net;lr>, <sip:pcscf1.homel.net;lr>
P-Asserted-Identity: "John Smith" <tel:+1-212-555-3333>
Privacy: none
P-Charging-Vector:
From:
To: <tel:+1-212-555-2222>;tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 9021
Content-Type: application/sdp
Content-Length: (...)
```

```
v=0
o=- 2987933623 2987933623 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
m=audio 0 RTP/AVP 97 96 0 15
```

19. 183 Session Progress (S-CSCF to I-CSCF) – see example in table 10.4.2-19

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

Table 10.4.2-19: 183 Session Progress (S-CSCF to I-CSCF)

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP icscf3_s.home1.net;branch=z9hG4bK87rr82.1, SIP/2.0/UDP
     scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
     icscf2_s.home1.net;branch=z9hG4bK09a238.1, SIP/2.0/UDP
     scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
     pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
     [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity: "John Smith" <tel:+1-212-555-3333>
Privacy: none
P-Charging-Vector:
From:
To:
Call-ID:
CSeq:
Require:
Supported:
Contact:
RSeq:
Content-Type:
Content-Length:

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

```

20. 183 Session Progress (I-CSCF to S-CSCF) – see example in table 10.4.2-20

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

Table 10.4.2-20: 183 Session Progress (I-CSCF to S-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home1.net;branch=z9hG4bK09a238.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity:
Privacy:
P-Charging-Vector:
From:
To:
Call-ID:
CSeq:
Require:
Supported:
Contact:
RSeq:
Content-Type:
Content-Length:

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

21. 183 Session Progress (S-CSCF to I-CSCF) – see example in table 10.4.2-21

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

Table 10.4.2-21: 183 Session Progress (S-CSCF to I-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP icscf2_s.home1.net;branch=z9hG4bK09a238.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity:
Privacy:
P-Charging-Vector:
From:
To:
Call-ID:
CSeq:
Require:
Supported:
Contact:
RSeq:
Content-Type:
Content-Length:

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

22. 183 Session Progress (I-CSCF to S-CSCF) – see example in table 10.4.2-22

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

Table 10.4.2-22: 183 Session Progress (I-CSCF to S-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP sscsf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity:
Privacy:
P-Charging-Vector:
From:
To:
Call-ID:
CSeq:
Require:
Supported:
Contact:
RSeq:
Content-Type:
Content-Length:

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

23. 183 Session Progress (S-CSCF to MO) – see example in table 10.4.2-23

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

Table 10.4.2-23: 183 Session Progress (S-CSCF to MO)

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcscfl.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity:
Privacy:
P-Charging-Vector:
From:
To:
Call-ID:
CSeq:
Require:
Supported:
Contact:
RSeq:
Content-Type:
Content-Length:

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

```

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX NEXT CHANGE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

10.4.3 Session redirection initiated by S-CSCF to CS-domain (S-S#2, MT#2 assumed)

The S-CSCF in the scenario above may determine that the session is to be redirected to a CS-domain endpoint, or to the PSTN. It recognizes this situation by the redirected URL being a tel: URL.

For the simplest configuration (Mobile located in home service area (MO#2), initiating a session to a destination served by same network operator(S-S#2)), the handling of redirection to a tel: URL is shown in figure 10.4.3-1. Other cases, which include roaming, PSTN origination, destinations served by other network operators, and THIGs, are handled in a similar manner.

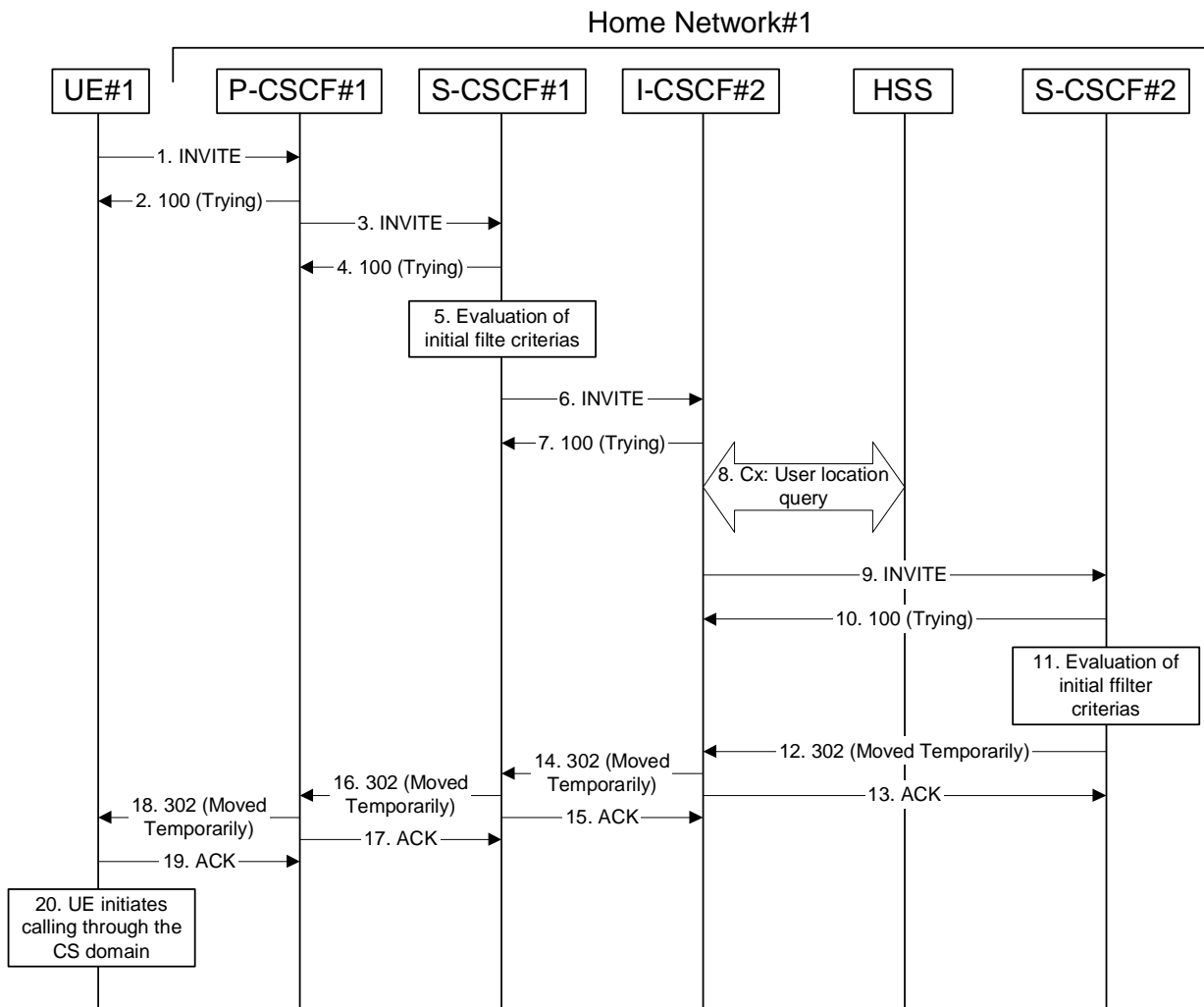


Figure 10.4.3-1: Session redirection initiated by S-CSCF to CS-Domain

Step-by-step processing is as follows:

1. INVITE (UE to P-CSCF) – see example in table 10.4.3-1

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

Table 10.4.3-1: INVITE (UE to P-CSCF)

```

INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.home1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
P-Preferred-Identity: "John Doe" <tel:+1-212-555-1111>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: precondition, sec-agree
Proxy-Require: sec-agree
Supported: 100rel
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-
    c=8642; port-s=7531
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Type: application/sdp
Content-Length: (...)

```

```

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 3400 RTP/AVP 98 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H261
a=rtpmap:99 MPV
m=video 3402 RTP/AVP 98 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H261
a=rtpmap:99 MPV
m=audio 3456 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
m=audio 3458 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none

```

```
a=des:ges-mandatory-local-sendreev  
a=des:ges-none-remote-sendreev  
a=rtptime:97-AMR  
a=fmtp:97-mode-set=0,2,5,7;maxframes=2  
a=rtptime:96-G726-32/8000
```

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

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

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

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network as specified in sub-clause 'Additional coding rules for P-access-network-info header', in 3GPP TS 24.229 [16].

From:/To:/Call-ID: Follow the recommendations of RFC 3323 [13], even though anonymity is not being requested for this session.

Cseq: is a random starting number.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

Contact: is a SIP URI that contains the IP address or FQDN of the originating UE.

2. 100 Trying (P-CSCF to UE) – see example in table 10.4.3-2

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

Table 10.4.3-2: 100 Trying (P-CSCF to UE)

```
SIP/2.0 100 Trying  
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7  
From:  
To:  
Call-ID:  
CSeq:  
Content-Length: 0
```

3. INVITE (P-CSCF to S-CSCF) – see example in table 10.4.3-3

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

~~— P-CSCF examines the media parameters, and removes any choices that the network operator decides based on local policy, not to allow on the network. For this example, assume the network operator disallows H261 video encoding.~~

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Proxy-Require header is empty, it removes this header completely.

The INVITE request is forwarded to the S-CSCF.

Table 10.4.3-3: INVITE (P-CSCF to S-CSCF)

```

INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Record-Route: <sip:pcscf1.home1.net;lr>
Route: <sip:scscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <tel:+1-212-555-1111>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy:
P-Charging-Vector: icid-value="AyreytU0dm+6O2Irt5tAFrbHLso=023551024"
From:
To:
Call-ID:
Cseq:
Require: precondition
Supported:
Contact:
Content-Type:
Content-Length:

```

```

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

```

P-Access-Network-Info: this header contains information from the UE.

SDP: ~~—————~~ The SDP contains the restricted set of codecs allowed by the network operator. The “m=” lines for the video media streams no longer list codec 98 (H261).

4. 100 Trying (S-CSCF to P-CSCF) – see example in table 10.4.3-4

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

Table 10.4.3-4: 100 Trying (S-CSCF to P-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

5. Evaluation of initial filter criterias

S-CSCF validates the service profile of this subscriber and evaluates the initial filter criterias.

6. INVITE (S-CSCF to I-CSCF) – see example in table 10.4.3-6

~~S-CSCF examines the media parameters, and removes any choices that the subscriber does not have authority to request. For this example, assume the subscriber is not allowed video. S-CSCF removes the stream by setting the port number for that stream to zero.~~

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

Table 10.4.3-6: INVITE (S-CSCF to I-CSCF)

```

INVITE sip:user2_public1@home1.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <tel:+1-212-555-1111>;
Privacy: none
P-Charging-Vector:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length:

```

```

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

```

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

7. 100 Trying (I-CSCF to S-CSCF) – see example in table 10.4.3-7

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

Table 10.4.3-7: 100 Trying (I-CSCF to S-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

8. Cx: User Location Query procedure

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

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

Table 7.3.2.1-6a provides the parameters in the SIP INVITE request (flow 6), which are sent to the HSS.

Table 7.3.2.1-6b provides the parameters sent from the HSS that need to be mapped to SIP INVITE (flow 9) and sent to S-CSCF.

9. INVITE (I-CSCF to S-CSCF) – see example in table 10.4.3-9

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

Table 10.4.3-10: 100 Trying (S-CSCF to I-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf2_s.home1.net;branch=z9hG4bK09a238.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

11. Evaluation of initial filter criterias

S-CSCF#2 validates the service profile of this subscriber and evaluates the initial filter criterias. Based on some service-specific criterion, S-CSCF#2 decides to redirect this session attempt to a CS-domain endpoint, at the URL tel:+1-212-555-3333.

12. 302 Moved Temporarily (S-CSCF to I-CSCF) – see example in table 10.4.3-12

S-CSCF#2 sends a 302 Moved Temporarily response to I-CSCF, containing the new destination.

Table 10.4.3-12: 302 Moved Temporarily (S-CSCF to I-CSCF)

```
SIP/2.0 302 Moved Temporarily
Via: SIP/2.0/UDP icscf2_s.home1.net;branch=z9hG4bK09a238.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Contact: <tel:+1-212-555-3333>
Content-Length: 0
```

13. ACK (I-CSCF to S-CSCF) – see example in table 10.4.3-13

I-CSCF acknowledges receipt of the 302 Moved Temporarily response by sending an ACK request to S-CSCF#2.

Table 10.4.3-13: ACK (I-CSCF to S-CSCF)

```
ACK sip:user2_public1@home1.net SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home1.net;branch=z9hG4bK09a238.1
Max-Forwards: 70
Route: <sip:scscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

14. 302 Moved Temporarily (I-CSCF to S-CSCF) – see example in table 10.4.3-14

I-CSCF sends a 302 Moved Temporarily response to S-CSCF#1, containing the new destination.

Table 10.4.3-14: 302 Moved Temporarily (I-CSCF to S-CSCF)

```
SIP/2.0 302 Moved Temporarily
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length: 0
```

15. ACK (S-CSCF to I-CSCF) – see example in table 10.4.3-15

S-CSCF#1 acknowledges receipt of the 302 Moved Temporarily response by sending an ACK request to I-CSCF.

Table 10.4.3-15: ACK (S-CSCF to I-CSCF)

```
ACK sip:user2_public1@home1.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1
Max-Forwards: 70
From:
To:
Call-ID:
Cseq:
Content-Length:
```

16. 302 Moved Temporarily (S-CSCF to P-CSCF) – see example in table 10.4.3-16

S-CSCF#1 sends a 302 Moved Temporarily response to P-CSCF, containing the new destination.

Table 10.4.3-16: 302 Moved Temporarily (S-CSCF to P-CSCF)

```
SIP/2.0 302 Moved Temporarily
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length: 0
```

17. ACK (P-CSCF to S-CSCF) – see example in table 10.4.3-17

P-CSCF acknowledges receipt of the 302 Moved Temporarily response by sending an ACK request to S-CSCF#1.

Table 10.4.3-17: ACK (P-CSCF to S-CSCF)

```
ACK tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1
Max-Forwards: 70
Route: <sip:scscf1.home1.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

18. 302 Moved Temporarily (P-CSCF to UE) – see example in table 10.4.3-18

P-CSCF sends a 302 Moved Temporarily response to UE, containing the new destination.

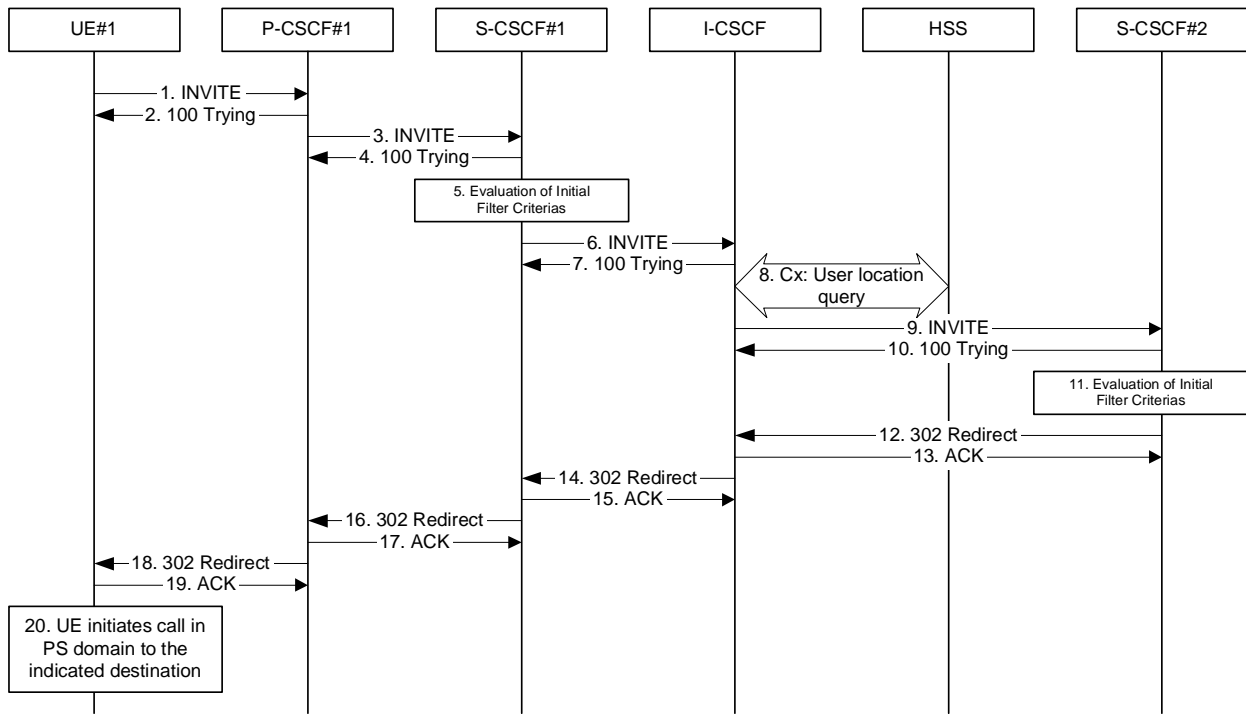


Figure 10.4.4-1: Session redirection initiated by S-CSCF to general endpoint

Step-by-step processing is as follows:

1. INVITE (UE to P-CSCF) – see example in table 10.4.4-1

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

Table 10.4.4-1: INVITE (UE to P-CSCF)

```

INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd];branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.home1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
P-Preferred-Identity: "John Doe" <tel:+1-212-555-1111>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: precondition, sec-agree
Proxy-Require: sec-agree
Supported: 100rel
Security-Verify: ipsec-3gpp; q=0.1; alg= hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-
    c=8642; port-s=7531
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Type: application/sdp
Content-Length: (...)

```

```

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H261
a=rtpmap:99 MPV
m=video 3402 RTP/AVP 98 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H261
a=rtpmap:99 MPV
m=audio 3456 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
m=audio 3458 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none

```



```
a=des:qos-mandatory-local-sendrecv  
a=des:qos-none-remote-sendrecv  
a=rtpmap:97-AMR  
a=fmtp:97-mode-set=0,2,5,7;maxframes=2  
a=rtpmap:96-G726-32/8000
```

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

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

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

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network as specified in sub-clause 'Additional coding rules for P-access-network-info header', in 3GPP TS 24.229 [16].

Route: contains the P-CSCF address learnt during P-CSCF discovery, plus the elements from the Service-Route header from registration. The P-CSCF URI contains the port number learnt during the security agreement negotiation

From:/To:/Call-ID: Follow the recommendations of RFC 3323 [13], even though anonymity is not being requested for this session.

Cseq: is a random starting number.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

Contact: is a SIP URI that contains the IP address or FQDN of the originating UE.

2. 100 Trying (P-CSCF to UE) – see example in table 10.4.4-2

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

Table 10.4.4-2: 100 Trying (P-CSCF to UE)

```
SIP/2.0 100 Trying  
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7  
From:  
To:  
Call-ID:  
CSeq:  
Content-Length: 0
```

3. INVITE (P-CSCF to S-CSCF) – see example in table 10.4.4-3

The P-CSCF adds itself to the Record-Route header and Via header. As the request is forwarded to an interface that is not compressed, the own P-CSCF SIP URI does not contain the "comp=sigcomp" parameter.

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Proxy-Require header is empty, it removes this header completely.

~~P-CSCF examines the media parameters, and removes any choices that the network operator decides based on local policy, not to allow on the network. For this example, assume the network operator disallows H261 video encoding.~~

The INVITE request is forwarded to the S-CSCF.

Table 10.4.4-3: INVITE (P-CSCF to S-CSCF)

```

INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Record-Route: <sip:pcscf1.home1.net;lr>
Route: <sip:scscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <tel:+1-212-555-1111>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy:
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"
From:
To:
Call-ID:
Cseq:
Require: preconditions
Supported:
Contact:
Content-Type:
Content-Length:

```

```

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

```

P-Access-Network-Info: this header contains information from the UE.

SDP: ~~—————~~ The SDP contains the restricted set of codecs allowed by the network operator. The “m=” lines for the video media streams no longer list codec 98 (H261).

4. 100 Trying (S-CSCF to P-CSCF) – see example in table 10.4.4-4

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

Table 10.4.4-4: 100 Trying (S-CSCF to P-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

5. Evaluation of initial filter criterias

S-CSCF validates the service profile of this subscriber and evaluates the initial filter criterias.

6. INVITE (S-CSCF to I-CSCF) – see example in table 10.4.4-6

~~S-CSCF examines the media parameters, and removes any choices that the subscriber does not have authority to request. For this example, assume the subscriber is not allowed video. S-CSCF removes the stream by setting the port number for that stream to zero.~~

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

Table 10.4.4-6: INVITE (S-CSCF to I-CSCF)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <tel:+1-212-555-1111>;
Privacy: none
P-Charging-Vector:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length:
```

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

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

7. 100 Trying (I-CSCF to S-CSCF) – see example in table 10.4.4-7

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

Table 10.4.4-7: 100 Trying (I-CSCF to S-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

8. Cx: User Location Query procedure

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

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

Table 7.3.2.1-6a provides the parameters in the SIP INVITE request (flow 6), which are sent to the HSS.

Table 7.3.2.1-6b provides the parameters sent from the HSS that need to be mapped to SIP INVITE (flow 9) and sent to S-CSCF.

9. INVITE (I-CSCF to S-CSCF) – see example in table 10.4.4-9

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

Table 10.4.4-10: 100 Trying (S-CSCF to I-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf2_s.home1.net;branch=z9hG4bK09a238.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

11. Evaluation of initial filter criterias

S-CSCF#2 validates the service profile of this subscriber and evaluates the initial filter criterias. Based on some service-specific criterion, S-CSCF#2 decides to redirect this session attempt to a PS-domain endpoint, at the URL <mailto:alienblaster@home.net>.

12. 302 Moved Temporarily (S-CSCF to I-CSCF) – see example in table 10.4.4-12

S-CSCF#2 sends a 302 Moved Temporarily response to I-CSCF, containing the new destination.

Table 10.4.4-12: 302 Moved Temporarily (S-CSCF to I-CSCF)

```
SIP/2.0 302 Moved Temporarily
Via: SIP/2.0/UDP icscf2_s.home1.net;branch=z9hG4bK09a238.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Contact: <mailto:alienblaster@home.net>
Content-Length: 0
```

13. ACK (I-CSCF to S-CSCF) – see example in table 10.4.4-13

I-CSCF acknowledges receipt of the 302 Moved Temporarily response by sending an ACK request to S-CSCF#2.

Table 10.4.4-13: ACK (I-CSCF to S-CSCF)

```
ACK sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home1.net;branch=z9hG4bK09a238.1
Max-Forwards: 70
Route: <sip:scscf2.home1.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

14. 302 Moved Temporarily (I-CSCF to S-CSCF) – see example in table 10.4.4-14

I-CSCF sends a 302 Moved Temporarily response to S-CSCF#1, containing the new destination.

Table 10.4.4-14: 302 Moved Temporarily (I-CSCF to S-CSCF)

```
SIP/2.0 302 Moved Temporarily
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length: 0
```

15. ACK (S-CSCF to I-CSCF) – see example in table 10.4.4-15

S-CSCF#1 acknowledges receipt of the 302 Moved Temporarily response by sending an ACK request to I-CSCF.

Table 10.4.4-15: ACK (S-CSCF to I-CSCF)

```
ACK sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1
Max-Forwards: 70
Route: <sip:icscf2_s.home1.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

16. 302 Moved Temporarily (S-CSCF to P-CSCF) – see example in table 10.4.4-16

S-CSCF#1 sends a 302 Moved Temporarily response to P-CSCF, containing the new destination.

Table 10.4.4-16: 302 Moved Temporarily (S-CSCF to P-CSCF)

```
SIP/2.0 302 Moved Temporarily
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length: 0
```

17. ACK (P-CSCF to S-CSCF) – see example in table 10.4.4-17

P-CSCF acknowledges receipt of the 302 Moved Temporarily response by sending an ACK request to S-CSCF#1.

Table 10.4.4-17: ACK (P-CSCF to S-CSCF)

```
ACK tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1
Max-Forwards: 70
Route: <sip:scscf1.home1.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

18. 302 Moved Temporarily (P-CSCF to UE) – see example in table 10.4.4-18

P-CSCF sends a 302 Moved Temporarily response to UE, containing the new destination.

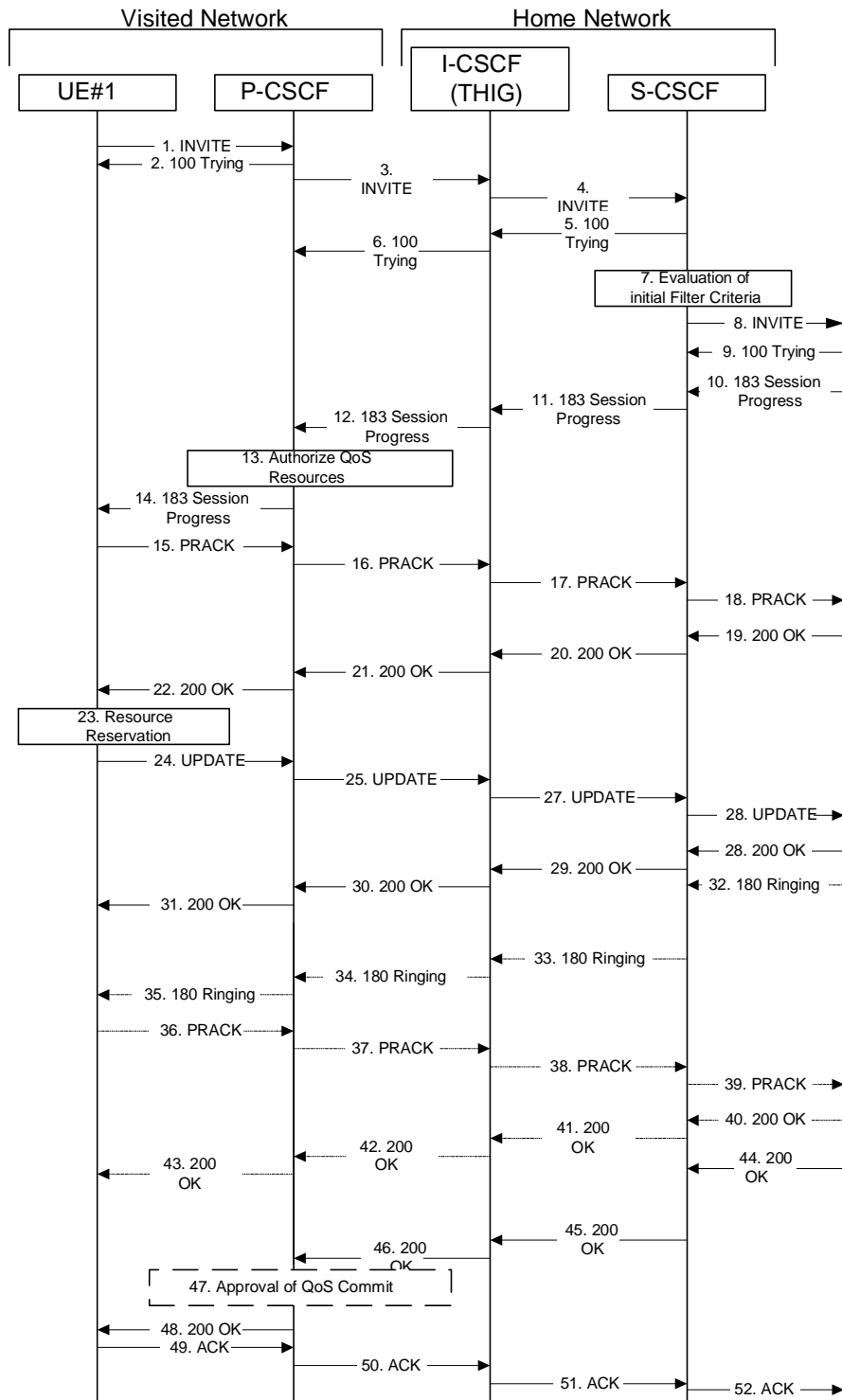


Figure 17.2.2.1-1: MO#1b

Procedure MO#1b is as follows:

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

UE#1 determines the complete set of codecs that it is capable of supporting for this session. It builds a SDP containing bandwidth requirements and characteristics of each, and assigns local port numbers for each possible media flow. Multiple media flows may be offered, and for each media flow (m= line in SDP), there may be multiple codec choices offered.

For this example, assume UE#1 is capable of sending two simultaneous video streams, either H261 or MPV format, and two simultaneous audio streams, either AMR, G726-32, PCMU, or G728.

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

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

```

INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:icscf1_p.home1.net;lr>,
<sip:Token(sip:scscf1.home1.net;lr)@home1.net;tokenized-by=home1.net>
P-Preferred-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>
Call-ID: cb03a0s09a2sdfgk490333
Cseq: 127 INVITE
Require: precondition, sec-agree
Proxy-Require: sec-agree
Supported: 100rel
Security-Verify: ipsec-3gpp; q=0.1; alg= hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-
c=8642; port-s=7531
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Type: application/sdp
Content-Length: (...)

```

```

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd-
t=907165275 0
m=video 3400 RTP/AVP 98 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H261
a=rtpmap:99 MPV
m=video 3402 RTP/AVP 98 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H261
a=rtpmap:99 MPV-
m=audio 3456 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR-
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
m=audio 3458 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none

```

```

a=curr:qos-remote-none
a=des:qos-mandatory-local-sendrecv
a=des:qos-none-remote-sendrecv
a=rtpmap:97-AMR
a=fmtp:97-mode-set=0,2,5,7;maxframes=2
a=rtpmap:96-G726-32/8000

```

- Request-URI:** Contains the public user identity of the called user.
- Via:** Contains the IP address or FQDN of the originating UE.
- Route:** contains the P-CSCF address learnt during P-CSCF discovery, plus the elements from the Service-Route header from registration. The P-CSCF URI contains the port number learnt during the security agreement negotiation
- Privacy:** the user does not require privacy, therefore the Privacy header is set to the value “none” as specified in RFC 3325 [17] and RFC 3323 [13].
- P-Preferred-Identity:** the user provides a hint about the identity to be used for this session.
- P-Access_Network-Info:** the UE provides the access-type and access-info, related to the serving access network as specified in 3GPP TS 24.229 [16].
- Cseq:** Is a random starting number.
- Security-Verify:** Contains the security agreement as represented by the received Security-Server header.
- Contact:** Is a SIP URI that contains the IP address or FQDN of the originating UE.
- SDP** The SDP contains et of codecs supported by UE#1 and desired by the user at UE#1 for this session

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

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

```

Request-URI: sip:user2_public1@home2.net
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq(2dest): 127 INVITE
Cseq(2orig): none
Route(2dest): <sip:icscf1_p.home1.net;lr>,
               <sip:Token(sip:scscf1.home1.net;lr)@home1.net;tokenized-by=home1.net>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>

```

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

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

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

```

SIP/2.0 100 Trying
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0

```

3. INVITE (P-CSCF to I-CSCF) – see example in table 17.2.2.1-3

The P-CSCF adds itself to the Record-Route header and Via header. As the request is forwarded to an interface that is not compressed, the own P-CSCF SIP URI does not contain the "comp=sigcomp" parameter.

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Proxy-Require header is empty, it removes this header completely.

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

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

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

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

```
INVITE sip:user2_public1@homel.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
 [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:icscf1_p.homel.net;lr>, <sip:Token(sip:scscf1.homel.net;lr)@homel.net;tokenized-
 by=homel.net>
Record-Route: <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@homel.net>
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy:
From:
To:
Call-ID:
Cseq:
Require: precondition
Supported:
Contact:
Content-Type:
Content-Length: (...)
```

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

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

P-Access-Network-Info: this header contains information from the UE

P-Charging-Vector: The P-CSCF inserts this header and populates the icid parameters with a globally unique value.

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

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

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

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

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

```
Request-URI: sip:user2_public1@home2.net
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2dest): none
Route(2orig): <sip:icscf1_p.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
```

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

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

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

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

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

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

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

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

7. Evaluation of initial filter criteria

S-CSCF validates the service profile of this subscriber, and evaluates the initial filter criteria.

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

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

S-CSCF forwards the INVITE request, as specified by the S-CSCF to S-CSCF procedures. As the S-CSCF does not know whether the I-CSCF at home2.net is a loose router or not, it does not introduce a Route header.

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

```

INVITE sip:user2_public1@home1.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Record-Route: <sip:scscf1.home1.net;lr>, <sip:icscf1_p.home1.net;lr>,
    <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>, <tel:+1-212-555-1111>
Privacy:
P-Charging-Vector: icid-value="AyretyU0dm+602Irt5tAFrbHLso=023551024"; orig-ioi=home1.net
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length: (...)

```

```

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

```

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

P-Asserted-Identity: The S-CSCF inserts the corresponding TEL URL to the P-Asserted-Identity header in order that the TEL URL is known to the destination network in case the INVITE is forwarded to a MGCF.

P-Charging-Vector: The S-CSCF adds the identifier of its own network to the originating Inter Operator Identifier (IOI) parameter of this header.

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

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

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

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
     icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
     pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
     [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

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

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

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

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home1.net;lr>, <sip:scscf2.home1.net;lr>, <sip:scscf1.home1.net;lr>,
    <sip:icscf1_p.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity: "John Smith" <sip:user2_public1@home1.net>, <tel:+1-212-555-2222>
Privacy: none
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"; orig-ioi=home1.net;
    term-ioi=home2.net
From:
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 9021
Content-Type: application/sdp
Content-Length: (...)
```

```
v=0
o=- 2987933623 2987933623 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97
b=AS:25.4 3
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15
```

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

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

```
Request-URI: sip:user2_public1@home2.net
From: <sip:user1_public1@home1.net>; tag=171828
To: <sip:user2_public1@home2.net>; tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2dest): <sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
Route(2orig): <sip:icscf1_p.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
Contact(dest): <sip:[5555:eee:fff:aaa:bbb]:8805;comp=sigcomp>
Contact(orig): <sip:[5555:aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
```

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

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

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

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555:aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity:
Privacy:
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"
P-Charging-Function-Addresses: ccf=[5555:b99:c88:d77:e66]; ccf=[5555:a55:b44:c33:d22];
    ecf=[5555:1ff:2ee:3dd:4cc]; ecf=[5555:6aa:7bb:8cc:9dd]
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

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

P-Charging-Function-Addresses: The S-CSCF passes this header to the I-CSCF for charging.

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

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

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

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:Token(<sip:pcscf2.home1.net;lr>, <sip:scscf2.home1.net;lr>,
<scscf1.home1.net;lr>)>@home1.net;tokenized-by=home1.net>, <sip:icscf1_p.home1.net;lr>,
<sip:pcscf1.visited1.net;lr>
P-Asserted-Identity:
Privacy:
P-Charging-Vector:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:
```

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

Record-Route: Header entries of the home network of the I-CSCF are tokenized. The I-CSCF itself and the UE addresses are not subject to tokenization.

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

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

```
Request-URI: sip:user2_public1@home2.net
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
CSeq(2dest): 127 INVITE
Cseq(2orig): none
Route(2dest): <sip:icscf1_p.home1.net;lr>, <sip:Token(<sip:scscf1.home1.net;lr>,
<sip:scscf2.home1.net;lr>, <pcscf2.home1.net;lr>)>;tokenized-by=home1.net>
Contact(dest): <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
```

13. Authorize QoS Resources

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

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

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

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

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:Token(sip:pcscf2.homel.net;lr>, <sip:scscf2.homel.net;lr>,
<scscf1.homel.net;lr)>@homel.net;tokenized-by=homel.net>, <sip:icscf1_p.homel.net>,
<sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>
P-Asserted-Identity:
Privacy:
P-Media-Authorization:
0020000100100101706466312e76697369746564322e6e6574000c02013942563330373200
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

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

P-Media-Authorization: A P-CSCF generated authorization token. This particular example shows a Policy-Element generated by "pdf1.visited1.net" with credentials "9BV3072". "00" at the end of the authorization token is required to pad to a multiple of 4 bytes.

Record-Route: The P-CSCF rewrites the Record-Route header to add the port number negotiated during the security agreement and the comp=sigcomp parameter to its own SIP URI.

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

UE#1 determines which media flows should be used for this session, and which codecs should be used for each of those media flows. If there was any change in media flows, or if there was more than one choice of codec for a media flow, then UE#1 includes a new SDP offer in the PRACK message sent to UE#2. UE- decides the set of media streams for this session, and includes this information as a new SDP offer in the PRACK request to P-CSCF.

For this example, assume UE#1 chooses H.263 as the codec to use for the single video stream. Therefore, UE#1 sends a new SDP offer in the PRACK request.

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

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:icscf1_p.home1.net;lr>,
      <sip:Token(<sip:scscf1.home1.net;lr>, <sip:scscf2.home1.net;lr>,
      <sip:pcscf2.home1.net;lr>)>@home1.net;tokenized-by=home1.net>
From: <sip:user1_public1@home1.net>;tag=171828
To:
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 128 PRACK
Require: precondition, sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-
c=8642; port-s=7531
RAck: 9021 127 INVITE
Content-Type: application/sdp
Content-Length: (...)
```

```
v=0
o=- 2987933615 2987933616 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtptime:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtptime:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15
```

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

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

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network as specified in 3GPP TS 24.229 [16].

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.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

16. Resource Reservation

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

17. PRACK (P-CSCF to I-CSCF) – see example in table 17.2.2.1-17

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

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Proxy-Require header is empty, it removes this header completely.

Table 17.2.2.1-17: PRACK (P-CSCF to I-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info:
Route: <sip:icscf1_p.home1.net;lr>, <sip:Token(<sip:scscf1.home1.net;lr>,
    <sip:scscf2.home1.net;lr>, <sip:pcscf2.home1.net;lr>@home1.net;tokenized-by=home1.net>
From:
To:
Call-ID:
Cseq:
Require: precondition
RAck:
Content-Type:
Content-Length:

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

Route: Saved from the Record-Route header of the 183 Session Progress response.

18. PRACK (I-CSCF to S-CSCF) – see example in table 17.2.2.1-18

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

Table 17.2.2.1-18: PRACK (I-CSCF to S-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
P-Access-Network-Info:
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home1.net;lr>, <sip:pcscf2.home1.net;lr>
From:
To:
Call-ID:
Cseq:
Require: precondition
RAck:
Content-Type:
Content-Length:

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

P-Access-Network-Info: this header contains information from the UE.

19. PRACK (MO#1b to S-S) – see example in table 17.2.2.1-19

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

Table 17.2.2.1-19: PRACK (MO#1b to S-S)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf2.home1.net;lr>, <sip:pcscf2.home1.net;lr>
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

20. **200 OK (S-S to MO#1b)** – see example in table 17.2.2.1-20 (related to 17.2.2.1-19)

The destination endpoint responds to the PRACK request (19) with a 200 OK response, per the S-CSCF to S-CSCF procedures.

Table 17.2.2.1-20: 200 OK (S-S to MO#1b)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933623 2987933624 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtptime:98 H263
a=fmtp:98 profile-level-id=0
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtptime:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:eee:ddd
s=-
e=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15
```

21. 200 OK (S-CSCF to I-CSCF) – see example in table 17.2.2.1-21

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

Table 17.2.2.1-21: 200 OK (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscfl_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscfl.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

22. 200 OK (I-CSCF to P-CSCF) – see example in table 17.2.2.1-22

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

Table 17.2.2.1-22: 200 OK (I-CSCF to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscfl.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

23. 200 OK (P-CSCF to UE) – see example in table 17.2.2.1-23

P-CSCF forwards the 200 OK response to UE.

Table 17.2.2.1-23: 200 OK (P-CSCF to UE)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

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

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

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

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:icscf1_p.home1.net;lr>,
      <sip:Token(<sip:scscf1.home1.net;lr>, <sip:scscf2.home1.net;lr>,
      <sip:pcscf2.home1.net;lr>)>@home1.net;tokenized-by=home1.net>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfgklkj490333
Cseq: 129 UPDATE
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg= hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-
c=8642; port-s=7531
Content-Type: application/sdp
Content-Length: (...)
```

```
v=0
o=- 2987933615 2987933617 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15
```

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

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

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network as specified in 3GPP TS 24.229 [16].

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.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

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

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

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Require and Proxy-Require headers are empty, it removes these headers completely.

The P-CSCF forwards the UPDATE request to the I-CSCF.

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

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info:
Route: <sip:icscf1_p.homel.net;lr>, <sip:Token(<sip:scscf1.homel.net;lr>,
    <sip:scscf2.homel.net;lr>, <sip:pcscf2.homel.net;lr>@homel.net;tokenized-by=homel.net>
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024";
    ggsn=[5555::4b4:3c3:2d2:1e1]; pdp-sig=no; gcid=723084371; auth-token=43876559; flow-id=1
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

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

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

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

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
P-Access-Network-Info:
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home1.net;lr>, <sip:pcscf2.home1.net;lr>
P-Charging-Vector:
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

P-Access-Network-Info: this header contains information from the UE.

P-Charging-Vector: The P-CSCF added the GPRS access network information to this header, which is removed and stored by the S-CSCF.

Upon receiving the UPDATE, the S-CSCF stores the following information about this session, for use in charging - see example in table 17.2.2.1-26b.

Table 17.2.2.1-26b: Storage of information at S-CSCF

```
Request-URI: sip:user2_public1@home2.net
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq(2dest): 127 INVITE
Cseq(2orig): none
Route(2dest): <sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
Route(2orig): <sip:icscf1_p.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Contact(dest): <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
```

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

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

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

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf2.home1.net;lr>, <sip:pcscf2.home1.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

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

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

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

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

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
     icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
     pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
     [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933623 2987933625 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98
b=AS:75
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event

#
#
#
#
#
#
#
#
#
#
#
#
#
#
#
#
#
```

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

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

Table 17.2.2.1-29 200 OK (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscfl_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscfl.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

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

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

Table 17.2.2.1-30: 200 OK (I-CSCF to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscfl.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

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

P-CSCF forwards the 200 OK response to UE.

Table 17.2.2.1-31: 200 OK (P-CSCF to UE)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

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

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

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

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home1.net;lr>, <sip:scscf2.home1.net;lr>, <sip:scscf1.home1.net;lr>,
<sip:icscf1_p.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From:
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 9022
Content-Length: 0
```

33. 180 Ringing (S-CSCF to I-CSCF) – see example in table 8.1.2-33

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

Table 17.2.2.1-33: 180 Ringing (S-CSCF to I-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

34. 180 Ringing (I-CSCF to P-CSCF) – see example in table 17.2.2.1-34

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

Table 17.2.2.1-34: 180 Ringing (I-CSCF to P-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:Token(<sip:pcscf2.home1.net;lr>, <sip:scscf2.home1.net;lr>,
    <sip:scscf1.home1.net;lr>@home1.net;tokenized-by=home1.net>, <sip:icscf1_p.home1.net;lr>,
    <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

Record-Route: Header entries of the home network of the I-CSCF are tokenized. The I-CSCF itself and the UE addresses are not subject to tokenization.

35. 180 Ringing (P-CSCF to UE) – see example in table 17.2.2.1-35

P-CSCF forwards the 180 Ringing response to UE.

Table 17.2.2.1-35: 180 Ringing (P-CSCF to UE)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:Token(<sip:pcscf2.home1.net;lr>, <sip:scscf2.home1.net;lr>,
    <sip:scscf1.home1.net;lr>@home1.net;tokenized-by=home1.net>, <sip:icscf1_p.home1.net;lr>,
    <sip:pcscf1.visited1.net;lr>,<sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

Record-Route: The P-CSCF rewrites the Record-Route header to add the comp=sigcomp parameter to its own SIP URI and its port number negotiated during the security agreement.

36. PRACK (UE to P-CSCF) – see example in table 17.2.2.1-36

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

Table 17.2.2.1-36: PRACK (UE to P-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:icscf1_p.home1.net;lr>,
      <sip:Token(<sip:scscf1.home1.net;lr>, <sip:scscf2.home1.net;lr>,
      <sip:pcscf2.home1.net;lr>)>@home1.net;tokenized-by=home1.net>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 130 PRACK
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-
c=8642; port-s=7531
RAck: 9022 127 INVITE
Content-Length: 0
```

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

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

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network as specified in 3GPP TS 24.229 [16].

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.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

37. PRACK (P-CSCF to I-CSCF) – see example in table 17.2.2.1-37

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

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Require and Proxy-Require headers are empty, it removes these headers completely.

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

Table 17.2.2.1-37: PRACK (P-CSCF to I-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
      [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info:
Route: <sip:icscf1_p.home1.net;lr>, <sip:Token(<sip:scscf1.home1.net;lr>,
      <sip:scscf2.home1.net;lr>, <sip:pcscf2.home1.net;lr>)>@home1.net;tokenized-by=home1.net>
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:
```

38. PRACK (I-CSCF to S-CSCF) – see example in table 17.2.2.1-38

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

Table 17.2.2.1-38: PRACK (I-CSCF to S-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
P-Access-Network-Info:
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home1.net;lr>, <sip:pcscf2.home1.net;lr>
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:
```

P-Access-Network-Info: this header contains information from the UE.

39. PRACK (MO#1b to S-S) – see example in table 17.2.2.1-39

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

Table 17.2.2.1-39: PRACK (MO#1b to S-S)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf2.home1.net;lr>, <sip:pcscf2.home1.net;lr>
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:
```

40. 200 OK (S-S to MO#1b) – see example in table 17.2.2.1-40 (related to 17.2.2.1-39)

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

Table 17.2.2.1-40: 200 OK (S-S to MO#1b)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

41. 200 OK (S-CSCF to I-CSCF) – see example in table 17.2.2.1-41

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

Table 17.2.2.1-41: 200 OK (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

42. 200 OK (I-CSCF to P-CSCF) – see example in table 17.2.2.1-42

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

Table 17.2.2.1-42: 200 OK (I-CSCF to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

43. 200 OK (P-CSCF to UE) – see example in table 17.2.2.1-43

P-CSCF forwards the 200 OK response to UE.

Table 17.2.2.1-43: 200 OK (P-CSCF to UE)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

44. 200 OK (S-S to MO#1b) – see example in table 17.2.2.1-44 (related to 17.2.2.1-8)

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

Table 17.2.2.1-44: 200 OK (S-S to MO#1b)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home1.net;lr>, <sip:scscf2.home1.net;lr>, <sip:scscf1.home1.net;lr>,
    <sip:icscf1_p.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From:
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID:
CSeq: 127 INVITE
Contact: sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp
Content-Length: 0
```

45. 200 OK (S-CSCF to I-CSCF) – see example in table 17.2.2.1-45

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

Table 17.2.2.1-45: 200 OK (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

46. 200 OK (I-CSCF to P-CSCF) – see example in table 17.2.2.1-46

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

Table 17.2.2.1-46: 200 OK (I-CSCF to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:Token(<sip:pcscf2.home1.net;lr>, <sip:scscf2.home1.net;lr>,
    <sip:scscf1.home1.net;lr>@home1.net;tokenized-by=home1.net>, <sip:icscf1_p.home1.net>,
    <sip:pcscf1.visited1.net>
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

Record-Route: Header entries of the home network of the I-CSCF are tokenized. The I-CSCF itself and the UE addresses are not subject to tokenization.

47. Approval of QoS Commit

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

48. 200 OK (P-CSCF to UE) – see example in table 17.2.2.1-48

P-CSCF forwards the 200 OK final response to the session originator. UE can start the media flow(s) for this session.

Table 17.2.2.1-48: 200 OK (P-CSCF to UE)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:Token(<sip:pcscf2.home1.net;lr>, <sip:scscf2.home1.net;lr>,
    <sip:scscf1.home1.net;lr>@home1.net;tokenized-by=home1.net>, <sip:icscf1_p.home1.net>,
    <sip:pcscf1.visited1.net>, <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

Record-Route: The P-CSCF rewrites the Record-Route header to add the comp=sigcomp parameter and port number negotiated during the security agreement to its own SIP URI.

49. ACK (UE to P-CSCF) – see example in table 17.2.2.1-49

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

Table 17.2.2.1-49: ACK (UE to P-CSCF)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:icscf1_p.home1.net;lr>,
      <sip:Token(<sip:scscf1.home1.net;lr>, <sip:scscf2.home1.net;lr>,
      <sip:pcscf2.home1.net;lr>@home1.net;tokenized-by=home1.net>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfgklkj490333
Cseq: 127 ACK
Content-Length: 0
```

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network as specified in 3GPP TS 24.229 [16].

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

50. ACK (P-CSCF to I-CSCF) – see example in table 17.2.2.1-50

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

Table 17.2.2.1-50: ACK (P-CSCF to I-CSCF)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
      [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info:
Route: <sip:icscf1_p.home1.net;lr>, <sip:Token(<sip:scscf1.home1.net;lr>,
      <sip:scscf2.home1.net;lr>, <sip:pcscf2.home1.net;lr>@home1.net;tokenized-by=home1.net>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

51. ACK (I-CSCF to S-CSCF) – see example in table 17.2.2.1-51

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

Table 17.2.2.1-51: ACK (I-CSCF to S-CSCF)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
      pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
      [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
P-Access-Network-Info:
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home1.net;lr>, <sip:pcscf2.home1.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

P-Access-Network-Info: this header contains information from the UE.

52. ACK (MO#1b to S-S) – see example in table 17.2.2.1-52

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

Table 17.2.2.1-52: ACK (MO#1b to S-S)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Route: <sip:scscf2.home1.net;lr>, <sip:pcscf2.home1.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX NEXT CHANGE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

17.3.2.1 (S-S#1b) Different network operators performing origination and termination, with configuration hiding by both network operators (MO#2, MT#2 assumed)

Figure 17.3.2.1-1 shows a S-CSCF handling session origination (S-CSCF#1) which performs an analysis of the destination address, and determines that it belongs to a subscriber of a different operator. The originating network operator desires to keep their configuration hidden, so forwards the request through an I-CSCF (I-CSCF#1) to a well-known entry point in the destination operator's network, I-CSCF#2. I-CSCF#2 queries the HSS for current location information, and finds the S-CSCF assigned to the subscriber (S-CSCF#2), and forwards the request to S-CSCF#2. The terminating network operator also desires to keep their configuration hidden, so I-CSCF#2 inserts itself into the signalling path for future exchanges.

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

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

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

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

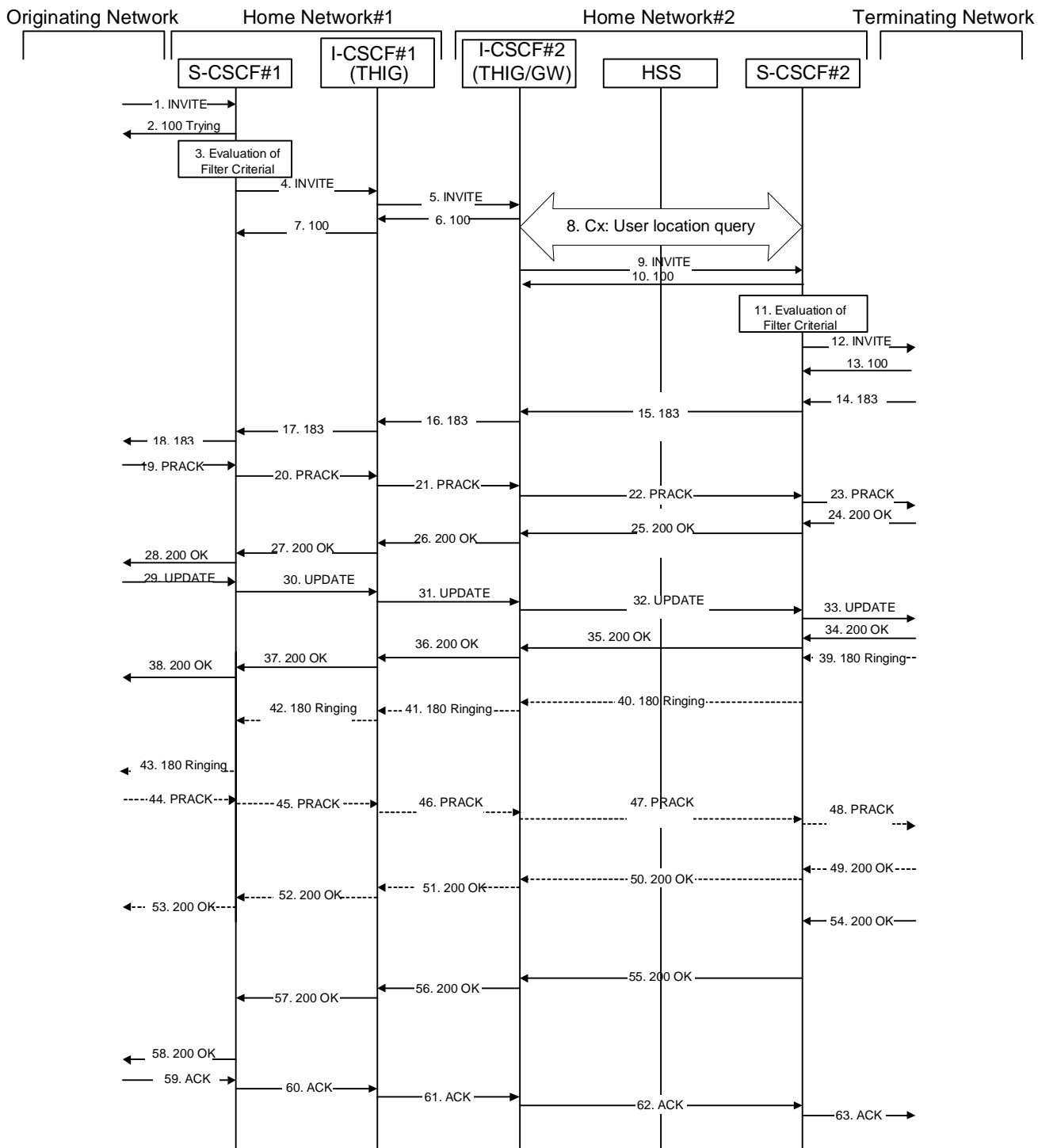


Figure 17.3.2.1-1: S-S#1b

Procedure S-S#1b is as follows:

1. INVITE (MO to S-S#1b) – see example in table 17.3.2.1-1

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

Table 17.3.2.1-1: INVITE (MO to S-S#1b)

```

INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
 [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Record-Route: <sip:pcscf1.home1.net;lr>
Route: <sip:scscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Charging-Vector: icid-value="AyretyU0dm+602Irt5tAFrbHLso=023551024"
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: precondition
Supported: 100rel
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Type: application/sdp
Content-Length: (...)

```

```

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 3400 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:99 MPV
m=video 3402 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:99 MPV
m=audio 3456 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
m=audio 3458 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR

```



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

2. 100 Trying (S-S#1b to MO) – see example in table 17.3.2.1-2

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

Table 17.3.2.1-2: 100 Trying (S-S#1b to MO)

```
SIP/2.0 100 Trying  
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP  
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7  
From:  
To:  
Call-ID:  
CSeq:  
Content-Length: 0
```

3. Evaluation of initial filter criterias

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

4. INVITE (S-CSCF to I-CSCF) – see example in table 17.3.2.1-4

S-CSCF#1 performs an analysis of the destination address, and determines the network operator to whom the destination subscriber belongs. Since the originating operator desires to keep their internal configuration hidden, S-CSCF#1 forwards the INVITE request to I-CSCF#1 adding I-CSCF#1 to the top of the Route Header.

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

Table 17.3.2.1-4: INVITE (S-CSCF to I-CSCF)

```

INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;;branch=z9hG4bKnashds7
Max-Forwards: 68
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
Route: <sip:icscf1_s.home1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>, <tel:+1-212-555-1111>
P-Charging-Vector: icid-value="AyretyU0dm+602IrT5tAFrbHLso=023551024"; orig-ioi=home1.net
Privacy:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length: (...)

```

```

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

```

P-Charging-Vector: The S-CSCF adds the identifier of its own network to the originating Inter Operator Identifier (IOI) parameter of this header.

Route: Updated to cause I-CSCF to forward the request to an I-CSCF in the terminating operator's network. The topmost Route header is set to the I-CSCF (THIG) for configuration hiding.

5. INVITE (I-CSCF to I-CSCF) – see example in table 17.3.2.1-5

I-CSCF#1 finds the entry point in home2.net and forwards the INVITE request to I-CSCF#2.

Table 17.3.2.1-6: 100 Trying (I-CSCF to I-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

7. 100 Trying (I-CSCF to S-CSCF) – see example in table 17.3.2.1-7

I-CSCF#1 decrypts the Via header entries that are tokenised and belong to its own network, and forwards the 100 Trying provisional response to S-CSCF#1.

Table 17.3.2.1-7: 100 Trying (I-CSCF to S-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

8. Cx: User Location Query procedure

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

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

Table 7.3.2-6a provides the parameters in the SIP INVITE request (flow 5) which are sent to the HSS.

Table 7.3.2-6b provides the parameters sent from the HSS that need to be mapped to the SIP INVITE request (flow 9) and sent to the S-CSCF.

9. INVITE (I-CSCF to S-CSCF) – see example in table 17.3.2.1-9

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

Table 17.3.2.1-10: 100 Trying (S-CSCF to I-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

11. Evaluation of initial filter criterias

S-CSCF#2 validates the service profile of this subscriber and evaluates the initial filter criterias.

12. INVITE (S-S#1b to MT) – see example in table 17.3.2.1-12

S-CSCF#2 forwards the INVITE request, as determined by the termination procedure.

Table 17.3.2.1-12: INVITE (S-S#1b to MT)

```

INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 65
Record-Route: <sip:scscf2.home2.net;lr>, <sip:icscf2_s.home2.net;lr>,
    <sip:icscf1_s.home1.net;lr>, <sip:Token(<sip:scscf1.home1.net;lr>,
    <sip:pcscf1.home1.net;lr>)@home1.net;tokenized-by=home1.net>
Route: <sip:pcscf2.home2.net;lr>
P-Asserted-Identity:
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"
Privacy:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
P-Called-Party-ID: <sip:user2_public1@home2.net>
Content-Type:
Content-Length: (...)

```

```

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

```

13. 100 Trying (MT to S-S#1b) – see example in table 17.3.2.1-13

S-CSCF#2 receives a 100 Trying provisional response to the INVITE request (12), as specified by the termination procedures.

Table 17.3.2.1-13: 100 Trying (MT to S-S#1b)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

14. 183 Session Progress (MT to S-S#1b) – see example in table 17.3.2.1-14

The media stream capabilities of the destination are returned along the signalling path, in a 183 Session Progress provisional response to the INVITE request (12), as per the termination procedure.

Table 17.3.2.1-14: 183 Session Progress (MT to S-S#1b)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
<sip:icscf2_s.home2.net;lr>, <sip:icscf1_s.home1.net;lr>,
<sip:Token(<sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr> )@home1.net;tokenized-
by=home1.net>
P-Asserted-Identity: "John Smith" <sip:user2_public1@home2.net>
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy:
From:
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 9021
Content-Type: application/sdp
Content-Length: (...)
```

```
v=0
o=- 2987933623 2987933623 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
m=audio 0 RTP/AVP 97 96 0 15
```

15. 183 Session Progress (S-CSCF to I-CSCF) – see example in table 17.3.2.1-15

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

Table 17.3.2.1-15: 183 Session Progress (S-CSCF to I-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity: "John Smith" <sip:user2_public1@home2.net>, <tel:+1-212-555-2222>
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"; orig-ioi=home1.net;
term-ioi=home2.net
P-Charging-Function-Addresses: ccf=[5555::b99:c88:d77:e66]; ccf=[5555::a55:b44:c33:d22];
ecf=[5555::1ff:2ee:3dd:4cc]; ecf=[5555::6aa:7bb:8cc:9dd]
Privacy:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

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

P-Asserted-Identity: The S-CSCF adds the corresponding TEL URL to the P-Asserted-Identity header in order that the TEL URL is known to the destination network in case the INVITE is forwarded to a MGCF.

P-Charging-Vector: The S-CSCF adds the identifier of its own network to the terminating Inter Operator Identifier (IOI) parameter of this header.

P-Charging-Function-Addresses: The S-CSCF passes this header to the I-CSCF for charging.

16. 183 Session Progress (I-CSCF to I-CSCF) – see example in table 17.3.2.1-16

I-CSCF#2 forwards the 183 Session Progress provisional response to I-CSCF#1.

Table 17.3.2.1-16: 183 Session Progress (I-CSCF to I-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:Token(<sip:pcscf2.home2.net;lr>,
<sip:scscf2.home2.net;lr>)@home2.net;tokenized-by=home2.net>, <sip:icscf2_s.home2.net;lr>,
<sip:icscf1_s.home1.net;lr>, <sip:Token(<sip:scscf1.home1.net;lr>,
<sip:pcscf1.home1.net;lr>)@home1.net;tokenized-by=home1.net>
P-Asserted-Identity:
P-Charging-Vector:
Privacy:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

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

Record-Route: The I-CSCF#2 encrypts all the entries belonging to its own network (home#2).

17. 183 Session Progress (I-CSCF to S-CSCF) – see example in table 17.3.2.1-17

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

Table 17.3.2.1-17: 183 Session Progress (I-CSCF to S-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:Token(<sip:pcscf2.home2.net;lr>,
<sip:scscf2.home2.net;lr>@home2.net;tokenized-by=home2.net>, <sip:icscf2_s.home2.net;lr>,
<sip:icscf1_s.home1.net;lr>, <sip:Token(<sip:scscf1.home1.net;lr>,
<sip:pcscf1.home1.net;lr>@home1.net;tokenized-by=home1.net>
P-Asserted-Identity:
P-Charging-Vector:
Privacy:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

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

Via/Record-Route: I-CSCF#1 decrypts all the entries that are tokenised and belong to its own network.

18. 183 Session Progress (S-S#1b to MO) – see example in table 17.3.2.1-18

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

Table 17.3.2.1-18: 183 Session Progress (S-S#1b to MO)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcscfl.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

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

19. PRACK (MO to S-S#1b) – see example in table 17.3.2.1-19

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

Table 17.3.2.1-19: PRACK (MO to S-S#1b)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
 [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
 <sip:Token(<sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>)>@home2.net;tokenized-
 by=home2.net>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 128 PRACK
Require: precondition
RAck: 9021 127 INVITE
Content-Type: application/sdp
Content-Length: (...)
```

```
v=0
o=- 2987933615 2987933616 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:eee:ddd
s=-
e=IN IP6 5555::aaa:bbb:eee:ddd
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15
```

20. PRACK (S-CSCF to I-CSCF) – see example in table 17.3.2.1-20

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

Table 17.3.2.1-20: PRACK (S-CSCF to I-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:icscf1_s.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
    <sip:Token(<sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>@home2.net;tokenized-
    by=home2.net)>
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

21. PRACK (I-CSCF to I-CSCF) – see example in table 17.3.2.1-21

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

Table 17.3.2.1-21: PRACK (I-CSCF to I-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:icscf2_s.home2.net;lr>, <sip:Token(<sip:scscf2.home2.net;lr>,
<sip:pcscf2.home2.net;lr>@home2.net;tokenized-by=home2.net>
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

Via: I-CSCF#1 encrypts all the entries that belong to its own network to maintain configuration independence of the home#1 operator.

22. PRACK (I-CSCF to S-CSCF) – see example in table 17.3.2.1-22

I-CSCF#2 decrypts all the tokenized route entries belonging to its own network to recover the routing information, and forwards the PRACK request to S-CSCF#2.

Table 17.3.2.1-22: PRACK (I-CSCF to S-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

23. PRACK (S-S#1b to MT) – see example in table 17.3.2.1-23

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

Table 17.3.2.1-23: PRACK (S-S#1b to MT)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 65
Route: <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

```

24. 200 OK (MT to S-S#1b) – see example in table 17.3.2.1-24

The terminating endpoint responds to the PRACK request (23) with a 200 OK response.

Table 17.3.2.1-24: 200 OK (MT to S-S#1b)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
  icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
  icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
  scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
  pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
  [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933623 2987933624 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:eee:ddd
s=-
e=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15
```

25. 200 OK (S-CSCF to I-CSCF) – see example in table 17.3.2.1-25

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

Table 17.3.2.1-25: 200 OK (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

26. 200 OK (I-CSCF to I-CSCF) – see example in table 17.3.2.1-26

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

Table 17.3.2.1-26: 200 OK (I-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

27. 200 OK (I-CSCF to S-CSCF) – see example in table 17.3.2.1-27

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

Table 17.3.2.1-27: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

Via: I-CSCF#1 decrypts all the tokenised entries belonging to its own network.

28. 200 OK (S-S#1b to MO) – see example in table 17.3.2.1-28

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

Table 17.3.2.1-28: 200 OK (S-S#1b to MO)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

29. UPDATE (MO to S-S#1b) – see example in table 17.3.2.1-29

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

Table 17.3.2.1-29: UPDATE (MO to S-S#1b)

```

UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
    <sip:Token(<sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr> )@home2.net;tokenized-
    by=home2.net>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 129 UPDATE
Content-Type: application/sdp
Content-Length: (...)

```

```

v=0
o=- 2987933615 2987933617 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:eee:ddd
s=-
e=IN IP6 5555::aaa:bbb:eee:ddd
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15

```


30. UPDATE (S-CSCF to I-CSCF) – see example in table 17.3.2.1-30

S-CSCF#1 forwards the UPDATE request to I-CSCF#1.

Table 17.3.2.1-30: UPDATE (S-CSCF to I-CSCF)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:icscf1_s.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
    <sip:Token(<sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>@home2.net;tokenized-
    by=home2.net)>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

31. UPDATE (I-CSCF to I-CSCF) – see example in table 17.3.2.1-31

I-CSCF#1 forwards the UPDATE request to I-CSCF#2.

Table 17.3.2.1-31: UPDATE (I-CSCF to I-CSCF)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:icscf2_s.home2.net;lr>, <sip:Token(<sip:scscf2.home2.net;lr>,
<sip:pcscf2.home2.net;lr>)>@home2.net;tokenized-by=home2.net>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

Via:: I-CSCF#1 encrypts all the entries belonging to its own network to maintain configuration independence of the home#1 operator.

32. UPDATE (I-CSCF to S-CSCF) – see example in table 17.3.2.1-32

I-CSCF#2 decrypts all the tokenised Route entries belonging to its own network and forwards the UPDATE request to S-CSCF#2.

Table 17.3.2.1-32: UPDATE (I-CSCF to S-CSCF)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

33. UPDATE (S-S#1b to MT) – see example in table 17.3.2.1-33

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

Table 17.3.2.1-33: UPDATE (S-S#1b to MT)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 65
Route: <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

34. 200 OK (MT to S-S#1b) – see example in table 17.3.2.1-34

The terminating endpoint responds to the UPDATE request (33) with a 200 OK response.

Table 17.3.2.1-34: 200 OK (MT to S-S#1b)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933623 2987933625 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98
b=AS:75
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15
```

35. 200 OK (S-CSCF to I-CSCF) – see example in table 17.3.2.1-35

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

Table 17.3.2.1-35: 200 OK (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

36. 200 OK (I-CSCF to I-CSCF) – see example in table 17.3.2.1-36

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

Table 17.3.2.1-36: 200 OK (I-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

37. 200 OK (I-CSCF to S-CSCF) – see example in table 17.3.2.1-37

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

Table 17.3.2.1-37: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

Via: I-CSCF#1 decrypts all the tokenised entries belonging to its own network.

38. 200 OK (S-S#1b to MO) – see example in table 17.3.2.1-38

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

Table 17.3.2.1-38: 200 OK (S-S#1b to MO)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

39. 180 Ringing (MT to S-S#1b) – see example in table 17.3.2.1-39

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

Table 17.3.2.1-39: 180 Ringing (MT to S-S#1b)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf2_s.home2.net;lr>, <sip:icscf1_s.home1.net;lr>,
    <sip:Token(<sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>)@home1.net;tokenized-
    by=home1.net>
From:
To:
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 9022
Content-Length: 0
```

40. 180 Ringing (S-CSCF to I-CSCF) – see example in table 17.3.2.1-40

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

Table 17.3.2.1-40: 180 Ringing (S-CSCF to I-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

41. 180 Ringing (I-CSCF to I-CSCF) – see example in table 17.3.2.1-41

I-CSCF#2 forwards the 180 Ringing response to I-CSCF#1.

Table 17.3.2.1-41: 180 Ringing (I-CSCF to I-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:Token(<sip:pcscf2.home2.net;lr>,
    <sip:scscf2.home2.net;lr>)@home2.net;tokenized-by=home2.net>, <sip:icscf2_s.home2.net;lr>,
    <sip:icscf1_s.home1.net;lr>, <sip:Token(<sip:scscf1.home1.net;lr>,
    <sip:pcscf1.home1.net;lr>)@home1.net;tokenized-by=home1.net>
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

Record-Route: I-CSCF#2 encrypts all the entries belonging to its own network.

42. 180 Ringing (I-CSCF to S-CSCF) – see example in table 17.3.2.1-42

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

Table 17.3.2.1-42: 180 Ringing (I-CSCF to S-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:Token(<sip:pcscf2.home2.net;lr>,
    <sip:scscf2.home2.net;lr>)@home2.net;tokenized-by=home2.net>, <sip:icscf2_s.home2.net;lr>,
    <sip:icscf1_s.home1.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

Record-Route: I-CSCF#1 decrypts all the entries belonging to its own network.

Via: I-CSCF#1 decrypts all the tokenised entries belonging to its own network.

43. 180 Ringing (S-S#1b to MO) – see example in table 17.3.2.1-43

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

Table 17.3.2.1-43: 180 Ringing (S-S#1b to MO)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

44. PRACK (MO to S-S#1b) – see example in table 17.3.2.1-44

The originator acknowledges the 180 Ringing provisional response (43) with a PRACK request.

Table 17.3.2.1-44: PRACK (MO to S-S#1b)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
    <sip:Token(<sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>@home2.net;tokenized-
        by=home2.net)>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfgklkj490333
Cseq: 130 PRACK
RAck: 9022 127 INVITE
Content-Length: 0
```

45. PRACK (S-CSCF to I-CSCF) – see example in table 17.3.2.1-45

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

Table 17.3.2.1-45: PRACK (S-CSCF to I-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:icscf1_s.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
    <sip:Token(<sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>@home2.net;tokenized-
        by=home2.net)>
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:
```

46. PRACK (I-CSCF to I-CSCF) – see example in table 17.3.2.1-46

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

Table 17.3.2.1-46: PRACK (I-CSCF to I-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:icscf2_s.home2.net;lr>, <sip:Token(<sip:scscf2.home2.net;lr>,
<sip:pcscf2.home2.net;lr>)@home2.net;tokenized-by=home2.net>
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:
```

Via: I-CSCF#1 encrypts all the entries belonging to its own network maintain configuration independence of the home#1 operator.

47. PRACK (I-CSCF to S-CSCF) – see example in table 17.3.2.1-47

I-CSCF#2 determines the routing information, and forwards the PRACK request to S-CSCF#2.

Table 17.3.2.1-47: PRACK (I-CSCF to S-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:
```

48. PRACK (S-S#1b to MT) – see example in table 17.3.2.1-48

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

Table 17.3.2.1-48: PRACK (S-S#1b to MT)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 65
Route: <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:
```

49. 200 OK (MT to S-S#1b) – see example in table 17.3.2.1-49

The terminating endpoint responds to the PRACK request (48) with a 200 OK response.

Table 17.3.2.1-49: 200 OK (MT to S-S#1b)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

50. 200 OK (S-CSCF to I-CSCF) – see example in table 17.3.2.1-50

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

Table 17.3.2.1-50: 200 OK (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

51. 200 OK (I-CSCF to I-CSCF) – see example in table 17.3.2.1-51

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

Table 17.3.2.1-51: 200 OK (I-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

52. 200 OK (I-CSCF to S-CSCF) – see example in table 17.3.2.1-52

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

Table 17.3.2.1-52: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

Via: I-CSCF#1 decrypts all tokenised entries that belong to its network..

53. 200 OK (S-S#1b to MO) – see example in table 17.3.2.1-53

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

Table 17.3.2.1-53: 200 OK (S-S#1b to MO)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

54. 200 OK (MT to S-S#1b) – see example in table 17.3.2.1-54

The final response to the INVITE (12), 200 OK, is sent by the terminating endpoint over the signalling path. This is typically generated when the subscriber has accepted the incoming session attempt. The response is sent to S-CSCF#2 per the termination procedure.

Table 17.3.2.1-54: 200 OK (MT to S-S#1b)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf2_s.home2.net;lr>, <sip:icscf1_s.home1.net;lr>,
    <sip:Token(<sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>)@home1.net;tokenized-
    by=home1.net>
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Content-Length: 0
```

55. 200 OK (S-CSCF to I-CSCF) – see example in table 17.3.2.1-55

The 200 OK response is forwarded to the I-CSCF#2.

Table 17.3.2.1-55: 200 OK (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

56. 200 OK (I-CSCF to I-CSCF) – see example in table 17.3.2.1-56

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

Table 17.3.2.1-56: 200 OK (I-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:Token(<sip:pcscf2.home2.net>, <sip:scscf2.home2.net>)@home2.net;tokenized-
by=home2.net>, <sip:icscf2_s.home2.net>, <sip:icscf1_s.home1.net>,
<sip:Token(<sip:scscf1.home1.net>, <sip:pcscf1.home1.net>)@home1.net;tokenized-
by=home1.net>
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

Record-Route: I-CSCF#2 encrypts all the entries that belong to its network.

57. 200 OK (I-CSCF to S-CSCF) – see example in table 17.3.2.1-57

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

Table 17.3.2.1-57: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:Token(<sip:pcscf2.home2.net;lr>,
<sip:scscf2.home2.net;lr>)@home2.net;tokenized-by=home2.net>, <sip:icscf2_s.home2.net;lr>,
<sip:icscf1_s.home1.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

Record-Route: I-CSCF#1 decrypts all the tokenised entries belonging to its own network.

Via: I-CSCF#1 decrypts all the tokenised entries that belong to its own network.

58. 200 OK (S-S#1b to MO) – see example in table 17.3.2.1-58

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

Table 17.3.2.1-58: 200 OK (S-S#1b to MO)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

59. ACK (MO to S-S#1b) – see example in table 17.3.2.1-59

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

Table 17.3.2.1-59: ACK (MO to S-S#1b)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
<sip:Token(<sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>@home2.net;tokenized-
by=home2.net>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfgkj490333
Cseq: 127 ACK
Content-Length: 0
```

60. ACK (S-CSCF to I-CSCF) – see example in table 17.3.2.1-60

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

Table 17.3.2.1-60: ACK (S-CSCF to I-CSCF)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:icscf1_s.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
<sip:Token(<sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>@home2.net;tokenized-
by=home2.net>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

61. ACK (I-CSCF to I-CSCF) – see example in table 17.3.2.1-61

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

Table 17.3.2.1-61: ACK (I-CSCF to I-CSCF)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:icscf2_s.home2.net;lr>, <sip:Token(<sip:scscf2.home2.net;lr>,
<sip:pcscf2.home2.net;lr>@home2.net;tokenized-by=home2.net>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

Via:: I-CSCF#1 encrypts all the entries that belong to its own network to maintain configuration independence of the home#1 operator.

62. ACK (I-CSCF to S-CSCF) – see example in table 17.3.2.1-62

I-CSCF#2 decrypts all the tokenised Route entries that belong to its own network and forwards the ACK request to S-CSCF#2.

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

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

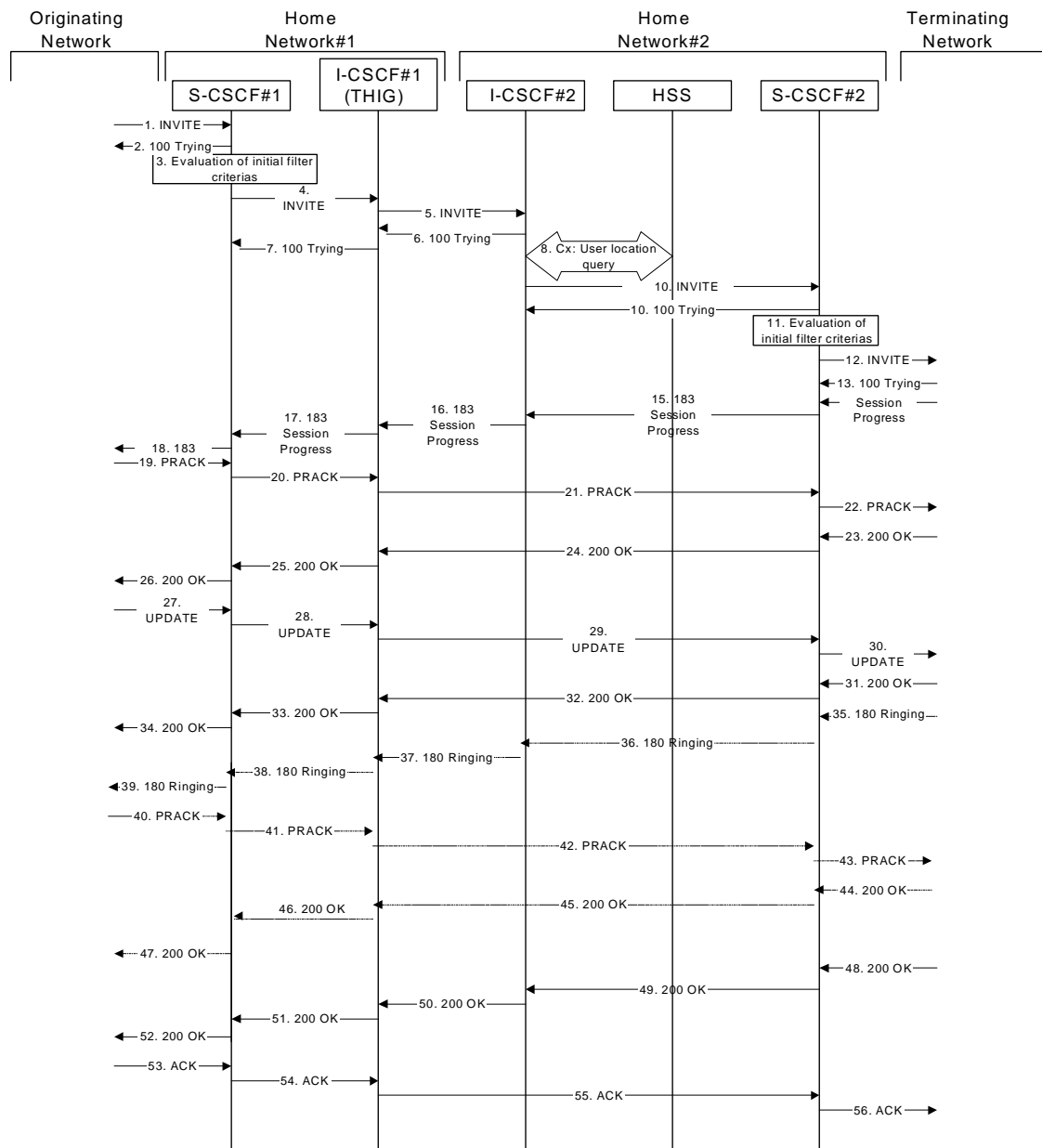


Figure 17.3.3.1-1: S-S#1c

Procedure S-S#1c is as follows:

1. INVITE (MO to S-S#1c) – see example in table 17.3.3.1-1

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

Table 17.3.3.1-1: INVITE (MO to S-S#1c)

```

INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
 [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>
Record-Route: <sip:pcscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>
Privacy: none
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: precondition
Supported: 100rel
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Type: application/sdp
Content-Length: (...)

```

```

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 3400 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:99 MPV
m=video 3402 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:99 MPV
m=audio 3456 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
m=audio 3458 RTP/AVP 97 96 0 15
b=AS:25.4
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
a=curr:qos local none
a=curr:qos remote none

```

```
a=des:qos-mandatory-local-sendrecv  
a=des:qos-none-remote-sendrecv
```

2. 100 Trying (S-S#1c to MO) – see example in table 17.3.3.1-2

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

Table 17.3.3.1-2: 100 Trying (S-S#1c to MO)

```
SIP/2.0 100 Trying  
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP  
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7  
From:  
To:  
Call-ID:  
CSeq:  
Content-Length: 0
```

3. Evaluation of Filter Criteria

S-CSCF#1 validates the service profile of this subscriber, and evaluates the initial filter criterias.

4. INVITE (S-CSCF to I-CSCF) – see example in table 17.3.3.1-4

S-CSCF#1 performs an analysis of the destination address, and determines the network operator to whom the destination subscriber belongs. Since the originating operator desires to keep their internal configuration hidden, S-CSCF#1 forwards the INVITE request to I-CSCF#1.

Table 17.3.3.1-4: INVITE (S-CSCF to I-CSCF)

```

INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:icscf1_s.home1.net;lr>
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>, <tel:+1-212-555-1111>
Privacy: none
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net
From:
To:
Call-ID:
Cseq:
Required:
Supported:
Contact:
Content-Type:
Content-Length: (...)

```

```

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

```

Route: Topmost Route header set to the I-CSCF that will perform the translation needed to maintain configuration independence.

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

P-Charging-Vector: The S-CSCF adds the identifier of its own network to the originating Inter Operator Identifier (IOI) parameter of this header.

5. INVITE (I-CSCF to I-CSCF) – see example in table 17.3.3.1-5

Table 17.3.3.1-6: 100 Trying (I-CSCF to I-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
  scscf1.home1.net, SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-
  by=home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

7. 100 Trying (I-CSCF to S-CSCF) – see example in table 17.3.3.1-7

I-CSCF#1 determines the Via header, and forwards the 100 Trying provisional response to S-CSCF#1.

Table 17.3.3.1-7: 100 Trying (I-CSCF to S-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
  pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
  [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

8. Cx: User Location Query procedure

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

For detailed message flows see 3GPP TS 29.228.

Table 7.3.2-6a provides the parameters in the SIP INVITE request (flow 5), which are sent to the HSS.

Table 7.3.2-6b provides the parameters sent from the HSS that are mapped to the SIP INVITE request (flow 9) and sent to the S-CSCF.

9. INVITE (I-CSCF to S-CSCF) – see example in table 17.3.3.1-9

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

Table 17.3.3.1-10: 100 Trying (S-CSCF to I-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
    SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

11. Evaluation of initial filter criteria

S-CSCF#2 validates the service profile of this subscriber and evaluates the initial filter criterias.t

12. INVITE (S-S#1c to MT) – see example in table 17.3.3.1-12

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

Table 17.3.3.1-12: INVITE (S-S#1c to MT)

```
INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
    SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 65
Route: <sip:pcscf2.home2.net;lr>
Record-Route: <sip:scscf2.home2.net;lr>, <sip:icscf1_s.home1.net;lr>,
    <sip:Token(<sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>)@home1.net;tokenized-
    by=home1.net>
P-Asserted-Identity:
Privacy:
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"
From:
To:
Call-ID:
Cseq:
Required:
Supported:
Contact:
P-Called-Party-ID: <sip:user2_public1@home2.net>
Content-Type:
Content-Length: (...)
```

```
v=0
o=29879232615-29879232615-IN IP6-5555::aaa:bbb:eee:ddd
s=-
c=IN IP6-5555::aaa:bbb:eee:ddd-
t=907165275-0
m=video 0 RTP/AVP 99
b=
a=
a=
a=
a=
a=
a=
a=
m=video 0 RTP/AVP 99
b=
a=
a=
a=
a=
a=
a=
a=audio 3456 RTP/AVP 97 96 0 15
b=AS:25-4
a=qos:mandatory-sendrecv-
a=rtptime:97-AMR-
a=fmt:97 mode-set=0,2,5,7; maxframes=2
a=rtptime:96 G726-32/8000
m=audio 0 RTP/AVP 97 96 0 15
```

13. 100 Trying (MT to S-S#1c) – see example in table 17.3.3.1-13

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

Table 17.3.3.1-13: 100 Trying (MT to S-S#1c)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
    SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

14. 183 Session Progress (MT to S-S#1c) – see example in table 17.3.3.1-14 (related to 17.3.3.1-12)

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

Table 17.3.3.1-14: 183 Session Progress (MT to S-S#1c)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
    SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf1_s.home1.net;lr>, <sip:Token(<sip:scscf1.home1.net;lr>,
    <sip:pcscf1.home1.net;lr>)@home1.net;tokenized-by=home1.net>
P-Asserted-Identity: "John Smith" <sip:user2_public1@home1.net>
Privacy: none
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
From:
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 9021
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933623 2987933623 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:eee:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97
b=AS:25.4 3
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=qos:mandatory sendrecv confirm
m=audio 0 RTP/AVP 97 96 0 15
```

15. 183 Session Progress (S-CSCF to I-CSCF) – see example in table 17.3.3.1-15

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

Table 17.3.3.1-15: 183 Session Progress (S-CSCF to I-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
    SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity: "John Smith" <sip:user2_public1@home1.net>, <tel:+1-212-555-2222>
Privacy: none
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net;
    term-ioi=home2.net
P-Charging-Function-Addresses: ccf=[5555::b99:c88:d77:e66]; ccf=[5555::a55:b44:c33:d22];
    ecf=[5555::1ff:2ee:3dd:4cc]; ecf=[5555::6aa:7bb:8cc:9dd]
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

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

P-Charging-Vector: The S-CSCF adds the identifier of its own network to the terminating Inter Operator Identifier (IOI) parameter of this header.

P-Charging-Function-Addresses: The S-CSCF passes this header to the I-CSCF for charging.

16. 183 Session Progress (I-CSCF to I-CSCF) – see example in table 17.3.3.1-16

I-CSCF#2 forwards the 183 Session Progress provisional response to I-CSCF#1.

Table 17.3.3.1-16: 183 Session Progress (I-CSCF to I-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP icscfl_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net, SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-
    by=home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity:
Privacy:
P-Charging-Vector:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

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

17. 183 Session Progress (I-CSCF to S-CSCF) – see example in table 17.3.3.1-17

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

Table 17.3.3.1-17: 183 Session Progress (I-CSCF to S-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf1_s.home1.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
P-Asserted-Identity:
Privacy:
P-Charging-Vector:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

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

Record-Route: I-CSCF#1 determines the entry to the right of its own entry.

Via: determined by I-CSCF#1.

18. 183 Session Progress (S-S#1c to MO) – see example in table 17.3.3.1-18

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

Table 17.3.3.1-18: 183 Session Progress (S-S#1c to MO)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcscfl.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity:
Privacy:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

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

19. PRACK (MO to S-S#1c) – see example in table 17.3.3.1-19

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

Table 17.3.3.1-19: PRACK (MO to S-S#1c)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>, <sip:scscf2.home2.net;lr>,
<sip:pcscf2.home2.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfgk490333
Require: precondition
Cseq: 128 PRACK
RAck: 9021 127 INVITE
Content-Type: application/sdp
Content-Length: (...)
```

```
v=0
o=- 2987933615 2987933616 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtptime:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtptime:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
e=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15
```

20. PRACK (S-CSCF to I-CSCF) – see example in table 17.3.3.1-20

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

Table 17.3.3.1-20: PRACK (S-CSCF to I-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:icscf1_s.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

21. PRACK (I-CSCF to S-CSCF) – see example in table 17.3.3.1-21

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

Table 17.3.3.1-21: PRACK (I-CSCF to S-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
  scscf1.home1.net, SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-
  by=home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

22. PRACK (S-S#1c to MT) – see example in table 17.3.3.1-22

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

Table 17.3.3.1-22: PRACK (S-S#1c to MT)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
    SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

23. 200 OK (MT to S-S#1c) – see example in table 17.3.3.1-23

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

Table 17.3.3.1-23: 200 OK (MT to S-S#1c)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
  icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
  SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
  SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933623 2987933624 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event

```

24. 200 OK (S-CSCF to I-CSCF) – see example in table 17.3.3.1-24

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

Table 17.3.3.1-24: 200 OK (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
  scscf1.home1.net, SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-
  by=home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

25. 200 OK (I-CSCF to S-CSCF) – see example in table 17.3.3.1-25

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

Table 17.3.3.1-25: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP sscsf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

Via: Determined by I-CSCF#1.

26. 200 OK (S-S#1c to MO) – see example in table 17.3.3.1-26

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

Table 17.3.3.1-26: 200 OK (S-S#1c to MO)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

27. UPDATE (MO to S-S#1c) – see example in table 17.3.3.1-27

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

Table 17.3.3.1-27: UPDATE (MO to S-S#1c)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>, <sip:scscf2.home2.net;lr>,
<sip:pcscf2.home2.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfgk490333
Cseq: 129 UPDATE
Content-Type: application/sdp
Content-Length: (...)
```

```
v=0
o=- 2987933615 2987933617 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtptime:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtptime:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
e=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15
```

28. UPDATE (S-CSCF to I-CSCF) – see example in table 17.3.3.1-28

S-CSCF#1 forwards the UPDATE request to I-CSCF#1.

Table 17.3.3.1-28: UPDATE (S-CSCF to I-CSCF)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:icscf1_s.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

29. UPDATE (I-CSCF to S-CSCF) – see example in table 17.3.3.1-29

I-CSCF#1 forwards the UPDATE request to S-CSCF#2.

Table 17.3.3.1-29: UPDATE (I-CSCF to S-CSCF)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
  scscf1.home1.net, SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-
  by=home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

30. UPDATE (S-S#1c to MT) – see example in table 17.3.3.1-30

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

Table 17.3.3.1-30: UPDATE (S-S#1c to MT)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
  icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
  SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
  SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

31. 200 OK (MT to S-S#1c) – see example in table 17.3.3.1-31

The terminating endpoint responds to the UPDATE request with a 200 OK response.

Table 17.3.3.1-31: 200 OK (MT to S-S#1c)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
  icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
  SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
  SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

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

32. 200 OK (S-CSCF to I-CSCF) – see example in table 17.3.3.1-32

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

Table 17.3.3.1-32: 200 OK (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net, SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-
    by=home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

v=0
o=- 2987933623 2987933625 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98
b=AS:75
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtptime:98 H263
a=fmt:98 profile-level-id=0
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtptime:97 AMR
a=fmt:97 mode-set=0,2,5,7; maxframes=2
a=rtptime:96 telephone-event

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```

33. 200 OK (I-CSCF to S-CSCF) – see example in table 17.3.3.1-33

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

Table 17.3.3.1-33: 200 OK (I-CSCF to S-CSCF)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

```

Via: Determined by I-CSCF#1.

34. 200 OK (S-S#1c to MO) – see example in table 17.3.3.1-34

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

Table 17.3.3.1-34: 200 OK (S-S#1c to MO)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

35. 180 Ringing (MT to S-S#1c) – see example in table 17.3.3.1-35 (related to table 17.3.3.1-12)

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

Table 17.3.3.1-35: 180 Ringing (MT to S-S#1c)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
    SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf1_s.home1.net;lr>, <sip:Token(<sip:scscf1.home1.net;lr>,
    <sip:pcscf1.home1.net;lr>)@home1.net;tokenized-by=home1.net>
From:
To:
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 9022
Content-Length: 0
```

36. 180 Ringing (S-CSCF to I-CSCF) – see example in table 17.3.3.1-36

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

Table 17.3.3.1-36: 180 Ringing (S-CSCF to I-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
    SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

37. 180 Ringing (I-CSCF to I-CSCF) – see example in table 17.3.3.1-37

I-CSCF#2 forwards the 180 Ringing response to I-CSCF#1.

Table 17.3.3.1-37: 180 Ringing (I-CSCF to I-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net, SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-
    by=home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

38. 180 Ringing (I-CSCF to S-CSCF) – see example in table 17.3.3.1-38

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

Table 17.3.3.1-38: 180 Ringing (I-CSCF to S-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf1_s.home1.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

Record-Route: Formed by I-CSCF#1 determining the entry to the right of its own entry.

Via: Determined by I-CSCF#1.

39. 180 Ringing (S-S#1c to MO) – see example in table 17.3.3.1-39

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

Table 17.3.3.1-39: 180 Ringing (S-S#1c to MO)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

40. PRACK (MO to S-S#1c) – see example in table 17.3.3.1-40

The originator acknowledges the 180 Ringing provisional response (39) with a PRACK request.

Table 17.3.3.1-40: PRACK (MO to S-S#1c)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:pcscf2.home2.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 130 PRACK
RAck: 9022 127 INVITE
Content-Length: 0
```

41. PRACK (S-CSCF to I-CSCF) – see example in table 17.3.3.1-41

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

Table 17.3.3.1-41: PRACK (S-CSCF to I-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:icscf1_s.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:
```

42. PRACK (I-CSCF to I-CSCF) – see example in table 17.3.3.1-42

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

Table 17.3.3.1-42: PRACK (I-CSCF to S-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net, SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-
by=home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Length:
```

43. PRACK (S-S#1c to MT) – see example in table 17.3.3.1-43

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

Table 17.3.3.1-43: PRACK (S-S#1c to MT)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:
```

44. 200 OK (MT to S-S#1c) – see example in table 17.3.3.1-44

The terminating endpoint responds to the PRACK request (43) with a 200 OK response.

Table 17.3.3.1-44: 200 OK (MT to S-S#1c)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

45. 200 OK (S-CSCF to I-CSCF) – see example in table 17.3.3.1-45

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

Table 17.3.3.1-45: 200 OK (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net, SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-
by=home1.net, SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

46. 200 OK (I-CSCF to S-CSCF) – see example in table 17.3.3.1-46

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

Table 17.3.3.1-46: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

Via: Determined by I-CSCF#1.

47. 200 OK (S-S#1c to MO) – see example in table 17.3.3.1-47

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

Table 17.3.3.1-47: 200 OK (S-S#1c to MO)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

48. 200 OK (MT to S-S#1c) – see example in table 17.3.3.1-48 (related to 17.3.3.1-13)

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 session attempt. The response is sent to S-CSCF#2 per the termination procedure.

Table 17.3.3.1-48: 200 OK (MT to S-S#1c)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf1_s.home1.net;lr>, <sip:Token(<sip:scscf1.home1.net;lr>,
    <sip:pcscf1.home1.net;lr>)@home1.net;tokenized-by=home1.net>
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Content-Length: (...)
```

49. 200 OK (S-CSCF to I-CSCF) – see example in table 17.3.3.1-49

The 200 OK response is forwarded to the I-CSCF#2.

Table 17.3.3.1-49: 200 OK (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

50. 200 OK (I-CSCF to I-CSCF) – see example in table 17.3.3.1-50

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

Table 17.3.3.1-50: 200 OK (I-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP
    Token(sip:scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

51. 200 OK (I-CSCF to S-CSCF) – see example in table 17.3.3.1-51

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

Table 17.3.3.1-51: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf1_s.home1.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

Record-Route: Formed by I-CSCF#1 determining the entry to the right of its own entry.

Via: Determined by I-CSCF#1.

52. 200 OK (S-S#1c to MO) – see example in table 17.3.3.1-52

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

Table 17.3.3.1-52: 200 OK (S-S#1c to MO)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

53. ACK (MO to S-S#1c) – see example in table 17.3.3.1-53

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

Table 17.3.3.1-53: ACK (MO to S-S#1c)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:pcscf2.home2.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 ACK
Content-Length: 0
```

54. ACK (S-CSCF to I-CSCF) – see example in table 17.3.3.1-54

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

Table 17.3.3.1-54: ACK (S-CSCF to I-CSCF)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:icscf1_s.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

55. ACK (I-CSCF to S-CSCF) – see example in table 17.3.3.1-55

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

Table 17.3.3.1-55: ACK (I-CSCF to S-CSCF)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

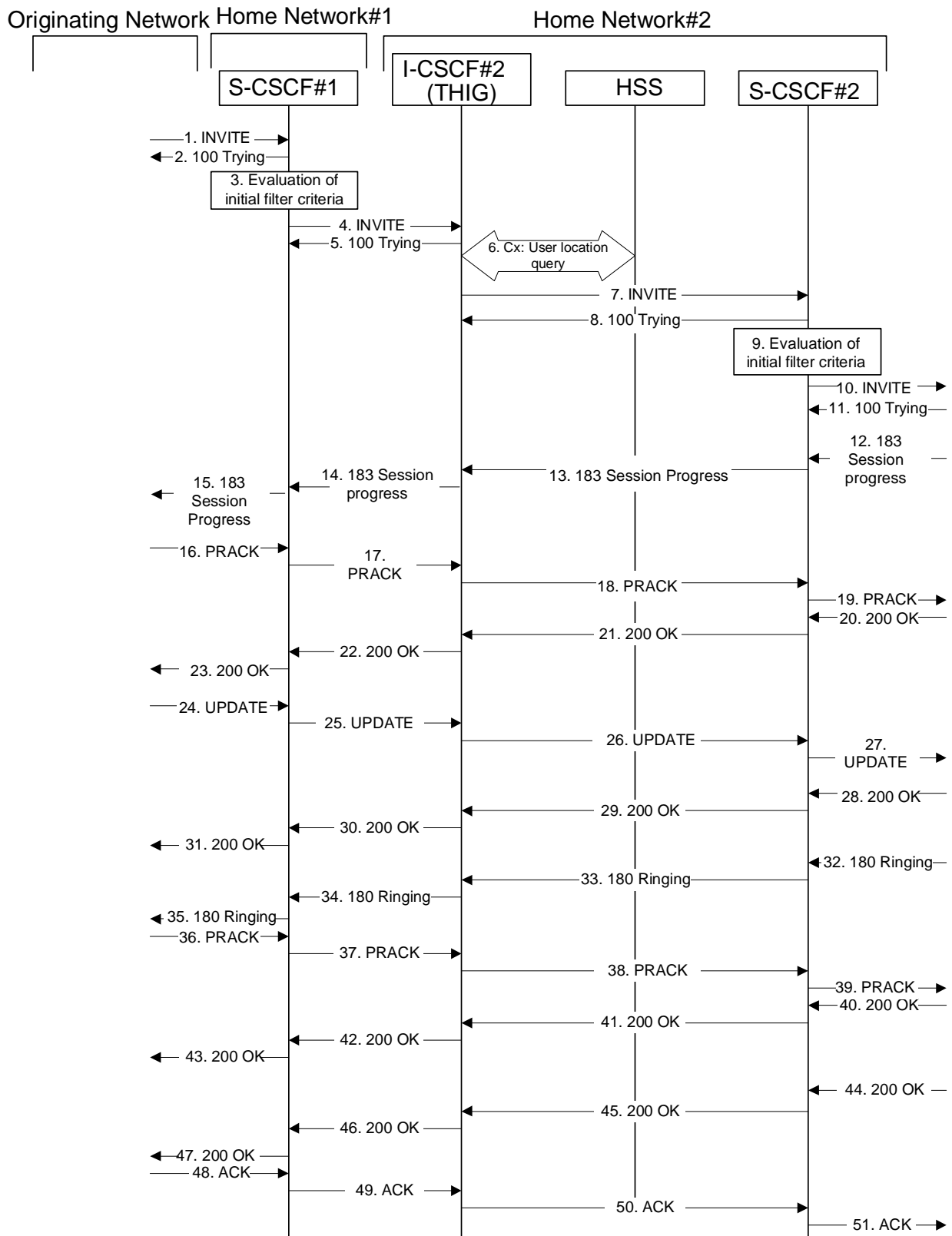



Figure 17.3.4.1-1: S-S#1d

Procedure S-S#1d is as follows:

1. INVITE (MO to S-S#1d) – see example in table 17.3.4.1-1

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

Table 17.3.4.1-1: INVITE (MO to S-S#1d)

```

INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
 [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>
Record-Route: <sip:pcscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <tel:+1-212-555-1111>
Privacy: none
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: precondition
Supported: 100rel
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Type: application/sdp
Content-Length: (...)

```

```

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 3400 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:99 MPV
m=video 3402 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:99 MPV
m=audio 3456 RTP/AVP 97 96 0 15
b=AS:25.4
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
m=audio 3458 RTP/AVP 97 96 0 15
b=AS:25.4
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
a=curr:qos local none
a=curr:qos remote none

```



```
a=des:qos-mandatory-local-sendrecv  
a=des:qos-none-remote-sendrecv
```

2. 100 Trying (S-S#1d to MO) – see example in table 17.3.4.1-2

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

Table 17.3.4.1-2: 100 Trying (S-S#1d to MO)

```
SIP/2.0 100 Trying  
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP  
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7  
From:  
To:  
Call-ID:  
CSeq:  
Content-Length: 0
```

3. Evaluation of initial filter criterias

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

- ~~— S-CSCF#1 examines the media parameters, and removes any choices that the subscriber does not have authority to request.~~
- ~~— For this example, assume the subscriber is not allowed video.~~

4. INVITE (S-CSCF to I-CSCF) – see example in table 17.3.4.1-4

S-CSCF#1 performs an analysis of the destination address, and determines the network operator to whom the destination subscriber belongs. S-CSCF#1 forwards the INVITE request to I-CSCF#2, the well-known entry point of the destination network.

Table 17.3.4.1-4: INVITE (S-CSCF to I-CSCF)

```

INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>, <tel:+1-212-555-1111>
Privacy:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length: (...)

```

```

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

```

P-Asserted-Identity: The S-CSCF adds the corresponding TEL URL to the P-Asserted-Identity header in order that the TEL URL is known to the destination network in case the INVITE is forwarded to a MGCF.

P-Charging-Vector: The S-CSCF adds the identifier of its own network to the originating Inter Operator Identifier (IOI) parameter of this header.

5. 100 Trying (I-CSCF to I-CSCF) – see example in table 17.3.4.1-5

I-CSCF#2 respond to the INVITE request (4) with a 100 (Trying) provisional response.

Table 17.3.4.1-5: 100 Trying (I-CSCF to S-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

6. Cx: User Location Query procedure

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

For detailed message flows see 3GPP TS 29.228.

Table 7.3.2.1-6a provides the parameters in the SIP INVITE message (flow 4) which need to be sent to HSS.

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

7. INVITE (I-CSCF to S-CSCF) – see example in table 17.3.4.1-7

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

Table 17.3.4.1-7: INVITE (I-CSCF to S-CSCF)


```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

9. Evaluation of initial filter criterias

S-CSCF#2 validates the service profile of this subscriber and evaluates the initial filter criterias. For this example, assume no Application Server involvement

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

~~S-CSCF#2 examines the media parameters, and removes any choices that the destination subscriber does not have authority to request.~~

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

10. INVITE (S-S#1d to MT) – see example in table 17.3.4.1-10

S-CSCF#2 forwards the INVITE request, as determined by the termination procedure.

Table 17.3.4.1-10: INVITE (S-S#1d to MT)

```
INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
  icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
  scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
  pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
  [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:pcscf2.home2.net;lr>
Record-Route: <sip:scscf2.home2.net;lr>, <sip:icscf2_s.home2.net;lr>,
  <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
P-Asserted-Identity:
Privacy:
P-Charging-Vector: icid-value="AyretyU0dm+602Irt5tAFrbHLso=023551024"
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
P-Called-Party-ID: <sip:user2_public1@home2.net>
Content-Type:
Content-Length: (...)
```

```
v=0
o=2987932615-2987932615-IN-IP6-5555::aaa:bbb:eee:ddd
s=-
c=IN-IP6-5555::aaa:bbb:eee:ddd
t=907165275-0
m=video-0-RTP/AVP-99
b=AS:54.6
a=curr:qos-local-none
a=curr:qos-remote-none
a=des:qos-mandatory-local-sendrecv
a=des:qos-none-remote-sendrecv
a=rtpmap:99-MPV
a=
a=
m=video-0-RTP/AVP-99
b=AS:54.6
a=curr:qos-local-none
a=curr:qos-remote-none
a=des:qos-mandatory-local-sendrecv
a=des:qos-none-remote-sendrecv
a=rtpmap:99-MPV
a=
a=m=audio-3456-RTP/AVP-97-96-0-15
b=AS:25.4
a=curr:qos-local-none
a=curr:qos-remote-none
a=des:qos-mandatory-local-sendrecv
a=des:qos-none-remote-sendrecv
a=rtpmap:97-AMR
a=fmp:97-mode-set=0,2,5,7;maxframes=2
a=rtpmap:96-G726-32/8000
m=audio-0-RTP/AVP-97-96-0-15
b=AS:25.4
a=curr:qos-local-none
a=curr:qos-remote-none
a=des:qos-mandatory-local-sendrecv
a=des:qos-none-remote-sendrecv
a=rtpmap:97-AMR
a=fmp:97-mode-set=0,2,5,7;maxframes=2
a=rtpmap:96-G726-32/8000
```

11.100 Trying (MT to S-S#1d) – see example in table 17.3.4.1-11

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

Table 17.3.4.1-11: 100 Trying (MT to S-S#1d)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

12. 183 Session Progress (MT to S-S#1d) – see example in table 17.3.4.1-12

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

Table 17.3.4.1-12: 183 Session Progress (MT to S-S#1d)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf2_s.home2.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity: "John Smith" <sip:user2_public1@home2.net>
Privacy: none
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
From:
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 9021
Content-Type: application/sdp
Content-Length: (...)
```

```
v=0
o=- 2987933623 2987933623 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97
b=AS:25.4 3
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15
```

13. 183 Session Progress (S-CSCF to I-CSCF) – see example in table 17.3.4.1-13

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

Table 17.3.4.1-13: 183 Session Progress (S-CSCF to I-CSCF)


```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity:
Privacy:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net;
    term-ioi=home2.net
P-Charging-Function-Addresses: ccf=[5555::b99:c88:d77:e66]; ccf=[5555::a55:b44:c33:d22];
    ecf=[5555::1ff:2ee:3dd:4cc]; ecf=[5555::6aa:7bb:8cc:9dd]
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

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

```

P-Charging-Vector: The S-CSCF adds the identifier of its own network to the terminating Inter Operator Identifier (IOI) parameter of this header.

P-Charging-Function-Addresses: The S-CSCF passes this header to the I-CSCF for charging.

14. 183 Session Progress (I-CSCF to S-CSCF) – see example in table 17.3.4.1-14

I-CSCF#2 forwards the 183 (Session Progress) provisional response to S-CSCF#1.

Table 17.3.4.1-14: 183 Session Progress (I-CSCF to S-CSCF)

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:token(<sip:pcscf2.home2.net;lr>,
    <sip:scscf2.home2.net;lr>)>@home2.net;tokenized-by=home2.net>, <sip:icscf2_s.home2.net;lr>,
    <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity:
Privacy:
P-Charging-Vector:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

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

```

Record-Route: The I-CSCF#2 tokenizes the entries of its own network

15. 183 Session Progress (S-S#1d to MO) – see example in table 17.3.4.1-15

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

Table 17.3.4.1-15: 183 Session Progress (S-S#1d to MO)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcscfl.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity:
Privacy:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

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

16. PRACK (MO to S-S#1d) – see example in table 17.3.4.1-16

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

Table 17.3.4.1-16: PRACK (MO to S-S#1d)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
 [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
 <sip:token(<sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>@home2.net;tokenized-
 by=home2.net)>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfgk490333
Cseq: 128 PRACK
Require: precondition
RAck: 9021 127 INVITE
Content-Type: application/sdp
Content-Length: (...)
```

```
v=0
o=- 2987933615 2987933616 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15
```

17. PRACK (S-CSCF to I-CSCF) – see example in table 17.3.4.1-17

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

Table 17.3.4.1-17: PRACK (S-CSCF to I-CSCF)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:icscf2_s.home2.net;lr>, <sip:token(<sip:pcscf2.home2.net;lr>,
    <sip:scscf2.home2.net;lr>@home2.net;tokenized-by=home2.net)>
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

```

18. PRACK (I-CSCF to S-CSCF) – see example in table 17.3.4.1-18

I-CSCF#2 determines the routing information, and forwards the PRACK request to S-CSCF#2.

Table 17.3.4.1-18: PRACK (I-CSCF to S-CSCF)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

```

19. PRACK (S-S#1d to MT) – see example in table 17.3.4.1-19

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

Table 17.3.4.1-19: PRACK (S-S#1d to MT)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

```

20. 200 OK (MT to S-S#1d) – see example in table 17.3.4.1-20

The terminating endpoint responds to the PRACK request (19) with a 200 (OK) response.

Table 17.3.4.1-20: 200 OK (MT to S-S#1d)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933623 2987933624 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15

```

21. 200 OK (S-CSCF to I-CSCF) – see example in table 17.3.4.1-21

S-CSCF#2 forwards the 200 (OK) response to I-CSCF#2.

Table 17.3.4.1-21: 200 OK (S-CSCF to I-CSCF)


```

SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

```

22. 200 OK (I-CSCF to S-CSCF) – see example in table 17.3.4.1-22

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

Table 17.3.4.1-22: 200 OK (I-CSCF to S-CSCF)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

```

23. 200 OK (S-S#1d to MO) – see example in table 17.3.4.1-23

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

Table 17.3.4.1-23: 200 OK (S-S#1d to MO)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

```

24. UPDATE (MO to S-S#1d) – see example in table 17.3.4.1-24

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

Table 17.3.4.1-24: UPDATE (MO to S-S#1d)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
 [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
 <sip:token(<sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>@home2.net;tokenized-
 by=home2.net)>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfgk490333
Cseq: 129 UPDATE
Content-Type: application/sdp
Content-Length: (...)
```

```
v=0
o=- 2987933615 2987933617 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
m=audio 0 RTP/AVP 97 96 0 15
```

25. UPDATE (S-CSCF to I-CSCF) – see example in table 17.3.4.1-25

S-CSCF#1 forwards the UPDATE request to I-CSCF#2.

Table 17.3.4.1-25: UPDATE (S-CSCF to I-CSCF)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:icscf2_s.home2.net;lr>, <sip:token(<sip:pcscf2.home2.net;lr>,
    <sip:scscf2.home2.net;lr>)>@home2.net;tokenized-by=home2.net>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

26. UPDATE (I-CSCF to S-CSCF) – see example in table 17.3.4.1-26

I-CSCF#2 forwards the UPDATE request to S-CSCF#2.

Table 17.3.4.1-26: UPDATE (I-CSCF to S-CSCF)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

27. UPDATE (S-S#1d to MT) – see example in table 17.3.4.1-27

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

Table 17.3.4.1-27: UPDATE (S-S#1d to MT)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

28. 200 OK (MT to S-S#1d) – see example in table 17.3.4.1-28

The terminating endpoint responds to the UPDATE request (27) with a 200 (OK) response.

Table 17.3.4.1-28: 200 OK (MT to S-S#1d)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: (...)

v=0
o=- 2987933623 2987933625 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98
b=AS:75
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::eee:fff:aaa:bbb
s=-
e=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15
```

29. 200 OK (S-CSCF to I-CSCF) – see example in table 17.3.4.1-29

S-CSCF#2 forwards the 200 (OK) response to I-CSCF#2.

Table 17.3.4.1-29: 200 OK (S-CSCF to I-CSCF)


```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

30. 200 OK (I-CSCF to S-CSCF) – see example in table 17.3.4.1-30

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

Table 17.3.4.1-30: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

31. 200 OK (S-S#1d to MO) – see example in table 17.3.4.1-31

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

Table 17.3.4.1-31: 200 OK (S-S#1d to MO)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

```

32. 180 Ringing (MT to S-S#1d) – see example in table 17.3.4.1-32

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

Table 17.3.4.1-32: 180 Ringing (MT to S-S#1d)

```

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf2_s.home2.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 9022
Content-Length: 0

```

33. 180 Ringing (S-CSCF to I-CSCF) – see example in table 17.3.4.1-33

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

Table 17.3.4.1-33: 180 Ringing (S-CSCF to I-CSCF)

```

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:

```

34. 180 Ringing (I-CSCF to S-CSCF) – see example in table 17.3.4.1-34

I-CSCF#2 forwards the 180 (Ringing) response to S-CSCF#1.

Table 17.3.4.1-34: 180 Ringing (I-CSCF to S-CSCF)

```

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:token(<sip:pcscf2.home2.net;lr>,
    <sip:scscf2.home2.net;lr>@home2.net;tokenized-by=home2.net>, <sip:icscf2_s.home2.net;lr>,
    <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:

```

35. 180 Ringing (S-S#1d to MO) – see example in table 17.3.4.1-35

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

Table 17.3.4.1-35: 180 Ringing (S-S#1d to MO)

```

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:

```

36. PRACK (MO to S-S#1d) – see example in table 17.3.4.1-36

The originator acknowledges the 180 (Ringing) provisional response (35) with a PRACK request.

Table 17.3.4.1-36: PRACK (MO to S-S#1d)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
    <sip:token(<sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>@home2.net;tokenized-
by=home2.net>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 130 PRACK
RAck: 9022 127 INVITE
Content-Length: 0

```

37. PRACK (S-CSCF to I-CSCF) – see example in table 17.3.4.1-37

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

Table 17.3.4.1-37: PRACK (S-CSCF to I-CSCF)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:icscf2_s.home2.net;lr>, <sip:token(<sip:pcscf2.home2.net;lr>,
    <sip:scscf2.home2.net;lr>@home2.net;tokenized-by=home2.net>
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:

```

38. PRACK (I-CSCF to S-CSCF) – see example in table 17.3.4.1-38

I-CSCF#2 determines the routing information, and forwards the PRACK request to S-CSCF#2.

Table 17.3.4.1-38: PRACK (I-CSCF to S-CSCF)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:

```

39. PRACK (S-S#1d to MT) – see example in table 17.3.4.1-39

S-CSCF#2 forwards the PRACK request to the terminating endpoint.

Table 17.3.4.1-39: PRACK (S-S#1d to MT)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP scscf1.home1.net, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:
```

40. 200 OK (MT to S-S#1d) – see example in table 17.3.4.1-40

The terminating endpoint responds to the PRACK request (39) with a 200 (OK) response.

Table 17.3.4.1-40: 200 OK (MT to S-S#1d)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

41. 200 OK (S-CSCF to I-CSCF) – see example in table 17.3.4.1-41

S-CSCF#2 forwards the 200 (OK) response to I-CSCF#2.

Table 17.3.4.1-41: 200 OK (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

42. 200 OK (I-CSCF to S-CSCF) – see example in table 17.3.4.1-42

I-CSCF#2 forwards the 200 (OK) response to S-CSCF#1.

Table 17.3.4.1-42: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

43. 200 OK (S-S#1d to MO) – see example in table 17.3.4.1-43

S-CSCF#1 forwards the 200 (OK) response to the originating endpoint.

Table 17.3.4.1-43: 200 OK (S-S#1d to MO)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

44. 200 OK (MT to S-S#1d) – see example in table 17.3.4.1-44

The final response to the INVITE (10), 200 (OK) response, is sent by the terminating endpoint over the signalling path. This is typically generated when the subscriber has accepted the incoming session attempt. The response is sent to S-CSCF#2 per the termination procedure.

Table 17.3.4.1-44: 200 OK (MT to S-S#1d)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home2.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf2_s.home2.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Content-Length: 0
```

45. 200 OK (S-CSCF to I-CSCF) – see example in table 17.3.4.1-45

The 200 (OK) response is forwarded to the I-CSCF#2.

Table 17.3.4.1-45: 200 OK (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

46. 200 OK (I-CSCF to S-CSCF) – see example in table 17.3.4.1-46

The 200 (OK) response is forwarded to S-CSCF#1.

Table 17.3.4.1-46: 200 OK (I-CSCF to S-CSCF)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:token(<sip:pcscf2.home2.net;lr>,
    <sip:scscf2.home2.net;lr>@home2.net;tokenized-by=home2.net>, <sip:icscf2_s.home2.net;lr>,
    <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:

```

47. 200 OK (S-S#1d to MO) – see example in table 17.3.4.1-47

The 200 (OK) response is returned to the originating endpoint, by the origination procedure.

Table 17.3.4.1-47: 200 OK (S-S#1d to MO)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:

```

48. ACK (MO to S-S#1d) – see example in table 17.3.4.1-48

The originating endpoint sends the final acknowledgement to S-CSCF#1 by the origination procedures.

Table 17.3.4.1-48: ACK (MO to S-S#1d)

```

ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
    <sip:token(<sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>@home2.net;tokenized-
    by=home2.net>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 127 ACK
Content-Length: 0

```

49. ACK (S-CSCF to I-CSCF) – see example in table 17.3.4.1-49

S-CSCF#1 forwards the ACK request to I-CSCF#2.

Table 17.3.4.1-49: ACK (S-CSCF to I-CSCF)

```

ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:icscf2_s.home2.net;lr>, <sip:token(<sip:pcscf2.home2.net;lr>,
    <sip:scscf2.home2.net;lr>@home2.net;tokenized-by=home2.net>
From:
To:
Call-ID:
Cseq:
Content-Length:

```


50. ACK (I-CSCF to S-CSCF) – see example in table 17.3.4.1-50

I-CSCF#2 forwards the ACK request to S-CSCF#2.

Table 17.3.4.1-50: ACK (I-CSCF to S-CSCF)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

51. ACK (S-S#1d to MT) – see example in table 17.3.4.1-51

S-CSCF#2 forwards the ACK request to the terminating endpoint, as per the termination procedure.

Table 17.3.4.1-51: ACK (S-S#1d to MT)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

XXXXXXXXXXXXXXXXXXXXXXXXXXXXX NEXT CHANGE XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

17.4.2.1 (MT#1b) Mobile termination, roaming (MO#2, S-S#2 assumed)

Figure 17.4.2.1-1 shows a termination procedure which applies to roaming subscribers when the home network operator desires to keep its internal configuration hidden from the visited network. The UE is located in a visited network, and determines the P-CSCF via the P-CSCF discovery procedure. During registration, the home network allocates a S-CSCF. The home network advertises an I-CSCF as the entry point from the visited network, who protects the S-CSCF identity and forwards requests to the P-CSCF.

When registration is complete, S-CSCF knows the name/address of its next hop in the signalling path toward the UE, the I-CSCF, and the S-CSCF knows the UE Contact address. I-CSCF receives information in the request, which it translates and obtains the name/address of P-CSCF, and P-CSCF obtains the name/address of the UE.

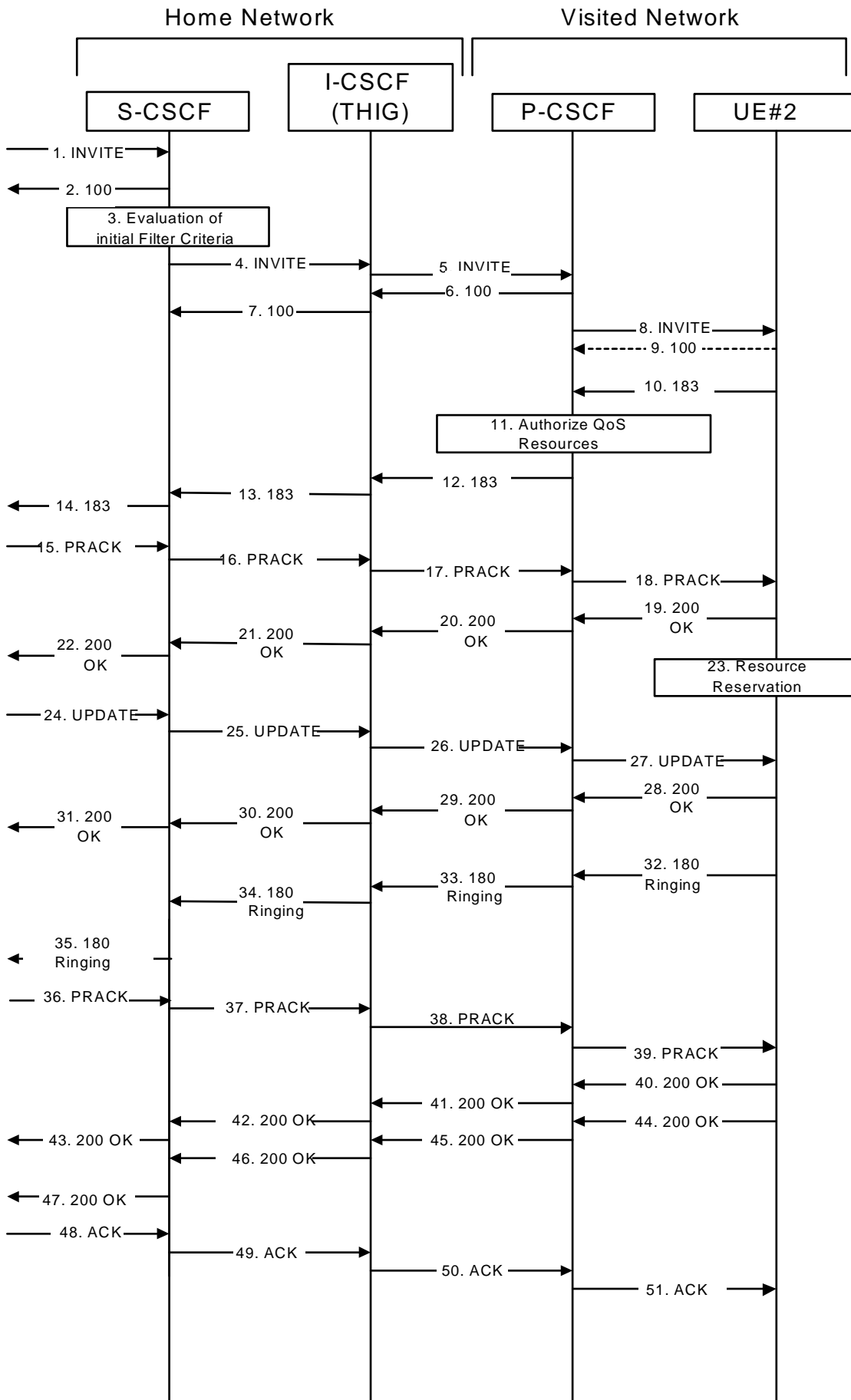


Figure 17.4.2.1-1: MT#1b

Procedure MT#1b is as follows:

1. INVITE (S-S to MT#1b) – see example in table 17.4.2.1-1

The calling party sends the INVITE request, via one of the origination procedures and via one of the S-CSCF to S-CSCF procedures, to the S-CSCF for the terminating subscriber.

Table 17.4.2.1-1: INVITE (S-S to MT#1b)

```

INVITE sip:user2_public1@home1.net SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf2.home1.net;lr>
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>, <tel:+1-212-555-1111>
Privacy: none
P-Charging-Vector: icid-value="AyretyU0dm+602Irt5tAFrbHLso=023551024"; orig-ioi=home1.net
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: preconditions
Supported: 100rel
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Type: application/sdp
Content-Length: (...)

```

```

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H261
a=rtpmap:99 MPV
m=video 0 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H261
a=rtpmap:99 MPV
m=audio 3456 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
m=audio 3458 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv

```

```
a=des:ges:none:remote:sendreev
a=rtpmap:97-AMR
a=fmtp:97-mode=0,2,5,7;maxframes=2
a=rtpmap:96-G726-32/8000
```

SDP The SDP contains the complete set of supported [and desired](#) codecs from the session originator, ~~as restricted by the originating network operator. The "m=" lines for the video media streams show a port number zero, which removes them from the negotiation.~~

Upon receipt of the INVITE, the S-CSCF stores the following information about this session, for use in providing enhanced services, charging or in possible error recovery actions – see example in table 17.4.2.1-1b.

Table 17.4.2.1-1b: Storage of information at S-CSCF

```
Request-URI: sip:user2_public1@home1.net
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>
Call-ID: cb03a0s09a2sdfg1kj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2orig): <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
Route(2dest): <sip:icscf2_p.home1.net;lr>, <sip:pcscf2.visited2.net;lr>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Contact(dest): <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
```

2. 100 Trying (MT#1b to S-S) – see example in table 17.4.2.1-2

S-CSCF responds to the INVITE request (1) with a 100 Trying provisional response.

Table 17.4.2.1-2: 100 Trying (MT#1b to S-S)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

3. Evaluation of initial filter criteria

S-CSCF validates the service profile of this subscriber, and evaluates the initial filter criteria.

4. INVITE (S-CSCF to I-CSCF) – see example in table 17.4.2.1-4

S-CSCF remembers (from the registration procedure) the UE Contact address and the next hop CSCF for this UE. It forwards the INVITE to the I-CSCF to perform the THIG functions.

~~S-CSCF examines the media parameters, and removes any choices that the destination subscriber does not have authority to request. For this example, assume the destination subscriber is not allowed stereo, so only a single audio stream is permitted.~~

Table 17.4.2.1-4: INVITE (S-CSCF to I-CSCF)

```

INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:icscf2_p.home1.net;lr>, <sip:pcscf2.visited2.net;lr>
Record-Route: <sip:scscf2.home1.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
P-Asserted-Identity:
Privacy:
P-Charging-Vector: icid-value="AyretyU0dm+602Irt5tAFrbHLso=023551024"
P-Charging-Function-Addresses: ccf=[5555::b99:c88:d77:e66]; ccf=[5555::a55:b44:c33:d22];
    ecf=[5555::1ff:2ee:3dd:4cc]; ecf=[5555::6aa:7bb:8cc:9dd]
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
P-Called-Party-ID: <sip:user2_public1@home2.net>
Content-Type:
Content-Length: (...)

```

```

v=0
o=29879232615 29879232615 IN IP6 5555::aaa:bbb:eee:ddd
s=-
c=IN IP6 5555::aaa:bbb:eee:ddd
t=907165275 0
m=video 0 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendreev
a=des:qos none remote sendreev
a=rtpmap:98 H261
a=rtpmap:99 MPV
a=
m=video 0 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendreev
a=des:qos none remote sendreeva=rtpmap:98 H261
a=rtpmap:99 MPV
a=
a=audio 3456 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendreev
a=des:qos none remote sendreev
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726 32/8000
m=audio 0 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendreev
a=des:qos none remote sendreev
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726 32/8000

```

Via/Record-Route: S-CSCF adds itself in the Record-Route and Via headers.

SDP ~~The SDP contains the restricted set of codecs allowed by the network operator. The "m=" lines for the second audio stream shows a port number zero, which removes it from the negotiation.~~

Request-URI: Built from the registration information.

Route: Built from the Contact address stored at registration.

P-Called-Party-ID: Includes the dialled URL with its parameters.

P-Charging-Function-Addresses: The S-CSCF passes this header to the I-CSCF for charging.

5. INVITE (I-CSCF to P-CSCF) – see example in table 17.4.2.1-5

I-CSCF translates the Via headers in the request, and forwards the INVITE request to P-CSCF.

Table 17.4.2.1-5b: Storage of information at P-CSCF

```
Request-URI: sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>
Call-ID: cb03a0s09a2sdfg1kj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2orig): <sip:icscf2_p.home1.net;lr>, <sip:Token(<sip:scscf2.home1.net;lr>,
<sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>)>@home1.net;tokenized-by=home1.net>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
```

6. 100 Trying (P-CSCF to I-CSCF) – see example in table 17.4.2.1-6

P-CSCF responds to the INVITE request (5) with a 100 Trying provisional response.

Table 17.4.2.1-6: 100 Trying (P-CSCF to I-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1)>@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

7. 100 Trying (I-CSCF to S-CSCF) – see example in table 17.4.2.1-7

I-CSCF determines the Via header, and forwards the 100 Trying provisional response to S-CSCF.

Table 17.4.2.1-7: 100 Trying (I-CSCF to S-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length:
```

8. INVITE (P-CSCF to UE) – see example in table 17.4.2.1-8

- ~~— P-CSCF examines the media parameters, and removes any that the network operator decides, based on local policy, not to allow on the network.~~
- ~~— For this example, assume the network operator does not allow 64 kb/s audio, so the PCMU codec is removed.~~

P-CSCF removes the Record-Route and Via headers, calculates the proper Route header to add to future requests, and saves that information without passing it to UE.

Table 17.4.2.1-8: INVITE (P-CSCF to UE)

```

INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
  icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
  scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
  icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
  scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
  pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
  [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 64
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:icscf2_p.home1.net;lr>,
  <sip:Token(<sip:scscf2.home1.net;lr>, <sip:scscf1.home1.net;lr>,
  <sip:pcscf1.home1.net;lr>)@home1.net;tokenized-by=home1.net>
P-Media-Authentication:
  0020000100100101706466322e76697369746564322e6e6574000c020133315331343363231
P-Asserted-Identity:
Privacy:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
P-Called-Party-ID:
Content-Type:
Content-Length:

```

```

v=0
o=29879232615-29879232615-IN-IP6-5555::aaa:bbb:eee:ddd
s=-
c=IN-IP6-5555::aaa:bbb:eee:ddd
t=907165275-0
m=video 0 RTP/AVP 99
b=AS:54.6
a=curr:qos-local-none
a=curr:qos-remote-none
a=des:qos-mandatory-local-sendrecv
a=des:qos-none-remote-sendrecv
a=rtptime:99-MPV
a=
a=
m=video 0 RTP/AVP 99
b=AS:54.6
a=curr:qos-local-none
a=curr:qos-remote-none
a=des:qos-mandatory-local-sendrecv
a=des:qos-none-remote-sendrecv
a=rtptime:99-MPV
a=
a=audio 3456 RTP/AVP 97
b=AS:25.4 96 15
a=curr:qos-local-none
a=curr:qos-remote-none
a=des:qos-mandatory-local-sendrecv
a=des:qos-none-remote-sendrecv
a=rtptime:97-AMR
a=fmt:97 mode-set=0,2,5,7;maxframes=2
a=rtptime:96-G726-32/8000
m=audio 0 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos-local-none
a=curr:qos-remote-none
a=des:qos-mandatory-local-sendrecv
a=des:qos-none-remote-sendrecv
a=rtptime:97-AMR
a=fmt:97 mode-set=0,2,5,7;maxframes=2
a=rtptime:96-G726-32/8000

```

Via: The P-CSCF adds the port number negotiated during the security agreement and the comp=sigcomp parameter to its Via header.

Record-Route: The P-CSCF adds the port number negotiated during the security agreement and the comp=sigcomp parameter to its own URI.

P-Media-Authorization: A P-CSCF generated authorization token. This particular example shows a Policy-Element generated by "pdf2.visited2.net" with credentials "31S14621".

~~SDP ————— The SDP contains the restricted set of codecs allowed by the network operator. The "m=" lines for the first audio stream no longer contains codec "0" (PCMU), which removes it from the negotiation.~~

9. 100 Trying (UE to P-CSCF) – see example in table 17.4.2.1-9

UE may optionally send a 100 Trying provisional response to P-CSCF.

Table 17.4.2.1-9: 100 Trying (UE to P-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
  icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
  scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
  icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
  scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
  pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
  [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

10. 183 Session Progress (UE to P-CSCF) – see example in table 17.4.2.1-10

UE#2 determines the complete set of codecs that it is capable of supporting for this session. It determines the intersection with those appearing in the SDP in the INVITE request. ~~For each media flow that is not supported, UE#2 inserts a SDP entry for media (m= line) with port=0. For each media flow that is supported, UE#2 inserts a SDP entry with an assigned port and with the codecs in common with those in the SDP from UE#1.~~

~~— For this example, assume UE#2 supports both AMR and G726, but not G728 (code 15).~~

UE responds with a 183 Session Progress response containing SDP back to the originator. This SDP may represent one or more media for a multimedia session. This response is sent to P-CSCF.

Table 17.4.2.1-10: 183 Session Progress (UE to P-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcsf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:icscf2_p.home1.net;lr>,
<sip:Token(<sip:scscf2.home1.net;lr>, <sip:scscf1.home1.net;lr>,
<sip:pcscf1.home1.net;lr>)@home1.net;tokenized-by=home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From:
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 9021
Content-Type: application/sdp
Content-Length: (...)
```

```
v=0
o=- 2987933623 2987933623 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
m=audio 0 RTP/AVP 97 96 0 15
```

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network as specified in sub-clause "Additional coding rules for P-access-network-info header", in 3GPP TS 24.229 [16].

To: A tag is added to the To header.

Contact: Identifies the IP address or FQDN of the UE. It includes the comp=sigcomp parameter.

SDP The SDP contains the subset of codecs supported by UE. It requests a confirmation of the QoS preconditions for establishing the session

P-CSCF saves information from the received INVITE request. The saved value of the information for this session is – see example in table 17.4.2.1-10b.

Table 17.4.2.1-10b: Storage of information at P-CSCF

```
Request-URI: sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2orig): <sip:icscf2_p.home1.net;lr>, <sip:Token(<sip:scscf2.home1.net;lr>,
<sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>)&tokenized-
by=home1.net>
Contact(dest): <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
```

11. Authorize QoS Resources

P-CSCF authorizes the resources necessary for this session.

12. 183 Session Progress (P-CSCF to I-CSCF) – see example in table 17.4.2.1-12

P-CSCF forwards the 183 Session Progress response to I-CSCF.

Table 17.4.2.1-12: 183 Session Progress (P-CSCF to I-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net, SIP/2.0/UDP icscf2_s.home1.net, SIP/2.0/UDP scscf1.home1.net, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net;lr>, <sip:icscf2_p.home1.net;lr>,
<sip:Token(<sip:scscf2.home1.net;lr>, <sip:scscf1.home1.net;lr>,
<sip:pcscf1.home1.net;lr>)@home1.net;tokenized-by=home1.net>
P-Asserted-Identity: "John Smith" <sip:user2_public1@home2.net>
Privacy: none
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
```

Record-Route: The P-CSCF rewrites the Record-Route header field value to remove the port number used for the security association and the comp=sigcomp parameter from its own URI

P-Asserted-Identity: P-CSCF inserts the default SIP URI of the user in the P-Asserted-Identity header field.

P-Access-Network-Info: this header contains information from the UE.

13. 183-Session-Progress (I-CSCF to S-CSCF) – see example in table 17.4.2.1-13

I-CSCF determines the Via and Record-Route headers, and forwards the response to S-CSCF.

Table 17.4.2.1-13: 183 Session Progress (I-CSCF to S-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net;lr>, <sip:icscf2_p.home1.net;lr>,
   <sip:Token(<sip:scscf2.home1.net;lr>, <sip:scscf1.home1.net;lr>,
   <sip:pcscf1.home1.net;lr>)>@home1.net;tokenized-by=home1.net>
P-Asserted-Identity:
Privacy:
P-Charging-Vector:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
```

Upon receipt of the 183 Session Progress, the S-CSCF stores the following information about this session, for use in providing enhanced services or in possible error recovery actions – see example in table 17.4.2.1-13b.

Table 17.4.2.1-13b: Storage of information at S-CSCF

```
Request-URI: sip:user2_public1@home2.net
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2dest): <sip:icscf2_p.home1.net;lr>, <sip:pcscf2.visited2.net;lr>
Route(2orig): <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
Contact(dest): <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
```

14. 183 Session Progress (MT#1b to S-S) – see example in table 17.4.2.1-14

S-CSCF forwards the 183 Session Progress response to the originator, per the S-CSCF to S-CSCF procedure.

Table 17.4.2.1-14: 183 Session Progress (MT#1b to S-S)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP icscf2_s.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity: "John Smith" <sip:user2_public1@home1.net>, <tel:+1-212-555-2222>
Privacy: none
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net;
term-ioi=home2.net
P-Charging-Function-Addresses: ccf=[5555::b99:c88:d77:e66]; ccf=[5555::a55:b44:c33:d22];
ecf=[5555::1ff:2ee:3dd:4cc]; ecf=[5555::6aa:7bb:8cc:9dd]
From:
To:
Call-ID:
Require:
CSeq:
Contact:
RSeq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
```

P-Charging-Vector: The S-CSCF adds its the identifier of its own network to the terminating Inter Operator Identifier (IOI) parameter of this header and puts back the originating IOI parameter.

P-Charging-Function-Addresses: The S-CSCF passes this header to the I-CSCF for charging.

15. PRACK (S-S to MT#1b) – see example in table 17.4.2.1-15

The originating endpoint sends a PRACK request containing the final SDP to be used in this session, via the S-CSCF to S-CSCF procedure, to S-CSCF.

Table 17.4.2.1-15: PRACK (S-S to MT#1b)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:scscf2.home1.net;lr>, <sip:icscf2_p.home1.net;lr>, <sip:pcscf2.visited2.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfgk490333
Cseq: 128 PRACK
Require: precondition
RAck: 9021 127 INVITE
Content-Type: application/sdp
Content-Length: (...)
```

```
v=0
o=- 2987933615 2987933616 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
e=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15
```

16. PRACK (S-CSCF to I-CSCF) – see example in table 17.4.2.1-16

S-CSCF forwards the PRACK request to I-CSCF.

Table 17.4.2.1-16: PRACK (S-CSCF to I-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:icscf2_s.home1.net;lr>, <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
b=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
```

17. PRACK (I-CSCF to P-CSCF) – see example in table 17.4.2.1-17

I-CSCF translates the Via headers in the PRACK request, and forwards the request to P-CSCF.

Table 17.4.2.1-17: PRACK (I-CSCF to P-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
```

Via: Translated to preserve configuration independence of the home network.

18. PRACK (P-CSCF to UE) – see example in table 17.4.2.1-18

P-CSCF forwards the PRACK request to UE.

Table 17.4.2.1-18: PRACK (P-CSCF to UE)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
    icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 65
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
```

Via: The P-CSCF adds the port number negotiated during the security agreement and the comp=sigcomp parameter to its own entry in the Via header.

19. 200 OK (UE to P-CSCF) – see example in table 17.4.2.1-19

UE acknowledges the PRACK request (18) with a 200 OK response.

Table 17.4.2.1-19: 200 OK (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933623 2987933624 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98
m=
m=
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event
```

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network as specified in sub-clause "Additional coding rules for P-access-network-info header", in 3GPP TS 24.229 [16].

20. 200 OK (P-CSCF to I-CSCF) – see example in table 17.4.2.1-20

P-CSCF forwards the 200 OK response to I-CSCF.

Table 17.4.2.1-20: 200 OK (P-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
```

Via: P-CSCF restores the Via headers from saved values, based on the token value in the branch parameter of its Via.

21. 200 OK (I-CSCF to S-CSCF) – see example in table 17.4.2.1-21

I-CSCF determines the Via and Record-Route headers, and forwards the 200 OK response to S-CSCF.

Table 17.4.2.1-21: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
     scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
     pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
     [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
```

P-Access-Network-Info: this header contains information from the UE.

22. 200 OK (MT#1b to S-S) – see example in table 17.4.2.1-22

S-CSCF forwards the 200 OK response to the originator, per the S-CSCF to S-CSCF procedure.

Table 17.4.2.1-22: 200 OK (MT#1b to S-S)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type
Content-Length:

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
```

23. Resource Reservation

UE initiates the reservation procedures for the resources needed for this session.

24. UPDATE (S-S to MT#1b) – see example in table 17.4.2.1-24

When the originating endpoint has completed its resource reservation, it sends the UPDATE request to S-CSCF, via the S-CSCF to S-CSCF procedures.

Table 17.4.2.1-24: UPDATE (S-S to MT#1b)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:scscf2.home1.net;lr>, <sip:icscf2_p.home1.net;lr>, <sip:pcscf2.visited2.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 129 UPDATE
Content-Type: application/sdp
Content-Length: (...)
```

```
v=0
o=- 2987933615 2987933617 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=qos:success sendonly
m=audio 0 RTP/AVP 97 96 0 15
```

25. UPDATE (S-CSCF to I-CSCF) – see example in table 17.4.2.1-25

S-CSCF forwards the UPDATE request to I-CSCF.

Table 17.4.2.1-25: UPDATE (S-CSCF to I-CSCF)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:icscf2_p.home1.net;lr>, <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
```

26. UPDATE (I-CSCF to P-CSCF) – see example in table 17.4.2.1-26

I-CSCF translates the Via headers in the UPDATE request, and forwards the request to P-CSCF.

Table 17.4.2.1-26: UPDATE (I-CSCF to P-CSCF)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
```

Via: Translated to preserve configuration independence of the home network.

Record-Route: Translated to preserve configuration independence of the home network.

27. UPDATE (P-CSCF to UE) – see example in table 17.4.2.1-27

P-CSCF forwards the UPDATE request to UE.

Table 17.4.2.1-27: UPDATE (P-CSCF to UE)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcsf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
```

Via: The P-CSCF adds the port number negotiated in the security agreement and the comp=sigcomp parameter to its own entry in the Via header.

28. 200 OK (UE to P-CSCF) – see example in table 17.4.2.1-28

UE acknowledges the UPDATE request (27) with a 200 OK response.

Table 17.4.2.1-28: 200 OK (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-type: application/sdp
Content-Length: (...)
```

```
v=0
o=- 2987933623 2987933625 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98
b=AS:75
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtptime:98 H263
a=fmtp:98 profile-level-id=0
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtptime:96 telephone-eventv=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
e=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15
```

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network as specified in sub-clause "Additional coding rules for P-access-network-info header", in 3GPP TS 24.229 [16].

29. 200 OK (P-CSCF to I-CSCF) – see example in table 17.4.2.1-29

P-CSCF forwards the 200 OK response to I-CSCF.

Table 17.4.2.1-29: 200 OK (P-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_p.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP scscf1.home1.net, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
```

30. 200 OK (I-CSCF to S-CSCF) – see example in table 17.4.2.1-30

I-CSCF determines the Via and Record-Route headers, and forwards the 200 OK to S-CSCF

Table 17.4.2.1-30: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
     scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
     pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
     [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
```

P-Access-Network-Info: this header contains information from the UE.

31. 200 OK (MT#1b to S-S) – see example in table 17.4.2.1-31

S-CSCF forwards the 200 OK response to the originator, per the S-CSCF to S-CSCF procedure.

Table 17.4.2.1-31: 200 OK (MT#1b to S-S)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
```

32. 180 Ringing (UE to P-CSCF) – see example in table 17.4.2.1-32 (related to 17.4.2.1-8)

Before proceeding with session establishment, the UE waits for two events. First, the resource reservation initiated in step #23 must complete successfully. Second, the resource reservation initiated by the originating endpoint must complete successfully (which is indicated by message #27 received by UE). The UE may now immediately accept the session (and proceed with step #45), or alert the destination subscriber of an incoming session attempt; if the latter it indicates this to the calling party by a 180 Ringing provisional response sent to P-CSCF.

Table 17.4.2.1-32: 180 Ringing (UE to P-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
    icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:icscf2_p.home1.net;lr>,
    <sip:Token(<sip:scscf2.home1.net;lr>, <sip:scscf1.home1.net;lr>,
    <sip:pcscf1.home1.net;lr> )@home1.net;tokenized-by=home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 9022
Content-Length: 0
```


P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network as specified in sub-clause "Additional coding rules for P-access-network-info header", in 3GPP TS 24.229 [16].

33. 180 Ringing (P-CSCF to I-CSCF) – see example in table 17.4.2.1-33

P-CSCF forwards the 180 Ringing response to I-CSCF.

Table 17.4.2.1-33: 180 Ringing (P-CSCF to I-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP scscf1.home1.net SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net;lr>, <sip:icscf2_p.home1.net;lr>,
<sip:Token(<sip:scscf2.home1.net;lr>, <sip:scscf1.home1.net;lr>,
<sip:pcscf1.home1.net;lr>@home1.net;tokenized-by=home1.net>
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+602Irt5tAFrbHLso=023551024";
ggsn=[5555::d6d:c7c:b8b:a9a]; pdp-sig=no; gcid=309685742; auth-token=86243614; flow-id=3
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

P-Access-Network-Info: this header contains information from the UE.

Record-Route: The P-CSCF rewrites the Record-Route header field value to remove the port number and the comp=sigcomp parameter from its own entry.

34. 180 Ringing (I-CSCF to S-CSCF) – see example in table 17.4.2.1-34

I-CSCF determines the Via and Record-Route headers, and forwards the 180 Ringing response to S-CSCF.

Table 17.4.2.1-34: 180 Ringing (I-CSCF to S-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net;lr>, <sip:icscf2_s.home1.net;lr>,
<sip:scscf2.home1.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
P-Access-Network-Info:
P-Charging-Vector:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

Upon receipt of the 180, the S-CSCF stores the following information about this session, for use in charging – see example in table 17.4.2.1-34b.

Table 17.4.2.1-34b: Storage of information at S-CSCF

```

Request-URI: sip:user2_public1@home2.net
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2dest): <sip:pcscf2.visited2.net;lr>
Route(2orig): <sip:scscf1.home1.net;lr>, <sip:icscf2_s.home1.net;lr>,
<sip:pcscf1.visited1.net;lr>
Contact(dest): <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>

```

35. 180 Ringing (MT#1b to S-S) – see example in table 17.4.2.1-35

S-CSCF forwards the 180 Ringing response to the originating endpoint, per the S-CSCF to S-CSCF procedure.

Table 17.4.2.1-35: 180 Ringing (MT#1b to S-S)

```

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:

```

36. PRACK (S-S to MT#1b) – see example in table 17.4.2.1-36

The originator acknowledges the 180 Ringing response (35) with a PRACK request.

Table 17.4.2.1-36: PRACK (S-S to MT#1b)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:scscf2.home1.net>, <sip:icscf2_p.home1.net;lr>, <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq: 130 PRACK
RAck: 9022 127 INVITE
Content-Length: 0

```

37. PRACK (S-CSCF to I-CSCF) – see example in table 17.4.2.1-37

S-CSCF forwards the PRACK request to I-CSCF.

Table 17.4.2.1-37: PRACK (S-CSCF to I-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:icscf2_s.home1.net;lr>, <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:
```

38. PRACK (I-CSCF to P-CSCF) – see example in table 17.4.2.1-38

I-CSCF translates the Via headers in the PRACK request, and forwards the request to P-CSCF.

Table 17.4.2.1-38: PRACK (I-CSCF to P-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:
```

Via: Translated to preserve configuration independence of the home network.

Record-Route: Translated to preserve configuration independence of the home network.

39. PRACK (P-CSCF to UE) – see example in table 17.4.2.1-39

P-CSCF forwards the PRACK request to UE.

Table 17.4.2.1-39: PRACK (P-CSCF to UE)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 65
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:
```

Via: The P-CSCF adds the port number negotiated during the security agreement and the parameter comp=sigcomp to its own entry in the Via header.

40. 200 OK (UE to P-CSCF) – see example in table 17.4.2.1-40

UE acknowledges the PRACK request (39) with a 200 OK response.

Table 17.4.2.1-40: 200 OK (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
    icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

41. 200 OK (P-CSCF to I-CSCF) – see example in table 17.4.2.1-41

P-CSCF forwards the 200 OK to I-CSCF.

Table 17.4.2.1-41: 200 OK (P-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Length:
```

42. 200 OK (I-CSCF to S-CSCF) – see example in table 17.4.2.1-42

I-CSCF determines the Via and Record-Route headers, and forwards the 200 OK response to S-CSCF.

Table 17.4.2.1-42: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Length:
```

Upon receipt of the 200, the S-CSCF stores the following information about this session (unless already done if information received with the 180), for use in charging – see example in table 17.4.2.1-42b.

Table 7.4.2.1-42b: Storage of information at S-CSCF

```

Request-URI: sip:user2_public1@home2.net
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2dest): <sip:pcscf2.visited2.net;lr>
Route(2orig): <sip:icscf2_p.home1.net;lr>, <sip:Token(<sip:scscf2.home1.net;lr>,
<sip:scscf1.home1.net;lr>)>@home1.net;tokenized-by=home1.net>,
<sip:pcscf1.visited1.net;lr>
Contact(dest): <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>

```

43. 200 OK (MT#1b to S-S) – see example in table 17.4.2.1-43

S-CSCF forwards the 200 OK to the session originator, per the S-CSCF to S-CSCF procedures.

Table 17.4.2.1-43: 200 OK (MT#1b to S-S)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Length:

```

44. 200 OK (UE to P-CSCF) – see example in table 17.4.2.1-44 (related to 17.4.2.1-8)

When the called party answers, the UE sends a 200 OK final response to the INVITE request (8) to P-CSCF, and starts the media flow(s) for this session.

Table 17.4.2.1-44: 200 OK (UE to P-CSCF)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:icscf2_p.home1.net;lr>,
<sip:Token(<sip:scscf2.home1.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>)
@home1.net;tokenized-by=home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID:
CSeq: 127 INVITE
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Content-Length: 0

```

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network as specified in sub-clause "Additional coding rules for P-access-network-info header", in 3GPP TS 24.229 [16].

45. 200 OK (P-CSCF to I-CSCF) – see example in table 17.4.2.1-45

P-CSCF indicates the resources reserved for this session should now be committed, and sends the 200 OK final response to I-CSCF.

Table 17.4.2.1-45: 200 OK (P-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP scscf1.home1.net, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net;lr>, <sip:icscf2_s.home1.net;lr>,
<sip:Token(<sip:scscf2.home1.net;lr>, <sip:scscf1.home1.net;lr>,
<sip:pcscf1.home1.net;lr>@home1.net;tokenized-by=home1.net>
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024";
ggsn=[5555::d6d:c7c:b8b:a9a]; pdp-sig=no; gcid=309685742; auth-token=86243614; flow-id=3
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

P-Access-Network-Info: this header contains information from the UE.

Record-Route: The P-CSCF rewrites the Record-Route header field value to remove the port number and the comp=sigcomp parameter from its own URI.

46. 200 OK (I-CSCF to S-CSCF) – see example in table 17.4.2.1-46

I-CSCF determines the Via and Record-Route headers, and forwards the 200 OK response to S-CSCF.

Table 17.4.2.1-46: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net;lr>, <sip:icscf2_p.home1.net;lr>,
<sip:iscscf2.home1.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
P-Access-Network-Info:
P-Charging-Vector:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

Upon receipt of the 200, the S-CSCF stores the P-Charging-Vector information for this session (unless already done if information received with the 180).

47. 200 OK (MT#1b to S-S) – see example in table 17.4.2.1-47

S-CSCF forwards the 200 OK final response along the signalling path back to the session originator, as per the S-CSCF to S-CSCF procedure.

Table 17.4.2.1-47: 200 OK (MT#1b to S-S)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

48. ACK (S-S to MT#1b) – see example in table 17.4.2.1-48

The calling party responds to the 200 OK final response (47) with an ACK request which is sent to S-CSCF via the S-CSCF to S-CSCF procedure.

Table 17.4.2.1-48: ACK (S-S to MT#1b)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:scscf2.home1.net;lr>; <sip:icscf2_p.home1.net;lr>, <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq: 127 ACK
Content-Length: 0
```

49. ACK (S-CSCF to I-CSCF) – see example in table 17.4.2.1-49

S-CSCF forwards the ACK request to I-CSCF.

Table 17.4.2.1-49: ACK (S-CSCF to I-CSCF)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Route: <sip:icscf2_s.home1.net;lr>, <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

50. ACK (I-CSCF to P-CSCF) – see example in table 17.4.2.1-50

I-CSCF forwards the ACK request to P-CSCF.

Table 17.4.2.1-50: ACK (I-CSCF to P-CSCF)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Route: <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq:
Contact:
Content-Length:
```

Via: Translated to preserve configuration independence of the home network.

51. ACK (P-CSCF to UE) – see example in table 17.4.2.1-51

P-CSCF forwards the ACK request to UE.

Table 17.4.2.1-51: ACK (P-CSCF to UE)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;branch=z9hG4bK361k21.1, SIP/2.0/UDP
icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
Cseq:
Content-Length:
```


CR-Form-v7

CHANGE REQUEST

⌘ **24.228 CR 122** ⌘ rev - ⌘ Current version: **5.6.0** ⌘

For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.

Proposed change affects: UICC apps ⌘ ME Radio Access Network Core Network

Title:	⌘ Security-Verify header in Reregistration		
Source:	⌘ Siemens		
Work item code:	⌘ IMS-CCR	Date:	⌘ 10/10/2003
Category:	⌘ F	Release:	⌘ Rel-5
	Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)

Reason for change:	⌘ During the CN1-SA3 workshop it was clarified that in order to have consistency in the procedures all REGISTER request sent by the UE shall contain a Security-Verify header.
Summary of change:	⌘ In a reREGISTER request the UE inserts a Security-Verify header. The P-CSCF shall remove this header in a reREGISTER request before forwarding the request..
Consequences if not approved:	⌘ Incorrect specification

Clauses affected:	⌘ 6.3, 16.3								
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table> Other core specifications ⌘ Test specifications ⌘ O&M Specifications ⌘	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Y	N								
<input type="checkbox"/>	<input checked="" type="checkbox"/>								
<input type="checkbox"/>	<input checked="" type="checkbox"/>								
<input type="checkbox"/>	<input checked="" type="checkbox"/>								
Other comments:	⌘								

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at <http://www.3gpp.org/specs/CR.htm>. Below is a brief summary:

- 1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be

downloaded from the 3GPP server under <ftp://ftp.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

***** 1st Change *****

6.3 Registration signalling: reregistration - user currently registered

For the purpose of the reregistration signalling flow shown in figure 6.3-1, the subscriber is considered to be roaming. The HSS information indicates that the subscriber is registered and authenticated, and that the S-CSCF has been allocated to this subscriber. In this signalling flow, the home network does not have network configuration hiding active. This flow also shows the authentication of the private user identity.

This signalling flow assumes:

1. That the same PDP Context allocated during the initial registration scenario is still used for reregistration. For the case when the UE does not still have an active PDP context then PDP context procedures from subclause 16.2 is completed first.
2. The DHCP procedure employed for P-CSCF discovery is not needed.
3. The S-CSCF selection procedure invoked by the I-CSCF is not needed.

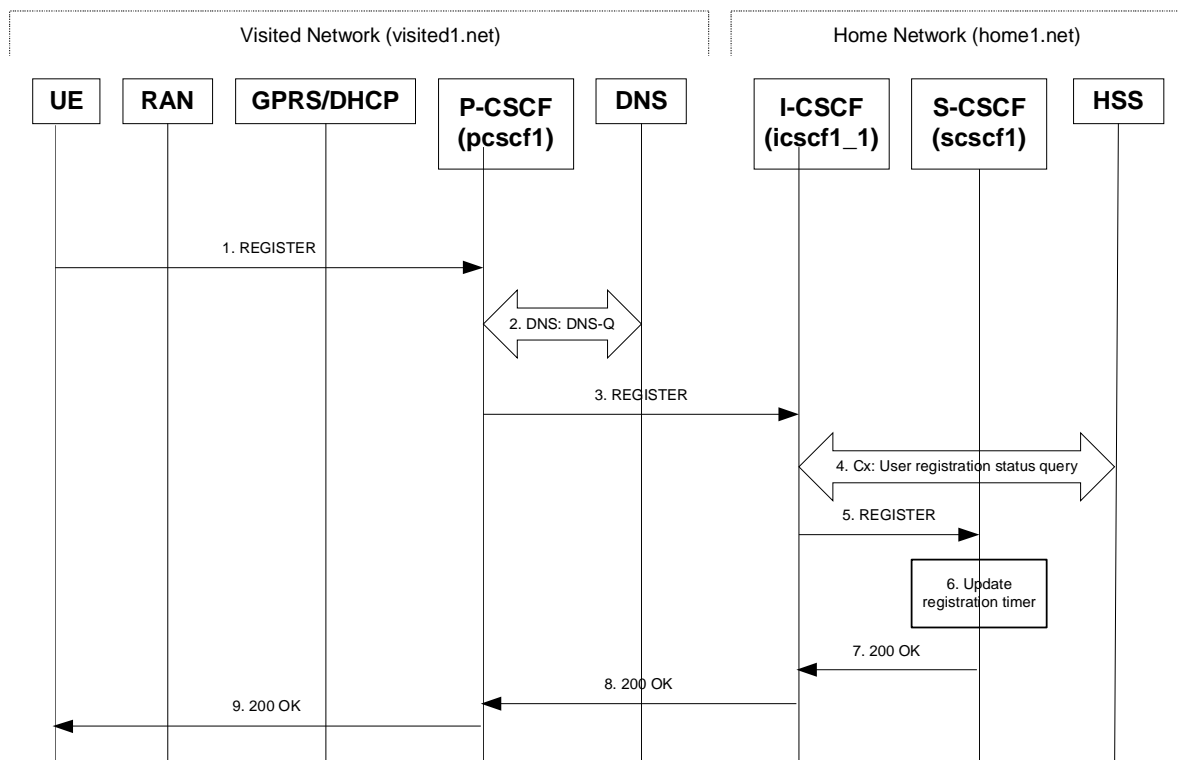


Figure 6.3-1: Reregistration when UE roaming

1. REGISTER request (UE to P-CSCF) - see example in table 6.3-1

The registration expires in the UE. The UE reregisters by sending a new REGISTER request. This request is sent to the same P-CSCF with which the UE initially registered.

Table 6.3-1: REGISTER request (UE to P-CSCF)

```

REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>;tag=4fa3
To: <sip:user1_public1@home1.net>
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>;expires=600000
Call-ID: apb03a0s09dkjdfglkj49111
Authorization: Digest username="user1_private@home1.net", realm="registrar.home1.net",
    nonce=base64(RAND + AUTN + server specific data), algorithm=AKAv1-MD5,
    uri="sip:registrar.home1.net", response="6629fae49393a05397450978507c4ef1", integrity-
    protected="yes"
Security-Client: ipsec-3gpp; alg=hmac-sha-1-96; spi-c=23456789; spi-s=12345678; port-c=2468;
    port-s=1357
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-
    c=8642; port-s=7531
Require: sec-agree
Proxy-Require: sec-agree
CSeq: 3 REGISTER
Supported: path
Content-Length: 0

```

The header field usage is the same as for the initial registration scenario:

- From:** This indicates the public user identity originating the REGISTER request. The public user identity may be obtained from the USIM.
- To:** This indicates public user identity being registered. This is the identity by which other parties know this subscriber.
- Contact:** This indicates the point-of-presence for the subscriber – the IP address of the UE. This is the temporary identifier for the subscriber that is being registered. Subsequent requests destined for this subscriber will be sent to this address. This information is stored in the S-CSCF.
- Authorization:** It carries authentication information. The private user identity (user1_private@home1.net) is carried in the username field of the Digest AKA protocol. As this is a re-registration process, the cached information (realm, nonce, algorithm, uri, response) is also sent.

NOTE 1: The actual nonce value in the WWW-Authenticate header field is encoded in base64, and it may look like: nonce="A34Cm+Fva37UYWpGNB34JP"

Security-Client: Lists the supported algorithm(s) by the UE. The values spi-c, spi-s, port-c and port-s are new parameter values and will not be used for security association setup in case the request is answered with 200 (OK).

Security-Verify: [Contains the security agreement as represented by the previously received Security-Server header](#)

Request-URI: The Request-URI (the URI that follows the method name, "REGISTER", in the first line) indicates the destination domain of this REGISTER request. The rules for routing a SIP request describe how to use DNS to resolve this domain name ("home1.net") into an address or entry point into the home operator's network (the I-CSCF). This information is stored in the USIM.

Supported: This header is included to indicate to the recipient that the UE supports the Path header.

Upon receiving this request the P-CSCF will detect that it already has a registration record for this UE and will reset it's SIP registration timer for this UE to the Expires time in this request.

2. DNS: DNS-Q

Based on the user's URI, the P-CSCF determines that UE is registering from a visiting domain and performs the DNS queries to locate the I-CSCF in the home network. The look up in the DNS is based on the domain name specified in the Request URI. The DNS provides the P-CSCF with the address of the I-CSCF in the home network. The P-CSCF must not use the I-CSCF address cached as a result of the previous registration.

3. REGISTER request (P-CSCF to I-CSCF) - see example in table 6.3-3

This signalling flow shows the REGISTER request being forward from the P-CSCF to the I-CSCF in the home domain.

The P-CSCF removes the Security-Client header and associated "sec-agree" option-tags prior to forwarding the request. As the Proxy-Require header is empty, it removes this header completely.

Table 6.3-3 REGISTER request (P-CSCF to I-CSCF)

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
Max-Forwards: 69
Path: <sip:term@pcscf1.visited1.net;lr>
Require: path
P-Visited-Network-ID: "Visited Network Number 1"
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"
From:
To:
Contact:
Call-ID:
Authorization: Digest username="user1_private@home1.net", realm="registrar.home1.net",
nonce=base64(RAND + AUTN + server specific data), algorithm=AKAv1-MD5,
uri="sip:registrar.home1.net", response="6629fae49393a05397450978507c4ef1", integrity-
protected="yes"
CSeq:
Supported:
Content-Length:
```

Path: This is the P-CSCF URI and is included to inform the S-CSCF where to route terminating requests.

Require: This header is included to ensure that the recipient correctly handles the Path header. If the recipient does not support the path header, a response will be received with a status code of 420 and an Unsupported header indicating "path". Such a response indicates a misconfiguration of the routing tables and the request has been routed outside the IM CN subsystem.

P-Visited-Network-ID: It contains the identifier of the P-CSCF network at the home network.

P-Charging-Vector: The P-CSCF inserts this header and populates the icid parameters with the same globally unique value that was used in the previous registration.

4. Cx: User registration status query procedure

The I-CSCF requests information related to the Subscriber registration status by sending the private user identity, public user identity and visited domain name to the HSS. Because the user has registered, the HSS returns the I-CSCF with the S-CSCF address for the subscriber.

For detailed message flows see 3GPP TS 29.228.

For the parameters in the REGISTER request (flow 3) which need to be sent to HSS, see table 6.2-5a.

Table 6.3-4a provides the parameters in the REGISTER request (flow 5), which are obtained from the information sent back from the HSS.

Table 6.3-4a Cx: User registration status query procedure (HSS to I-CSCF)

Message source & destination	Cx Information element name	Mapping to SIP header in REGISTER	Description
HSS to I-CSCF	S-CSCF name	Request-URI:	This information indicates the serving CSCF's name of that user

5. REGISTER request (I-CSCF to S-CSCF) - see example in table 6.3-5

This signalling flow forwards the REGISTER request from the I-CSCF to the S-CSCF selected. The Request-URI is changed to the address of the S-CSCF.

Table 6.3-5: REGISTER request (I-CSCF to S-CSCF)

```
REGISTER sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
Max-Forwards: 68
Path:
Require:
P-Visited-Network-ID:
P-Charging-Vector:
From:
To:
Contact:
Call-ID:
Authorization:
CSeq:
Supported:
Content-Length:
```

Path: The S-CSCF stores the contents of the Path header and uses this URI for routing mobile terminated requests.

P-Visited-Network-ID: It contains the identifier of the P-CSCF network at the home network.

Upon receiving this request the S-CSCF will detect that it already has a registration record for this UE and will reset its SIP registration timer for this UE to the Expires time in this request.

6. Update registration timer

As the REGISTER request arrived integrity protected, the S-CSCF does not need to challenge the user, but just update the registration timer to the value requested by the user (if the policy of the network allows it).

NOTE: The S-CSCF is allowed to challenge the user. If S-CSCF decides to challenge the user, the call flow will be similar to the one presented in section 6.2.

7. 200 OK response (S-CSCF to I-CSCF) – see example in Table 6.3-7

The S-CSCF sends a 200 (OK) response to the I-CSCF indicating that Registration was successful. This response will traverse the path that the REGISTER request took as described in the Via list.

Table 6.3-7 200 OK response (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Path:
Service-Route: <sip:orig@scscf1.home1.net;lr>
From:
To:
Call-ID:
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>;expires=600000
CSeq:
Date: Wed, 11 July 2001 08:49:37 GMT
P-Associated-URI: <sip:user1_public2@home1.net>, <sip:user1_public3@home1.net>, <sip:+1-212-
    555-1111@home1.net;user=phone>
Content-Length:
```

Service-Route: The S-CSCF inserts the Service-Route header that includes its own URI including a character string in the user part to differentiate mobile originating requests from mobile terminating requests.

8. 200 OK response (I-CSCF to P-CSCF) – see example in Table 6.3-8

The I-CSCF forwards the 200 (OK) response from the S-CSCF to the P-CSCF indicating that the registration was successful. This response will traverse the path that the REGISTER request took as described in the Via list.

Table 6.3-8 200 OK response (I-CSCF to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Path:
Service-Route:
From:
To:
Call-ID:
Contact:
CSeq:
Date:
P-Associated-URI:
Content-Length:
```

9. 200 OK response (P-CSCF to UE) – see example in Table 6.3-9

The P-CSCF saves the value of the Service-Route header and associates it with the UE. The P-CSCF then forwards 200 (OK) response from the I-CSCF to the UE indicating that the registration was successful.

Table 6.3-9 200 OK response (P-CSCF to UE)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Path:
Service-Route:
From:
To:
Call-ID:
Contact:
CSeq:
Date:
P-Associated-URI:
Content-Length:
```

*****Next Change*****

16.3 Registration signalling: reregistration – user currently registered

For the purpose of the reregistration signalling flow shown in figure 16.3-1, the subscriber is considered to be roaming. This flow also shows the authentication of the private user identity. In this signalling flow, the home network has network configuration hiding active.

This signalling flow assumes:

1. That the same PDP Context allocated during the initial registration scenario is still used for reregistration. For the case when the UE does not still have an active PDP context then PDP context procedures from subclause 16.2 is completed first.
2. The S-CSCF selection procedure invoked by the I-CSCF is not needed.

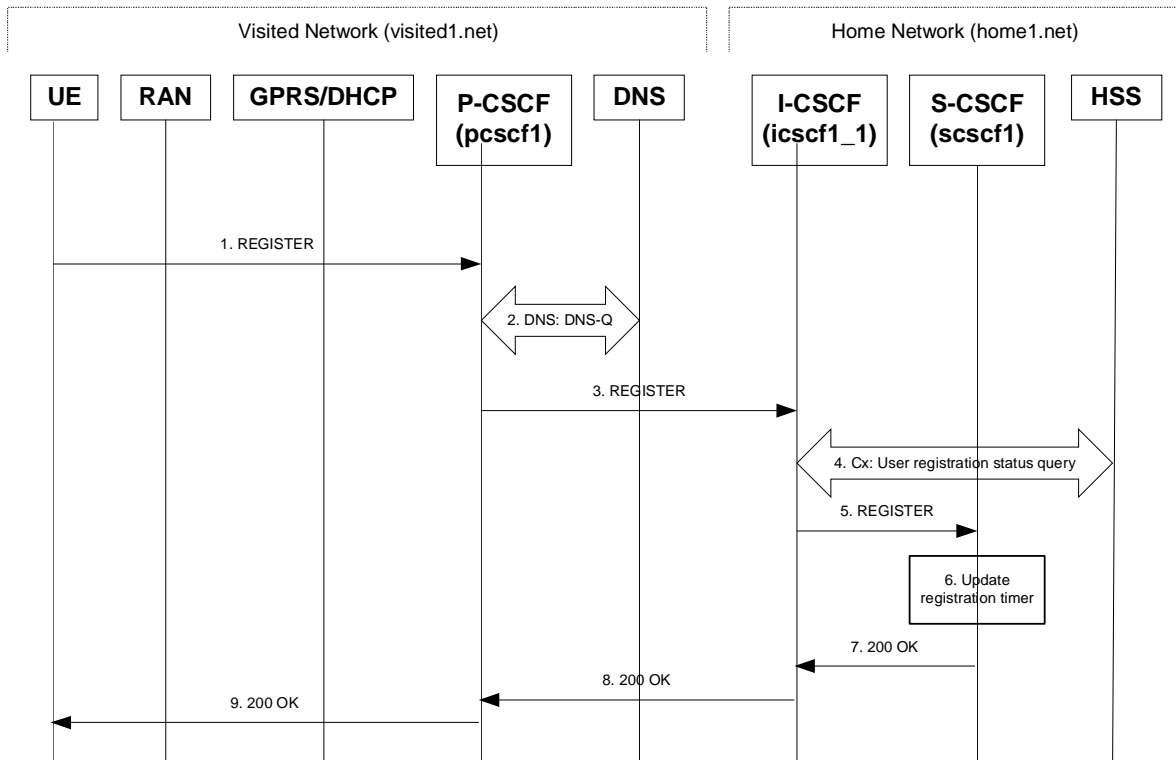


Figure 16.3-1: Reregistration when UE roaming

1. REGISTER request (UE to P-CSCF) – see example in table 16.3-1

The registration expires in the UE. The UE reregisters by sending a new REGISTER request. This request is sent to the same P-CSCF with which the UE initially registered.

Table 16.3-1 REGISTER request (UE to P-CSCF)

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>;tag=4fa3
To: <sip:user1_public1@home1.net>;tag=5ef4
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>;expires=600000
Call-ID: apb03a0s09dkjdfglkj49111
Authorization: Digest username="user1_private@home1.net", realm="registrar.home1.net",
    nonce=base64(RAND + AUTN + server specific data), algorithm=AKAv1-MD5,
    uri="sip:registrar.home1.net", response="6629fae49393a05397450978507c4ef1"
Security-Client: ipsec-3gpp; alg= hmac-sha-1-96; spi-c=23456789; spi-s=12345678; port-c=2468;
    port-s=1357
Security-Verify: ipsec-3gpp; q=0.1; alg= hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-
    c=8642; port-s=7531
Require: sec-agree
Proxy-Require: sec-agree
CSeq: 3 REGISTER
Supported: path
Content-Length: 0
```

The header field usage is the same as for the initial registration scenario:

- From:** This indicates the public user identity originating the REGISTER request. The public user identity may be obtained from the USIM.
- To:** This indicates public user identity being registered. This is the identity by which other parties know this subscriber.

Contact: This indicates the point-of-presence for the subscriber – the IP address of the UE. This is the temporary identifier for the subscriber that is being registered. Subsequent requests destined for this subscriber will be sent to this address. This information is stored in the P-CSCF.

Authorization: It carries authentication information. The private user identity (user1_private@home1.net) is carried in the username field of the Digest AKA protocol. As this is a re-registration process, the cached information (realm, nonce, algorithm, uri, response) is also sent.

NOTE 1: The actual nonce value in the WWW-Authenticate header field is encoded in base64, and it may look like: nonce="A34Cm+Fva37UYWpGNB34JP"

Request-URI: The Request-URI (the URI that follows the method name, "REGISTER", in the first line) indicates the destination domain of this REGISTER request. The rules for routing a SIP request describe how to use DNS to resolve this domain name ("home1.net") into an address or entry point into the home operator's network (the I-CSCF). This information is stored in the USIM.

Security-Client: Lists the supported algorithm(s) by the UE. The values spi-c, spi-s, port-c and port-s are new parameter values and will not be used for security association setup in case the request is answered with 200 (OK).

Security-Verify: [Contains the security agreement as represented by the received Security-Server header](#)

Supported: This header is included to indicate to the recipient that the UE supports the Path header.

Upon receiving this request the P-CSCF will detect that it already has a registration record for this UE and will reset its SIP registration timer for this UE to the Expires time in this request.

2. DNS: DNS-Q

Based on the user's URI, the P-CSCF determines that UE is registering from a visiting domain and performs the DNS queries to locate the I-CSCF in the home network. The look up in the DNS is based on the address specified in the Request URI. The DNS provides the P-CSCF with an address of the I-CSCF in the home network. The P-CSCF must not use the I-CSCF address cached as a result of the previous registration.

3. REGISTER request (P-CSCF to I-CSCF) – see example in table 16.3-3

This signalling flow shows the REGISTER request being forward from the P-CSCF to the I-CSCF in the home domain.

The P-CSCF removes the Security-Client header and associated "sec-agree" option-tags prior to forwarding the request. As the Proxy-Require header is empty, it removes this header completely.

Table 16.3-3 REGISTER request (P-CSCF to I-CSCF)

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
Max-Forwards: 69
Path: <sip:term@pcscf1.visited1.net;lr>
Require: path
P-Visited-Network-ID: "Visited Network Number 1"
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
From:
To:
Contact:
Call-ID:
Authorization: Digest username="user1_private@home1.net", realm="registrar.home1.net",
    nonce=base64(RAND + AUTN + server specific data), algorithm=AKAv1-MD5,
    uri="sip:registrar.home1.net", response="6629fae49393a05397450978507c4ef1", integrity-
    protected="yes"
CSeq:
Supported: path
Content-Length:
```

Path: This is the P-CSCF URI and is included to inform the S-CSCF where to route terminating requests.

Require: This header is included to ensure that the recipient correctly handles the Path header. If the recipient does not support the path header, a response will be received with a status code of 420 and an Unsupported header indicating "path". Such a response indicates a misconfiguration of the routing tables and the request has been routed outside the IM CN subsystem.

P-Visited-Network-ID: It contains the identifier of the P-CSCF network at the home network.

4. Cx: User registration status query procedure

The I-CSCF requests information related to the Subscriber registration status by sending the private user identity, public user identity and visited domain name to the HSS. Because the user has registered, the HSS returns the I-CSCF with the S-CSCF address for the subscriber

For detailed message flows see 3GPP TS 29.228.

For the parameters in the REGISTER request (flow 3), which are sent to the HSS, see table 6.2-5a.

Table 6.3-4a provides the parameters in the SIP REGISTER request (flow 5), which are obtained from the information sent back from the HSS.

5. REGISTER request (I-CSCF to S-CSCF) – see example in table 16.3-5

This signalling flow forwards the REGISTER request from the I-CSCF to the S-CSCF selected. The Request-URI is changed to the address of the S-CSCF.

I-CSCF adds a proper I-CSCF name to the Path header.

Table 16.3-5 REGISTER request (I-CSCF to S-CSCF)

```
REGISTER sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
Max-Forwards: 68
Path: <sip:icscf1_p.home1.net;lr>, <sip:term@pcscf1.visited1.net;lr>
Require:
P-Visited-Network-ID:
P-Charging-Vector:
From:
To:
Contact:
Authorization:
Call-ID:
CSeq:
Supported:
Content-Length:
```

Path: The S-CSCF stores the contents of the Path header and uses these URIs for routing mobile terminated requests.

P-Visited-Network-ID: It contains the identifier of the P-CSCF network at the home network.

Upon receiving this request the S-CSCF will detect that it already has a registration record for this UE and will reset it's SIP registration timer for this UE to the Expires time in this request.

6. Update registration timer

As the REGISTER request arrived integrity protected, the S-CSCF does not need to challenge the user, but just update the registration timer to the value requested by the user (if the policy of the network allows it).

NOTE: The S-CSCF is allowed to challenge the user. If S-CSCF decides to challenge the user, the call flow will be similar to the one presented in section 16.2.

7. 200 OK response (S-CSCF to I-CSCF) – see example in Table 16.3-7

The S-CSCF sends a 200 (OK) response to the I-CSCF indicating that Registration was successful. This response will traverse the path that the REGISTER request took as described in the Via list.

Table 16.3-7 200 OK response (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Path: <sip:icscf1_p.home1.net;lr>, <sip:term@pcscf1.visited1.net;lr>
Service-Route: <sip:icscf1_p.home1.net;lr>, <sip:orig@scscf1.home1.net;lr>
From:
To:
Call-ID:
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>;expires=600000
CSeq:
Date: Wed, 11 July 2001 08:49:37 GMT
P-Associated-URI: <sip:user1_public2@home1.net>, <sip:user1_public3@home1.net>, <sip:+1-212-
    555-1111@home1.net;user=phone>
Content-Length:
```

Service-Route: The S-CSCF inserts the Service-Route header value that includes a URI of an I-CSCF (THIG) and its own URI including a character string in the user part to differentiate mobile originating requests from mobile terminating requests.

8. 200 OK response (I-CSCF to P-CSCF) – see example in Table 16.3-8

The I-CSCF translates the S-CSCF name in the Service-Route header. The I-CSCF forwards the 200 (OK) response from the S-CSCF to the P-CSCF indicating that Registration was successful. This response will traverse the path that the REGISTER request took as described in the Via list.

Table 16.3-8 200 OK response (I-CSCF to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Path:
Service-Route: <sip:icscf1_p.home1.net;lr>,
    <sip:token(scscf1.home1.net;lr)@home1.net;tokenized-by=home1.net>
From:
To:
Call-ID:
Contact:
CSeq:
Date:
P-Associated-URI:
Content-Length:
```

9. 200 OK response (P-CSCF to UE) – see example in Table 16.3-9

The P-CSCF saves the value of the Service-Route header and associates it with the UE. The P-CSCF then forwards the 200 (OK) response from the I-CSCF to the UE indicating the registration was successful.

Table 16.3-9 200 OK response (P-CSCF to UE)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Path:
Service-Route:
From:
To:
Call-ID:
Contact:
CSeq:
Date:
P-Associated-URI:
Content-Length:
```

CR-Form-v7

CHANGE REQUEST

⌘ **24.228 CR 123** ⌘ rev **1** ⌘ Current version: **5.6.0** ⌘

For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ Correction of flow for user authentication failure		
Source:	⌘ Siemens		
Work item code:	⌘ IMS-CCR	Date:	⌘ 10/10/2003
Category:	⌘ F	Release:	⌘ Rel-5
	Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)

Reason for change:	⌘ In case the S-CSCF receives a REGISTER request containing an RES that does not match XRES, then the S-CSCF shall send a 403 Forbidden response and regard the authentication to have failed. This is already described in 24.229. However in the current version of 24.228 the S-CSCF sends another challenge.
Summary of change:	⌘ When a REGISTER containing a RES that does not match XRES then the S-CSCF sends 403.
Consequences if not approved:	⌘ Misalignment 24.229<->24.228.

Clauses affected:	⌘ 6.9.3						
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table> Other core specifications	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	⌘	
Y	N						
<input type="checkbox"/>	<input checked="" type="checkbox"/>						
	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table> Test specifications	<input checked="" type="checkbox"/>					
<input checked="" type="checkbox"/>							
	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table> O&M Specifications	<input checked="" type="checkbox"/>					
<input checked="" type="checkbox"/>							
Other comments:	⌘						

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at <http://www.3gpp.org/specs/CR.htm>. Below is a brief summary:

- 1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be

downloaded from the 3GPP server under <ftp://ftp.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

6.9.3 Registration failure – user authentication failure

This clause (see figure 6.9.3-1) shows the signalling flow with user authentication failure at step 19 of subclause 6.2 "Signalling flows for REGISTER" ~~and a final failure of the authentication at step 30.~~

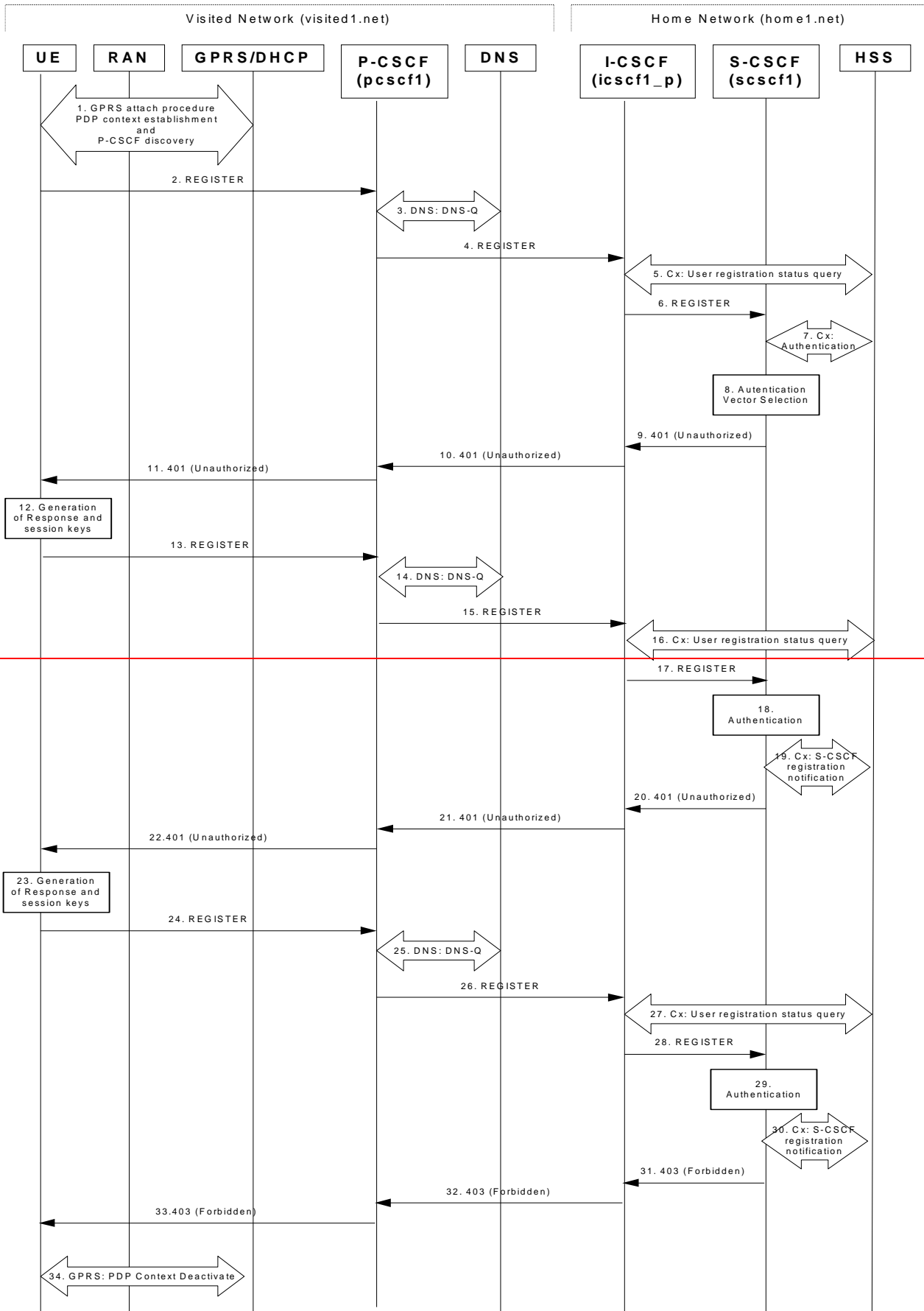


Figure 6.9.3-1: User authentication failure

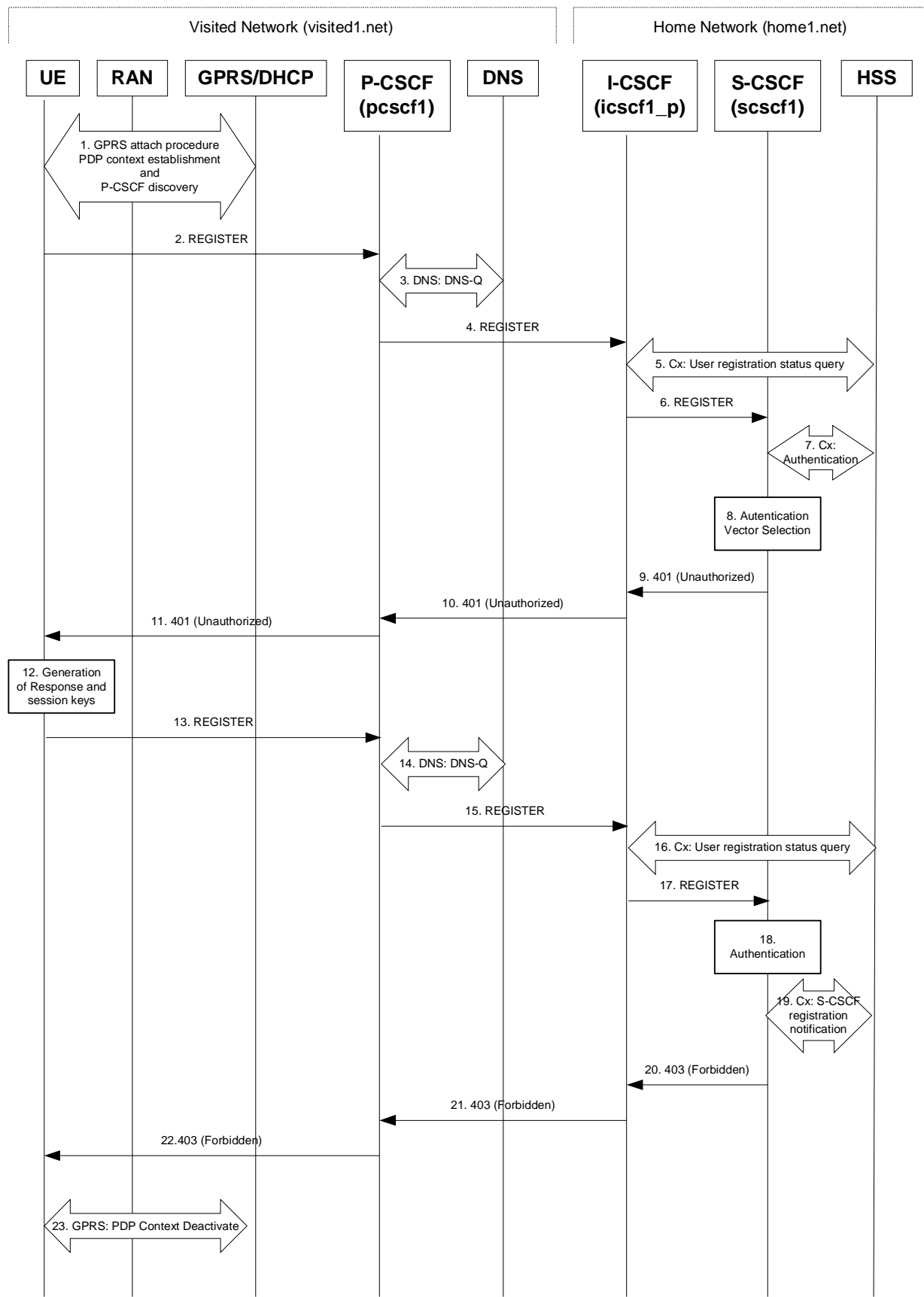


Figure 6.9.3-1: User authentication failure

Steps 1 through 17 are the same as the signalling flow in subclause 6.2.

18. Authentication: User authentication fails

Upon receiving the REGISTER request carrying the authentication response, RES, the S-CSCF checks that the user's active XRES matches the received RES. If the check is unsuccessful then this authentication challenge fails and the public user identity is not ~~yet~~ registered in the S-CSCF.

~~At this point the S-CSCF has the option of repeating a number of authentication challenges as given in step 18 through 28. For the purposes of this flow, only one repetition is shown.~~

~~19. Cx. S-CSCF registration notification~~

~~— The S-CSCF selects new authentication vectors as specified in step 9, either from the list already within the S-CSCF, or by requesting new vectors from the HSS.~~

~~20. 401 (Unauthorized) response (S-CSCF to I-CSCF) – see example in table 6.9.3-20~~

~~— The authentication challenge is sent in the 401 (Unauthorized) response towards the UE.~~

Table 6.9.3-20: 401 (Unauthorized) response (S-CSCF to I-CSCF)

```
SIP/2.0 401 Unauthorized
Via: SIP/2.0/UDP iescf1_p.homel.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pescf1.visited1.net;comp=sigcomp;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    {5555::aaa:bbb:ccc:ddd};branch=z9hG4bKnaahds7
From: <sip:user1_public1@homel.net>;tag=4fa3
To: <sip:user1_public1@homel.net>;tag=5ef4
Call-ID: apb03a0s09dkjdfglkj49111
WWW-Authenticate: Digest realm="registrar.homel.net", nonce=base64(RAND + AUTN + server
    specific data), algorithm=AKAv1-MD5,
    ik="00112233445566778899aabbccdeeff",
    ek="ffeeddecbbaa11223344556677889900"
CSeq: 2 REGISTER
Content-Length: 0
```

~~NOTE:— The actual nonce value in the WWW-Authenticate header field is encoded in base64, and it may look like: nonce="AY+3fUYo021Qi1Mnv3C6qAzEp4502"~~

~~21. 401 (Unauthorized) response (I-CSCF to P-CSCF) – see example in table 6.9.3-21~~

~~— The authentication challenge is sent in the 401 (Unauthorized) response towards the UE.~~

Table 6.9.3-21: 401 (Unauthorized) response (I-CSCF to P-CSCF)

```
SIP/2.0 401 Unauthorized
Via: SIP/2.0/UDP pescf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    {5555::aaa:bbb:ccc:ddd};comp=sigcomp;branch=z9hG4bKnaahds7
From:
To:
Call-ID:
WWW-Authenticate:
CSeq:
Content-Length:
```

~~22. 401 (Unauthorized) response (P-CSCF to UE) – see example in table 6.9.3-22~~

~~— The P-CSCF removes any keys received in the 401 (Unauthorized) response and forwards the rest of the response to the UE.~~

Table 6.9.3-22: 401 (Unauthorized) response (P-CSCF to UE)

```

SIP/2.0 401 Unauthorized
Via: SIP/2.0/UDP [5555::aaa::bbb::ccc::ddd];comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
WWW-Authenticate: Digest realm="registrar.homel.net", nonce=base64(RAND + AUTN + server-
specific data), algorithm=AKAv1-MD5
Security Server: ipsec 3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=987654321; spi-s=87654321;
port-c=8642; port-s=7531
CSeq:
Content-Length:

```

WWW-Authenticate: The P-CSCF removes the ik and ck parameters (directives) from the header.

Security Server: q is the preference value, 0.1 means IPsec is the first preferred choice. The q value represents only relative degradation of all mechanisms listed here. The lower value, the higher priority.

23. Generation of response and session keys at UE

- Upon receiving the Unauthorised response, the UE extracts the MAC and the SQN from the AUTN. The UE calculates the XMAC and checks that XMAC matches the received MAC and that the SQN is in the correct range. If both these checks are successful the UE calculates the response, RES, and also computes the session keys IK and CK. The RES is put into the Authorization header and sent back to the registrar in the REGISTER request.

24. REGISTER request (UE to P-CSCF) – see example in table 6.9.3-24

Table 6.9.3-24: REGISTER request (UE to P-CSCF)

```

REGISTER sip:registrar.homel.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa::bbb::ccc::ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Max-Forwards: 70
From: <sip:user1_publicl@homel.net>;tag=4fa3
To: <sip:user1_publicl@homel.net>
Contact: <sip:[5555::aaa::bbb::ccc::ddd]:1357;comp=sigcomp>;expires=600000
Call-ID: apb03a0s09dkjdfglkj49111
Authorization: Digest username="user1_private@homel.net", realm="registrar.homel.net",
nonce=base64(RAND + AUTN + server-specific data), algorithm=AKAv1-MD5,
uri="sip:registrar.homel.net", response="0a1b04e89e54f09ab45e84d30e29f83a"
Security-Verify: ipsec 3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=987654321; spi-s=87654321;
port-c=8642; port-s=7531
Require: sec-agree
Proxy-Require: sec-agree
CSeq: 3 REGISTER
Supported: path
Content-Length: 0

```

Authorization: This carries the response to the authentication challenge received in step 12 along with the private user identity, the realm, the nonce, the URI and the algorithm.

25. DNS: DNS-Q

- Based on the user's URI, the P-CSCF determines that UE is registering from a visiting domain and performs the DNS queries to locate the I-CSCF in the home network. The look up in the DNS is based on the domain name specified in the Request URI.
- The P-CSCF sends the REGISTER request after local processing to the address indicated in the Request URI. When forwarding the REGISTER request the P-CSCF needs to specify the protocol, port number and IP address of the I-CSCF server in the home network to which to send the REGISTER request. The P-CSCF tries to find this information by querying the DNS. Since the Request URI does not specify a numeric IP address, and the transport protocol and port are not indicated, the P-CSCF performs an NAPTR query for the domain specified in the Request URI.

Table 6.9.3-25a DNS: DNS Query (P-CSCF to DNS)

```

OPCODE=QUERY
QNAME=registrar.home1.net, QCLASS=IN, QTYPE=NAPTR

```

~~The DNS records are retrieved according to RFC 3263 [4].~~

Table 6.9.3-25b DNS Query Response (DNS to P-CSCF)

```

OPCODE=QUERY, RESPONSE, AA
QNAME=registrar.home1.net, QCLASS=IN, QTYPE=NAPTR

registrar.home1.net 0 IN NAPTR 50 50 "s" "SIP+D2U" ""
  _sip._udp.registrar.home1.net
  0 IN NAPTR 90 50 "s" "SIP+D2T" "" _sip._tcp.registrar.home1.net
  0 IN NAPTR 100 50 "s" "SIPS+D2T" ""
  _sips._tcp.registrar.home1.net

```

~~Since the UDP is preferred, the P-CSCF finds the I-CSCF by a DNS SRV lookup according to RFC 2782 [4].~~

Table 6.9.3-25c: DNS: DNS Query (P-CSCF to DNS)

```

OPCODE=QUERY
QNAME=_sip._udp.registrar.home1.net, QCLASS=IN, QTYPE=SRV

```

~~The DNS records are retrieved according to RFC 2782 [4].~~

Table 6.9.3-25d: DNS Query Response (DNS to P-CSCF)

```

OPCODE=QUERY, RESPONSE, AA
QNAME=_sip._udp.registrar.home1.net, QCLASS=IN, QTYPE=SRV

_sip._udp.registrar.home1.net 0 IN SRV 1 10 5060 iesef1_p.home1.net
  0 IN SRV 1 0 5060 iesef7_p.home1.net

iesef1_p.home1.net 0 IN AAAA 5555::aba:dab:aaa:daa
iesef7_p.home1.net 0 IN AAAA 5555::ala:b2b:e3e:d4d

```

~~In the Answer field of the query response each I-CSCF is identified by its host domain name. The returned SRV Resource Records (RRs) are merged and ordered, and the selection technique (employing the Priority and Weight parameters returned in the RRs) as specified in RFC 2782 [4] is used to select the I-CSCF (i.e. the iesef1_p.home1.net). Since the Additional Data field of the query response also contains the IP address of the selected I-CSCF (i.e. 5555::aba:dab:aaa:daa), a new query to the DNS is not required.~~

~~Once the IP address of the I-CSCF is obtained, the P-CSCF forwards the REGISTER request to this IP address (i.e. 5555::aba:dab:aaa:daa) using the UDP protocol and port number 5060.~~

26. REGISTER request (P-CSCF to I-CSCF) – see example in table 6.9.3-26

~~This signalling flow shows the REGISTER request being forwarded from the P-CSCF to the I-CSCF in the home domain.~~

~~The P-CSCF removes the Security-Verify header and associated "sec-agree" option tags prior to forwarding the request. As the Proxy-Require header is empty, it removes this header completely.~~

Table 6.9.3-26: REGISTER request (P-CSCF to I-CSCF)

```
REGISTER sip:registrar.homel.net SIP/2.0
Via: SIP/2.0/UDP pesefl.visited1.net;branch=z9hG4bK240f24.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnaahds7
P-Access-Network-Info:
Max-Forwards: 69
Path: <sip:term@pesefl.visited1.net;lr>
Require: path
P-Visited-Network-ID: "Visited-Network-Number-1"
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
From:
To:
Contact:
Call-ID:
Authorization: Digest username="user1_private@homel.net", realm="registrar.homel.net",
    nonce=base64(RAND + AUTN + server-specific-data), algorithm=AKAv1-MD5,
    uri="sip:registrar.homel.net", response="0a1b04e89e54f09ab45e84d30e29f83a",
    integrity-protected="yes"
CSeq:
Supported:
Content-Length:
```

Path: This is the P-CSCF URI and is included to inform the S-CSCF where to route terminating requests.

27.Cx: User registration status query procedure

- The I-CSCF requests information related to the Subscriber registration status by sending the private user identity, public user identity and visited domain name to the HSS. The HSS returns the S-CSCF required capabilities and the I-CSCF uses this information to select a suitable S-CSCF.
- For detailed message flows see 3GPP TS 29.228 [11].
- Table 6.9.3-27a provides the parameters in the REGISTER request (flow 5) which need to be sent to HSS.

Table 6.9.3-27a Cx: User registration status query procedure (I-CSCF to HSS)

Message-source & destination	Cx Information element name	Information-Source in REGISTER request	Description
I-CSCF to HSS	Private User Identity	Authorization:	The Private User Identity is encoded in the username field according to the Authorization protocol.
	Public User Identity	To:	Identity which is used to communicate with other users
	Visited Network Identifier	P-Visited-Network-ID:	This information indicates the network identifier of the visited network

28. REGISTER request (I-CSCF to S-CSCF) – see example in table 6.9.3-28

- This signalling flow forwards the REGISTER request from the I-CSCF to the S-CSCF selected.

Table 6.9.3-28: REGISTER request (I-CSCF to S-CSCF)

```

REGISTER sip:esef1.homel.net SIP/2.0
Via: SIP/2.0/UDP iesef1_p.homel.net;branch=z9hG4bK251g45.1, SIP/2.0/UDP-
    pesef1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP-
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnaahds7
P-Access-Network-Info:
Max-Forwards: 68
Path:
Require:
P-Visited-Network-ID:
P-Charging-Vector:
From:
To:
Contact:
Call-ID:
Authorization:
CSeq:
Supported:
Content-Length:
    
```

Path: The S-CSCF stores the contents of the Path header and uses this URI for routing mobile-terminated sessions.

29. Authentication

— Upon receiving the REGISTER request carrying the authentication response, RES, the S-CSCF checks that the user's active, XRES matches the received RES. If the check is unsuccessful, and no more authentication challenges are to be made, then the authentication has failed and the public user identity is not registered in the S-CSCF.

30.19. Cx: S-CSCF registration notification procedure

Upon user authentication failure the S-CSCF informs the HSS that the user has not been registered at this instance. The HSS clears the S-CSCF name for that subscriber.

For detailed message flows see 3GPP TS 29.229.

Table 6.9.3-30 provides the parameters in the REGISTER request (flow 18) which needs to be sent to HSS.

Table 6.9.3-30 Cx: S-CSCF registration notification procedure (S-CSCF to HSS)

Message source & destination	Cx Information element name	Information Source in REGISTER request	Description
S-CSCF to HSS	Public User Identity	To:	Identity which is used to communicate with other users
	Private User Identity	Authorization:	The Private User Identity is encoded in the username field according to the Authorization protocol.
	S-CSCF name	Request-URI:	This information indicates the serving CSCF's name of that user

34.20. 403 (Forbidden) response (S-CSCF to I-CSCF) - see example in table 6.9.3-31

The S-CSCF sends an 403 (Forbidden) response to the I-CSCF indicating that authentication failed. No security parameters are included in this response. The S-CSCF will insert a warning header in the response, indicating to the UE the reason of refusing the Registration request. The Warning header will contain the name of the network inserting the warning header (warn-agent = homel.net) and in addition it may contain a warn-text. The warn-code inserted into the Warning header is 399.

Table 6.9.3-31: 403 (Forbidden) response (S-CSCF to I-CSCF)

```
SIP/2.0 403 Forbidden
Via: SIP/2.0/UDP icscf1.p.homel.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Warning: 399 homel.net "Authentication failed"
From: <sip:user1_public1@homel.net>;tag=4fa3
To: <sip:user1_public1@homel.net>; tag=5ef4
Call-ID: apb03a0s09dkjdfglkj49111
CSeq: 3 REGISTER
Content-Length: 0
```

3221. 403 (Forbidden) response (I-CSCF to P-CSCF) - see example in table 6.9.3-32

The I-CSCF forwards the 403 (Forbidden) response from the S-CSCF to the P-CSCF indicating that authentication was unsuccessful.

Table 6.9.3-32: 403 (Forbidden) response (I-CSCF to P-CSCF)

```
SIP/2.0 403 Forbidden
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Warning: 399 homel.net "Authentication failed"
From:
To:
Call-ID:
CSeq:
Content-Length:
```

3322. 403 (Forbidden) response (P-CSCF to UE) - see example in table 6.9.3-33

The P-CSCF forwards the 403 (Forbidden) response to the UE.

Table 6.9.3-33: 403 (Forbidden) response (P-CSCF to UE)

```
SIP/2.0 403 Forbidden
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Warning: 399 homel.net "Authentication failed"
From:
To:
Call-ID:
CSeq:
Content-Length:
```

3423. PDP Context Deactivate

On receiving the 403 (Forbidden) response the UE ceases registration and authentication attempts. In this case, if the PDP context on which the SIP signalling was being conducted is not being used for other purposes, the UE deactivates the signalling PDP context.

CHANGE REQUEST

⌘ **24.228 CR 124** ⌘ rev **1** ⌘ Current version: **5.6.0** ⌘

For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.

Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ Corrections to the P-Access-Network-Info header		
Source:	⌘ Lucent Technologies		
Work item code:	⌘ IMS-CCR	Date:	⌘ 20/10/03
Category:	⌘ F	Release:	⌘ Rel-5
	Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)

Reason for change:	⌘ 24.228 currently documents the P-Access-Network-Info header. A number of issues are however identified: <ol style="list-style-type: none"> 1. Some of the flows show ACK containing a P-Access-Network-Info header, and the defining RFC and 24.229 both preclude this. 2. Some of the flows show the response to the CANCEL request containing the P-Access-Network-Info header, and the defining RFC and 24.229 both preclude this. 3. The S-S flows show information appearing from the related P-CSCF at both ends of the flow, and these flows are meant to be identical to those produced within the corresponding MT or MO flows. One area they are different is that the S-S flows currently do not show the P-Access-Network-Info header, and this is corrected by including this header. 4. Some of the flows show the presence of the header in one portion of the flow, but not in the next flow.
Summary of change:	⌘ <ol style="list-style-type: none"> 1. In subclause 7.2.2.1, 7.3.2.1, the P-Access-Network-Info header is deleted from the ACK flows. 2. In subclause 7.2.3.1, 7.3.5.1, 7.3.5.2, the P-Access-Network-Info header is added to all flows coming into the S-CSCFs from the direction of the UE. 3. In subclause 7.4.2.2, the header is added to flow 37, where it is currently missing, despite it occurring in flow 34. 4. In subclause 7.4.2.3, the header is removed from flow 40, as this is a 200 (OK) response to a CANCEL request. 5. In subclause 7.4.2.3, the header is added to flow 43, as it appears already in

- flow 41.
6. In subclause 7.4.3.1, the header is deleted from flow 37, as this is a flow between S-CSCFs, beyond the point where the header is removed.
 7. In subclause 7.4.5.1, the header has been inserted, presumably as an editing error, in the wrong flow. It is deleted from flow 8 (an ACK in the wrong direction) and inserted in flow 9.
 8. In subclause 7.5.2, the header has been inserted in flows 25 and 27, where it is currently missing – this is a standard 200 (OK) response to PRACK.
 9. In subclause 7.5.2, the header has been inserted in flows 37 and 28, where it is currently missing – this is a standard 200 (OK) response to UPDATE.
 10. In subclause 7.5.2, the header has been inserted in flows 54 and 55, where it is currently missing – this is a standard 200 (OK) response to PRACK.
 11. In subclause 10.3.3, the header is added to flow 14, which represents the P-CSCF forwarding flow 12, where it is included.
 12. In subclause 10.3.5, the header is added to flow 14, which represents the P-CSCF forwarding flow 12, where it is included.
 13. In subclause 10.4.2, the header is added to flow 18, as this comes from a UE and has not yet traversed the S-CSCF that removes it.
 14. In subclause 10.4.7, the header is removed from flow 3, as this flow is from S-CSCF#2 to I-CSCF#2, and S-CSCF#2 should have removed the header.
 15. Where a description of the P-Access-Network-Info contents appears below the flow contents tables, sometimes it appears out of sequence to the headers shown in the flows. In these cases, it is positioned in a more appropriate place.
 16. The contents of the descriptions of the P-Access-Network-Info header has been revised to remove reference to a subclause of 24.229. In any case this reference will be incorrect for release 6 if current proposals for change of that subclause are agreed. In any case, this reference provides a different level of description to the description of other flows, and is therefore inappropriately inconsistent.
 17. Where these descriptions are previously not present, they have been included in a consistent manner. [A general policy regarding descriptions has been followed.](#)
 - o [such that: at release 5, for each flow only the first inclusion of a header by each entity is described, therefore only the first occurrence of the P-Access-Network header inserted by the UE will have documentation, and not ones in a subsequent request or response.](#)
 - o [at release 6, where a header is behaving exactly as it would for release 5, no description is included, therefore no description of the P-Access-Network-Info header is included.](#)

Consequences if not approved: ⌘ Demonstrated flows will be inconsistent with requirements of RFC 3261 and 3GPP TS 24.229

Clauses affected: ⌘ 6.2, 6.3, 6.5, 6.7.1, 6.7.2, 6.8, ~~6.9.3~~, 7.2.2.1, 7.2.3.1, 7.3.2.1, 7.3.2.2, 7.3.5.1, 7.3.5.2, 7.3.6.1, 7.3.7.1, 7.4.2.1, 7.4.2.2, 7.4.2.3, 7.4.3.1, 7.4.5.1, 7.5.2, 7.5.3, 8.2, 10.1.2, 10.1.3, 10.3.3, 10.3.5, 10.4.2, 10.4.3, 10.4.4, 10.4.7, 10.5.2, 10.6

Other specs affected:	⌘	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>Y</td><td>N</td></tr><tr><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr></table>	Y	N	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Other core specifications	⌘
		Y	N							
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>									
<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr></table>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Test specifications					
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>									
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<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr></table>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	O&M Specifications							
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>									

Other comments: ⌘

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at <http://www.3gpp.org/specs/CR.htm>. Below is a brief summary:

- 1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <ftp://ftp.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

Proposed change

6.2 Registration signalling: user not registered

Figure 6.2-1 shows the registration signalling flow for the scenario when the user is not registered. For the purpose of this registration signalling flow, the subscriber is considered to be roaming. This flow also shows the authentication of the private user identity. In this signalling flow, the home network does not have network configuration hiding active.

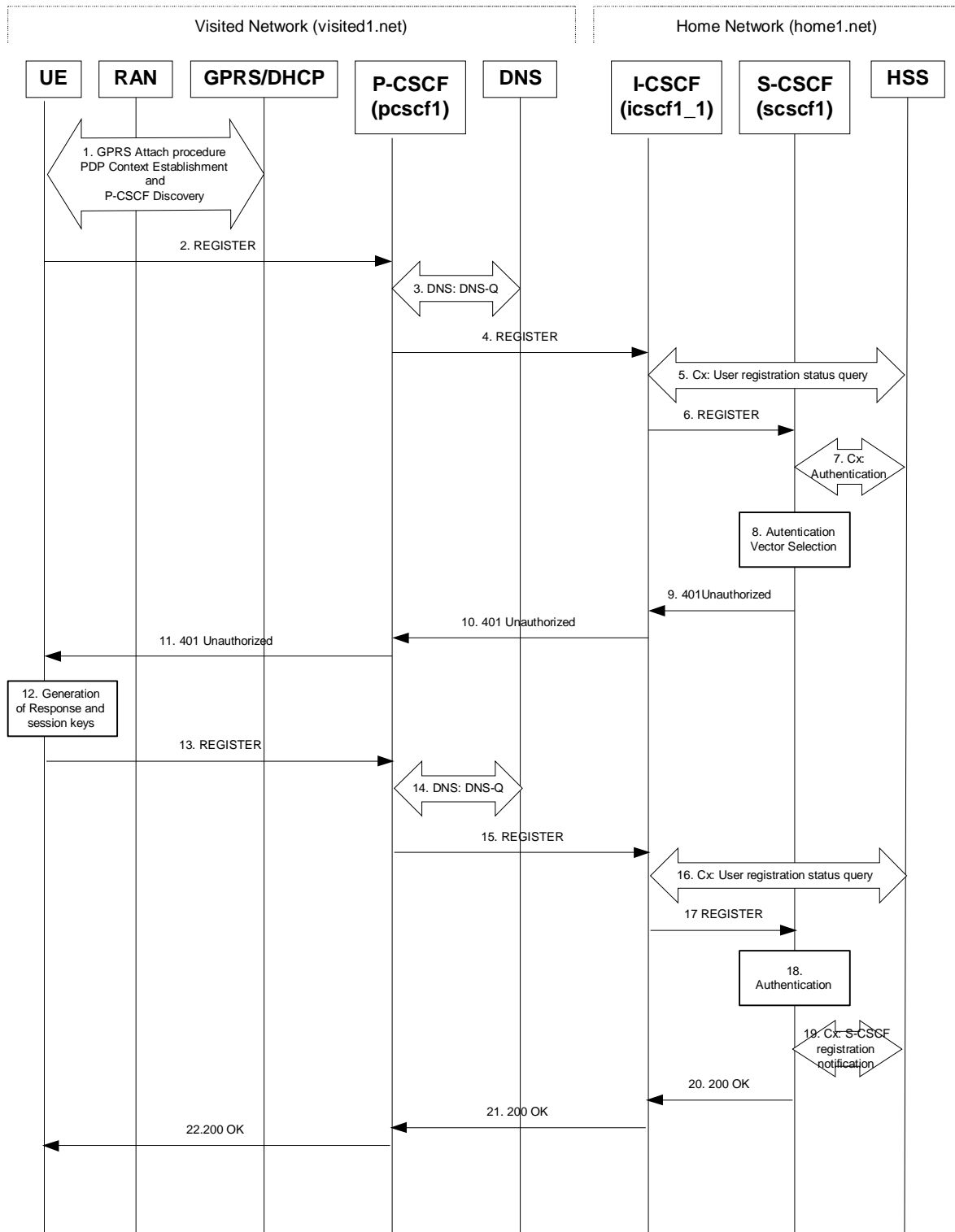


Figure 6.2-1: Registration signalling: user not registered

Material not shown.

2. REGISTER request (UE to P-CSCF) – see example in table 6.2-2

The purpose of this request is to register the user's SIP URI with a S-CSCF in the home network. This request is routed to the P-CSCF because it is the only SIP server known to the UE.

Table 6.2-2: REGISTER request (UE to P-CSCF)

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd];comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>;tag=4fa3
To: <sip:user1_public1@home1.net>
Contact: <sip:[5555::aaa:bbb:ccc:ddd];comp=sigcomp>;expires=600000
Call-ID: apb03a0s09dkjdfglkj49111
Authorization: Digest username="user1_private@home1.net", realm="registrar.home1.net",
  nonce="", uri="sip:registrar.home1.net", response=""
Security-Client: ipsec-3gpp; alg=hmac-sha-1-96; spi-c=23456789; spi-s=12345678; port-
  c=2468; port-s=1357
Require: sec-agree
Proxy-Require: sec-agree
CSeq: 1 REGISTER
Supported: path
Content-Length: 0
```

Request-URI: The Request-URI (the URI that follows the method name, "REGISTER", in the first line) indicates the destination domain of this REGISTER request. The rules for routing a SIP request describe how to use DNS to resolve this domain name ("registrar.home1.net") into an address or entry point into the home operator's network (the I-CSCF). This information is stored in the USIM.

Via: IPv6 address of the UE allocated during the PDP Context Activation process.

Max-Forwards: Set to 70 by the UE and used to prevent loops.

P-Access-Network-Info: [the UE provides the access-type and access-info, related to the serving access network.](#)

From: This indicates the public user identity originating the REGISTER request. The public user identity may be obtained from the USIM.

To: This indicates the public user identity being registered. This is the identity by which other parties know this subscriber. It may be obtained from the USIM.

Contact: This indicates the point-of-presence for the subscriber - the IP address of the UE. This is the temporary point of contact for the subscriber that is being registered. Subsequent requests destined for this subscriber will be sent to this address. This information is stored in the S-CSCF.

Authorization: It carries authentication information. The private user identity (user1_private@home1.net) is carried in the username field of the Digest AKA protocol. The uri parameter (directive) contains the same value as the Request-URI. The realm parameter (directive) contains the network name where the username is authenticated. The Request-URI and the realm parameter (directive) value are obtained from the same field in the USIM and therefore, are identical. In this example, it is assumed that a new UICC card was just inserted into the terminal, and there is no other cached information to send. Therefore, nonce and response parameters (directives) are empty.

Security-Client: Lists the supported algorithm(s) by the UE.

Supported: This header is included to indicate to the recipient that the UE supports the Path header.

~~P-Access-Network-Info:~~ ~~the UE provides the access-type and access-info, related to the serving access-network as specified in sub-clause "Additional coding rules for P-Access-Network-Info-header", in 3GPP TS 24.229 [16].~~

Upon receiving this request the P-CSCF will set its SIP registration timer for this UE to the Expires time in this request.

Material not shown.

4. REGISTER request (P-CSCF to I-CSCF) - see example in table 6.2-4

The P-CSCF needs to be in the path for all mobile terminated requests for this user. To ensure this, the P-CSCF adds itself to the Path header value for future requests.

The P-CSCF binds the public user identity under registration to the Contact header supplied by the user.

The P-CSCF adds also the P-Visited-Network-ID header with the contents of the identifier of the P-CSCF network. This may be the visited network domain name or any other identifier that identifies the visited network at the home network.

This signalling flow shows the REGISTER request being forward from the P-CSCF to the I-CSCF in the home domain.

The P-CSCF removes the Security-Client header and associated "sec-agree" option-tags prior to forwarding the request. As the Proxy-Require header is empty, it removes this header completely.

Table 6.2-4: REGISTER request (P-CSCF to I-CSCF)

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd];comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info:
Path: <sip:term@pcscf1.visited1.net;lr>
Require: path
P-Visited-Network-ID: "Visited Network Number 1"
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAfrbHLso=023551024"
From:
To:
Contact:
Call-ID:
Authorization: Digest username="user1_private@home1.net", realm="registrar.home1.net",
nonce="", uri="sip:registrar.home1.net", response="", integrity-protected="no"
CSeq:
Supported:
Content-Length:
```

Path: This is the address of the P-CSCF and is included to inform the S-CSCF where to route terminating requests.

Require: This header is included to ensure that the recipient correctly handles the Path header. If the recipient does not support the path header, a response will be received with a status code of 420 and an Unsupported header indicating "path". Such a response indicates a misconfiguration of the routing tables and the request has been routed outside the IM CN subsystem.

P-Visited-Network-ID: It contains the identifier of the P-CSCF network at the home network.

~~**P-Access-Network-Info:** this header contains information from the UE.~~

P-Charging-Vector: The P-CSCF inserts this header and populates the icid parameters with a globally unique value.

Material not shown.

6. REGISTER request (I-CSCF to S-CSCF) – see example in table 6.2-6

I-CSCF does not modify the Path header.

This signalling flow forwards the REGISTER request from the I-CSCF to the S-CSCF selected.

Table 6.2-6: REGISTER request (I-CSCF to S-CSCF)

```

REGISTER sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd];comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
P-Access-Network-Info:
Path:
Require:
P-Visited-Network-ID:
P-Charging-Vector:
From:
To:
Contact:
Call-ID:
Authorization:
CSeq:
Supported:
Content-Length:

```

P-Access-Network-Info: [this header contains information from the UE.](#)

Path: The S-CSCF stores the contents of the Path header and uses the URI for routing mobile terminated requests.

Upon receiving this request the S-CSCF may set its SIP registration timer for this UE to the Expires time in this request or the S-CSCF may assign another registration timer for this registration

Remainder of subclause not shown.

Proposed change

6.3 Registration signalling: reregistration - user currently registered

For the purpose of the reregistration signalling flow shown in figure 6.3-1, the subscriber is considered to be roaming. The HSS information indicates that the subscriber is registered and authenticated, and that the S-CSCF has been allocated to this subscriber. In this signalling flow, the home network does not have network configuration hiding active. This flow also shows the authentication of the private user identity.

This signalling flow assumes:

1. That the same PDP Context allocated during the initial registration scenario is still used for reregistration. For the case when the UE does not still have an active PDP context then PDP context procedures from subclause 16.2 is completed first.
2. The DHCP procedure employed for P-CSCF discovery is not needed.
3. The S-CSCF selection procedure invoked by the I-CSCF is not needed.

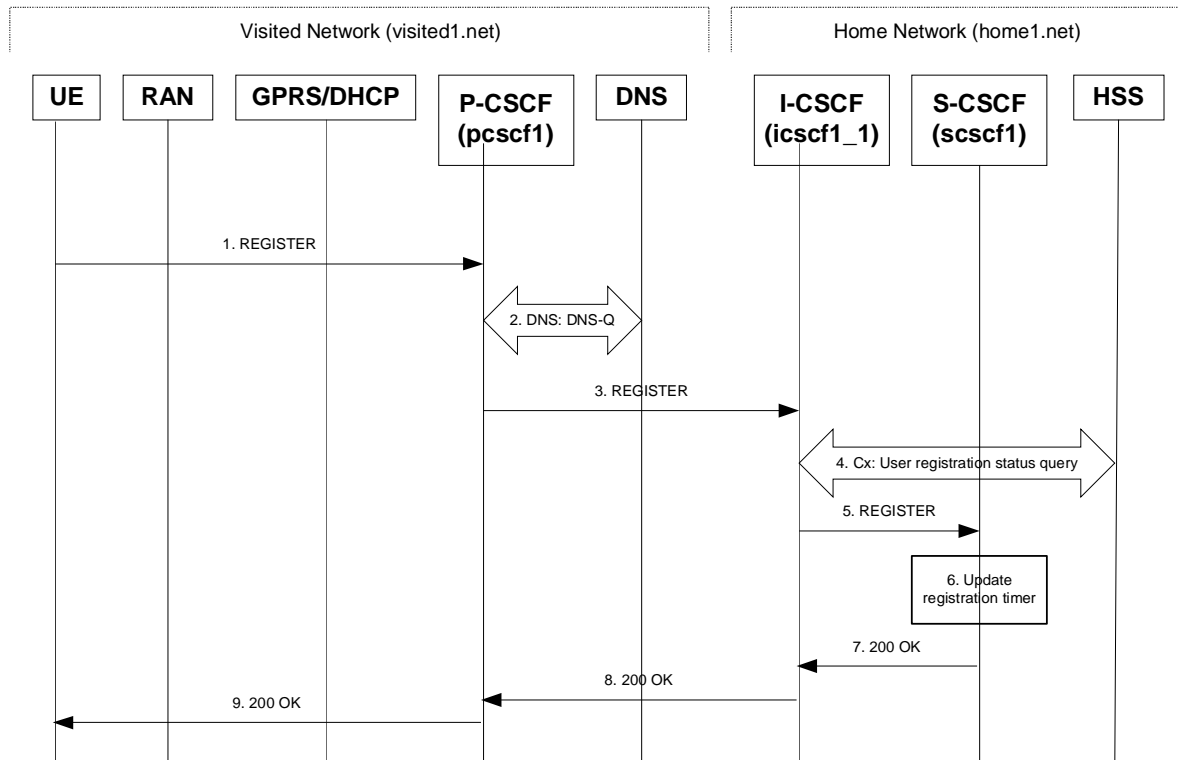


Figure 6.3-1: Reregistration when UE roaming

1. REGISTER request (UE to P-CSCF) - see example in table 6.3-1

The registration expires in the UE. The UE reregisters by sending a new REGISTER request. This request is sent to the same P-CSCF with which the UE initially registered.

Table 6.3-1: REGISTER request (UE to P-CSCF)

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>;tag=4fa3
To: <sip:user1_public1@home1.net>
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>;expires=600000
Call-ID: apb03a0s09dkjdfglkj49111
Authorization: Digest username="user1_private@home1.net", realm="registrar.home1.net",
    nonce=base64(RAND + AUTN + server specific data), algorithm=AKAv1-MD5,
    uri="sip:registrar.home1.net", response="6629fae49393a05397450978507c4ef1", integrity-
    protected="yes"
Security-Client: ipsec-3gpp; alg= hmac-sha-1-96; spi-c=23456789; spi-s=12345678; port-
    c=2468; port-s=1357
Require: sec-agree
Proxy-Require: sec-agree
CSeq: 3 REGISTER
Supported: path
Content-Length: 0
```

The header field usage is the same as for the initial registration scenario:

P-Access-Network-Info: [the UE provides the access-type and access-info, related to the serving access network.](#)

From: This indicates the public user identity originating the REGISTER request. The public user identity may be obtained from the USIM.

To: This indicates public user identity being registered. This is the identity by which other parties know this subscriber.

Contact: This indicates the point-of-presence for the subscriber – the IP address of the UE. This is the temporary identifier for the subscriber that is being registered. Subsequent requests destined for this subscriber will be sent to this address. This information is stored in the S-CSCF.

Authorization: It carries authentication information. The private user identity (user1_private@home1.net) is carried in the username field of the Digest AKA protocol. As this is a re-registration process, the cached information (realm, nonce, algorithm, uri, response) is also sent.

NOTE 1: The actual nonce value in the WWW-Authenticate header field is encoded in base64, and it may look like: nonce="A34Cm+Fva37UYWpGNB34JP"

Security-Client: Lists the supported algorithm(s) by the UE. The values spi-c, spi-s, port-c and port-s are new parameter values and will not be used for security association setup in case the request is answered with 200 (OK).

Request-URI: The Request-URI (the URI that follows the method name, "REGISTER", in the first line) indicates the destination domain of this REGISTER request. The rules for routing a SIP request describe how to use DNS to resolve this domain name ("home1.net") into an address or entry point into the home operator's network (the I-CSCF). This information is stored in the USIM.

Supported: This header is included to indicate to the recipient that the UE supports the Path header.

Upon receiving this request the P-CSCF will detect that it already has a registration record for this UE and will reset its SIP registration timer for this UE to the Expires time in this request.

Material not included

5. REGISTER request (I-CSCF to S-CSCF) - see example in table 6.3-5

This signalling flow forwards the REGISTER request from the I-CSCF to the S-CSCF selected. The Request-URI is changed to the address of the S-CSCF.

Table 6.3-5: REGISTER request (I-CSCF to S-CSCF)

```
REGISTER sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555:aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
Max-Forwards: 68
Path:
Require:
P-Visited-Network-ID:
P-Charging-Vector:
From:
To:
Contact:
Call-ID:
Authorization:
CSeq:
Supported:
Content-Length:
```

P-Access-Network-Info: This header contains information from the UE.

Path: The S-CSCF stores the contents of the Path header and uses this URI for routing mobile terminated requests.

P-Visited-Network-ID: It contains the identifier of the P-CSCF network at the home network.

Upon receiving this request the S-CSCF will detect that it already has a registration record for this UE and will reset its SIP registration timer for this UE to the Expires time in this request.

Remainder of subclause not shown.

Proposed change

6.5 UE subscription for the registration state event package

This subclause describes the subscription procedure for the registration state event, whereby the UE requests to be notified by the S-CSCF when the event has occurred. This is done using the information structure as indicated in 3GPP TS 24.229 [16].

It is assumed that the user has registered prior to initiating subscription of an event. Also, the subscriber is considered to be roaming and the home network operator does not desire to keep its internal configuration hidden from the visited network. For this example the trigger point at the P-CSCF for sending out the SUBSCRIBE request is the 200 (OK) response of the user's registration.

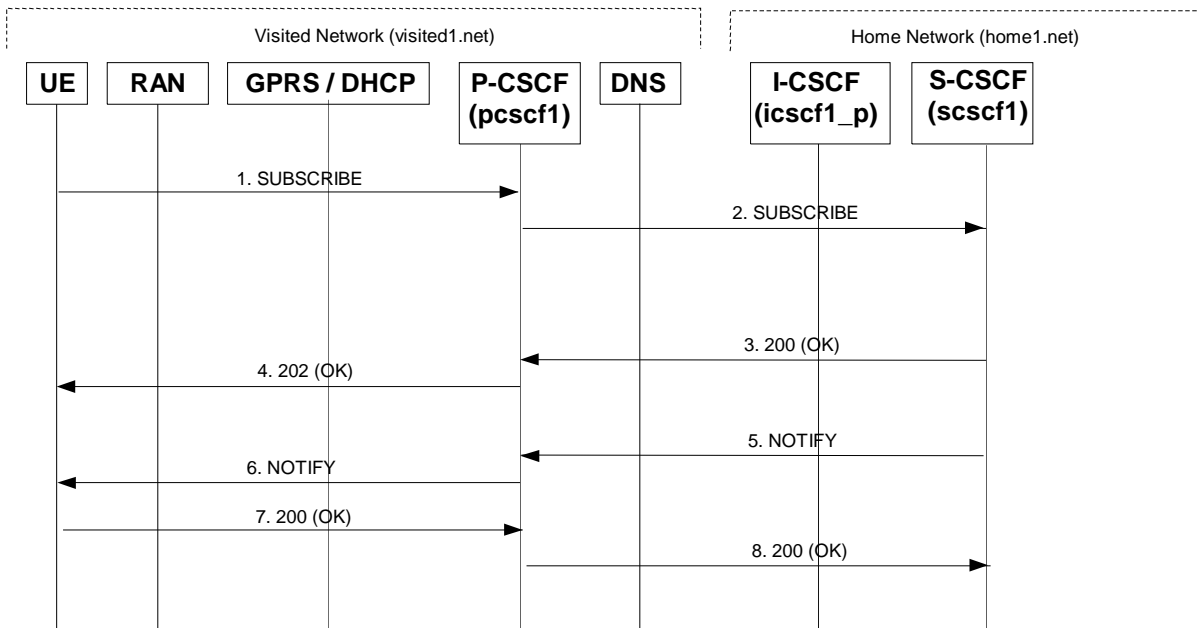


Figure 6.5-1: UE subscription for the registration state event package (without I-CSCF providing configuration independence)

1. SUBSCRIBE request (UE to P-CSCF) - see example in table 6.5-1

The UE sends the SUBSCRIBE request for the reg event package.

Table 6.5-1: SUBSCRIBE request (UE to P-CSCF)

```

SUBSCRIBE sip:user1_public1@home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:orig@scscf1.home1.net;lr>
P-Preferred-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From: <sip:user1_public1@home1.net>;tag=31415
To: <sip:user1_public@home1.net>
Call-ID: b89rjhnedlrfjflslj40a222
Require: sec-agree
Proxy-Require: sec-agree
CSeq: 61 SUBSCRIBE
Event: reg
Expires: 600000
Accept: application/reginfo+xml
Security-Verify: ipsec-3gpp; q=0.1; alg= hmac-sha-1-96; spi-c=98765432; spi-s=87654321;
port-c=8642; port-s=7531
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Length: 0
    
```

- From:** The user does not require privacy, the From header contains the value requested by the user.
- Privacy:** The user does not require privacy, therefore the Privacy header is set to the value "none" as specified in RFC 3323 [13].
- Route:** contains the P-CSCF address learnt during P-CSCF discovery, plus the elements from the Service-Route header from registration. The P-CSCF URI contains the port number learnt during the security agreement negotiation.

P-Preferred-Identity: The user provides a hint about the identity to be used for this dialog.

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network ~~as specified in sub-clause "Additional coding rules for P-Access-Network-Info header", in 3GPP TS 24.229 [16].~~

Event: This field is populated with the value "reg" to specify the use of the registration state package.

Accept: This field is populated with the value "application/reginfo+xml".

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

2. SUBSCRIBE request (P-CSCF to S-CSCF) - see example in table 6.5-2

The SUBSCRIBE request is forwarded to the S-CSCF.

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Require and Proxy-Require headers are empty, it removes these headers completely.

Table 6.5-2: SUBSCRIBE request (P-CSCF to S-CSCF)

```
SUBSCRIBE sip:user1_public1@home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd].1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:orig@scscf1.home1.net;lr>
Record-Route: <sip:pcscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"
Privacy:
From:
To:
Call-ID:
CSeq:
Event:
Expires:
Accept:
Contact:
Content-Length:
```

P-Asserted-Identity: P-CSCF inserts the SIP URI in the P-Asserted-Identity header field and it also removes P-Preferred-Identity header field.

P-Access-Network-Info: [This header contains information from the UE.](#)

P-Charging-Vector: The P-CSCF inserts this header and populates the icid parameters with a globally unique value.

Material not shown.

Proposed change

6.7.1 Network-initiated deregistration event occurs in the S-CSCF

Figure 6.7.1-1 assumes that the UE and the P-CSCF both have subscribed for the user's registration state event package according to subclause 6.5 and shows how the UE and the P-CSCF are notified when the network-initiated deregistration event occurs in the S-CSCF.

Also, it is assumed that the home network does not have network configuration hiding active.

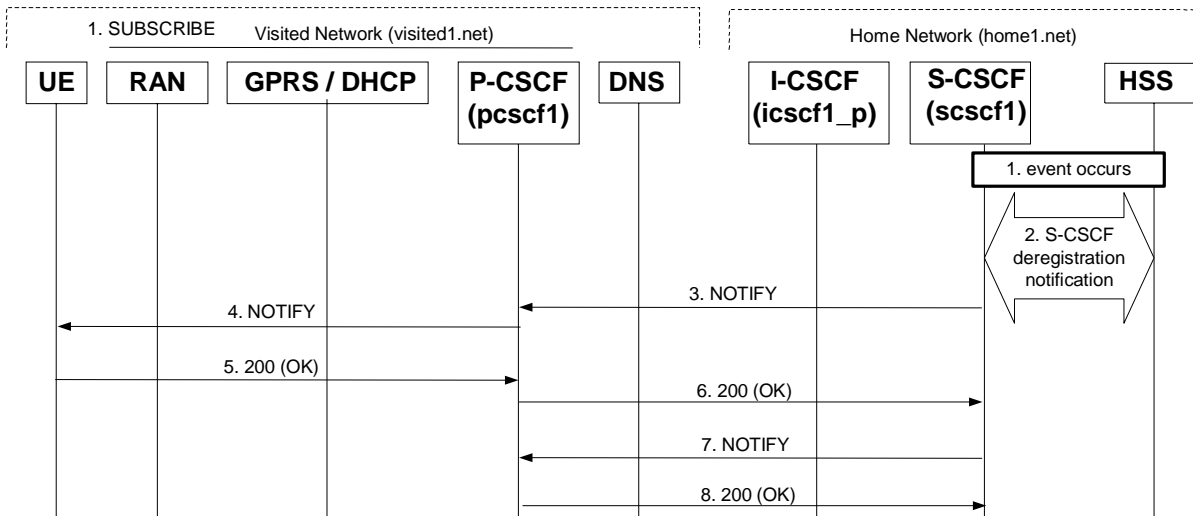


Figure 6.7.1-1: Network Initiated Deregistration event occurs in the S-CSCF

Material not shown.

5. **200 (OK) response (UE to P-CSCF)** - see example in table 6.7.1-5

Table 6.7.1-5: SIP 200 (OK) response (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net:7531;comp=sigcomp;branch=z9hG4bK240f34.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network.

6. **SIP 200 (OK) response (P-CSCF to S-CSCF)** - see example in table 6.7.1-6

Table 6.7.1-6: SIP 200 (OK) response (P-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Length:
```

P-Access-Network-Info: This header contains information from the UE.

Remainder of subclause not shown.

Proposed change

6.7.2 Network-initiated deregistration event occurs in the HSS

Figure 6.7.2-1 assumes that the UE and the P-CSCF both have subscribed for the user's registration state event package according to subclause 6.5 and shows how the UE and the P-CSCF are notified when the Network Initiated Deregistration event occurs in the HSS.

Also, it is assumed that the home network does not have network configuration hiding active.

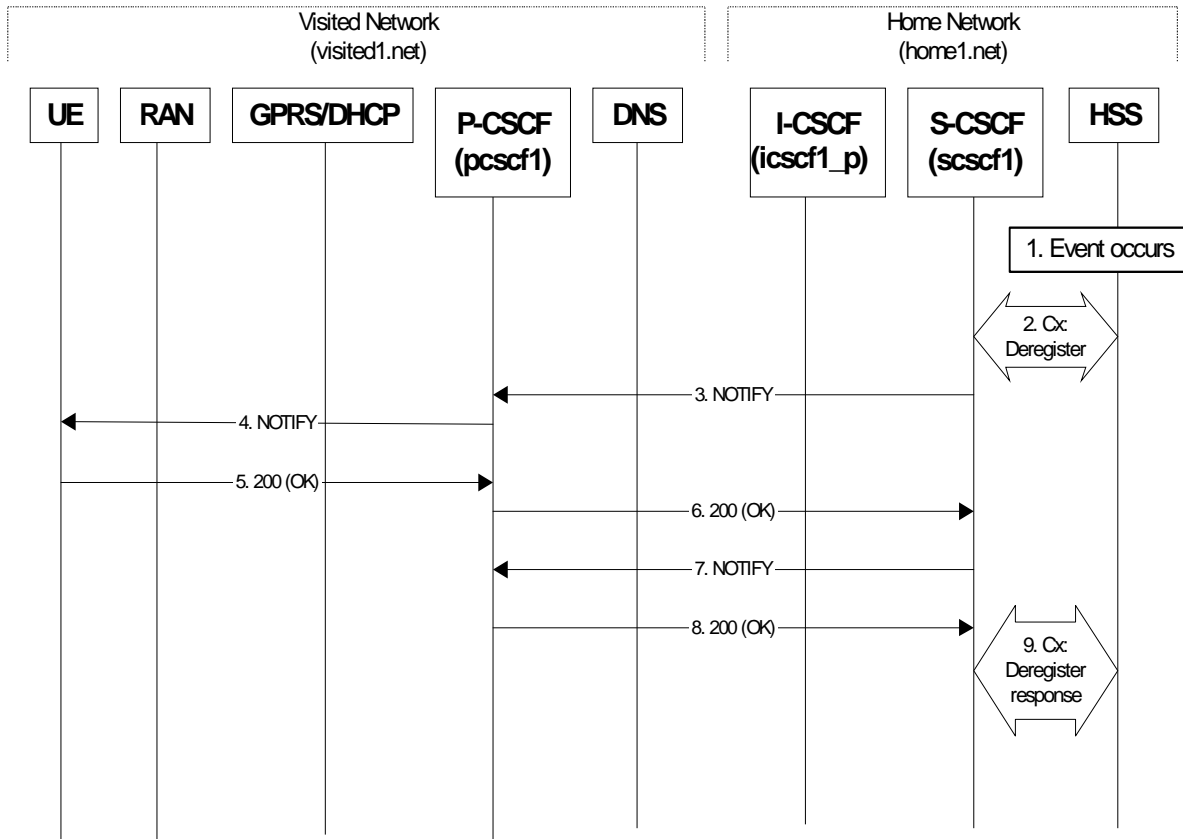


Figure 6.7.2-1: Network-initiated deregistration event occurs in the HSS

Material not shown.

5. SIP 200 (OK) response (UE to P-CSCF) - see example in table 6.7.2-5

Table 6.7.2-5: SIP 200 (OK) response (UE to P-CSCF)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net:7531;comp=sigcomp;branch=z9hG4bK240f34.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Length: 0
    
```

[P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network.](#)

6. SIP 200 (OK) response (P-CSCF to S-CSCF) - see example in table 6.7.2-6

Table 6.7.2-6: SIP 200 (OK) response (P-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Length:
```

[P-Access-Network-Info: This header contains information from the UE.](#)

Remainder of subclause not shown.

Proposed change

6.8 Network initiated re-authentication

This subclause describes the notification of a UE that occurs when the S-CSCF assigned to that user requests re-authentication.

It is assumed that user has registered and also subscribed to the registration state event before. Also, the subscriber is considered to be roaming and the home network operator does not desire to keep its internal configuration hidden from the visited network.

After this procedure the user's UE might automatically initiate re-registration procedures. If the user fails to re-register, the public user identity for which re-authentication is requested, the public user identity may be deregistered by S-CSCF.

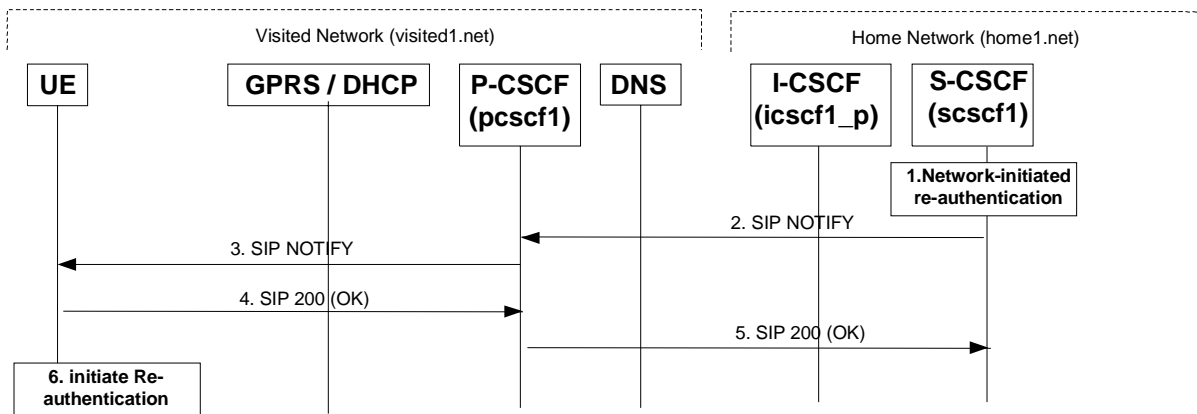


Figure 6.8-1: S-CSCF informs UE about network-initiated re-authentication event (without I-CSCF providing configuration independence)

Material not included.

4. SIP 200 (OK) response (UE to P-CSCF) - see example in table 6.8-4

The UE generates a 200 (OK) response to the NOTIFY request.

Table 6.8-4: SIP 200 (OK) response (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net:7531;comp=sigcomp;branch=z9hG4bK240f34.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network.

5. SIP 200 (OK) response (P-CSCF to S-CSCF) - see example in table 6.8-5

P-CSCF forwards the 200 (OK) response to the S-CSCF.

Table 6.8-5: SIP 200 (OK) response (P-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Length:
```

P-Access-Network-Info: This header contains information from the UE.

Material in remainder of subclause not shown.

Proposed change

7.2.2.1 (MO#1a) Mobile origination, roaming (S-S#1a, MT#1a assumed)

Figure 7.2.2.1-1 shows an origination procedure which applies to roaming subscribers when the home network operator does not desire to keep its internal configuration hidden from the visited network. The UE is located in a visited network, and determines the P-CSCF via the CSCF discovery procedure. During registration, the home network allocates a S-CSCF. The home network provides the S-CSCF name/address as the entry point from the visited network.

When registration is complete, P-CSCF knows the name/address of the S-CSCF.

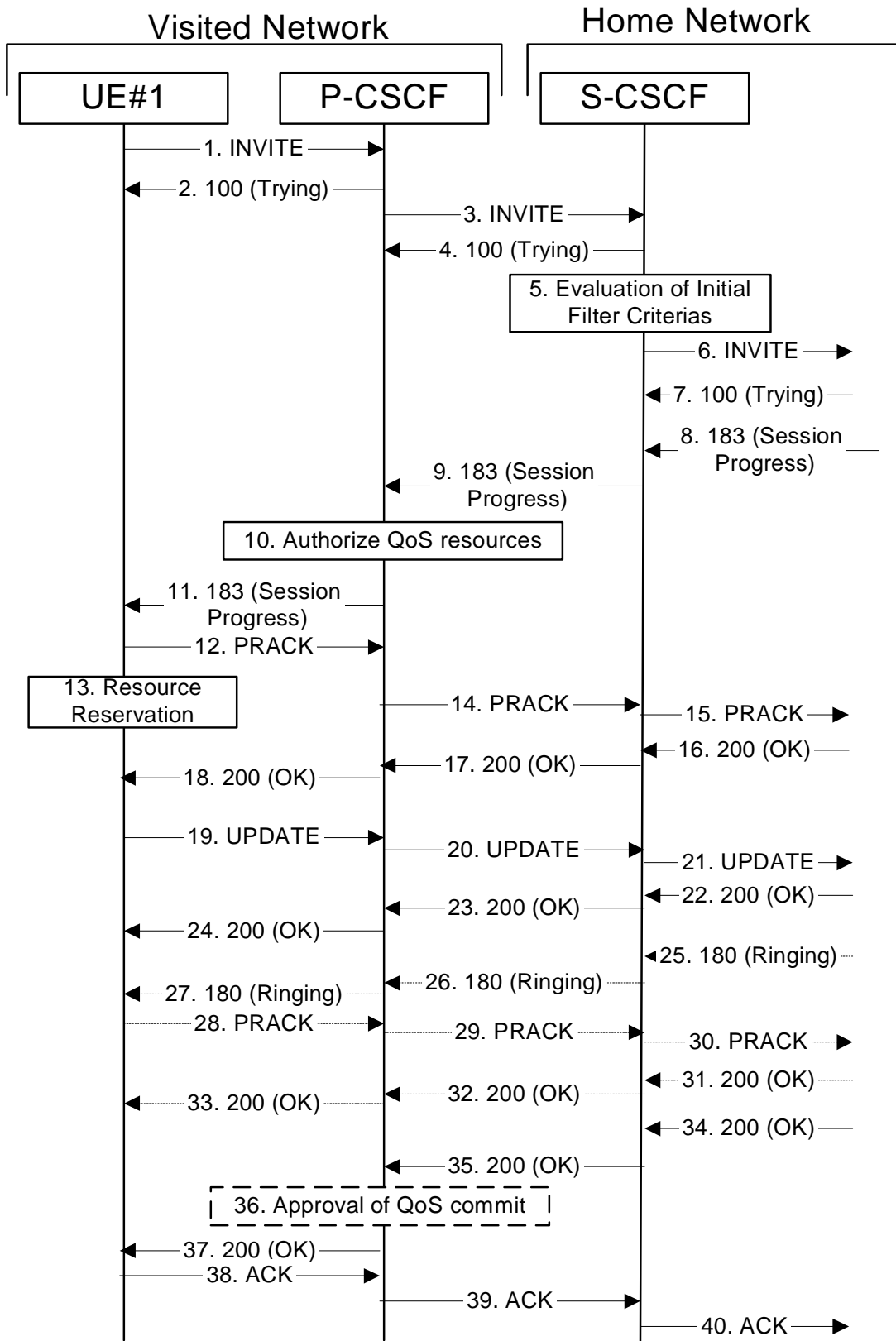


Figure 7.2.2.1-1: MO#1a

Procedure MO#1a is as follows:

1. INVITE (UE to P-CSCF) - see example in table 7.2.2.1-1

UE#1 determines the complete set of codecs that it is capable of supporting for this session. It builds a SDP containing bandwidth requirements and characteristics of each, and assigns local port numbers for each possible media flow. Multiple media flows may be offered, and for each media flow (m= line in SDP), there may be multiple codec choices offered.

For this example, it is assumed that UE#1 is willing to establish a multimedia session comprising a video stream and an audio stream. The video stream supports two codecs, either H.263 or MPEG-4 Visual. The audio stream supports the AMR codec.

UE sends the INVITE request, containing an initial SDP, to the P-CSCF determined via the CSCF discovery mechanism. The initial SDP may represent one or more media for a multimedia session.

Table 7.2.2.1-1: INVITE (UE to P-CSCF)

```

INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
P-Preferred-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: precondition, sec-agree
Proxy-Require: sec-agree
Supported: 100rel
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321;
port-c=8642; port-s=7531
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event

```

Request-URI: contains the international E.164 number from the user.

Via: contains the IP address or FQDN of the originating UE.

Route: contains the P-CSCF address learnt during P-CSCF discovery, plus the elements from the Service-Route header from registration. The P-CSCF URI contains the port number learnt during the security agreement negotiation

Privacy: the user does not require privacy, therefore the Privacy header is set to the value “none” as specified in RFC 3325 [17] and RFC 3323 [13].

P-Preferred-Identity: the user provides a hint about the identity to be used for this session.

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network ~~as specified in sub-clause 'Additional coding rules for P-Access-Network-Info-header', in 3GPP TS 24.229 [16].~~

From: the user does not require privacy, the From header contains the value requested by the user.

Cseq: is a random starting number.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

Contact: is a SIP URI that contains the IP address or FQDN of the originating UE.

SDP The SDP contains a set of codecs supported by UE#1 and desired by the user at UE#1 for this session.

Upon receiving the INVITE, the P-CSCF stores the following information about this session, for use in possible error recovery actions - see example in table 7.2.2.1-1b.

Table 7.2.2.1-1b: Storage of information at P-CSCF

```
Request-URI: tel:+1-212-555-2222
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfgklkj490333
Cseq(2dest): 127 INVITE
Cseq(2orig): none
Route(2dest): <sip:scscf1.home1.net;lr>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
```

Material not included.

12. PRACK (UE to P-CSCF) - see example in table 7.2.2.1-12

UE#1 determines which media flows should be used for this session, and which codecs should be used for each of those media flows. If there was any change in media flows, or if there was more than one choice of codec for a media flow, then UE#1 includes a new SDP offer in the PRACK message sent to UE#2.

For this example, assume UE#1 chooses H.263 as the codec to use for the single video stream. Therefore, UE#1 sends a new SDP offer in the PRACK request.

Table 7.2.2.1-12: PRACK (UE to P-CSCF)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>,
<sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfgklkj490333
Cseq: 128 PRACK
Require: precondition, sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321;
port-c=8642; port-s=7531
RAck: 9021 127 INVITE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933616 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event

```

Request-URI: takes the value of the Contact header of the received 183 Session Progress response.

Via: takes the value of either the IP address or FQDN of the originating UE.

~~**P-Access-Network-Info:** the UE provides the access type and access info, related to the serving access network as specified in sub-clause 'Additional coding rules for P access network info header', in 3GPP TS 24.229 [16].~~

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.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

Material not included.

14. PRACK (P-CSCF to S-CSCF) – see example in table 7.2.2.1-14

The P-CSCF forwards the PRACK request to S-CSCF.

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Proxy-Require header is empty, it removes this header completely.

Table 7.2.2.1-14: PRACK (P-CSCF to S-CSCF)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscfl.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info:
Route: <sip:scscfl.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq:
Require: precondition
RAck:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=

```

~~**P-Access-Network-Info:** this header contains information from the UE.~~

Material not included.

19. UPDATE (UE to P-CSCF) – see example in table 7.2.2.1-19

When the resource reservation is completed, UE sends the UPDATE request to the terminating endpoint, via the signalling path established by the INVITE request.

Table 7.2.2.1-19: UPDATE (UE to P-CSCF)

```

UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>,
<sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfgklkj490333
Cseq: 129 UPDATE
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321;
port-c=8642; port-s=7531
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933617 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event

```

Request-URI: takes the value of the Contact header of the received 183 Session Progress response.

Via: takes the value of either the IP address or FQDN of the originating UE.

P-Access-Network-Info: ~~the UE provides the access type and access info, related to the serving access network as specified in sub-clause 'Additional coding rules for P-access network info-header', in 3GPP TS 24.229 [16].~~

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.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

The SDP indicates that the resource reservation was successful in the local segment.

20. UPDATE (P-CSCF to S-CSCF) – see example in table 7.2.2.1-20

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Require and Proxy-Require headers are empty, it removes these headers completely.

P-CSCF forwards the UPDATE request to S-CSCF.

Table 7.2.2.1-20: UPDATE (P-CSCF to S-CSCF)

```

UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024";
    ggsn=[5555::4b4:3c3:2d2:1e1]; pdp-sig=no; gcid=723084371; auth-token=43876559; flow-
    id=3
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=

```

~~P-Access-Network-Info: this header contains information from the UE.~~

P-Charging-Vector: The P-CSCF added the GPRS access network information to this header, which is removed and stored by the S-CSCF.

Upon receiving the UPDATE, the S-CSCF stores the following information about this session, for use in charging - see example in table 7.2.2.1-20b.

Table 7.2.2.1-20b: Storage of information at S-CSCF

```

Request-URI: tel:+1-212-555-2222
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq(2dest): 127 INVITE
Cseq(2orig): none
Route(2orig): <sip:pcscf1.visited1.net;lr>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Contact(dest): <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>

```

Material not included.

28. PRACK (UE to P-CSCF) – see example in table 7.2.2.1-28

The UE indicates to the originating subscriber that the destination is ringing. It responds to the 180 (Ringing) provisional response (28) with a PRACK request.

Table 7.2.2.1-28: PRACK (UE to P-CSCF)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>,
<sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg= hmac-sha-1-96; spi-c=98765432; spi-s=87654321;
port-c=8642; port-s=7531
Cseq: 130 PRACK
RAck: 9022 127 INVITE
Content-Length: 0

```

Request-URI: takes the value of the Contact header of the received 180 Ringing response.

Via: takes the value of either the IP address or FQDN of the originating UE.

~~**P-Access-Network-Info:** the UE provides the access type and access info, related to the serving access network as specified in sub-clause 'Additional coding rules for P access network info header', in 3GPP TS 24.229 [16].~~

From:/To:/Call-ID: copied from the 180 Ringing response so that they include any revised tag parameters.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

Cseq: takes a higher value than in the previous request.

29. PRACK (P-CSCF to S-CSCF) – see example in table 7.2.2.1-29

The P-CSCF forwards the PRACK request to S-CSCF.

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Require and Proxy-Require headers are empty, it removes these headers completely.

Table 7.2.2.1-29: PRACK (P-CSCF to S-CSCF)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info:
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:

```

~~**P-Access-Network-Info:** this header contains information from the UE.~~

Material not included.

38. ACK (UE to P-CSCF) – see example in table 7.2.2.1-38

The UE starts the media flow for this session, and responds to the 200 (OK) response (37) with an ACK request sent to the P-CSCF.

Table 7.2.2.1-38: ACK (UE to P-CSCF)

```

ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>,
      <sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 127 ACK
Content-Length: 0

```

~~**P-Access-Network-Info:** the UE provides the access type and access info, related to the serving access network as specified in sub-clause "Additional coding rules for P-access-network-info-header", in 3GPP TS 24.229 [16].~~

Cseq: is required to be the same value as Cseq contained in original INVITE request [3].

39. ACK (P-CSCF to S-CSCF) – see example in table 7.2.2.1-39

The P-CSCF forwards the ACK request to the S-CSCF.

Table 7.2.2.1-39: ACK (P-CSCF to S-CSCF)

```

ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
      [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info:
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:

```

~~**P-Access-Network-Info:** this header contains information from the UE.~~

Material in remainder of subclause not shown.

Proposed change

7.2.3.1 (MO#2) Mobile origination, located in home network (S-S#2, MT#2 assumed)

Figure 7.2.3.1-1 shows an origination procedure which applies to subscribers located in their home service area.

The UE is located in the home network, and determines the P-CSCF via the CSCF discovery procedure. During registration, the home network allocates an S-CSCF in the home network.

When registration is complete, the P-CSCF knows the name/address of S-CSCF.

NOTE: Although S-S#2 flow is assumed, home2.net is used in the Record-Route and Route headers in order to be more generic and clearly identify the originating and terminating nodes. In the S-S#2 scenario home2.net = home1.net.

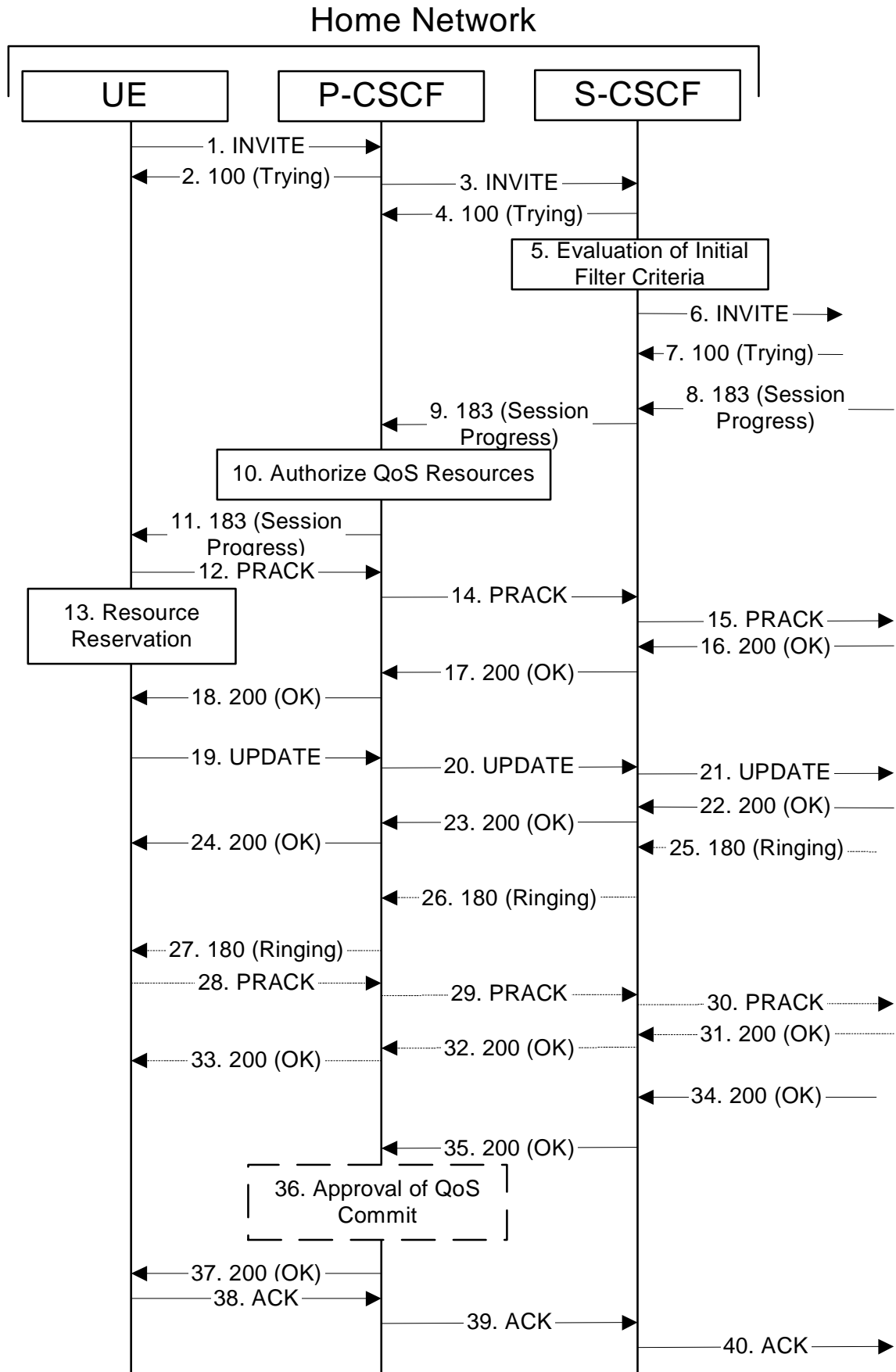


Figure 7.2.3.1-1: MO#2

Procedure MO#2 is as follows:

1. INVITE (UE to P-CSCF) - see example in table 7.2.3.1-1

UE#1 determines the complete set of codecs that it is capable of supporting for this session. It builds a SDP containing bandwidth requirements and characteristics of each, and assigns local port numbers for each possible media flow. Multiple media flows may be offered, and for each media flow (m= line in SDP), there may be multiple codec choices offered.

For this example, it is assumed that UE#1 is willing to establish a multimedia session comprising a video stream and an audio stream. The video stream supports two codecs, either H.263 or MPEG-4 Visual. The audio stream supports the AMR codec.

UE sends the INVITE request, containing an initial SDP, to the P-CSCF determined via the CSCF discovery mechanism.

Table 7.2.3.1-1: INVITE (UE to P-CSCF)

```

INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.home1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
P-Preferred-Identity: "John Doe" <tel:+1-212-555-1111>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: precondition, sec-agree
Proxy-Require: sec-agree
Supported: 100rel
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Security-Verify: ipsec-3gpp; q=0.1; alg= hmac-sha-1-96; spi-c=98765432; spi-s=87654321;
    port-c=8642; port-s=7531
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H263
a=rtpmap:99 MP4V-ES
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event

```

Request-URI: Contains the international E.164 number from the user. This is specified by the UE as <tel:E.164_number>. This is in accordance to standard IETF procedures for specifying dialled digits.

Via: contains the IP address or FQDN of the originating UE.

Route: contains the P-CSCF address learnt during P-CSCF discovery, including the port number negotiated during the security agreement, plus the elements from the Service-Route header from registration.

P-Preferred-Identity: The user provides a hint about the identity to be used for this session.

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network.

Cseq: A random starting number.

Contact: is a SIP URI that contains the IP address or FQDN of the originating UE. It also contains the port number where the UE wants to receive protected messages.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

SDP The SDP contains a set of codecs supported by UE#1 and desired by the user at UE#1 for this session.

Upon receiving the INVITE, the P-CSCF stores the following information about this session, for use in possible error recovery actions – see example in table 7.2.3.1-1b:

Table 7.2.3.1-1b: Storage of information at P-CSCF

```
Request-URI: tel:+1-212-555-2222
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq(2dest): 127 INVITE
Cseq(2orig): none
Route(2dest): <sip:scscf1.home1.net;lr>
Contact(orig): <sip:[5555:aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
```

Material not included.

3. INVITE (P-CSCF to S-CSCF) – see example in table 7.2.3.1-3

The P-CSCF adds itself to the Record-Route header and Via header.

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Proxy-Require header is empty, it removes this header completely.

The INVITE request is forwarded to the S-CSCF.

Table 7.2.3.1-3: INVITE (P-CSCF to S-CSCF)

```

INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Record-Route: <sip:pcscf1.home1.net;lr>
Route: <sip:scscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <tel:+1-212-555-1111>
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"
Privacy:
From:
To:
Call-ID:
Cseq:
Require: precondition
Supported:
Contact:
Allow:
Content-Type:
Content-Length: (...)

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=

```

P-Asserted-Identity: P-CSCF inserts the TEL URI in the P-Asserted-Identity header field and it also removes P-Preferred-Identity header field.

P-Access-Network-Info: [This header contains information from the UE.](#)

P-Charging-Vector: The P-CSCF inserts this header and populates the icid parameters with a unique globally value.

Upon receiving the INVITE, the S-CSCF stores the following information about this session, for use in charging or possible error recovery actions – see example in table 7.2.3.1-3b:

Table 7.2.3.1-3b: Storage of information at S-CSCF

```

Request-URI: tel:+1-212-555-2222
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfg1kj490333
CSeq(2dest): 127 INVITE
Cseq(2orig): none
Route(2orig): <sip:pcscf1.home1.net;lr>
Contact (orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>

```

Material not included.

39. ACK (P-CSCF to S-CSCF) – see example in table 7.2.3.1-39

P-CSCF forwards the ACK request to S-CSCF.

Table 7.2.3.1-39: ACK (P-CSCF to S-CSCF)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info: 3GPP-UTRAN-TDD: utran-cell-id-3gpp-234151D0FCE11
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

Material in remainder of subclause not shown.

Proposed change

7.3.2.1 (S-S#1a) Different network operators performing origination and termination (MO#1a, MT#1a assumed)

Figure 7.3.2.1-1 shows a S-CSCF handling session origination (S-CSCF#1), which performs an analysis of the destination address, and determines that it belongs to a subscriber of a different operator. The originating network operator does not desire to keep their configuration hidden, so it forwards the request to a well-known entry point in the destination operator's network, I-CSCF. I-CSCF queries the HSS for current location information, and finds the S-CSCF assigned to the subscriber (S-CSCF#2), and forwards the request to S-CSCF#2. The terminating network operator does not desire to keep their configuration hidden, so the I-CSCF does not insert itself into the signalling path for future exchanges. This example flow does not show Application Server involvement.

Origination sequences that share this common S-CSCF to S-CSCF procedure are:

- MO#1a** Mobile origination, roaming, without a THIG. The "Originating Network" of S-S#1a is therefore a visited network.
- MO#1b** Mobile origination, roaming, with a THIG in home network. The "Originating Network" of S-S#1a is therefore a visited network.
- MO#2** Mobile origination, located in home service area. The "Originating Network" of S-S#1a is therefore the home network.

Termination sequences that share this common S-CSCF to S-CSCF procedure are:

- MT#1a** Mobile termination, roaming, without a THIG. The "Terminating Network" of S-S#1a is a visited network.
- MT#1b** Mobile termination, roaming, with a THIG in home network. The "Terminating Network" of S-S#1a is a visited network.
- MT#2** Mobile termination, located in home service area. The "Terminating Network" of S-S#1a is the home network.

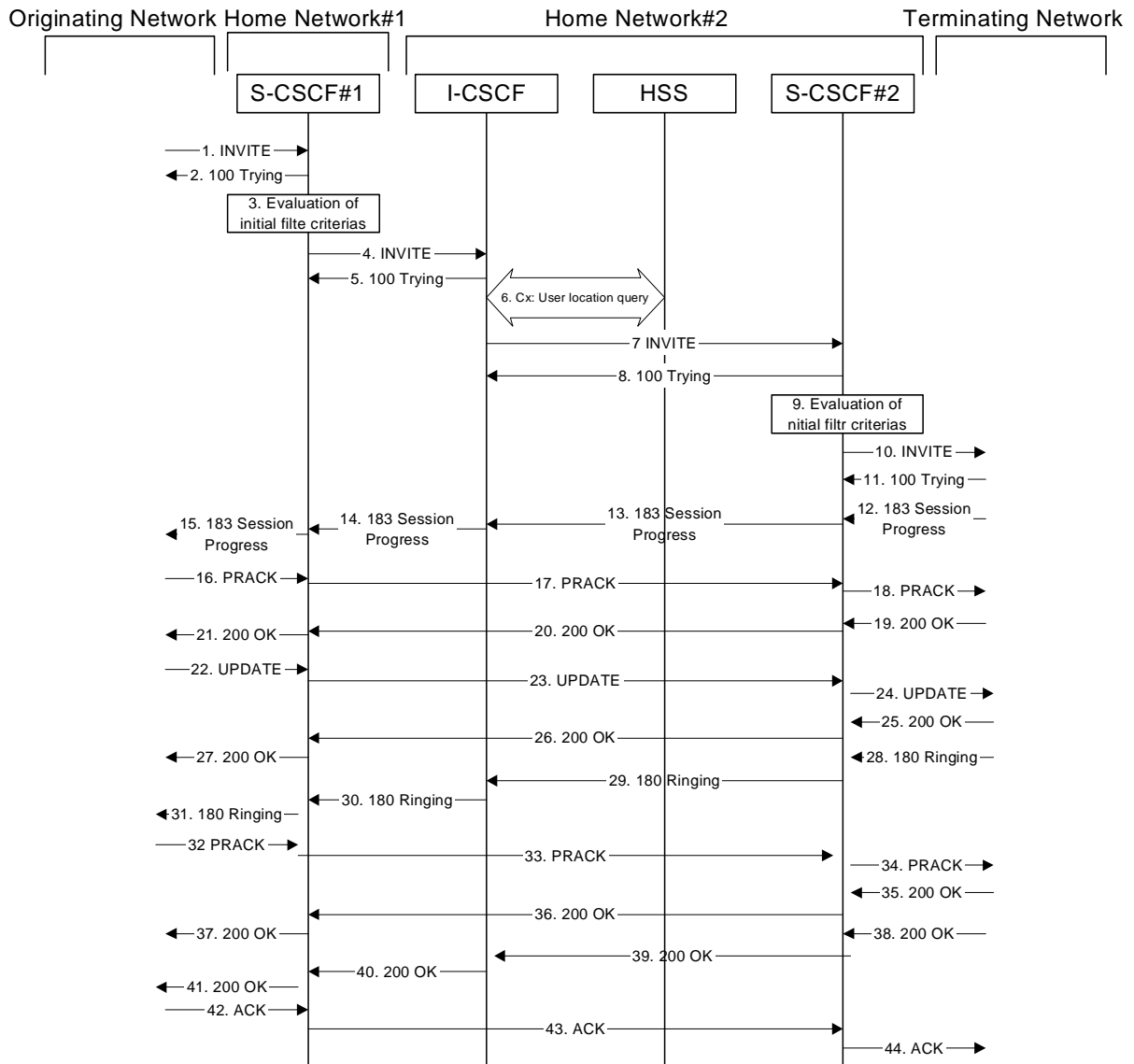


Figure 7.3.2.1-1: S-S#1a

Procedure S-S#1a is as follows:

1. INVITE (MO to S-S#1a) – see example in table 7.3.2.1-1

The INVITE request is sent from the UE to S-CSCF#1 by the procedures of the originating signalling flow.

Table 7.3.2.1-1: INVITE (MO to S-S#1a)

```

INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>
Record-Route: <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfgklkj490333
Cseq: 127 INVITE
Require: precondition
Supported: 100rel
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event

```

Material not included.

12. 183 Session Progress (MT to S-S#1a) – see example in table 7.3.2.1-12 (related to table 7.3.2.1-10)

The media stream capabilities of the destination are returned along the signalling path, in a 183 Session Progress provisional response to the INVITE request (10), as per the termination procedure.

Table 7.3.2.1-12: 183 Session Progress (MT to S-S#1a)

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net;lr>, <sip:scscf2.home2.net;lr>,
<sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
P-Asserted-Identity: "John Smith" <sip:user2_public1@home2.net>
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy: none
From:
To: <tel:+1-212-555-2222>;tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
RSeq: 9021
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933623 2987933623 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:98 H263
a=rtpmap:99 MP4V-ES
a=fmtp:98 profile-level-id=0
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event

```

Material not included.

16. PRACK (MO to S-S#1a) – see example in table 7.3.2.1-16

The originator decides the final set of media streams, and includes this information in the PRACK request sent to S-CSCF#1 by the origination procedures.

Table 7.3.2.1-16: PRACK (MO to S-S#1a)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcsf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:scsf1.home1.net;lr>, <sip:scsf2.home2.net;lr>, <sip:cscf2.visited2.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 128 PRACK
Require: precondition
RAck: 9021 127 INVITE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933616 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtptime:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtptime:96 telephone-event

```

Material not included.

19. 200 OK (MT to S-S#1a) – see example in table 7.3.2.1-19 (related to table 7.3.2.1-18)

The terminating endpoint responds to the PRACK request (18) with a 200 OK response.

Table 7.3.2.1-19: 200 OK (MT to S-S#1a)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933623 2987933624 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event

```

Material not included.

22. UPDATE (MO to S-S#1a) – see example in table 7.3.2.1-22

When the originating endpoint has completed the resource reservation procedures, it sends the UPDATE request to S-CSCF#1 by the origination procedures.

Table 7.3.2.1-22: UPDATE (MO to S-S#1a)

```

UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
 [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024";
 ggsn=[5555::4b4:3c3:2d2:1e1]; pdp-sig=no; gcid=723084371; auth-token=43876559; flow-
 id=3
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 129 UPDATE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933617 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=crr:qos local sendrecv
a=crr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=crr:qos local sendrecv
a=crr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event

```

Material not included.

25. 200 OK (MT to S-S#1a) – see example in table 7.3.2.1-25 (related to table 7.3.2.1-24)

The terminating endpoint responds to the UPDATE request (24) with a 200 OK response.

Table 7.3.2.1-25: 200 OK (MT to S-S#1a)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933623 2987933625 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98
b=AS:75
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtptime:98 H263
a=fmtp:98 profile-level-id=0
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtptime:96 telephone-event

```

Material not included.

28. 180 Ringing (MT to S-S#1a) – see example in table 7.3.2.1-28 (related to table 7.3.2.1-10)

The terminating endpoint may optionally send a 180 Ringing provisional response indicating alerting is in progress. This response is sent by the termination procedure to S-CSCF#2.

Table 7.3.2.1-28: 180 Ringing (MT to S-S#1a)

```

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKKnashds7
Record-Route: <sip:pcscf2.visited2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024";
    ggsn=[5555::d6d:c7c:b8b:a9a]; pdp-sig=no; gcid=309685742; auth-token=86243614; flow-
    id=3
From:
To:
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
RSeq: 9022
Content-Length: 0

```

Material not included.

32. PRACK (MO to S-S#1a) – see example in table 7.3.2.1-32

The originator acknowledges the 180 Ringing provisional response (31) with a PRACK request.

Table 7.3.2.1-32: PRACK (MO to S-S#1a)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfgklkj490333
Cseq: 130 PRACK
RAck: 9022 127 INVITE
Content-Length: 0
```

Material not included.

35. 200 OK (MT to S-S#1a) – see example in table 7.3.2.1-35 (related to table 7.3.2.1-34)

The terminating endpoint responds to the PRACK request (34) with a 200 OK response.

Table 7.3.2.1-35: 200 OK (MT to S-S#1a)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

Material not included.

38. 200 OK (MT to S-S#1a) – see example in table 7.3.2.1-38 (related to table 7.3.2.1-10)

The final response to the INVITE request (10), 200 OK, is sent by the terminating endpoint over the signalling path. This is typically generated when the subscriber has accepted the incoming session attempt. The response is sent to S-CSCF#2 per the termination procedure.

Table 7.3.2.1-38: 200 OK (MT to S-S#1a)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024";
    ggsn=[5555::d6d:c7c:b8b:a9a]; pdp-sig=no; gcid=309685742; auth-token=86243614; flow-
    id=3
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Length: 0
```

Material in remainder of subclause not shown.

Proposed change

7.3.2.2 Termination failure

The subscriber that originated a session with one of the MO procedures had the attempt fail due to an error detected in the termination procedure. This could be due to, for example, destination busy (error code 486), resource failure (error code 580), or some other error.

Depending on the exact error that causes the session initiation failure, and when the error situation was detected, the S-CSCF-to-S-CSCF procedure could be at many different stages in the session establishment procedure. This is shown in figure 7.3.2.2-1, as optional messages 12-38 that may appear in this error procedure.

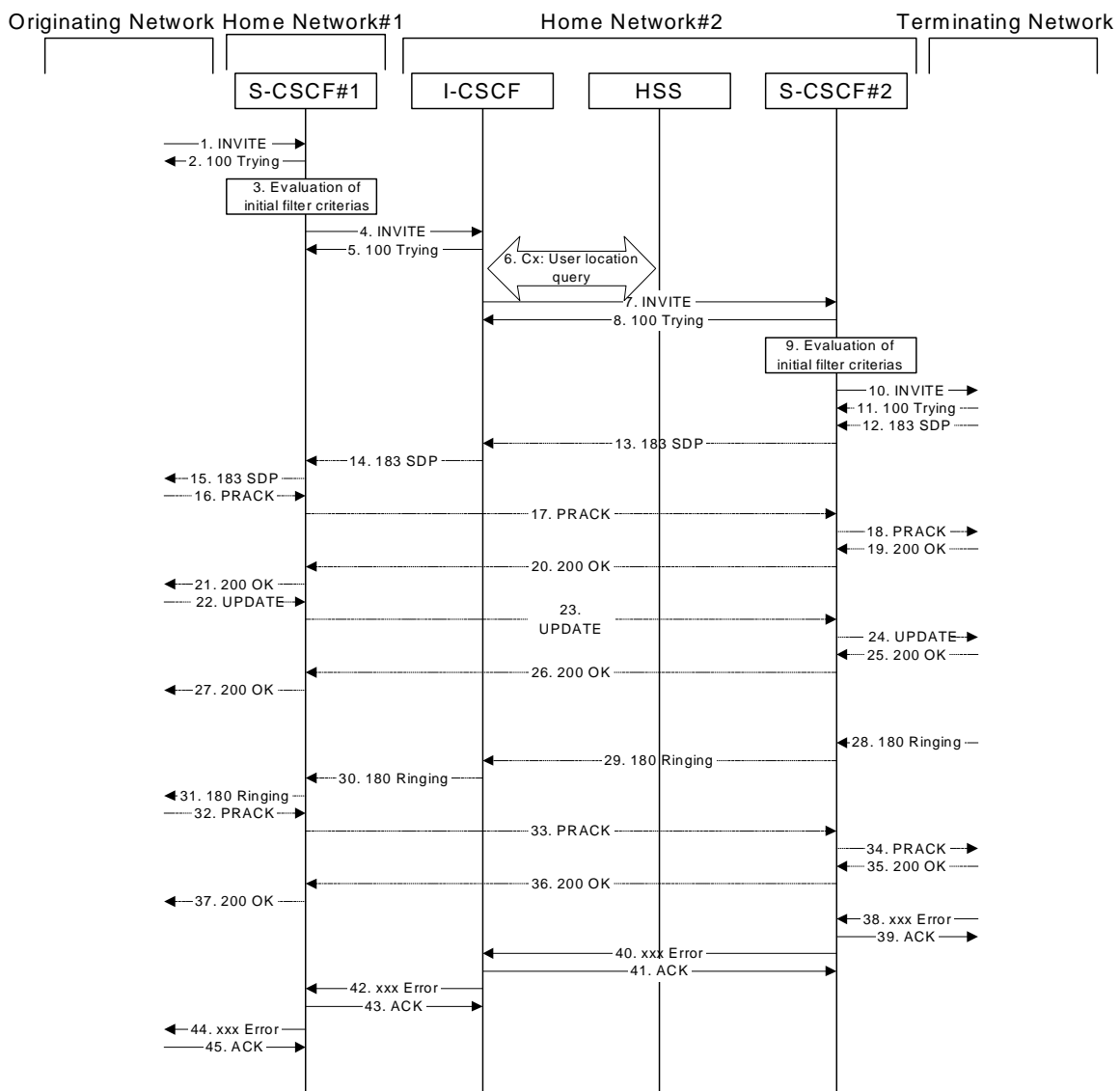


Figure 7.3.2.2-1: Failure in termination procedure

Material not included.

38. xxx Error (MT to S-CSCF) – see example in table 7.3.2.2-38

The termination procedure detected some error situation, and returned a SIP 4xx response.

NOTE 1: The error response may be, for example, "486 (Busy Here)", "403 (Forbidden)", "480 (Temporarily Unavailable)", "580 (Precondition Failure)", or others. For this example, "486 (Busy Here)" is shown.

Table 7.3.2.2-38: 486 Busy Here (MT to S-CSCF)

```
SIP/2.0 486 Busy Here
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Retry-After: 3600
Content-Length: 0
```

Material in remainder of subclause not shown.

Proposed change

7.3.5.1 (S-S#2) Single network operator performing origination and termination (MO#2, MT#2 assumed)

Figure 7.3.5.1-1 shows a S-CSCF handling session origination, which performs an analysis of the destination address, and determines that it belongs to a subscriber of the same operator. The request is therefore forwarded to a local I-CSCF. The I-CSCF queries the HSS for current location information, and finds the S-CSCF assigned to the subscriber (S-CSCF#2), and forwards the request to S-CSCF#2.

Origination sequences that share this common S-CSCF to S-CSCF procedure are:

- MO#1a** Mobile origination, roaming, without a THIG. The "Originating Network" of S-S#2 is therefore a visited network.
- MO#1b** Mobile origination, roaming, with a THIG in home network. The "Originating Network" of S-S#2 is therefore a visited network.
- MO#2** Mobile origination, located in home service area. The "Originating Network" of S-S#2 is therefore the home network.
- CS-O** CS Networks origination. The "Originating Network" of S-S#2 is the home network. The element labeled S-CSCF#1 is the MGCF of the CS-O procedure with the exception that all actions performed by the labelled S-CSCF#1 handling the session origination will not be performed by the MGCF: It does not perform the evaluation of initial filter criteria and the destination address translation. The details of the flow do not show the CS-O case..

Termination sequences that share this common S-CSCF to S-CSCF procedure are:

- MT#1a** Mobile termination, roaming, without a THIG. The "Terminating Network" of S-S#2 is a visited network.
- MT#1b** Mobile termination, roaming, with a THIG in home network. The "Terminating Network" of S-S#2 is a visited network.
- MT#2** Mobile termination, located in home service area. The "Terminating Network" of S-S#2 is the home network.

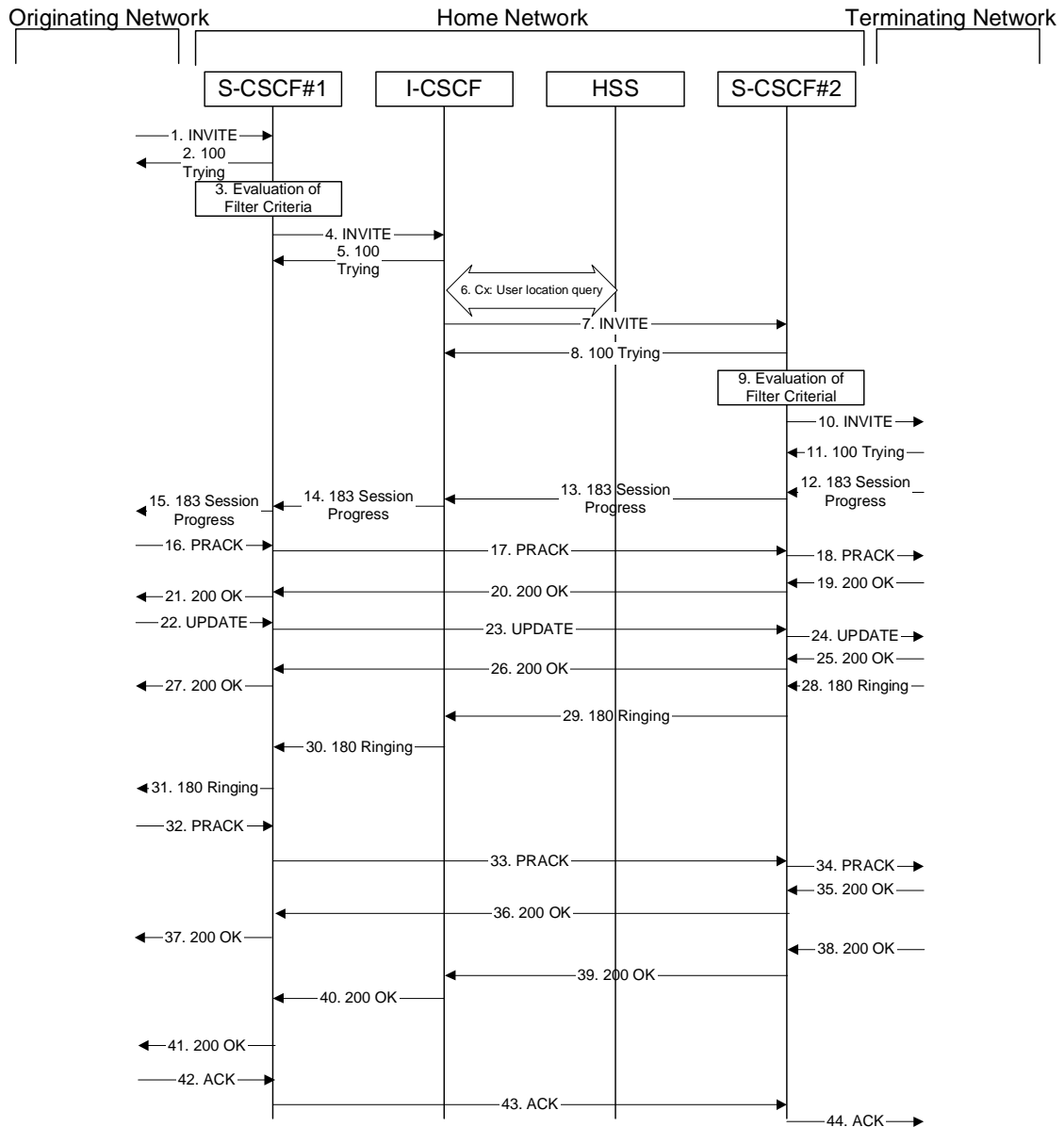


Figure 7.3.5.1-1: S-S#2

Procedure S-S#2 is as follows:

1. INVITE (MO to S-S#2) – see example in table 7.3.5.1-1

The INVITE request is sent from the UE to S-CSCF#1 by the procedures of the originating signalling flow.

Table 7.3.5.1-1: INVITE (MO to S-S#2)

```

INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>
Record-Route: <sip:pcscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <tel:+1-212-555-1111>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfgk490333
Cseq: 127 INVITE
Require: precondition
Supported: 100rel
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event

```

Material not included.

12. 183 Session Progress (MT to S-S#2) – see example in table 7.3.5.1-12 (related to table 7.3.5.1-10)

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.

Table 7.3.5.1-12: 183 Session Progress (MT to S-S#2)

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP icscf2_s.home1.net,
    SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home1.net;lr>, <sip:scscf2.home1.net;lr>,
    <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
P-Asserted-Identity: "John Smith" <tel:+1-212-555-2222>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
P-Charging-Vector: icid-value="AyretyU0dm+602Irt5tAFrbHLso=023551024"
Privacy: none
From:
To: <tel:+1-212-555-2222>;tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
RSeq: 9021
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933623 2987933623 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:98 H263
a=rtpmap:99 MP4V-ES
a=fmtp:98 profile-level-id=0
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event

```

Material not included.

16. PRACK (MO to S-S#2) – see example in table 7.3.5.1-16

The originator decides the final set of media streams, and includes this information in the PRACK request sent to S-CSCF#1 by the origination procedures.

Table 7.3.5.1-16: PRACK (MO to S-S#2)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home1.net;lr>, <sip:pcscf2.home1.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 128 PRACK
Require: precondition
RAck: 9021 127 INVITE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933616 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event

```

Material not included.

19. 200 OK (MT to S-S#2) – see example in table 7.3.5.1-19 (related to table 7.3.5.1-18)

The terminating endpoint responds to the PRACK request (19) with a 200 OK response.

Table 7.3.5.1-19: 200 OK (MT to S-S#2)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
      scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
      pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
      [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933623 2987933624 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event

```

Material not included.

22. UPDATE (MO to S-S#2) – see example in table 7.3.5.1-22

When the originating endpoint has completed the resource reservation procedures, it sends the UPDATE request to S-CSCF#1 by the origination procedures.

Table 7.3.5.1-22: UPDATE (MO to S-S#2)

```

UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home1.net;lr>, <sip:pcscf2.home1.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfgk490333
Cseq: 129 UPDATE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933617 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event

```

Material not included.

25. 200 OK (MT to S-S#2) – see example in table 7.3.5.1-25 (related to table 7.3.5.1-24)

The terminating endpoint responds to the UPDATE request (24) with a 200 OK response.

Table 7.3.5.1-25: 200 OK (MT to S-S#2)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

v=0
o=- 2987933623 2987933625 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98
b=AS:75
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtptime:98 H263
a=fmtp:98 profile-level-id=0
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtptime:96 telephone-event

```

Material not included.

28. 180 Ringing (MT to S-S#2) – see example in table 7.3.5.1-28 (related to table 7.3.5.1-10)

The terminating endpoint may optionally send a 180 Ringing provisional response indicating alerting is in progress. This response is sent by the termination procedure to S-CSCF#2.

Table 7.3.5.1-28: 180 Ringing (MT to S-S#2)

```

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Record-Route: <sip:pcscf2.home1.net;lr>, <sip:scscf2.home1.net;lr>,
    <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
From:
To:
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Allow:
RSeq: 9022
Content-Length: 0

```

Material not included.

32. PRACK (MO to S-S#2) – see example in table 7.3.5.1-32

The originator acknowledges the 180 Ringing provisional response (34) with a PRACK request.

Table 7.3.5.1-32: PRACK (MO to S-S#2)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home1.net;lr>, <sip:pcscf2.home1.net;lr>,
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 130 PRACK
RAck: 9022 127 INVITE
Content-Length: 0

```

Material not included.

35. 200 OK (MT to S-S#2) – see example in table 7.3.5.1-35 (related to table 7.3.5.1-34)

The terminating endpoint responds to the PRACK request (34) with a 200 OK response.

Table 7.3.5.1-35: 200 OK (MT to S-S#2)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Length: 0

```

Material not included.

38. 200 OK (MT to S-S#2) – see example in table 7.3.5.1-38 (related to table 7.3.5.1-10)

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 session attempt. The response is sent to S-CSCF#2 per the termination procedure.

Table 7.3.5.1-38: 200 OK (MT to S-S#2)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Record-Route: <sip:pcscf2.home1.net;lr>, <sip:scscf2.home1.net;lr>,
    <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Length: 0

```

Material in remainder of subclause not shown.

Proposed change

7.3.5.2 (S-S#2) Single network operator performing origination and termination, terminating UE is busy, and not able or not willing to answer the call (MO#2, MT#2 assumed)

Figure 7.3.5.2-1 shows the subscriber that originated a session with one of the MO procedures had the attempt fail due to an error detected in the termination procedure. In this flow, 486 error response is shown as the example.

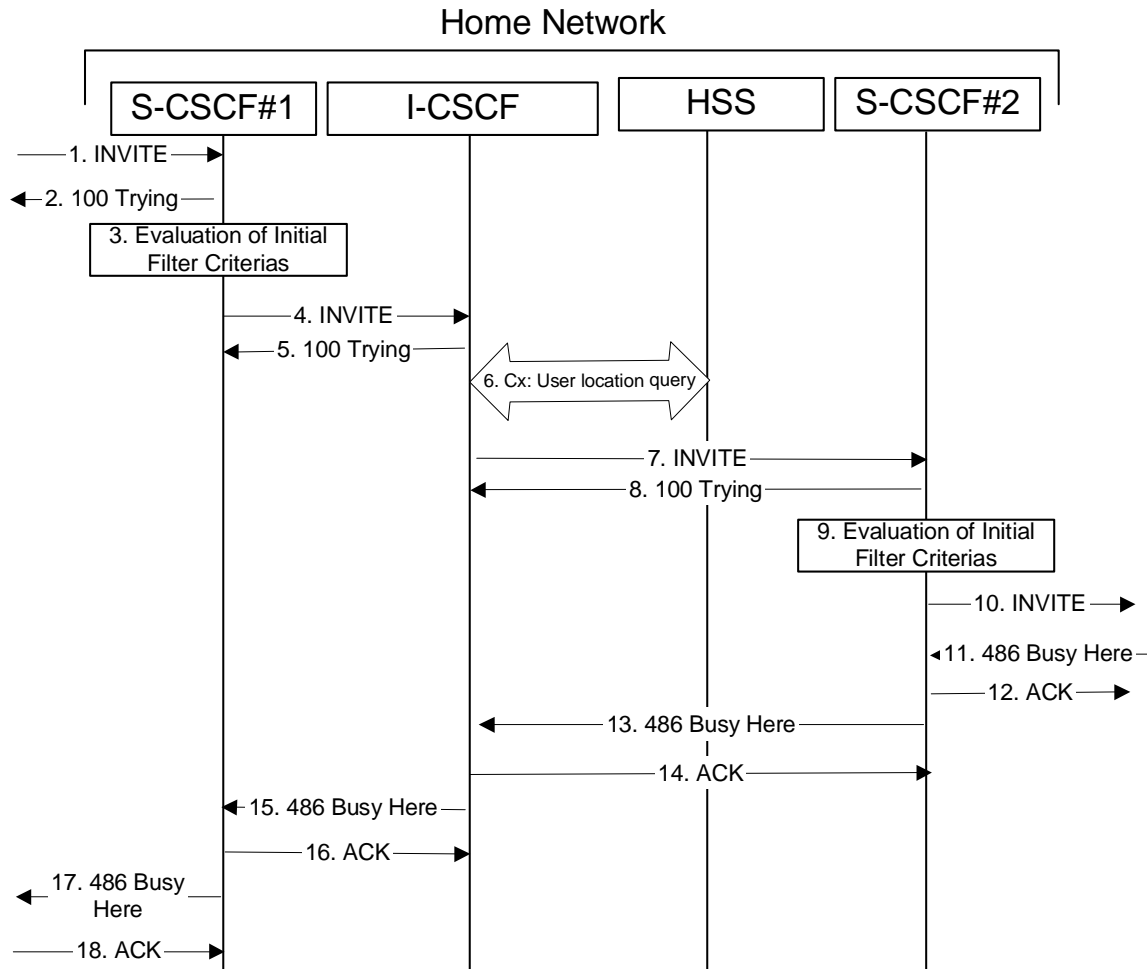


Figure 7.3.5.2: (S-S#2) Single network operator performing origination and termination, terminating UE is busy, and not able or not willing to answer the call (MO#2, MT#2 assumed)

1-10. The same as described in flow 1-8 in subclause 7.3.5

11. **486 Busy Here (MT to S-CSCF)** – see example in table 7.3.5.2-11

The termination procedure detected some error situation, and returned a SIP 486 Busy Here response.

NOTE: The error response may be other error responses like "403 Service Denied", "480 Temporarily Unavailable", "580 Precondition Failure", or others. For this example, "486 Busy" is shown.

Table 7.3.5.2-11: 486 Busy Here (MT to S-CSCF)

```
SIP/2.0 486 Busy Here
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7)
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Retry-After: 3600
Content-Length: 0
```

Material in remainder of subclause not shown.

Proposed change

7.3.6.1 (S-S#3) PSTN Termination performed by home network of originator (MO#2 assumed)

Figure 7.3.6.1-1 shows a S-CSCF handling session origination, which performs an analysis of the destination address, and determines that it will result in a PSTN termination. The request is therefore forwarded to a local BGCF. The BGCF performs further analysis of the destination address, combined with information of agreements between operators for optimum Gateway selection, and decides to do the PSTN termination locally. The BGCF therefore allocates a MGCF within the home network, and sends the request to it. This example flow does not show Application Server involvement.

Origination sequences that share this common S-CSCF to S-CSCF procedure are:

- MO#1a** Mobile origination, roaming, without a THIG. The "Originating Network" of S-S#3 is therefore a visited network.
- MO#1b** Mobile origination, roaming, with a THIG in home network. The "Originating Network" of S-S#3 is therefore a visited network.
- MO#2** Mobile origination, located in home service area. The "Originating Network" of S-S#3 is therefore the home network.
- CS-O** CS Networks origination. The "Originating Network" of S-S#3 is the home network. The element labelled S-CSCF#1 is the MGCF of the CS-O procedure.

Termination sequences that share this common S-CSCF to S-CSCF procedure are:

- CS-T** CS Networks termination.

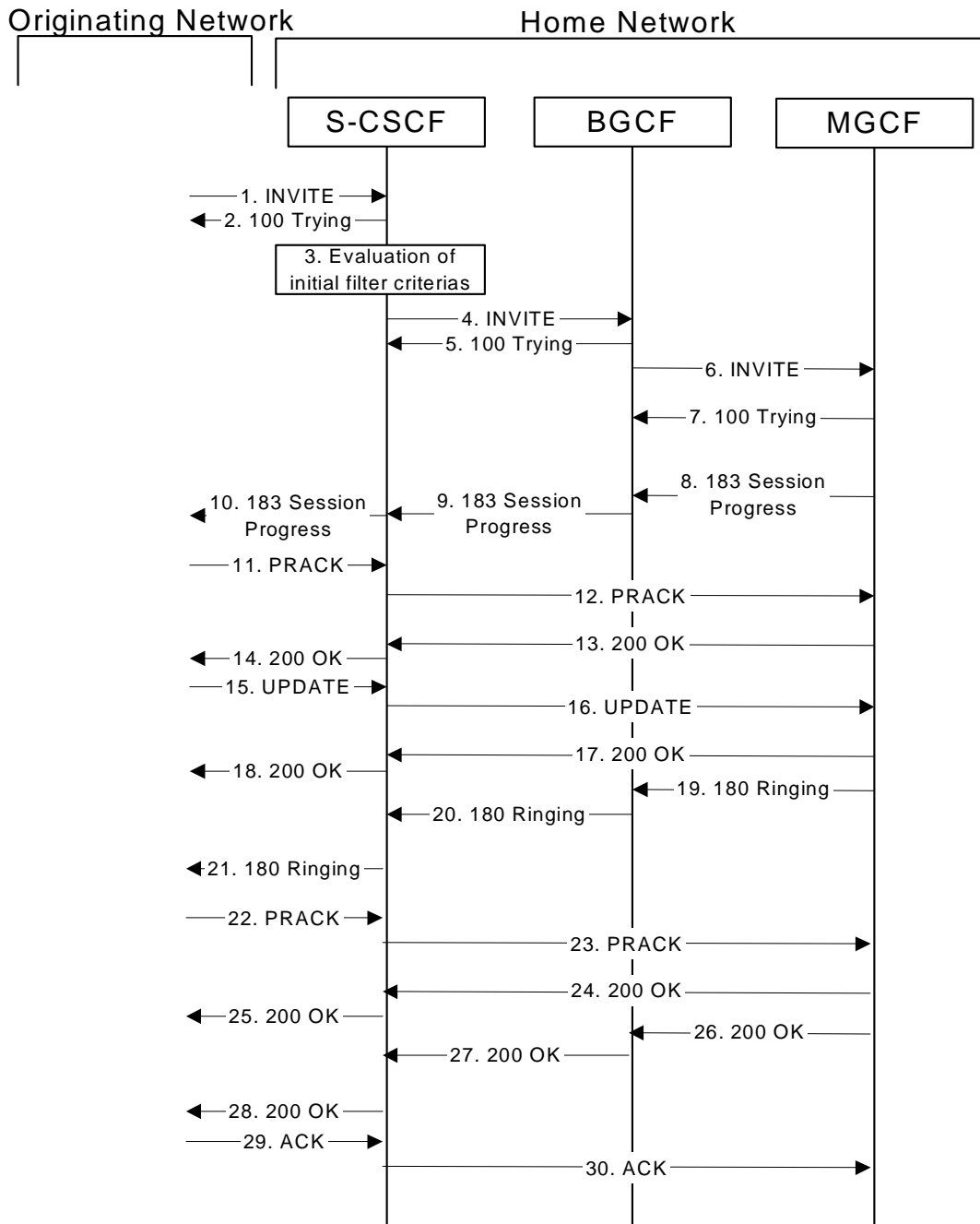


Figure 7.3.6.1-1: S-S#3

Procedure S-S#3 is as follows:

1. INVITE (MO to S-S#3) – see example in table 7.3.6.1-1

The INVITE request is sent from the UE to S-CSCF#1 by the procedures of the originating signalling flow.

Table 7.3.6.1-1: INVITE (MO to S-S#3)

```

INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
  [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>
Record-Route: <sip:pcscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <tel:+1-212-555-1111>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
P-Charging-Vector: icid-value="AyretyU0dm+602Irt5tAFrbHLso=023551024"
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 127 INVITE
Require: precondition
Supported: 100rel
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event

```

Material not included.

11. PRACK (MO to S-S#3) – see example in table 7.3.6.1-11

The originator confirms with a PRACK request sent to S-CSCF#1 by the origination procedures. The request does not contain SDP because in the initial SDP offer/answer there was a single media stream with a single codec.

Table 7.3.6.1-11: PRACK (MO to S-S#3)

```

PRACK sip:mgcf1.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
  [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:scscf1.home1.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 128 PRACK
Require: precondition
RAck: 9021 127 INVITE
Content-Length: 0

```

Material not included.

15. UPDATE (MO to S-S#3) – see example in table 7.3.6.1-15

When the originating endpoint has completed the resource reservation procedures, it sends the UPDATE request to S-CSCF#1 by the origination procedures.

Table 7.3.6.1-15: UPDATE (MO to S-S#3)

```
UPDATE sip:mgcf1.home1.net SIP/2.0
Via: SIP/2.0/UDP pcsf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
 [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:scscf1.home1.net;lr>
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024";
 ggsn=[5555::4b4:3c3:2d2:1e1]; pdp-sig=no; gcid=723084371; auth-token=43876559; flow-
 id=3
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 129 UPDATE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933616 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 0 RTP/AVP 98 99
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event
```

P-Charging-Vector: The P-CSCF added the GPRS access network information to this header, which is removed and stored by the S-CSCF.

Upon receiving the UPDATE, the S-CSCF stores the P-Charging-Vector information for use in charging.

Material not included.

22. PRACK (MO to S-S#3) – see example in table 7.3.6.1-22

The originator acknowledges the 180 Ringing provisional response (21) with a PRACK request.

Table 7.3.6.1-22: PRACK (MO to S-S#3)

```
PRACK sip:mgcf1.home1.net SIP/2.0
Via: SIP/2.0/UDP pcsf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
 [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:scscf1.home1.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 130 PRACK
RAck: 9022 127 INVITE
Content-Length: 0
```

Material in remainder of subclause not shown.

Proposed change

7.3.7.1 (S-S#4) PSTN Termination performed by different operator than origination (MO#2 assumed)

Figure 7.3.7.1-1 shows a S-CSCF handling session origination, which performs an analysis of the destination address, and determines that it will result in a PSTN termination. The request is therefore forwarded to a local BGCF (BGCF#1). BGCF#1 performs further analysis of the destination address, combined with information of agreements between operators for optimum Gateway selection, and decides to do the PSTN termination in a different operator's network. BGCF#1 therefore forwards the request to a BGCF in the terminating operator's network, BGCF#2. BGCF#2 allocates a MGCF within its network, and sends the request to it. This example flow does not show Application Server involvement.

Origination sequences that share this common S-CSCF to S-CSCF procedure are:

- MO#1a** Mobile origination, roaming, without a THIG. The "Originating Network" of S-S#4 is therefore a visited network.
- MO#1b** Mobile origination, roaming, with a THIG in home network. The "Originating Network" of S-S#4 is therefore a visited network.
- MO#2** Mobile origination, located in home service area. The "Originating Network" of S-S#4 is therefore the home network.
- CS-O** CS Networks origination. The "Originating Network" of S-S#4 is the home network. The element labeled S-CSCF#1 is the MGCF of the CS-O procedure.

Termination sequences that share this common S-CSCF to S-CSCF procedure are:

- CS-T** CS Networks termination.

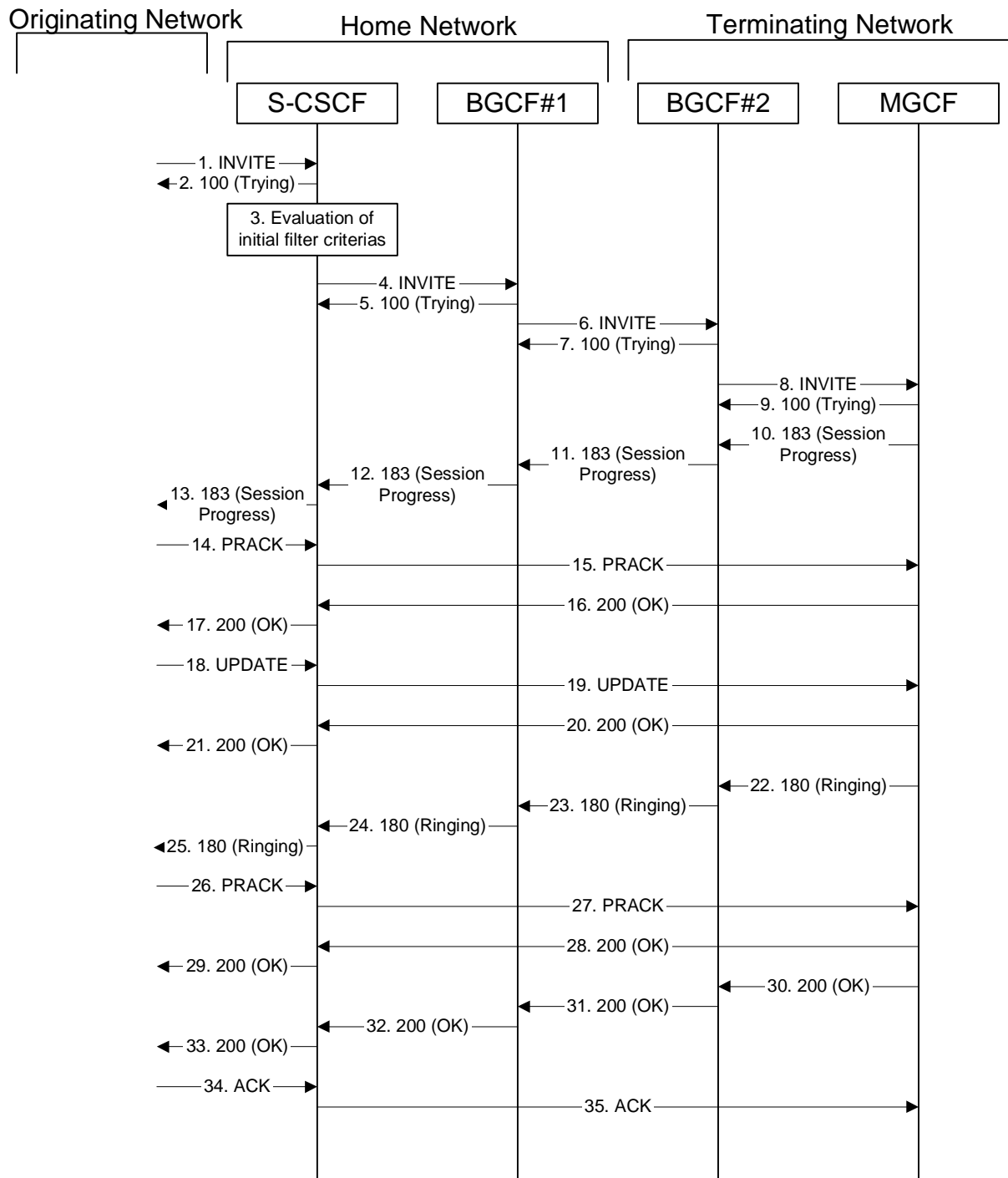


Figure 7.3.7.1-1: S-S#4

Procedure S-S#4 is as follows:

Material not included.

14. PRACK (MO to S-S#4) – see example in table 7.3.7.1-14

The originator sends a PRACK request sent to S-CSCF by the origination procedures. The PRACK request does not contain SDP because in the initial SDP offer/answer the negotiation resulted in a single media stream with a single codec.

Table 7.3.7.1-14: PRACK (MO to S-S#4)

```

PRACK sip:mgcf2.home2.net SIP/2.0
Via: SIP/2.0/UDP pcsf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:scsf1.home1.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 128 PRACK
Require: precondition
RAck: 9021 127 INVITE
Content-Length: 0

```

Material not included.

18. UPDATE (MO to S-S#4) – see example in table 7.3.7.1-18

When the originating endpoint has completed the resource reservation procedures, it sends the UPDATE request to S-CSCF#1 by the origination procedures.

Table 7.3.7.1-18: UPDATE (MO to S-S#4)

```

UPDATE sip:mgcf2.home2.net SIP/2.0
Via: SIP/2.0/UDP pcsf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:scsf1.home1.net;lr>
P-Charging-Vector: icid-value="AyretyU0dm+602Irt5tAFrbHLso=023551024";
    ggsn=[5555::4b4:3c3:2d2:1e1]; pdp-sig=no; gcid=723084371; auth-token=43876559; flow-
    id=3
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 129 UPDATE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933616 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 0 RTP/AVP 98 99
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event

```

P-Charging-Vector: The P-CSCF added the GPRS access network information to this header, which is removed and stored by the S-CSCF.

Upon receiving the UPDATE, the S-CSCF stores the P-Charging-Vector information for use in charging.

Material not included.

26. PRACK (MO to S-S#4) – see example in table 7.3.7.1-26

The originator acknowledges the 180 Ringing provisional response (25) with a PRACK request.

Table 7.3.7.1-26: PRACK (MO to S-S#4)

```
PRACK sip:mgcf2.home2.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:scscf1.home1.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 130 PRACK
RAck: 9022 127 INVITE
Content-Length: 0
```

Material in remainder of subclause not shown.

Proposed change

7.4.2.1 (MT#1a) Mobile termination, roaming (MO#1a, S-S#1a assumed)

Figure 7.4.2.1 shows a termination procedure which applies to roaming subscribers when the home network operator does not desire to keep its internal configuration hidden from the visited network. The UE is located in a visited network, and determines the P-CSCF via the P-CSCF discovery procedure. During registration, the home network allocates the S-CSCF.

When registration is complete, S-CSCF knows the name/address of P-CSCF and the UE Contact address, and P-CSCF obtains the name/address of the UE.

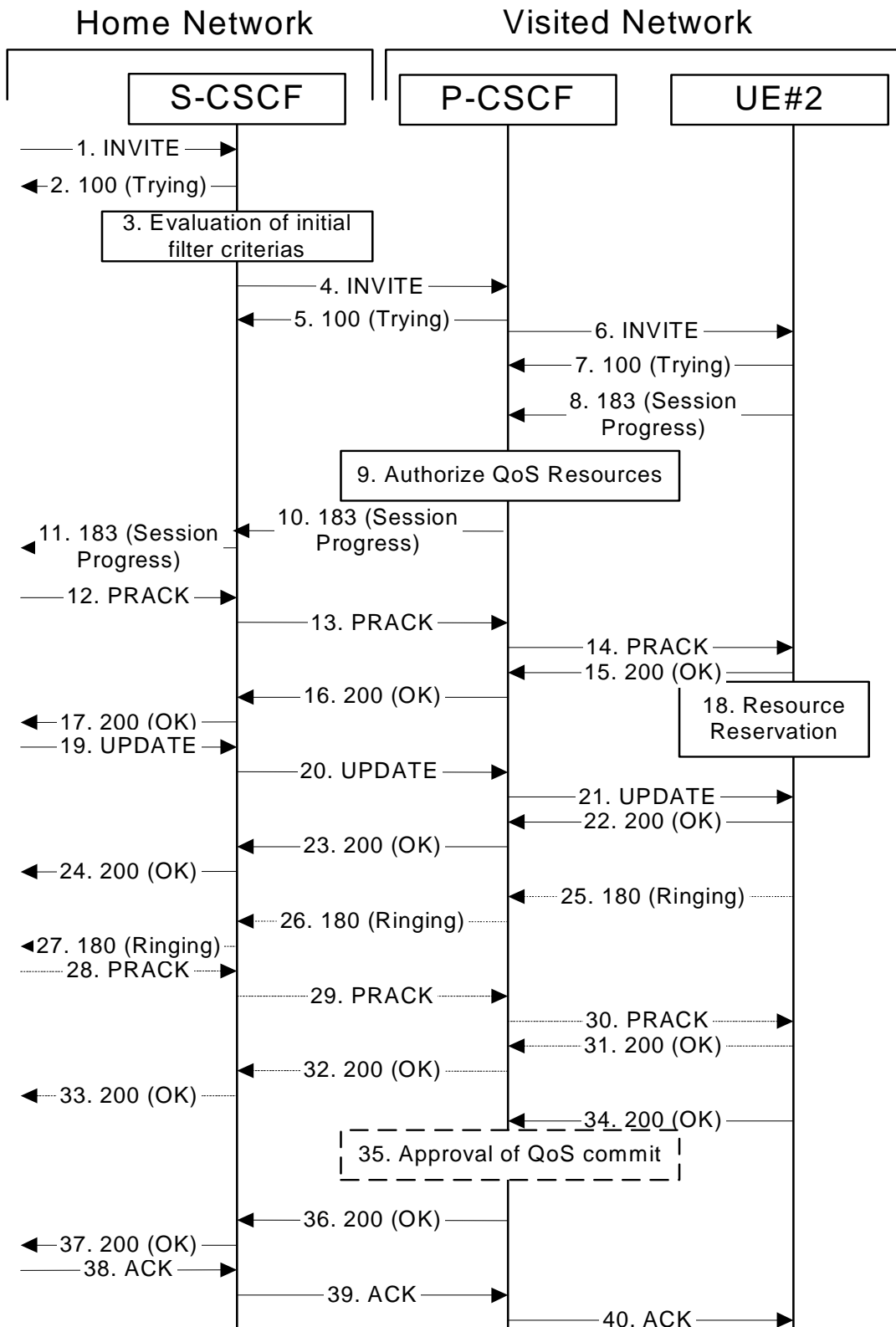


Figure 7.4.2.1-1: MT#1a

Procedure MT#1a is as follows:

Material not included.

8. 183 Session Progress (UE to P-CSCF) – see example in table 7.4.2.1-8

UE#2 determines the complete set of codecs that it is capable of supporting for this session. It determines the intersection with those appearing in the SDP in the INVITE request.

UE responds with a 183 Session Progress response containing SDP back to the originator. This response is sent to P-CSCF.

Table 7.4.2.1-8: 183 Session Progress (UE to P-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKKnashds7
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>,
<sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From:
To: <tel:+1-212-555-2222>;tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
RSeq: 9021
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933623 2987933623 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98 99
b=AS:75
a=crr:qos local none
a=crr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtmpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtmpmap:99 MP4V-ES
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=crr:qos local none
a=crr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtmpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtmpmap:96 telephone-event
```

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network ~~as specified in sub-clause "Additional coding rules for P-access-network-info-header", in 3GPP TS 24.229 [16].~~

To: A tag is added to the To header.

Contact: Contains a SIP URI with the IP address or FQDN of the UE. It includes the comp=sigcomp parameter.

SDP The SDP contains the set of codecs supported by UE. It requests a confirmation of the QoS preconditions for establishing the session

Upon receipt of the 183 Session Progress, the P-CSCF stores the following information about this session, for use in providing enhanced services or in possible error recovery actions – see example in table 7.4.2.1-8b.

Table 7.4.2.1-8b: Storage of information at P-CSCF

```
Request-URI: sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfgklj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2orig): <sip:scscf2.home2.net;lr>, <sip:scscf1.home1.net;lr>,
<sip:pcscf1.visited1.net;lr>
Contact(dest): <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
```

Material not included.

15. 200 OK (UE to P-CSCF) – see example in table 7.4.2.1-15

UE acknowledges the PRACK request (14) with a 200 OK response.

Table 7.4.2.1-15: 200 OK (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933623 2987933624 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event
```

~~**P-Access-Network-Info:** the UE provides the access type and access info, related to the serving access network as specified in sub-clause 'Additional coding rules for P-access-network-info-header', in 3GPP TS 24.229 [16].~~

16. 200 OK (P-CSCF to S-CSCF) – see example in table 7.4.2.1-16

P-CSCF forwards the 200 OK response to S-CSCF.

Table 7.4.2.1-16: 200 OK (P-CSCF to S-CSCF)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
a=

```

~~P-Access-Network-Info: this header contains information from the UE.~~

Material not included.

22. 200 OK (UE to P-CSCF) – see example in table 7.4.2.1-22

UE acknowledges the UPDATE request (21) with a 200 OK response.

Table 7.4.2.1-22: 200 OK (UE to P-CSCF)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933623 2987933625 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98
b=AS:75
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event

```

~~**P-Access-Network-Info:** the UE provides the access type and access info, related to the serving access network as specified in sub-clause 'Additional coding rules for P access network info-header', in 3GPP TS 24.229 [16].~~

23. 200 OK (P-CSCF to S-CSCF) – see example in table 7.4.2.1-23

P-CSCF forwards the 200 OK response to S-CSCF.

Table 7.4.2.1-23: 200 OK (P-CSCF to S-CSCF)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=

```

~~P-Access-Network-Info: this header contains information from the UE.~~

Material not included.

25. 180 Ringing (UE to P-CSCF) – see example in table 7.4.2.1-25

Before proceeding with session establishment, the UE waits for two events. First, the resource reservation initiated in step #17 must complete successfully. Second, the resource reservation initiated by the originating endpoint must complete successfully (which is indicated by message #20 received by UE). The UE may now immediately accept the session (and proceed with step #34), or alert the destination subscriber of an incoming session attempt; if the latter it indicates this to the calling party by a 180 Ringing provisional response sent to P-CSCF.

Table 7.4.2.1-25: 180 Ringing (UE to P-CSCF)

```

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
    scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>,
    <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
RSeq: 9022
Content-Length: 0

```

~~**P-Access-Network-Info:** the UE provides the access type and access info, related to the serving access network as specified in sub-clause 'Additional coding rules for P-access network info header', in 3GPP TS 24.229 [16].~~

26. 180 Ringing (P-CSCF to S-CSCF) – see example in table 7.4.2.1-26

P-CSCF forwards the 180 Ringing response to S-CSCF.

Table 7.4.2.1-26: 180 Ringing (P-CSCF to S-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024";
    ggsn=[5555::d6d:c7c:b8b:a9a]; pdp-sig=no; gcid=309685742; auth-token=86243614; flow-
    id=3
From:
To:
Call-ID:
CSeq:
Require:
Contact:
Allow:
RSeq:
Content-Length:
```

~~**P-Access-Network-Info:** this header contains information from the UE.~~

Record-Route: The P-CSCF rewrites the Record-Route header field value to remove the port number and the comp=sigcomp parameter from its own entry.

Upon receipt of the 180, the S-CSCF stores the following information about this session, for use in charging – see example in table 7.4.2.1-26b.

Table 7.4.2.1-26b: Storage of information at S-CSCF

```
Request-URI: sip:user2_public1@home2.net
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfgklkj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2dest): <sip:pcscf2.visited2.net;lr>
Route(2orig): <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
Contact(dest): <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
```

Material not included.

34. 200 OK (UE to P-CSCF) – see example in table 7.4.2.1-34

When the called party answers the UE sends a 200 OK final response to the INVITE request (6) to P-CSCF, and starts the media flow(s) for this session.

Table 7.4.2.1-34: 200 OK (UE to P-CSCF)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>,
<sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Length: 0

```

~~**P-Access-Network-Info:** the UE provides the access type and access info, related to the serving access network as specified in sub-clause 'Additional coding rules for P-access-network-info-header', in 3GPP TS 24.229 [16].~~

Material in remainder of subclause not shown.

Proposed change

7.4.2.2 UE-detected failure/resource failure

The subscriber that initiated a session with one of the MO procedures had the attempt fail due to an error detected in the Termination procedure. This could be due to, for example, destination busy (error code 486), or some other error.

Depending on the exact error that causes the session initiation failure, and when the error situation was detected, MT#1a could be at many different stages in the session establishment procedure. This is shown in figure 7.4.2.2-1, as optional messages 7-33 that may appear in this error procedure.

This subclause also includes the procedures for the terminating UE to indicate a failure to allocate required resources for the session. This is detected in step #18 and reported with a 580-Precondition-Failure error response.

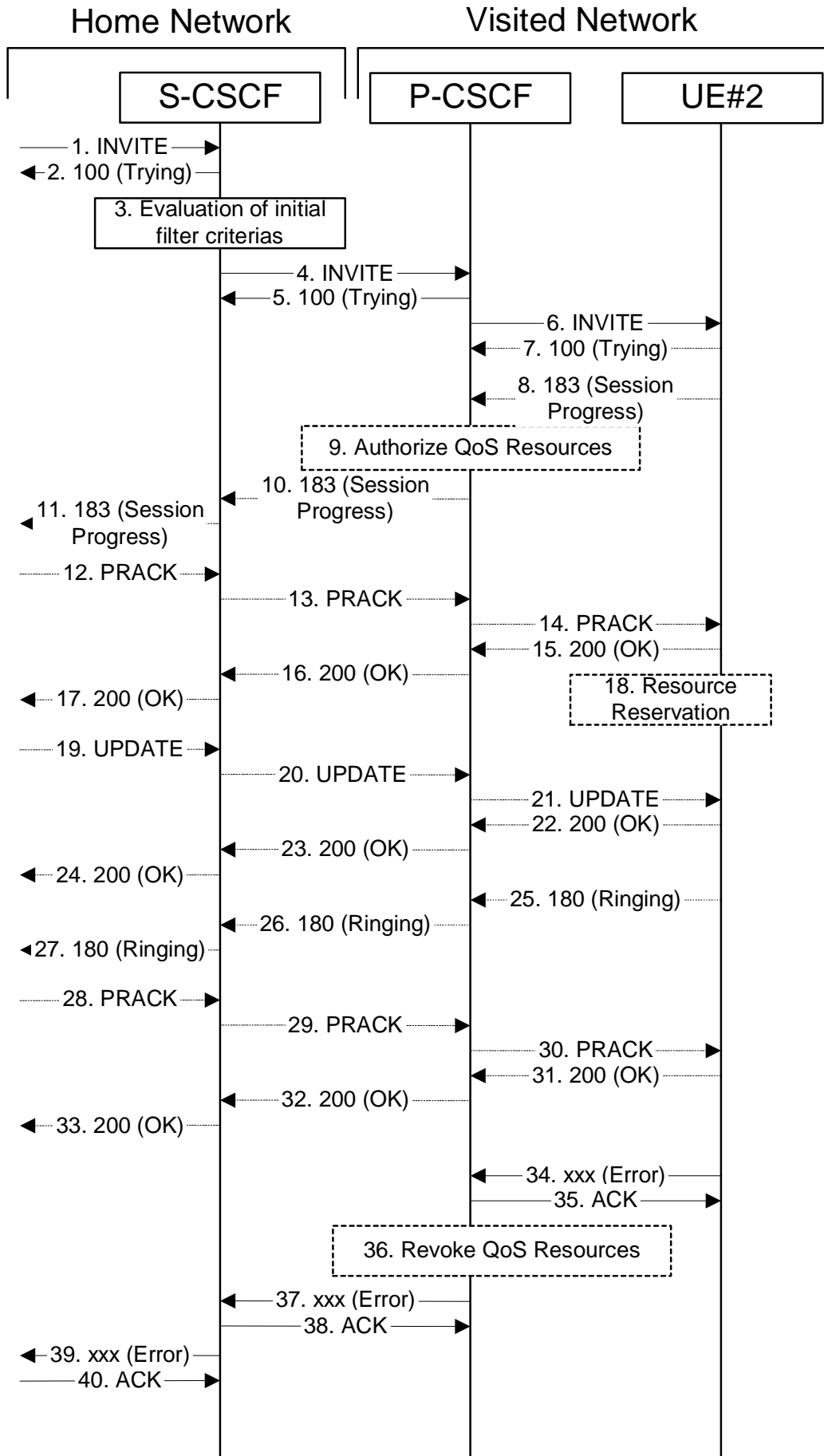


Figure 7.4.2.2-1: Failure in termination procedure

Material not included.

37. xxx Error (P-CSCF to S-CSCF) – see example in table 7.4.2.2-37 (related to table 7.4.2.2-34)

The P-CSCF returned a SIP error response to S-CSCF.

NOTE 2: The error response may be, for example, “486 (Busy Here)”, “403 (Forbidden)”, “480 (Temporarily Unavailable)”, or others. For this example, “486 (Busy Here)” is shown.

Table 7.4.2.2-37: 486 Busy Here (P-CSCF to S-CSCF)

```
SIP/2.0 486 Busy Here
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Retry-After: 3600
Content-Length: 0
```

[P-Access-Network-Info: This header contains information from the UE.](#)

Material in remainder of subclause not shown.

Proposed change

7.4.2.3 Origination failure

After sending the initial INVITE for a multimedia session, the originating endpoint either abandoned the attempt or was unable to obtain the resources necessary for the session. The termination procedure is informed of this by a CANCEL request from the originator, which is shown in figure 7.4.2.3-1.

If the session is aborted due to failure to obtain resources by the originator, it will occur prior to step #19; steps 19-33 (marked as optional) will not be present. If the session is abandoned due to user command, it can happen at any point between steps 8-33.

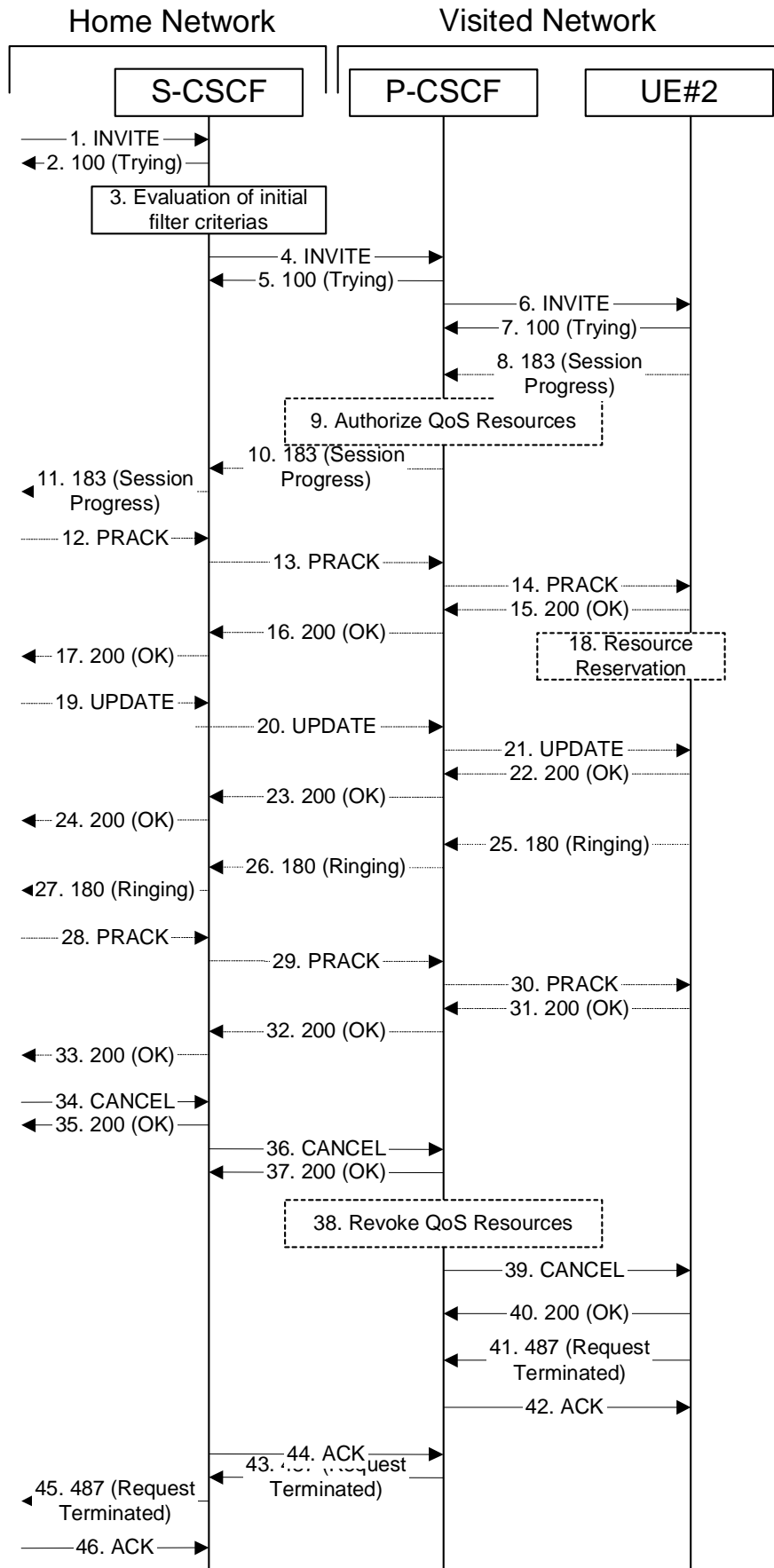


Figure 7.4.2.3-1: Failure in origination procedure

Material not included.

40. 200 OK (UE to P-CSCF) – see example in table 7.4.2.3-40

Upon receive the CANCEL request from the P-CSCF, the UE sends 200 OK.

Table 7.4.2.3-40: 200 OK (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscaf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

Material not included.

43. 487 Request Terminated (P-CSCF to S-CSCF) – see example in table 7.4.2.3-43 (related to table 7.4.2.3-41)

The P-CSCF returns the SIP error response to S-CSCF.

Table 7.4.2.3-43: 487 Request Terminated (P-CSCF to S-CSCF)

```
SIP/2.0 487 Request Terminated
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Retry-After: 3600
Content-Length: 0
```

Material in remainder of subclause not shown.

Proposed change

7.4.3.1 (MT#2) Mobile termination, located in home network (MO#2, S-S#2 assumed)

Figure 7.4.3.1-1 shows a termination procedure which applies to subscribers located in their home service area.

The UE is located in the home network, and determines the P-CSCF via the CSCF discovery procedure. During registration, the home network allocates a S-CSCF in the home network, S-CSCF.

When registration is complete, S-CSCF knows the name/address of P-CSCF, and P-CSCF knows the name/address of the UE.

NOTE: Although S-S#2 flow is assumed, home2.net is used in the Via, Record-Route and Route headers in order to be more generic and clearly identify the originating and terminating nodes. In the S-S#2 scenario home2.net = home1.net.

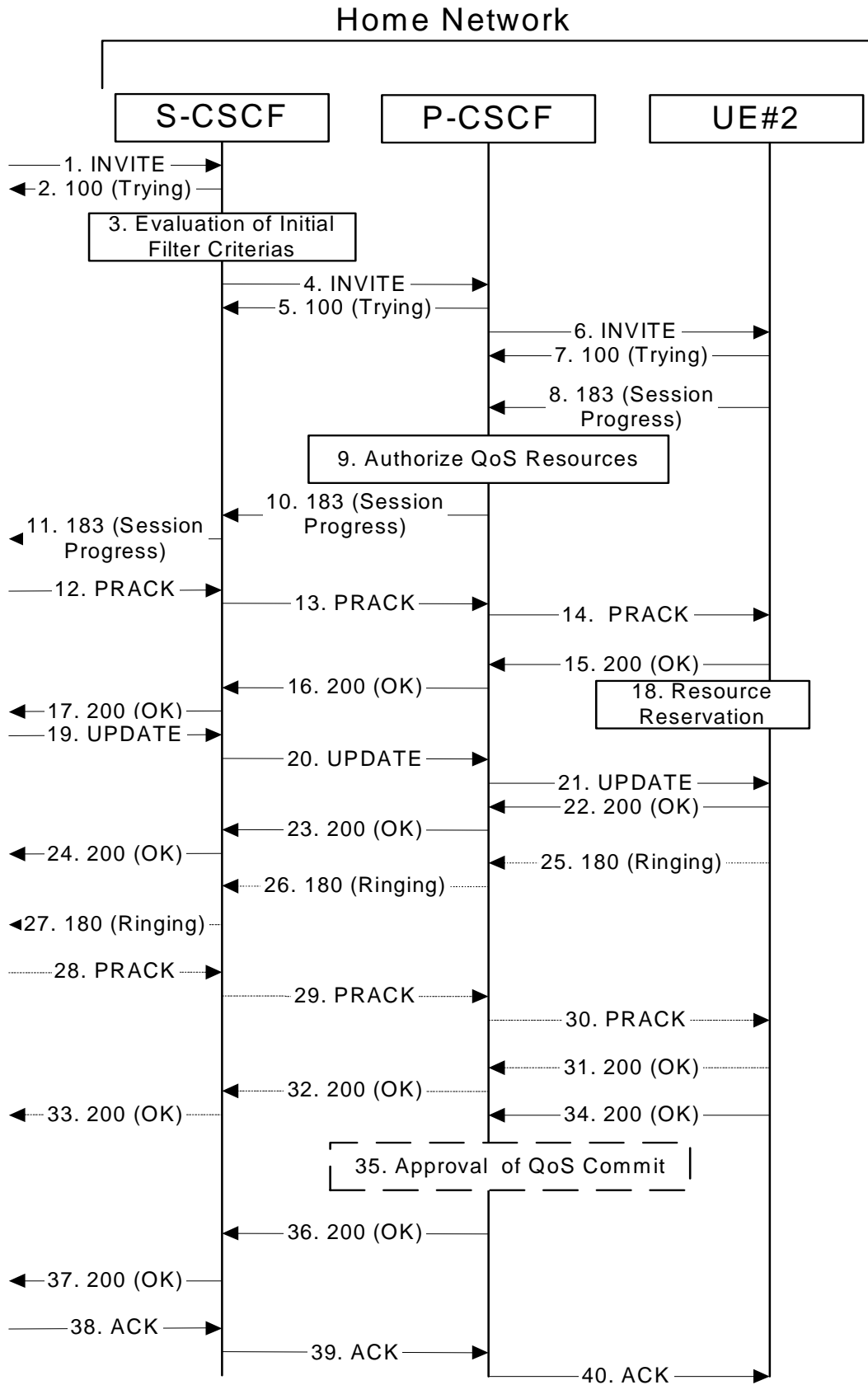


Figure 7.4.3.1-1: MT#2

Procedure MT#2 is as follows:

Material not included.

8. 183 Session Progress (UE to P-CSCF) – see example in table 7.4.3.1-8

UE#2 determines the complete set of codecs that it is capable of supporting for this session. It determines the intersection with those appearing in the SDP in the INVITE request.

UE responds with a 183 Session Progress response containing SDP back to the originator. This response is sent to P-CSCF.

Table 7.4.3.1-8: 183 Session Progress (UE to P-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcscf2.home2.net:5088;comp=sigcomp;branch=z9hG4bK876t12.1, SIP/2.0/UDP
scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>,
<sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From:
To: <tel:+1-212-555-2222>;tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
RSeq: 9021
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933623 2987933623 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:98 H263
a=rtpmap:99 MP4V-ES
a=fmtp:98 profile-level-id=0
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event
```

[P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network.](#)

To: A tag is added to the To header.

Contact: Contains a SIP URI with the IP address or FQDN of the terminating UE.

SDP The SDP contains the subset of codecs supported by UE. It requests a confirmation of the QoS preconditions for establishing the session.

Upon receipt of the 183 Session Progress, the P-CSCF stores the following information about this session, for use in providing enhanced services or in possible error recovery actions – see example in table 7.4.3.1-8b.

Table 7.4.3.1-8b: Storage of information at P-CSCF

```
Request-URI: sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2orig): <sip:scscf2.home2.net;lr>, <sip:scscf1.home1.net;lr>,
<sip:pcscf1.home1.net;lr>
Contact(dest): <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
```

Material not included.

10. 183 Session Progress (P-CSCF to S-CSCF) – see example in table 7.4.3.1-10

P-CSCF forwards the 183 Session Progress response to S-CSCF.

Table 7.4.3.1-10: 183 Session Progress (P-CSCF to S-CSCF)

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7)
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
P-Access-Network-Info:
P-Asserted-Identity: "John Smith" <sip:user2_public1@home2.net>
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"
Privacy:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
Allow:
RSeq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=

```

P-Access-Network-Info: This header contains information from the UE.

P-Asserted-Identity: P-CSCF inserts the default SIP URI of the user in the P-Asserted-Identity header field.

Record-Route: The P-CSCF rewrites the Record-Route header to remove the port number and the comp=sigcomp parameter from its own SIP URI

Upon receipt of the 183 Session Progress, the S-CSCF stores the following information about this session, for use in providing enhanced services or in possible error recovery actions – see example in table 7.4.3.1-10b.

Table 7.4.3.1-10b: Storage of information at S-CSCF

```

Request-URI: sip:user2_public1@home2.net
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2dest): <sip:pcscf2.home2.net;lr>
Route(2orig): <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
Contact(dest): <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>

```

Material not included.

25. 180 Ringing (UE to P-CSCF) – see example in table 7.4.3.1-25

Before proceeding with session establishment, the UE waits for two events. First, the resource reservation initiated in step #17 must complete successfully. Second, the resource reservation initiated by the originating endpoint must complete successfully (which is indicated by message #20 received by UE). The UE may now immediately accept the session (and proceed with step #34), or alert the destination subscriber of an incoming session attempt; if the latter it indicates this to the calling party by a 180 Ringing provisional response sent to P-CSCF.

Table 7.4.3.1-25: 180 Ringing (UE to P-CSCF)

```

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP pcscf2.home2.net:5088;comp=sigcomp;branch=z9hG4bK876t12.1, SIP/2.0/UDP
scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>,
<sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Require:
Contact: <sip:[5555::eee:fff:aaa:bbb]>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
RSeq: 9022
Content-Length: 0

```

~~**P-Access-Network-Info:** the UE provides the access type and access info, related to the serving access network as specified in sub-clause "Additional coding rules for P-access-network-info-header", in 3GPP TS 24.229 [16].~~

Material not included.

37. 200 OK (MT#2 to S-S) – see example in table 7.4.3.1-37

S-CSCF forwards the 200 OK final response along the signalling path back to the session originator, as per the S-CSCF to S-CSCF procedure.

Table 7.4.3.1-37: 200 OK (MT#2 to S-S)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1,SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Contact:
Allow:
Content-Length:
```

Material in remainder of subclause not shown.

Proposed change

7.4.5.1 (MT#1c) Mobile termination, roaming, without I-CSCF in home network providing configuration independence, terminating UE is busy, and not able or not willing to answer the call (MO#2, S-S#2 assumed)

Figure 7.4.5.1 shows a termination procedure which applies to roaming subscribers when the home network operator does not desire to keep its internal configuration hidden from the visited network. The UE is located in a visited network, and determines the P-CSCF via the CSCF discovery procedure. During registration, the home network allocates the S-CSCF.

When registration is complete, S-CSCF knows the name/address of P-CSCF, and P-CSCF knows the name/address of the UE.

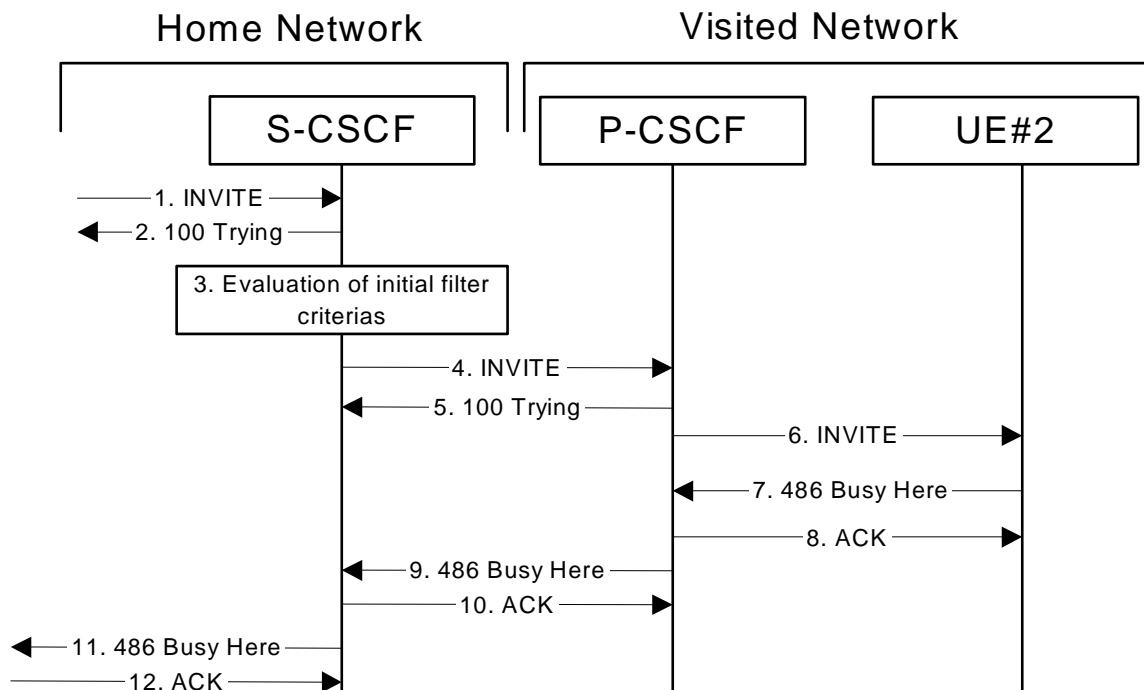


Figure 7.4.5.1-1: MT#1c

Procedure MT#1c is as follows:

Material not included.

7. 486 Busy Here (UE to P-CSCF) – see example in table 7.4.5.1-7

UE is contacted successfully but it is currently not willing or able to take additional sessions. The response MAY indicate a better time later to call in the Retry-After header.

Table 7.4.5.1-7: 486 Busy Here (UE to P-CSCF)

```
SIP/2.0 486 Busy Here
Via: SIP/2.0/UDP pscsf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To: <tel:+1-212-555-2222>;tag=314159
Call-ID:
CSeq:
Retry-After: 3600
Content-Length: 0
```

[P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network.](#)

8. ACK (P-CSCF to UE) – see example in table 7.4.5.1-8

Upon receive the 486 response from the UE, P-CSCF sends ACK back to the UE.

Table 7.4.5.1-8: ACK (P-CSCF to UE)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pscsf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1
Max-Forwards: 70
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

9. 486 Busy Here (P-CSCF to S-CSCF) – see example in table 7.4.5.1-9

P-CSCF forwards the 486 response to the S-CSCF.

Table 7.4.5.1-9: 486 Busy Here (P-CSCF to S-CSCF)

```
SIP/2.0 486 Busy Here
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7)
P-Access-Network-Info:
From:
To: <tel:+1-212-555-2222>;tag=314159
Call-ID:
CSeq:
Retry-After: 3600
Content-Length: 0
```

[P-Access-Network-Info: This header contains information from the UE.](#)

Material in remainder of subclause not shown.

Proposed change

7.5.2 Sample multimedia signalling flow - addition of further media - originator and terminator are both roaming and operated by different networks

Figure 7.5.2-1 shows a multimedia signalling flow for the addition of another media where the originator and terminator are both roaming and operated by different networks. Both networks are without I-CSCF providing configuration independence. The UE has already established an IM session carrying voice and is generating an INVITE request to add video media to the already established IM session.

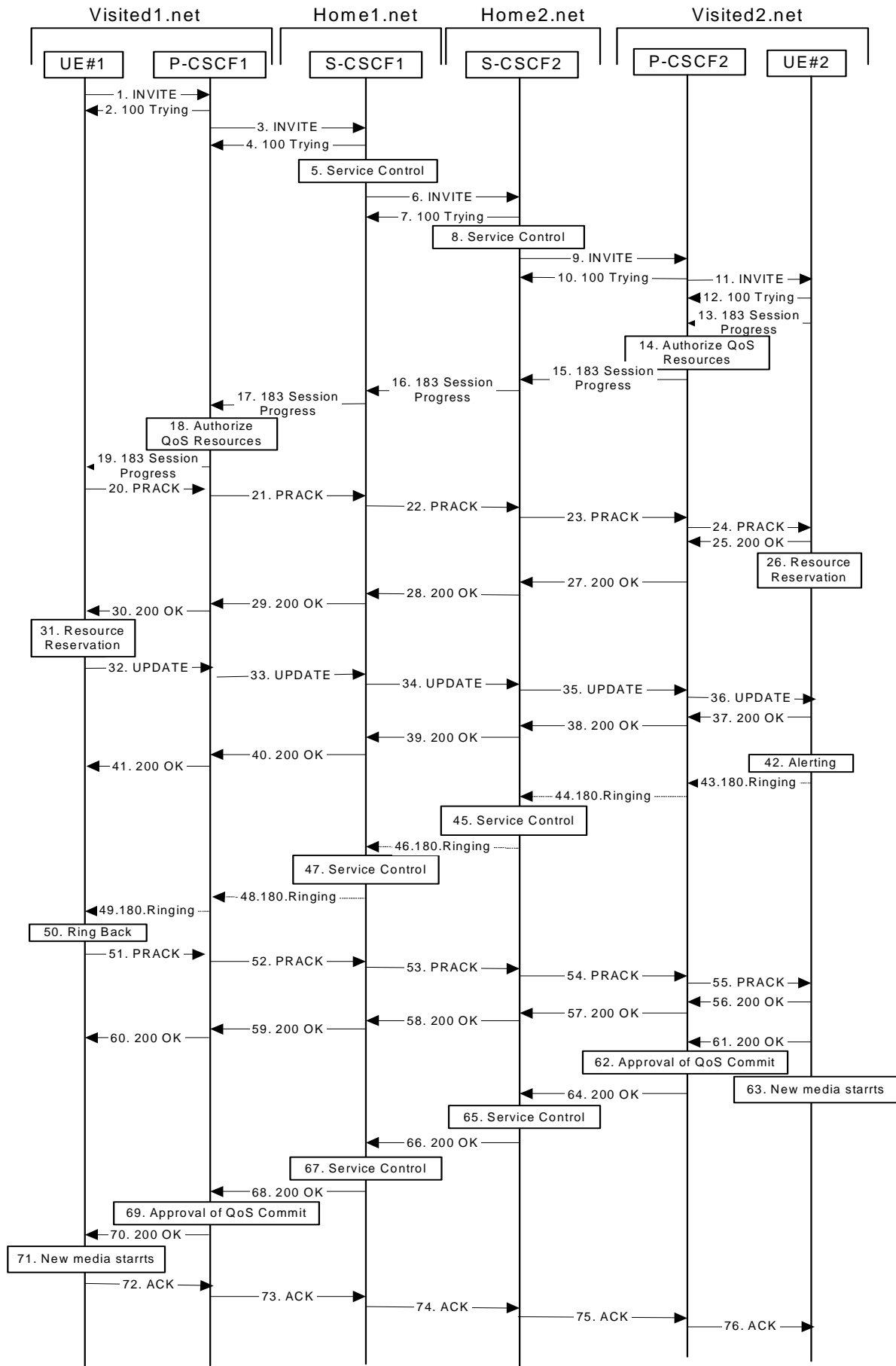


Figure 7.5.2-1: Sample multimedia signalling flow - addition of further media

1. INVITE (UE1 to P-CSCF1) – see example in table 7.5.2-1

UE#1 sends a SIP INVITE request, containing new SDP for the new video media and including the original SDP, to P-CSCF1, which is pcsf1.visited1.net in its visited network.

Table 7.5.2-1 INVITE (UE1 to P-CSCF1)

```

INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>,
      <sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
P-Preferred-Identity: "John Doe" <tel:+1-212-555-1111>
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 132 INVITE
Require: precondition, sec-agree
Proxy-Require: sec-agree
Supported: 100rel
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Security-Verify: ipsec-3gpp; q=0.1; alg= hmac-sha-1-96; spi-c=98765432; spi-s=87654321;
      port-c=8642; port-s=7531
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933618 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=rtpmap:96 telephone-event
m=application 32416 udp wb
b=AS:10
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv

```

Request-URI: Contains the international E.164 number from the user.

Via: Contains the IP address or FQDN of the originating UE.

P-Access-Network-Info: [the UE provides the access-type and access-info, related to the serving access network.](#)

P-Preferred-Identity: The user provides a hint about the identity to be used for this session.

Cseq: Is a random starting number.

Contact: Is the SIP URI that contains the IP address or FQDN of the originating UE.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

Material not included.

3. INVITE (P-CSCF1 to S-CSCF1) - see example in table 7.5.2-3

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Proxy-Require header is empty, it removes this header completely.

The INVITE request is sent by the P-CSCF to the next hop scscf1.home1.net, which is in UE's home network. Because this a re-invite, so the I-CSCF1 is not involved in sip transaction.

Table 7.5.2-3: INVITE (P-CSCF1 to S-CSCF1)

```
INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Record-Route: <sip:pcscf1.visited1.net;lr>
P-Access-Network-Info:
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
P-Asserted-Identity:
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"
Privacy:
From:
To:
Call-ID:
Cseq:
Require: precondition
Supported:
Contact:
Allow:
Content-Type:
Content-Length: (...)

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
```

P-Access-Network-Info: This header contains information from the UE.

Material not included.

25. 200 OK (UE2 to P-CSCF2) - see example in table 7.5.2-25

UE acknowledges the PRACK request with a 200 OK response.

Table 7.5.2-25: 200 OK (UE2 to P-CSCF2)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
RAck:
Content-Length:

```

P-Access-Network-Info: [the UE provides the access-type and access-info, related to the serving access network.](#)

Material not included.

27. 200 OK (P-CSCF2 to S-CSCF2) - see example in table 7.5.2-27

P-CSCF forwards the 200 OK response to S-CSCF.

Table 7.5.2-27: 200 OK (P-CSCF2 to S-CSCF2)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Length:

```

P-Access-Network-Info: [This header contains information from the UE.](#)

Material not included.

37. 200 OK (UE2 to P-CSCF2) - see example in table 7.5.2-37

UE acknowledges the UPDATE request with a 200 OK response.

Table 7.5.2-37: 200 OK (UE2 to P-CSCF2)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

v=0
o=- 2987933623 2987933627 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98
b=AS:75
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=rtpmap:96 telephone-event
m=application 61423 udp wb
b=AS:10
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv

```

38. 200 OK (P-CSCF2 to S-CSCF2) - see example in table 7.5.2-38

P-CSCF2 forwards the 200 OK response to S-CSCF2.

Table 7.5.2-38: 200 OK (P-CSCF2 to S-CSCF2)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=

```

Material not included.

54. 200 OK (UE2 to P-CSCF2) - see example in table 7.5.2-54

UE2 acknowledges the PRACK request with a 200 OK response.

Table 7.5.2-54: 200 OK (UE2 to P-CSCF2)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Length: 0

```

55. 200 OK (P-CSCF2 to S-CSCF2) - see example in table 7.5.2-55

P-CSCF2 forwards the 200 OK response to S-CSCF2.

Table 7.5.2-55: 200 OK (P-CSCF2 to S-CSCF2)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Length:
```

Material in remainder of subclause not shown.

Proposed change

7.5.3 Session attempt rejected by the network due to unauthorized media parameters

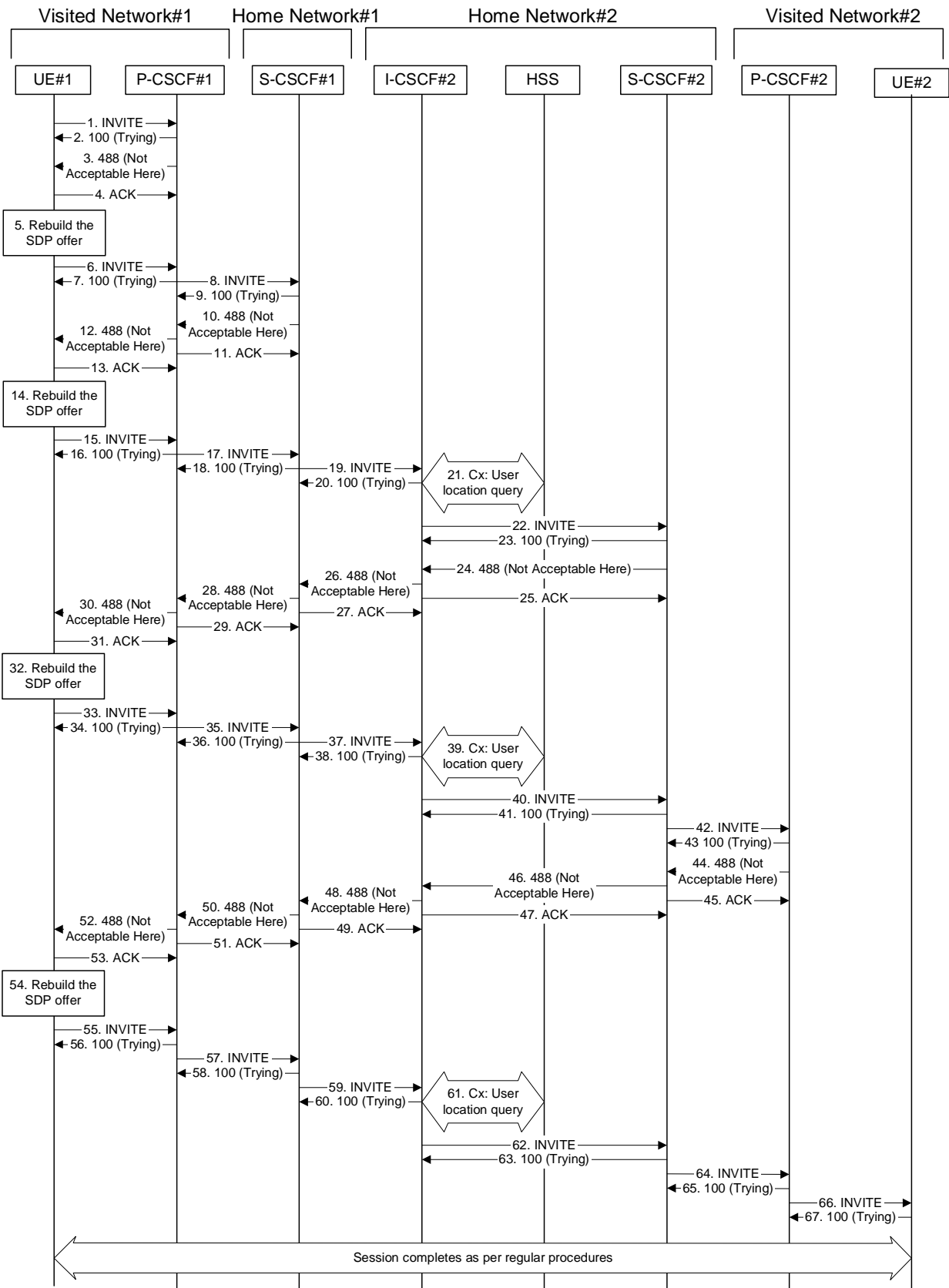


Figure 7.5.3-1: Session rejected by the network due to unauthorized media parameters

Figure 7.5.3-1 shows an example of how the network entities, such as the P-CSCF or the S-CSCF can reject a session attempt due to unauthorized media parameters.

This example shows the worst case scenario, where both P-CSCFs (originating and terminating) and both S-CSCFs (originating and terminating) involved in the session setup reject some part of the media.

For this example, we assume that the UE initiates the session attempt requiring a relatively large amount of media streams and codecs.

1. INVITE (UE1 to P-CSCF1) - see example in table 7.5.3-1

The UE sends the INVITE request, containing an initial SDP, to the P-CSCF1. The initial SDP offer includes three media streams: video, audio and whiteboard. Each media stream contains support for several codecs.

Table 7.5.3-1: INVITE (UE to P-CSCF)

```

INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
P-Preferred-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: precondition, sec-agree
Proxy-Require: sec-agree
Supported: 100rel
Security-Verify: ipsec-3gpp; q=0.1; alg= hmac-sha-1-96; spi-c=98765432; spi-s=87654321;
    port-c=8642; port-s=7531
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98 99 31 32
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
a=rtpmap:31 H261/90000
a=rtpmap:32 MPV/90000
m=audio 3456 RTP/AVP 97 0 8 100 96
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:0 PCMU/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:100 iLBC
a=rtpmap:96 telephone-event
m=application 32416 udp wb
b=AS:10
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv

```

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network.

Material in remainder of subclause not shown.

Proposed change

8.2 Mobile terminal initiated session release

Figure 8.2-1 shows a mobile terminal initiated IM CN subsystem application (SIP) session release. It is assumed that the session is active and that the bearer was established directly between the two visited networks (the visited networks could be the Home network in either or both cases).

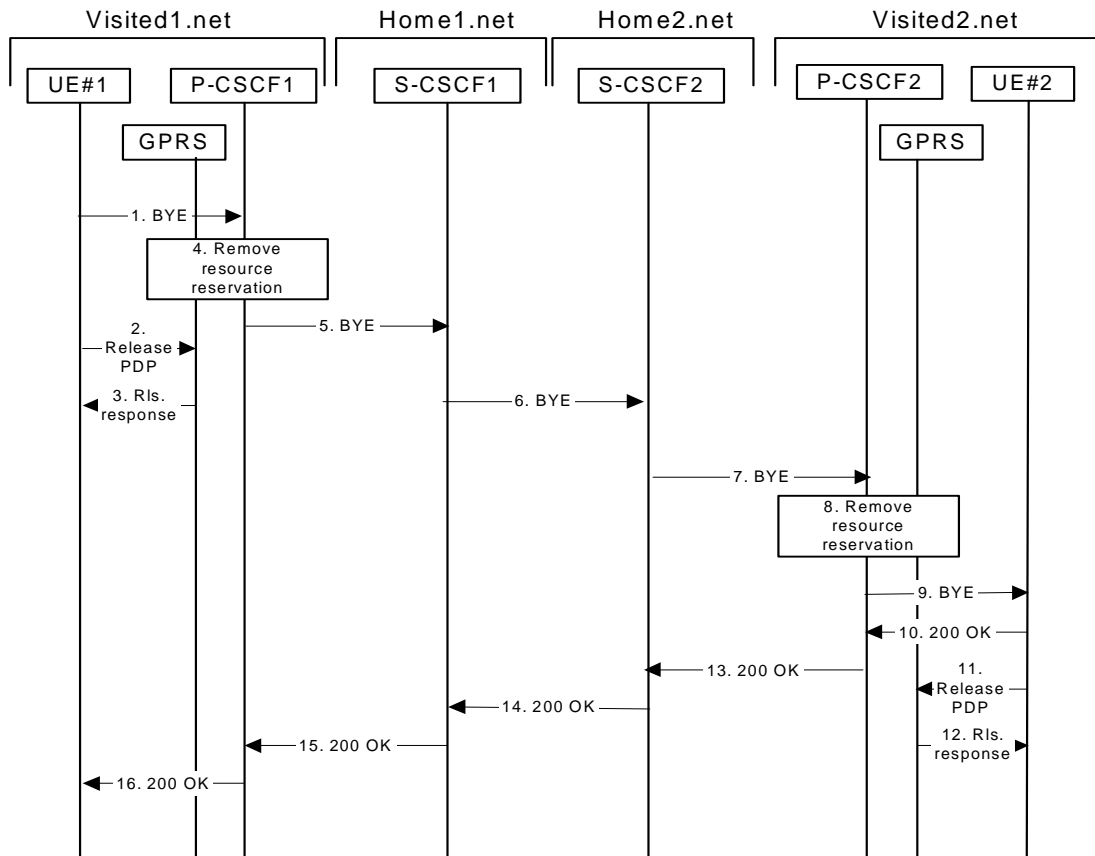


Figure 8.2-1: Mobile initiated session release

1 SIP BYE (UE to P-CSCF) - see example in table 8.2-1

One mobile party hangs up, which generates a SIP BYE request from the UE to the P-CSCF.

Table 8.2-1: SIP BYE (UE to P-CSCF)

```

BYE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>,
<sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321;
port-c=8642; port-s=7531
CSeq: 153 BYE
Content-Length: 0

```

Request-URI: takes the value of the Contact header of the original received response.

Via: takes the value of either the IP address or the FQDN of the originating UE.

P-Access-Network-Info: [the UE provides the access-type and access-info, related to the serving access network.](#)

From:/To:/Call-ID: the example contents of the From header, the To header and Call-ID header are used to identify the session being cleared, and therefore are identical to those of the previously received response for that session, so that they include any tag parameters.

CSeq: the content of the Cseq header must have a higher sequence number than the previous transaction. Here it is assumed that a Cseq value no greater than 152 has been previously used.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

Material not included.

5 SIP BYE (P-CSCF to S-CSCF) - see example in table 8.2-5

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Require and Proxy-Require headers are empty, it removes these headers completely.

The P-CSCF sends a SIP BYE request to the S-CSCF of the releasing party.

Table 8.2-5: SIP BYE (P-CSCF to S-CSCF)

```

BYE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info:
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
CSeq:
Content-Length: 0

```

P-Access-Network-Info: [This header contains information from the UE.](#)

Material not included.

10 200 OK (UE to P-CSCF) - see example in table 8.2-10

The mobile responds with a 200 OK response, which is sent back to the P-CSCF.

Table 8.2-10: 200 OK (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;branch=z9hG4bK361k21.1, SIP/2.0/UDP
scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

[P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network.](#)

Material not included.

13 200 OK (P-CSCF to S-CSCF) - see example in table 8.2-13

The P-CSCF sends a 200 OK response to the S-CSCF directly.

Table 8.2-13: 200 OK (P-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

[P-Access-Network-Info: This header contains information from the UE.](#)

Material in remainder of subclause not shown.

Proposed change

10.1.2 Mobile-to-mobile session hold and resume procedures

A session was previously established between an initiating UE and a terminating UE. Each of these UEs has an associated P-CSCF in the same network where they are currently located (either home or roaming), and a S-CSCF assigned in their home network. These functional elements co-operate to clear the session, and the procedures are independent of whether they are located in the home or visited networks.

The hold and resume procedures are identical whether the UE that initiated the session also initiates the session-hold, or whether the UE that terminated the session initiates the session-hold.

When a media stream has been placed on hold, it should not be resumed by any endpoint other than the one that placed it on hold.

These procedures show only one combination of Mobile-Originated, Serving-to-Serving, and Mobile-Terminated procedures, MO#2, S-S#2, and MT#2. These procedures do not show the use of optional I-CSCFs. If an I-CSCF was included in the signalling path during the session establishment procedure, it would continue to be used in any subsequent signalling flows such as the ones described in this clause. Procedures at the I-CSCFs are identical to those described for the BYE, PRACK, and UPDATE requests and responses described in other clauses.

As this flow does not require a user interaction at the remote end, it is realized with an UPDATE request.

The procedures for placing a media stream on hold, and later resuming the media stream, are as shown in figure 10.1.2-1:

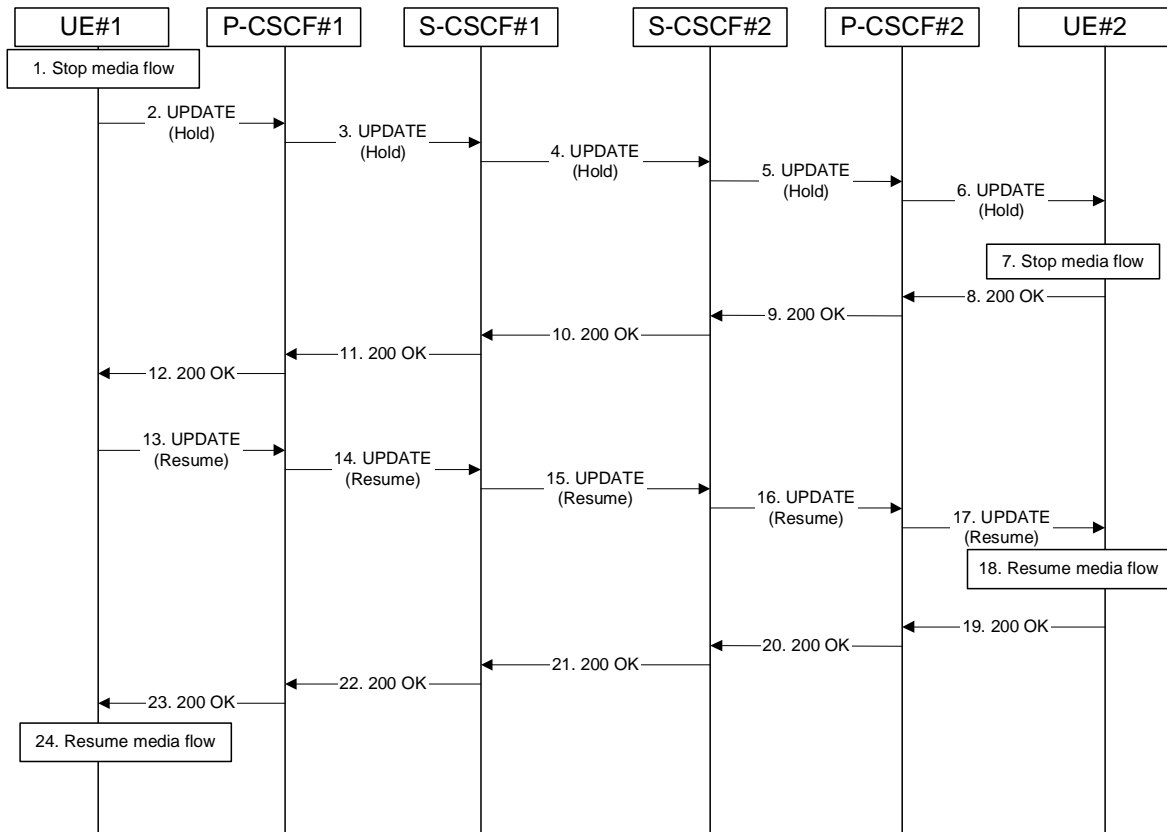


Figure 10.1.2-1: Mobile to mobile session hold and resume

Signalling flow procedures are as follows:

Material not included.

2. UPDATE(Hold) (UE to P-CSCF) – see example in table 10.1.2-2

UE#1 sends a Hold request to its proxy, P-CSCF#1.

Table 10.1.2-2: UPDATE(Hold) (UE to P-CSCF)

```

UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.home1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>,
<sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 130 UPDATE
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321;
port-c=8642; port-s=7531
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933616 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=inactive
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2

```

Request-URI: Contains the value of the Contact header from the 200 (OK) response to the initial INVITE.

Via: Contains the IP address or FQDN of the originating UE.

P-Access-Network-Info: [the UE provides the access-type and access-info, related to the serving access network.](#)

From:/To:/Call-ID: Contain the values previously used to establish the session, including the tag value from the response.

Cseq: Next higher sequential value.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

SDP The sendrecv media stream is placed on hold by changing it to inactive media stream, and no media is sent to the far end.

3. UPDATE (Hold) (P-CSCF to S-CSCF) – see example in table 10.1.2-3

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Require and Proxy-Require headers are empty, it removes these headers completely.

The P-CSCF#1 forwards the Hold request to S-CSCF#1.

Table 10.1.2-3: UPDATE(Hold) (P-CSCF to S-CSCF)

```

UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-forwards: 69
P-Access-Network-Info:
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
P-Charging-Vector: icid-value="AyretyU0dm+602Irt5tAFrbHLso=023551024"
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=

```

P-Access-Network-Info: This header contains information from the UE.

P-Charging-Vector: The P-CSCF inserts this header and populates the icid parameters with a globally unique value.

Material not included.

8. 200-OK (UE to P-CSCF) – see example in table 10.1.2-8

UE#2 acknowledges receipt of the Hold request (6) with a 200 (OK) final response, sent to P-CSCF#2.

Table 10.1.2-8: 200 OK (UE to P-CSCF)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.home2.net:5088;comp=sigcomp;branch=z9hG4bK556g98.5, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933616 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=audio 6402 RTP/AVP 97
b=AS:25.4
a=inactive
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2

```

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network.

SDP: Since the media stream was offered as inactive, it is marked as inactive in the response.

9. 200-OK (P-CSCF to S-CSCF) – see example in table 10.1.2-9

P-CSCF#2 forwards the 200 OK final response to S-CSCF#2.

Table 10.1.2-9: 200 OK (P-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
```

[P-Access-Network-Info: This header contains information from the UE.](#)

Material in remainder of subclause not shown.

Proposed change

10.1.3 Mobile-initiated hold and resume of a mobile-PSTN session

An IM session was previously established between an initiating UE and a MGCF acting as a gateway for a session terminating on the PSTN, or between an initiating MGCF acting as a gateway for a session originating on the PSTN to a terminating UE. The UE has an associated P-CSCF in the same network where it is currently located (either home or roaming), an S-CSCF assigned in its home network, and a BGCF that chooses the MGCF. These functional elements co-operate to clear the session, and the procedures are independent of whether they are located in the subscriber's home or visited networks. Therefore there is no distinction in this clause of home network vs. visited network.

The session hold and resume procedure is similar whether the UE initiated the session to the PSTN, or if the PSTN initiated the session to the UE. The only difference is the optional presence of the BGCF in the case of a session initiated by the UE. The BGCF might or might not be present in the signalling path after the first INVITE is routed.

These procedures show only one combination of Mobile-Originated, Serving-to-Serving, and Mobile-Terminated procedures, MO#2, S-S#3, and CS-T. These procedures do not show the use of optional I-CSCFs, or the use of the BGCF in achieving network configuration independence. If an I-CSCF/BGCF was included in the signalling path during the session establishment procedure, it would continue to be used in any subsequent signalling flows such as the ones described in this clause. Procedures at the I-CSCFs are identical to those described for the BYE, PRACK, and UPDATE requests and responses described in other clauses.

As this flow does not require a user interaction at the remote end, it is realized with an UPDATE request.

The procedures for placing a media stream on hold, and later resuming the media stream, are as shown in figure 10.1.3-1:

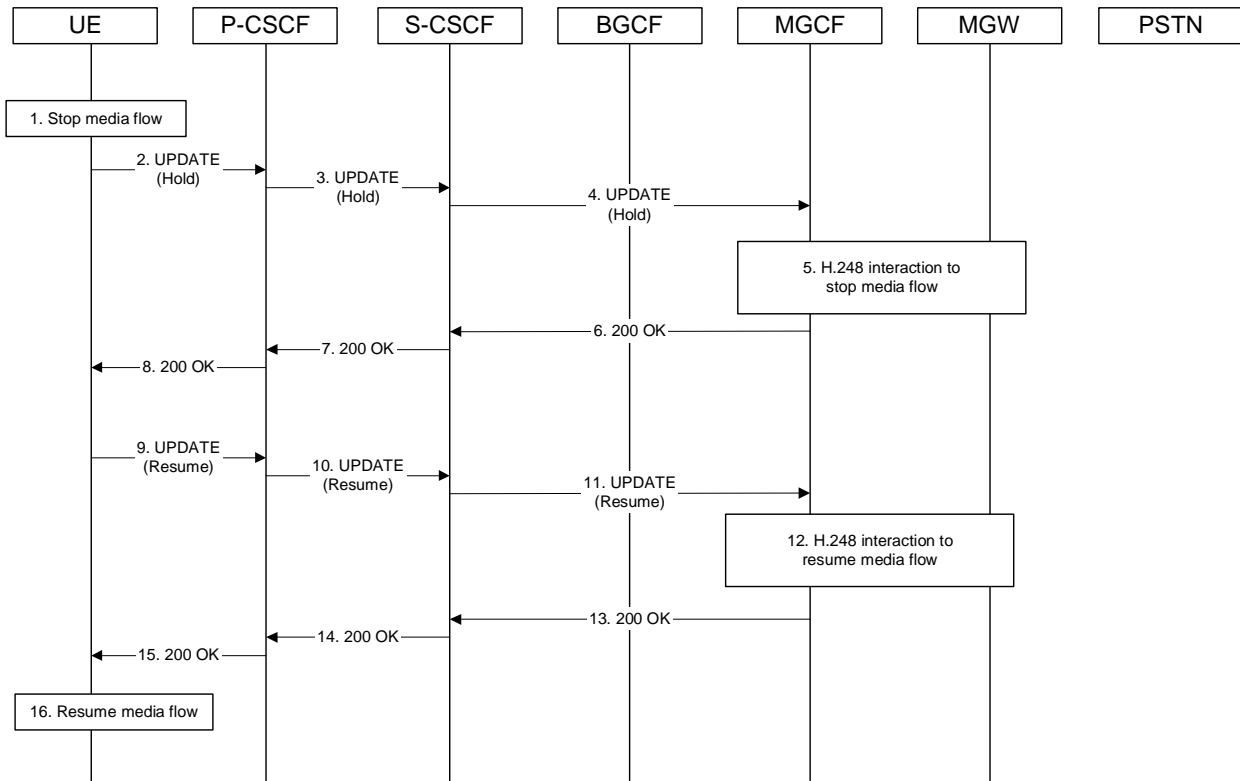


Figure 10.1.3-1: Mobile to PSTN session hold and resume

Signalling flow procedures are as follows:

Material not included.

2. UPDATE (Hold) (UE to P-CSCF) – see example in 10.1.3-2

UE sends a Hold request to its proxy, P-CSCF.

Table 10.1.3-2: UPDATE (Hold) (UE to P-CSCF)

```

UPDATE sip:mgcf1.homel.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:pcscf1.homel.net:7531;lr;comp=sigcomp>, <sip:scscf1.homel.net;lr>
From: <sip:user1_public1@homel.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfgk490333
Cseq: 130 UPDATE
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321;
port-c=8642; port-s=7531
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933616 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=inactive
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
    
```

Request-URI: Contains the value of the Contact header from the 200 (OK) response to the initial INVITE.

Via: Contains the IP address or FQDN of the originating UE.

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network.

From:/To:/Call-ID: Contain the values previously used to establish the session, including the tag value from the response.

Cseq: Next higher sequential value.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

SDP The sendrecv media stream is placed on hold by changing it to inactive media stream, and no media is sent to the far end.

3. UPDATE (Hold) (P-CSCF to S-CSCF) – see example in table 10.1.3-3

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Require and Proxy-Require headers are empty, it removes these headers completely.

The P-CSCF forwards the Hold request to S-CSCF.

Table 10.1.3-3: UPDATE (Hold) (P-CSCF to S-CSCF)

```
UPDATE sip:mgcf1.homel.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.homel.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
 [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info:
Route: <sip:scscf1.homel.net;lr>
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
```

P-Access-Network-Info: This header contains information from the UE.

P-Charging-Vector: The P-CSCF inserts this header and populates the icid parameters with a globally unique value.

Material in remainder of subclause not shown.

Proposed change

10.3.3 Codec or media flow change requiring new resources and/or authorisation

After the multimedia session is established, it is possible for either endpoint to change the set of media flows or codec for a media flow. If the change requires additional resources beyond those previously signalled or reserved, then it is necessary to perform the resource reservation and bearer establishment procedures. If the reservation request fails for whatever reason, the original multimedia session remains in progress.

An example signalling flow for a codec or media flow change requiring new resources and/or authorization is given in figure 10.3.3-1. This example shows mobile originated while in home network, establishing a session with another mobile served by the same network operator, also in its home network (MO#2, S-S#2, MT#2). Other configurations may include I-CSCFs in the signalling path; procedures at the I-CSCFs are identical to those described for the BYE, PRACK, and UPDATE requests and responses described in other clauses.

As this flow may require user interaction at the remote end to accept the proposed changes, it is realized with a re-INVITE request.

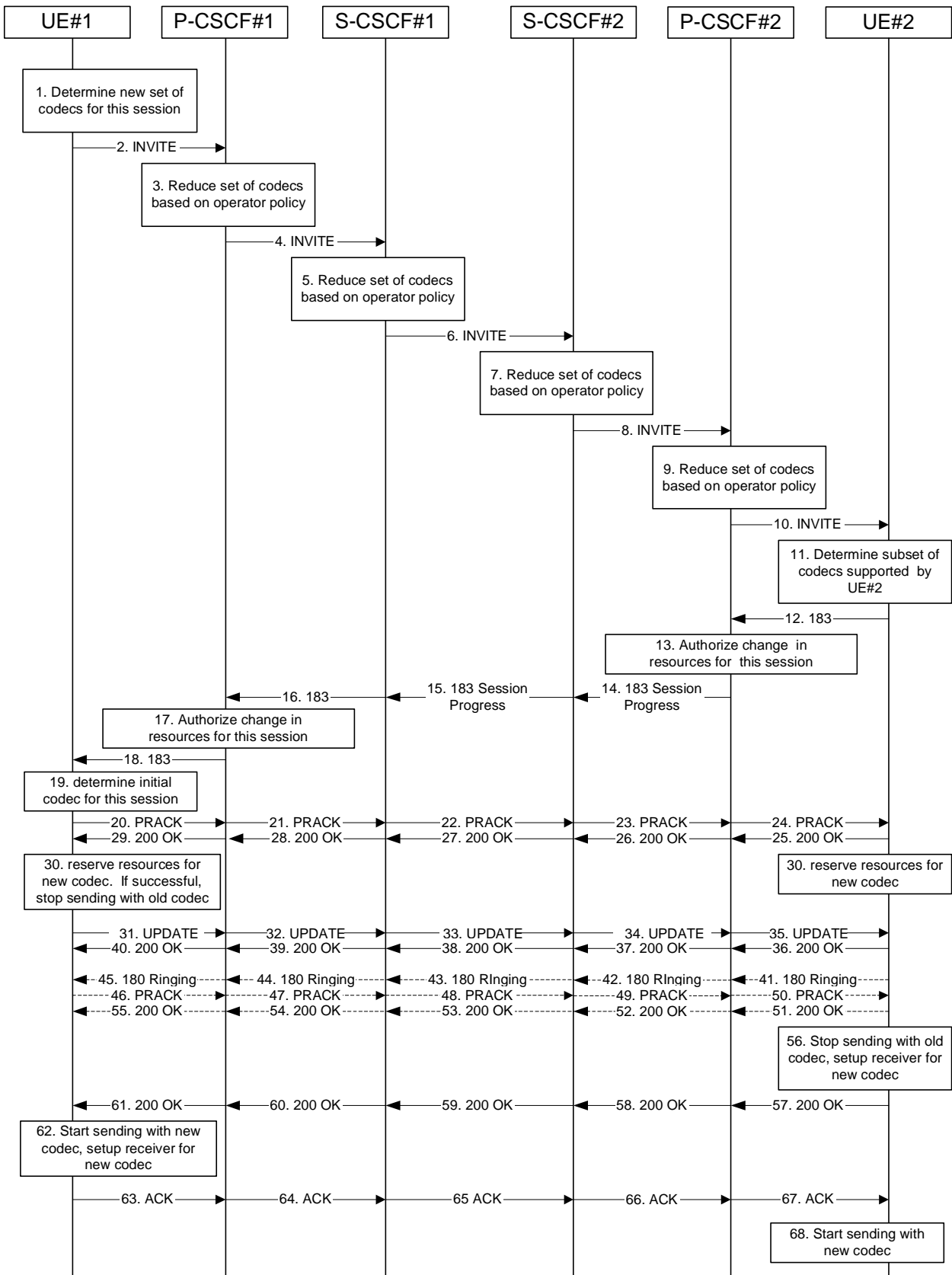


Figure 10.3.3-1: Codec or media flow change - new reservation

The detailed procedure is as follows:

Material not included.

2. INVITE (UE to P-CSCF) – see example in table 10.3.3-2

UE#1 sends the INVITE request to P-CSCF#1 containing this SDP.

Table 10.3.3-2: INVITE (UE to P-CSCF)

```

INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.home1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>,
      <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
P-Preferred-Identity: "John Doe" <tel:+1-212-555-1111>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 131 INVITE
Require: precondition, sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321;
               port-c=8642; port-s=7531
Supported: 100rel
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 3400 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:99:MPV
m=audio 3456 RTP/AVP 10
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv

```

Request-URI: Contains the value of the Contact header from the 200 (OK) response to the initial INVITE.

Via: Contains the IP address or FQDN of the originating UE.

P-Access-Network-Info: [the UE provides the access-type and access-info, related to the serving access network.](#)

From:/To:/Call-ID: Contain the values previously used to establish the session, including the tag value from the response.

Cseq: Next higher sequential value.

Contact: The SIP URI that contains the IP address or FQDN of the originating UE.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

SDP The SDP contains the revised set of codecs desired by UE#1.

Material not included.

4. INVITE (P-CSCF to S-CSCF) – see example in table 10.3.3-4

P-CSCF#1 forwards the INVITE request to S-CSCF#1.

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Proxy-Require header is empty, it removes this header completely.

Table 10.3.3-4: INVITE (P-CSCF to S-CSCF)

```

INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
Record-Route: <sip:pcscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <tel:+1-212-555-1111>
P-Access-Network-Info:
Privacy:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
From:
To:
Call-ID:
Cseq:
Require: precondition
Supported:
Contact:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=

```

P-Access-Network-Info: This header contains information from the UE.

Material not included.

12. 183 Session Progress (UE to P-CSCF) – see example in table 10.3.3-12

UE#2 returns a 183 Session Progress response, containing the SDP answer, to P-CSCF#2.

Table 10.3.3-12: 183 Session Progress (UE to P-CSCF)

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcscf2.home2.net:5088;comp=sigcomp;branch=z9hG4bK556g98.5, SIP/2.0/UDP
scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Record-Route: <sip:pcscf2.home2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>,
<sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
P-Preferred-Identity: "John Smith" <tel:+1-212-555-2222>
Privacy: none
From:
To:
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 18
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 6540 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:99:MPV
m=audio 6544 RTP/AVP 10
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv

```

[P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network.](#)

SDP The SDP contains an answer to the received offer.

Material not included.

14. 183 Session Progress (P-CSCF to S-CSCF) - see example in table 10.3.3-14

P-CSCF#2 forwards the 183 Session Progress response to S-CSCF#2.

Table 10.3.3-14: 183 Session Progress (P-CSCF to S-CSCF)

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKdashds7
P-Access-Network-Info:
Record-Route:
P-Asserted-Identity: "John Smith" <tel:+1-212-555-2222>
Privacy:
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAfrbHLso=023551024"
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=

```

[P-Access-Network-Info: This header contains information from the UE.](#)

Material in remainder of subclause not shown.

Proposed change

10.3.5 Error changing codec or media flows requiring new resources and/or authorisation

After the multimedia session is established, it is possible for either endpoint to change the set of media flows or codec for a media flow. If the change requires additional resources beyond those previously reserved, then it is necessary to perform the resource reservation and bearer establishment procedures. If the reservation request fails for whatever reason, the original multimedia session remains in progress.

If the destination UE is unable, or unwilling, to change to the new set of codecs, it may return a 488 Not Acceptable Here error response.

If the P-CSCF and/or S-CSCF disallow a particular media flow or codec appearing in the SDP from the initiating UE, and it is the last codec in the last media flow, the CSCF returns a 488 Not Acceptable Here error response.

An example signalling flow for an error changing codec or media flow requiring new resources and/or authorization is given in figure 10.3.5-1. This is the case where the UE rejects the codec change; rejection by a CSCF is a subset of this signalling flow.

This example shows mobile originated while in home network, establishing a session with another mobile served by the same network operator, also in its home network (MO#2, S-S#2, MT#2). Other configurations may include I-CSCFs in the signalling path; procedures at the I-CSCFs are identical to those described for the BYE, PRACK, and UPDATE requests and responses described in other clauses.

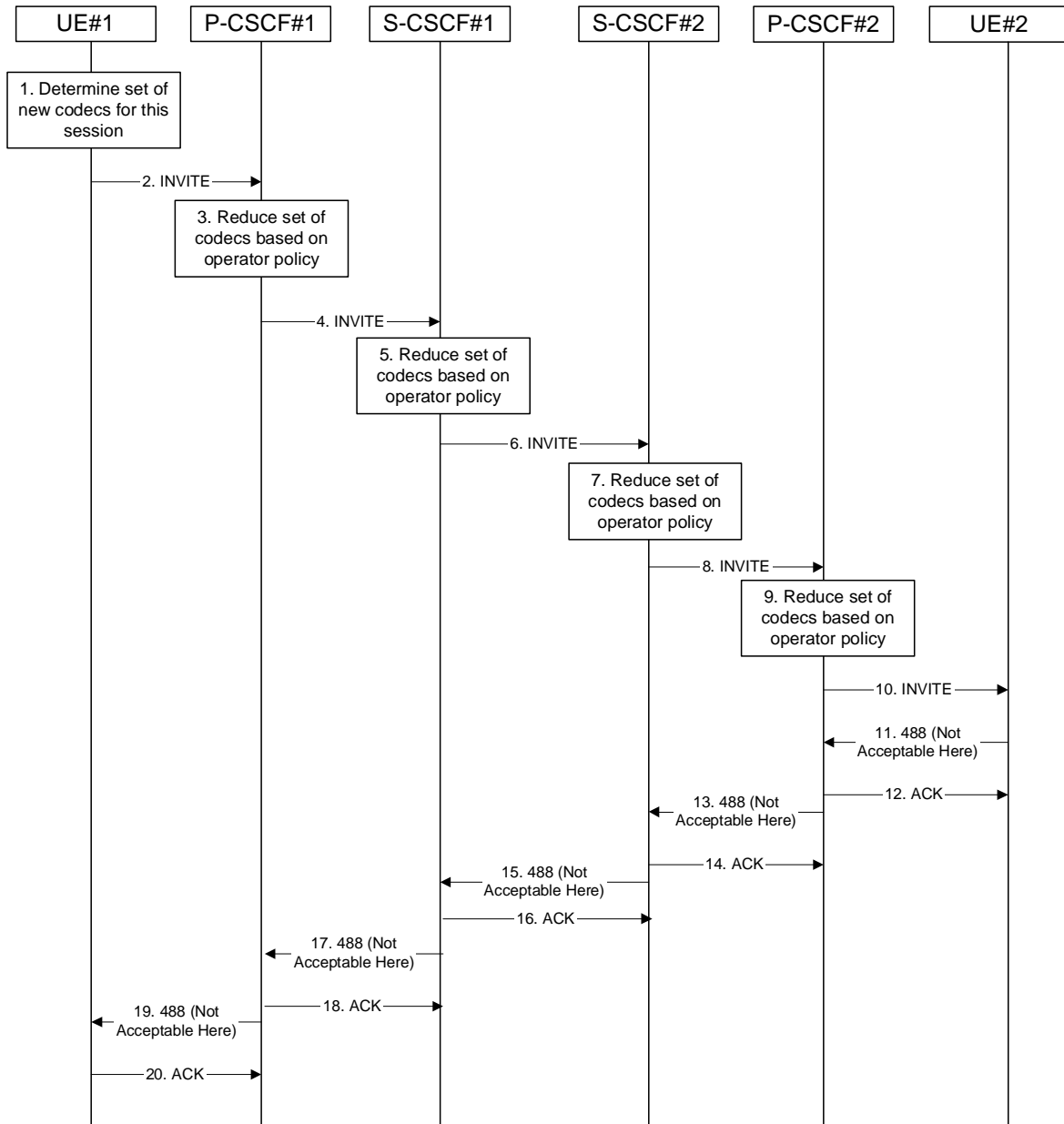


Figure 10.3.5-1: Error changing Codec or media flows needing a new reservation

The detailed procedure is as follows:

Material not included.

2. INVITE (UE to P-CSCF) – see example in table 10.3.5-2

UE#1 sends the INVITE request to P-CSCF#1 containing this SDP.

Table 10.3.5-2: INVITE (UE to P-CSCF)

```

INVITE sip:[5555:eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.home1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>,
<sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
P-Preferred-Identity: "John Doe" <tel:+1-212-555-1111>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfgklkj490333
Cseq: 131 INVITE
Require: precondition, sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg= hmac-sha-1-96; spi-c=98765432; spi-s=87654321;
port-c=8642; port-s=7531
Supported: 100rel
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 3400 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtptime:99:MPV
m=audio 3456 RTP/AVP 10
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv

```

Request-URI: Contains the value of the Contact header from the 200 (OK) response to the initial INVITE.

Via: Contains the IP address or FQDN of the originating UE.

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network.

From:/To:/Call-ID: Contain the values previously used to establish the session, including the tag value from the response.

Cseq: Next higher sequential value.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

Contact: A SIP URI that contains the IP address or FQDN of the originating UE.

SDP The SDP contains the revised set of codecs desired by UE#1.

Material not included.

4. INVITE (P-CSCF to S-CSCF) – see example in table 10.3.5-4

P-CSCF#1 forwards the INVITE request to S-CSCF#1.

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Proxy-Require header is empty, it removes this header completely.

Table 10.3.5-4: INVITE (P-CSCF to S-CSCF)

```

INVITE sip:[5555:eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
Record-Route: <sip:pcscf1.home1.net;lr>
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"
P-Asserted-Identity: "John Doe" <tel:+1-212-555-1111>
P-Access-Network-Info:
Privacy:
From:
To:
Call-ID:
Cseq:
Require: precondition
Supported:
Contact:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=

```

P-Access-Network-Info: This header contains information from the UE.

Material not included.

12. 488 Not Acceptable Here (UE to P-CSCF) – see example in table 10.3.5-12

UE#2 responds to the INVITE request (10) with a 488 (Not Acceptable Here) response, sent to P-CSCF#2.

Table 10.3.5-12: 488 Not Acceptable Here (UE to P-CSCF)

```

SIP/2.0 488 Not Acceptable Here
Via: SIP/2.0/UDP pcscf2.home2.net:5088;comp=sigcomp;branch=z9hG4bK556g98.5, SIP/2.0/UDP
    scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Length: 0

```

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network.

Material not included.

14. 488 Not Acceptable Here (P-CSCF to S-CSCF) – see example in table 10.3.5-14

P-CSCF#2 sends the 488 (Not Acceptable Here) response to S-CSCF#2.

Table 10.3.5-14: 488 Not Acceptable Here (P-CSCF to S-CSCF)

```
SIP/2.0 488 Not Acceptable Here
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Length:
```

[P-Access-Network-Info: This header contains information from the UE.](#)

Material in remainder of subclause not shown.

Proposed change

10.4.2 Session redirection initiated by S-CSCF to IM CN subsystem (MO#2, MT#2 assumed)

One of the entities in a basic session that may initiate a redirection is the S-CSCF of the destination subscriber. The subscriber profile information obtained from the HSS by the 'Cx-pull' during registration may contain complex logic and triggers causing session redirection. S-CSCF#2 sends the SIP INVITE request to the I-CSCF for the new destination (I-CSCF#F in the figure), who forwards it to S-CSCF#F, who forwards it to the new destination.

In cases when the destination subscriber is not currently registered in the IM CN subsystem, the I-CSCF may assign a temporary S-CSCF to perform the service control on behalf of the intended destination. This temporary S-CSCF takes the role of S-CSCF#2 in figure 10.4.2-1.

The service implemented by figure 10.4.2-1 is typically "Session Forward Unconditional", "Session Forward Variable" or "Selective Session Forwarding". S-CSCF#2 may also make use of knowledge of current sessions in progress at the UE, and implement "Session Forwarding Busy" in this way.

There are 9 distinct signalling flows for this session redirection, as follows:

- Single network operator performing origination, forwarding, and termination.
- One network operator performing origination and forwarding, separate network operator performing termination, with a THIG between to maintain configuration independence.
- One network operator performing origination and forwarding, separate network operator performing termination, without a THIG between.
- One network operator performing origination, second network operator performing forwarding and termination, with a THIG between to maintain configuration independence.
- One network operator performing origination, second network operator performing forwarding and termination, without a THIG between.
- One network operator performing origination, second network operator performing forwarding, and third network operator performing termination, without any THIGs between them.
- One network operator performing origination, second network operator performing forwarding, and third network operator performing termination, with a THIG between first two to maintain configuration independence

- One network operator performing origination, second network operator performing forwarding, and third network operator performing termination, with a THIG between second and third to maintain configuration independence.
- One network operator performing origination, second network operator performing forwarding, and third network operator performing termination, with a THIG between all three to maintain configuration independence.

Further, it is possible that a session will be redirected multiple times, so the above list generalizes to include multiple forwarding elements.

All of these Session-Redirection procedures can be combined with MO#1a, MO#1b, or MO#2 for session origination, and with MT#1a, MT#1b, or MT#2 for session termination.

Only the first case is shown here, with a single network operator performing origination, forwarding, and termination. The additional cases can be derived from the procedures shown here and in S-S#1a, and S-S#1b.

This case is shown in the signalling flow in figure 10.4.2-1.

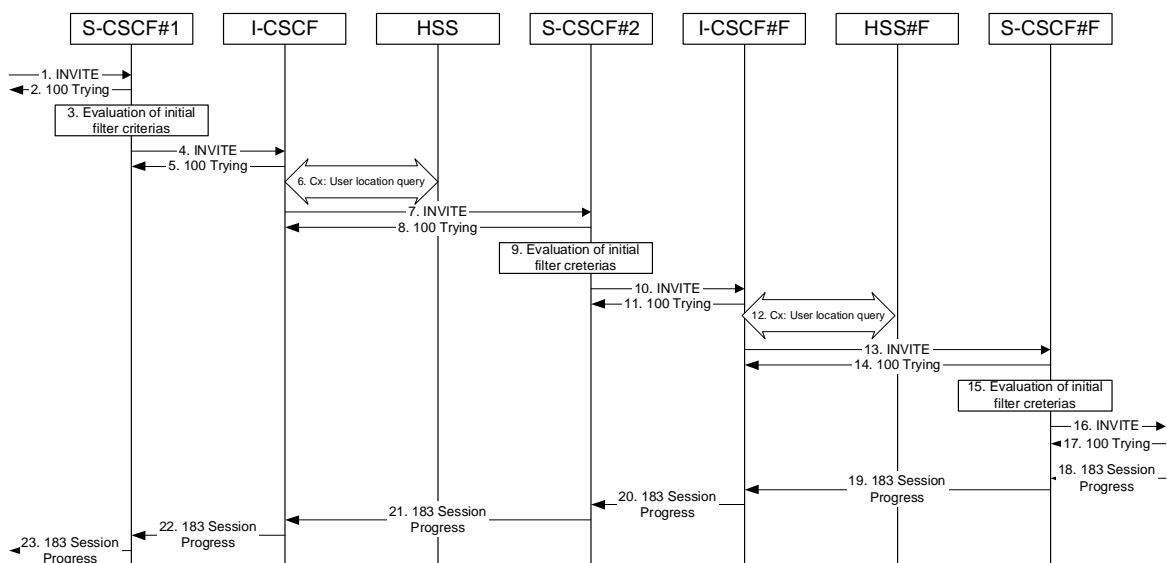


Figure 10.4.2-1: Session redirection initiated by S-CSCF to IM CN subsystem

The IM CN subsystem - Session Redirection Procedure is as follows:

1. INVITE (MO to S-CSCF) – see example in table 10.4.2-1

The INVITE request is sent from the UE to S-CSCF#1 by the procedures of the originating signalling flow.

Table 10.4.2-1: INVITE (MO to S-CSCF)

```

INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Record-Route: <sip:pcscf1.home1.net;lr>
Route: <sip:scscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <tel:+1-212-555-1111>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfgklkj490333
Cseq: 127 INVITE
Require: precondition
Supported: 100rel
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 3400 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:99 MPV
m=video 3402 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:99 MPV
m=audio 3456 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
m=audio 3458 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000

```

[P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network.](#)

Material not included.

18. 183 Session Progress (MT to S-CSCF) – see example in table 10.4.2-18

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.

Table 10.4.2-18: 183 Session Progress (MT to S-CSCF)

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf3.home1.net;branch=z9hG4bKyiiir82.4, SIP/2.0/UDP
icscf3_s.home1.net;branch=z9hG4bK87rr82.1, SIP/2.0/UDP
scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home1.net;branch=z9hG4bK09a238.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Record-Route: <sip:pcscf3.home1.net;lr>, <sip:scscf3.home1.net;lr>,
<sip:scscf2.home1.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
P-Asserted-Identity: "John Smith" <tel:+1-212-555-3333>
Privacy: none
P-Charging-Vector:
From:
To: <tel:+1-212-555-2222>;tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 9021
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
m=audio 0 RTP/AVP 97 96 0 15

```

[P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network.](#)

Material in remainder of subclause not shown.

Proposed change

10.4.3 Session redirection initiated by S-CSCF to CS-domain (S-S#2, MT#2 assumed)

The S-CSCF in the scenario above may determine that the session is to be redirected to a CS-domain endpoint, or to the PSTN. It recognizes this situation by the redirected URL being a tel: URL.

For the simplest configuration (Mobile located in home service area (MO#2), initiating a session to a destination served by same network operator (S-S#2)), the handling of redirection to a tel: URL is shown in figure 10.4.3-1. Other cases, which include roaming, PSTN origination, destinations served by other network operators, and THIGs, are handled in a similar manner.

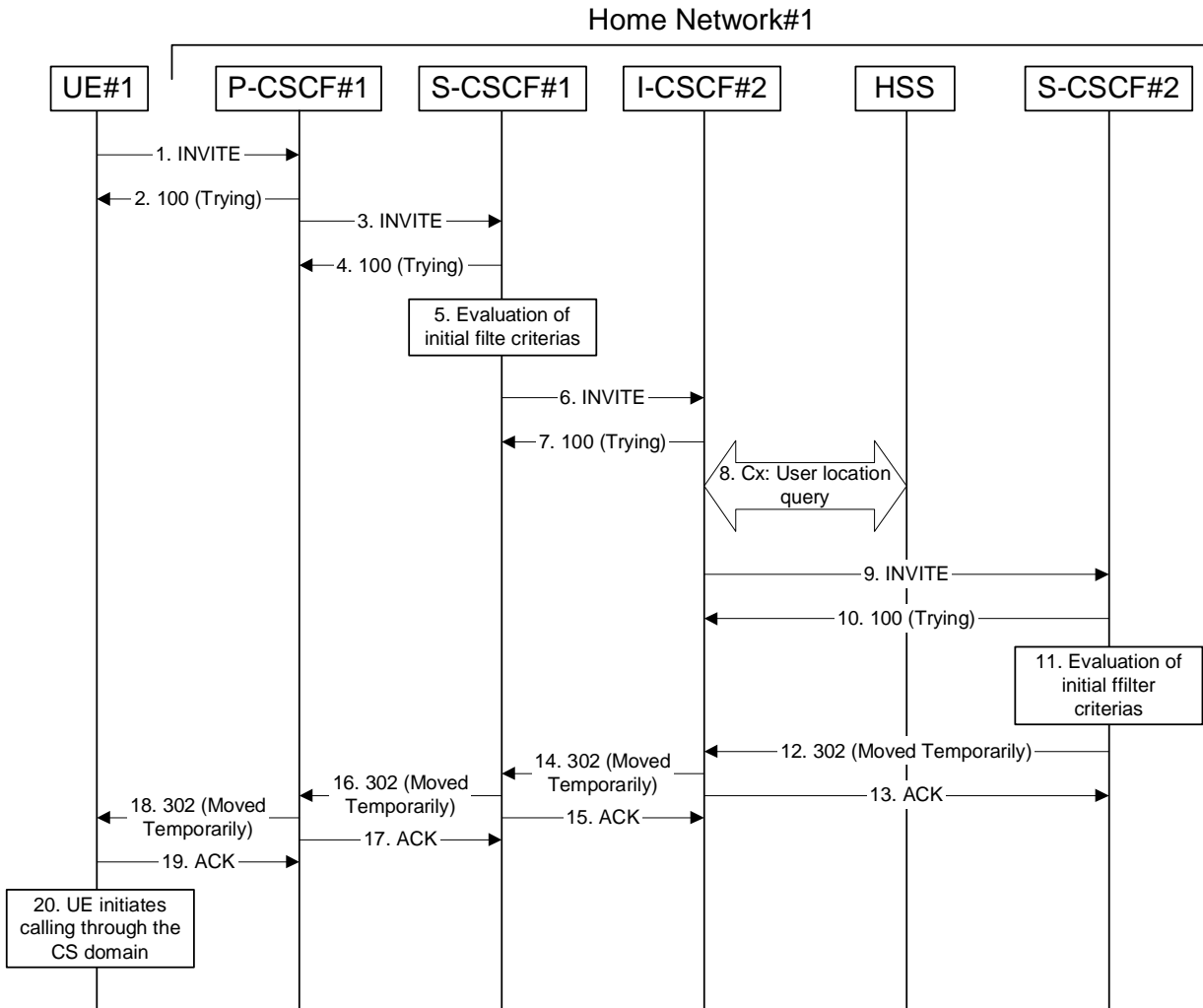


Figure 10.4.3-1: Session redirection initiated by S-CSCF to CS-Domain

Step-by-step processing is as follows:

1. INVITE (UE to P-CSCF) – see example in table 10.4.3-1

UE sends the INVITE request, containing an initial SDP, to the P-CSCF determined via the CSCF discovery mechanism.

Table 10.4.3-1: INVITE (UE to P-CSCF)

```

INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.home1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
P-Preferred-Identity: "John Doe" <tel:+1-212-555-1111>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: precondition, sec-agree
Proxy-Require: sec-agree
Supported: 100rel
Security-Verify: ipsec-3gpp; q=0.1; alg= hmac-sha-1-96; spi-c=98765432; spi-s=87654321;
    port-c=8642; port-s=7531
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 3400 RTP/AVP 98 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H261
a=rtpmap:99 MPV
m=video 3402 RTP/AVP 98 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H261
a=rtpmap:99 MPV
m=audio 3456 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
m=audio 3458 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000

```

Request-URI: Contains the keyed number from the user.

Via: Contains the IP address or FQDN of the originating UE.

P-Preferred-Identity: the user provides a hint about the identity to be used for this session.

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network **as specified in sub-clause 'Additional coding rules for P access network info-header', in 3GPP TS 24.229 [16].**

From:/To:/Call-ID: Follow the recommendations of RFC 3323 [13], even though anonymity is not being requested for this session.

Cseq: is a random starting number.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

Contact: is a SIP URI that contains the IP address or FQDN of the originating UE.

Material in remainder of subclause not shown.

Proposed change

10.4.4 Session redirection initiated by S-CSCF to general endpoint (S-S#2, MT#2 assumed)

The S-CSCF in the scenario above may determine that the session is to be redirected to an endpoint outside the IMS and outside the CS-domain. Examples of these destinations include web pages, email addresses, etc. It recognizes this situation by the redirected URL being other than a sip: or tel: URL.

For the simplest configuration (Mobile located in home service area (MO#2), initiating a session to a destination served by same network operator(S-S#2)), the handling of redirection to a general URL is shown in figure 10.4.4-1. Other cases, which include roaming, PSTN origination, destinations served by other network operators, and THIGs, are handled in a similar manner.

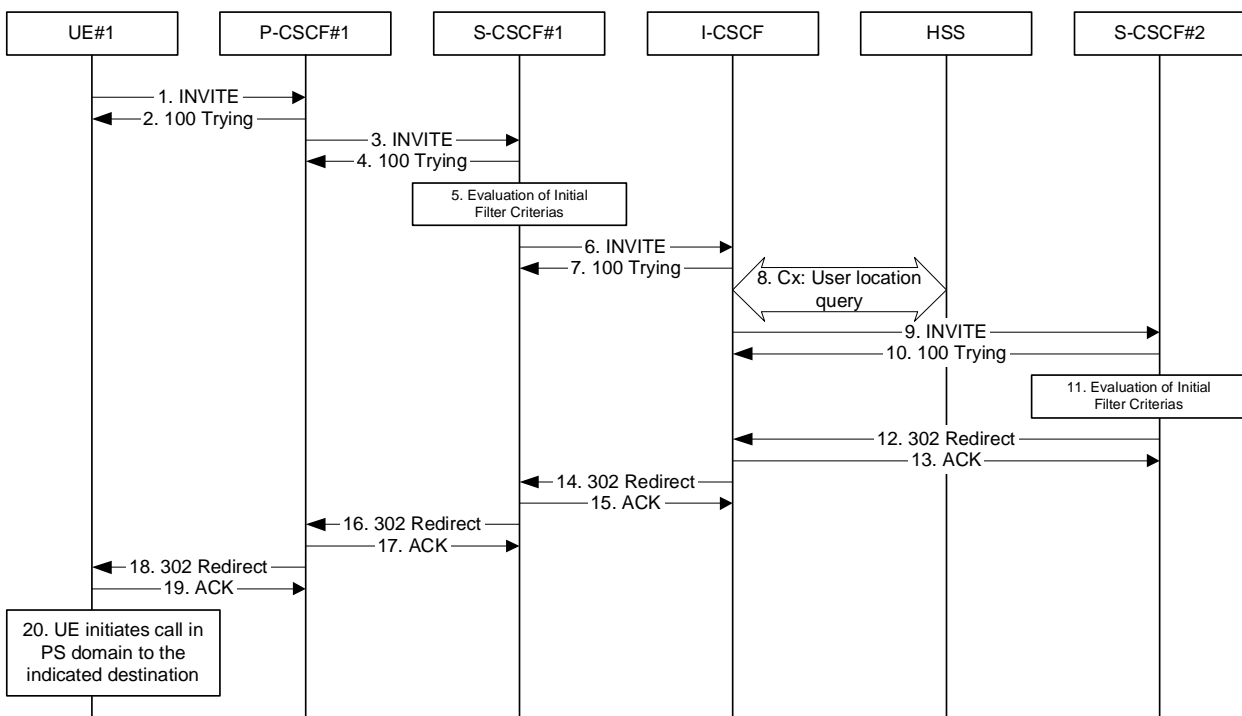


Figure 10.4.4-1: Session redirection initiated by S-CSCF to general endpoint

Step-by-step processing is as follows:

1. INVITE (UE to P-CSCF) – see example in table 10.4.4-1

UE sends the INVITE request, containing an initial SDP, to the P-CSCF determined via the CSCF discovery mechanism.

Table 10.4.4-1: INVITE (UE to P-CSCF)

```

INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd];branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.home1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
P-Preferred-Identity: "John Doe" <tel:+1-212-555-1111>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: precondition, sec-agree
Proxy-Require: sec-agree
Supported: 100rel
Security-Verify: ipsec-3gpp; q=0.1; alg= hmac-sha-1-96; spi-c=98765432; spi-s=87654321;
    port-c=8642; port-s=7531
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 3400 RTP/AVP 98 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H261
a=rtpmap:99 MPV
m=video 3402 RTP/AVP 98 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H261
a=rtpmap:99 MPV
m=audio 3456 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
m=audio 3458 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000

```

Request-URI: Contains the keyed number from the user.

Via: Contains the IP address or FQDN of the originating UE.

P-Preferred-Identity: the user provides a hint about the identity to be used for this session.

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network ~~as specified in sub-clause 'Additional coding rules for P access network info header', in 3GPP TS 24.229 [16].~~

- Route:** contains the P-CSCF address learnt during P-CSCF discovery, plus the elements from the Service-Route header from registration. The P-CSCF URI contains the port number learnt during the security agreement negotiation
- From:/To:/Call-ID:** Follow the recommendations of RFC 3323 [13], even though anonymity is not being requested for this session.
- Cseq:** is a random starting number.
- Security-Verify:** Contains the security agreement as represented by the received Security-Server header.
- Contact:** is a SIP URI that contains the IP address or FQDN of the originating UE.

Material in remainder of subclause not shown.

Proposed change

10.4.7 Session redirection initiated after bearer establishment

The UE of the destination subscriber may request the session be redirected after a customer-specified ringing interval. The UE may also implement customer-specific feature processing, and base its decision to redirect this session on such things as the identity of caller, current sessions in progress, other applications currently being accessed, etc. The UE sends the SIP Redirect response to its P-CSCF, who forwards back along the signalling path to the originating endpoint, who initiates a session to the new destination.

The service implemented by this signalling flow is typically "Session Forward No Answer".

Redirection to another CN subsystem endpoint (e.g. a sip: URL) is shown in figure 10.4.7-1. The figure starts at the point in the session establishment when the destination is known, resources have been reserved, and the destination subscriber is being alerted. If the desire for redirection was known earlier than this point, the procedures of Subclause 10.4.6 would be followed instead.

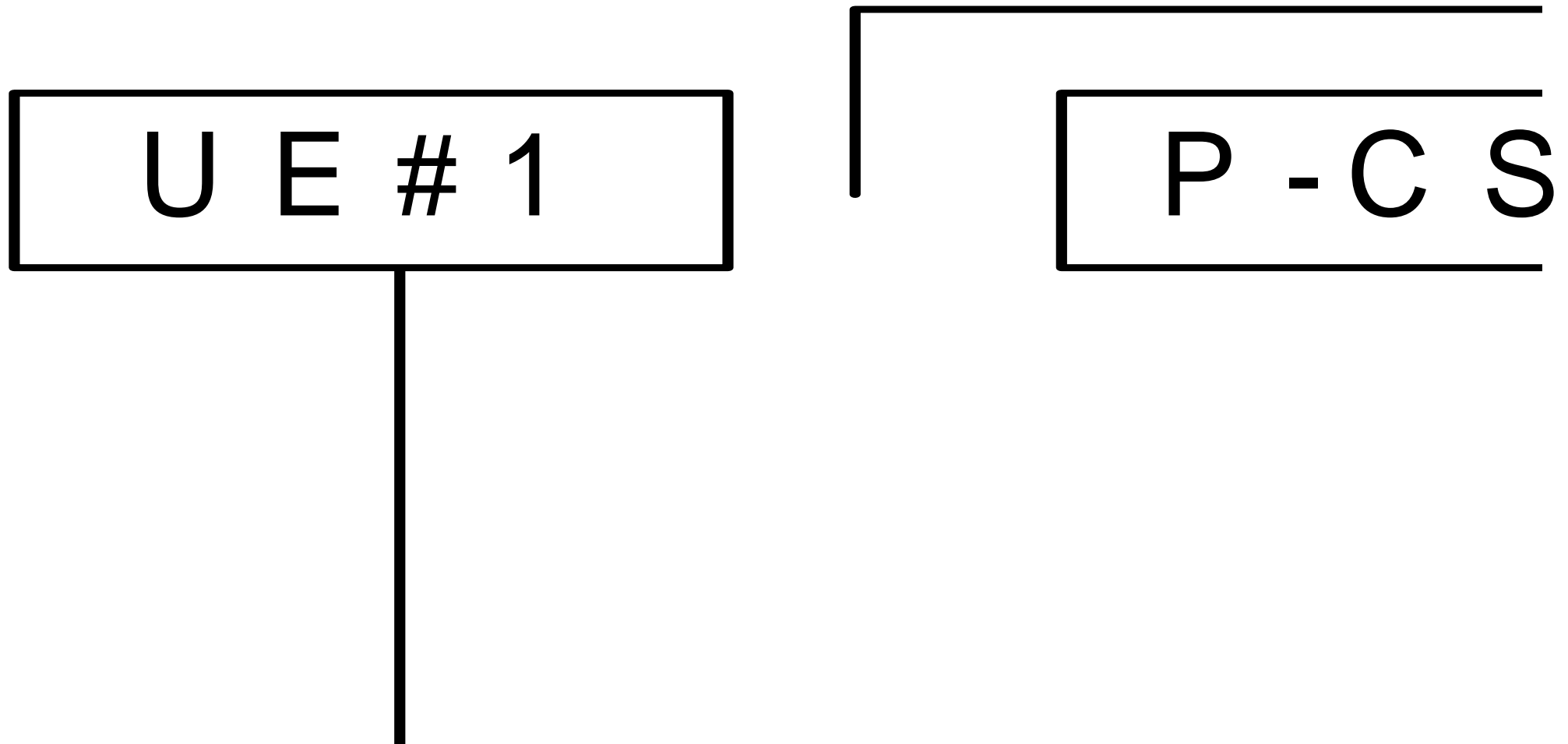


Figure 10.4.7-1: Session redirection after bearer establishment

Step-by-step processing is as follows:

1. 180 Ringing (UE to P-CSCF) – see example in table 10.4.7-1

Depending on the type of codec change being performed, alerting may be required at the destination UE. If so, UE#2 sends a 180 Ringing provisional response to the originator, through P-CSCF#2.

Table 10.4.7-1: 180 Ringing (UE to P-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP pcscf2.home1.net:5088;comp=sigcomp;branch=z9hG4bK556g98.5, SIP/2.0/UDP
scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home1.net:5088;lr;comp=sigcomp>, <sip:scscf2.home1.net;lr>,
<sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222;tag=314159>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 131 INVITE
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 19
Content-Length: 0
```

P-Access-Network-Info: [the UE provides the access-type and access-info, related to the serving access network.](#)

2. 180 Ringing (P-CSCF to S-CSCF) – see example in table 10.4.7-2

P-CSCF#2 sends the 180 Ringing response to S-CSCF#2.

Table 10.4.7-2: 180 Ringing (P-CSCF to S-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
Record-Route: <sip:pcscf2.home1.net;lr>, <sip:scscf2.home1.net;lr>, <sip:scscf1.home1.net;lr>,
<sip:pcscf1.home1.net;lr>
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrBHLso=023551024";
ggsn=[5555::d6d:c7c:b8b:a9a]; pdp-sig=no; gcid=309685742; auth-token=86243614; flow-id=1
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

P-Access-Network-Info: [This header contains information from the UE.](#)

3. 180 Ringing (S-CSCF to I-CSCF) – see example in table 10.4.7-3

S-CSCF#2 sends the 180 Ringing response to I-CSCF#2.

Table 10.4.7-3: 180 Ringing (S-CSCF to I-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP icscf2_s.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:-
Record-Route:
P-Charging-Vector:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

Material not included.

7. PRACK (UE to P-CSCF) – see example in table 10.4.7-7

UE#1 sends the PRACK request to UE#2, along the signalling path established by the INVITE request.

Table 10.4.7-7: PRACK (UE to P-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.home1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>,
    <sip:scscf2.home1.net;lr>, <sip:pcscf2.home1.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 130 PRACK
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-
    c=8642; port-s=7531
Rack: 19 131 INVITE
Content-Length: 0
```

Request-URI: Takes the value of the Contact header of the 180 Ringing response.

P-Access-Network-Info: ~~the~~ The UE provides the access-type and access-info, related to the serving access network ~~as specified in sub-clause 'Additional coding rules for P access network info header', in 3GPP TS 24.229 [16].~~

Via: Take the value of either the IP address or FQDN of the UE.

From:/To:/Call-ID: Copied from the 180 Ringing response so that they include any revised tag parameters.

Cseq: Takes a higher value than in the previous request.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

8. PRACK (P-CSCF to S-CSCF) – see example in table 10.4.7-8

P-CSCF#1 sends the PRACK request to S-CSCF#1, along the signalling path established by the INVITE request.

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Require and Proxy-Require headers are empty, it removes these headers completely.

Table 10.4.7-8: PRACK (P-CSCF to S-CSCF)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home1.net;lr>, <sip:pcscf2.home1.net;lr>
P-Access-Network-Info:
From:
To:
Call-ID:
Cseq:
Contact:
RAck:
Content-Length:

```

P-Access-Network-Info: This header contains information from the UE.

Material not included.

30. INVITE (UE to P-CSCF) – see example in table 10.4.7-30

UE sends the INVITE request, containing an initial SDP and the new destination, to the P-CSCF determined via the CSCF discovery mechanism.

Table 10.4.7-30: INVITE (UE to P-CSCF)

```

INVITE sip:Token(token(tel:+1-212-555-3333)@scscf2.home1.net;lr;tokenized-
    by=scscf2.home1.net)@icscf2_s.home1.net;lr;tokenized-by=icscf2_s.home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.home1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
P-Preferred-Identity: "John Doe" <tel:+1-212-555-1111>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 127 INVITE
Require: precondition, sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-
    c=8642; port-s=7531
Supported: 100rel
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=audio 3456 RTP/AVP 97 3 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtptime:96 G726-32/8000

```

Request-URI: Contains the SIP URI from the Contact header in the received 302 (Moved Temporarily) response.

Via: Contains the IP address or FQDN of the originating UE.

P-Preferred-Identity: the user provides a hint about the identity to be used for this session.

P-Access-Network-Info: ~~the~~The UE provides the access-type and access-info, related to the serving access network ~~as specified in sub-clause 'Additional coding rules for P access network info header', in 3GPP TS 24.229 [16].~~

From:/To:/Call-ID: Follow the recommendations of RFC 3323 [13], even though privacy is not being requested for this session.

Cseq: is a random starting number.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

Contact: is a SIP URI that contains the IP address or FQDN of the originating UE.

Material in remainder of subclause not shown.

Proposed change

10.5.2 Session Transfer initiating a new session

An IM session already exists between UE#1 and UE#2. UE#2 desires UE#1 to initiate a new session to a new destination, UE#3, and terminate the existing session. The procedures for this transfer are shown in figure 10.5.2-1.

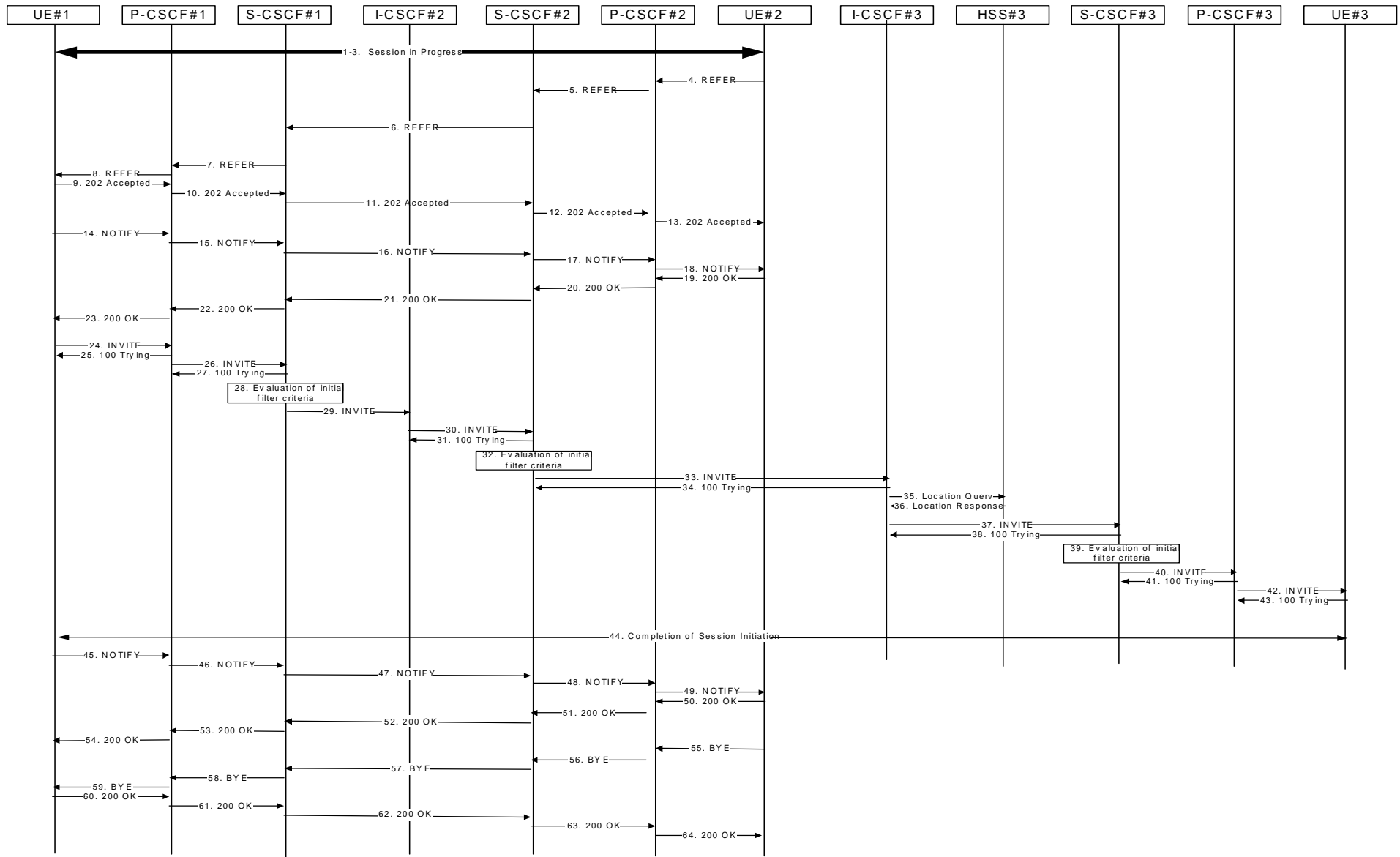


Figure 10.5.2-1: Session Transfer initiating a new session

Material not included.

4. REFER (UE to P-CSCF) – see example in table 10.5.2-4

UE#2 sends a REFER request to its proxy, P-CSCF#2.

Table 10.5.2-4: REFER (UE to P-CSCF)

```
REFER sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK834y72.2
Max-Forwards: 70
Route: <sip:pcscf2.home2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>,
      <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
P-Preferred-Identity: "John Smith" <tel:+1-212-555-2222>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From: <tel:+1-212-555-2222>;tag=314159
To: <sip:user1_public1@home1.net>;tag=171828
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 130 REFER
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c= 22334455; spi-s=11223344; port-
c=6199; port-s=5088
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Refer-To: <tel:+1-212-555-3333>
Content-Length: 0
```

Request-URI: Contains the value of the Contact header from the initial INVITE.

Via: Contains the IP address or FQDN of the originating UE.

Privacy: the user does not require privacy, therefore the Privacy header is set to the value "none" as specified in RFC 3325 [17] and RFC 3323 [13].

P-Preferred-Identity: the user provides a hint about the identity to be used for this session.

P-Access-Network-Info: ~~the~~ The UE provides the access-type and access-info, related to the serving access network ~~as specified in sub-clause 'Additional coding rules for P-access network info-header', in 3GPP TS 24.229 [16].~~

From:/To:/Call-ID: Contain the values previously used to establish the session, including the tag value from the response.

Cseq: Next higher sequential value.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

Contact: is a SIP URI that contains the IP address or FQDN of the originating UE.

Material not included.

9. 202-Accepted (UE to P-CSCF) – see example in table 10.5.2-9

UE#2 acknowledges receipt of the REFER request (8) with a 202 (Accepted) final response, sent to P-CSCF#1.

Table 10.5.2-9: 202 (Accepted) (UE to P-CSCF)

```
SIP/2.0 202 Accepted
Via: SIP/2.0/UDP pcscf1.home1.net:7531;comp=sigcomp;branch=z9hG4bK876t12.1, SIP/2.0/UDP
    scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    pcscf2.home2.net;branch=z9hG4bK876t12.1, SIP/2.0/UDP
    [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK834y72.2
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Length: 0
```

P-Access-Network-Info: [the UE provides the access-type and access-info, related to the serving access network.](#)

10. 202-Accepted (P-CSCF to S-CSCF) – see example in table 10.5.2-10

P-CSCF#1 forwards the 202 (Accepted) final response to S-CSCF#1.

Table 10.5.2-10: 202 (Accepted) (P-CSCF to S-CSCF)

```
SIP/2.0 202 Accepted
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    pcscf2.home2.net;branch=z9hG4bK876t12.1, SIP/2.0/UDP
    [5555::eee:fff:aaa:bbb]:1357;comp=sigcomp;branch=z9hG4bK834y72.2
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

P-Access-Network-Info: [This header contains information from the UE.](#)

Material not included.

14. NOTIFY (UE to P-CSCF) – see example in table 10.5.2-14

UE#1 sends an immediate NOTIFY request to its proxy, P-CSCF#1.

Table 10.5.2-14: NOTIFY (UE to P-CSCF)

```
NOTIFY sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.home1.net:7531;comp=sigcomp>, <sip:scscf1.home1.net;lr>,
    <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-
    c=8642; port-s=7531
Cseq: 130 NOTIFY
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:8805;comp=sigcomp>
Subscription-State: active;expires=240
Event: refer
Content-Type: message/sipfrag
Content-Length: (...)

SIP/2.0 100 Trying
```

Request-URI: Contains the value of the Contact header from the 200 (OK) response to the initial INVITE.

Via: Contains the IP address or FQDN of the originating UE.

~~**P-Access-Network-Info:** the UE provides the access type and access info, related to the serving access network as specified in sub-clause 'Additional coding rules for P-access-network-info header', in 3GPP TS 24.229 [16].~~

From:/To:/Call-ID: Contain the values previously used to establish the session, including the tag value from the response.

Cseq: Next higher sequential value.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

15. NOTIFY (P-CSCF to S-CSCF) – see example in table 10.5.2-15

P-CSCF#1 forwards the NOTIFY request to S-CSCF#1.

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Require and Proxy-Require headers are empty, it removes these headers completely.

Table 10.5.2-15: NOTIFY (P-CSCF to S-CSCF)

```
NOTIFY sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
P-Access-Network-Info:
From:
To:
Call-ID:
Cseq:
Contact:
Subscription-State:
Event:
Content-Type:
Content-Length:

SIP/2.0 100 Trying
```

~~**P-Access-Network-Info:** this header contains information from the UE.~~

Material not included.

45. NOTIFY (UE to P-CSCF) – see example in table 10.5.2-45

When the session with UE#3 has been successfully established, UE#1 sends a NOTIFY request to its proxy, P-CSCF#1.

Table 10.5.2-45: NOTIFY (UE to P-CSCF)

```

NOTIFY sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.home1.net;lr>, <sip:scscf1.home1.net;lr>,
      <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=314159
Call-ID: cb03a0s09a2sdfgk490333
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-
              c=8642; port-s=7531
Cseq: 130 NOTIFY
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Subscription-State: active;expires=210
Event: refer
Content-Type: message/sipfrag
Content-Length: (...)

SIP/2.0 200 OK

```

Request-URI: Contains the value of the Contact header from the 200 (OK) response to the initial INVITE.

Via: Contains the IP address or FQDN of the originating UE.

~~**P-Access-Network-Info:** the UE provides the access type and access info, related to the serving access network as specified in sub-clause 'Additional coding rules for P-access-network-info-header', in 3GPP TS 24.229 [16].~~

From:/To:/Call-ID: Contain the values previously used to establish the session, including the tag value from the response.

Cseq: Next higher sequential value.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

46. NOTIFY (P-CSCF to S-CSCF) – see example in table 10.5.2-46

P-CSCF#1 forwards the NOTIFY request to S-CSCF#1.

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Require and Proxy-Require headers are empty, it removes these headers completely.

Table 10.5.2-46: NOTIFY (P-CSCF to S-CSCF)

```

NOTIFY sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
      [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:pcscf1.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
From:
To:
Call-ID:
Cseq:
Contact:
Subscription-State:
Event:
Content-Type:
Content-Length:

SIP/2.0 200 OK

```

~~**P-Access-Network-Info:** this header contains information from the UE.~~

Material not included.

55. SIP BYE (UE to P-CSCF) – see example in table 10.5.2-55

Upon receiving the notification of successful refer operation (49), UE#2 terminates the session with UE#1.

Table 10.5.2-55: SIP BYE (UE to P-CSCF)

```

BYE sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK834y72.2
Max-Forwards: 70
Route: <sip:pcscf2.home2.net:5088;lr;comp=sigcomp;lr>, <sip:scscf2.home2.net;lr>,
      <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <tel:+1-212-555-2222>;tag=314159
To: <sip:user1_public1@home1.net>;tag=171828
Call-ID: cb03a0s09a2sdfglkj490333
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c= 22334455; spi-s=11223344; port-
c=6199; port-s=5088
Cseq: 131 BYE
Content-Length: 0

```

Via: Contains the IP address or FQDN of the originating UE.

~~**P-Access-Network-Info:** the The UE provides the access type and access info, related to the serving access network as specified in sub-clause 'Additional coding rules for P access network info header', in 3GPP TS 24.229 [16].~~

From:/To:/Call-ID: Contain the values previously used to establish the session, including the tag value from the response. Since this request is being initiated by the destination, the From and To are reversed.

Cseq: Next higher sequential value.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

56. SIP BYE (P-CSCF to S-CSCF) – see example in table 10.5.2-56

P-CSCF#2 forwards the BYE request to S-CSCF#2.

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Require and Proxy-Require headers are empty, it removes these headers completely.

Table 10.5.2-56: SIP BYE (P-CSCF to S-CSCF)

```

BYE sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf2.home2.net;branch=z9hG4bK876t12.1, SIP/2.0/UDP
      [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK834y72.2
Max-Forwards: 69
Route: <sip:scscf2.home2.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>
P-Access-Network-Info:
From:
To:
Call-ID:
Cseq:
Content-Length:

```

~~**P-Access-Network-Info:** this header contains information from the UE.~~

Material in remainder of subclause not shown.

Proposed change

10.6 IMS Message Exchange, UEs in different networks

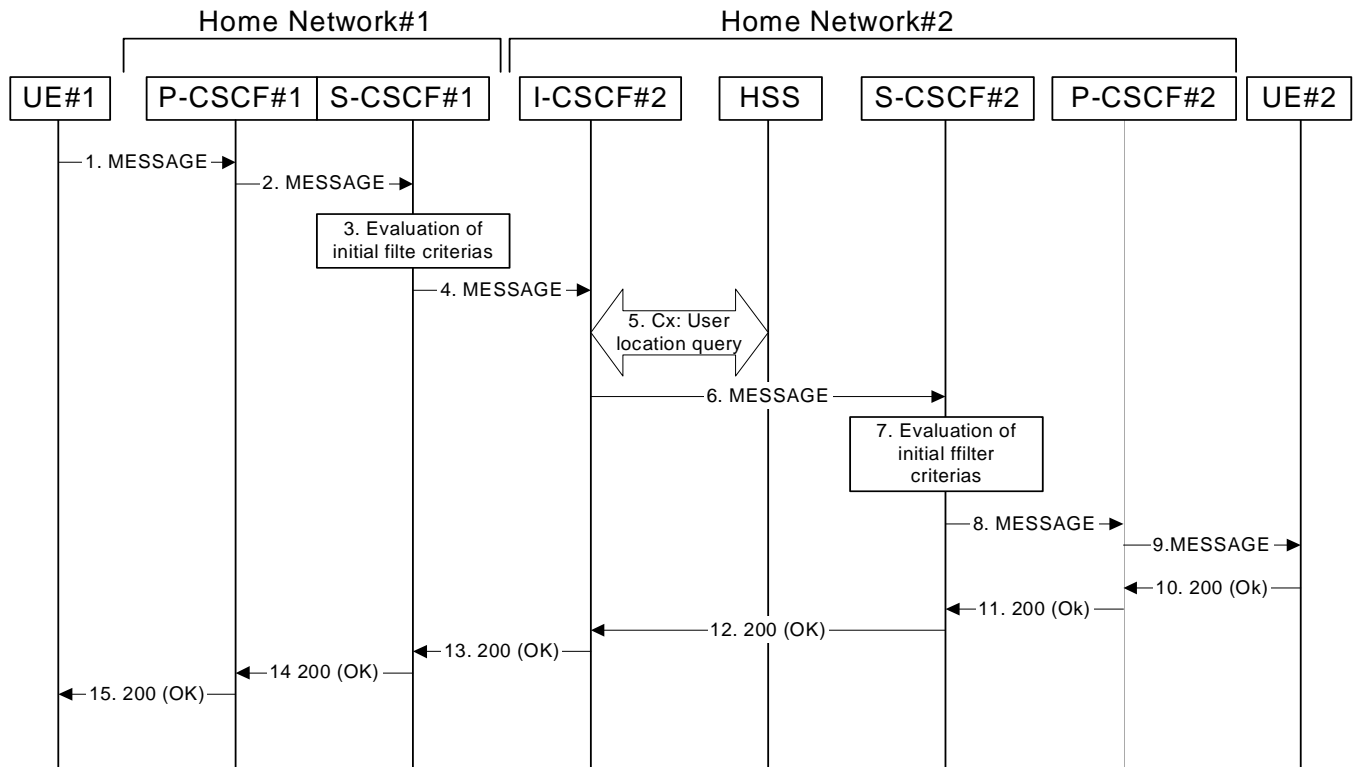


Figure 10.6-1 Message exchange, UEs in different networks

Figure 10.6-1 shows two IMS UEs exchanging a Message. The details of the flows are as follows:

1. MESSAGE request (UE to P-CSCF#1) – see example in table 10.6-1

UE#1 sends the MESSAGE request to the P-CSCF.

Table 10.6-1 MESSAGE request (UE to P-CSCF#1)

```

MESSAGE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Preferred-Identity: <sip:user1_public1@home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
Route: <sip:pcscf1.home1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
From: <sip:user1_public1@home1.net>;tag=31415
To: <sip:user2_public1@home2.net>
Call-ID: b89rjhnedlrfjflslj40a222
CSeq: 129 MESSAGE
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg= hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-c=8642; port-s=7531
Content-Type: text/plain
Content-Length: (...)

    The address is: 650 Route des Lucioles - Sophia Antipolis. From the airport take the A8
    towards Cannes.
    
```

Request URI: Public user identity of the subscriber subscribes that the MESSAGE request is being sent to. In this case the Public User Identity of the user in SIP URI format.

P-Access-Network-Info: [the UE provides the access-type and access-info, related to the serving access network.](#)

Privacy: the user does not require privacy, therefore the Privacy header is set to the value “none” as specified in RFC 3325 [17] and RFC 3323[13].

P-Preferred-Identity: the user provides a hint about the identity to be used.

From: This field is populated with the SIP URI containing the logical representation (FQDN) for the entity sending the MESSAGE request.

To: Same as the Request-URI.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

2. MESSAGE request (P-CSCF#1 to S-CSCF#1) – see example in table 10.6-2

The MESSAGE request is forwarded to the S-CSCF.

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Require and Proxy-Require headers are empty, it removes these headers completely.

Table 10.6-2 MESSAGE request (P-CSCF#1 to S-CSCF#1)

```
MESSAGE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1 ,SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKKnashds7
Max-Forwards: 69
P-Asserted-Identity: <sip:user1_public1@home1.net>
P-Access-Network-Info:
Privacy:
Route: <sip:scscf1.home1.net;lr>
From:
To:
CSeq:
Content-Type:
Content-Length:

(...)
```

P-Asserted-Identity: P-CSCF inserts the SIP URI in the P-Asserted-Identity header field and it also removes P-Preferred-Identity header field.

P-Access-Network-Info: [This header contains information from the UE.](#)

Material not included.

10. 200 (OK) response (PS to S-CSCF) - see example in table 10.6-10

UE#2 sends the response to P-CSCF#2.

Table 10.6-10: 200 (OK) response (UE#2 to P-CSCF#2)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.home2.net:5088;comp=sigcomp;branch=z9hG4bK876t12.1, SIP/2.0/UDP
    scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To: <sip:user1_public1@home1.net>;tag=151170
Call-ID:
CSeq:
Content-Length: 0
```

P-Access-Network-Info: [the UE provides the access-type and access-info, related to the serving access network.](#)

11. 200 (OK) response (P-CSCF#2 to S-CSCF#2) - see example in table 10.6-11

P-CSCF#2 forwards the response to S-CSCF#2.

Table 10.6-11: 200 (OK) response (P-CSCF#2 to S-CSCF#2)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Length:
```

P-Access-Network-Info: This header contains information from the UE.

Material in remainder of subclause not shown.

CHANGE REQUEST

⌘ **24.228 CR 125** ⌘ rev **1** ⌘ Current version: **5.6.0** ⌘

For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.

Proposed change affects: UICC apps ⌘ ME Radio Access Network Core Network

Title:	⌘ Corrections to the P-Access-Network-Info header		
Source:	⌘ Lucent Technologies		
Work item code:	⌘ IMS-CCR	Date:	⌘ 20/10/03
Category:	⌘ F	Release:	⌘ Rel-5
	Use <u>one</u> of the following categories: F (correction) A (corresponds to a correction in an earlier release) B (addition of feature), C (functional modification of feature) D (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)

Reason for change:	⌘ 24.228 currently documents the P-Access-Network-Info header. A number of issues are however identified: <ol style="list-style-type: none"> 1. Some of the flows show ACK containing a P-Access-Network-Info header, and the defining RFC and 24.229 both preclude this. 2. The S-S flows show information appearing from the related P-CSCF at both ends of the flow, and these flows are meant to be identical to those produced within the corresponding MT or MO flows. One area they are different is that the S-S flows currently do not show the P-Access-Network-Info header, and this is corrected by including this header. 3. Some of the flows show the presence of the header in one portion of the flow, but not in the next flow.
Summary of change:	⌘ <ol style="list-style-type: none"> 1. In subclause 17.2.2.1, the P-Access-Network-Info header is deleted from the ACK flows. 2. In subclause 17.3.2.1, 17.3.3.1, 17.3.4.1, the P-Access-Network-Info header is added to all flows coming into the S-CSCFs from the direction of the UE. 3. In subclause 17.4.2.1, the header is added to flow 12, where it is currently missing, despite it occurring in flow 11. 4. In subclause 17.4.2.1, the header is deleted from flow 43, as it should have been removed by the S-CSCF at that point. 5. In subclause 17.5.2, the header is added to flow 41, 43, 44, as this is a 200 (OK) response to a PRACK request. 6. In subclause 17.5.2, the header is added to flow 61, 62, 63, as this is a 200 (OK) response to an UPDATE request. 7. In subclause 17.5.2, the header is added to flow 81, 82, 83, as this is a

- PRACK request.
8. In subclause 17.5.2, the header is added to flow 90, 91, 92, as this is a 200 (OK) response to a PRACK request.
 9. In subclause 17.5.2, the header is removed from flow 113, as this is an ACK request, and indeed this flow is generated as a result of the ACK flow into the P-CSCF which does not contain this header.
 10. In subclause 18.2, the header is added to flows 5 and 6, as it appears already in flow 1.
 11. Where a description of the P-Access-Network-Info contents appears below the flow contents tables, sometimes it appears out of sequence to the headers shown in the flows. In these cases, it is positioned in a more appropriate place.
 12. The contents of the descriptions of the P-Access-Network-Info header has been revised to remove reference to a subclause of 24.229. In any case this reference will be incorrect for release 6 if current proposals for change of that subclause are agreed. In any case, this reference provides a different level of description to the description of other flows, and is therefore inappropriately inconsistent.
 13. Where these descriptions are previously not present, they have been included in a consistent manner. A general policy regarding descriptions has been followed.
 - o such that: at release 5, for each flow only the first inclusion of a header by each entity is described, therefore only the first occurrence of the P-Access-Network header inserted by the UE will have documentation, and not ones in a subsequent request or response.
 - ~~13.~~o at release 6, where a header is behaving exactly as it would for release 5, no description is included, therefore no description of the P-Access-Network-Info header is included.

Consequences if not approved: ☼ Demonstrated flows will be inconsistent with requirements of RFC 3261 and 3GPP TS 24.229

Clauses affected: ☼ 16.2, 16.3, 16.4, 16.5, 16.8, 17.2.2.1, 17.3.2.1, 17.3.3.1, 17.3.4.1, 17.4.2.1, 17.4.5.1, 17.5.2, 18.2

Other specs affected:	☼	<table border="1"><tr><td>Y</td><td>N</td></tr><tr><td></td><td>X</td></tr><tr><td></td><td>X</td></tr><tr><td></td><td>X</td></tr></table>	Y	N		X		X		X	Other core specifications	☼
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	X											
	X											
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	X											
	X											
	X											
<table border="1"><tr><td></td><td>X</td></tr></table>		X	O&M Specifications									
	X											

Other comments: ☼

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at <http://www.3gpp.org/specs/CR.htm>. Below is a brief summary:

- 1) Fill out the above form. The symbols above marked ☼ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <ftp://ftp.3gpp.org/specs/>. For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

Proposed change

16.2 Registration signalling: user not registered

Figure 16.2-1 shows the registration signalling flow for the scenario when the user is not registered. For the purpose of this signalling flow, the subscriber is considered to be roaming. This flow also shows the authentication of the private user identity. In this signalling flow, the home network has network configuration hiding active.

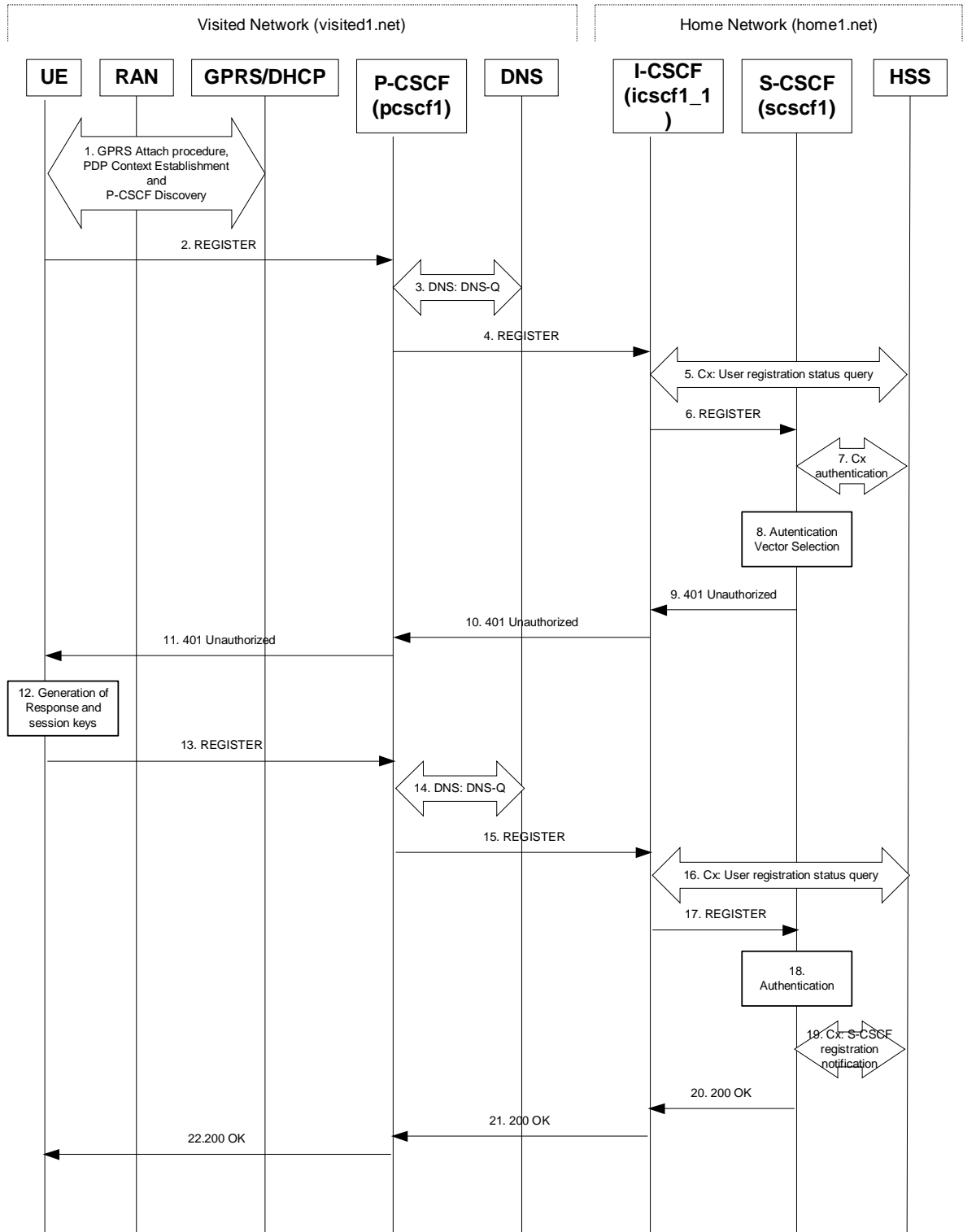


Figure 16.2-1: Registration when UE roaming

Material not included.

2. REGISTER request (UE to P-CSCF) – see example in table 16.2-2

The purpose of this request is to register the user's SIP URI with a S-CSCF in the home network. This request is routed to the P-CSCF because it is the only SIP server known to the UE.

Table 16.2-2 REGISTER request (UE to P-CSCF)

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd];comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11'
From: <sip:user1_public1@home1.net>;tag=4fa3
To: <sip:user1_public1@home1.net>
Contact: <sip:[5555::aaa:bbb:ccc:ddd];comp=sigcomp>;expires=600000
Call-ID: apb03a0s09dkjdfglkj49111
Authorization: Digest username="user1_private@home1.net", realm="registrar.home1.net",
  nonce="", uri="sip:registrar.home1.net", response=""
Security-Client: ipsec-3gpp; alg= hmac-sha-1-96; spi-c=23456789; spi-s=12345678; port-c=2468;
  port-s=1357
Require: sec-agree
Proxy-Require: sec-agree
CSeq: 1 REGISTER
Supported: path
Content-Length: 0
```

Request-URI: The Request-URI (the URI that follows the method name, "REGISTER", in the first line) indicates the destination domain of this REGISTER request. The rules for routing a SIP request describe how to use DNS to resolve this domain name ("registrar.home1.net") into an address or entry point into the home operator's network (the I-CSCF). This information is stored in the USIM.

Via: IPv6 address of UE allocated during the PDP Context Activation process.

Max-Forwards: Set to 70 by the UE and used to prevent loops.

P-Access-Network-Info: [the UE provides the access-type and access-info, related to the serving access network.](#)

From: This indicates the public user identity originating the REGISTER request. The public user identity may be obtained from the USIM.

To: This indicates the public user identity being registered. This is the identity by which other parties know this subscriber. It may be obtained from the USIM.

Contact: This indicates the point-of-presence for the subscriber – the IP address of the UE. This is the temporary point of contact for the subscriber that is being registered. Subsequent requests destined for this subscriber will be sent to this address. This information is stored in the S-CSCF.

Authorization: It carries authentication information. The private user identity (user1_private@home1.net) is carried in the username field of the Digest AKA protocol. The uri parameter (directive) contains the same value as the Request-URI. The realm parameter (directive) contains the network name where the username is authenticated. The Request-URI and the realm parameter (directive) value are obtained from the same field in the USIM, and therefore, are identical. In this example, it is assumed that a new UICC card was just inserted into the terminal, and there is no other cached information to send. Therefore, nonce and response parameters (directives) are empty.

Security-Client: Lists the supported algorithm(s) by the UE.

Supported: This header is included to indicate to the recipient that the UE supports the Path header.

~~**P-Access-Network-Info:** the UE provides the access-type and access-info, related to the serving access network as specified in sub clause "Additional coding rules for P-Access-Network-Info header", in 3GPP TS-24.229 [16].~~

Upon receiving this request the P-CSCF will set it's SIP registration timer for this UE to the Expires time in this request.

Material not included.

4. REGISTER request (P-CSCF to I-CSCF) – see example in table 16.2-4

The P-CSCF removes the Security-Client header and associated "sec-agree" option-tags prior to forwarding the request. As the Proxy-Require header is empty, it removes this header completely.

The P-CSCF needs to be in the path for all terminating requests for this user. To ensure this, the P-CSCF adds itself to the path for future requests.

The P-CSCF adds also the P-Visited-Network-ID header with the contents of the identifier of the P-CSCF network. This may be the visited network domain name or any other identifier that identifies the visited network at the home network.

This signalling flow shows the REGISTER request being forward from the P-CSCF to the I-CSCF in the home domain.

Table 16.2-4 REGISTER request (P-CSCF to I-CSCF)

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd];comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info:
Path: <sip:term@pcscf1.visited1.net;lr>
Require: path
P-Visited-Network-ID: "Visited Network Number 1"
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
From:
To:
Contact:
Call-ID:
Authorization: Digest username="user1_private@home1.net", realm="registrar.home1.net",
    nonce="", uri="sip:registrar.home1.net", response="", integrity-protected="no"
CSeq:
Supported:
Content-Length:
```

Path: This is the address of the P-CSCF and is included to inform the S-CSCF where to route terminating requests.

Require: This header is included to ensure that the recipient correctly handles the Path header. If the recipient does not support the path header, a response will be received with a status code of 420 and an Unsupported header indicating "path". Such a response indicates a misconfiguration of the routing tables and the request has been routed outside the IM CN subsystem.

P-Visited-Network-ID: It contains the identifier of the P-CSCF network at the home network.

~~**P-Access-Network-Info:** this header contains information from the UE.~~

Material not included.

6. REGISTER request (I-CSCF to S-CSCF) – see example in table 16.2-6

I-CSCF adds a proper I-CSCF URI to the Path header.

This signalling flow forwards the REGISTER request from the I-CSCF to the S-CSCF selected. The Request-URI is changed to the address of the S-CSCF.

Table 16.2-6 REGISTER request (I-CSCF to S-CSCF)

```

REGISTER sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd];comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
P-Access-Network-Info:
Path: <sip:icscf1_p.home1.net;lr>, <sip:term@pcscf1.visited1.net;lr>
Require:
P-Visited-Network-ID:
P-Charging-Vector:
From:
To:
Contact:
Call-ID:
Authorization:
CSeq:
Supported: path
Content-Length:

```

P-Access-Network-Info: This header contains information from the UE.

Path: The S-CSCF stores the contents of the Path header and uses these URIs for routing mobile terminated requests.

Upon receiving this request the S-CSCF will set it's SIP registration timer for this UE to the Expires time in this request.

Remaining material of subclause not included.

Proposed change

16.3 Registration signalling: reregistration – user currently registered

For the purpose of the reregistration signalling flow shown in figure 16.3-1, the subscriber is considered to be roaming. This flow also shows the authentication of the private user identity. In this signalling flow, the home network has network configuration hiding active.

This signalling flow assumes:

1. That the same PDP Context allocated during the initial registration scenario is still used for reregistration. For the case when the UE does not still have an active PDP context then PDP context procedures from subclause 16.2 is completed first.
2. The S-CSCF selection procedure invoked by the I-CSCF is not needed.

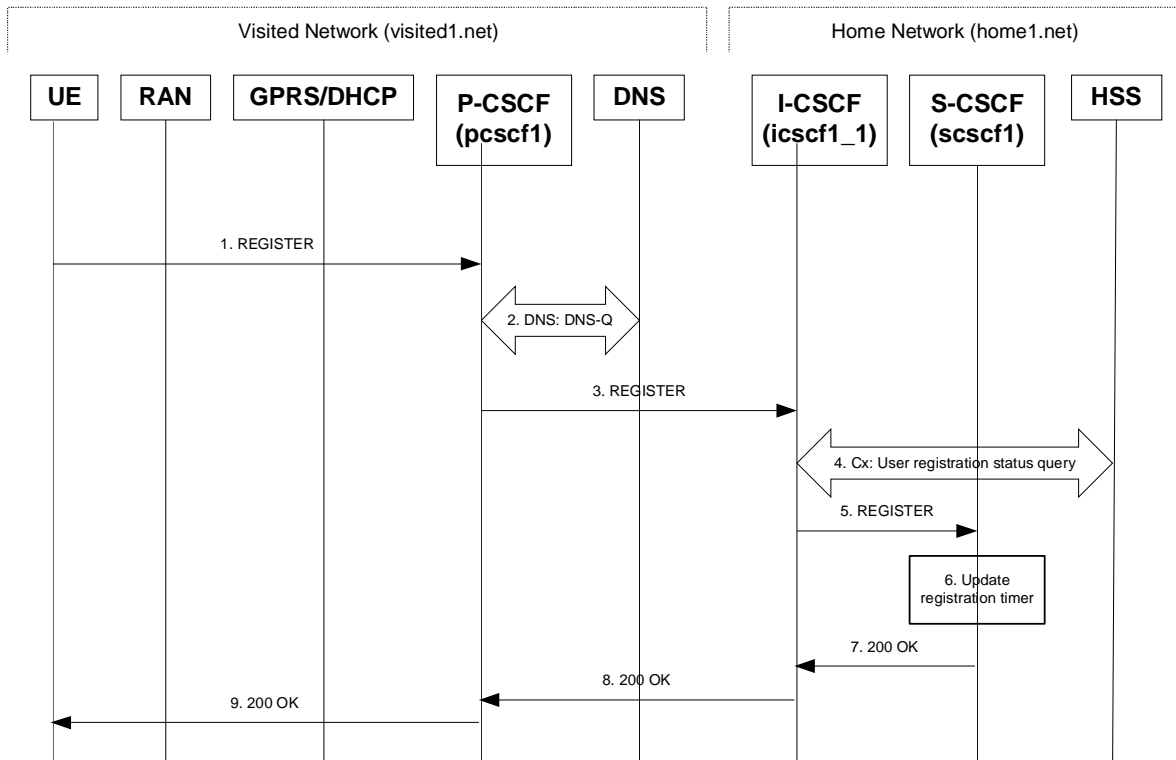


Figure 16.3-1: Reregistration when UE roaming

1. REGISTER request (UE to P-CSCF) – see example in table 16.3-1

The registration expires in the UE. The UE reregisters by sending a new REGISTER request. This request is sent to the same P-CSCF with which the UE initially registered.

Table 16.3-1 REGISTER request (UE to P-CSCF)

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>;tag=4fa3
To: <sip:user1_public1@home1.net>;tag=5ef4
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>;expires=600000
Call-ID: apb03a0s09dkjdfglkj49111
Authorization: Digest username="user1_private@home1.net", realm="registrar.home1.net",
    nonce=base64(RAND + AUTN + server specific data), algorithm=AKAv1-MD5,
    uri="sip:registrar.home1.net", response="6629fae49393a05397450978507c4ef1"
Security-Client: ipsec-3gpp; alg= hmac-sha-1-96; spi-c=23456789; spi-s=12345678; port-c=2468;
    port-s=1357
Require: sec-agree
Proxy-Require: sec-agree
CSeq: 3 REGISTER
Supported: path
Content-Length: 0
```

The header field usage is the same as for the initial registration scenario:

P-Access-Network-Info: [the UE provides the access-type and access-info, related to the serving access network.](#)

From: This indicates the public user identity originating the REGISTER request. The public user identity may be obtained from the USIM.

To: This indicates public user identity being registered. This is the identity by which other parties know this subscriber.

Contact: This indicates the point-of-presence for the subscriber – the IP address of the UE. This is the temporary identifier for the subscriber that is being registered. Subsequent requests destined for this subscriber will be sent to this address. This information is stored in the P-CSCF.

Authorization: It carries authentication information. The private user identity (user1_private@home1.net) is carried in the username field of the Digest AKA protocol. As this is a re-registration process, the cached information (realm, nonce, algorithm, uri, response) is also sent.

NOTE 1: The actual nonce value in the WWW-Authenticate header field is encoded in base64, and it may look like: nonce="A34Cm+Fva37UYWpGNB34JP"

Request-URI: The Request-URI (the URI that follows the method name, "REGISTER", in the first line) indicates the destination domain of this REGISTER request. The rules for routing a SIP request describe how to use DNS to resolve this domain name ("home1.net") into an address or entry point into the home operator's network (the I-CSCF). This information is stored in the USIM.

Security-Client: Lists the supported algorithm(s) by the UE. The values spi-c, spi-s, port-c and port-s are new parameter values and will not be used for security association setup in case the request is answered with 200 (OK).

Supported: This header is included to indicate to the recipient that the UE supports the Path header.

Upon receiving this request the P-CSCF will detect that it already has a registration record for this UE and will reset it's SIP registration timer for this UE to the Expires time in this request.

Material not included.

5. REGISTER request (I-CSCF to S-CSCF) – see example in table 16.3-5

This signalling flow forwards the REGISTER request from the I-CSCF to the S-CSCF selected. The Request-URI is changed to the address of the S-CSCF.

I-CSCF adds a proper I-CSCF name to the Path header.

Table 16.3-5 REGISTER request (I-CSCF to S-CSCF)

```
REGISTER sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
Max-Forwards: 68
Path: <sip:icscf1_p.home1.net;lr>, <sip:term@pcscf1.visited1.net;lr>
Require:
P-Visited-Network-ID:
P-Charging-Vector:
From:
To:
Contact:
Authorization:
Call-ID:
CSeq:
Supported:
Content-Length:
```

P-Access-Network-Info: This header contains information from the UE.

Path: The S-CSCF stores the contents of the Path header and uses these URIs for routing mobile terminated requests.

P-Visited-Network-ID: It contains the identifier of the P-CSCF network at the home network.

Upon receiving this request the S-CSCF will detect that it already has a registration record for this UE and will reset it's SIP registration timer for this UE to the Expires time in this request.

Remaining material of subclause not included.

Proposed change

16.4 Registration signalling: mobile initiated deregistration

Figure 16.4-1 shows a signalling flow for mobile initiated deregistration. For the purposes of this deregistration signalling flow, the subscriber is considered to be roaming. In this signalling flow, the home network has configuration hiding active.

This signalling flow assumes:

1. That the same PDP Context allocated during the initial registration scenario is still used for deregistration. For the case when the UE does not still have an active PDP context then PDP context procedures from subclause 16.2 must first be completed.
2. The procedure employed for P-CSCF discovery is not needed.
3. The S-CSCF selection procedure invoked by the I-CSCF is not needed.

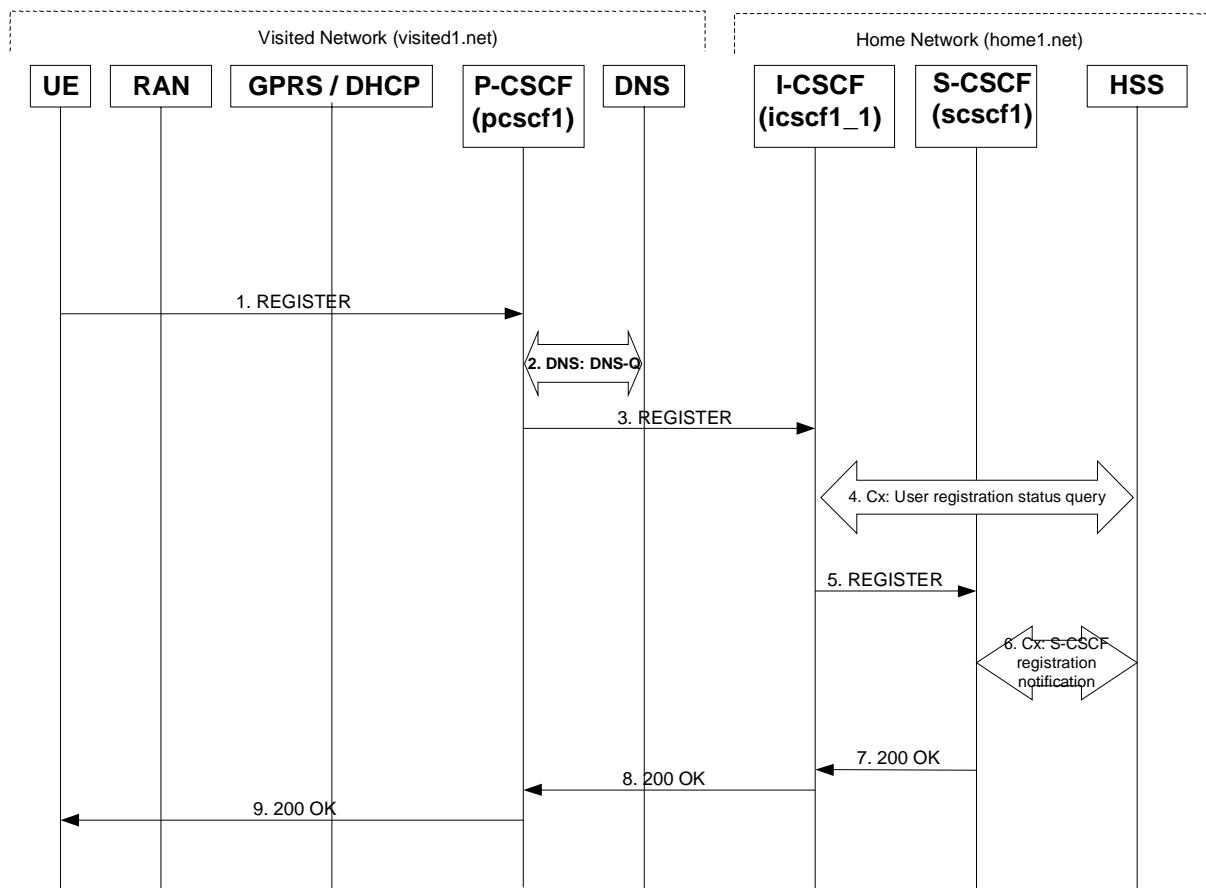


Figure 16.4-1: Registration signalling: mobile initiated deregistration

1. REGISTER request (UE to P-CSCF) – see example in table 16.4-1

The UE intends to de-register itself. It does so by sending a new REGISTER request. This request looks similar as in reregister case, but the Expires header contains zero. This request is sent to the same P-CSCF with which the UE initially registered.

Table 16.4-1 REGISTER (UE to P-CSCF)

```

REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Max-Forwards: 70
From: <sip:user1_public1@home1.net>;tag=4fa3
To: <sip:user1_public1@home1.net>
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>;expires=0
Call-ID: apb03a0s09dkjdfglkj49111
Authorization: Digest username="user1_private@home1.net", realm="registrar.home1.net",
    nonce=base64(RAND + AUTN + server specific data), algorithm=AKAv1-MD5,
    uri="sip:registrar.home1.net", response="6629fae49393a05397450978507c4ef1"
CSeq: 7 REGISTER
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-
    c=8642; port-s=7531
Require: sec-agree
Proxy-Require: sec-agree
Supported: path
Content-Length: 0

```

The header field usage is the same as for the initial registration scenario:

P-Access-Network-Info: [the UE provides the access-type and access-info, related to the serving access network.](#)

- From:** This indicates the public user identity originating the REGISTER request. The public user identity may be obtained from the USIM.
- To:** This indicates public user identity. This is the identity by which other parties know this subscriber.
- Contact:** This indicates the point-of-presence for the subscriber – the IP address of the UE. This is the temporary identifier for the subscriber that is being de-registered. The 0 value of the expires parameter indicates the registration is being cancelled.
- Authorization:** It carries authentication information. The private user identity is carried in the username field of the Digest AKA protocol. The deregistration process also includes the cached information (realm, nonce, algorithm, uri, response).
- Request-URI:** The Request-URI (the URI that follows the method name, "REGISTER", in the first line) indicates the destination domain of this REGISTER request. The rules for routing a SIP request describe how to use DNS to resolve this domain name ("home1.net") into an address or entry point into the home operator's network (the I-CSCF). This information is stored in the USIM.
- Security-Verify:** Contains the security agreement as represented by the received Security-Server header.
- Supported:** This header is included to indicate to the recipient that the UE supports the Path header.

Upon receiving this request the P-CSCF will reset the SIP registration timer for this UE to 0.

Material not included.

5. REGISTER (I-CSCF to S-CSCF) – see example in table 16.4-5

I-CSCF adds a proper I-CSCF name to the Path header.

This signalling flow forwards the REGISTER request from the I-CSCF to the S-CSCF selected. The Request-URI is changed to the address of the S-CSCF.

Table 16.4-5 REGISTER request (I-CSCF to S-CSCF)

```
REGISTER sip:scscf1.home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
Max-Forwards: 68
Path: <sip:icscf1_p.home1.net;lr> <sip:term@pcscf1.visited1.net;lr>
Require:
P-Visited-Network-ID:
From:
To:
Contact:
Call-ID:
Authorization:
CSeq:
Supported:
Expires:
Content-Length:
```

P-Access-Network-Info: This header contains information from the UE.

Upon receiving this request the S-CSCF will reset the SIP registration timer for this UE to 0.

Remaining material of subclause not included.

Proposed change

16.5 UE subscription for the registration state event package

This section describes the subscription procedure for the registration states event package, whereby the UE requests to be notified by the S-CSCF when the event has occurred. This is done using the information structure as indicated in 3GPP TS 24.229 [16].

It is assumed that the user has registered prior to initiating subscription of an event. Also, the subscriber is considered to be roaming and the home network has network configuration hiding active. For this example the trigger point at the UE for sending out the SUBSCRIBE request is the 200 (OK) response of the user's registration.

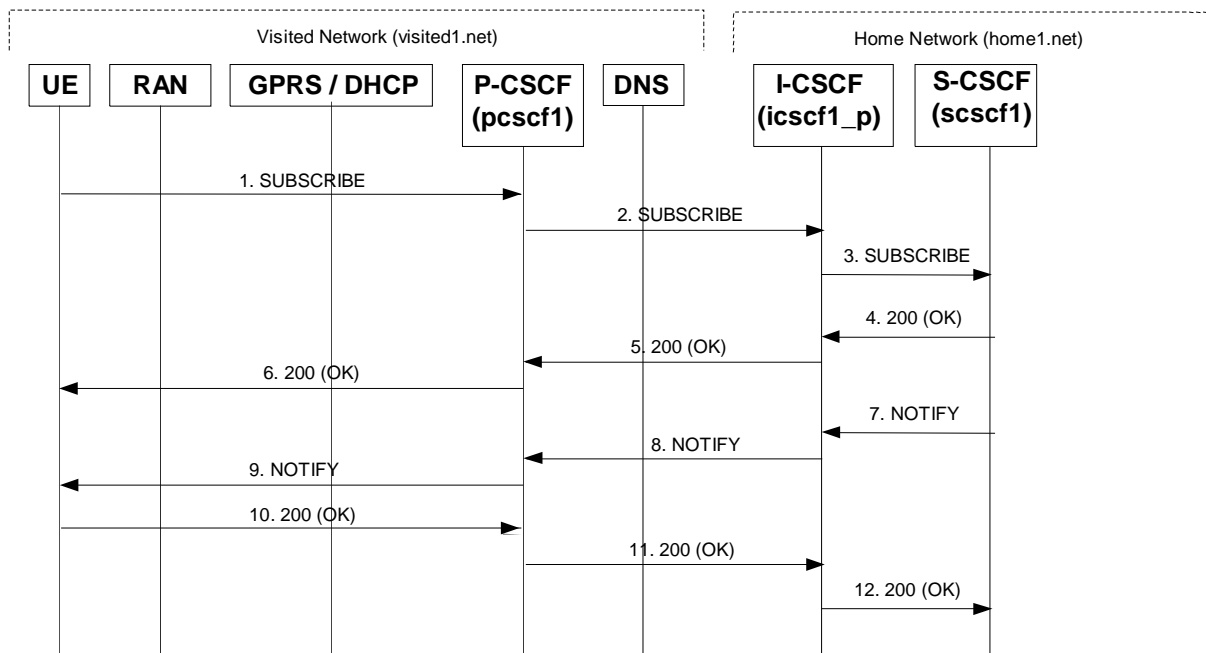


Figure 16.5-1: UE subscription for the registration state event package (with I-CSCF providing configuration independence)

1. SUBSCRIBE request (UE to P-CSCF) – see example in table 16.5-1

The UE generates a SUBSCRIBE request in order to subscribe for the reg event package.

The From and To fields both will contain the UE's public address.

Table 16.5-1 SUBSCRIBE request (UE to P-CSCF)

```
SUBSCRIBE sip:user1_public1@home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:orig@scscf1.home1.net;lr>
P-Preferred-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From: <sip:user1_public1@home1.net>;tag=31415
To: <sip:user1_public1@home1.net>
Call-ID: b89rjhnedlrfjflslj40a222
Require: sec-agree
Proxy-Require: sec-agree
CSeq: 61 SUBSCRIBE
Event: reg
Expires: 600000
Accept: application/reginfo+xml
Security-Verify: ipsec-3gpp; q=0.1; alg= hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-
c=8642; port-s=7531
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Length: 0
```

Request URI: Public user identity whose events the subscriber subscribes to. In this case the subscribing user and the monitored user are identical.

[P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network.](#)

From: This field is populated with logical representation (FQDN) for the entity sending the SUBSCRIBE request.

Privacy: The user does not require privacy, therefore the Privacy header is set to the value "none" as specified in RFC 3323 [13].

Route: contains the P-CSCF address learnt during P-CSCF discovery, plus the elements from the Service-Route header from registration. The P-CSCF URI contains the port number learnt during the security agreement negotiation.

P-Preferred-Identity: The user provides a hint about the identity to be used for this dialog.

~~**P-Access-Network-Info:** the UE provides the access-type and access-info, related to the serving access network as specified in sub-clause "Additional coding rules for P-Access-Network-Info header", in 3GPP TS 24.229 [16].~~

Event: This field is populated with the value "reg" to specify the use of the presence package.

Accept: This field is populated with the value "application/reginfo+xml".

To: Same as the Request-URI.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

Contact: The contact information of the subscribing user.

Material not included.

5. 200 (OK) response (I-CSCF to P-CSCF) – see example in table 16.5-5

The I-CSCF forwards the 200 (OK) response to the P-CSCF.

Table 16.5-5 200 (OK) response (I-CSCF to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:icscf1_p.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity:
Privacy:
From:
To:
Call-ID:
CSeq:
Contact: <sip:token(<sip:scscf1.home1.net> )@home1.net;tokenized-by=home1.net>
Expires:
Content-Length:
```

P-Access-Network-Info: This header contains information from the UE.

Material not included.

Proposed change

16.8 Network initiated re-authentication

This subclause describes the notification that occurs when the S-CSCF assigned to that user requests re-authentication in the case where the user's home network provides network configuration hiding.

It is assumed that user has registered and also subscribed to the registration state event before. Also, the subscriber is considered to be roaming and the home network operator does not desire to keep its internal configuration hidden from the visited network.

After this procedure the user's UE might automatically initiate re-registration procedures. If the user fails to re-register the public user identity for which re-authentication was requested, the public user identity may be deregistered by S-CSCF.

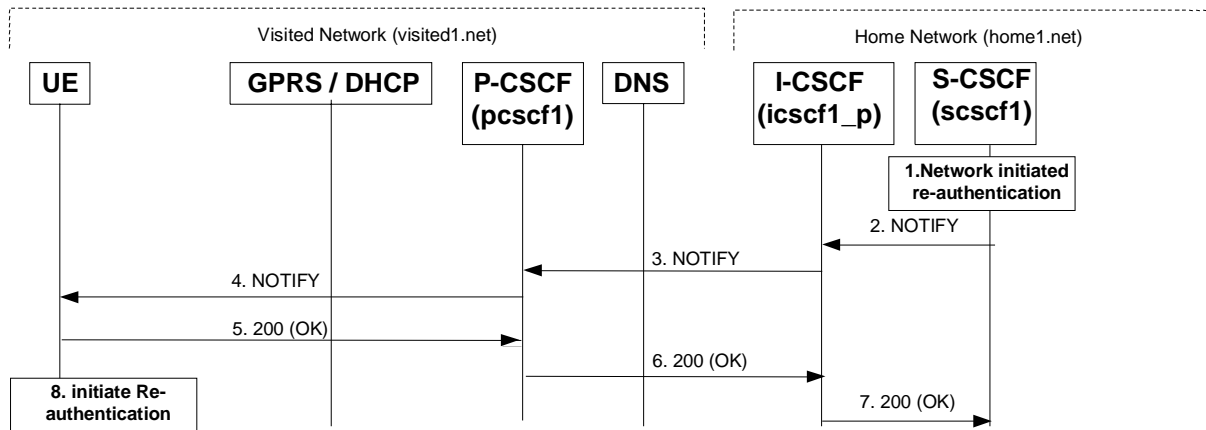


Figure 16.8-1: S-CSCF informs UE that network initiated re-authentication is needed (with I-CSCF providing configuration independence)

Material not included.

5. SIP 200 (OK) response (UE to P-CSCF) – see example in table 16.8-5

UE responds with a 200 (OK) response to the NOTIFY request.

Table 16.8-5 SIP 200 (OK) response (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net:7531;comp=sigcomp;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1)@home1.net;tokenized-by=home1.net
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network.

Material not included.

7. SIP 200 (OK) response (I-CSCF to S-CSCF) – see example in table 16.8-7

I-CSCF determines the request and forwards response to S-CSCF. This confirms that notification has reached the UE.

Table 16.8-7 SIP 200 (OK) response (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Length:
```

P-Access-Network-Info: This header contains information from the UE.

Remaining material of subclause not included.

Proposed change

17.2.2.1 (MO#1b) Mobile origination, roaming (S-S#2, MT#2 assumed)

Figure 17.2.2.1-1 shows an origination procedure which applies to roaming subscribers when the home network operator desires to keep its internal configuration hidden from the visited network. The UE is located in a visited network, and determines the P-CSCF via the CSCF discovery procedure. During registration, the home network allocates an S-CSCF. The home network advertises an I-CSCF as the entry point from the visited network, who forwards requests to the S-CSCF.

When registration is complete, P-CSCF knows the name/address of the next hop in the signalling path toward the S-CSCF, the I-CSCF. I-CSCF receives information in the request, from which it determines the name/address of the proper S-CSCF.

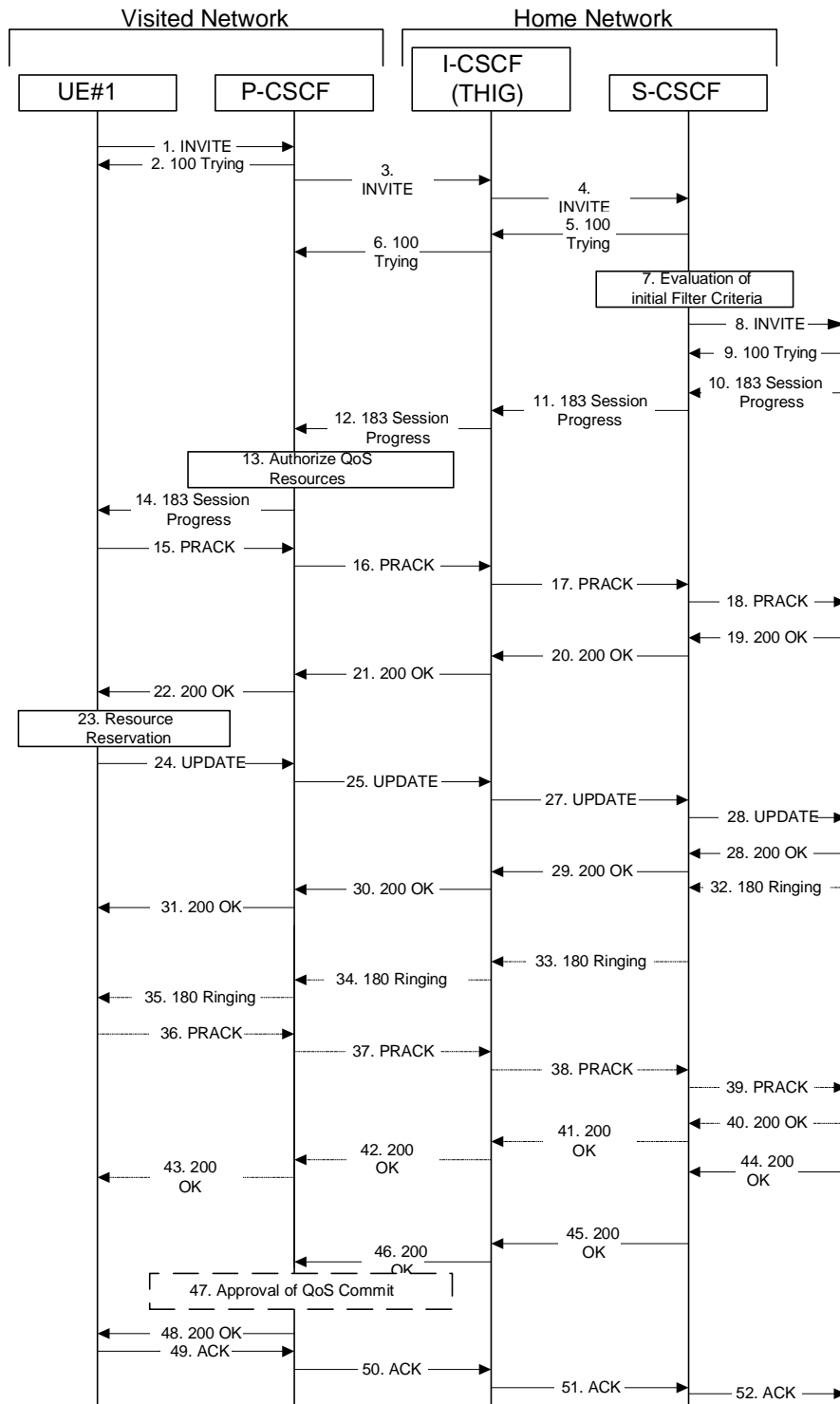


Figure 17.2.2.1-1: MO#1b

Procedure MO#1b is as follows:

1. INVITE (UE to P-CSCF) – see example in table 17.2.2.1-1

UE#1 determines the complete set of codecs that it is capable of supporting for this session. It builds a SDP containing bandwidth requirements and characteristics of each, and assigns local port numbers for each possible media flow. Multiple media flows may be offered, and for each media flow (m= line in SDP), there may be multiple codec choices offered.

For this example, assume UE#1 is capable of sending two simultaneous video streams, either H261 or MPV format, and two simultaneous audio streams, either AMR, G726-32, PCMU, or G728.

UE sends the INVITE request, containing an initial SDP, to the P-CSCF determined via the CSCF discovery mechanism. An example is contained in table 17.2.2.1-1.

Table 17.2.2.1-1: INVITE (UE to P-CSCF)

```

INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:icscf1_p.home1.net;lr>,
      <sip:Token(sip:scscf1.home1.net;lr)@home1.net;tokenized-by=home1.net>
P-Preferred-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: precondition, sec-agree
Proxy-Require: sec-agree
Supported: 100rel
Security-Verify: ipsec-3gpp; q=0.1; alg= hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-
c=8642; port-s=7531
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 3400 RTP/AVP 98 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H261
a=rtpmap:99:MPV
m=video 3402 RTP/AVP 98 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H261
a=rtpmap:99:MPV
m=audio 3456 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
m=audio 3458 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000

```

Request-URI: Contains the public user identity of the called user.

Via: Contains the IP address or FQDN of the originating UE.

Route: contains the P-CSCF address learnt during P-CSCF discovery, plus the elements from the Service-Route header from registration. The P-CSCF URI contains the port number learnt during the security agreement negotiation

Privacy: the user does not require privacy, therefore the Privacy header is set to the value “none” as specified in RFC 3325 [17] and RFC 3323 [13].

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network.

P-Preferred-Identity: the user provides a hint about the identity to be used for this session.

~~**P-Access-Network-Info:** the UE provides the access-type and access-info, related to the serving access network as specified in 3GPP TS 24.229 [16].~~

Cseq: Is a random starting number.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

Contact: Is a SIP URI that contains the IP address or FQDN of the originating UE.

SDP The SDP contains et of codecs supported by UE#1 and desired by the user at UE#1 for this session

Upon receiving the INVITE, the P-CSCF stores the following information about this session, for use in possible error recovery actions – see example in table 17.2.2.1-1b:

Table 17.2.2.1-1b: Storage of information at P-CSCF

```
Request-URI: sip:user2_public1@home2.net
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>
Call-ID: cb03a0s09a2sdfgklkj490333
Cseq(2dest): 127 INVITE
Cseq(2orig): none
Route(2dest): <sip:icscf1_p.home1.net;lr>,
               <sip:Token(sip:scscf1.home1.net;lr)@home1.net;tokenized-by=home1.net>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
```

Material not included.

3. INVITE (P-CSCF to I-CSCF) – see example in table 17.2.2.1-3

The P-CSCF adds itself to the Record-Route header and Via header. As the request is forwarded to an interface that is not compressed, the own P-CSCF SIP URI does not contain the "comp=sigcomp" parameter.

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Proxy-Require header is empty, it removes this header completely.

P-CSCF examines the media parameters, and removes any choices that the network operator decides based on local policy, not to allow on the network.

For this example, assume the network operator disallows H261 video encoding.

The INVITE request is forwarded through this I-CSCF to the S-CSCF.

Table 17.2.2.1-3: INVITE (P-CSCF to I-CSCF)

```

INVITE sip:user2_public1@homel.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
  [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:icscf1_p.homel.net;lr>, <sip:Token(sip:scscf1.homel.net;lr)@homel.net;tokenized-
  by=homel.net>
Record-Route: <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@homel.net>
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy:
From:
To:
Call-ID:
Cseq:
Require: precondition
Supported:
Contact:
Content-Type:
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 3400 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:99:MPV
m=video 3402 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:99:MPV
m=audio 3456 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
m=audio 3458 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000

```

P-Asserted-Identity: The P-CSCF inserts this header based on the user's hint present in the incoming P-Preferred-Identity header.

~~**P-Access-Network-Info:** this header contains information from the UE~~

P-Charging-Vector: The P-CSCF inserts this header and populates the icid parameters with a globally unique value.

SDP The SDP contains the restricted set of codecs allowed by the network operator. The "m=" lines for the video media streams no longer list code 98 (H261).

4. INVITE (I-CSCF to S-CSCF) – see example in table 17.2.2.1-4

I-CSCF adds itself to the Record-Route header, and adds a Via header.

I-CSCF determines the routing information contained in the request, and forwards the request to S-CSCF that is serving the UE.

Table 17.2.2.1-4: INVITE (I-CSCF to S-CSCF)

```

INVITE sip:user2_public1@home1.net SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Record-Route: <sip:icscf1_p.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
Route: <sip:scscf1.home1.net;lr>
P-Asserted-Identity:
P-Access-Network-Info:
P-Charging-Vector:
Privacy:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=

```

P-Access-Network-Info: This header contains information from the UE.

~~**P-Access-Network-Info:** this header contains information from the UE and will be removed and stored by the S-CSCF.~~

Upon receiving the INVITE, the S-CSCF stores the following information about this session, for use in possible error recovery actions – see example in table 17.2.2.1-4b:

Table 17.2.2.1-4b: Storage of information at S-CSCF

```

Request-URI: sip:user2_public1@home2.net
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2dest): none
Route(2orig): <sip:icscf1_p.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>

```

Material not included.

15. PRACK (UE to P-CSCF) – see example in table 17.2.2.1-15

UE decides the set of media streams for this session, and includes this information as a new SDP offer in the PRACK request to P-CSCF.

Table 17.2.2.1-15: PRACK (UE to P-CSCF)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:icscf1_p.home1.net;lr>,
      <sip:Token(<sip:scscf1.home1.net;lr>, <sip:scscf2.home1.net;lr>,
      <sip:pcscf2.home1.net;lr>)>@home1.net;tokenized-by=home1.net>
From: <sip:user1_public1@home1.net>;tag=171828
To:
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 128 PRACK
Require: precondition, sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-
c=8642; port-s=7531
RAck: 9021 127 INVITE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15

```

Request-URI: Takes the value of the Contact header of the received 183 Session Progress response.

Via: Take the value of either the IP address or FQDN of the originating UE.

P-Access-Network-Info: the UE provides the access type and access info, related to the serving access network as specified in 3GPP TS 24.229 [16].

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.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

Material not included.

18. PRACK (I-CSCF to S-CSCF) – see example in table 17.2.2.1-18

I-CSCF determines the routing information, and forwards the PRACK request to S-CSCF.

Table 17.2.2.1-18: PRACK (I-CSCF to S-CSCF)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
P-Access-Network-Info:
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home1.net;lr>, <sip:pcscf2.home1.net;lr>
From:
To:
Call-ID:
Cseq:
Require: precondition
RAck:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
```

~~P-Access-Network-Info: this header contains information from the UE.~~

Material not included.

24. UPDATE (UE to P-CSCF) – see example in table 17.2.2.1-24

When the resource reservation is completed, UE sends the UPDATE request to the terminating endpoint, via the signalling path established by the INVITE request. The request is sent first to P-CSCF.

Table 17.2.2.1-24: UPDATE (UE to P-CSCF)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:icscf1_p.home1.net;lr>,
      <sip:Token(<sip:scscf1.home1.net;lr>, <sip:scscf2.home1.net;lr>,
      <sip:pcscf2.home1.net;lr>)>@home1.net;tokenized-by=home1.net>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfgklkj490333
Cseq: 129 UPDATE
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg= hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-
c=8642; port-s=7531
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15
```

Request-URI: Takes the value of the Contact header of the received 183 Session Progress response.

Via: Take the value of either the IP address or FQDN of the originating UE.

~~**P-Access-Network-Info:** the The UE provides the access type and access info, related to the serving access network as specified in 3GPP TS 24.229 [16].~~

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.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

The SDP indicates that the resource reservation was successful in the local segment.

Material not included.

26. UPDATE (I-CSCF to S-CSCF) – see example in table 17.2.2.1-26

I-CSCF determines the routing information, and forwards the request to S-CSCF.

Table 17.2.2.1-26: UPDATE (I-CSCF to S-CSCF)

```

UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
P-Access-Network-Info:
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home1.net;lr>, <sip:pcscf2.home1.net;lr>
P-Charging-Vector:
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
m=

```

~~**P-Access-Network-Info:** this header contains information from the UE.~~

P-Charging-Vector: The P-CSCF added the GPRS access network information to this header, which is removed and stored by the S-CSCF.

Upon receiving the UPDATE, the S-CSCF stores the following information about this session, for use in charging - see example in table 17.2.2.1-26b.

Table 17.2.2.1-26b: Storage of information at S-CSCF

```

Request-URI: sip:user2_public1@home2.net
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq(2dest): 127 INVITE
Cseq(2orig): none
Route(2dest): <sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
Route(2orig): <sip:icscf1_p.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Contact(dest): <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>

```

Material not included.

36. PRACK (UE to P-CSCF) – see example in table 17.2.2.1-36

UE indicates to the originating subscriber that the destination is ringing. It acknowledges the 180 Ringing provisional response (35) with a PRACK request.

Table 17.2.2.1-36: PRACK (UE to P-CSCF)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:icscf1_p.home1.net;lr>,
      <sip:Token(<sip:scscf1.home1.net;lr>, <sip:scscf2.home1.net;lr>,
      <sip:pcscf2.home1.net;lr>)>@home1.net;tokenized-by=home1.net>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 130 PRACK
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-
c=8642; port-s=7531
RAck: 9022 127 INVITE
Content-Length: 0

```

Request-URI: Takes the value of the Contact header of the 180 Ringing response.

Via: Take the value of either the IP address or FQDN of the UE.

~~**P-Access-Network-Info:** the UE provides the access type and access info, related to the serving access network as specified in 3GPP TS 24.229 [16].~~

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.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

Material not included.

38. PRACK (I-CSCF to S-CSCF) – see example in table 17.2.2.1-38

I-CSCF forwards the PRACK request to S-CSCF.

Table 17.2.2.1-38: PRACK (I-CSCF to S-CSCF)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
P-Access-Network-Info:
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home1.net;lr>, <sip:pcscf2.home1.net;lr>
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:

```

~~**P-Access-Network-Info:** this header contains information from the UE.~~

Material not included.

49. ACK (UE to P-CSCF) – see example in table 17.2.2.1-49

UE starts the media flow for this session, and responds to the 200 OK (48) with an ACK request sent to P-CSCF.

Table 17.2.2.1-49: ACK (UE to P-CSCF)

```

ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:icscf1_p.home1.net;lr>,
      <sip:Token(<sip:scscf1.home1.net;lr>, <sip:scscf2.home1.net;lr>,
      <sip:pcscf2.home1.net;lr>)>@home1.net;tokenized-by=home1.net>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 127 ACK
Content-Length: 0

```

~~**P-Access-Network-Info:** the UE provides the access type and access info, related to the serving access network as specified in 3GPP TS 24.229 [16].~~

Cseq: Is required to be the same value as Cseq contained in original INVITE request [3].

50. ACK (P-CSCF to I-CSCF) – see example in table 17.2.2.1-50

P-CSCF forwards the ACK request to I-CSCF.

Table 17.2.2.1-50: ACK (P-CSCF to I-CSCF)

```

ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
      [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info:
Route: <sip:icscf1_p.home1.net;lr>, <sip:Token(<sip:scscf1.home1.net;lr>,
      <sip:scscf2.home1.net;lr>, <sip:pcscf2.home1.net;lr>)>@home1.net;tokenized-by=home1.net>
From:
To:
Call-ID:
Cseq:
Content-Length:

```

51. ACK (I-CSCF to S-CSCF) – see example in table 17.2.2.1-51

I-CSCF determines the routing information, and forwards the ACK request to S-CSCF.

Table 17.2.2.1-51: ACK (I-CSCF to S-CSCF)

```

ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
      pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
      [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
P-Access-Network-Info:
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home1.net;lr>, <sip:pcscf2.home1.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:

```

~~**P-Access-Network-Info:** this header contains information from the UE.~~

Remaining material of subclause not included.

Proposed change

- 17.3.2.1 (S-S#1b) Different network operators performing origination and termination, with configuration hiding by both network operators (MO#2, MT#2 assumed)

Figure 17.3.2.1-1 shows a S-CSCF handling session origination (S-CSCF#1) which performs an analysis of the destination address, and determines that it belongs to a subscriber of a different operator. The originating network operator desires to keep their configuration hidden, so forwards the request through an I-CSCF (I-CSCF#1) to a well-known entry point in the destination operator's network, I-CSCF#2. I-CSCF#2 queries the HSS for current location information, and finds the S-CSCF assigned to the subscriber (S-CSCF#2), and forwards the request to S-CSCF#2. The terminating network operator also desires to keep their configuration hidden, so I-CSCF#2 inserts itself into the signalling path for future exchanges.

Origination sequences that share this common S-CSCF to S-CSCF procedure are:

- MO#1a** Mobile origination, roaming, without a THIG. The "Originating Network" of S-S#1b is therefore a visited network.
- MO#1b** Mobile origination, roaming, with a THIG in home network. The "Originating Network" of S-S#1b is therefore a visited network.
- MO#2** Mobile origination, located in home service area. The "Originating Network" of S-S#1b is therefore the home network.
- CS-O** CS Networks origination. The "Originating Network" of S-S#1b is the home network. The element labelled S-CSCF#1 is the MGCF of the CS-O procedure.

Termination sequences that share this common S-CSCF to S-CSCF procedure are:

- MT#1a** Mobile termination, roaming, without a THIG. The "Terminating Network" of S-S#1b is a visited network.
- MT#1b** Mobile termination, roaming, with a THIG in home network. The "Terminating Network" of S-S#1b is a visited network.
- MT#2** Mobile termination, located in home service area. The "Terminating Network" of S-S#1b is the home network.

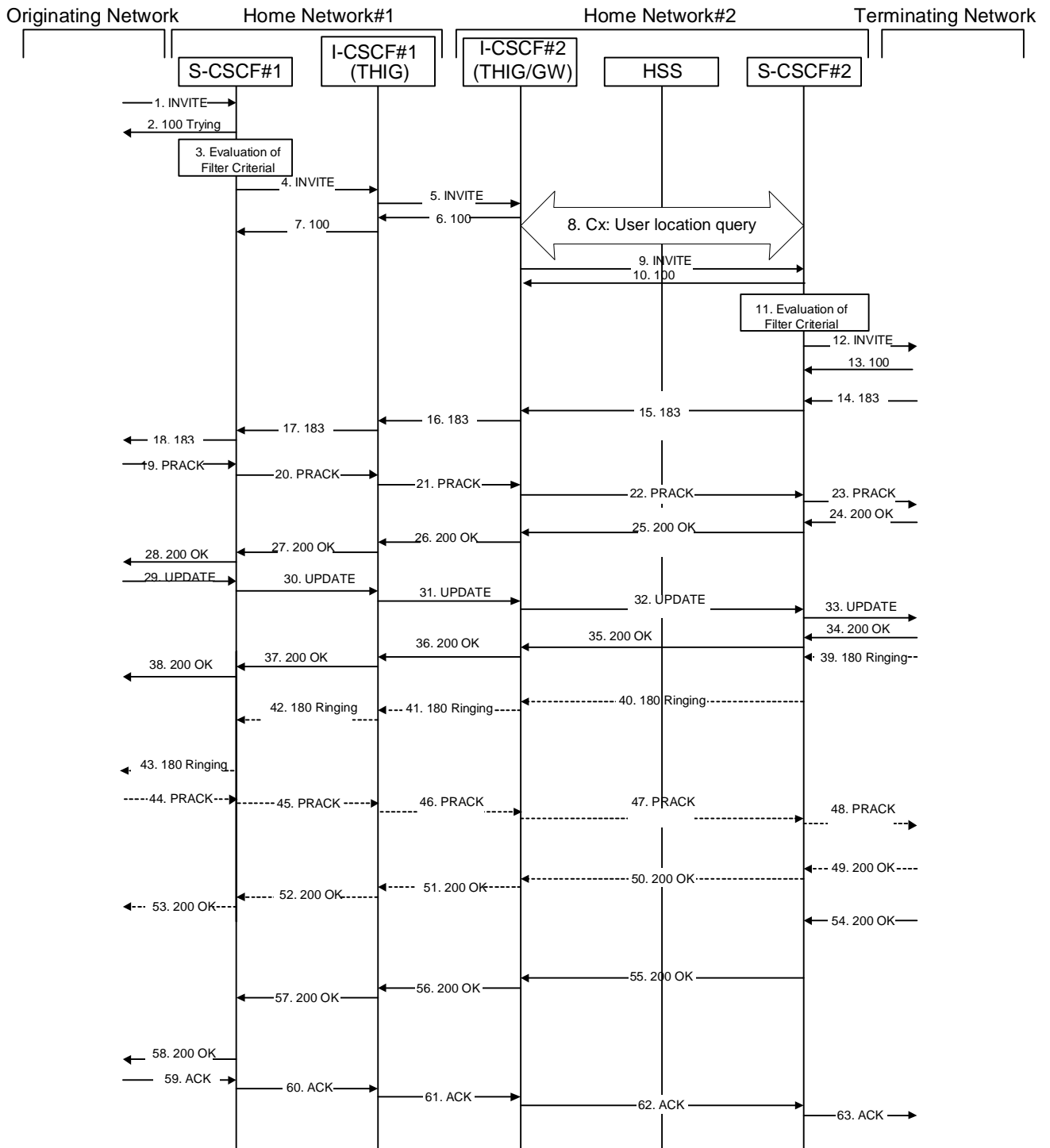


Figure 17.3.2.1-1: S-S#1b

Procedure S-S#1b is as follows:

1. INVITE (MO to S-S#1b) – see example in table 17.3.2.1-1

The INVITE request is sent from the UE to S-CSCF#1 by the procedures of the originating signalling flow.

Table 17.3.2.1-1: INVITE (MO to S-S#1b)

```

INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
  [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Record-Route: <sip:pcscf1.home1.net;lr>
Route: <sip:scscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>
Call-ID: cb03a0s09a2sdfgklkj490333
Cseq: 127 INVITE
Require: precondition
Supported: 100rel
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 3400 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:99:MPV
m=video 3402 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:99:MPV
m=audio 3456 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
m=audio 3458 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000

```

Material not included.

14. 183 Session Progress (MT to S-S#1b) – see example in table 17.3.2.1-14

The media stream capabilities of the destination are returned along the signalling path, in a 183 Session Progress provisional response to the INVITE request (12), as per the termination procedure.

Table 17.3.2.1-14: 183 Session Progress (MT to S-S#1b)

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
<sip:icscf2_s.home2.net;lr>, <sip:icscf1_s.home1.net;lr>,
<sip:Token(<sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>)@home1.net;tokenized-
by=home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
P-Asserted-Identity: "John Smith" <sip:user2_public1@home2.net>
P-Charging-Vector: icid-value="AyretyU0dm+602Irt5tAFrbHLso=023551024"
Privacy:
From:
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 9021
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
m=audio 0 RTP/AVP 97 96 0 15

```

Material not included.

19. PRACK (MO to S-S#1b) – see example in table 17.3.2.1-19

The originator decides the final set of media streams, and includes this information in the PRACK request sent to S-CSCF#1 by the origination procedures.

Table 17.3.2.1-19: PRACK (MO to S-S#1b)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
    <sip:Token(<sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>@home2.net;tokenized-
        by=home2.net>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfgklkj490333
Cseq: 128 PRACK
Require: precondition
RAck: 9021 127 INVITE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15

```

Material not included.

24. 200 OK (MT to S-S#1b) – see example in table 17.3.2.1-24

The terminating endpoint responds to the PRACK request (23) with a 200 OK response.

Table 17.3.2.1-24: 200 OK (MT to S-S#1b)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15

```

Material not included.

29. UPDATE (MO to S-S#1b) – see example in table 17.3.2.1-29

When the originating endpoint has completed the resource reservation procedures, it sends the UPDATE request to S-CSCF#1 by the origination procedures.

Table 17.3.2.1-29: UPDATE (MO to S-S#1b)

```

UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
<sip:Token(<sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>@home2.net;tokenized-
by=home2.net>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfgklkj490333
Cseq: 129 UPDATE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15

```

Material not included.

34. 200 OK (MT to S-S#1b) – see example in table 17.3.2.1-34

The terminating endpoint responds to the UPDATE request (33) with a 200 OK response.

Table 17.3.2.1-34: 200 OK (MT to S-S#1b)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15

```

Material not included.

39. 180 Ringing (MT to S-S#1b) – see example in table 17.3.2.1-39

The terminating endpoint may optionally send a 180 Ringing provisional response indicating alerting is in progress. This response is sent by the termination procedure to S-CSCF#2.

Table 17.3.2.1-39: 180 Ringing (MT to S-S#1b)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
<sip:icscf2_s.home2.net;lr>, <sip:icscf1_s.home1.net;lr>,
<sip:Token(<sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>)@home1.net;tokenized-
by=home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 9022
Content-Length: 0
```

Material not included.

44. PRACK (MO to S-S#1b) – see example in table 17.3.2.1-44

The originator acknowledges the 180 Ringing provisional response (43) with a PRACK request.

Table 17.3.2.1-44: PRACK (MO to S-S#1b)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
    <sip:Token(<sip:scscf2.home2.net;lr>, <sip:pcscf2.home2.net;lr>)@home2.net;tokenized-
    by=home2.net>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 130 PRACK
RAck: 9022 127 INVITE
Content-Length: 0
```

Material not included.

49. 200 OK (MT to S-S#1b) – see example in table 17.3.2.1-49

The terminating endpoint responds to the PRACK request (48) with a 200 OK response.

Table 17.3.2.1-49: 200 OK (MT to S-S#1b)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

Material not included.

54. 200 OK (MT to S-S#1b) – see example in table 17.3.2.1-54

The final response to the INVITE (12), 200 OK, is sent by the terminating endpoint over the signalling path. This is typically generated when the subscriber has accepted the incoming session attempt. The response is sent to S-CSCF#2 per the termination procedure.

Table 17.3.2.1-54: 200 OK (MT to S-S#1b)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
<sip:icscf2_s.home2.net;lr>, <sip:icscf1_s.home1.net;lr>,
<sip:Token(<sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>)@home1.net;tokenized-
by=home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Content-Length: 0
```

Remaining material of subclause not included.

Proposed change

17.3.3.1 (S-S#1c) Different network operators performing origination and termination, with configuration hiding by originating network operator (MO#2, MT#2 assumed)

Figure 17.3.3.1-1 shows a S-CSCF handling session origination (S-CSCF#1) which performs an analysis of the destination address, and determines that it belongs to a subscriber of a different operator. The originating network operator desires to keep their configuration hidden, so forwards the request through an I-CSCF (I-CSCF#1) to a well-known entry point in the destination operator's network, I-CSCF#2. I-CSCF#2 queries the HSS for current location information, and finds the S-CSCF assigned to the subscriber (S-CSCF#2), and forwards the request to S-CSCF#2. The terminating network operator does not desire to keep their configuration hidden, so I-CSCF#2 does not insert itself into the signalling path for future exchanges.

Origination sequences that share this common S-CSCF to S-CSCF procedure are:

MO#1a Mobile origination, roaming, without a THIG. The "Originating Network" of S-S#1c is therefore a visited network.

- MO#1b** Mobile origination, roaming, with a THIG in home network. The "Originating Network" of S-S#1c is therefore a visited network.
- MO#2** Mobile origination, located in home service area. The "Originating Network" of S-S#1c is therefore the home network.
- CS-O** CS Networks origination. The "Originating Network" of S-S#1c is the home network. The element labeled S-CSCF#1 is the MGCF of the CS-O procedure.

Termination sequences that share this common S-CSCF to S-CSCF procedure are:

- MT#1a** Mobile termination, roaming, without a THIG. The "Terminating Network" of S-S#1c is a visited network.
- MT#1b** Mobile termination, roaming, with a THIG in home network. The "Terminating Network" of S-S#1c is a visited network.
- MT#2** Mobile termination, located in home service area. The "Terminating Network" of S-S#1c is the home network.

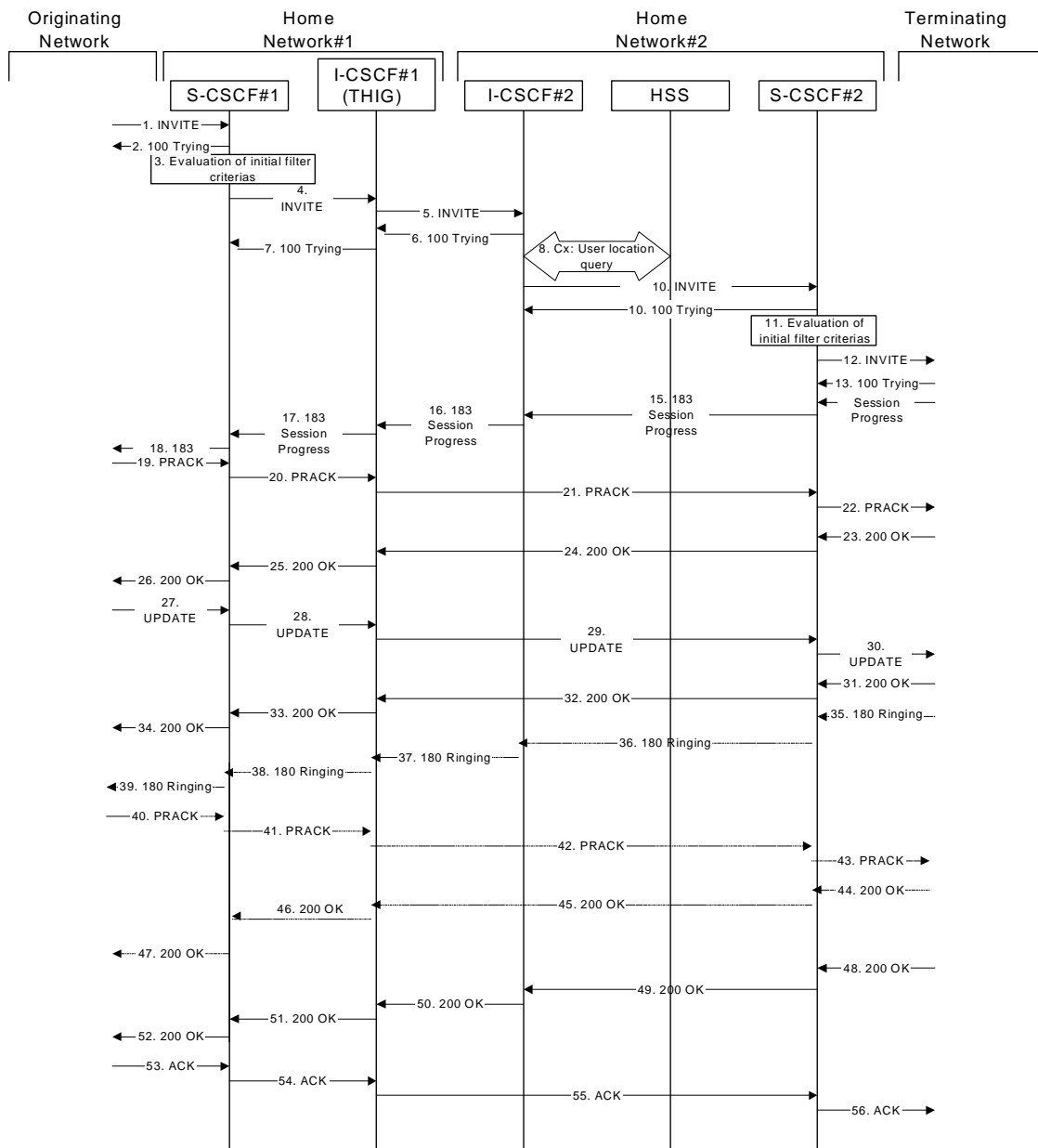


Figure 17.3.3.1-1: S-S#1c

Procedure S-S#1c is as follows:

1. **INVITE (MO to S-S#1c) – see example in table 17.3.3.1-1**

The INVITE request is sent from the UE to S-CSCF#1 by the procedures of the originating signalling flow.

Table 17.3.3.1-1: INVITE (MO to S-S#1c)

```

INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
 [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>
Record-Route: <sip:pcscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: precondition
Supported: 100rel
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 3400 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:99:MPV
m=video 3402 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:99:MPV
m=audio 3456 RTP/AVP 97 96 0 15
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
m=audio 3458 RTP/AVP 97 96 0 15
b=AS:25.4
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv

```

Material not included.

14. 183 Session Progress (MT to S-S#1c) – see example in table 17.3.3.1-14 (related to 17.3.3.1-12)

The media stream capabilities of the destination are returned along the signalling path, in a 183 Session Progress provisional response to the INVITE request, as per the termination procedure.

Table 17.3.3.1-14: 183 Session Progress (MT to S-S#1c)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
    SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf1_s.home1.net;lr>, <sip:Token(<sip:scscf1.home1.net;lr>,
    <sip:pcscf1.home1.net;lr>)@home1.net;tokenized-by=home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
P-Asserted-Identity: "John Smith" <sip:user2_public1@home1.net>
Privacy: none
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"
From:
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 9021
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97
b=AS:25.4 3
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=qos:mandatory sendrecv confirm
m=audio 0 RTP/AVP 97 96 0 15
```

Material not included.

19. PRACK (MO to S-S#1c) – see example in table 17.3.3.1-19

The originator decides the final set of media streams, and includes this information in the PRACK request sent to S-CSCF#1 by the origination procedures.

Table 17.3.3.1-19: PRACK (MO to S-S#1c)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>, <sip:scscf2.home2.net;lr>,
   <sip:pcscf2.home2.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Require: precondition
Cseq: 128 PRACK
RAck: 9021 127 INVITE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15

```

Material not included.

23. 200 OK (MT to S-S#1c) – see example in table 17.3.3.1-23

The terminating endpoint responds to the PRACK request with a 200 OK response.

Table 17.3.3.1-23: 200 OK (MT to S-S#1c)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
   SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
   SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
m=

```

Material not included.

27. UPDATE (MO to S-S#1c) – see example in table 17.3.3.1-27

When the originating endpoint has completed the resource reservation procedures, it sends the UPDATE request to S-CSCF#1 by the origination procedures.

Table 17.3.3.1-27: UPDATE (MO to S-S#1c)

```

UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
 [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKKnashds7
Max-Forwards: 69
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>, <sip:scscf2.home2.net;lr>,
 <sip:pcscf2.home2.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 129 UPDATE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15

```

Material not included.

31. 200 OK (MT to S-S#1c) – see example in table 17.3.3.1-31

The terminating endpoint responds to the UPDATE request with a 200 OK response.

Table 17.3.3.1-31: 200 OK (MT to S-S#1c)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
    SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
m=

```

Material not included.

35. 180 Ringing (MT to S-S#1c) – see example in table 17.3.3.1-35 (related to table 17.3.3.1-12)

The terminating endpoint may optionally send a 180 Ringing provisional response indicating alerting is in progress. This response is sent by the termination procedure to S-CSCF#2.

Table 17.3.3.1-35: 180 Ringing (MT to S-S#1c)

```

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
    SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf1_s.home1.net;lr>, <sip:Token(<sip:scscf1.home1.net;lr>,
    <sip:pcscf1.home1.net;lr>)@home1.net;tokenized-by=home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 9022
Content-Length: 0

```

Material not included.

40. PRACK (MO to S-S#1c) – see example in table 17.3.3.1-40

The originator acknowledges the 180 Ringing provisional response (39) with a PRACK request.

Table 17.3.3.1-40: PRACK (MO to S-S#1c)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:pcscf2.home2.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
Cseq: 130 PRACK
RAck: 9022 127 INVITE
Content-Length: 0

```

Material not included.

44. 200 OK (MT to S-S#1c) – see example in table 17.3.3.1-44

The terminating endpoint responds to the PRACK request (43) with a 200 OK response.

Table 17.3.3.1-44: 200 OK (MT to S-S#1c)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP scscf1.home1.net,
    SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Length: 0

```

Material not included.

48. 200 OK (MT to S-S#1c) – see example in table 17.3.3.1-48 (related to 17.3.3.1-13)

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 session attempt. The response is sent to S-CSCF#2 per the termination procedure.

Table 17.3.3.1-48: 200 OK (MT to S-S#1c)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf1_s.home1.net;lr>, <sip:Token(<sip:scscf1.home1.net;lr>,
    <sip:pcscf1.home1.net;lr>)@home1.net;tokenized-by=home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Content-Length: (...)

```

Remaining material of subclause not included.

Proposed change

17.3.4.1 (S-S#1d) Different network operators performing origination and termination, with configuration hiding by terminating network operator (MO#2, MT#2 assumed)

Figure 17.3.4.1-1 shows a S-CSCF handling session origination (S-CSCF#1) which performs an analysis of the destination address, and determines that it belongs to a subscriber of a different operator. S-CSCF#1 forwards the request to a well-known entry point in the destination operator's network, I-CSCF#2. I-CSCF#2 queries the HSS for current location information, and finds the S-CSCF assigned to the subscriber (S-CSCF#2), and forwards the request to S-CSCF#2. The terminating network operator desires to keep their configuration hidden, so I-CSCF#2 inserts itself into the signalling path for future exchanges.

Origination sequences that share this common S-CSCF to S-CSCF procedure are:

- MO#1a** Mobile origination, roaming, without a THIG. The "Originating Network" of S-S#1d is therefore a visited network.
- MO#1b** Mobile origination, roaming, with a THIG in home network. The "Originating Network" of S-S#1d is therefore a visited network.
- MO#2** Mobile origination, located in home service area. The "Originating Network" of S-S#1d is therefore the home network.
- CS-O** CS Networks origination. The "Originating Network" of S-S#1d is the home network. The element labeled S-CSCF#1 is the MGCF of the CS-O procedure.

Termination sequences that share this common S-CSCF to S-CSCF procedure are:

- MT#1a** Mobile termination, roaming, without a THIG. The "Terminating Network" of S-S#1d is a visited network.
- MT#1b** Mobile termination, roaming, with a THIG in home network. The "Terminating Network" of S-S#1d is a visited network.
- MT#2** Mobile termination, located in home service area. The "Terminating Network" of S-S#1d is the home network.

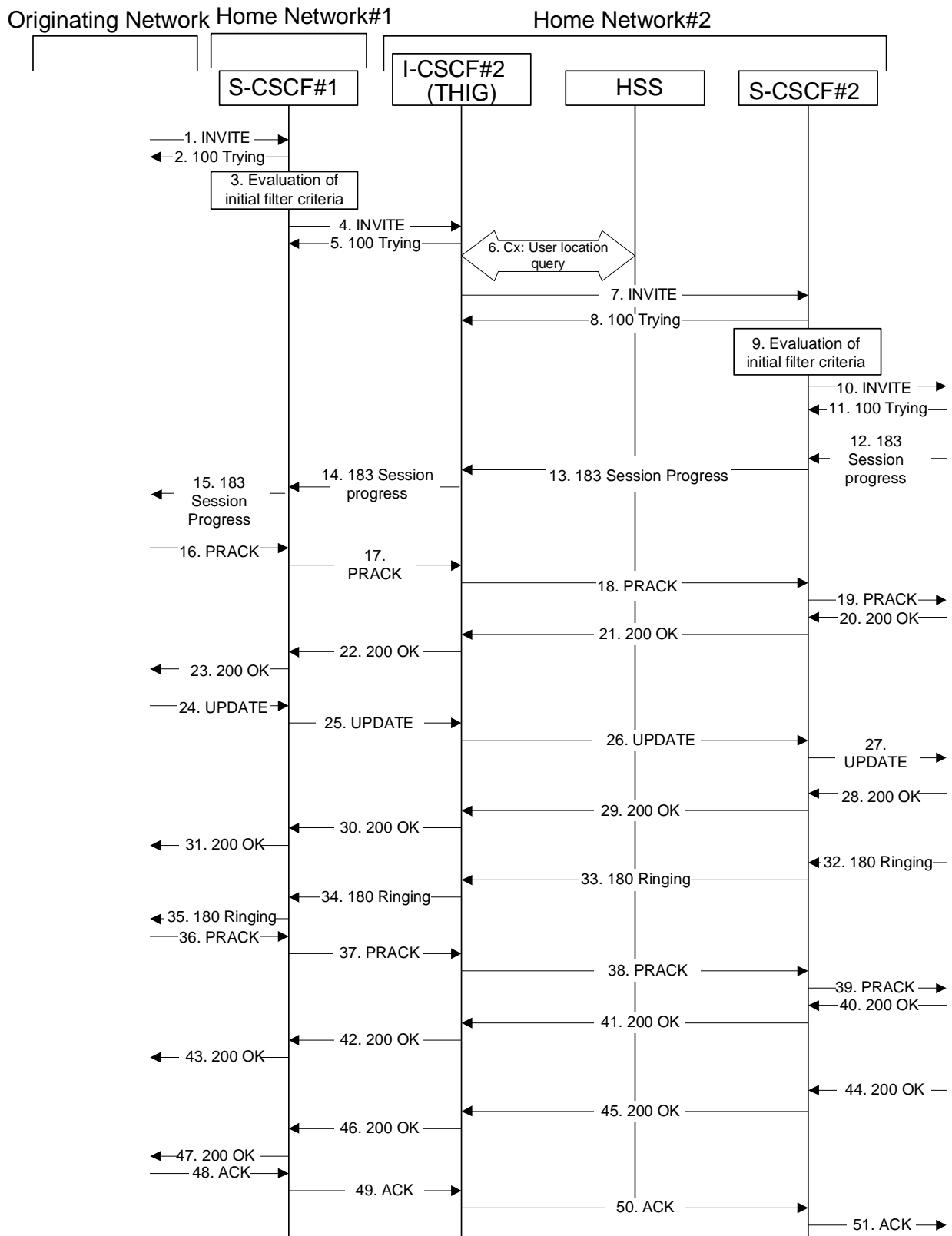


Figure 17.3.4.1-1: S-S#1d

Procedure S-S#1d is as follows:

1. INVITE (MO to S-S#1d) – see example in table 17.3.4.1-1

The INVITE request is sent from the UE to S-CSCF#1 by the procedures of the originating signalling flow.

Table 17.3.4.1-1: INVITE (MO to S-S#1d)

```

INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
  [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>
Record-Route: <sip:pcscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <tel:+1-212-555-1111>
Privacy: none
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>
Call-ID: cb03a0s09a2sdfgk490333
Cseq: 127 INVITE
Require: precondition
Supported: 100rel
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 3400 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:99:MPV
m=video 3402 RTP/AVP 99
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:99:MPV
m=audio 3456 RTP/AVP 97 96 0 15
b=AS:25.4
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
m=audio 3458 RTP/AVP 97 96 0 15
b=AS:25.4
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv

```

Material not included.

12. 183 Session Progress (MT to S-S#1d) – see example in table 17.3.4.1-12

The media stream capabilities of the destination are returned along the signalling path, in a 183 (Session Progress) provisional response to the INVITE request (10), as per the termination procedure.

Table 17.3.4.1-12: 183 Session Progress (MT to S-S#1d)

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
<sip:icscf2_s.home2.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
P-Asserted-Identity: "John Smith" <sip:user2_public1@home2.net>
Privacy: none
P-Charging-Vector: icid-value="AyretyU0dm+602Irt5tAFrbHLso=023551024"
From:
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 9021
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97
b=AS:25.4 3
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15

```

Material not included.

16. PRACK (MO to S-S#1d) – see example in table 17.3.4.1-16

The originator decides the final set of media streams, and includes this information in the PRACK request sent to S-CSCF#1 by the origination procedures.

Table 17.3.4.1-16: PRACK (MO to S-S#1d)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:scscf1.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
    <sip:token(<sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>)>@home2.net;tokenized-
    by=home2.net>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 128 PRACK
Require: precondition
RAck: 9021 127 INVITE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15

```

Material not included.

20. 200 OK (MT to S-S#1d) – see example in table 17.3.4.1-20

The terminating endpoint responds to the PRACK request (19) with a 200 (OK) response.

Table 17.3.4.1-20: 200 OK (MT to S-S#1d)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=conf:qos remote sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15

```

Material not included.

24. UPDATE (MO to S-S#1d) – see example in table 17.3.4.1-24

When the originating endpoint has completed the resource reservation procedures, it sends the UPDATE request to S-CSCF#1 by the origination procedures.

Table 17.3.4.1-24: UPDATE (MO to S-S#1d)

```

UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
 [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKKnashds7
Max-Forwards: 69
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:scscf1.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
 <sip:token(<sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>)>@home2.net;tokenized-
 by=home2.net>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 129 UPDATE
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
m=audio 0 RTP/AVP 97 96 0 15

```

Material not included.

28. 200 OK (MT to S-S#1d) – see example in table 17.3.4.1-28

The terminating endpoint responds to the UPDATE request (27) with a 200 (OK) response.

Table 17.3.4.1-28: 200 OK (MT to S-S#1d)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15

```

Material not included.

32. 180 Ringing (MT to S-S#1d) – see example in table 17.3.4.1-32

The terminating endpoint may optionally send a 180 (Ringing) provisional response indicating alerting is in progress. This response is sent by the termination procedure to S-CSCF#2.

Table 17.3.4.1-32: 180 Ringing (MT to S-S#1d)

```

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf2_s.home2.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 9022
Content-Length: 0

```

Material not included.

36. PRACK (MO to S-S#1d) – see example in table 17.3.4.1-36

The originator acknowledges the 180 (Ringing) provisional response (35) with a PRACK request.

Table 17.3.4.1-36: PRACK (MO to S-S#1d)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKKnashds7
Max-Forwards: 69
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:scscf1.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
    <sip:token(<sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr> )@home2.net;tokenized-
    by=home2.net>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 130 PRACK
RAck: 9022 127 INVITE
Content-Length: 0

```

Material not included.

40. 200 OK (MT to S-S#1d) – see example in table 17.3.4.1-40

The terminating endpoint responds to the PRACK request (39) with a 200 (OK) response.

Table 17.3.4.1-40: 200 OK (MT to S-S#1d)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Length: 0

```

Material not included.

44. 200 OK (MT to S-S#1d) – see example in table 17.3.4.1-44

The final response to the INVITE (10), 200 (OK) response, is sent by the terminating endpoint over the signalling path. This is typically generated when the subscriber has accepted the incoming session attempt. The response is sent to S-CSCF#2 per the termination procedure.

Table 17.3.4.1-44: 200 OK (MT to S-S#1d)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home2.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKKnashds7
Record-Route: <sip:pcscf2.home2.net;lr>, <sip:scscf2.home2.net;lr>,
    <sip:icscf2_s.home2.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Content-Length: 0

```

Remaining material of subclause not included.

Proposed change

17.4.2.1 (MT#1b) Mobile termination, roaming (MO#2, S-S#2 assumed)

Figure 17.4.2.1-1 shows a termination procedure which applies to roaming subscribers when the home network operator desires to keep its internal configuration hidden from the visited network. The UE is located in a visited network, and determines the P-CSCF via the P-CSCF discovery procedure. During registration, the home network allocates a S-CSCF. The home network advertises an I-CSCF as the entry point from the visited network, who protects the S-CSCF identity and forwards requests to the P-CSCF.

When registration is complete, S-CSCF knows the name/address of its next hop in the signalling path toward the UE, the I-CSCF, and the S-CSCF knows the UE Contact address. I-CSCF receives information in the request, which it translates and obtains the name/address of P-CSCF, and P-CSCF obtains the name/address of the UE.

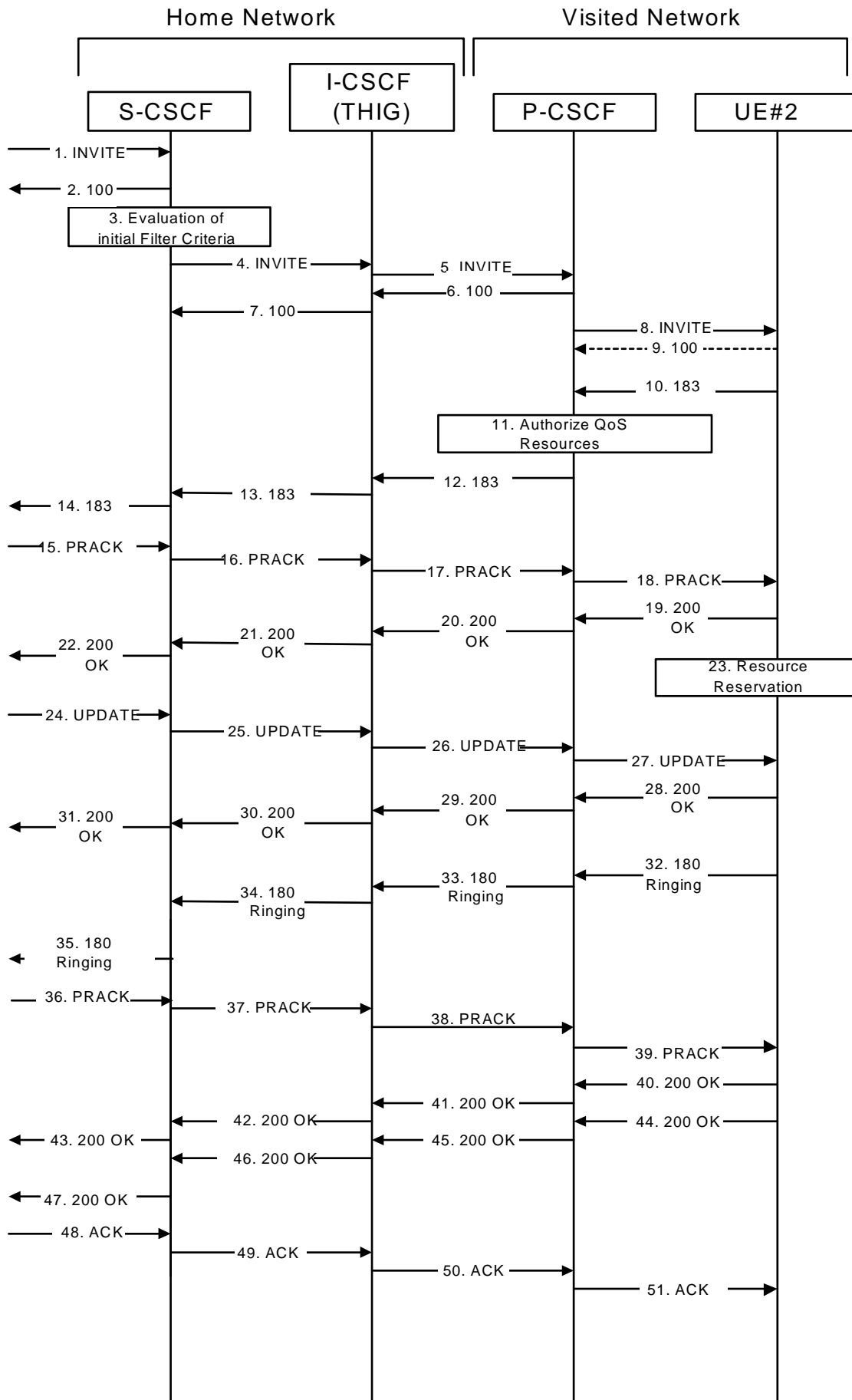


Figure 17.4.2.1-1: MT#1b

Procedure MT#1b is as follows:

Material not included.

10. 183 Session Progress (UE to P-CSCF) – see example in table 17.4.2.1-10

UE#2 determines the complete set of codecs that it is capable of supporting for this session. It determines the intersection with those appearing in the SDP in the INVITE request. For each media flow that is not supported, UE#2 inserts a SDP entry for media (m= line) with port=0. For each media flow that is supported, UE#2 inserts a SDP entry with an assigned port and with the codecs in common with those in the SDP from UE#1.

For this example, assume UE#2 supports both AMR and G726, but not G728 (code 15).

UE responds with a 183 Session Progress response containing SDP back to the originator. This SDP may represent one or more media for a multimedia session. This response is sent to P-CSCF.

Table 17.4.2.1-10: 183 Session Progress (UE to P-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcscaf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
  icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
  scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
  icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
  scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
  pcscaf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
  [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:icscf2_p.home1.net;lr>,
  <sip:Token(<sip:scscf2.home1.net;lr>, <sip:scscf1.home1.net;lr>,
  <sip:pcscf1.home1.net;lr>)@home1.net;tokenized-by=home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From:
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 9021
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 G726-32/8000
m=audio 0 RTP/AVP 97 96 0 15
```

P-Access-Network-Info: ~~the~~ The UE provides the access-type and access-info, related to the serving access network ~~as specified in sub-clause "Additional coding rules for P access network info header", in 3GPP TS 24.229 [16].~~

To: A tag is added to the To header.

Contact: Identifies the IP address or FQDN of the UE. It includes the comp=sigcomp parameter.

SDP The SDP contains the subset of codecs supported by UE. It requests a confirmation of the QoS preconditions for establishing the session

P-CSCF saves information from the received INVITE request. The saved value of the information for this session is – see example in table 17.4.2.1-10b.

Table 17.4.2.1-10b: Storage of information at P-CSCF

```
Request-URI: sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2orig): <sip:icscf2_p.home1.net;lr>, <sip:Token(<sip:scscf2.home1.net;lr>,
<sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>)>@home1.net;tokenized-
by=home1.net>
Contact(dest): <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
```

Material not included.

12. 183 Session Progress (P-CSCF to I-CSCF) – see example in table 17.4.2.1-12

P-CSCF forwards the 183 Session Progress response to I-CSCF.

Table 17.4.2.1-12: 183 Session Progress (P-CSCF to I-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net, SIP/2.0/UDP icscf2_s.home1.net, SIP/2.0/UDP scscf1.home1.net, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)>@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net;lr>, <sip:icscf2_p.home1.net;lr>,
<sip:Token(<sip:scscf2.home1.net;lr>, <sip:scscf1.home1.net;lr>,
<sip:pcscf1.home1.net;lr>)>@home1.net;tokenized-by=home1.net>
P-Access-Network-Info:
P-Asserted-Identity: "John Smith" <sip:user2_public1@home2.net>
Privacy: none
P-Charging-Vector: icid-value="AyretyU0dm+6O2Irt5tAFrbHLso=023551024"
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
```

Record-Route: The P-CSCF rewrites the Record-Route header field value to remove the port number used for the security association and the comp=sigcomp parameter from its own URI

P-Asserted-Identity: P-CSCF inserts the default SIP URI of the user in the P-Asserted-Identity header field.

~~**P-Access-Network-Info:** this header contains information from the UE.~~

13. 183-Session-Progress (I-CSCF to S-CSCF) – see example in table 17.4.2.1-13

I-CSCF determines the Via and Record-Route headers, and forwards the response to S-CSCF.

Table 17.4.2.1-13: 183 Session Progress (I-CSCF to S-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net;lr>, <sip:icscf2_p.home1.net;lr>,
    <sip:Token(<sip:scscf2.home1.net;lr>, <sip:scscf1.home1.net;lr>,
    <sip:pcscf1.home1.net;lr>)>@home1.net;tokenized-by=home1.net>
P-Access-Network-Info:
P-Asserted-Identity:
Privacy:
P-Charging-Vector:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
```

P-Access-Network-Info: This header contains information from the UE.

Upon receipt of the 183 Session Progress, the S-CSCF stores the following information about this session, for use in providing enhanced services or in possible error recovery actions – see example in table 17.4.2.1-13b.

Table 17.4.2.1-13b: Storage of information at S-CSCF

```
Request-URI: sip:user2_public1@home2.net
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
CSeq(2dest): 127 INVITE
CSeq(2orig): none
Route(2dest): <sip:icscf2_p.home1.net;lr>, <sip:pcscf2.visited2.net;lr>
Route(2orig): <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
Contact(dest): <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Contact(orig): <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
```

Material not included.

19. 200 OK (UE to P-CSCF) – see example in table 17.4.2.1-19

UE acknowledges the PRACK request (18) with a 200 OK response.

Table 17.4.2.1-19: 200 OK (UE to P-CSCF)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=

```

~~**P-Access-Network-Info:** the The UE provides the access type and access info, related to the serving access network as specified in sub-clause "Additional coding rules for P-access-network-info header", in 3GPP TS-24.229 [16].~~

Material not included.

21. **200 OK (I-CSCF to S-CSCF)** – see example in table 17.4.2.1-21

I-CSCF determines the Via and Record-Route headers, and forwards the 200 OK response to S-CSCF.

Table 17.4.2.1-21: 200 OK (I-CSCF to S-CSCF)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
m=

```

~~P-Access-Network-Info: this header contains information from the UE.~~

Material not included.

28. 200 OK (UE to P-CSCF) – see example in table 17.4.2.1-28

UE acknowledges the UPDATE request (27) with a 200 OK response.

Table 17.4.2.1-28: 200 OK (UE to P-CSCF)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
    icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907165275 0
m=video 0 RTP/AVP 99
m=video 0 RTP/AVP 99
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=audio 0 RTP/AVP 97 96 0 15

```

~~P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access-network as specified in sub-clause "Additional coding rules for P-access-network-info header", in 3GPP TS 24.229 [16].~~

Material not included.

30. 200 OK (I-CSCF to S-CSCF) – see example in table 17.4.2.1-30

I-CSCF determines the Via and Record-Route headers, and forwards the 200 OK to S-CSCF

Table 17.4.2.1-30: 200 OK (I-CSCF to S-CSCF)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-type:
Content-Length:

v=
o=
s=
c=
t=
m=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=

```

~~P-Access-Network-Info: this header contains information from the UE.~~

Material not included.

32. 180 Ringing (UE to P-CSCF) – see example in table 17.4.2.1-32 (related to 17.4.2.1-8)

Before proceeding with session establishment, the UE waits for two events. First, the resource reservation initiated in step #23 must complete successfully. Second, the resource reservation initiated by the originating endpoint must complete successfully (which is indicated by message #27 received by UE). The UE may now immediately accept the session (and proceed with step #45), or alert the destination subscriber of an incoming session attempt; if the latter it indicates this to the calling party by a 180 Ringing provisional response sent to P-CSCF.

Table 17.4.2.1-32: 180 Ringing (UE to P-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
  icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
  scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
  scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
  pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
  [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:icscf2_p.home1.net;lr>,
  <sip:Token(<sip:scscf2.home1.net;lr>, <sip:scscf1.home1.net;lr>,
  <sip:pcscf1.home1.net;lr>)@home1.net;tokenized-by=home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
RSeq: 9022
Content-Length: 0
```

~~**P-Access-Network-Info:** the The UE provides the access type and access info, related to the serving access-network as specified in sub-clause "Additional coding rules for P-access-network-info header", in 3GPP TS 24.229 [16].~~

33. 180 Ringing (P-CSCF to I-CSCF) – see example in table 17.4.2.1-33

P-CSCF forwards the 180 Ringing response to I-CSCF.

Table 17.4.2.1-33: 180 Ringing (P-CSCF to I-CSCF)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
  scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
  icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP scscf1.home1.net SIP/2.0/UDP
  pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
  [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net;lr>, <sip:icscf2_p.home1.net;lr>,
  <sip:Token(<sip:scscf2.home1.net;lr>, <sip:scscf1.home1.net;lr>,
  <sip:pcscf1.home1.net;lr>)@home1.net;tokenized-by=home1.net>
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+602Irt5tAFrbHLso=023551024";
  ggsn=[5555::d6d:c7c:b8b:a9a]; pdp-sig=no; gcid=309685742; auth-token=86243614; flow-id=3
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Length:
```

~~**P-Access-Network-Info:** this header contains information from the UE.~~

Record-Route: The P-CSCF rewrites the Record-Route header field value to remove the port number and the comp=sigcomp parameter from its own entry.

Material not included.

43. 200 OK (MT#1b to S-S) – see example in table 17.4.2.1-43

S-CSCF forwards the 200 OK to the session originator, per the S-CSCF to S-CSCF procedures.

Table 17.4.2.1-43: 200 OK (MT#1b to S-S)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Length:
```

44. 200 OK (UE to P-CSCF) – see example in table 17.4.2.1-44 (related to 17.4.2.1-8)

When the called party answers, the UE sends a 200 OK final response to the INVITE request (8) to P-CSCF, and starts the media flow(s) for this session.

Table 17.4.2.1-44: 200 OK (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
    icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:icscf2_p.home1.net;lr>,
    <sip:Token(<sip:scscf2.home1.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.home1.net;lr>)
    @home1.net;tokenized-by=home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID:
CSeq: 127 INVITE
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Content-Length: 0
```

~~**P-Access-Network-Info:** the The UE provides the access type and access info, related to the serving access network as specified in sub-clause "Additional coding rules for P access network info header", in 3GPP TS 24.229 [16].~~

45. 200 OK (P-CSCF to I-CSCF) – see example in table 17.4.2.1-45

P-CSCF indicates the resources reserved for this session should now be committed, and sends the 200 OK final response to I-CSCF.

Table 17.4.2.1-45: 200 OK (P-CSCF to I-CSCF)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP Token(SIP/2.0/UDP
scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP scscf1.home1.net, SIP/2.0/UDP
pcscf1.home1.net;branch=z9hG4bK431h23.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net;lr>, <sip:icscf2_s.home1.net;lr>,
<sip:Token(<sip:scscf2.home1.net;lr>, <sip:scscf1.home1.net;lr>,
<sip:pcscf1.home1.net;lr>)@home1.net;tokenized-by=home1.net>
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024";
ggsn=[5555::d6d:c7c:b8b:a9a]; pdp-sig=no; gcid=309685742; auth-token=86243614; flow-id=3
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:

```

~~P-Access-Network-Info: this header contains information from the UE.~~

Record-Route: The P-CSCF rewrites the Record-Route header field value to remove the port number and the comp=sigcomp parameter from its own URI.

Remaining material of subclause not included.

Proposed change

17.4.5.1 (MT#1d) Mobile termination, roaming, with I-CSCF in home network providing configuration independence, terminating UE is busy, and not able or not willing to answer the call (MO#2, S-S#2 assumed)

Figure 17.4.5.1-1 shows a termination procedure which applies to roaming subscribers when the home network operator desires to keep its internal configuration hidden from the visited network. The UE is located in a visited network, and determines the P-CSCF via the P-CSCF discovery procedure. During registration, the home network allocates the S-CSCF.

When registration is complete, S-CSCF knows the name/address of P-CSCF and the UE Contact address, and P-CSCF obtains the name/address of the UE.

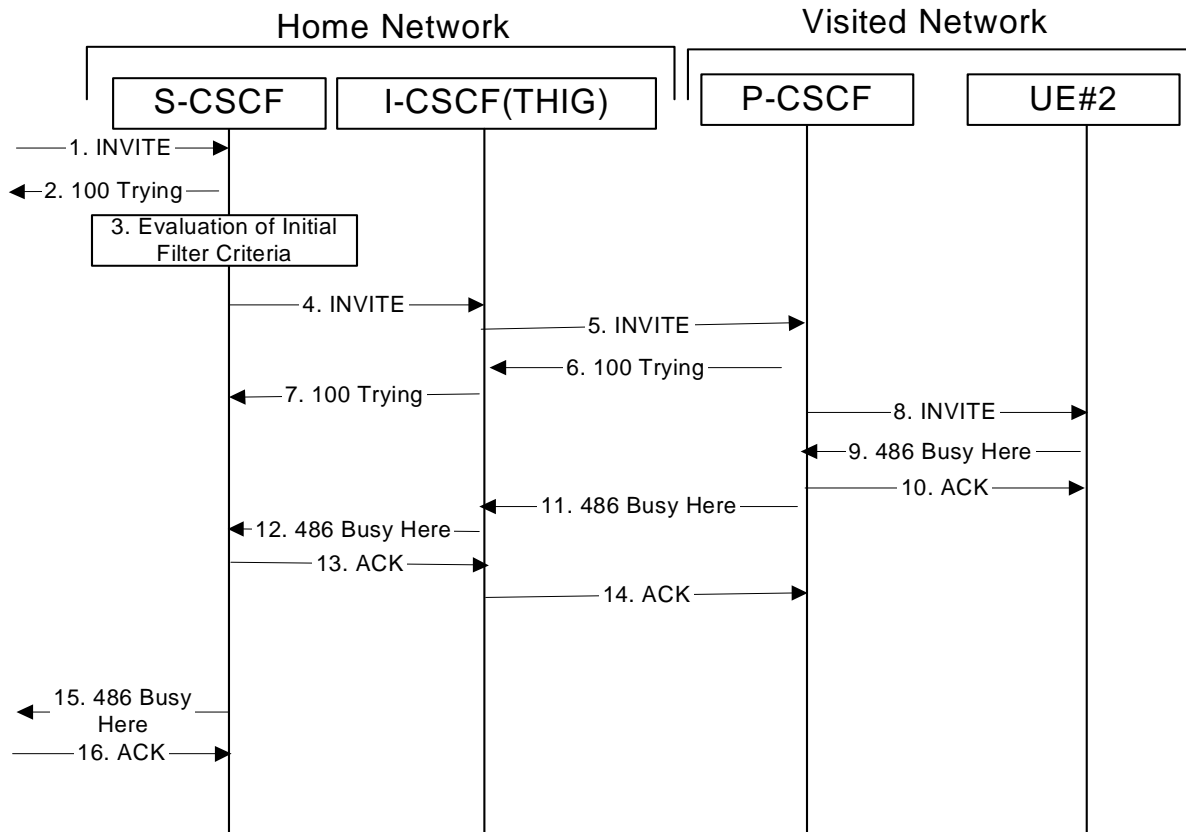


Figure 17.4.5.1-1: MT#1d

Procedure MT#1d is as follows:

Material not included.

9. **486 Busy Here (UE to P-CSCF)** – see example in table 17.4.5.1-9

UE is contacted successfully but it is currently not willing or able to take additional sessions. The response MAY indicate a better time to call in the Retry-After header.

Table 17.4.5.1-9: 486 Busy Here (UE to P-CSCF)

```

SIP/2.0 486 Busy Here
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
    icscf2_p.home1.net;branch=z9hG4bKa9012.1, SIP/2.0/UDP
Token(scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1,
    SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID:
CSeq:
Retry-After: 3600
Content-Length: 0
    
```

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network.

Retry-After: Indicates how long the caller can try again.

Material not included.

12. **486 Busy Here (I-CSCF to S-CSCF)** – see example in table 17.4.5.1-12

I-CSCF forwards the 486 response to the S-CSCF.

Table 17.4.5.1-12: 486 Busy Here (I-CSCF to S-CSCF)

```
SIP/2.0 486 Busy Here
Via: SIP/2.0/UDP scscf2.home1.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home1.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP pcscf1.home1.net;branch=z9hG4bK431h23.1,
    SIP/2.0/UDP [5555:aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Retry-After:
Content-Length:
```

[P-Access-Network-Info: This header contains information from the UE.](#)

Remaining material of subclause not included.

Proposed change

17.5.2 Sample multimedia signalling flow - addition of further media originator and terminator are both roaming and operated by different networks

Figure 17.5.2-1 shows a multimedia signalling flow for the addition of another media where the originator and terminator are both roaming and operated by different networks. Both networks are with I-CSCF providing configuration independence. The UE has already established an IM CN session carrying voice and is generating an INVITE request to add video media to the already established IM session.

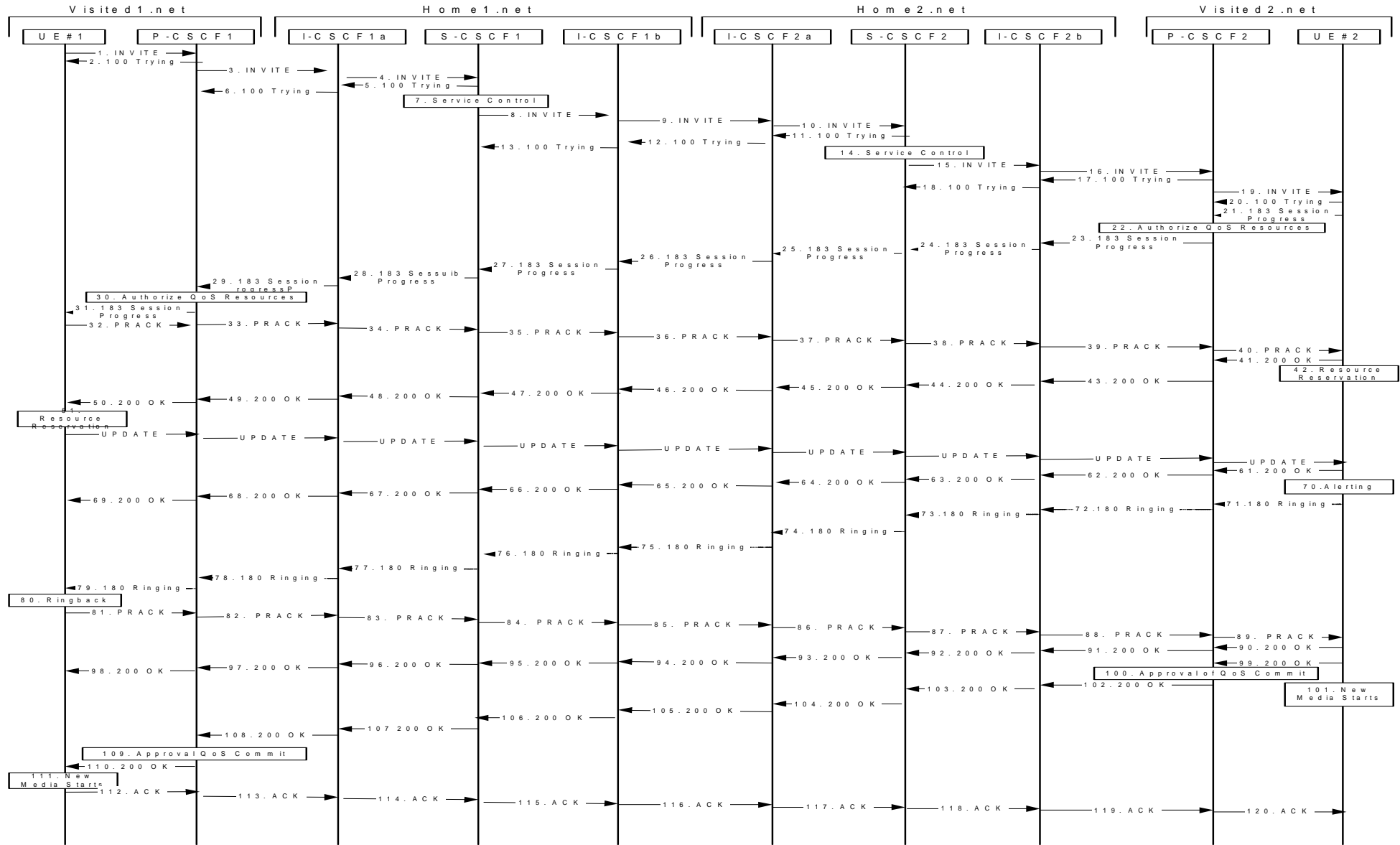


Figure 17.5.2-1: Sample multimedia signalling flow - additional of further media with I-CSCF (THIG)

1. INVITE (UE1 to P-CSCF1) - see example in table 17.5.2-1

UE sends the Re-INVITE request, containing another media description in SDP, to the P-CSCF determined via the CSCF discovery mechanism. An example is contained in table 17.5.2-1.

Table 17.5.2-1: INVITE (UE1 to P-CSCF1)

```
INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:icscf1_p.home1.net;lr>,
<sip:token(<sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr> )@home1.net;tokenized-
by=home1.net>, <sip:icscf2_s.home2.net;lr>, <sip:token(<sip:scscf2.home2.net;lr>,
<sip:icscf2_p.home2.net;lr> )@home2.net;tokenized-by=home2.net>,
<sip:pcscf2.visited2.net;lr>
P-Preferred-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
CSeq: 132 INVITE
Require: precondition, sec-agree
Proxy-Require: sec-agree
Supported: 100rel
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-
c=8642; port-s=7531
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=907166275 0
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=video 9544 RTP/AVP 31
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:31 H261/90000
```

Request-URI: Contains the keyed number from the user. This is specified by the UE as sip:<keyed number>@home1.net. This is in accordance to standard IETF procedure for specifying dialled digits.

Via: Contains the IP address or FQDN of the originating UE.

P-Preferred-Identity: the user provides a hint about the identity to be used for this session.

P-Access-Network-Info: ~~the~~ The UE provides the access-type and access-info, related to the serving access network ~~as specified in sub-clause 'Additional coding rules for P-access-network-info-header', in 3GPP TS 24.229 [16].~~

From:/To:/Call-ID: Follow the recommendations of RFC 3323 [13], even though anonymity is not being requested for this session.

Cseq: Is a random starting number.

Contact: Is a SIP URI that contains the IP address or FQDN of the originating UE.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

Material not included.

4. INVITE (I-CSCF1a to S-CSCF1) - see example in table 17.5.2-4

I-CSCF1a performs the THIG function and forwards the invite to S-CSCF1.

Table 17.5.2-4: INVITE (I-CSCF1a to S-CSCF1)

```

INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Record-Route: <sip:icscf1_p.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
Route: <sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
    <sip:token(<sip:scscf2.home2.net;lr>, <sip:icscf2_p.home2.net;lr>)&tokenized-
    by=home2.net>, <sip:pcscf2.visited2.net;lr>
P-Asserted-Identity:
P-Access-Network-Info:
Privacy:
P-Charging-Vector:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=

```

P-Access-Network-Info: This header contains information from the UE.

Material not included.

21. 183 Session Progress (UE2 to P-CSCF2) - see example in table 17.5.2-21

The media stream capabilities of the destination are returned along the signalling path, in a 183 Session Progress provisional response.

Table 17.5.2-21: 183 Session Progress response (UE2 to P-CSCF2)

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
icscf2_p.home2.net;branch=z9hG4bK556u87.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home2.net;branch=z9hG4bK871y12.1)@home2.net;tokenized-by=home2.net, SIP/2.0/UDP
icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
icscf1_p.home1.net;branch=z9hG4bK351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:icscf2_p.home2.net;lr>,
<sip:token(<sip:scscf2.home2.net;lr>, <sip:icscf2_s.home2.net;lr>)@home2.net;tokenized-
by=home2.net>, <sip:icscf1_s.home1.net;lr>, <sip:token(<sip:scscf1.home1.net;lr>,
<sip:icscf1_s.home1.net;lr>)@home1.net;tokenized-by=home1.net>,
<sip:pcscf1.visited1.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From:
To:
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;lr;comp=sigcomp>
RSeq: 9022
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907166275 0
m=audio 6544 RTP/AVP 97
b=AS:25.4 3
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=video 7544 RTP/AVP 31
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=conf:qos remote sendrecv
a=rtpmap:31 H261/90000

```

P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network.

Material not included.

24. 183 Session Progress (I-CSCF2b to S-CSCF2) - see example in table 17.5.2-24

I-CSCF2b forwards the 183 Session Progress response to S-CSCF2.

Table 17.5.2-24: 183 Session Progress (I-CSCF2b to S-CSCF2)

```

SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
icscf1_p.home1.net;branch=z9hG4bK351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net;lr>, <sip:icscf2_p.home2.net;lr>,
<sip:scscf2.home2.net;lr>, <sip:icscf2_s.home2.net;lr>, <sip:icscf1_s.home1.net;lr>,
<sip:token(<sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>)@home1.net;tokenized-
by=home1.net>, <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity:
P-Access-Network-Info:
Privacy:
P-Charging-Vector:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
RSeq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=

```

[P-Access-Network-Info](#): This header contains information from the UE.

Material not included.

41. 200 OK (UE2 to P-CSCF2) - see example in table 17.5.2-41

UE2 acknowledges the PRACK request with a 200 OK response.

Table 17.5.2-41: 200 OK (UE2 to P-CSCF2)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
icscf2_p.home2.net;branch=z9hG4bK556u87.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home2.net;branch=z9hG4bK871y12.1)@home2.net;tokenized-by=home2.net, SIP/2.0/UDP
icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
icscf1_p.home1.net;branch=z9hG4bK351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=907166275 0
m=audio 6544 RTP/AVP 97
b=AS:25.4 3
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=conf:qos remote sendrecv
a=rtptime:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=video 7544 RTP/AVP 31
b=AS:54.6
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=conf:qos remote sendrecv
a=rtptime:31 H261/90000

```

Material not included.

43. 200 OK (P-CSCF2 to I-CSCF2b) - see example in table 17.5.2-43

P-CSCF2 forwards the 200 OK response to I-CSCF2b.

Table 17.5.2-43: 200 OK (P-CSCF2 to I-CSCF2b)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_p.home2.net;branch=z9hG4bK556u87.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home2.net;branch=z9hG4bK871y12.1)@home2.net;tokenized-by=home2.net, SIP/2.0/UDP
icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
icscf1_p.home1.net;branch=z9hG4bK351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
| P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=

```

44. 200 OK (I-CSCF2b to S-CSCF2) - see example in table 17.5.2-44

I-CSCF2b forwards the 200 OK response to S-CSCF2.

Table 17.5.2-44: 200 OK (I-CSCF2b to S-CSCF2)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    icscf1_p.home1.net;branch=z9hG4bK351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=

```

Material not included.

61. 200 OK (UE2 to P-CSCF2) - see example in table 17.5.2-61

UE2 acknowledges the UPDATE request with a 200 OK response.

Table 17.5.2-61: 200 OK (UE2 to P-CSCF2)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
icscf2_p.home2.net;branch=z9hG4bK556u87.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home2.net;branch=z9hG4bK871y12.1)@home2.net;tokenized-by=home2.net, SIP/2.0/UDP
icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
icscf1_p.home1.net;branch=z9hG4bK351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555:aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq: 134 UPDATE
Content-Type:
Content-Length: 0

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=

```

62. 200 OK (P-CSCF2 to I-CSCF2b) - see example in table 17.5.2-62

Table 17.5.2-62: 200 OK (P-CSCF2 to I-CSCF2b)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_p.home2.net;branch=z9hG4bK556u87.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home2.net;branch=z9hG4bK871y12.1)@home2.net;tokenized-by=home2.net, SIP/2.0/UDP
icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
icscf1_p.home1.net;branch=z9hG4bK351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
| P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=

```

63. 200 OK (I-CSCF2b to S-CSCF2) - see example in table 17.5.2-63

Table 17.5.2-63: 200 OK (I-CSCF2b to S-CSCF2)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
icscf1_p.home1.net;branch=z9hG4bK351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

v=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=

```

Material not included.

71. 180 Ringing (UE2 to P-CSCF2) - see example in table 17.5.2-71

If UE2 performs alerting, it sends a ringing indication to the originator via the signalling path. The response is sent first to P-CSCF2.

Table 17.5.2-71: 180 Ringing (UE2 to P-CSCF2)

```

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
icscf2_p.home2.net;branch=z9hG4bK556u87.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home2.net;branch=z9hG4bK871y12.1)@home2.net;tokenized-by=home2.net, SIP/2.0/UDP
icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
icscf1_p.home1.net;branch=z9hG4bK351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:icscf2_p.home2.net;lr>,
<sip:token(<sip:scscf2.home2.net;lr>, <sip:icscf2_s.home2.net;lr>)@home2.net;tokenized-
by=home2.net>, <sip:icscf1_s.home1.net;lr>, <sip:token(<sip:scscf1.home1.net;lr>,
<sip:icscf1_s.home1.net;lr>)@home1.net;tokenized-by=home1.net>,
<sip:pcscf1.visited1.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq: 132 INVITE
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Rseq: 9023
Content-Length: 0

```

Material not included.

73. 180 Ringing (I-CSCF2b to S-CSCF2) - see example in table 17.5.2-73**Table 17.5.2-73: 180 Ringing (I-CSCF2b to S-CSCF2)**

```

SIP/2.0 180 Ringing
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
icscf1_p.home1.net;branch=z9hG4bK351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net;lr>, <sip:icscf2_p.home2.net;lr>,
    <sip:scscf2.home2.net;lr>, <sip:icscf2_s.home2.net;lr>, <sip:icscf1_s.home1.net;lr>,
    <sip:token(<sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>)&tokenized-
by=home1.net>, <sip:pcscf1.visited1.net;lr>
P-Access-Network-Info:
P-Charging-Vector:
From:
To:
Call-ID:
CSeq:
Contact:
Rseq:
Content-Length:

```

Material not included.

81. PRACK (UE1 to P-CSCF1) - see example in table 17.5.2-81

The originator sends [PRACK](#) to the terminator for the Ringing response.

Table 17.5.2-81: PRACK (UE1 to P-CSCF1)

```

PRACK sip: [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:token(<sip:scscf1.home1.net;lr>,
    <sip:icscf1_s.home1.net;lr>)&tokenized-by=home1.net>,
    <sip:icscf1_s.home1.net;lr>, <sip:token(<sip:scscf2.home2.net;lr>,
    <sip:icscf2_s.home2.net;lr>)&tokenized-by=home2.net>,
    <sip:icscf2_p.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfgklkj490333
Cseq: 135 PRACK
Require: precondition, sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-
c=8642; port-s=7531
RAck: 9023 132 INVITE
Content-Length:

```

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

82. PRACK (P-CSCF1 to I-CSCF1a) - see example in table 17.5.2-82

The PRACK request is forwarded through this I-CSCF 1a to the S-CSCF.

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Require and Proxy-Require headers are empty, it removes these headers completely.

Table 17.5.2-82: PRACK (P-CSCF1 to I-CSCF1a)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:icscf1_p.home1.net;lr>, <sip:token(<sip:scscf1.home1.net;lr>,
    <sip:icscf1_s.home1.net;lr>)>@home1.net;tokenized-by=home1.net>,
    <sip:icscf2_s.home2.net;lr>, <sip:token(<sip:scscf2.home2.net;lr>,
    <sip:icscf2_p.home2.net;lr>)>@home2.net;tokenized-by=home2.net>,
    <sip:pcscf2.visited2.net;lr>
P-Access-Network-Info:
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:

```

83. PRACK (I-CSCF1a to S-CSCF1) - see example in table 17.5.2-83

The PRACK request is forwarded through this I-CSCF1a to the S-CSCF1.

Table 17.5.2-83: PRACK (I-CSCF1a to S-CSCF1)

```

PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>, <sip:icscf2_s.home2.net;lr>,
    <sip:token(<sip:scscf2.home2.net;lr>, <sip:icscf2_p.home2.net;lr>)>@home2.net;tokenized-
    by=home2.net>, <sip:pcscf2.visited2.net;lr>
P-Access-Network-Info:
From:
To:
Call-ID:
Cseq:
RAck:
Content-Length:

```

Material not included.

90. 200 OK (UE2 to P-CSCF2) - see example in table 17.5.2-90

UE2 acknowledges the PRACK request with a 200 OK response.

Table 17.5.2-90: 200 OK (UE2 to P-CSCF2)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;;branch=z9hG4bK361k21.1, SIP/2.0/UDP
    icscf2_p.home2.net;branch=z9hG4bK556u87.1, SIP/2.0/UDP token(SIP/2.0/UDP
    scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1)>@home2.net;tokenized-by=home2.net, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    icscf1_p.home1.net;branch=z9hG4bK351g45.1)>@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq: 135 PRACK
Content-Length: 0

```

91. 200 OK (P-CSCF2 to I-CSCF2b) - see example in table 17.5.2-91

P-CSCF2 forwards the 200 OK response to I-CSCF2b.

Table 17.5.2-91: 200 OK (P-CSCF2 to I-CSCF2b)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_p.home2.net;branch=z9hG4bK556u87.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home2.net;branch=z9hG4bK871y12.1)@home2.net;tokenized-by=home2.net, SIP/2.0/UDP
icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
icscf1_p.home1.net;branch=z9hG4bK351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Length:
```

92. 200 OK (I-CSCF2b to S-CSCF2) - see example in table 17.5.2-92

I-CSCF2b forwards the 200 OK response to S-CSCF2.

Table 17.5.2-92: 200 OK (I-CSCF2b to S-CSCF2)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
icscf1_p.home1.net;branch=z9hG4bK351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Length:
```

Material not included.

102. 200 OK (P-CSCF2 to I-CSCF2b) - see example in table 17.5.2-102

P-CSCF2 forwards the 200 OK response to I-CSCF2b.

Table 17.5.2-102: 200 OK (P-CSCF2 to I-CSCF2b)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2_p.home2.net;branch=z9hG4bK556u87.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
icscf2_s.home2.net;branch=z9hG4bK871y12.1)@home2.net;tokenized-by=home2.net, SIP/2.0/UDP
icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
icscf1_p.home1.net;branch=z9hG4bK351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Access-Network-Info: 3GPP UTRAN TDD; utran-cell-id-3gpp=234151D0FCE11
P-Charging-Vector: icid-value="AyretyU0dm+602Irt5tAFrbHLso=023551024";
ggsn=[5555::d6d:c7c:b8b:a9a]; pdp-sig=no; gcid=309685742; auth-token=86243614; flow-id=1
From:
To:
Call-ID:
CSeq:
Contact:
Content-length:
```

103. 200 OK (I-CSCF2b to S-CSCF2) - see example in table 17.5.2-103

I-CSCF2b forwards the 200 OK response to S-CSCF2.

Table 17.5.2-103: 200 OK (I-CSCF2b to S-CSCF2)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP token(SIP/2.0/UDP
scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    icscf1_p.home1.net;branch=z9hG4bK351g45.1)@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
P-Charging-Vector:
From:
To:
Call-ID:
CSeq:
Contact:
Content-length:

```

Material not included.

113. ACK (P-CSCF1 to I-CSCF1a) - see example in table 17.5.2-113

Table 17.5.2-113: ACK (P-CSCF1 to I-CSCF1a)

```

ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:icscf1_p.home1.net;lr>, <sip:token(<sip:scscf1.home1.net;lr>,
    <sip:icscf1_s.home1.net;lr>)@home1.net;tokenized-by=home1.net>,
    <sip:icscf2_s.home2.net;lr>, <sip:token(<sip:scscf2.home2.net;lr>,
    <sip:icscf2_p.home2.net;lr>)@home2.net;tokenized-by=home2.net>,
    <sip:pcscf2.visited2.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
Cseq:
Content-length: 0

```

Remaining material of subclause not included.

Proposed change

18.2 Mobile terminal initiated session release

Figure 18.2-1 shows a mobile terminal initiated IM CN subsystem application (SIP) session release. It is assumed that the session is active and that the bearer was established directly between the two visited networks (the visited networks could be the home network in either or both cases).

NOTE 1: For the purposes of the description of the I-CSCF in figure 18.2-1 and in the associated text, it is assumed that the party that established the session initiated the clearing. For clearing in the reverse direction, there is a slight change in the optionality of the I-CSCFs between the S-CSCFs. This is as described for session establishment.

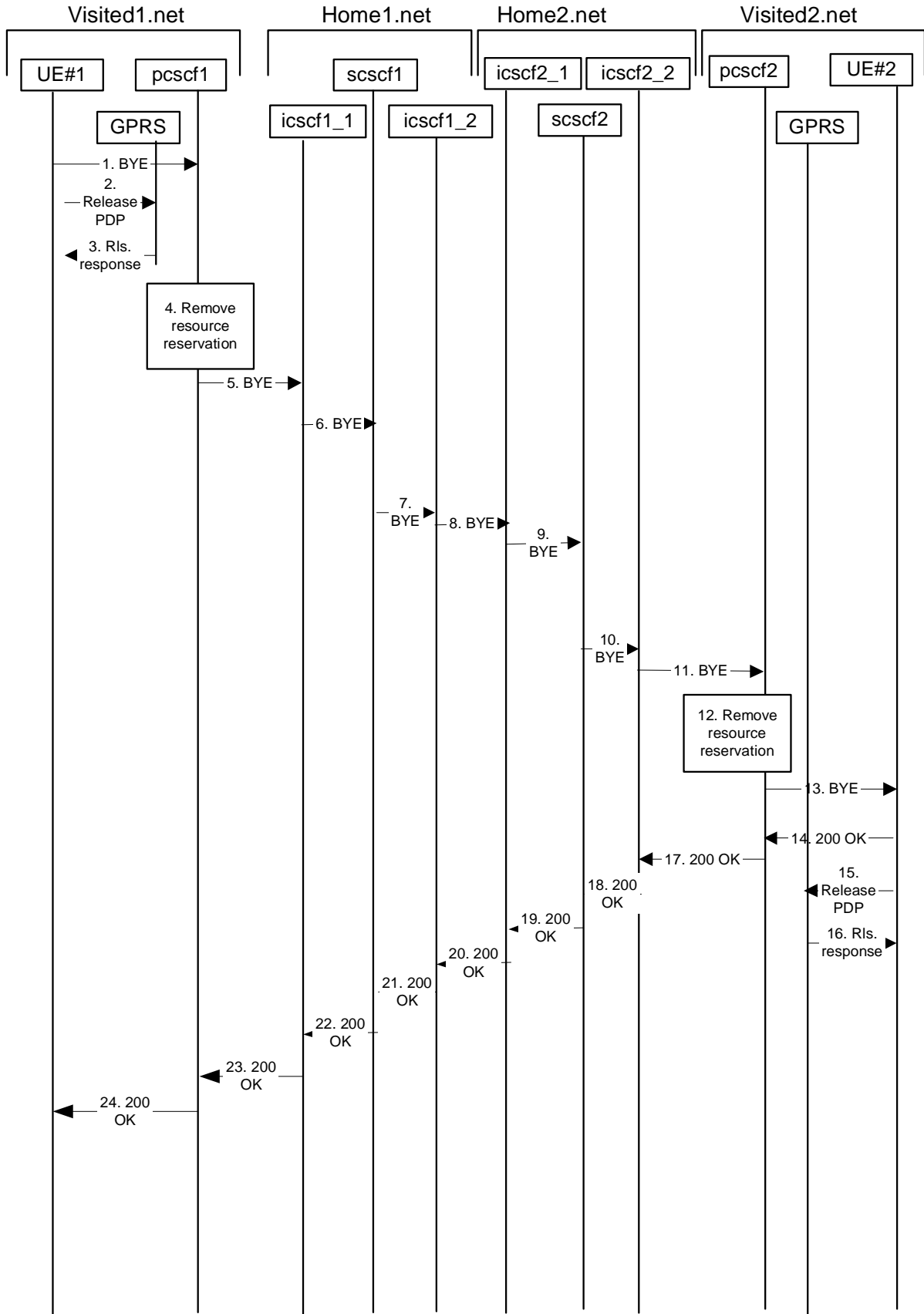


Figure 18.2-1: Mobile initiated session release

1. SIP BYE (UE to P-CSCF) - see example in table 18.2-1

One mobile party hangs up, which generates a SIP BYE request from the UE to the P-CSCF.

Table 18.2-1: SIP BYE (UE to P-CSCF)

```

BYE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:icscf1_p.home1.net;lr>,
      <sip:Token(<sip:scscf1_s.home1.net;lr>@home1.net;tokenized-by=home1.net>,
      <sip:icscf2_s.home2.net;lr>, <sip:Token(<sip:scscf2.home2.net;lr>,
      <sip:icscf2_p.home2.net;lr>@home2.net;tokenized-by=home2.net>,
      <sip:@pcscf2.visited2.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfg1kj490333
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321; port-
c=8642; port-s=7531
CSeq: 153 BYE
Content-Length: 0

```

Request-URI: takes the value of the Contact header of the original received response.

Via: takes the value of either the IP address or the FQDN of the originating UE.

P-Access-Network-Info: [the UE provides the access-type and access-info, related to the serving access network.](#)

From:/To:/Call-ID: the example contents of the From header, the To header and Call-ID header are used to identify the session being cleared, and therefore are identical to those of the previously received response for that session, so that they include any tag parameters.

CSeq: the content of the Cseq header must have a higher sequence number than the previous transaction. Here it is assumed that a Cseq value no greater than 152 has been previously used.

Security-Verify: Contains the security agreement as represented by the received Security-Server header.

Material not included.

5. SIP BYE (P-CSCF to I-CSCF) - see example in table 18.2-5

The P-CSCF sends a SIP BYE request to the I-CSCF (THIG) hiding the S-CSCF of the releasing party.

The P-CSCF removes the Security-Verify header and associated "sec-agree" option-tags prior to forwarding the request. As the Require and Proxy-Require headers are empty, it removes these headers completely.

Table 18.2-5: SIP BYE (P-CSCF to I-CSCF)

```

BYE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
      [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:icscf1_p.home1.net;lr>,
      <sip:Token(<sip:scscf1_s.home1.net;lr>@home1.net;tokenized-by=home1.net>,
      <sip:icscf2_s.home2.net;lr>, <sip:Token(<sip:scscf2.home2.net;lr>,
      <sip:icscf2_p.home2.net;lr>@home2.net;tokenized-by=home2.net>,
      <sip:pcscf2.visited2.net;lr>
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Length:

```

6. SIP BYE (I-CSCF to S-CSCF) - see example in table 18.2-6

The I-CSCF (THIG) sends a SIP BYE request to the S-CSCF of the releasing party.

Table 18.2-6: SIP BYE (I-CSCF to S-CSCF)

```

BYE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP icscf1_p.home1.net;branch=z9hG4bK351g45.1, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:scscf1.home1.net;lr>, <sip:icscf1_s.home1.net;lr>,
    <sip:Token(<sip:scscf2.home2.net;lr>, <sip:icscf2_p.home2.net;lr> )@home2.net;tokenized-
    by=home2.net>, <sip:@pcscf2.visited2.net;lr>
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Length:

```

[P-Access-Network-Info: This header contains information from the UE.](#)

Material not included.

14. 200 OK (UE to P-CSCF) - see example in table 18.2-14

The mobile responds with a 200 (OK) response, which is sent back to the P-CSCF.

Table 18.2-14: 200 OK (UE to P-CSCF)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
    icscf2_p.home2.net, SIP/2.0/UDP Token(scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1 )@home2.net;tokenized-by=home2.net, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    icscf1_p.home1.net;branch=z9hG4bK351g45.1 )@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
CSeq:
Content-Length:

```

[P-Access-Network-Info: the UE provides the access-type and access-info, related to the serving access network.](#)

Material not included.

18. 200 OK (I-CSCF to S-CSCF) - see example in table 18.2-18

The I-CSCF (THIG) sends a 200 OK response to the S-CSCF.

Table 18.2-18: 200 OK (I-CSCF to S-CSCF)

```

SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
    icscf1_s.home1.net;branch=z9hG4bK312a32.1, SIP/2.0/UDP Token(SIP/2.0/UDP
    scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
    icscf1_p.home1.net;branch=z9hG4bK351g45.1 )@home1.net;tokenized-by=home1.net, SIP/2.0/UDP
    pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
    [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Length:

```

P-Access-Network-Info: This header contains information from the UE.

Remaining material of subclause not included.