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	Functional models, information flows and protocol details
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Presentation of Technical Report to TSG or WG

Presentation to:	**TSG CN Meeting #21**
Document for presentation:	**TR, Version 1.0.0**
Presented for:	**Information**

Abstract of document:

The document is a temporary container for the functional models, flows and protocol details for the conferencing capabilities within the IP Multimedia (IM) Core Network (CN) subsystem based on the Session Initiation Protocol (SIP), Session Description Protocol (SDP), SIP Events and other protocols currently under development in IETF. The main content of this report when stable will be moved into the Technical

Title: **Conferencing based on SIP, SDP and other protocols;**

Specification 3GPP TS 24.147, material that is identified as being general to IMS (see chapter 9) will be shifted to 3GPP TS 24.229 [5] and possibly also to other Technical Specifications.
Where possible the document specifies the requirements for this protocol by reference to specifications produced by the IETF within the scope of the relevant protocol. Where this is not possible, extensions to SIP are defined within the present document. The document has therefore been structured in order to allow both forms of specification.
The document includes information applicable to network operators, service providers and manufacturers.
Agreed material is held in this TR for an interim period of time, and the material transferred into release 6 versions of 24.147, 24.229 and possibly also to other Technical Specifications at a later time.
This TR will not be published.

Changes since last presentation to TSG Meeting #:

-

Outstanding Issues:

As this document is meant to be a repository for information to create all the documentation in WG CN1 for IMS Conferencing, the outstanding issues are all the remaining IMS Conferencing open issues.

Contentious Issues:

None of the issues identified are contentious within WG CN1.

Some of the issues identified are still undergoing resolution in WG SA2, e.g. those relating to PSI's; these are generic within the IM CN subsystem, rather than specific to Presence.
There are issues in the referenced IETF documentation where resolution is providing contentious.

3GPP TR 29.847 V1.0.0 (2003-09)

Technical Report

**3rd Generation Partnership Project;
Technical Specification Group Core Network;
Conferencing based on SIP, SDP and other protocols;
Functional models, information flows and protocol details
(Release 6)**

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Contents

Foreword

This Technical Report has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document is a temporary container for the functional models, flows and protocol details for the conferencing service within the IP Multimedia Core Network subsystem (IMS) based on the Session Initiation Protocol (SIP), SIP Events, the Session Description Protocol (SDP) and other protocols. The document covers also instant messaging conferences. The contents of this report when stable will be moved into the Technical Specification 3GPP TS 23.218 [3], 3GPP TS 24.228 [4] and 3GPP TS 24.229 [5].

Editor's note: This TR will also include information on conference floor control, which will be using different protocols than SIP and SDP (see clause 9), as e.g. described in draft-wu-sipping-floor-control-04.txt. This information might be moved either to TS 24.229 or to another 3GPP document.

Editor's note: This TR will also include information on Conference Policy Management (see clause 8) , as e.g. described in draft-koskelainen-sipping-conf-policy-req-00.txt. This information might be moved either to TS 24.229 or to another 3GPP document.

Editor's note: The "other protocols" that are mentioned here need to be listed in detail, in order to replace the phrase "other protocols". This TR only covers protocols in the scope of CN1.

Editor's note: The work on conference policy control is related to the work under the work item for IMS group management, WID: 11036, and the decision is to be made on contributed text as in which document it will appear.

Editor's note: The work on instant messaging conferences is related to the work under the work item for IMS messaging, WID 11039, and the decision is to be made on contributed text as in which document it will appear.

Editor's note: The ongoing work on floor control and conferencing in CN5 needs to be taken into account.

This document does not cover the signalling between a MRFC and a MRFP.

Where possible the present document specifies the requirements for this protocol by reference to specifications produced by the IETF within the scope of SIP, SIP Events, SDP and other protocols. Where this is not possible, extensions to SIP are defined within the present document. The document has therefore been structured in order to allow both forms of specification.

The present document includes information applicable to network operators, service providers and manufacturers.

Editor's note: Agreed material is held in this TR for an interim period of time, and the material transferred into release 6 versions of 23.218, 24.228 and 24.229 at a later time. This has the advantage that:

It creates a location where the material may stabilise outside a document under CR control, thus fulfilling the function of the original annexes in the IN CN subsystem documents.

It avoids the need to create release 6 mirror CRs for all release 5 changes to the IM CN subsystem.

This TR will not be published.

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: "3G Vocabulary".

[2] 3GPP TS 22.228: " Service requirements for the Internet Protocol (IP) multimedia core network subsystem; Stage 1".

[3] 3GPP TS 23.218: "IP Multimedia (IM) Session Handling; IP Multimedia (IM) call model; Stage 2".

[4] 3GPP TS 24.228: "Signalling flows for the IP multimedia call control based on SIP and SDP; Stage 3".

[5] 3GPP TS 24.229: "IP Multimedia Call Control Protocol based on SIP and SDP; Stage 3".

[6] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".

[7] RFC 3261 (March 2002): "SIP: Session Initiation Protocol".

[8] draft-ietf-sipping-conferencing-framework-00 (May 2003): "A Framework for Conferencing with the Session Initiation Protocol"

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

[9] draft-ietf-sipping-cc-conferencing-01 (June 2003): "Session Initiation Protocol Call Control – Conferencing for User Agents"

Editor's note: The reference to this draft may become obsolete in the future if IETF moves all the material, that is required for the description of IMS conferencing, to 3GPP TS 24.147

[10] RFC 3265 (March 2002): "Session Initiation Protocol Specific Event Notification".

[11] draft-ietf-sipping-conference-package-00 (June 2003): "A Session Initiation Protocol (SIP) Event Package for Conference State"

Editor's note: The reference to this draft may become obsolete in the future if IETF moves all the material, that is required for the description of IMS conferencing, to 3GPP TS 24.147

[12] 3GPP TS 29.228: "IP Multimedia (IM) Subsystem Cx Interface; Signalling flows and message contents".

[13] RFC 3323 (May 2002): "A Privacy Mechanism for the Session Initiation Protocol (SIP)".

[14] RFC 3325 (May 2002): "Extensions to the Session Initiation Protocol (SIP) for Network Asserted Identity within Trusted Networks".

[15] 3GPP TS 29.208: " End to end quality of Service (QoS) signaling flows".

[16] RFC 2833 (May 2000): " RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals"

[17] RFC 3515 (April 2003): "The Session Initiation Protocol (SIP) REFER Method"

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply.

For the purposes of the present document, the terms and definitions defined in 3GPP TS 21.905 [1] and 3GPP TS 22.141 [2] apply.

Conferencing AS: an Application Server that supports functionality specific to a SIP conference focus.

The following terms and definitions given in 3GPP TS 23.228 [2] apply (unless otherwise specified)

Public Service Identity

Three-way session The following terms and definitions given in draft-ietf-sipping-conferencing-framework-00 [8] apply (unless otherwise specified)

Conference

Conference-Aware Participant

Conference Notification Service

Conference Policy

Conference Policy Control Protocol

Conference Policy Server

Conference-Unaware Participant

Conference URI

Focus

Media Policy

Media policy server

Membership Policy

Mixer

Participant

Tightly Coupled Conference

The following terms and definitions given in draft-ietf-sipping-cc-conferencing-01 [9] apply (unless otherwise specified)

Conference Factory URI

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AMR	Adaptive Multi-Rate
AS	Application Server
CN	Core Network
CSCF	Call Session Control Function
CPCP	Conference Policy Control Protocol
FQDN	Fully Qualified Domain Name
HSS	Home Subscriber Server
I-CSCF	Interrogating CSCF
IM	IP Multimedia
IMS	IP Multimedia CN subsystem
IP	Internet Protocol
MGCF	Media Gateway Control Function
MRFC	Multimedia Resource Function Controller
MRFP	Multimedia Resource Function Processor
P-CSCF	Proxy CSCF
PSI	Public Service Identity
S-CSCF	Serving CSCF
SDP	Session Description Protocol
SIP	Session Initiation Protocol

UE User Equipment

4 Conference service overview

Editor's note: This is an introductory clause to the TR and is not intended to be introduced to any other 3GPP Specification.

The basic services for the IP Multimedia core network Subsystem (IMS), as defined in 3GPP TS 24.229 [5], allow a user to initiate, modify and terminate media sessions based on the Session Initiation Protocol, as defined in RFC 3261 [7]. Although these basic mechanisms already allow multi party calls, more sophisticated services for communication between multiple parties can be made available by the network.

The conferencing service provides the means for a user to create, manage, terminate, join and leave conferences, which are handled by a server within a home network of the conference creator. It also provides the network with the ability to give information about these conferences to the involved parties. Participants to conferences may be internal or external to the home network.

The network operator or the user may apply membership and media policies to a conference by using a conference policy control protocol.

Conferencing applies to any kind of media stream by which users may want to communicate, this includes e.g. audio and video media streams as well as instant message based conferences or gaming. Floor control, as part of the conferencing service offers control of shared conference resources at the MRFP.

The framework for SIP conferences is specified in draft-ietf-sipping-conferencing-framework-00.txt [8].

The architecture for the 3GPP conference service is specified in 3GPP TS 23.228 [6] and 3GPP TS 23.218 [3].

The present document specifies SIP and SDP protocols to realize 3GPP conference service based on the protocols specified by the IETF defined conference service as per RFCs and Internet Drafts listed in clause 2: reference. However, since the IETF conference service has various scenarios and features as described in draft-ietf-sipping-conferencing-framework-00[8], 3GPP conference service is a subset of the above IETF defined conference service. 3GPP conference service has the following characteristics as shown below;

- Loosely coupled conferencing is outside the scope of this release.
- Focus, Conference policy server , Media policy server and Mixer are colocated in a AS/MRFC in this release.

5 Protocol using SIP and SIP events for conferencing

5.1 Introduction

5.2 Functional entities

5.2.1 User Equipment (UE)

For the purpose of SIP based conferences, the UE shall implement the role of a Conference participant as described in subclause 5.3.1.

5.2.2 Media Resource Function Controller (MRFC)

As the function split between the MRFC and the conferencing AS is out of scope of this document, the procedures for the MRFC are described together with those for the conferencing AS in subclause 5.2.2.

For the purpose of SIP based conferences, the MRFC shall regard the MRFP as a mixer, as described in draft-ietf-sipping-conferencing-framework-00.txt [8] and draft-ietf-sipping-cc-conferencing-01 [9].

5.2.3 Conferencing Application Server (AS)

The conferencing AS may include MRFC functionality. As the function split between the conferencing AS and the MRFC is out of scope of this specification, only the procedures related to the conferencing AS are described here.

For the purpose of SIP based conferences, the conferencing AS shall act as a conference focus, as described in subclause 5.3.2 and as a conference notification service, as described in subclause 5.3.3. The conferencing AS may act as a conference participant as described in section 5.3.1.

5.2.4 Media Gateway Control Function (MGCF)

For the purpose of SIP based conference, the MGCF shall implement the role of conference participant as described in clause 5.3.1.

5.3 Role

5.3.1 Conference Participant

5.3.1.2 Tightly coupled conferences

The conference participant shall be able to act as a subscriber to the conferencing event package, as described in draft-ietf-sipping-conference-package-00 [11].

5.3.1.3 Conference creation

5.3.1.3.1 General

The conference participant shall make use of the procedures for session establishment as described in subclause 5.1.2A and subclause 5.1.3 of 24.229 [5] when creating conferences.

5.3.1.3.2 Conference creation with a conference factory URI

Upon a request to create a conference with a conference factory URI, the conference participant shall

1) generate an initial INVITE request in accordance with section 5.1.3.1 of 24.229 [5]; and

2) set the request URI of the INVITE request to the conference factory URI.

On receiving a 200 (OK) response to the INVITE request with the "isfocus" option tag indicated in Contact header, the conference participant shall store the content of the received Contact header as the conference URI. In addition to this, the conference participant may subscribe to the conference state event package as described in draft-ietf-sipping-conference-package-00 [11] by using the stored conference URI.

NOTE: A conference participant can decide not to subscribe to the registration state event package for conferences with a large number of attendees, due to, e.g., the signalling traffic caused by the notifications about users joining or leaving the conference.

5.3.1.3.3 Three-way session creation

When a conference participant is participating in two or more SIP sessions and wants to join together two or more of these active sessions to a so-called three-way session, the conference participant shall perform the following steps

1) create a conference at the conference focus by sending an INVITE request with the conference factory URI for the three-way session towards the conference focus;

Editor's Note: It is currently not possible to make the conference participant automatically aware of a conference-factory URI. For automated ad-hoc conferences such a mechanism is needed anyway. Therefore a reference should be added here, when the mechanism for ad-hoc conference creation is described within this document at a later point in time.

2) decide and perform for each of the active sessions, that are requested to be joined to the three-way session, how the remote user shall be invited to the three-way session, which can either be:

   a) by performing the procedures for inviting a user to a conference by sending an REFER request to the user, as described in subclause 5.3.1.5.2; or

   b) by performing the procedures for inviting a user to a conference by sending a REFER request to the conference focus, as described in subclause 5.3.1.5.3;

3) release the active session with a user, by applying the procedures for session release in accordance with RFC 3261 [7], after a NOTIFY request has been received from that user, indicating that the user has successfully joined the three-way session, i.e. including:

   a) a body of content-type "message/sipfrag" that indicates a "200 OK" response; and,

   b) a Subscription-State header set to the value "terminated"; and,

4) treat the created three-way session as a normal conference, i.e. shall apply the applicable procedures of subclause 5.3.1 for it.

5.3.1.4 Joining a conference

5.3.1.4.1 User joining a conference by using a conference URI

Upon generating an initial INVITE request to join a conference for which the conference URI is known to the conference participant, the conference participant shall

1) set the request URI of the INVITE request to the conference URI.

2) send the INVITE request towards the conferencing AS that is hosting the conference.

NOTE 1: The initial INVITE request is generated in accordance with 3GPP TS 24.229 [5]; and,

NOTE 2: The mechanisms by which the conference participant / user gets aware of the conference URI are outside the scope of this specification.

On receiving a 200 (OK) response to the INVITE request with the "isfocus" option tag indicated in Contact header, the conference participant shall store the contents of the received Contact header as the conference URI. In addition to that the conference participant may subscribe to the conference state event package as described in draft-ietf-sipping-conference-package-00 [11] by using the stored conference URI.

NOTE 3: A conference participant can decide not to subscribe to the registration state event package for conferences with a large number of attendees, due to the signalling traffic caused by the notifications about e.g. users joining or leaving the conference.

5.3.1.4.2 User joining a conference after receipt of a REFER request

Upon receipt of a REFER request that includes a Refer-To header which includes

- the "isfocus" parameter; and

- the "method" parameter set to INVITE;

the conference participant shall:

1) handle the REFER request in accordance with RFC 3515 [17]; and,

2) perform the actions as described in subclause 5.3.1.4.1 for a user joining a conference.

5.3.1.5 Inviting other users to a conference

5.3.1.5.1 General

Upon inviting another user to a conference, the conference participant has to decide which of the following procedures has to be applied:

1) inviting an user to a conference by sending a REFER request to the user directly, as described in subclause 5.3.1.5.2; or

2) inviting a user to a conference by sending a REFER request to the conference focus, as described in subclause 5.3.1.5.3.

Editor's Note: There might be several more possibilities to perform invitation of another user to a conference, which might be based on the functionality of the conference policy control protocol (CPCP). These possibilities need to be listed here as further alternatives.

Editor's Note: It needs to be stated that REFER methods sent directly from the conference participant to the conference AS or to other users put a lot of load to the air interface, due to the responses and the two subsequent NOTIFY messages. The CPCP related procedures – when introduced – will give a possibility for the conference participant to invite other users to a conference by other means than sending a REFER method that put less load to the air interface.

It is out of the scope of this specification, how the UE decides which of the above procedures shall be applied.

5.3.1.5.2 User invites other user to a conference by sending a REFER request to the other user

Upon generating a REFER request that is destined to a user in order to invite that user to a specific conference, the conference participant shall:

1) set the request URI of the REFER request to the address of the user who is invited to the conference;

2) set the Refer-To header of the REFER request to the conference URI of the conference that the other user shall be invited to, including

   a) the "isfocus" parameter; and

   b) the "method" parameter set to "INVITE"; and

NOTE: Other headers of the REFER request will be set in accordance with 3GPP TS 24.229 [5].

3) send the REFER request towards the user who is invited to the conference.

Afterwards the UE shall treat incoming NOTIFY requests that are related to the previously sent REFER request in accordance with RFC 3515 [17] and may indicate the received information to the user.

5.3.1.5.3 User invites other user to a conference by sending a REFER request to the conferencing AS

Upon generating a REFER request that is destined to the conferencing AS in order to invite another user to a specific conference, the conference participant shall:

1) set the request URI of the REFER request to the conference URI to which the user is invited to;

2) set the Refer-To header of the REFER request to the SIP URI or tel URL of the user who is invited to the conference;

3) include the "method" parameter with the value "INVITE" in the Refer-To header;

NOTE: Other headers of the REFER request will be set in accordance with 3GPP TS 24.229 [5].

4) send the REFER request towards the conference focus that is hosting the conference.

Afterwards the UE shall treat incoming NOTIFY requests that are related to the previously sent REFER request in accordance with RFC 3515 [17].

5.3.2 Conference Focus

5.3.2.1 General

5.3.2.2 Generic procedures for all conference related methods at the conference focus

5.3.2.2.1 Conference Focus originating case

Editor's Note: This section shall include generic handling of requests that are generated by the conference focus due to IMS conferencing.

5.3.2.2.2 Conference Focus terminating case

Upon receipt of a conference related initial request the conference focus shall:

1) store the value of the icid parameter received in the P-Charging-Vector header;

2) store the value of the orig-ioi parameter received in the P-Charging-Vector header. The orig-ioi parameter identifies the sending network of the request message; and

3) store the values received in the P-Charging-Function-Addresses header, if received.

When creating the first response for this initial request, the conference focus shall

1) include the P-Charging-Vector header including

   a) the value of the icid parameter as received in the initial request;

   b) the value of the orig-ioi parameter as received in the initial request; and

   c) the term-ioi parameter, indicating the network of the conference focus; and

2) include the P-Charging-Function-Addresses header as received in the initial request or, if the P-Charging-Function-Addresses header was not received in the initial request, indicate the values applicable for the conference in the P-Charging-Function-Addresses header.

When creating responses for an initial INVITE request, the conference focus shall additionally send the 200 (OK) response to the initial INVITE request only after the resource reservation has been completed.

5.3.2.3 Conference creation

5.3.2.3.1 Conference creation with a conference factory URI

Upon receipt of an INVITE request that includes a conference factory URI in the request URI, the conference focus shall

1) check if the conference factory URI is allocated and perform the actions described in subclause 5.3.2.3.2 if it is not allocated;

2) perform the actions described in subclause 9.2.1. The following actions shall only be performed if the request can be authorized;

;

3) allocate a conference URI and may allocate a temporary conference URI;

4) if "preconditions" were indicated as required in the INVITE request, generate a first provisional response to the INVITE request, indicating the temporary conference URI in the Contact header if allocated, else the conference URI; and

5) request resources for the conference from the conference mixer;

Upon receipt of an indication from the conference mixer that conference resources have been through-connected, the conference focus shall generate a 200 (OK) response to the INVITE request, indicating

a) the conference URI in the Contact header; and

b) the "isfocus" option tag as a parameter to the conference URI in the Contact header; and

5.3.2.3.2 Abnormal cases

Upon receipt of an INVITE request that includes a conference factory URI in the request URI, that is not allocated at the conference focus, the conference focus shall return a 604 (Does Not Exist Anywhere) response.

NOTE: The mechanism by which the conference focus gets aware whether a URI is a conference factory URI is out of the scope of this specification. One possibility would be that an operator uses a specific user part (e.g. conference-factory@home1.net) or host part (e.g. conference-factory.home1.net) for identification of conference factory URIs.

5.3.2.4 User joining a conference

5.3.2.4.1 User joining a conference by using a conference URI

Upon receipt of an INVITE request that includes a conference URI in the request URI, the conference focus shall:

1) check if the conference URI is allocated. If the conference URI is not allocated, the conference focus shall perform the actions as described in subclause 5.3.2.4.2;

2) perform the actions described in subclause 9.2.1. The following actions shall only be performed if the request can be authorized;

3) generate a provisional response to the INVITE request, indicating the conference URI in the Contact header; and

4) request resources for the conference from the conference mixer.

Upon receipt of an indication from the conference mixer that conference resources have been through-connected, the conference mixer shall

1) generate a 200 (OK) response to the INVITE request, indicating

    a) the conference URI in the Contact header; and

    b) the "isfocus" option tag as a parameter to the conference URI in the Contact header; and

2) forward the request in accordance with the routing procedures of RFC 3261 [7].

5.3.2.4.2 Abnormal cases

Upon receipt of an INVITE request that includes in the request URI a conference URI, that is not allocated at the conference focus, the conference focus shall return a 604 (Does Not Exist Anywhere) response.

5.3.2.5 Invitation of users to a conference

5.3.2.5.1 General

The conference focus can invite users to a conference by sending an INVITE request to the user, as described in subclause 5.3.3.5.3. This procedure will be triggered at the conference focus

1) either by the conference policy for the conference hosted at the conference focus; or

2) by a REFER request received from authorized users, that request the conference focus to invite other users to the conferece, as described in subclause 5.3.3.5.2.

5.3.3.5.2 Request from a user to invite another user to a conference

Upon receipt of an REFER request that includes

- a conference URI in the request URI; and,
- a Refer-To header including:
  - a valid SIP URI or tel URL; and,
  - the "method" parameter set to "INVITE";

the conference focus shall:

1) check if the conference URI is allocated. If the conference URI is not allocated, the conference shall perform the actions as described in subclause 5.3.2.3.2 for the INVITE request;
2) perform the actions described in subclause 9.2.1. The following actions shall only be performed if the request can be authorized;
3) generate a final response to the REFER request in accordance with RFC 3515 [17];
4) invite the user indicated in the Refer-To header by performing the procedures as described in subclause 5.3.3.5.3; and,
5) based on the progress of this invitation, send NOTIFY messages in accordance with the procedures of RFC 3515 [17] towards the user who sent the REFER request.

5.3.3.5.3 Inviting a user to a conference by sending a INVITE request

When generating an INVITE request in order to invite a user to a specific conference, the conference foucs shall:

1) set the request URI of the INVITE request to the address of the user who is invited to the conference;
2) set the P-Asserted-Identity header of the INVITE request to the conference URI of the conference that the user shall be invited to;
3) set the Contact header of the INVITE request to the conference URI of the conference that the user shall be invited to, including the "isfocus" parameter;
4) request the resources required for the new user from the conference focus; and
5) send the INVITE request towards the user who is invited to the conference.

NOTE: Requests are generated in accordance with 3GPP TS 24.229 [5].

Afterwards the conference focus shall proceed the session establishment as described in 3GPP TS 24.229 [5].

5.3.3.5.4 Abnormal cases

Upon receipt of a REFER request that includes in the request URI a conference URI, that is not allocated at the conference focus, the conference foucs shall return a 604 (Does Not Exist Anywhere) response.

5.3.3 Conference Notification Service

5.3.3.1 General

Editor's Note: This subclause includes general information about the conference notification service

5.3.3.1 Subscription to conference state event package

5.3.3.1.1 User subscribes to the conference state event package

Upon receipt of a SUBSCRIBE request that includes a conference URI in the request URI and the "conf" tag in the Event header, the conference notification service shall

1) check if the conference URI is allocated and perform the actions described in subclause 5.3.3.1.2 if it is not allocated;

2) perform the actions described in subclause 9.2.1. The following actions shall only be performed if the request can be authorized; and

3) establish the subscription to the conference state event information as described in RFC 3265 [10] and draft-ietf-sipping-conference-package-00 [11].

5.3.3.1.2 Abnormal cases

Upon receipt of an SUBSCRIBE request that includes a conference URI in the request URI, that is not allocated at the conference focus, the conference notification service shall return a 604 (Does Not Exist Anywhere) response.

6 Protocol using SDP for conferencing

6.1 Introduction

6.2 Functional entities

6.2.1 User Equipment (UE)

For the purpose of SIP based conferences, the UE shall implement the role of a conference participant as described in subclause 6.3.1.

6.2.2 Media Resource Function Controller (MRFC)

As the function split between the MRFC and the conferencing AS is out of scope of this document, the procedures for the MRFC are described together with those for the conferencing AS in subclause 5.2.2.

6.2.3 Conferencing Application Server (Conferencing AS)

The conferencing AS may include MRFC functionality. As the function split between the conferencing AS and the MRFC is out of scope of this specification, only the procedures related to the conferencing AS are described here.

For the purpose of SIP based conferences, the conferencing AS shall act as a conference focus, as described in subclause 6.3.2. The conferencing AS may act as a conference Participant as described in section 5.3.1.

6.2.4 Media Gateway Control Function (MGCF)

The MGCF implements the role of conference participant (see clause 6.3.1),

6.3 Role

6.3.1 Conference participant

Editor's Note: It is not expected that there are specific procedures for SDP usage at the conference participant for IMS conferencing.

6.3.2 Conference Focus

When the conference focus receives any SIP request or response containing SDP, the conference focus shall examine the media parameters in the received SDP.

Provided that the INVITE request received by the conference focus contains an SDP offer including one or more "m=" media descriptions, the SDP answer shall

- reflect the media capabilities and policies as available for the conference; and
- contain a request confirmation for the result of the resource reservation at the originating end point for every "m=" media line if preconditions were required by the originator.

During session establishment procedure for a conference, SIP messages shall only contain SDP payload if that is intended to modify the session description.

For "video" and "audio" media types that utilize the RTP/RTCP, the conference focus shall specify the proposed bandwidth for each media stream utilizing the "b=" media descriptor in the SDP. For other media streams the "b=" media descriptor may be included. The value or absence of the "b=" parameter will affect the assigned QoS which is defined in 3GPP TS 29.208 [15].

The conference focus shall include the DTMF media format at the end of the "m=" media descriptor in the SDP for audio media flows that support both audio codec and DTMF payloads in RTP packets as described in RFC 2833 [16].

Upon receipt of a SDP answer or sending a SDP answer that changes the resource requirements for the conference, the conference focus shall provide the corresponding changes of conference resources.

Upon receipt of a SDP offer during conference creation, that confirms that the conference participant has reserved the required resources, the conference focus shall through-connect the conference resources.

7 Protocol for conference policy control at the Ut reference point

Editor's Note: This clause holds material concerning the Conference Policy Control Protocol (CPCP).

Editor's note: The work on conference policy control is related to the work under the work item for IMS group management, WID: 11036, and the decision is to be made on contributed text as in which document it will appear.

7.1 Introduction

Editor's note: No material currently in 29.847 for this clause

7.2 Functional entities

7.2.1 User Equipment (UE)

7.2.1 Conferencing Application Server (Conferencing AS)

7.3 Role

8 Protocol for floor control for conferencing at the Ut reference point

Editor's Note: This clause holds material on concerning floor control for IMS based conferences. As it is currently suggested to implement floor control for SIP based conferences by using the Simple Object Access Protocol (SOAP), information concerning SOAP (or other protocols used for floor control purposes) should be in this extra clause.

8.1 Introduction

8.2 Functional entities

8.2.1 User Equipment (UE)

8.2.1 Conferencing Application Server (Conferencing AS)

8.3 Role

9 Identified material for 3GPP documents other than 3GPP TS 24.147

Editor's Note: Thisclause holds material that has to be moved to 3GPP documentation other than 3GPP TS 24.147.

9.1 General

Editor's Note: Text needs to be added that clarifies, that the text in clause 9 needs to be aligned with the text of the document it finally gets shifted to. The text introduced here initially will be written specifically for the conference functionality.

Editor's Note: References within other subclauses to the material in clause 9 needs to be updated accordingly.

9.2 Material identified for 3GPP TS 24.229

9.2.1 Conference participant identity verification and request authorization

Editor's Note: This section shall be kept in-line with the section in the presence TR 29.841, that describes watcher identity verification and request authorization.

9.2.1.1 Conference participant identify verification at the conference focus

When the conference user receives an initial request from a conference participant who is either

a) creating a conference;

b) joining a conference;

c) inviting another user to a conference; or

d) subscribing to the conference event state of a conference;

the conference focus shall attempt to verify the identity of the conference participant prior to authorizing the conference participants request according to the procedures described in subclause 9.2.1.2.

When the conference focus receives an initial request that does not contain credentials, the conference focus shall:

NOTE: Mechanisms for transporting the credentials can include, among others, P-Asserted-Identity, Authorization header, digital signatures, S/MIME body, etc.

a) if a Privacy header is present in the initial request and the Privacy header value is set to "id" or "user", then the conference participant and the request are considered as anonymous, and no further actions are required. The conference focus shall continue with authorizing the users request according to the procedures described in 9.2.1.2;

b) if there is no Privacy header present in the initial request, or if the Privacy header contains a value other than "id" or "user", then the conference foucs shall check for the presence of a P-Asserted-Identity header in the initial request. Two cases exists:

   i) the initial request contains a P-Asserted-Identity header. This is typically the case when the user is located inside a trusted domain as defined by 3GPP TS 24.229 [5] subclause 4.4. In this case, the conference focus is aware of the identity of the conference participant and no extra actions are needed. The conference focus shall continue with authorization of the request according to the procedures described in 9.2.1.2;

   ii) the initial request does not contain a P-Asserted-Identity header. This is typically the case when the user is located outside a trusted domain as defined by 3GPP TS 24.229 [5] subclause 4.4. In this case, the conference focus does not have a verified identity of the conference participant. The conference focus shall check the From header of the initial request. If the From header value in the initial request is set to "Anonymous", then the conference participant and the request are considered as anonymous and no further actions are required. If the From header value does not indicate anonymity, then the conference focus shall challenge the conference participant by issuing a 401 (Unauthorized) response including a challenge as per procedures described in RFC 3261 [7].

When the conference focus receives an initial request that contains credentials but it does not contain a P-Asserted-Identity the conference focus shall check the correctness of the credentials. If the credentials are correct, then the conference focus shall consider the identity of the conference participant verified, and the conference focus shall continue with authorizing the conference participants request according to the procedures described in 9.2.1.2.

If the credentials are not correct, the conference focus may either re-challenge the conference participant (up to a predetermined maximum number of times predefined in the conference focus configuration data), or consider the conference participant as anonymous. If the conference participant is considered anonymous, the conference focus shall continue with the request authorization procedures described in subclause 9.2.1.2.

Editor's Note: It needs to be investigated whether the *maximum number of times predefined in the conference focus configuration data* creates a potential denial of service attack, as it requires the conference focus to keep states between different authentications trials.

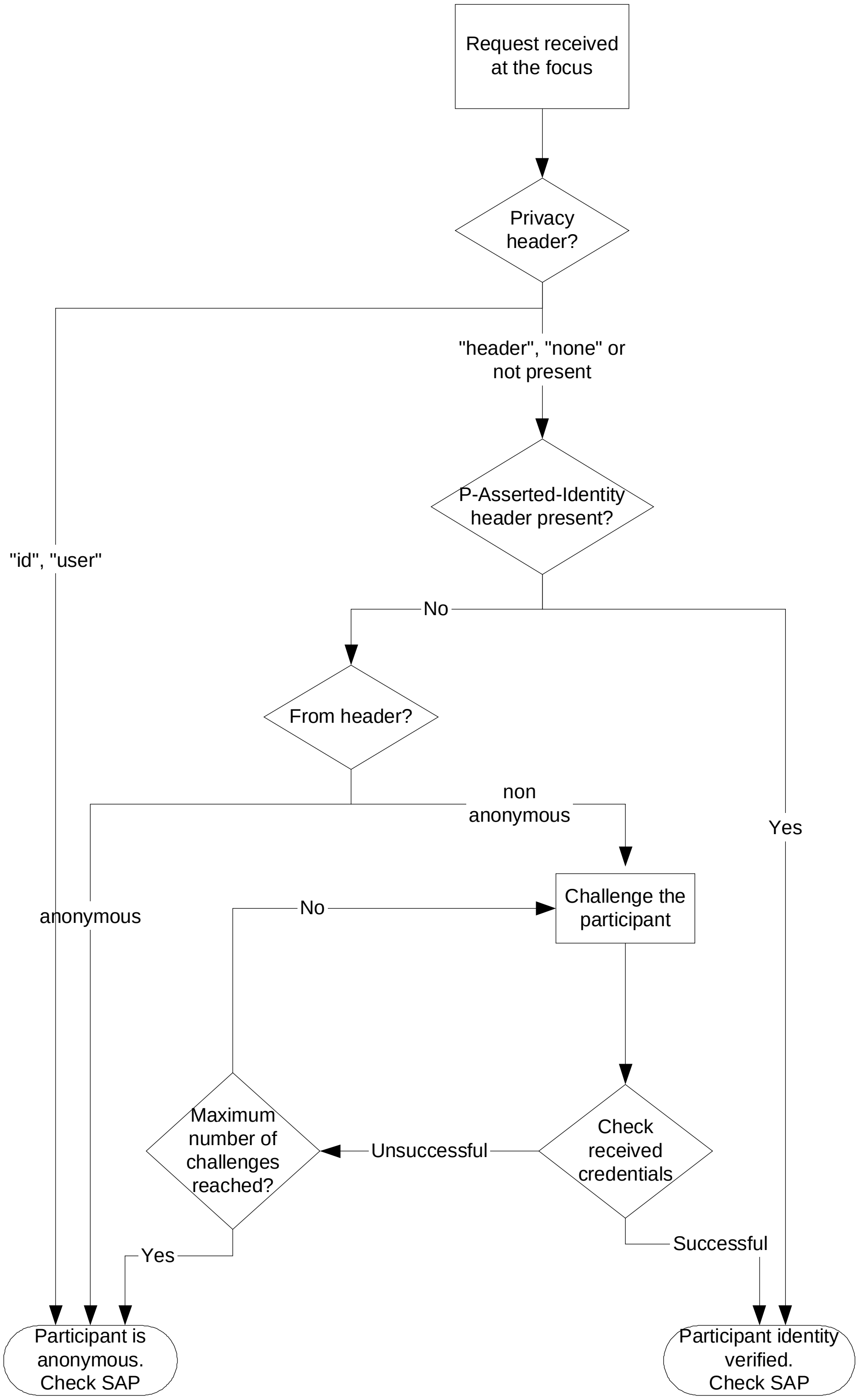


Figure 9.2.1-1: Conference participant identity verification flow at the conference foucs

9.2.1.2 Authorization of a request

Requests received by the conference focus from a conference participant can be for one of the following conference related functionalities:

a) request for conference creation

b) request for joining a conference;

c) request for inviting another user to the conference; or

d) request for subscription to the conference event state.

Depending on the requested functionality, the conference focus has to perform specific actions after the request was authorized or not. This subclause only describes the authorization of a request, the actions to be taken if the authorization succeeds are described in

a) subclause 5.3.2.3 for conference creation;

b) subclause 5.3.2.4 for joining a conference;

c) subclause 5.3.2.5 for inviting another user to a conference; or

d) subclause 5.3.3.1 for subscription to the conference event state.

Once the conference focus has tried to verify the identity of the conference participant (see subclause 9.2.1.1), the conference focus either has a verified identity of the conference participant or it considers the conference participant as anonymous.

If the conference participant is considered anonymous, the conference focus shall check if the policy of the conference allows an anonymous request for the requested functionality. If the conference policy allows anonymous requests for the requested functionality then the conference focus shall perform the requested functionality, otherwise it shall not.

If the conference participant is identified by an identity, the conference focus shall apply the conference authorization policy of the conference to detect whether the particular conference participant is allowed to perform the requested functionality for the specific conference. The conference authorization policy can include the verified identity as a possible conference participant. In this case the conference focus shall perform the requested functionality.

If the requested functionality is performed, the conference focus shall return a 200 (OK) response to the conference participant.

If the requested functionality cannot be performed, the conference focus shall either:

- reject the request according to the procedures of RFC 3261 [7] and RFC 3265 [10] e.g., by issuing a 403 (Forbidden) response.

- if the conference authorization policy dictates it, do a polite blocking (as defined in 3GPP TS 22.141 [7.53]) by sending a 200 (OK) response.

Annex A (informative): Example signalling flows of conferencing operation

A.1 Scope of signalling flows

This annex gives examples of signalling flows for conferencing within the IP Multimedia CN Subsystem (IMS) based on the Session Initiation Protocol (SIP), SIP Events, the Session Description Protocol (SDP) and other protocols.

These signalling flows provide detailed signalling flows, which expand on the overview information flows provided in 3GPP TS 23.228 [6].

A.2 Introduction

This subclause breaks down the signalling flows for establishing sessions into a number of individual procedures, following the same principles as 3GPP TS 23.228 [3] subclause 5.4.9.

For the purposes of this document, a further breakdown has been necessary, and therefore a number of signalling flows have been given an (a) or (b) suffix, so that the signalling flows for establishing sessions where configuration independence is applied may be distinguished from those where it is not, e.g.:

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

A.2.1 General

A.2.2 Key required to interpret signalling flows

The key to interpret signalling flows specified in 3GPP TS 24.228 [4] subclause 4.1 applies with the additions specified below.

Editor's note: Additional material yet to be specified.

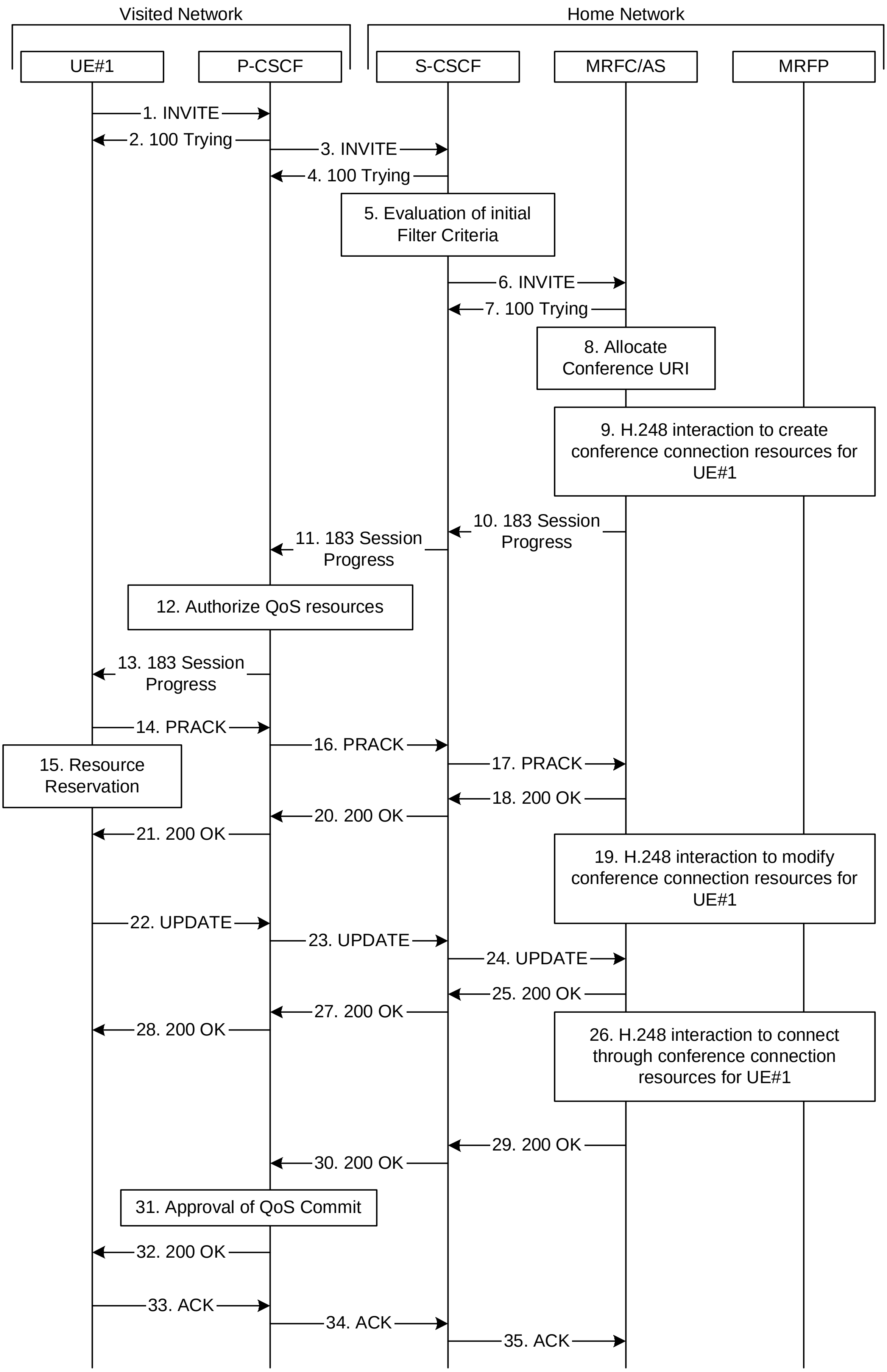
A.3 Flows demonstrating the creation of a conference

A.3.1 Introduction

This subclause covers the flows that show how a user can create conferences at a MRFC/AS.

A.3.2 User automatically creating a conference with a Conference Factory URI

A.3.2.1 User in home network



Visited Network
Home Network
UE#1
P-CSCF
S-CSCF
MRFC/AS
MRFP
1. INVITE
2. 100 Trying
3. INVITE
4. 100 Trying
5. Evaluation of initial Filter Criteria
6. INVITE
7. 100 Trying
8. Allocate Conference URI
9. H.248 interaction to create conference connection resources for UE#1
10. 183 Session Progress
11. 183 Session Progress
12. Authorize QoS resources
13. 183 Session Progress
14. PRACK
15. Resource Reservation
16. PRACK
17. PRACK
18. 200 OK
19. H.248 interaction to modify conference connection resources for UE#1
20. 200 OK
21. 200 OK
22. UPDATE
23. UPDATE
24. UPDATE
25. 200 OK
26. H.248 interaction to connect through conference connection resources for UE#1
27. 200 OK
28. 200 OK
29. 200 OK
30. 200 OK
31. Approval of QoS Commit
32. 200 OK
33. ACK
34. ACK
35. ACK

Figure A.3.2.1-1: User automatically creating a conference with a conference factory URI – User in home network

Figure A.3.2.1-1 shows an IMS user creating a conference by using a conference-factory URI. The conference is created at a MRFC/AS of the users home network.

The details of the flows are as follows:

1. **INVITE (UE to P-CSCF) - see example in table A.3.2.1-1**

   A user agent wants to create a conference. For this purpose the user agent is aware of a conference-factory URI that was obtained by means outside this specification (e.g. due to pre-configuration or via other protocols, such as http)

   The UE determines the complete set of codecs that it is capable of supporting for this conference. It builds a SDP Offer 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 to the P-CSCF.

Table A.3.2.1-1: INVITE (UE to P-CSCF)

```
INVITE sip:conference-factory1@mrfc1.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=171828
To: <sip:conference-factory1@mrfc1.home1.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=87654321; port1=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:MPVMP4V-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 conference factory URI.

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.

To: same as the Request-URI.

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.

2. **100 Trying (P-CSCF to UE) - see example in table A.3.2.1-2**

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

Table A.3.2.1-2: 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 S-CSCF) - see example in table A.3.2.1-3**

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.

The P-CSCF examines the media parameters, and does not find any choices that the local policy does not allow.

The INVITE request is forwarded to the S-CSCF.

Table A.3.2.1-3: INVITE (P-CSCF to S-CSCF)

```
INVITE sip:conference-factory1@mrfc1.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.visited1.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:
Require: precondition
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=
```

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.

4. **100 Trying (S-CSCF to P-CSCF) - see example in table A.3.2.1-4**

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

Table A.3.2.1-4: 100 Trying (S-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: 0
```

5. **Evaluation of initial filter criteria**

   S-CSCF validates the service profile of this subscriber and evaluates the initial filter criteria.

6. **INVITE (S-CSCF to MRFC/AS) - see example in table A.3.2.1-6**

   S-CSCF examines the media parameters based on the network operators policy. For this example, assume the subscriber is allowed requested parameters.

   S-CSCF forwards the INVITE request to the MRFC/AS that is indicated in the host part of the request URI. The S-CSCF does not re-write the request URI.

Table A.3.2.1-6: INVITE request (S-CSCF to MRFC/AS)

```
INVITE sip:conference-factory1@mrfc1.home1.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:+358-50-4821437>
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=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
```

P-Asserted-Identity: The S-CSCF inserts the corresponding TEL URL to the P-Asserted-Identity header.

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

7. **100 Trying (MRFC/AS to S-CSCF) - see example in table A.3.2.1-7 (related to table A.3.2.1-6)**

   MRFC/AS responds to the INVITE request (6) with a 100 Trying provisional response.

Table A.3.2.1-7: 100 Trying (MRFC/AS 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
```

8. **Allocate Conference URI**

   MRFC/AS allocates a conference URI, based on local information and information gained from the conference-factory URI, as well as information gained from other elements of the SIP signalling.

9. **H.248 interaction to Create Connection**

   MRFC initiates a H.248 interaction to create an IMS connection point for UE#1 in MRFP and to determine media capabilities of MRFP.

10. **183 Session Progress (MRFC/AS to S-CSCF) - see example in table A.3.2.1-13 (related to table A.3.2.1-6)**

    The MRFC determines the complete set of codecs that it is capable of supporting for this conference. It determines the intersection with those appearing in the SDP in the INVITE request.

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

Table A.3.2.1-10: 183 Session Progress (MRFC/AS 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.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity: "Conference Server" <sip:mrfc1.home1.net>
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy: none
From:
To: <sip:conference-factory1@mrfc1.home1.net>; tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:lmaa234269@mrfc1.home1.net >
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::aaa:bbb:ccc:ddd
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
```

To: a tag is added to the To header.

Contact: contains the IP address or FQDN of the MRFC/AS and a temporary identifier of the conference being created in the user part. The URI for the allocated conference is not indicated yet.

SDP: contains the set of codecs supported by the MRFC. It requests confirmation of the QoS preconditions for establishing the session.

P-Charging-Vector: The MRFC/AS inserts this header and populates the icid parameters with a unique value.

11. **183 Session Progress (S-CSCF to P-CSCF) - see example in table A.3.2.1-11**

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

Table A.3.2.1-11: 183 Session Progress (S-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:
P-Asserted-Identity:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net;
   term-ioi=home1.net
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=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
```

P-Charging-Vector: The S-CSCF inserts the originating and terminating IOI (both are in the home network).

12. **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 (39) based on operator local policy.

13 **183 Session Progress (P-CSCF to UE) – see example in table A.3.2.1-13**

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

Table A.3.2.1-13: 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:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>
P-Asserted-Identity:
Privacy:
P-Media-Authorization:
   0020000100100101706466322e76697369746564322e6e6574000c02013942563330373
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-Media-Authorization: a P-CSCF generated authorization token. This particular example shows a Policy-Element generated by "pdf2.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.

14. **PRACK (UE to P-CSCF) - see example in table A.3.2.1-14**

The UE 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 includes a new SDP offer in the PRACK message sent to the MRFC/AS.

For this example, assume the UE 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 A.3.2.1-14: PRACK (UE to P-CSCF)

```
PRACK sip:lmaa234269@mrfc1.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
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr> From:
   <sip:user1_public1@home1.net>; tag=171828
To: <sip:conference-factory1@mrfc1.home1.net>;tag=314159
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=87654321; port1=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 [5].

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.

15. **Resource Reservation**

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

16. **PRACK (P-CSCF to S-CSCF) – see example in table A.3.2.1-16**

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

Table A.3.2.1-16: PRACK (P-CSCF to S-CSCF)

```
PRACK sip:lmaa234269@mrfc1.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:
Route: <sip:scscf1.home1.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.

17. **PRACK (S-CSCF to MRFC/AS) – see example in table A.3.2.1-17**

S-CSCF forwards the PRACK request to the MRFC/AS.

Table A.3.2.1-17: PRACK (S-CSCF to MRFC/AS)

```
PRACK sip:lmaa234269@mrfc1.home1.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
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

18. **200 OK (MRFC/AS to S-CSCF) – see example in table A.3.2.1-18 (related to table A.3.2.1-17)**

The MRFC/AS acknowledges the PRACK request (17) with a 200 (OK) response.

Table A.3.2.1-18: 200 OK (MRFC/AS to S-CSCF)

```
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: application/sdp
Content-Length: (…)

v=0
o=- 2987933623 2987933624 IN IP6 5555::aaa:bbb:ccc:ddd
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
```

19. **H.248 interaction to Modify Connection**

    MRFC initiates a H.248 interaction to modify the connection established in step #9 and instructs MRFP to reserve the IMS multimedia processing resources for UE#1 according to the preceding resource negotiation between the UE#1 and the MRFC.

20. **200 OK (S-CSCF to P-CSCF) - see example in table A.3.2.1-20**

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

Table A.3.2.1-20: 200 OK (S-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-Type:
Content-Length:

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

21. **200 OK (P-CSCF to UE) - see example in table A.3.2.1-21**

P-CSCF forwards the 200 OK response to UE.

Table A.3.2.1-21: 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=
a=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
```

22. **UPDATE (UE to P-CSCF) – see example in table A.3.2.1-22**

When the resource reservation is completed, UE sends the UPDATE request to the MRFC/AS, via the signalling path established by the INVITE request.

Table A.3.2.1-22: UPDATE (UE to P-CSCF)

```
UPDATE sip:lmaa234269@mrfc1.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:scscf1.home1.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>; tag=171828
To: <sip:conference-factory1@mrfc1.home1.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 129 UPDATE
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=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 0 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 telphone-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.

23. **UPDATE (P-CSCF to S-CSCF) – see example in table A.3.2.1-23**

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 S-CSCF.

Table A.3.2.1-23: UPDATE (P-CSCF to S-CSCF)

```
UPDATE sip:lmaa234269@mrfc1.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:
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>
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=
```

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.

24. **UPDATE (S-CSCF to MRFC/AS) - see example in table A.3.2.1-24**

S-CSCF forwards the UPDATE request to MRFC/AS.

Table A.3.2.1-24: UPDATE (S-CSCF to MRFC/AS)

```
UPDATE sip:lmaa234269@mrfc1.home1.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
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=
```

25. **200 OK (MRFC/ASto S-CSCF) – see example in table A.3.2.1-25 (related to table A.3.2.1-24)**

The MRFC/AS acknowledges the UPDATE request (24) with a 200 OK response.

Table A.3.2.1-25: 200 OK (MRFC/AS to S-CSCF)

```
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: application/sdp
Content-Length: (…)

v=0
o=- 2987933623 2987933625 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 0 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
```

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

26. **H.248 interaction to Modify Connection**

    MRFC initiates a H.248 interaction to connect through the IMS multimedia processing resources for UE#1 in MRFP.

27. **200 OK (S-CSCF to P-CSCF) - see example in table A.3.2.1-27**

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

Table A.3.2.1-27: 200 OK (S-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-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=
```

28. **200 OK (P-CSCF to UE) – see example in table A.3.2.1-28**

P-CSCF forwards the 200 OK response to UE.

Table A.3.2.1-28: 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=
```

29. **200 OK (MRFC/AS to S-CSCF) – see example in table A.3.2.1-29 (related to table A.3.2.1-6)**

After the success modification of the session (26), the MRFC/AS sends a 200 OK final response to the INVITE request (6) to the S-CSCF.

Table A.3.2.1-29: 200 OK (MRFC/AS to S-CSCF)

```
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
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: <sip:conference1@mrfc1.home1.net>:2342;isfocus
Content-Length:0
```

Contact: contains the conference URI for the conference allocated at the MRFC/AS and the isfocus tag.

30. **200 OK (S-CSCF to P-CSCF) – see example in table A.3.2.1-30**

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

Table A.3.2.1-30: 200 OK (S-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:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

31. **Approval of QoS Commit**

The P-CSCF approves the commitment of the QoS resources if it was not approved already in step (12).

32. **200 OK (P-CSCF to UE) – see example in table A.3.2.1-32**

P-CSCF forwards the 200 OK final response to the session originator. UE can start the media flow(s) for this session.

Table A.3.2.1-32: 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:scscf1.home1.net;lr>, <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.

33. **ACK (UE to P-CSCF) – see example in table A.3.2.1-33**

UE starts the media flow for this session, and responds to the 200 OK (32) with an ACK request sent to P-CSCF.

Table A.3.2.1-33: ACK (UE to P-CSCF)

```
ACK sip:conference1@mrfc1.home1.net:2342 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>From:
   <sip:user1_public1@home1.net>; tag=171828
To: <sip:conference-factory1@mrfc1.home1.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
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].

34. **ACK (P-CSCF to S-CSCF) – see example in table A.3.2.1-34**

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

Table A.3.2.1-34: ACK (P-CSCF to S-CSCF)

```
ACK sip:conference1@mrfc1.home1.net:2342 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>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

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

35. **ACK (S-CSCF to MRFC/AS) - see example in table A.3.2.1-35**

S-CSCF forwards the ACK request to the MRFC/AS.

Table A.3.2.1-35: ACK (S-CSCF to MRFC/AS)

```
ACK sip:conference1@mrfc1.home1.net:2342 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
From:
To:
Call-ID:
Cseq:
Content-Length:
```

A.3.2.2 User in different network

Figure A.3.2.2-1 shows an IMS user creating a conference by using a conference-factory URI. The conference is created at a MRFC/AS located in a different network than user’s S-CSCF.

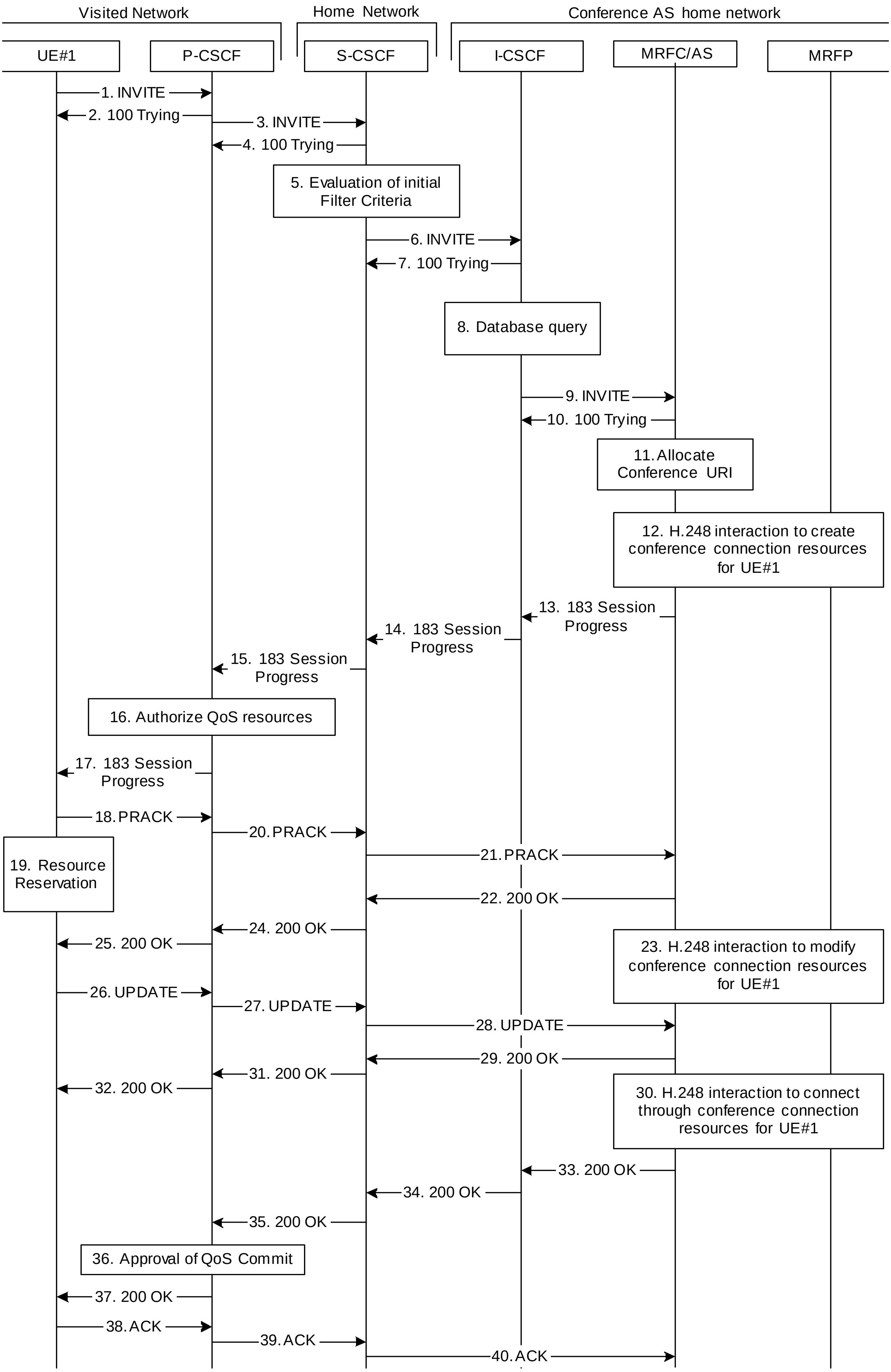

Visited Network
Home Network
Conference AS home network
UE#1
P-CSCF
S-CSCF
I-CSCF
MRFC/AS
MRFP
1. INVITE
2. 100 Trying
3. INVITE
4. 100 Trying
5. Evaluation of initial Filter Criteria
6. INVITE
7. 100 Trying
8. Database query
9. INVITE
10. 100 Trying
11. Allocate Conference URI
12. H.248 interaction to create conference connection resources for UE#1
13. 183 Session Progress
14. 183 Session Progress
15. 183 Session Progress
16. Authorize QoS resources
17. 183 Session Progress
18. PRACK
19. Resource Reservation
20. PRACK
21. PRACK
22. 200 OK
23. H.248 interaction to modify conference connection resources for UE#1
24. 200 OK
25. 200 OK
26. UPDATE
27. UPDATE
28. UPDATE
29. 200 OK
30. H.248 interaction to connect through conference connection resources for UE#1
31. 200 OK
32. 200 OK
33. 200 OK
34. 200 OK
35. 200 OK
36. Approval of QoS Commit
37. 200 OK
38. ACK
39. ACK
40. ACK

Figure A.3.2.2-1: User automatically creating a conference with a conference factory URI – user in different network

The details of the flows are as follows:

1. **INVITE (UE to P-CSCF) - see example in table A.3.2.2-1**

   A user agent wants to create a conference to a MRFC/AS in other network. For this purpose the user agent is aware of a conference-factory URI that was obtained by means outside this specification (e.g. due to pre-configuration or via other protocols, such as http)

   The UE determines the complete set of codecs that it is capable of supporting for this conference. It builds a SDP Offer 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 to the P-CSCF.

Table A.3.2.2-1: INVITE (UE to P-CSCF)

```
INVITE sip:conference-factory@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: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=171828
To: <sip:conference-factory@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=87654321; port1=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:MPVMP4V-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 conference factory URI.

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.

To: same as the Request-URI.

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.

2. **100 Trying (P-CSCF to UE) - see example in table A.3.2.2-2**

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

Table A.3.2.2-2: 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 A.3.2.2-3**

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.

The P-CSCF examines the media parameters, and does not find any choices that the local policy does not allow.

The INVITE request is forwarded to the S-CSCF.

Table A.3.2.2-3: INVITE (P-CSCF to S-CSCF)

```
INVITE sip:conference-factory@home2.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.visited1.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:
Require: precondition
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=
```

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.

4. **100 Trying (S-CSCF to P-CSCF) - see example in table A.3.2.2-4**

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

Table A.3.2.2-4: 100 Trying (S-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: 0
```

5. **Evaluation of initial filter criteria**

 S-CSCF validates the service profile of this subscriber and evaluates the initial filter criteria.

6. **INVITE (S-CSCF to I-CSCF) - see example in table A.3.2.2-6**

 S-CSCF examines the media parameters based on the network operators policy. For this example, assume the subscriber is allowed requested parameters.

 S-CSCF determines the network where the INVITE request should be forwarded. The S-CSCF resolves the I-CSCF as the next hop for this request.

Table A.3.2.2-6: INVITE request (S-CSCF to I-CSCF)

```
INVITE sip:conference-factory@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:+358-50-4821437>
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=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
```

P-Asserted-Identity: The S-CSCF inserts the corresponding TEL URL to the P-Asserted-Identity header.

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

7. **100 Trying (I-CSCF to S-CSCF) - see example in table A.3.2.2-7**

 I-CSCF responds to the INVITE request (6) with a 100 Trying provisional response.

Table A.3.2.2-7: 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.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. **Database query**

   I-CSCF resolves the conference-factory URI. In this example the I-CSCF queries a generic database to resolve the MRFC/AS address to be contacted.

Editor's Note: It is still under discussion in SA2, which functional entity will fulfil the database capabilities. This section has to be changed later on, when a decision has been taken on this issue.

9. **INVITE (I-CSCF to MRFC/AS) - see example in table A.3.2.2-9**

   I-CSCF forwards the INVITE request to the MRFC/AS. The I-CSCF does not add itself to the Record-Route header since it does not need to stay on the signalling path for subsequent requests.

Table A.3.2.2-9: INVITE request (I-CSCF to MRFC/AS)

```
INVITE sip:conference-factory@home2.net SIP/2.0
Via: SIP/2.0/UDP icscf1.home2.net;branch=z9hG4bK32f432.1, 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
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:
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=
```

10. **100 Trying (MRFC/AS to I-CSCF) - see example in table A.3.2.2-10 (related to table A.3.2.2-9)**

MRFC/AS responds to the INVITE request (6) with a 100 Trying provisional response.

Table A.3.2.2-10: 100 Trying (MRFC/AS to I-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf1.home2.net;branch=z9hG4bK32f432.1, 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
```

11. **Allocate Conference URI**

MRFC/AS allocates a conference URI, based on local information and information gained from the conference-factory URI, as well as information gained from other elements of the SIP signalling.

12. **H.248 interaction to Create Connection**

MRFC initiates a H.248 interaction to create an IMS connection point for UE#1 in MRFP and to determine media capabilities of MRFP.

13. **183 Session Progress (MRFC/AS to I-CSCF) - see example in table A.3.2.2-13 (related to table A.3.2.2-9)**

The MRFC determines the complete set of codecs that it is capable of supporting for this conference. It determines the intersection with those appearing in the SDP in the INVITE request.

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

Table A.3.2.2-13: 183 Session Progress (MRFC/AS to I-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP icscf1.home2.net;branch=z9hG4bK32f432.1, 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:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity: "Conference Server" <sip:mrfc1.home2.net>
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: none
From:
To: <sip:conference-factory1@home2.net>; tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:conference1@mrfc1.home2.net;isfocus>
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::aaa:bbb:ccc:ddd
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
```

To: a tag is added to the To header.

Contact: contains the IP address or FQDN of the MRFC/AS and the Request-URI of the conference.

SDP: contains the set of codecs supported by the MRFC. It requests confirmation of the QoS preconditions for establishing the session.

P-Charging-Vector: The MRFC/AS inserts the terminating IOI parameter.

P-Charging-Function-Addresses: The MRFC/AS inserts the P-Charging-Function-Addresses header field to be passed to the I-CSCF.

14. **183 Session Progress (I-CSCF to S-CSCF) - see example in table A.3.2.2-14**

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

Table A.3.2.2-14: 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.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity:
P-Charging-Vector:
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=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
```

15. **183 Session Progress (S-CSCF to P-CSCF) - see example in table A.3.2.2-15**

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

Table A.3.2.2-15: 183 Session Progress (S-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:
P-Asserted-Identity:
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=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
```

16. **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.

17. **183 Session Progress (P-CSCF to UE) – see example in table A.3.2.2-17**

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

Table A.3.2.2-17: 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:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>
P-Asserted-Identity:
Privacy:
P-Media-Authorization:
   0020000100100101706466322e76697369746564322e6e6574000c020139425633303732
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-Media-Authorization: a P-CSCF generated authorization token. This particular example shows a Policy-Element generated by "pdf2.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.

18. **PRACK (UE to P-CSCF) - see example in table A.3.2.2-18**

The UE 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 includes a new SDP offer in the PRACK message sent to the MRFC/AS.

For this example, assume the UE 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 A.3.2.2-18: PRACK (UE to P-CSCF)

```
PRACK sip:conference1@mrfc1.home2.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.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
From: <sip:user1_public1@home1.net>; tag=171828
To: <sip:conference-factory1@home2.net>;tag=314159
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=87654321; port1=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 [5].

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.

19. **Resource Reservation**

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

20. **PRACK (P-CSCF to S-CSCF) – see example in table A.3.2.2-20**

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

Table A.3.2.2-20: PRACK (P-CSCF to S-CSCF)

```
PRACK sip:conference1@mrfc1.home2.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:
Route: <sip:scscf1.home1.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.

21. **PRACK (S-CSCF to MRFC/AS) – see example in table A.3.2.2-21**

S-CSCF resolves the Request-URI and forwards the PRACK request directly to MRFC/AS.

Table A.3.2.2-21: PRACK (S-CSCF to MRFC/AS)

```
PRACK sip:conference1@mrfc1.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
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

22. **200 OK (MRFC/AS to S-CSCF) – see example in table A.3.2.2-22 (related to table A.3.2.2-21)**

The MRFC/AS acknowledges the PRACK request (20) with a 200 (OK) response.

Table A.3.2.2-22: 200 OK (MRFC/AS to S-CSCF)

```
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: application/sdp
Content-Length: (…)

v=0
o=- 2987933623 2987933624 IN IP6 5555::aaa:bbb:ccc:ddd
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
```

23. **H.248 interaction to Modify Connection**

MRFC initiates a H.248 interaction to modify the connection established in step #11 and instructs MRFP to reserve the IMS multimedia processing resources for UE#1 according to the preceding resource negotiation between the UE#1 and the MRFC.

24. **200 OK (S-CSCF to P-CSCF) - see example in table A.3.2.2-24**

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

Table A.3.2.2-24: 200 OK (S-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-Type:
Content-Length:

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

25. **200 OK (P-CSCF to UE) - see example in table A.3.2.2-25**

P-CSCF forwards the 200 OK response to UE.

Table A.3.2.2-25: 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=
a=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
```

26. **UPDATE (UE to P-CSCF) – see example in table A.3.2.2-26**

When the resource reservation is completed, UE sends the UPDATE request to the MRFC/AS, via the signalling path established by the INVITE request.

Table A.3.2.2-26: UPDATE (UE to P-CSCF)

```
UPDATE sip:conference1@mrfc1.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-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>; tag=171828
To: <sip:conference-factory1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 129 UPDATE
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=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 0 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 telphone-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.

27. **UPDATE (P-CSCF to S-CSCF) – see example in table A.3.2.2-27**

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 S-CSCF.

Table A.3.2.2-27: UPDATE (P-CSCF to S-CSCF)

```
UPDATE sip:conferece1@mrfc1.home2.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:
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>
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=
```

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.

28. **UPDATE (S-CSCF to MRFC/AS) - see example in table A.3.2.2-28**

S-CSCF forwards the UPDATE request to MRFC/AS.

Table A.3.2.2-28: UPDATE (S-CSCF to MRFC/AS)

```
UPDATE sip:conference1@mrfc1.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
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=
```

29. **200 OK (MRFC/ASto S-CSCF) – see example in table A.3.2.2-29 (related to table A.3.2.2-28)**

    The MRFC/AS acknowledges the UPDATE request (27) with a 200 OK response.

Table A.3.2.2-29: 200 OK (MRFC/AS to S-CSCF)

```
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: application/sdp
Content-Length: (…)

v=0
o=- 2987933623 2987933625 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 0 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
```

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

30. **H.248 interaction to Modify Connection**

    MRFC initiates a H.248 interaction to connect through the IMS multimedia processing resources for UE#1 in MRFP.

31. **200 OK (S-CSCF to P-CSCF) - see example in table A.3.2.2-31**

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

Table A.3.2.2-31: 200 OK (S-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-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. **200 OK (P-CSCF to UE) – see example in table A.3.2.2-32**

P-CSCF forwards the 200 OK response to UE.

Table A.3.2.2-32: 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=
```

33. **200 OK (MRFC/AS to I-CSCF) – see example in table A.3.2.2-33 (related to table A.3.2.2-9)**

After the success modification of the session (29), the MRFC/AS sends a 200 OK final response to the INVITE request (8) to the I-CSCF.

Table A.3.2.2-33: 200 OK (MRFC/AS to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1.home2.net;branch=z9hG4bK32f432.1, 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:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: <sip:conference1@mrfc1.home2.net;isfocus>;isfocus
Content-Length:0
```

Contact: contains the conference URI for the conference allocated at the MRFC/AS and the isfocus tag.

34. **200 OK (I-CSCF to S-CSCF) – see example in table A.3.2.2-34**

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

Table A.3.2.2-34: 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.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:0
```

35. **200 OK (S-CSCF to P-CSCF) – see example in table A.3.2.2-35**

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

Table A.3.2.2-35: 200 OK (S-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:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

36. **Approval of QoS Commit**

The P-CSCF approves the commitment of the QoS resources if it was not approved already in step (12).

37. **200 OK (P-CSCF to UE) – see example in table A.3.2.2-37**

P-CSCF forwards the 200 OK final response to the session originator. UE can start the media flow(s) for this session.

Table A.3.2.2-37: 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:scscf1.home1.net;lr>, <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.

38. **ACK (UE to P-CSCF) – see example in table A.3.2.2-38**

UE starts the media flow for this session, and responds to the 200 OK (32) with an ACK request sent to P-CSCF.

Table A.3.2.2-38: ACK (UE to P-CSCF)

```
ACK sip:conference1@mrfc1.home2.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.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
From: <sip:user1_public1@home1.net>; tag=171828
To: <sip:conference-factory1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
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 A.3.2.2-39**

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

Table A.3.2.2-39: ACK (P-CSCF to S-CSCF)

```
ACK sip:conference1@mrfc1.home2.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:
Route: <sip:scscf1.home1.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

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

40. **ACK (S-CSCF to MRFC/AS) - see example in table A.3.2.2-40**

S-CSCF forwards the ACK request to the MRFC/AS.

Table A.3.2.2-40: ACK (S-CSCF to MRFC/AS)

```
ACK sip:conference1@mrfc1.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
From:
To:
Call-ID:
Cseq:
Content-Length:
```

A.3.3 User automatically creating a conference with a Conference URI

A.3.3.1 User in home network

A.3.4 User creating a conference by manually dialing into the IMS

A.3.4.1 User in home network

A.3.5 User creating a conference from two existing connections (Three-way session), users in different networks

A.3.5.1 User in home network

Editor's Note: This section shows how a Three-way session (see 3GPP TS 23.228, section 5.11.A.3.3) can be established

A.4 Flows demonstrating a user joining a conference

A.4.1 Introduction

A.4.2 User calling into a conference

A.4.2.1 User in a different network

A.4.2.1.1 Conference URI does not include a FQDN

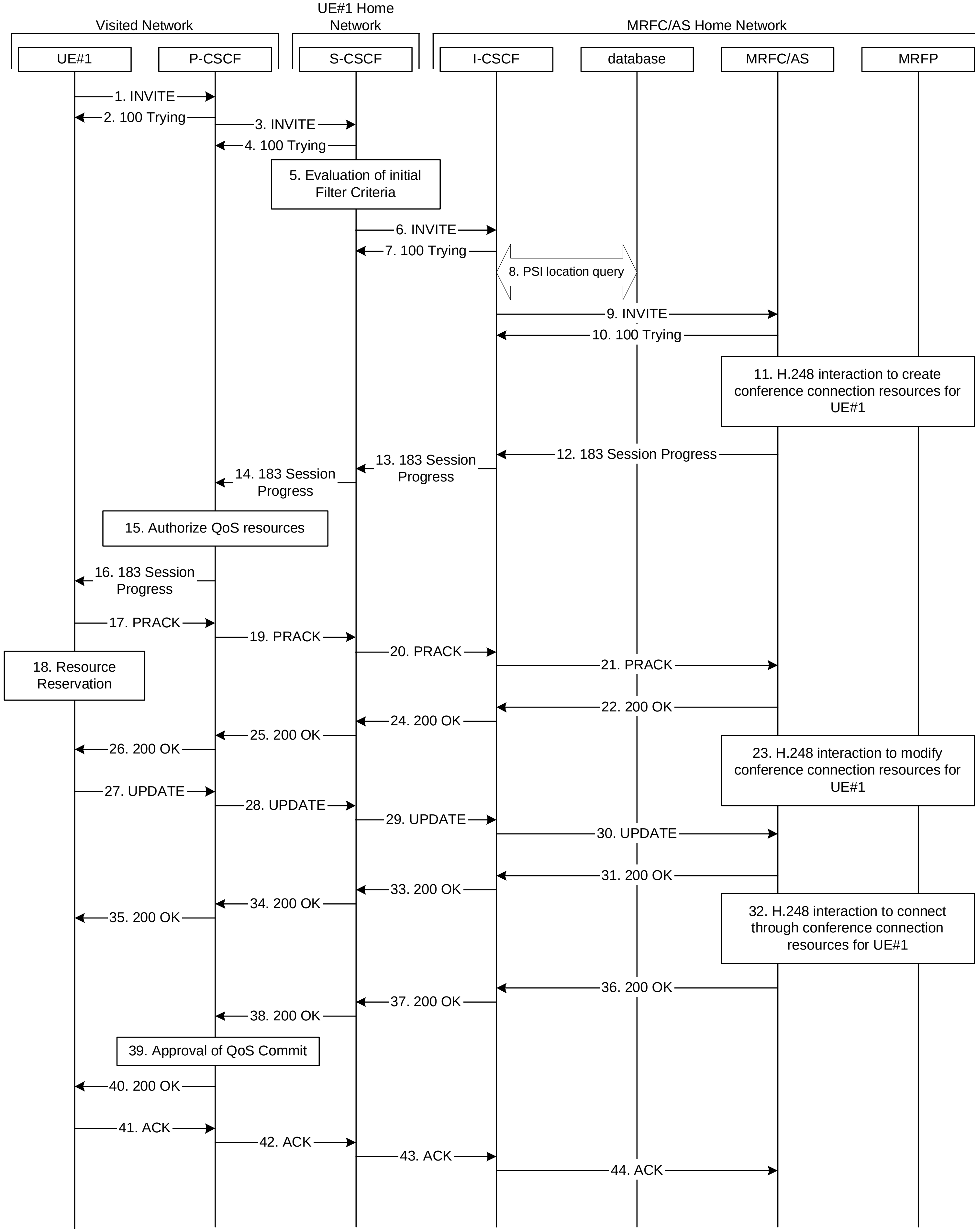

Visited Network
UE#1 Home Network
MRFC/AS Home Network
UE#1
P-CSCF
S-CSCF
I-CSCF
database
MRFC/AS
MRFP
1. INVITE
2. 100 Trying
3. INVITE
4. 100 Trying
5. Evaluation of initial Filter Criteria
6. INVITE
7. 100 Trying
8. PSI location query
9. INVITE
10. 100 Trying
11. H.248 interaction to create conference connection resources for UE#1
12. 183 Session Progress
13. 183 Session Progress
14. 183 Session Progress
15. Authorize QoS resources
16. 183 Session Progress
17. PRACK
18. Resource Reservation
19. PRACK
20. PRACK
21. PRACK
22. 200 OK
23. H.248 interaction to modify conference connection resources for UE#1
24. 200 OK
25. 200 OK
26. 200 OK
27. UPDATE
28. UPDATE
29. UPDATE
30. UPDATE
31. 200 OK
32. H.248 interaction to connect through conference connection resources for UE#1
33. 200 OK
34. 200 OK
35. 200 OK
36. 200 OK
37. 200 OK
38. 200 OK
39. Approval of QoS Commit
40. 200 OK
41. ACK
42. ACK
43. ACK
44. ACK

Figure A.4.2.1.1-1: User calling into a conference – user in a different network – conference URI does not include a FQDN

Figure A.4.2.1.1-1 shows an IMS user calling into a conference by using a conference URI. The focus of that conference is at a MRFC/AS which are located in another network. The conference URI in this example does not include a FQDN in the host part.

The details of the flows are as follows:

1. **INVITE (UE to P-CSCF) - see example in table A.4.2.1.1-1**

   A user agent wants to join a conference. For this purpose the user agent is aware of the related conference URI that was obtained by means outside this specification (e.g. via other protocols, such as http)

   The UE determines the complete set of codecs that it is capable of supporting for this conference. It builds a SDP Offer 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.capable of sending two simultaneous video streams, either H261 orUE sends the INVITE request to the P-CSCF.

Table A.4.2.1.1-1: INVITE (UE to P-CSCF)

```
INVITE sip:conference1@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: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=171828
To: <sip:conference1@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=87654321; port1=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:MPVMP4V-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 conference URI.

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.

To: same as the Request-URI.

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.

2. **100 Trying (P-CSCF to UE) - see example in table A.4.2.1.1-2**

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

Table A.4.2.1.1-2: 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 S-CSCF) - see example in table A.4.2.1.1-3**

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.

The P-CSCF examines the media parameters, and does not find any choices that the local policy does not allow.

The INVITE request is forwarded to the S-CSCF.

Table A.4.2.1.1-3: INVITE (P-CSCF to S-CSCF)

```
INVITE sip:conference1@home2.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.visited1.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:
Require: precondition
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=
```

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.

4. **100 Trying (S-CSCF to P-CSCF) - see example in table A.4.2.1.1-4**

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

Table A.4.2.1.1-4: 100 Trying (S-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: 0
```

5. **Evaluation of initial filter criteria**

   S-CSCF validates the service profile of this subscriber and evaluates the initial filter criteria.

6. **INVITE (S-CSCF to I-CSCF) - see example in table A.4.2.1.1-6**

   S-CSCF 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 forwards the INVITE request directly to 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 A.4.2.1.1-6: INVITE request (S-CSCF to I-CSCF)

```
INVITE sip:conference1@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:+358-50-4821437>
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=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
```

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.

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

7. **100 Trying (I-CSCF to S-CSCF) - see example in table A.4.2.1.1-7 (related to table A.4.2.1.1-6)**

   I-CSCF responds to the INVITE request (6) with a 100 Trying provisional response.

Table A.4.2.1.1-7: 100 Trying (MRFC/AS 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
```

8. **Public service identity (PSI) location query**

   The I-CSCF sends a query to the database to find out the MRFC/AS at which the conference has been created. The database responds with the address of the MRFC/AS at which the conference is hosted.

Editor's Note: It is still under discussion in SA2 which entity in the IMS shall act as the database. Therefore the text of the above paragraph has to be updated according to SA2 decision.

Editor's Note: More detailed information is needed here, similar to the Cx interface information given in 24.228.

9. **INVITE (I-CSCF to MRFC/AS) - see example in table A.4.2.1.1-9**

   I-CSCF forwards the INVITE request to the MRFC/AS that was resolved during the PSI location query (8). The I-CSCF does not re-write the request URI.

Table A.4.2.1.1-9: INVITE request (I-CSCF to MRFC/AS)

```
INVITE sip:conference1@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
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:
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=
```

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

10. **100 Trying (MRFC/AS to I-CSCF) - see example in table A.4.2.1.1-10 (related to table A.4.2.1.1-9)**

MRFC/AS responds to the INVITE request (9) with a 100 Trying provisional response.

Table A.4.2.1.1-10: 100 Trying (MRFC/AS 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
```

11. **H.248 interaction to create conference connection resources for UE#1**

MRFC initiates a H.248 interaction to create an IMS connection point for UE#1 in MRFP.

12. **183 Session Progress (MRFC/AS to I-CSCF) - see example in table A.4.2.1.1-12 (related to table A.4.2.1.1-9)**

The media stream capabilities of the conference are returned along the signalling path, in a 183 Session Progress provisional response (to 9).

Table A.4.2.1.1-12: 183 Session Progress (MRFC/AS 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.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity: "Conference Server" <sip:mrfc1.home2.net>
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net;
   term-ioi=home2.net
Privacy: none
From:
To: <sip:conference1@home2.net>; tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:conference1@home2.net;isfocus>
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::aaa:bbb:ccc:ddd
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
```

To: a tag is added to the To header.

Contact: contains the conference URI for the conference allocated at the MRFC/AS and the isfocus tag.

SDP: contains the set of codecs supported for this conference. It requests confirmation of the QoS preconditions for establishing the session.

P-Charging-Vector: The MRFC/AS inserts this header and populates the icid parameters with an unique value and the terminating Inter Operator Identifier (IOI) for the home network of the MRFC/AS and puts back the originating IOI.

13. **183 Session Progress (I-CSCF to S-CSCF) - see example in table A.4.2.1.1-13**

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

Table A.4.2.1.1-13: 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.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity:
P-Charging-Vector:
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=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
```

14. **183 Session Progress (S-CSCF to P-CSCF) - see example in table A.4.2.1.1-14**

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

Table A.4.2.1.1-14: 183 Session Progress (S-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:
P-Asserted-Identity:
P-Charging-Vector:
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=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
```

15. **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 (38) based on operator local policy.

16. **183 Session Progress (P-CSCF to UE) – see example in table A.4.2.1.1-16**

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

Table A.4.2.1.1-16: 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:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>
P-Asserted-Identity:
Privacy:
P-Media-Authorization:
   0020000100100101706466322e76697369746564322e6e6574000c020139425633303732
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-Media-Authorization: a P-CSCF generated authorization token. This particular example shows a Policy-Element generated by "pdf2.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.

17. **PRACK (UE to P-CSCF) - see example in table A.4.2.1.1-17**

The UE 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 includes a new SDP offer in the PRACK message sent to the MRFC/AS.

For this example, assume the UE 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 A.4.2.1.1-17: PRACK (UE to P-CSCF)

```
PRACK sip:conference1@home2.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.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
From: <sip:user1_public1@home1.net>; tag=171828
To: <sip:conference1@home2.net>;tag=314159
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=87654321; port1=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 [5].

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.

18. **Resource Reservation**

After determining the final media streams in step #17, UE initiates the reservation procedures for the resources needed for this session.

19. **PRACK (P-CSCF to S-CSCF) – see example in table A.4.2.1.1-19**

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

Table A.4.2.1.1-19: PRACK (P-CSCF to S-CSCF)

```
PRACK sip:conference1@home2.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:
Route: <sip:scscf1.home1.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.

20. **PRACK (S-CSCF to I-CSCF) – see example in table A.4.2.1.1-20**

S-CSCF 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 forwards the PRACK request directly to 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 A.4.2.1.1-20: PRACK (S-CSCF to I-CSCF)

```
PRACK sip:conference1@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
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

21. **PRACK (I-CSCF to MRFC/AS) – see example in table A.4.2.1.1-21**

I-CSCF forwards the PRACK request to the MRFC/AS that was resolved during the PSI location query (8).

Table A.4.2.1.1-21: PRACK (I-CSCF to MRFC/AS)

```
PRACK sip:conference1@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
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

22. **200 OK (MRFC/AS to I-CSCF) – see example in table A.4.2.1.1-22 (related to table A.4.2.1.1-21)**

The MRFC/AS acknowledges the PRACK request (21) with a 200 (OK) response.

Table A.4.2.1.1-22: 200 OK (MRFC/AS 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.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::aaa:bbb:ccc:ddd
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=2a=rtpmap:96 telephone-event
```

23. **H.248 interaction to Modify Connection for UE#1**

MRFC initiates a H.248 interaction to modify the connection established in step #11 and instructs MRFP to reserve the IMS multimedia processing resources for UE#1 according to the preceding resource negotiation between the UE#1 and the MRFC.

24. **200 OK (I-CSCF to S-CSCF) - see example in table A.4.2.1.1-24**

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

Table A.4.2.1.1-24: 200 OK (I-CSCF to S-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.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=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
```

25. **200 OK (S-CSCF to P-CSCF) - see example in table A.4.2.1.1-25**

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

Table A.4.2.1.1-25: 200 OK (S-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-Type:
Content-Length:

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

26. **200 OK (P-CSCF to UE) - see example in table A.4.2.1.1-26**

P-CSCF forwards the 200 OK response to UE.

Table A.4.2.1.1-26: 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=
a=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
```

27. **UPDATE (UE to P-CSCF) – see example in table A.4.2.1.1-27**

When the resource reservation is completed, UE sends the UPDATE request to the MRFC/AS, via the signalling path established by the INVITE request.

Table A.4.2.1.1-27: UPDATE (UE to P-CSCF)

```
UPDATE sip:conference1@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-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>; tag=171828
To: <sip:conference1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 129 UPDATE
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=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 0 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 telphone-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.

28. **UPDATE (P-CSCF to S-CSCF) – see example in table A.4.2.1.1-28**

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 S-CSCF.

Table A.4.2.1.1-28: UPDATE (P-CSCF to S-CSCF)

```
UPDATE sip:conference1@home2.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:
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>
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=
```

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.

29. **UPDATE (S-CSCF to I-CSCF) - see example in table A.4.2.1.1-29**

S-CSCF 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 forwards the UPDATE request directly to 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 A.4.2.1.1-29: UPDATE (S-CSCF to I-CSCF)

```
UPDATE sip:conference1@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
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. **UPDATE (I-CSCF to MRFC/AS) - see example in table A.4.2.1.1-30**

I-CSCF forwards the UPDATE request to the MRFC/AS that was resolved during the PSI location query (8). The I-CSCF does not re-write the request URI.

Table A.4.2.1.1-30: UPDATE (I-CSCF to MRFC/AS)

```
UPDATE sip:conference1@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
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=
```

31. **200 OK (MRFC/AS to I-CSCF) – see example in table A.4.2.1.1-31 (related to table A.4.2.1.1-30)**

The MRFC/AS acknowledges the UPDATE request (30) with a 200 OK response.

Table A.4.2.1.1-31: 200 OK (MRFC/AS 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.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::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 0 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
```

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

32. **H.248 interaction to Modify Connection**

    MRFC initiates a H.248 interaction to connect through the IMS multimedia processing resources for UE#1 in MRFP.

33. **200 OK (I-CSCF to S-CSCF) – see example in table A.4.2.1.1-31**

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

Table A.4.2.1.1-31: 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.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=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
```

34. **200 OK (S-CSCF to P-CSCF) - see example in table A.4.2.1.1-34**

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

Table A.4.2.1.1-34: 200 OK (S-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-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=
```

35. **200 OK (P-CSCF to UE) – see example in table A.4.2.1.1-35**

P-CSCF forwards the 200 OK response to UE.

Table A.4.2.1.1-35: 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=
```

36. **200 OK (MRFC/AS to I-CSCF) – see example in table A.4.2.1.1-36 (related to table A.4.2.1.1-9)**

After the success modification of the session (32), the MRFC/AS sends a 200 OK final response to the INVITE request (9) to the I-CSCF.

Table A.4.2.1.1-36: 200 OK (MRFC/AS 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.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: <sip:conference1@home2.net>;isfocus
Content-Length:0
```

Contact: contains the conference URI for the conference allocated at the MRFC/AS and the isfocus tag.

37. **200 OK (I-CSCF to S-CSCF) – see example in table A.4.2.1.1-37**

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

Table A.4.2.1.1-37: 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.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:
```

38. **200 OK (S-CSCF to P-CSCF) – see example in table A.4.2.1.1-38**

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

Table A.4.2.1.1-38: 200 OK (S-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:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

39. **Approval of QoS Commit**

    The P-CSCF approves the commitment of the QoS resources if it was not approved already in step (15).

40. **200 OK (P-CSCF to UE) – see example in table A.4.2.1.1-40**

    P-CSCF forwards the 200 OK final response to the session originator. UE can start the media flow(s) for this session.

Table A.4.2.1.1-40: 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:scscf1.home1.net;lr>, <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.

41. **ACK (UE to P-CSCF) – see example in table A.4.2.1.1-41**

    UE starts the media flow for this session, and responds to the 200 OK (40) with an ACK request sent to P-CSCF.

Table A.4.2.1.1-41: ACK (UE to P-CSCF)

```
ACK sip:conference1@home2.net:2342 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>
From: <sip:user1_public1@home1.net>; tag=171828
To: <sip:conference1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
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].

42. **ACK (P-CSCF to S-CSCF) – see example in table A.4.2.1.1-42**

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

Table A.4.2.1.1-42: ACK (P-CSCF to S-CSCF)

```
ACK sip:conference1@home2.net:2342 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>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

43. **ACK (S-CSCF to I-CSCF) - see example in table A.4.2.1.1-43**

S-CSCF 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 forwards the ACK request directly to 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 A.4.2.1.1-43: ACK (S-CSCF to I-CSCF)

```
ACK sip:conference1@home2.net:2342 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
From:
To:
Call-ID:
Cseq:
Content-Length:
```

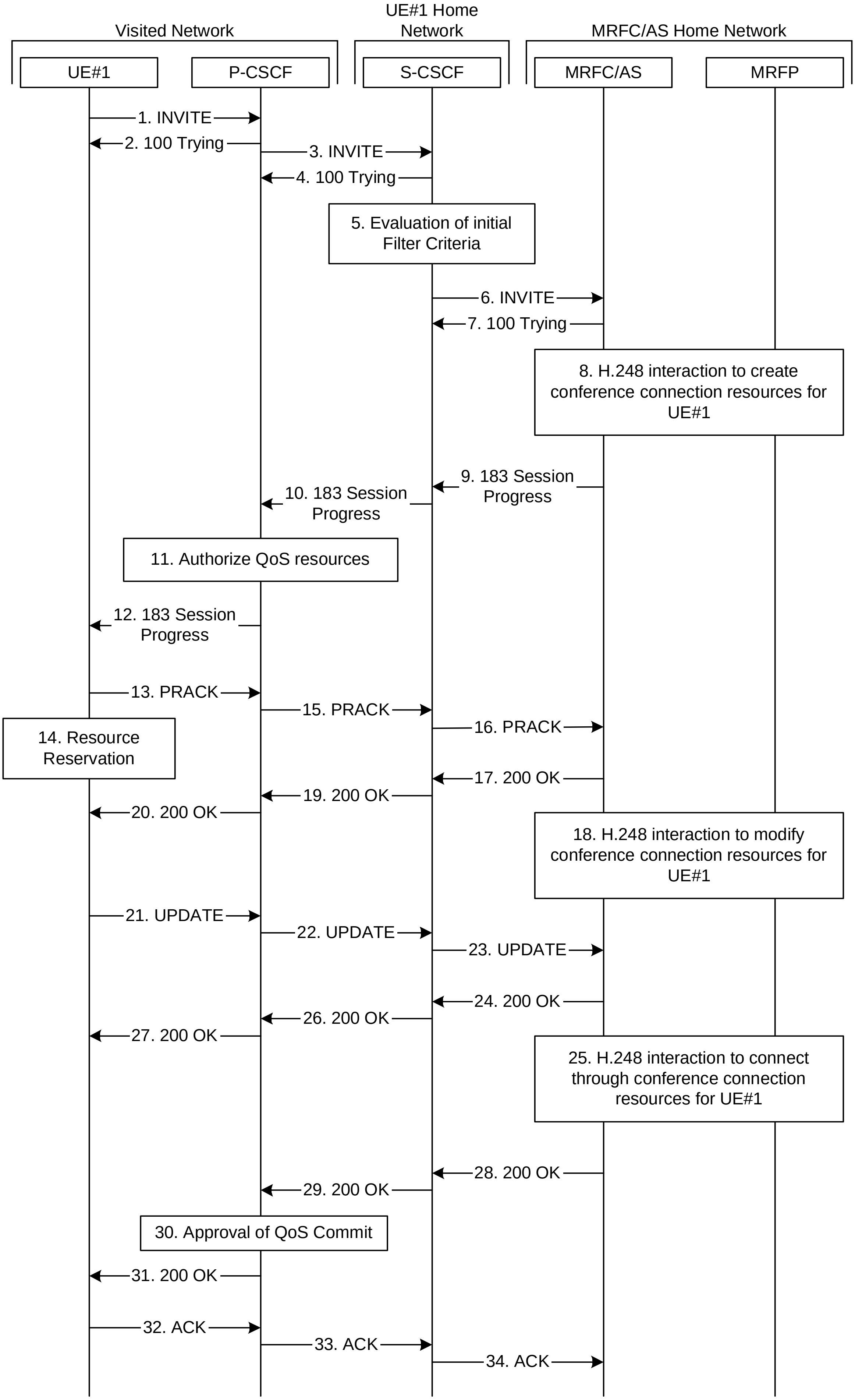
44. **ACK (I-CSCF to MRFC/AS) - see example in table A.4.2.1.1-44**

I-CSCF forwards the ACK request to the MRFC/AS that was resolved during the PSI location query (8). The I-CSCF does not re-write the request URI.

Table A.4.2.1.1-44: ACK (I-CSCF to MRFC/AS)

```
ACK sip:conference1@home2.net:2342 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
From:
To:
Call-ID:
Cseq:
Content-Length:
```

A.4.2.1.2 Conference URI includes a FQDN



Visited Network
UE#1 Home Network
MRFC/AS Home Network
UE#1
P-CSCF
S-CSCF
MRFC/AS
MRFP
1. INVITE
2. 100 Trying
3. INVITE
4. 100 Trying
5. Evaluation of initial Filter Criteria
6. INVITE
7. 100 Trying
8. H.248 interaction to create conference connection resources for UE#1
9. 183 Session Progress
10. 183 Session Progress
11. Authorize QoS resources
12. 183 Session Progress
13. PRACK
14. Resource Reservation
15. PRACK
16. PRACK
17. 200 OK
19. 200 OK
20. 200 OK
18. H.248 interaction to modify conference connection resources for UE#1
21. UPDATE
22. UPDATE
23. UPDATE
24. 200 OK
26. 200 OK
27. 200 OK
25. H.248 interaction to connect through conference connection resources for UE#1
28. 200 OK
29. 200 OK
30. Approval of QoS Commit
31. 200 OK
32. ACK
33. ACK
34. ACK

Figure A.4.2.1.2-1: User calling into a conference – user in a different network – conference URI does include a FQDN

Figure A.4.2.1.2-1 shows an IMS user calling into a conference by using a conference URI. The focus of that conference is at a MRFC/AS which are located in another network. The conference URI in this example include a FQDN in the host part.

The details of the flows are as follows:

1. **INVITE (UE to P-CSCF) - see example in table A.4.2.1.2-1**

   A user agent wants to join a conference. For this purpose the user agent is aware of the related conference URI that was obtained by means outside this specification.

   The UE determines the complete set of codecs that it is capable of supporting for this conference. It builds a SDP Offer 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.

Table A.4.2.1.2-1: INVITE (UE to P-CSCF)

```
INVITE sip:conference1@mrfc2.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: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=171828
To: <sip:conference1@mrfc2.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=87654321; port1=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 conference URI.

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.

To: same as the Request-URI.

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.

2. **100 Trying (P-CSCF to UE) - see example in table A.4.2.1.2-2**

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

Table A.4.2.1.2-2: 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 A.4.2.1.2-3**

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.

The P-CSCF examines the media parameters, and does not find any choices that the local policy does not allow.

The INVITE request is forwarded to the S-CSCF.

Table A.4.2.1.2-3: INVITE (P-CSCF to S-CSCF)

```
INVITE sip:conference1@mrfc2.home2.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.visited1.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:
Require: precondition
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=
```

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.

4. **100 Trying (S-CSCF to P-CSCF) - see example in table A.4.2.1.2-4**

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

Table A.4.2.1.2-4: 100 Trying (S-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: 0
```

5. **Evaluation of initial filter criteria**

   S-CSCF validates the service profile of this subscriber and evaluates the initial filter criteria.

6. **INVITE (S-CSCF to MRFC/AS) - see example in table A.4.2.1.2-6**

   S-CSCF forwards the INVITE request to the MRFC/AS based on the request URI of the INVITE request. The S-CSCF does not re-write the request URI.

Table A.4.2.1.2-6: INVITE request (S-CSCF to MRFC/AS)

```
INVITE sip:conference1@mrfc2.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:+358-50-4821437>
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=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
```

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.

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

7. **100 Trying (MRFC/AS to S-CSCF) - see example in table A.4.2.1.2-7 (related to table A.4.2.1.2-6)**

   MRFC/AS responds to the INVITE request (6) with a 100 Trying provisional response.

Table A.4.2.1.2-7: 100 Trying (MRFC/AS 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
```

8. **H.248 interaction to create conference connection resources for UE#1**

   MRFC initiates a H.248 interaction to create an IMS connection point for UE#1 in MRFP.

9. **183 Session Progress (MRFC/AS to S-CSCF) - see example in table A.4.2.1.2-9 (related to table A.4.2.1.2-6)**

   The media stream capabilities of the conference are returned along the signalling path, in a 183 Session Progress provisional response (to 6).

Table A.4.2.1.2-9: 183 Session Progress (MRFC/AS 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.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net;
   term-ioi=home2.net
Privacy: none
From:
To: <sip:conference1@mrfc2.home2.net>; tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:conference1@mrfc2.home2.net;isfocus>
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::1111:2222:3333:4444
s=-
c=IN IP6 5555::1111:2222:3333:4444
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
```

To: a tag is added to the To header.

Contact: contains the conference URI for the conference allocated at the MRFC/AS and the isfocus tag.

SDP: contains the set of codecs supported for this conference. It requests confirmation of the QoS preconditions for establishing the session.

P-Charging-Vector: The MRFC/AS inserts this header and populates the icid parameters with an unique value and the terminating Inter Operator Identifier (IOI) for the home network of the MRFC/AS and puts back the originating IOI.

Editor's Note: It has to be investigated if the MRFC/AS includes a P-Asserted-Identity header. If it includes this header, it needs to be investigated which value needs to be populated in it.

10. **183 Session Progress (S-CSCF to P-CSCF) - see example in table A.4.2.1.2-10**

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

Table A.4.2.1.2-10: 183 Session Progress (S-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:
P-Asserted-Identity:
P-Charging-Vector:
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=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
```

11. **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 (30) based on operator local policy.

12. **183 Session Progress (P-CSCF to UE) – see example in table A.4.2.1.2-12**

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

Table A.4.2.1.2-12: 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:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>
P-Asserted-Identity:
Privacy:
P-Media-Authorization:
   0020000100100101706466322e76697369746564322e6e6574000c02013942563330373200
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-Media-Authorization: a P-CSCF generated authorization token. This particular example shows a Policy-Element generated by "pdf2.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.

13. **PRACK (UE to P-CSCF) - see example in table A.4.2.1.2-13**

The UE 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 includes a new SDP offer in the PRACK message sent to the MRFC/AS.

For this example, assume the UE 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 A.4.2.1.2-13: PRACK (UE to P-CSCF)

```
PRACK sip:conference1@mrfc2.home2.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.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
From: <sip:user1_public1@home1.net>; tag=171828
To: <sip:conference1@mrfc2.home2.net>;tag=314159
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=87654321; port1=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 [5].

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.

14. **Resource Reservation**

After determining the final media streams in step #13, UE initiates the reservation procedures for the resources needed for this session.

15. **PRACK (P-CSCF to S-CSCF) – see example in table A.4.2.1.2-15**

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.

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

Table A.4.2.1.2-15: PRACK (P-CSCF to S-CSCF)

```
PRACK sip:conference1@mrfc2.home2.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:
Route: <sip:scscf1.home1.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.

16. **PRACK (S-CSCF to MRFC/AS) – see example in table A.4.2.1.2-16**

S-CSCF forwards the PRACK request to the MRFC/AS based on the request URI of the PRACK request. The S-CSCF does not re-write the request URI.

Table A.4.2.1.2-16: PRACK (S-CSCF to MRFC/AS)

```
PRACK sip:conference1@mrfc2.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
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

17. **200 OK (MRFC/AS to S-CSCF) – see example in table A.4.2.1.2-17 (related to table A.4.2.1.2-16)**

The MRFC/AS acknowledges the PRACK request (16) with a 200 (OK) response.

Table A.4.2.1.2-17: 200 OK (MRFC/AS to S-CSCF)

```
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: application/sdp
Content-Length: (…)

v=0
o=- 2987933623 2987933624 IN IP6 5555::aaa:bbb:ccc:ddd
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=2a=rtpmap:96 telephone-event
```

18. **H.248 interaction to Modify Connection for UE#1**

    MRFC initiates a H.248 interaction to modify the connection established in step #11 and instructs MRFP to reserve the IMS multimedia processing resources for UE#1 according to the preceding resource negotiation between the UE#1 and the MRFC.

19. **200 OK (S-CSCF to P-CSCF) - see example in table A.4.2.1.2-19**

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

Table A.4.2.1.2-19: 200 OK (S-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-Type:
Content-Length:

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

20. **200 OK (P-CSCF to UE) - see example in table A.4.2.1.2-20**

P-CSCF forwards the 200 OK response to UE.

Table A.4.2.1.2-20: 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=
a=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
```

21. **UPDATE (UE to P-CSCF) – see example in table A.4.2.1.2-21**

When the resource reservation is completed, UE sends the UPDATE request to the MRFC/AS, via the signalling path established by the INVITE request.

Table A.4.2.1.2-21: UPDATE (UE to P-CSCF)

```
UPDATE sip:conference1@mrfc2.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-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>; tag=171828
To: <sip:conference1@mrfc2.home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 129 UPDATE
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=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 0 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 telphone-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.

22. **UPDATE (P-CSCF to S-CSCF) – see example in table A.4.2.1.2-22**

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 S-CSCF.

Table A.4.2.1.2-22: UPDATE (P-CSCF to S-CSCF)

```
UPDATE sip:conference1@mrfc2.home2.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:
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>
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=
```

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.

23. **UPDATE (S-CSCF to MRFC/AS) - see example in table A.4.2.1.2-23**

S-CSCF forwards the UPDATE request to the MRFC/AS based on the request URI of the UPDATE request. The S-CSCF does not re-write the request URI.

Table A.4.2.1.2-23: UPDATE (S-CSCF to MRFC/AS)

```
UPDATE sip:conference1@mrfc2.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
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=
```

24. **200 OK (MRFC/AS to S-CSCF) – see example in table A.4.2.1.2-24 (related to table A.4.2.1.2-23)**

The MRFC/AS acknowledges the UPDATE request (23) with a 200 OK response.

Table A.4.2.1.2-24: 200 OK (MRFC/AS to S-CSCF)

```
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: application/sdp
Content-Length: (…)

v=0
o=- 2987933623 2987933625 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 0 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
```

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

25. **H.248 interaction to Modify Connection**

MRFC initiates a H.248 interaction to connect through the IMS multimedia processing resources for UE#1 in MRFP.

26. **200 OK (S-CSCF to P-CSCF) - see example in table A.4.2.1.2-26**

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

Table A.4.2.1.2-26: 200 OK (S-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-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=
```

27. **200 OK (P-CSCF to UE) – see example in table A.4.2.1.2-27**

P-CSCF forwards the 200 OK response to UE.

Table A.4.2.1.2-27: 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=
```

28. **200 OK (MRFC/AS to S-CSCF) – see example in table A.4.2.1.2-28 (related to table A.4.2.1.2-7)**

After the success modification of the session (25), the MRFC/AS sends a 200 OK final response to the INVITE request (6) to the I-CSCF.

Table A.4.2.1.2-28: 200 OK (MRFC/AS to S-CSCF)

```
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
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: <sip:conference1@mrfc2.home2.net>;isfocus
Content-Length:0
```

Contact: contains the conference URI for the conference allocated at the MRFC/AS and the isfocus tag.

29. **200 OK (S-CSCF to P-CSCF) – see example in table A.4.2.1.2-29**

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

Table A.4.2.1.2-29: 200 OK (S-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:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

30. **Approval of QoS Commit**

The P-CSCF approves the commitment of the QoS resources if it was not approved already in step (14).

31. **200 OK (P-CSCF to UE) – see example in table A.4.2.1.2-31**

P-CSCF forwards the 200 OK final response to the session originator. UE can start the media flow(s) for this session.

Table A.4.2.1.2-31: 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
Record-Route: <sip:scscf1.home1.net;lr>, <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.

32. **ACK (UE to P-CSCF) – see example in table A.4.2.1.2-32**

UE starts the media flow for this session, and responds to the 200 OK (31) with an ACK request sent to P-CSCF.

Table A.4.2.1.2-32: ACK (UE to P-CSCF)

```
ACK sip:conference1@mrfc2.home2.net:2342 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>
From: <sip:user1_public1@home1.net>; tag=171828
To: <sip:conference1@mrfc2.home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
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].

33. **ACK (P-CSCF to S-CSCF) – see example in table A.4.2.1.2-33**

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

Table A.4.2.1.2-33: ACK (P-CSCF to S-CSCF)

```
ACK sip:conference1@mrfc2.home2.net:2342 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>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

34. **ACK (S-CSCF to MRFC/AS) - see example in table A.4.2.1.2-34**

S-CSCF forwards the ACK request to the MRFC/AS based on the request URI of the ACK request. The S-CSCF does not re-write the request URI.

Table A.4.2.1.2-34: ACK (S-CSCF to MRFC/AS)

```
ACK sip:conference1@mrfc2.home2.net:2342 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
From:
To:
Call-ID:
Cseq:
Content-Length:
```

A.4.3 User inviting another IMS user to a conference

A.4.3.1 User in a different network

A.4.3.1.1 User inviting another user to conference – sending REFER request

Figure A.4.3.1.1-1 shows how UE#1 invites UE#2 to a conference by sending UE#2 a REFER message. UE#1 has created a conference by using the mechanisms described in Subclause 6.2, and UE#1 has learned the Conference URI that identifies this conference.

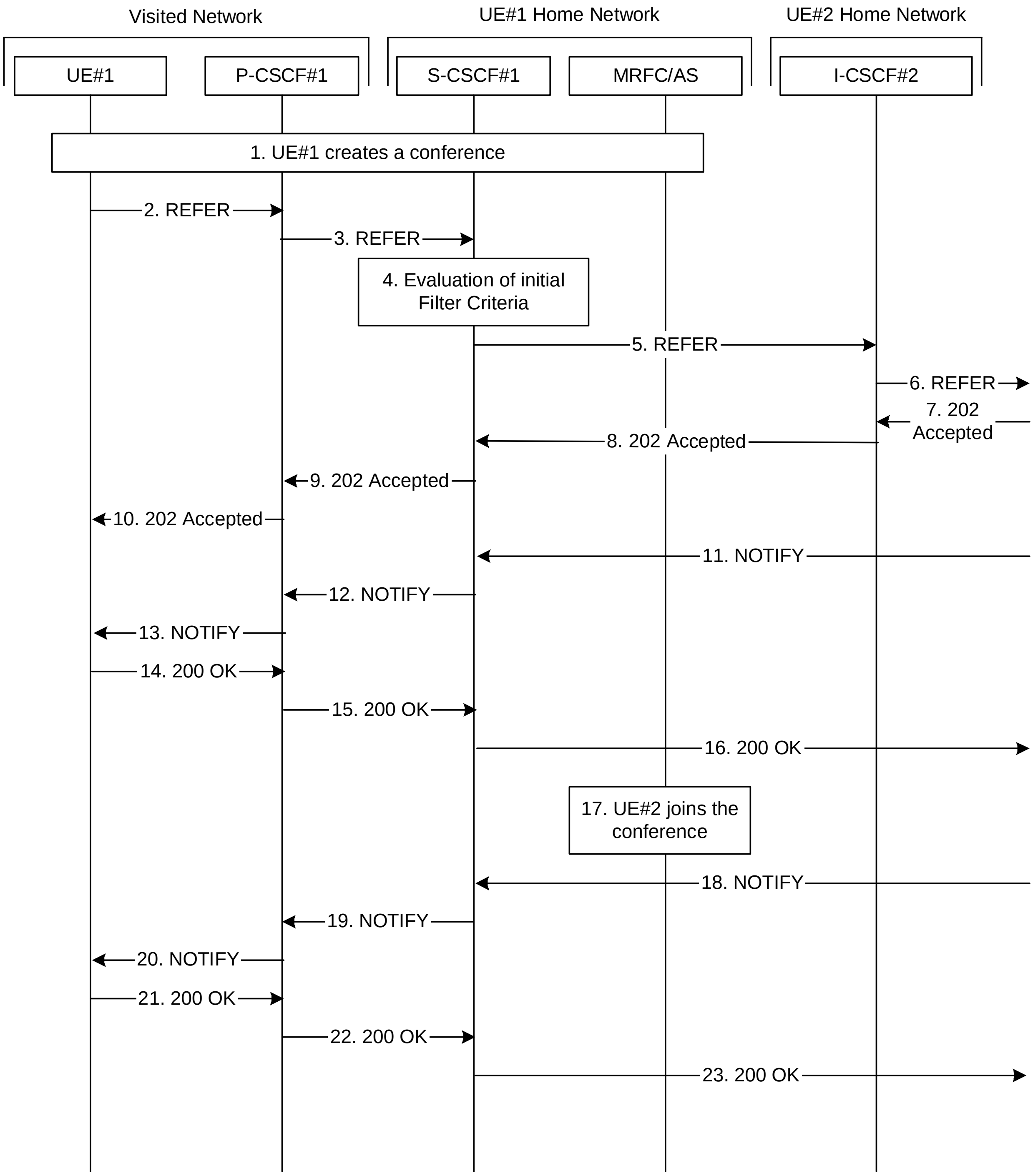


Figure A.4.3.1.1-1: User inviting another user to a conference by sending a REFER to the other user.

The details of the flows are as follows:

1. **UE#1 creates a conference**

   UE#1 creates a conference as described in Subclause 6.3.2. Once the conference creation is accomplished, UE#1 has learned the Conference URI allocated for this conference.

2. **REFER (UE to P-CSCF) - see example in table A.4.3.1.1-1**

   A user agent has created a conference and learned the conference URI. Now the user agent wants to invite another user agent to that conference.

Table A.4.3.1.1-1: REFER (UE to P-CSCF)

```
REFER 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: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=171828
To: <sip:user2_public1@home2.net>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 REFER
Require: sec-agree
Refer-To: <sip:conference1@mrfc1.home1.net;isfocus;method=INVITE>
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=7531
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Length: 0
```

Request-URI: contains the public user identity of UE#2.

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.

To: same as the Request-URI.

Cseq: is a random starting number.

Refer-To: contains the conference URI as learned during the conference establishment, including the isfocus parameter. Additionally the method parameter indicates that the other user shall send an INVITE request to this conference URI.

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.

The message does not contain a body.

3. **REFER (P-CSCF to S-CSCF) - see example in table A.4.3.1.1-2**

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 and Require headers are empty, the P-CSCF removes these headers completely.

The REFER request is forwarded to the S-CSCF.

Table A.4.3.1.1-2: REFER (P-CSCF to S-CSCF)

```
REFER sip:user2_public1@home2.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.visited1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
P-Access-Network-Info:
Privacy:
From:
To:
Call-ID:
Cseq:
Refer-To:
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.

4. **Evaluation of initial Filter Criteria**

   S-CSCF validates the service profile of this subscriber and evaluates the initial filter criteria.

5. **REFER (S-CSCF to I-CSCF in UE#2 home network) - see example in table A.4.3.1.1-3**

   S-CSCF 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 forwards the REFER request directly to the destination network.

Table A.4.3.1.1-3: REFER (S-CSCF to I-CSCF)

```
REFER 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:+358-50-4821437>
P-Charging-Vector:  icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net
Privacy:
From:
To:
Call-ID:
Cseq:
Refer-To:
Contact:
Content-Length:
```

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.

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

6. **REFER (I-CSCF towards S-CSCF of UE#2) - see example in table A.4.3.1.1-4**

   I-CSCF performs a Cx location query to the HSS (not shown in this flow) to find out the S-CSCF of UE#2.

I-CSCF then forwards the REFER request to that S-CSCF that will handle the session termination.

Table A.4.3.1.1-4: REFER (I-CSCF towards S-CSCF of UE#2)

```
REFER sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP icscf2.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:
P-Asserted-Identity:
P-Charging-Vector:
Privacy:
From:
To:
Call-ID:
Cseq:
Refer-To:
Contact:
Content-Length:
```

Note that the I-CSCF does not add itself to the Record-Route, as it has no need to stay on the signalling path once the session is established.

7. **202 Accepted (S-CSCF of UE#2 to I-CSCF) - see example in table A.4.3.1.1-5**

UE#2 home network indicates that it has received the REFER request by sending a 202 Accepted response. This means that UE#2 home network has begun to process the request. This does not mean, however, that the referred-to resource would have been contacted.

Table A.4.3.1.1-5: 202 Accepted (S-CSCF of UE#2 to I-CSCF)

```
SIP/2.0 202 Accepted
Via: SIP/2.0/UDP icscf2.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>, <tel:+1-212-555-2222>
P-Charging-Vector: icid-value=1234bcd9876e; icid-generated-at=[5555::f5f:e4e:d3d:c2c]; 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:none
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=151170
Call-ID: cb03a0s09a2sdfglkj490333
CSeq: 127 REFER
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Content-Length:0
```

8. **202 Accepted (I-CSCF to S-CSCF) - see example in Table A.4.3.1.1-6**

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

Table A.4.3.1.1-6: 202 Accepted (I-CSCF to S-CSCF)

```
SIP/2.0 202 Accepted
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
Record-Route:
P-Asserted-Identity:
P-Charging-Vector:
Privacy:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

9. **202 Accepted (S-CSCF to P-CSCF) - see example in Table A.4.3.1.1-7**

   S-CSCF forwards the response to P-CSCF.

Table A.4.3.1.1-7: 202 Accepted (S-CSCF to P-CSCF)

```
SIP/2.0 202 Accepted
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:
P-Asserted-Identity:
P-Charging-Vector:
Privacy:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

10. **202 Accepted (P-CSCF to UE#1) - see example in Table A.4.3.1.1-8**

    P-CSCF forwards the response to the UE.

Table 6.3.3.1-8: 202 Accepted (P-CSCF to UE#1)

```
SIP/2.0 202 Accepted
Via: 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:7531;lr;comp=sigcomp>
P-Asserted-Identity:
Privacy:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:0
```

11. **NOTIFY (from S-CSCF of UE#2 to S-CSCF) - see example in Table A.4.3.1.1-9**

    S-SCSF receives a NOTIFY message corresponding the the REFER request. The NOTIFY contains information about the progress of the REFER processing. The body of the NOTIFY message contains a fragment of the response as received by the notifying UE for the request that was initiated due to the REFER request. The NOTIFY is forwarded to the P-CSCF.

Table A.4.3.1.1-9: NOTIFY (from S-CSCF of UE#2 to S-CSCF)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch= z9hG4bK764z87.1, SIP/2.0/UDP
   pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
   [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
Max-Forwards: 68
Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
To: <sip:user1_public1@home1.net>;tag=171828
From: <sip:user2_public1@home2.net>;tag=151170
Call-ID: cb03a0s09a2sdfglkj490333
CSeq: 42 NOTIFY
Subscription-State: active;expires:7200
Event: refer
Contact: sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp
Content-Length: (…)
Content-Type: message/sipfrag

SIP/2.0 100 Trying
```

To: matches the From field of the original REFER message.

From: matches the To field of the original REFER message.

Call-ID: matches the Call-ID of the original REFER message.

12. **NOTIFY (from S-CSCF to P-CSCF) - see example in Table A.4.3.1.1-10**

S-CSCF forwards the message to P-CSCF.

Table: A.4.3.1.1-10: NOTIFY (from S-CSCF to P-CSCF)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK23436s.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
   [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
Max-Forwards: 67
Route: <sip:pcscf1.visited1.net;lr>
To:
From:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Length: (…)
Content-Type:

(...)
```

13. **NOTIFY (from P-CSCF to UE#1) - see example in Table A.4.3.1.1-11.**

P-CSCF forwards the message to UE#1.

Table A.4.3.1.1-11: NOTIFY (from P-CSCF to UE#1)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net:7531;comp=sigcomp;branch=z9hG4bK23433.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK23436s.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
   [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
Max-Forwards: 66
To:
From:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Length: (…)
Content-Type:

(...)
```

14. **200 OK (UE to P-CSCF) – see example in Table A.4.3.1.1-12.**

    The UE acknowledges the NOTIFY request with a 200 (OK) response to the P-CSCF.

Table A.4.3.1.1-12: 200 OK (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net:7531;comp=sigcomp;branch=z9hG4bK23433.1, SIP/2.0/UDP
      scscf1.home1.net;branch=z9hG4bK23436s.1, SIP/2.0/UDP
      scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
      pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
      [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

15. **200 OK (P-CSCF to S-CSCF) – see example in Table A.4.3.1.1-13.**

    The P-CSCF forwads the 200 OK response to the S-CSCF.

Table A.4.3.1.1-13: 200 OK (P-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK23436s.1, SIP/2.0/UDP
      scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
      pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
      [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

16. **200 OK (S-CSCF to S-CSCF of UE#2) – see example in Table A.4.3.1.1-14.**

    The S-CSCF forwards the 200 OK response to the S-CSCF of UE#2 according to the information in the Via field.

Table A.4.3.1.1-14: 200 OK (S-CSCF to S-CSCF of UE#2)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
      pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
      [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

17. **UE#2 joins the conference.**

    UE#2 joins the conference. The message flows are depicted in Subclause 6.3.2.

18. **NOTIFY (from S-CSCF of UE#2 to S-CSCF) - see example in Table A.4.3.1.1-15.**

    S-SCSF receives a NOTIFY message corresponding the the REFER request.

Table A.4.3.1.1-15: NOTIFY (from S-CSCF of UE#2 to S-CSCF)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK23d244.1, SIP/2.0/UDP
   pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
   [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
Max-Forwards: 68
Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
To: <sip:user1_public1@home1.net>; tag=171828
From: <sip:user2_public1@home2.net>;tag=151170
Call-ID: cb03a0s09a2sdfglkj490333
CSeq: 43 NOTIFY
Subscription-State: terminated
Event: refer
Contact:
Content-Length: (…)
Content-Type: message/sipfrag

SIP/2.0 200 OK
```

To: matches the From field of the original REFER message.

From: matches the To field of the original REFER message.

Call-ID: matches the Call-ID of the original REFER message.

Subscription-State: indicates that the implicit subscription to the REFER event has been terminated.

19. NOTIFY (from S-CSCF to P-CSCF) - see example in Table A.4.3.1.1-16.

S-CSCF forwards the message to P-CSCF.

Table A.4.3.1.1-16: NOTIFY (from S-CSCF to P-CSCF)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK23436s.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK23d244.1, SIP/2.0/UDP
   pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
   [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
Max-Forwards: 67
Route: <sip:pcscf1.visited1.net;lr>
To:
From:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Length: (…)
Content-Type:

(...)
```

20. **NOTIFY (from P-CSCF to UE#1) - see example in Table A.4.3.1.1-17.**

P-CSCF forwards the message to UE#1.

Table A.4.3.1.1-17: NOTIFY (from P-CSCF to UE#1)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net:7531;comp=sigcomp;branch=z9hG4bK23433.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK23436s.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK23d244.1, SIP/2.0/UDP
   pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
   [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
Max-Forwards: 66
To:
From:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Length: (…)
Content-Type:

(...)
```

21. **200 OK (UE to P-CSCF) – see example in Table A.4.3.1.1-18.**

The UE acknowledges the NOTIFY request with a 200 (OK) response to the P-CSCF.

Table A.4.3.1.1-18: 200 OK (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net:7531;comp=sigcomp;branch=z9hG4bK23433.1, SIP/2.0/UDP
      scscf1.home1.net;branch=z9hG4bK23436s.1, SIP/2.0/UDP
      scscf2.home2.net;branch=z9hG4bK23d244.1, SIP/2.0/UDP
      pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
      [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

22. **200 OK (P-CSCF to S-CSCF) – see example in Table A.4.3.1.1-19.**

The P-CSCF forwads the 200 OK response to the S-CSCF.

Table A.4.3.1.1-19: 200 OK (P-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK23436s.1, SIP/2.0/UDP
      scscf2.home2.net;branch=z9hG4bK23d244.1, SIP/2.0/UDP
      pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
      [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

23. **200 OK (S-CSCF to S-CSCF of UE#2) – see example in Table A.4.3.1.1-20.**

    The S-CSCF forwards the 200 OK response to the home network of UE#2 according to the information in the Via field.

Table A.4.3.1.1-20: 200 OK (S-CSCF to S-SCSF of UE#2)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK23d244.1, SIP/2.0/UDP
      pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
      [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

A.4.3.1.2 User getting invited to a conference

Figure A.4.3.1.2-1 shows how UE#2 gets invited to a conference by receiving a REFER message. The REFER contains the Conference URI where UE#2 should use when joining the conference.

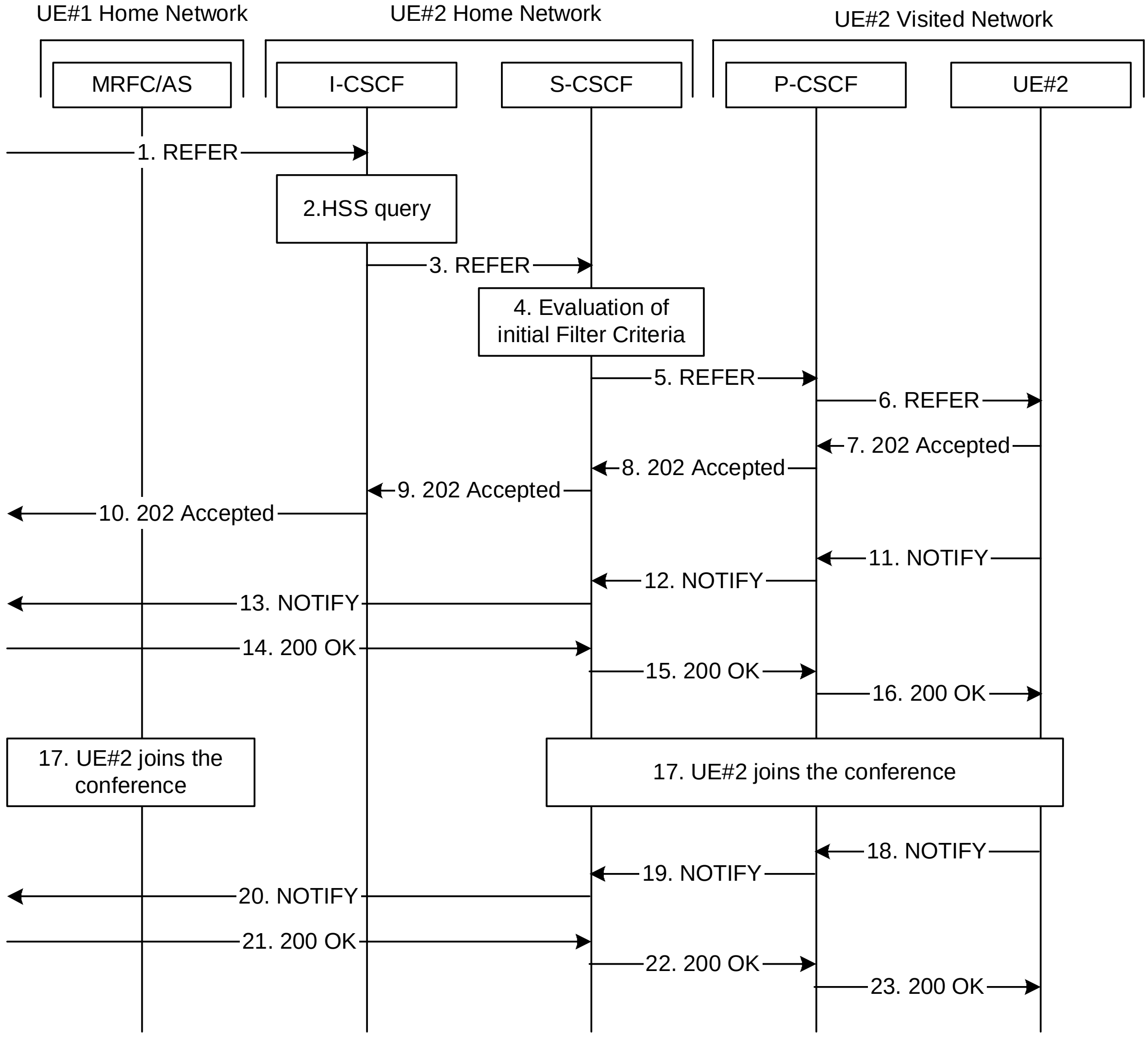


Figure A.4.3.1.2-1: User getting invited to a conference by receiving a REFER.

The details of the flows are as follows:

1. **REFER (S-CSCF of UE#1 to I-CSCF) - see example in table A.4.3.1.2-1**

   REFER message is sent by the S-CSCF of UE#1 to UE#2 home network. S-SCSF of UE#1 has resolved the address of I-CSCF as the entry point to UE#2 home network. See Subclause 6.3.3.1.1 for originating side of the call flow.

Table A.4.3.1.2-1: REFER (S-CSCF of UE#1 to I-CSCF)

```
REFER 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:+358-50-4821437>
P-Charging-Vector:  icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net
Privacy: none
From: <sip:user1_public1@home1.net>; tag=171828
To: <sip:user2_public1@home2.net>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 REFER
Refer-To: <sip:conference1@mrfc1.home1.net;isfocus;method=INVITE>
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Length: 0
```

Request-URI: contains the public user identity of UE#2.

Via: contains the IP addresses or FQDNs of visited nodes.

P-Asserted-Identity: The S-CSCF has inserted UE#1 TEL URL to the P-Asserted-Identity header in order that the TEL URL is known to the UE#2 home network.

Privacy: UE#1 does not require privacy, therefore the Privacy header is set to the value "none" as specified in RFC 3325 [17] and RFC 3323 [13].

From: the user does not require privacy, the From header contains the value requested by the user.

To: same as the Request-URI.

Cseq: is a random starting number.

Refer-To: contains the conference URI as learned during the conference establishment, including the isfocus parameter. Additionally the method parameter indicates that the other user shall send an INVITE request to this conference URI.

Contact: is a SIP URI that contains the IP address or FQDN of the originating UE.

The message does not contain a body.

2. **I-CSCF performs HSS query**

   I-CSCF performs HSS query to find out the S-CSCF serving UE#2.

3. **REFER (I-CSCF to S-CSCF) - see example in Table A.4.3.1.2-2**

   After finding out the S-CSCF assigned to UE#2, I-CSCF forwards the REFER request to that S-CSCF. I-CSCF does not add itself to the Record-route since it does not have to remain on the signalling path for subsequent requests within the same dialog.

Table A.4.3.1.2-2: REFER (I-CSCF to S-CSCF)

```
REFER sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP icscf2.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
Record-Route:
Route: <sip:scscf2.home2.net;lr>
P-Asserted-Identity:
P-Charging-Vector:
Privacy:
From:
To:
Call-ID:
Cseq:
Refer-To:
Contact:
Content-Length:

(...)
```

Route: I-CSCF adds S-CSCF to the Route header.

4. **Evaluation of initial Filter Criteria**

   S-CSCF validates the service profile of this subscriber, and evaluates the initial Filter Criteria.

5. **REFER (S-CSCF to P-CSCF) - see example in Table A.4.3.1.2-3**

   S-CSCF remembers (from registration procedures) the contact address of UE#2 and determins the P-CSCF assigned for UE#2 and routes message there.

Table A.4.3.1.2-3: REFER (S-CSCF to P-CSCF)

```
REFER sip:[5555::eeee:ffff:aaaa:bbbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK234974.3, SIP/2.0/UDP
   icscf2.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
Record-Route: <sip:scscf2.home2.net;lr>, <sip:scscf1.home1.net;lr>,
   <sip:pcscf1.visited1.net;lr>
Route: <pcscf2.visited2.net;lr>
P-Asserted-Identity:
P-Charging-Vector:
Privacy:
From:
To:
Call-ID:
Cseq:
Refer-To:
Contact:
P-Called-Party-ID: <sip:user2_public1@home2.net>
Content-Length:

(...)
```

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

6. **REFER (P-CSCF to UE#2) - see example in Table A.4.3.1.2-4**

   P-CSCF forwards the request to UE#2.

Table A.4.3.1.2-4: REFER (P-CSCF to UE#2)

```
REFER sip:[5555::eeee:ffff:aaaa:bbbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK249354.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK234974.3, SIP/2.0/UDP
   icscf2.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:
From:
To:
Call-ID:
Cseq:
Refer-To:
Contact:
P-Called-Party-ID:
Content-Length:

(...)
```

7. **202 Accepted (UE#2 to P-CSCF) - see example in table A.4.3.1.2-5**

   UE# accepts the REFER request by sending a 202 Accepted response.

Table A.4.3.1.2-5: 202 Accepted (UE#2 to P-CSCF)

```
SIP/2.0 202 Accepted
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK249354.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK234974.3, SIP/2.0/UDP
   icscf2.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: <sip:user2_public1@home2.net>;tag=151170
Call-ID:
CSeq:
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Content-Length:0
```

To: UE#2 has appended the tag to the original To-header.

Contact: Contains the UE#2 contact address.

8. **202 Accepted (P-CSCF to S-CSCF) - see example in Table A.4.3.1.2-6**

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

Table A.4.3.1.2-6: 202 Accepted (P-CSCF to S-CSCF)

```
SIP/2.0 202 Accepted
Via: scscf2.home2.net;branch=z9hG4bK234974.3, SIP/2.0/UDP
   icscf2.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=1234bcd9876e; icid-generated-at=[5555::f5f:e4e:d3d:c2c]
Privacy:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:0
```

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

9. **202 Accepted (S-CSCF to I-CSCF) - see example in Table A.4.3.1.2-7**

S-CSCF forwards the response to I-CSCF.

Table A.4.3.1.2-7: 202 Accepted (S-CSCF to I-CSCF)

```
SIP/2.0 202 Accepted
Via: SIP/2.0/UDP icscf2.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=1234bcd9876e; icid-generated-at=[5555::f5f:e4e:d3d:c2c]; 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:
Contact:
Content-Length:0
```

S-CSCF adds charging related headers to the 202 Accepted message before forwarding it to I-CSCF. S-CSCF also adds the Tel-URL to the P-Asserted-Identity header.

10. **202 Accepted (I-CSCF to UE#1 home network) - see example in Table A.4.3.1.2-8**

I-CSCF forwards the response to S-CSCF of UE#1.

Table A.4.3.1.2-8: 202 Accepted (I-CSCF to S-CSCF of UE#1)

```
SIP/2.0 202 Accepted
Via: 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:
P-Charging-Vector:
Privacy:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:0
```

11. **NOTIFY (from UE#2 to P-CSCF) - see example in Table A.4.3.1.2-9**

According to [RFC3515], UE#2 creates a subscription and sends a notification of the status of the refer.

Table A.4.3.1.2-9: NOTIFY (from UE#2 to P-CSCF)

```
NOTIFY 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=z9hG4bK23dh42.1
Max-Forwards: 70
Route: <sip:pcscf2.home2.net:5088;lr>,<sip:scscf2.home2.net;lr>, <sip:scscf1.home1.net;lr>,
   <sip:pcscf1.visited1.net;lr>
To: <sip:user1_public1@home1.net>;tag=171828
From: <sip:user2_public1@home2.net>;tag=151170
Call-ID: cb03a0s09a2sdfglkj490333
CSeq: 42 NOTIFY
Subscription-State: active;expires:7200
Event: refer
Contact: sip:[5555::eeee:ffff:aaaa:bbbb]:8805;comp=sigcomp
Content-Length: (…)
Content-Type: message/sipfrag

SIP/2.0 100 Trying
```

To: matches the From field of the original REFER message.

From: matches the To field of the original REFER message.

Call-ID: matches the Call-ID of the original REFER message.

12. **NOTIFY (from P-CSCF to S-CSCF) - see example in Table A.4.3.1.2-10**

P-CSCF forwards the message to S-CSCF.

Table: A.4.3.1.2-10: NOTIFY (from P-CSCF to S-CSCF)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
   [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
Max-Forwards: 69
Route: <sip:scscf2.home2.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
To:
From:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Length: (…)
Content-Type:

(...)
```

13. **NOTIFY (from S-CSCF to UE#1 home network) - see example in Table A.4.3.1.2-11.**

S-CSCF forwards the message to UE#1 home network (S-CSCF#1).

Table A.4.3.1.2-11: NOTIFY (from S-CSCF to UE#1 home network)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
   [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
Max-Forwards: 68
Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
To:
From:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Length: (…)
Content-Type:

(...)
```

14. **200 OK (S-CSCF of UE#1 to S-CSCF) – see example in Table A.4.3.1.2-12.**

S-CSCF receives a 200 OK to NOTIFY from UE#1 home network.

Table A.4.3.1.2-12: 200 OK (S-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
      pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
      [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

15. **200 OK (S-CSCF to P-CSCF) – see example in Table A.4.3.1.2-13.**

    The S-CSCF forwads the 200 OK response to the P-CSCF.

Table A.4.3.1.2-13: 200 OK (S-CSCF to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
      [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

16. **200 OK (P-CSCF to UE#2) – see example in Table A.4.3.1.2-14.**

    The P-CSCF forwards the 200 OK response to UE#2.

Table A.4.3.1.2-14: 200 OK (P-CSCF to UE#2)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

17. **UE#2 joins the conference.**

    UE#2 joins the conference. The message flows are depicted in Subclause 6.3.2.

18. **NOTIFY (from UE#2 to P-CSCF) - see example in Table A.4.3.1.2-15.**

    P-SCSF receives a NOTIFY from UE#2 indicating the status of the refer.

Table A.4.3.1.2-15: NOTIFY (from UE#2 to P-CSCF)

```
NOTIFY 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=z9hG4bK23dh42.1
Max-Forwards: 70
Route: <sip:pcscf2.visited2.net:5088;lr>,<sip:scscf2.home2.net;lr>, <sip:scscf1.home1.net;lr>,
   <sip:pcscf1.visited1.net;lr>
To: <sip:user1_public1@home1.net>; tag=171828
From: <sip:user2_public1@home2.net>;tag=151170
Call-ID: cb03a0s09a2sdfglkj490333
CSeq: 43 NOTIFY
Subscription-State: terminated
Event: refer
Contact:
Content-Length: (…)
Content-Type: message/sipfrag

SIP/2.0 200 OK
```

To: matches the From field of the original REFER message.

From: matches the To field of the original REFER message.

Call-ID: matches the Call-ID of the original REFER message.

Subscription-State: indicates that the implicit subscription to the REFER event has been terminated.

19. NOTIFY (from P-CSCF to S-CSCF) - see example in Table A.4.3.1.2-16.

P-CSCF forwards the message to S-CSCF.

Table A.4.3.1.2-16: NOTIFY (from P-CSCF to S-CSCF)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
   [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
Max-Forwards: 69
Route: <sip:scscf2.home2.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
To:
From:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Length: (…)
Content-Type:

(...)
```

20. **NOTIFY (from S-CSCF to S-CSCF of UE#1) - see example in Table A.4.3.1.2-17.**

    S-CSCF forwards the message to UE#1 home network.

Table A.4.3.1.2-17: NOTIFY (from S-CSCF to S-CSCF of UE#1)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK23d244.1, SIP/2.0/UDP
   pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
   [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
Max-Forwards: 68
Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
To:
From:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Length: (…)
Content-Type:

(...)
```

21. **200 OK (S-CSCF of UE#1 to S-CSCF) – see example in Table A.4.3.1.2-18.**

    S-CSCF receives a 200 OK to NOTIFY from UE#1 home network.

Table A.4.3.1.2-18: 200 OK (S-CSCF of UE#1 to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK23d244.1, SIP/2.0/UDP
      pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
      [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

22. **200 OK (P-CSCF to S-CSCF) – see example in Table A.4.3.1.2-19.**

    The S-CSCF forwads the 200 OK response to the P-CSCF.

Table A.4.3.1.2-19: 200 OK (S-CSCF to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
      [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

23. **200 OK (P-CSCF to UE#2) – see example in Table A.4.3.1.2-20.**

The P-CSCF forwards the 200 OK response to UE#2.

Table A.4.3.1.2-20: 200 OK (P-CSCF UE#2)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

A.4.4 User requesting IMS to join another user

A.4.4.1 User in a different network

A.4.5 User joins a private conversation to a conference

A.4.5.1 User in a different network

A.5 Flows demonstrating a user subscribing to the conference event package

A.5.1 Introduction

A.5.2 User subscribing to the conference state event package

A.5.2.1 User in a different network

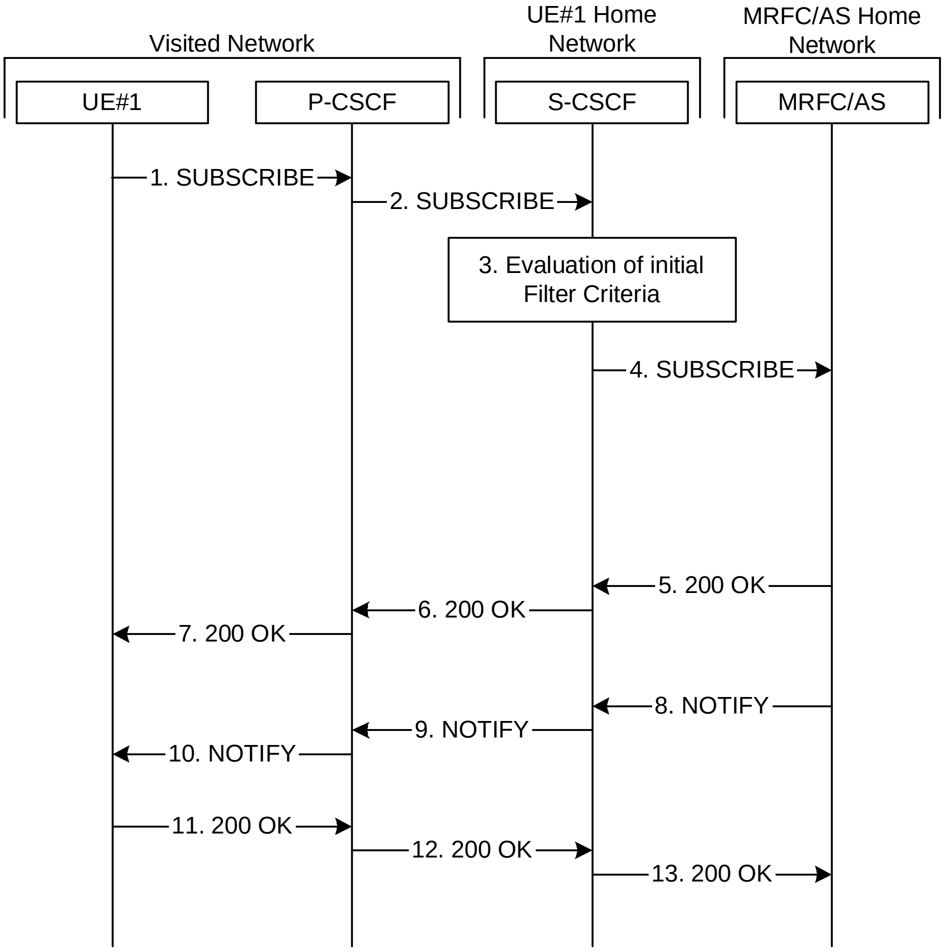


Figure A.5.2.1-1: User subscribing to conference state event package – user in a different network

Figure A.5.2.1-1 shows an IMS user subscribing to the conference state event for a specific conference that is provided at a MRFC/AS located in another network. The conference URI, which is used for subscription to the conference event package, does include a FQDN in the host part in this example.

The details of the flows are as follows:

1. **SUBSCRIBE (UE to P-CSCF) - see example in table A.5.2.1-1**

   A user agent wants to get informed about the state of a certain conference, the involved users and their related media states. The conference is identified by a conference URI. In order to initiate a subscription to the MRFC/AS, the UE generates a SUBSCRIBE request containing the 'conference' event, together with the length of time this periodic subscription should last. For this example it is assumed that the UE is only interested in information about "membership" and "basic media".

Table A.5.2.1-1: SUBSCRIBE (UE to P-CSCF)

```
SUBSCRIBE sip:conference1@mrfc2.home2.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.visited1.net:7531;lr;comp=sigcomp>, <sip:orig@scscf1.home1.net;lr>
P-Preferred-Identity: <sip:user1_public1@home1.net>
Privacy: none
From: <sip:user1_public1@home1.net>;tag=31415
To: <sip:conference1@mrfc2.home2.net>
Call-ID: b89rjhnedlrfjflslj40a222
CSeq: 61 SUBSCRIBE
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=7531
Event: conference;recurse;type="membership,basic-media"
Expires: 7200
Accept: application/conference-info+xml
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Length: 0
```

Request-URI: contains the conference URI.

Route: The Route header is populated with the service route from registration.

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.

From: the user does not require privacy, the From header contains the value requested by the user.

Event: This field is populated with the value 'conference;recurse;type="membership,basic-media"' to specify the use of the conference state event package and to indicate that also the participants of conferences that act as participants to this conference shall be listed. The type parameter is used to indicate what conference information is requested.

Accept: This field is populated with the value 'application/conference-info+xml'.

To: same as the Request-URI.

Contact: is a SIP URI that contains the IP address or FQDN of the originating UE.

2. **SUBSCRIBE (P-CSCF to S-CSCF) - see example in table A.5.2.1-2**

   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.

   The SUBSCRIBE request is forwarded to the S-CSCF.

Table A.5.2.1-2: SUBSCRIBE (P-CSCF to S-CSCF)

```
SUBSCRIBE sip:conference1@mrfc2.home2.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
P-Asserted-Identity: <sip:user1_public1@home1.net>
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy:
Route: <sip:orig@scscf1.home1.net;lr>
Record-Route: <sip:pcscf1.visited1.net;lr>
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-Charging-Vector: The P-CSCF inserts this header and populates the icid parameters with a globally unique value

3. **Evaluation of initial filter criteria**

   S-CSCF validates the service profile of this subscriber and evaluates the initial filter criteria.

4. **SUBSCRIBE (S-CSCF to MRFC/AS) - see example in table A.5.2.1-4**

   S-CSCF forwards the SUBSCRIBE request to the MRFC/AS based on the request URI of the SUBSCRIBE request. The S-CSCF does not re-write the request URI.

Table A.5.2.1-4: SUBSCRIBE request (S-CSCF to MRFC/AS)

```
SUBSCRIBE sip:conference1@mrfc2.home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.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
P-Asserted-Identity:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net
Privacy:
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1;lr>
From:
To:
Call-ID:
CSeq:
Event:
Expires:
Accept:
Contact:
Content-Length:
```

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. **200 OK (MRFC/AS to S-CSCF) – see example in table A.5.2.1-5 (related to table A.5.2.1-4)**

   The MRFC/AS performs the necessary authorisation checks on the originator to ensure that he/she is allowed to subscribe to this specific conference. In this example the conditions have been met, so the MRFC/AS acknowledges the SUBSCRIBE request (6) with a 200 (OK) response.

Table A.5.2.1-5: 200 OK (MRFC/AS to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.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-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net;
      term-ioi=home2.net
From:
To: <sip:conference1@mrfc2.home2.net>;tag=151170
Call-ID:
CSeq:
Event:
Expires:
Contact: <sip:conference1@mrfc2.home2.net>
Content-Length:
```

6. **200 OK (S-CSCF to P-CSCF) - see example in table A.5.2.1-6**

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

Table A.5.2.1-6: 200 OK (S-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:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
From:
To:
Call-ID:
CSeq:
Event:
Expires:
Contact:
Content-Length:
```

7. **200 OK (P-CSCF to UE) - see example in table A.5.2.1-7**

   P-CSCF forwards the 200 OK response to UE.

Table A.5.2.1-7: 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:
From:
To:
Call-ID:
CSeq:
Event:
Expires:
Contact:
Content-Length:
```

8. **NOTIFY (MRFC/AS to S-CSCF) – see example in table A.5.2.1-8**

   The MRFC/AS generates a NOTIFY message that includes information about all participants that the subscribing user is allowed to see. The information about one participant includes

   - the SIP URI identifying the user;
   - the dialog state associated for that users attachment to the conference;
   - the users status in the conference (active, declined, departed); and

- the users status in terms of receiving media in the conference.

Table A.5.2.1-8: NOTIFY (MRFC/AS to S-CSCF)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP mrfc2.home2.net;branch=z9hG4bK348923.1
Max-Forwards: 70
Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From: <sip:conference1@mrfc2.home2.net>;tag=151170
To: <sip:user1_public1@home1.net>;tag=31415
Call-ID: b89rjhnedlrfjflslj40a222
CSeq: 42 NOTIFY
Subscription-State: active ;expires=7200
Event: conference;recurse
Contact: <sip:conference1@mrfc2.home2.net>
Content-Type: application/conference-info+xml
Content-Length: (...)

   <?xml version="1.0" encoding="UTF-8"?>
   <conference-info   version="0"
                      state="full"
                      entity="conference1@mrfc2.home2.net"
                      xmlns="urn:ietf:params:xml:ns:conference-info">
     <user uri="sip:user1_public1@home1.net" display-name="John Doe">
       <status>active</status>
       <media-status>
         <media-stream media-type="audio"/>
       </media-status>
     </user>
     <user uri="sip:user3_public1@home3.net" display-name="Simon Moon">
       <status>active</status>
     </user>
   </conference-info>
```

From: The tag of this field matches that of the To; field in the received 200 (OK) for the SUBSCRIBE.

Content-Type: Set to the value of the Accept: header received in the SUBSCRIBE request.

The message body in the NOTIFY request that carries the conference state information of the conference participants is formed as indicated in draft-ietf-sipping-conference-package-00 [7.82].

9. **NOTIFY (S-CSCF to P-CSCF) – see example in table A.5.2.1-9**

The S-CSCF forwards the NOTIFY request to the P-CSCF.

Table A.5.2.1-9: NOTIFY (S-CSCF to P-CSCF)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
      mrfc2.home2.net;branch=z9hG4bK348923.1
Max-Forwards: 69
Route: <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Type:
Content-Length:

(...)
```

10. **NOTIFY (P-CSCF to UE) – see example in table A.5.2.1-10**

P-CSCF forwards the NOTIFY request to UE.

Table A.5.2.1-10: NOTIFY (P-CSCF to UE)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UPD
      scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
      mrfc2.home2.net;branch=z9hG4bK348923.1
Max-Forwards: 68
From:
To:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Type:
Content-Length:

(...)
```

11. **200 OK (UE to P-CSCF) – see example in table A.5.2.1-11 (related to table A.5.2.1-10)**

    The UE acknowledges the NOTIFY request with a 200 (OK) response to the P-CSCF.

Table A.5.2.1-11: 200 OK (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UPD
      scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
      mrfc2.home2.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

12. **200 OK (P-CSCF to S-CSCF) – see example in table A.5.2.1-12**

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

Table A.5.2.1-12: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UPD scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
      mrfc2.home2.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
CSeq:
Content-Length:
```

13. **200 OK (S-CSCF to MRFC/AS) – see example in table A.5.2.1-13**

    S-CSCF forwards the 200 (OK) response to the MRFC/AS.

Table A.5.2.1-13: 200 OK (S-CSCF to MRFC/AS)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP mrfc2.home2.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
CSeq:
Content-Length:
```

A.6 Flows demonstrating a user leaving a conference

A.6.1 Introduction

A.6.2 User leaving the conference

A.6.2.1 User in a different network

Figure A.6.2.1-1 shows an IMS user leaving a conference. The example shows the flow for the user, who created the conference with a conference-factory URI. For this example it is assume that the user is subscribed to the conference state event package at the MRFC/AS.

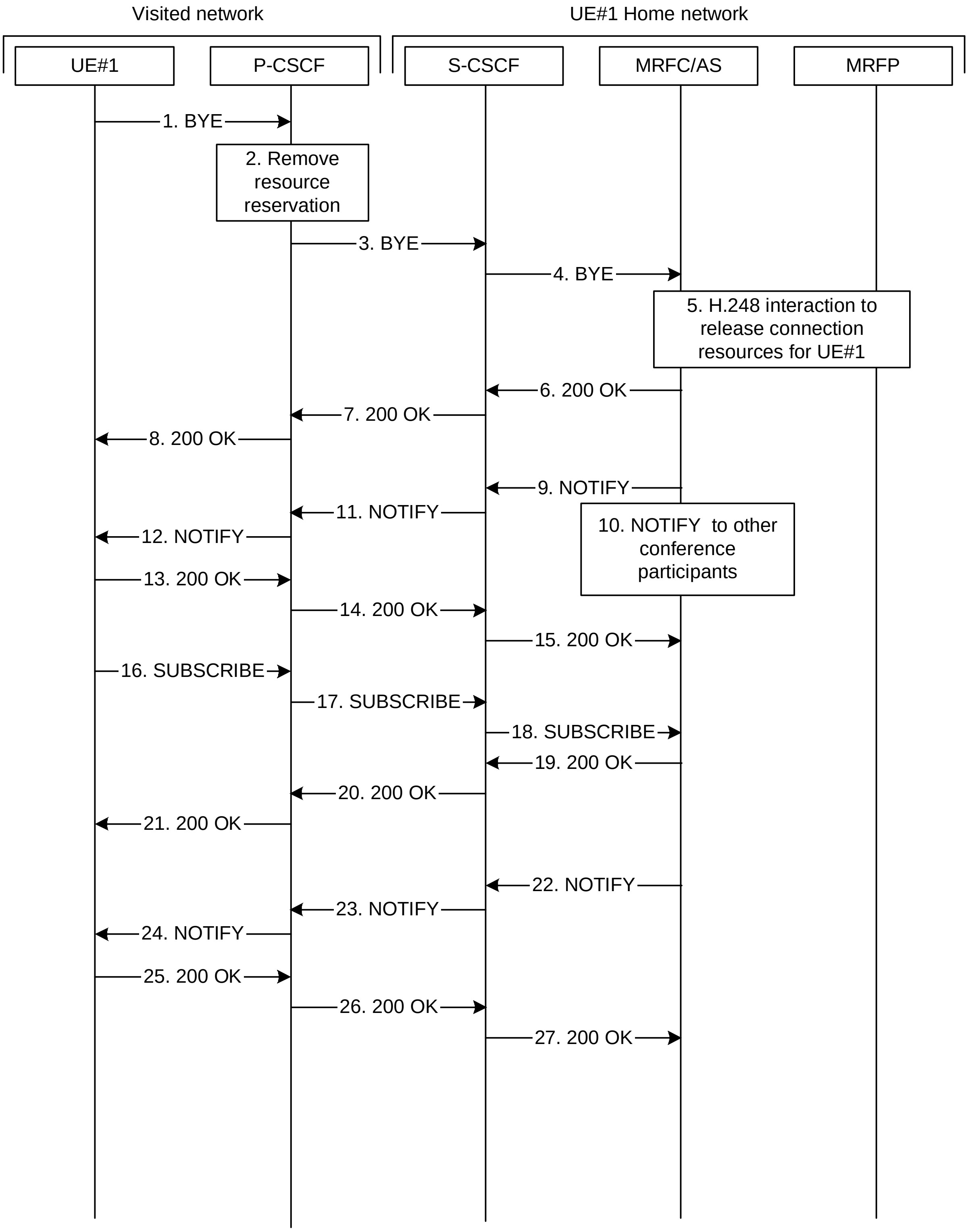


Figure A.6.2.1-1. User leaving a conference

The details of the flows are as follows.

1. BYE (UE to P-CSCF) – see example in Table A.6.2.1-1

A user agent wants to leave a conference. For this purpose the user agent sends a BYE message to the P-CSCF with the Conference-URI as the Request-URI.

Table A.6.2.1-1: BYE (UE to P-CSCF)

```
BYE sip:conference1@mrfc1.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-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>; tag=171828
To: <sip:conference-factory1@mrfc1.home1.net>; tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=7531
Cseq: 153 BYE
Content-Length: 0
```

Request-URI: contains the value of the Conference-URI as learned during conference creation.

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

To: contains the conference-factory URI, that was used by this user to create the conference.

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

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

2. **Remove resource reservation**

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

3. **BYE (P-CSCF to S-CSCF) - see example in table A.6.2.1-2**

   The P-CSCF removes the Security-Verify header, and the sec-agree tag from the Require and Proxy-Require headers. As the Require and Proxy-Require headers are empty, it removes these headers completely.

Table A.6.2.1-2: BYE (P-CSCF to S-CSCF)

```
BYE sip:conference1@mrfc1.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>
P-Access-Network-Info:
From:
To:
Call-ID:
Cseq:
Content-Length: 0
```

4. **BYE (S-CSCF to MRFC/AS) - see example in table A.6.2.1-3**

   The S-CSCF forwards the BYE to the MRFC/AS.

Table A.6.2.1-3: BYE (S-CSCF to MFRC/AS)

```
BYE sip:conference1@mrfc1.home1.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
From:
To:
Call-ID:
Cseq:
Content-Length:
```

5. **H.248 interaction to release resources**

   MRFC/AS interacts with the MRFP to release the resources reserved for UE#1 in this conference.

6. **200 OK (MRFC/AS to S-CSCF) - see example in table A.6.2.1-4**

   After succesfully releasing the resources from the MRFP, the MRFC/AS sends a 200 OK message to the S-CSCF.

Table A.6.2.1-4: 200 OK (MRFC/AS to S-CSCF)

```
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: 0
```

7. **200 OK (S-CSCF to P-CSCF) - see example in table A.6.2.1-5**

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

Table A.6.2.1-5: 200 OK (S-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: 0
```

8. **200 OK (P-CSCF to UE) - see example in table A.6.2.1-6**

   P-CSCF forwards the message to the UE.

Table A.6.2.1-6: 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: 0
```

9. **NOTIFY (MRFC/AS to S-CSCF) – see example in table A.6.2.1-7**

   The MRFC/AS generates a NOTIFY message to indicate that UE1 has left the conference.

Table A.6.2.1-7: NOTIFY (MRFC/AS to S-CSCF)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP mrfc1.home1.net;branch=z9hG4bK348923.1
Max-Forwards: 70
Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From: <sip:conference1@mrfc1.home1.net>;tag=151170
To: <sip:user1_public1@home1.net>;tag=31415
Call-ID: b89rjhnedlrfjflslj40a222
CSeq: 42 NOTIFY
Subscription-State: active ;expires=7200
Event: conference
Contact: <sip:conference1@mrfc1.home1.net>
Content-Type: application/conference-info+xml
Content-Length: (...)

   <?xml version="1.0" encoding="UTF-8"?>
   <conference-info   version="0"
                      state="full"
                      entity="conference1@mrfc1.home1.net"
                      xmlns="urn:ietf:params:xml:ns:conference-info">
     <user uri="sip:user1_public1@home1.net" display-name="John Doe">
       <status>departed</status>
       <media-status>
         <media-stream media-type="audio"/>
       </media-status>
     </user>
     <user uri="sip:user3_public1@home3.net" display-name="Simon Moon">
       <status>active</status>
     </user>
   </conference-info>
```

From: The tag of this field matches that of the To: field in the received 200 (OK) for the initial SUBSCRIBE.

To: The tag of this field matches the of the From: field in the intial SUBSCRIBE.

Call-ID: Matches that of the initial SUBSCRIBE.

Content-Type: Set to the value of the Accept: header received in the SUBSCRIBE request.

Subscription-State: Set to the value "active", as the user stays still subscribed to the conference state event package. The BYE request does only terminate the session and INVITE created dialog, but not the subscription.

Content-Type: Set to the value of the Accept: header received in the SUBSCRIBE request.

The message body in the NOTIFY request that carries the conference state information of the conference participants is formed as indicated in draft-ietf-sipping-conference-package-00 [7.82].

10. **Other conference participants are notified**

MRFC/AS similarly notifies other conference participants that have subscribed to the event notification service that UE1 has left the conference.

11. **NOTIFY (S-CSCF to P-CSCF) – see example in table A.6.2.1-9**

The S-CSCF forwards the NOTIFY request to the P-CSCF.

Table A.6.2.1-9: NOTIFY (S-CSCF to P-CSCF)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
      mrfc1.home1.net;branch=z9hG4bK348923.1
Max-Forwards: 69
Route: <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Type:
Content-Length:

(...)
```

12. **NOTIFY (P-CSCF to UE) – see example in table A.6.2.1-10**

    P-CSCF forwards the NOTIFY request to UE.

Table A.6.2.1-10: NOTIFY (P-CSCF to UE)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net:7531;comp=sigcomp;branch=z9hG4bK240f34.1, SIP/2.0/UPD
      scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
      mrfc1.home1.net;branch=z9hG4bK348923.1
Max-Forwards: 68
From:
To:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Type:
Content-Length:

(...)
```

13. **200 OK (UE to P-CSCF) – see example in table A.6.2.1-11 (related to table A.6.2.1-10)**

    The UE acknowledges the NOTIFY request with a 200 (OK) response to the P-CSCF.

Table A.6.2.1-11: 200 OK (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/UPD
      scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
      mrfc1.home1.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

14. **200 OK (P-CSCF to S-CSCF) – see example in table A.6.2.1-12**

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

Table A.6.2.1-12: 200 OK (P-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UPD scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
      mrfc1.home1.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
CSeq:
Content-Length:
```

15. **200 OK (S-CSCF to MRFC/AS) – see example in table A.6.2.1-13**

    S-CSCF forwards the 200 (OK) response to the MRFC/AS.

Table A.6.2.1-13: 200 OK (S-CSCF to MRFC/AS)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP mrfc1.home1.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
CSeq:
Content-Length:
```

16. **SUBSCRIBE (UE to P-CSCF) - see example in table A.6.2.1-14**

    User agent wants to terminate the subscription to the conference state event package. Therefore, it sends a SUBSCRIBE request to the P-CSCF with Expires: value of 0.

Table A.6.2.1-14: SUBSCRIBE (UE to P-CSCF)

```
SUBSCRIBE sip:conference1@mrfc1.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>
Privacy: none
From: <sip:user1_public1@home1.net>;tag=31415
To: <sip:conference1@mrfc1.home1.net>;tag=151170
Call-ID: b89rjhnedlrfjflslj40a222
CSeq: 62 SUBSCRIBE
Event: conference
Expires: 0
Content-Length: 0
```

Request-URI: contains the conference URI.

Route: The Route header is populated with the recorded route that was recorded during the initial subscription.

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].

From: The tag value in this header field matches that of the initial SUBSCRIBE.

To: The tag value in this header field matches that of the 200 OK to the intial SUBSCRIBE.

Call-ID: Matches that of the initial SUBSCRIBE.

Event: Identifies the event notification package.

Expires: A value of 0 indicates that the UE would like to unsubscribe from the notification service.

17. **SUBSCRIBE (P-CSCF to S-CSCF) - see example in table A.6.2.1-15**

    The SUBSCRIBE request is forwarded to the S-CSCF.

Table A.6.2.1-15: SUBSCRIBE (P-CSCF to S-CSCF)

```
SUBSCRIBE sip:conference1@mrfc1.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
Privacy:
Route: <sip:orig@scscf1.home1.net;lr>
From:
To:
Call-ID:
CSeq:
Event:
Expires:
```

18. **SUBSCRIBE (S-CSCF to MRFC/AS) - see example in table A.6.2.1-16**

    The SUBSCRIBE request is forwarded to the MRFC/AS.

Table A.6.2.1-16: SUBSCRIBE (S-CSCF to MRFC/AS)

```
SUBSCRIBE sip:conference1@mrfc1.home1.net SIP/2.0
Via: SIP/2.0/UDP scscf1.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
Privacy:
From:
To:
Call-ID:
CSeq:
Event:
Expires:
```

19. **200 OK (MRFC/AS to S-CSCF) – see example in table A.6.2.1-17 (related to table A.6.2.1-16)**

    The MRFC/AS removes the UE from the conference notification service and sends back a 200 OK message to the SUBSCRIBE.

Table A.6.2.1-17: 200 OK (MRFC/AS to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.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:
Content-Length:
```

20. **200 OK (S-CSCF to P-CSCF) – see example in table A.6.2.1-18**

    S-CSCF forwards the message to P-CSCF.

Table A.6.2.1-18: 200 OK (S-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:
Content-Length:
```

21. **200 OK (P-CSCF to UE) – see example in table A.6.2.1-19**

    P-CSCF forwards the message to UE.

Table A.6.2.1-19: 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:
Content-Length:
```

22. **NOTIFY (MRFC/AS to S-CSCF) – see example in table A.6.2.1-20**

The MRFC/AS generates a NOTIFY that confirmes that the subscription to the conference notification service is terminated.

Table A.6.2.1-20: NOTIFY (MRFC/AS to S-CSCF)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP mrfc1.home1.net;branch=z9hG4bK348923.1
Max-Forwards: 70
Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From: <sip:conference1@mrfc1.home1.net>;tag=151170
To: <sip:user1_public1@home1.net>;tag=31415
Call-ID: b89rjhnedlrfjflslj40a222
CSeq: 43 NOTIFY
Subscription-State: terminated
Event: conference
Contact: <sip:conference1@mrfc1.home1.net>
Content-Length: 0
```

From: The tag of this field matches that of the To: field in the received 200 (OK) for the SUBSCRIBE.

To: The tag of this field matches the of the From: field in the intial SUBSCRIBE.

Call-ID: Matches that of the initial SUBSCRIBE.

Content-Type: Set to the value of the Accept: header received in the SUBSCRIBE request.

Subscription-State: Value of "terminated" indicates that the UE has been unsubscribed from the conference notification service.

23. **NOTIFY (S-CSCF to P-CSCF) – see example in table A.6.2.1-21**

The S-CSCF forwards the NOTIFY request to the P-CSCF.

Table A.6.2.1-21: NOTIFY (S-CSCF to P-CSCF)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
      mrfc1.home1.net;branch=z9hG4bK348923.1
Max-Forwards: 69
Route: <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Length:
```

24. **NOTIFY (P-CSCF to UE) – see example in table A.6.2.1-22**

P-CSCF forwards the NOTIFY request to UE.

Table A.6.2.1-22: NOTIFY (P-CSCF to UE)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net:7531;comp=sigcomp;branch=z9hG4bK240f34.1, SIP/2.0/UPD
      scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
      mrfc1.home1.net;branch=z9hG4bK348923.1
Max-Forwards: 68
From:
To:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Length: 0
```

25. **200 OK (UE to P-CSCF) – see example in table A.6.2.1-23 (related to table A.6.2.1-22)**

    The UE acknowledges the NOTIFY request with a 200 (OK) response to the P-CSCF.

Table A.6.2.1-23: 200 OK (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/UPD
      scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
      mrfc1.home1.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

26. **200 OK (P-CSCF to S-CSCF) – see example in table A.6.2.1-24**

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

Table A.6.2.1-24: 200 OK (P-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UPD scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
      mrfc1.home1.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
CSeq:
Content-Length:
```

27. **200 OK (S-CSCF to MRFC/AS) – see example in table A.6.2.1-25**

    S-CSCF forwards the 200 (OK) response to the MRFC/AS.

Table A.6.2.1-25: 200 OK (S-CSCF to MRFC/AS)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP mrfc1.home1.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
CSeq:
Content-Length:
```

A.6.3 User requesting the IMS to remove another user from conference

A.6.3.1 User in a different network

A.6.4 MRFC/AS drops a user from a conference

A.6.4.1 User in a different network

Figure A.6.4.1-1 shows an MRFC/AS dropping a user from a conference.

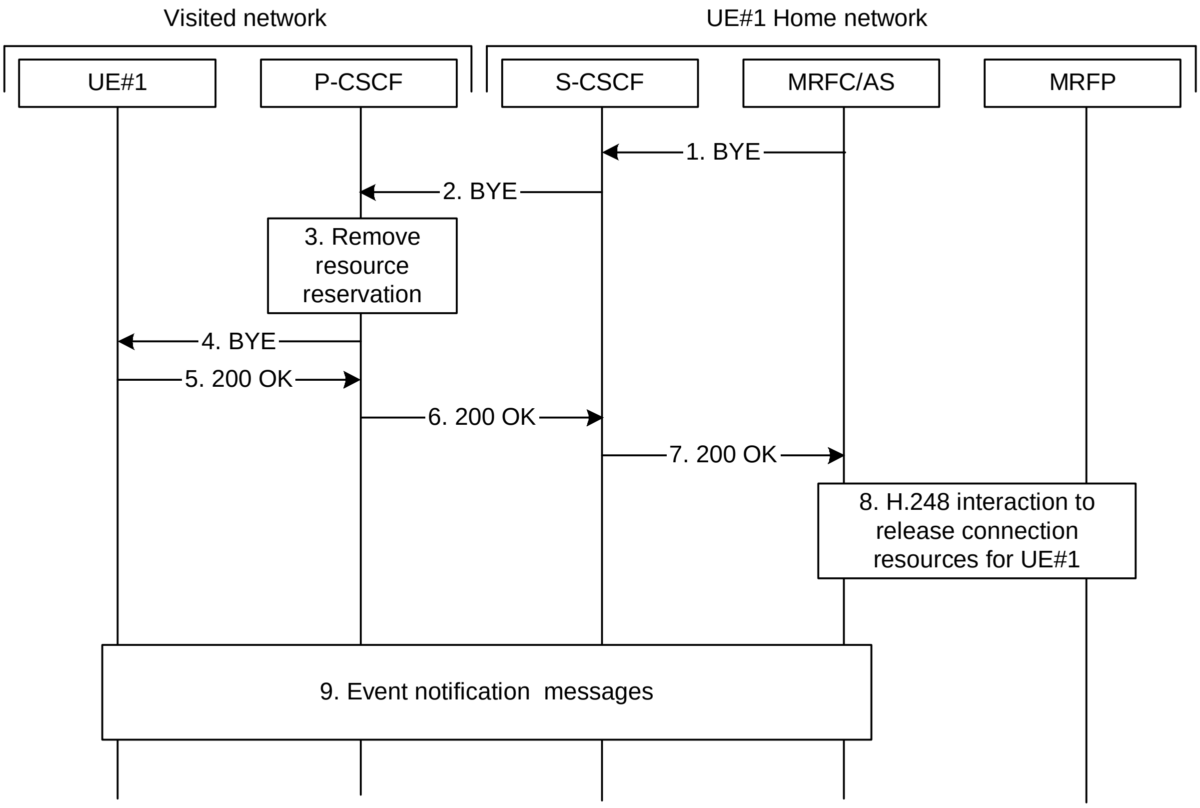


Figure A.6.4.1-1. MRFC/AS dropping a user from a conference

The details of the flows are as follows.

1. BYE (MRFC/AS to S-CSCF) – see example in Table A.6.4.1-1

MRFC/AS decides to drop a user from a conference. The decision may be based on a change in the conference policy, because the conference lifetime is exceeded, or some other reason.

The MRFC/AS issues a BYE request to the S-CSCF.

Table A.6.4.1-1: BYE (MRFC/AS to S-CSCF)

```
BYE sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP mrfc1.home1.net;branch=z9hG4bK348923.1
Max-Forwards: 70
Route: Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From: <sip:conference1@mrfc1.home1.net>; tag=314159
To: <sip:user1_public1@home1.net>; tag=171828
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 73 BYE
Content-Length: 0
```

Request-URI: contains the value of the Conference-URI as learned during conference creation.

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

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

CSeq: the content of the Cseq header must have a higher sequence number than the previous transaction. Here it is assumed that a Cseq value no greater than 72 has been previously used.

2. **BYE (S-CSCF to P-CSCF) - see example in table A.6.4.1-2**

   The S-CSCF forwards the BYE request to the P-CSCF.

Table A.6.4.1-2: BYE (S-CSCF to P-CSCF)

```
BYE sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   mrfc1.home1.net;branch=z9hG4bK348923.1
Max-Forwards: 69
Route: <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length: 0
```

3. **Remove resource reservation**

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

4. **BYE (P-CSCF to UE) - see example in table A.6.4.1-3**

   The P-CSCF forwards the BYE to the UE.

Table A.6.4.1-3: BYE (P-CSCF to UE)

```
BYE sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP mrfc1.home1.net;branch=z9hG4bK348923.1
Max-Forwards: 68
From:
To:
Call-ID:
Cseq:
Content-Length:
```

5. **200 OK (UE to P-CSCF) - see example in table A.6.4.1-4**

   After successfully releasing the resources from the MRFP, the MRFC/AS sends a 200 OK message to the S-CSCF.

Table A.6.4.1-4: 200 OK (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP mrfc1.home1.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
Cseq:
Content-Length: 0
```

6. **200 OK (P-CSCF to S-CSCF) - see example in table A.6.4.1-5**

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

Table A.6.4.1-5: 200 OK (P-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   mrfc1.home1.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
Cseq:
Content-Length: 0
```

7. **200 OK (S-CSCF to MRFC/AS) - see example in table A.6.4.1-6**

   S-CSCF forwards the message to the MRFC/AS.

Table A.6.4.1-6: 200 OK (S-CSCF to MRFC/AS)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP mrfc1.home1.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
Cseq:
Content-Length: 0
```

8. **H.248 interaction to release resources**

   MRFC/AS interacts with the MRFP to release the resources reserved for UE#1 in this conference.

9. **Event notification messages**

   The MRFC/AS also terminates the user's subscription to the conference state event package. The message flow is identical to messages 6.5.2.1-22 to 6.5.2.1-27 in subclause 6.5.2.1. for an user leaving a conference.

A.7 Flows demonstrating conference termination

A.7.1 Introduction

A.7.2 Last user leaving the conference

A.7.2.1 User in a different network

A.7.3 User requesting IMS to terminate the conference

A.7.3.1 User in a different network

A.8 Flows demonstrating usage of hold and resume during conferences

A.9 Flows demonstrating conference participation from non-IMS networks

Annex B: Bibliography

The following documents constitute essential reading for the understanding of the conferencing service, and its provision by SIP. Unless additionally included in clause 2 of this specification, they do not constitute provisions for the support of conferencing by SIP in the IM CN subsystem, or of the related technical specifications 3GPP TS 23.218, 3GPP TS 24.228 or 3GPP TS 24.229.

Editor's Note: The material in this Annex will not be included in TS 23.218, TS 24.228 or TS 24.229.

Editor's Note: IETF drafts included in this annex are not being tracked as part of the IETF 3GPP coordination process as until they appear as a normative reference in another document, 3GPP is not dependent on them.

Editor's Note: Some of the below listed IETF drafts have not been adopted as working group items up till now. They are listed here as they are part of the outcome of the IETF conference design team.

[B1] IETF RFC 3261 (June 2002): "SIP: Session Initiation Protocol".

[B2] IETF RFC 3265 (June 2002): "Session Initiation Protocol (SIP)-Specific Event Notification".

[B3] "A Framework for Conferencing with the Session Initiation Protocol", J. Rosenberg, Internet-Draft, http://www.ietf.org/internet-drafts/draft-ietf-sipping-conferencing-framework-00.txt, February 2003

[B4] "Session Initiation Protocol Call Control - Conferencing for User Agents", A. Johnston, O. Levin, Internet-Draft, http://www.ietf.org/internet-drafts/draft-ietf-sipping-cc-conferencing-00.txt, August 2003

[B5] "Requirements for conference policy data", P. Koskelainen, Internet-Draft, http://www.ietf.org/internet-drafts/draft-koskelainen-sipping-conf-policy-req-00.txt, February 2003

[B6] "A Session Initiation Protocol (SIP) Event Package for Conference State", J. Rosenberg, H. Schulzrinne, Internet-Draft, http://www.ietf.org/internet-drafts/draft-ietf-sipping-conference-package-00.txt, June 2004

[B7] "Requirements for Tightly Coupled SIP Conferencing", O. Levin, R. Even, Internet-Draft http://www.ietf.org/internet-drafts/draft-levin-sipping-conferencing-requirements-03.txt, March 2003

[B8] "Conferencing media policy requirements", R. Even, O. Levin, N. Ismail, Internet-Draft, http://www.ietf.org/internet-drafts/draft-even-sipping-media-policy-requirements-00.txt, February 2003

[B9] "Requirements for Floor Control", P. Koskelainen, H. Schulzrinne, J. Ott, Internet-Draft, http://www.ietf.org/internet-drafts/draft-koskelainen-mmusic-floor-req-01.txt, October 2003

[B10] "Use of Session Initiation Protocol (SIP) and Simple Object Access Protocol (SOAP) for Conference Floor Control", Wu, Koskelainen, Schulzrinne, Internet-Draft, http://www.ietf.org/internet-drafts/draft-wu-sipping-floor-control-04.txt, September 2003

[B11] "Additional Requirements to Conferencing", Koskelainen, Schulzrinne, Wu, Internet-Draft, http://www.cs.columbia.edu/~petkos/draft-koskelainen-sipping-conf-requirements-00.txt, April 2002

[B12] "Media Policy Manipulation in the Conference Policy Control Protocol", R. Mahy, N. Ismail, Internet-Draft, http://www.ietf.org/internet-drafts/draft-mahy-sipping-media-policy-control-00.txt, February 2003

Annex C: Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
17.03.03					Version 0.0.0 Editor's 1st draft to CN1		
04.04.03					Version 0.1.0 produced as a result of CN1#29. TR number assigned by MCC. Incorporating agreements from - N1-030541 - initial material - N1-030542 - structure of section 6 for call flows; and - N1-030565 - call flow for conference creation with conference-factory URI		
02.06.03					Version 0.2.0 produced as a result of CN1#30 Incorporating agreements from - N1-030602 – Flow: User joining a conference – flow 1 - N1-030775 – Update of references - N1-030909 – Text: Generic Procedures for Conferencing - N1-030910 – Flow: Update of conference factory URI flow - N1-030913 – Flow: User joining a conference – flow 2 - N1-030914 – Flow: Subscription to conference event package - N1-030936 – Text: Conference creation with conference factory URI - N1-030937 – Text: User joining a conference Updated subclause numbering as described in cover sheet		N1-031121
01.09.03					Version 0.3.0 produced as a result of CN1#31 Incorporating agreements from: - N1-031288 – Revised TR structure, to align with TS 24.124 The following CR's were incorporated and the editor adopted their content / structure to the revised TR structure: - N1-031131 – Flow: User getting invited to conference - N1-031134 – Text: Three way conference - N1-031266 – Flow corrections - N1-031268 – Text: Additions to clause 4 - Overview - N1-031282 – Flow: Usage of "Type" parameter in subscription - N1-031286 – Flow: Conference creation in other network - N1-031291 – Text: User Authentication at AS - N1-031322 – Text: AS invites other participant - N1-031292 – Text: AS procedures: User subscribes to conf event - N1-031293 – Text: User invites other user to conference (REFER) - N1-031294 – Flow: User invites other user to conference - N1-031297 – Flow: User leaving a conference - N1-031298 – Flow: AS drops user from conference	N1-031121	
10.09.03					mindor editorial updates		

3GPP TR 29.847 V~~0.3.0~~1.0.0 (2003-09)

Technical Report

**3rd Generation Partnership Project;
Technical Specification Group Core Network;
Conferencing based on SIP, SDP and other protocols;
Functional models, information flows and protocol details
(Release 6)**

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Contents

Foreword

This Technical Report has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document is a temporary container for the functional models, flows and protocol details for the conferencing service within the IP Multimedia Core Network subsystem (IMS) based on the Session Initiation Protocol (SIP), SIP Events, the Session Description Protocol (SDP) and other protocols. The document covers also instant messaging conferences. The contents of this report when stable will be moved into the Technical Specification 3GPP TS 23.218 [3], 3GPP TS 24.228 [4] and 3GPP TS 24.229 [5].

Editor's note: This TR will also include information on conference floor control, which will be using different protocols than SIP and SDP (see clause 9), as e.g. described in draft-wu-sipping-floor-control-04.txt. This information might be moved either to TS 24.229 or to another 3GPP document.

Editor's note: This TR will also include information on Conference Policy Management (see clause 8) , as e.g. described in draft-koskelainen-sipping-conf-policy-req-00.txt. This information might be moved either to TS 24.229 or to another 3GPP document.

Editor's note: The "other protocols" that are mentioned here need to be listed in detail, in order to replace the phrase "other protocols". This TR only covers protocols in the scope of CN1.

Editor's note: The work on conference policy control is related to the work under the work item for IMS group management, WID: 11036, and the decision is to be made on contributed text as in which document it will appear.

Editor's note: The work on instant messaging conferences is related to the work under the work item for IMS messaging, WID 11039, and the decision is to be made on contributed text as in which document it will appear.

Editor's note: The ongoing work on floor control and conferencing in CN5 needs to be taken into account.

This document does not cover the signalling between a MRFC and a MRFP.

Where possible the present document specifies the requirements for this protocol by reference to specifications produced by the IETF within the scope of SIP, SIP Events, SDP and other protocols. Where this is not possible, extensions to SIP are defined within the present document. The document has therefore been structured in order to allow both forms of specification.

The present document includes information applicable to network operators, service providers and manufacturers.

Editor's note: Agreed material is held in this TR for an interim period of time, and the material transferred into release 6 versions of 23.218, 24.228 and 24.229 at a later time. This has the advantage that:

It creates a location where the material may stabilise outside a document under CR control, thus fulfilling the function of the original annexes in the IN CN subsystem documents.

It avoids the need to create release 6 mirror CRs for all release 5 changes to the IM CN subsystem.

This TR will not be published.

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: "3G Vocabulary".

[2] 3GPP TS 22.228: " Service requirements for the Internet Protocol (IP) multimedia core network subsystem; Stage 1".

[3] 3GPP TS 23.218: "IP Multimedia (IM) Session Handling; IP Multimedia (IM) call model; Stage 2".

[4] 3GPP TS 24.228: "Signalling flows for the IP multimedia call control based on SIP and SDP; Stage 3".

[5] 3GPP TS 24.229: "IP Multimedia Call Control Protocol based on SIP and SDP; Stage 3".

[6] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".

[7] RFC 3261 (March 2002): "SIP: Session Initiation Protocol".

[8] draft-ietf-sipping-conferencing-framework-00 (May 2003): "A Framework for Conferencing with the Session Initiation Protocol"

Editor's note: The above document cannot be formally referenced until it is published as an RFC. ~~3 Definitions, symbols and abbreviations~~

[9] draft-ietf-sipping-cc-conferencing-01 (June 2003): "Session Initiation Protocol Call Control – Conferencing for User Agents"

Editor's note: The reference to this draft may become obsolete in the future if IETF moves all the material, that is required for the description of IMS conferencing, to 3GPP TS 24.147

[10] RFC 3265 (March 2002): "Session Initiation Protocol Specific Event Notification".

[11] draft-ietf-sipping-conference-package-00 (June 2003): "A Session Initiation Protocol (SIP) Event Package for Conference State"

Editor's note: The reference to this draft may become obsolete in the future if IETF moves all the material, that is required for the description of IMS conferencing, to 3GPP TS 24.147

[12] 3GPP TS 29.228: "IP Multimedia (IM) Subsystem Cx Interface; Signalling flows and message contents".

[13] RFC 3323 (May 2002): "A Privacy Mechanism for the Session Initiation Protocol (SIP)".

[14] RFC 3325 (May 2002): "Extensions to the Session Initiation Protocol (SIP) for Network Asserted Identity within Trusted Networks".

[15] 3GPP TS 29.208: " End to end quality of Service (QoS) signaling flows".

[16] RFC 2833 (May 2000): " RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals"

[17] RFC 3515 (April 2003): "The Session Initiation Protocol (SIP) REFER Method"

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply.

For the purposes of the present document, the terms and definitions defined in 3GPP TS 21.905 [1] and 3GPP TS 22.141 [2] apply.

Conferencing AS: an Application Server that supports functionality specific to a SIP conference focus.

The following terms and definitions given in 3GPP TS 23.228 [2] apply (unless otherwise specified)

Public Service Identity

Three-way session The following terms and definitions given in draft-ietf-sipping-conferencing-framework-00 [8] apply (unless otherwise specified)

Conference

Conference-Aware Participant

Conference Notification Service

Conference Policy

Conference Policy Control Protocol

Conference Policy Server

Conference-Unaware Participant

Conference URI

Focus

Media Policy

Media policy server

Membership Policy

Mixer

Participant

Tightly Coupled Conference

The following terms and definitions given in draft-ietf-sipping-cc-conferencing-01 [9] apply (unless otherwise specified)

Conference Factory URI

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AMR	Adaptive Multi-Rate
AS	Application Server
CN	Core Network
CSCF	Call Session Control Function
CPCP	Conference Policy Control Protocol
FQDN	Fully Qualified Domain Name
HSS	Home Subscriber Server
I-CSCF	Interrogating CSCF
IM	IP Multimedia
IMS	IP Multimedia CN subsystem
IP	Internet Protocol
MGCF	Media Gateway Control Function
MRFC	Multimedia Resource Function Controller
MRFP	Multimedia Resource Function Processor
P-CSCF	Proxy CSCF
PSI	Public Service Identity
S-CSCF	Serving CSCF

SDP	Session Description Protocol
SIP	Session Initiation Protocol
UE	User Equipment

4 Conference service overview

Editor's note: This is an introductory ~~sub~~clause to the TR and is not intended to be introduced to any other 3GPP Specification.

The basic services for the IP Multimedia core network Subsystem (IMS), as defined in 3GPP TS 24.229 [5], allow a user to initiate, modify and terminate media sessions based on the Session Initiation Protocol, as defined in RFC 3261 [7]. Although these basic mechanisms already allow multi party calls, more sophisticated services for communication between multiple parties can be made available by the network.

The conferencing service provides the means for a user to create, manage, terminate, join and leave conferences, which are handled by a server within a home network of the conference creator. It also provides the network with the ability to give information about these conferences to the involved parties. Participants to conferences may be internal or external to the home network.

The network operator or the user may apply membership and media policies to a conference by using a conference policy control protocol.

Conferencing applies to any kind of media stream by which users may want to communicate, this includes e.g. audio and video media streams as well as instant message based conferences or gaming. Floor control, as part of the conferencing service offers control of shared conference resources at the MRFP.

The framework for SIP conferences is specified in draft-ietf-sipping-conferencing-framework-00.txt [8].

The architecture for the 3GPP conference service is specified in 3GPP TS 23.228 [6] and 3GPP TS 23.218 [3].

The present document specifies SIP and SDP protocols to realize 3GPP conference service based on the protocols specified by the IETF defined conference service as per RFCs and Internet Drafts listed in clause 2: reference. However, since the IETF conference service has various scenarios and features as described in draft-ietf-sipping-conferencing-framework-00[8], 3GPP conference service is a subset of the above IETF defined conference service. 3GPP conference service has the following characteristics as shown below;

- Loosely coupled conferencing is outside the scope of this release.
- Focus, Conference policy server , Media policy server and Mixer are colocated in a AS/MRFC in this release.

5 Protocol using SIP and SIP events for conferencing

5.1 Introduction

5.2 Functional entities

5.2.1 User Equipment (UE)

For the purpose of SIP based conferences, the UE shall implement the role of a Conference participant as described in subclause 5.3.1.

5.2.2 Media Resource Function Controller (MRFC)

As the function split between the MRFC and the conferencing AS is out of scope of this document, the procedures for the MRFC are described together with those for the conferencing AS in subclause 5.2.2.

For the purpose of SIP based conferences, the MRFC shall regard the MRFP as a mixer, as described in draft-ietf-sipping-conferencing-framework-00.txt [8] and draft-ietf-sipping-cc-conferencing-01 [9].

5.2.3 Conferencing Application Server (AS)

The conferencing AS may include MRFC functionality. As the function split between the conferencing AS and the MRFC is out of scope of this specification, only the procedures related to the conferencing AS are described here.

For the purpose of SIP based conferences, the conferencing AS shall act as a conference focus, as described in subclause 5.3.2 and as a conference notification service, as described in subclause 5.3.3. The conferencing AS may act as a conference participant as described in section 5.3.1.

5.2.4 Media Gateway Control Function (MGCF)

For the purpose of SIP based conference, the MGCF shall implement the role of conference participant as described in clause 5.3.1.

5.3 Role

5.3.1 Conference Participant

5.3.1.2 Tightly coupled conferences

The conference participant shall be able to act as a subscriber to the conferencing event package, as described in draft-ietf-sipping-conference-package-00 [11].

5.3.1.3 Conference creation

5.3.1.3.1 General

The conference participant shall make use of the procedures for session establishment as described in subclause 5.1.2A and subclause 5.1.3 of 24.229 [5] when creating conferences.

5.3.1.3.2 Conference creation with a conference factory URI

Upon a request to create a conference with a conference factory URI, the conference participant shall

1) generate an initial INVITE request in accordance with section 5.1.3.1 of 24.229 [5]; and

2) set the request URI of the INVITE request to the conference factory URI.

On receiving a 200 (OK) response to the INVITE request with the "isfocus" option tag indicated in Contact header, the conference participant shall store the content of the received Contact header as the conference URI. In addition to this, the conference participant may subscribe to the conference state event package as described in draft-ietf-sipping-conference-package-00 [11] by using the stored conference URI.

NOTE: A conference participant can decide not to subscribe to the registration state event package for conferences with a large number of attendees, due to, e.g., the signalling traffic caused by the notifications about users joining or leaving the conference.

5.3.1.3.3 Three-way session creation

When a conference participant is participating in two or more SIP sessions and wants to join together two or more of these active sessions to a so-called three-way session, the conference participant shall perform the following steps

1) create a conference at the conference focus by sending an INVITE request with the conference factory URI for the three-way session towards the conference focus;

Editor's Note: It is currently not possible to make the conference participant automatically aware of a conference-factory URI. For automated ad-hoc conferences such a mechanism is needed anyway. Therefore a reference should be added here, when the mechanism for ad-hoc conference creation is described within this document at a later point in time.

2) decide and perform for each of the active sessions, that are requested to be joined to the three-way session, how the remote user shall be invited to the three-way session, which can either be:

   a) by performing the procedures for inviting a user to a conference by sending an REFER request to the user, as described in subclause 5.3.1.5.2; or

   b) by performing the procedures for inviting a user to a conference by sending a REFER request to the conference focus, as described in subclause 5.3.1.5.3;

3) release the active session with a user, by applying the procedures for session release in accordance with RFC 3261 [7], after a NOTIFY request has been received from that user, indicating that the user has successfully joined the three-way session, i.e. including:

   a) a body of content-type "message/sipfrag" that indicates a "200 OK" response; and,

   b) a Subscription-State header set to the value "terminated"; and,

4) treat the created three-way session as a normal conference, i.e. shall apply the applicable procedures of subclause 5.3.1 for it.

5.3.1.4 Joining a conference

5.3.1.4.1 User joining a conference by using a conference URI

Upon generating an initial INVITE request to join a conference for which the conference URI is known to the conference participant, the conference participant shall

1) set the request URI of the INVITE request to the conference URI.

2) send the INVITE request towards the conferencing AS that is hosting the conference.

NOTE 1: The initial INVITE request is generated in accordance with 3GPP TS 24.229 [5]; and,

NOTE 2: The mechanisms by which the conference participant / user gets aware of the conference URI are outside the scope of this specification.

On receiving a 200 (OK) response to the INVITE request with the "isfocus" option tag indicated in Contact header, the conference participant shall store the contents of the received Contact header as the conference URI. In addition to that the conference participant may subscribe to the conference state event package as described in draft-ietf-sipping-conference-package-00 [11] by using the stored conference URI.

NOTE 3: A conference participant can decide not to subscribe to the registration state event package for conferences with a large number of attendees, due to the signalling traffic caused by the notifications about e.g. users joining or leaving the conference.

5.3.1.4.2 User joining a conference after receipt of a REFER request

Upon receipt of a REFER request that includes a Refer-To header which includes

- the "isfocus" parameter; and

- the "method" parameter set to INVITE;

the conference participant shall:

1) handle the REFER request in accordance with RFC 3515 [17]; and,

2) perform the actions as described in subclause 5.3.1.4.1 for a user joining a conference.

5.3.1.5 Inviting other users to a conference

5.3.1.5.1 General

Upon inviting another user to a conference, the conference participant has to decide which of the following procedures has to be applied:

1) inviting an user to a conference by sending a REFER request to the user directly, as described in subclause 5.3.1.5.2; or

2) inviting a user to a conference by sending a REFER request to the conference focus, as described in subclause 5.3.1.5.3.

Editor's Note: There might be several more possibilities to perform invitation of another user to a conference, which might be based on the functionality of the conference policy control protocol (CPCP). These possibilities need to be listed here as further alternatives.

Editor's Note: It needs to be stated that REFER methods sent directly from the conference participant to the conference AS or to other users put a lot of load to the air interface, due to the responses and the two subsequent NOTIFY messages. The CPCP related procedures – when introduced – will give a possibility for the conference participant to invite other users to a conference by other means than sending a REFER method that put less load to the air interface.

It is out of the scope of this specification, how the UE decides which of the above procedures shall be applied.

5.3.1.5.2 User invites other user to a conference by sending a REFER request to the other user

Upon generating a REFER request that is destined to a user in order to invite that user to a specific conference, the conference participant shall:

1) set the request URI of the REFER request to the address of the user who is invited to the conference;

2) set the Refer-To header of the REFER request to the conference URI of the conference that the other user shall be invited to, including

   a) the "isfocus" parameter; and

   b) the "method" parameter set to "INVITE"; and

NOTE: Other headers of the REFER request will be set in accordance with 3GPP TS 24.229 [5].

3) send the REFER request towards the user who is invited to the conference.

Afterwards the UE shall treat incoming NOTIFY requests that are related to the previously sent REFER request in accordance with RFC 3515 [17] and may indicate the received information to the user.

5.3.1.5.3 User invites other user to a conference by sending a REFER request to the conferencing AS

Upon generating a REFER request that is destined to the conferencing AS in order to invite another user to a specific conference, the conference participant shall:

1) set the request URI of the REFER request to the conference URI to which the user is invited to;

2) set the Refer-To header of the REFER request to the SIP URI or tel URL of the user who is invited to the conference;

3) include the "method" parameter with the value "INVITE" in the Refer-To header;

NOTE: Other headers of the REFER request will be set in accordance with 3GPP TS 24.229 [5].

4) send the REFER request towards the conference focus that is hosting the conference.

Afterwards the UE shall treat incoming NOTIFY requests that are related to the previously sent REFER request in accordance with RFC 3515 [17].

5.3.2 Conference Focus

5.3.2.1 General

5.3.2.2 Generic procedures for all conference related methods at the conference focus

5.3.2.2.1 Conference Focus originating case

Editor's Note: This section shall include generic handling of requests that are generated by the conference focus due to IMS conferencing.

5.3.2.2.2 Conference Focus terminating case

Upon receipt of a conference related initial request the conference focus shall:

1) store the value of the icid parameter received in the P-Charging-Vector header;

2) store the value of the orig-ioi parameter received in the P-Charging-Vector header. The orig-ioi parameter identifies the sending network of the request message; and

3) store the values received in the P-Charging-Function-Addresses header, if received.

When creating the first response for this initial request, the conference focus shall

1) include the P-Charging-Vector header including

   a) the value of the icid parameter as received in the initial request;

   b) the value of the orig-ioi parameter as received in the initial request; and

   c) the term-ioi parameter, indicating the network of the conference focus; and

2) include the P-Charging-Function-Addresses header as received in the initial request or, if the P-Charging-Function-Addresses header was not received in the initial request, indicate the values applicable for the conference in the P-Charging-Function-Addresses header.

When creating responses for an initial INVITE request, the conference focus shall additionally send the 200 (OK) response to the initial INVITE request only after the resource reservation has been completed.

5.3.2.3 Conference creation

5.3.2.3.1 Conference creation with a conference factory URI

Upon receipt of an INVITE request that includes a conference factory URI in the request URI, the conference focus shall

1) check if the conference factory URI is allocated and perform the actions described in subclause 5.3.2.3.2 if it is not allocated;

2) perform the actions described in subclause 9.2.1. The following actions shall only be performed if the request can be authorized;

;

3) allocate a conference URI and may allocate a temporary conference URI;

4) if "preconditions" were indicated as required in the INVITE request, generate a first provisional response to the INVITE request, indicating the temporary conference URI in the Contact header if allocated, else the conference URI; and

5) request resources for the conference from the conference mixer;

Upon receipt of an indication from the conference mixer that conference resources have been through-connected, the conference focus shall generate a 200 (OK) response to the INVITE request, indicating

a) the conference URI in the Contact header; and

b) the "isfocus" option tag as a parameter to the conference URI in the Contact header; and

5.3.2.3.2 Abnormal cases

Upon receipt of an INVITE request that includes a conference factory URI in the request URI, that is not allocated at the conference focus, the conference focus shall return a 604 (Does Not Exist Anywhere) response.

NOTE: The mechanism by which the conference focus gets aware whether a URI is a conference factory URI is out of the scope of this specification. One possibility would be that an operator uses a specific user part (e.g. conference-factory@home1.net) or host part (e.g. conference-factory.home1.net) for identification of conference factory URIs.

5.3.2.4 User joining a conference

5.3.2.4.1 User joining a conference by using a conference URI

Upon receipt of an INVITE request that includes a conference URI in the request URI, the conference focus shall:

1) check if the conference URI is allocated. If the conference URI is not allocated, the conference focus shall perform the actions as described in subclause 5.3.2.4.2;

2) perform the actions described in subclause 9.2.1. The following actions shall only be performed if the request can be authorized;

3) generate a provisional response to the INVITE request, indicating the conference URI in the Contact header; and

4) request resources for the conference from the conference mixer.

Upon receipt of an indication from the conference mixer that conference resources have been through-connected, the conference mixer shall

1) generate a 200 (OK) response to the INVITE request, indicating

   a) the conference URI in the Contact header; and

   b) the "isfocus" option tag as a parameter to the conference URI in the Contact header; and

2) forward the request in accordance with the routing procedures of RFC 3261 [7].

5.3.2.4.2 Abnormal cases

Upon receipt of an INVITE request that includes in the request URI a conference URI, that is not allocated at the conference focus, the conference focus shall return a 604 (Does Not Exist Anywhere) response.

5.3.2.5 Invitation of users to a conference

5.3.2.5.1 General

The conference focus can invite users to a conference by sending an INVITE request to the user, as described in subclause 5.3.3.5.3. This procedure will be triggered at the conference focus

   1) either by the conference policy for the conference hosted at the conference focus; or

2) by a REFER request received from authorized users, that request the conference focus to invite other users to the conferece, as described in subclause 5.3.3.5.2.

5.3.3.5.2 Request from a user to invite another user to a conference

Upon receipt of an REFER request that includes

- a conference URI in the request URI; and,
- a Refer-To header including:
  - a valid SIP URI or tel URL; and,
  - the "method" parameter set to "INVITE";

the conference focus shall:

1) check if the conference URI is allocated. If the conference URI is not allocated, the conference shall perform the actions as described in subclause 5.3.2.3.2 for the INVITE request;
2) perform the actions described in subclause 9.2.1. The following actions shall only be performed if the request can be authorized;
3) generate a final response to the REFER request in accordance with RFC 3515 [17];
4) invite the user indicated in the Refer-To header by performing the procedures as described in subclause 5.3.3.5.3; and,
5) based on the progress of this invitation, send NOTIFY messages in accordance with the procedures of RFC 3515 [17] towards the user who sent the REFER request.

5.3.3.5.3 Inviting a user to a conference by sending a INVITE request

When generating an INVITE request in order to invite a user to a specific conference, the conference foucs shall:

1) set the request URI of the INVITE request to the address of the user who is invited to the conference;
2) set the P-Asserted-Identity header of the INVITE request to the conference URI of the conference that the user shall be invited to;
3) set the Contact header of the INVITE request to the conference URI of the conference that the user shall be invited to, including the "isfocus" parameter;
4) request the resources required for the new user from the conference focus; and
5) send the INVITE request towards the user who is invited to the conference.

NOTE: Requests are generated in accordance with 3GPP TS 24.229 [5].

Afterwards the conference focus shall proceed the session establishment as described in 3GPP TS 24.229 [5].

5.3.3.5.4 Abnormal cases

Upon receipt of a REFER request that includes in the request URI a conference URI, that is not allocated at the conference focus, the conference foucs shall return a 604 (Does Not Exist Anywhere) response.

5.3.3 Conference Notification Service

5.3.3.1 General

Editor's Note: This subclause includes general information about the conference notification service

5.3.3.1 Subscription to conference state event package

5.3.3.1.1 User subscribes to the conference state event package

Upon receipt of a SUBSCRIBE request that includes a conference URI in the request URI and the "conf" tag in the Event header, the conference notification service shall

1) check if the conference URI is allocated and perform the actions described in subclause 5.3.3.1.2 if it is not allocated;

2) perform the actions described in subclause 9.2.1. The following actions shall only be performed if the request can be authorized; and

3) establish the subscription to the conference state event information as described in RFC 3265 [10] and draft-ietf-sipping-conference-package-00 [11].

5.3.3.1.2 Abnormal cases

Upon receipt of an SUBSCRIBE request that includes a conference URI in the request URI, that is not allocated at the conference focus, the conference notification service shall return a 604 (Does Not Exist Anywhere) response.

6 Protocol using SDP for conferencing

6.1 Introduction

6.2 Functional entities

6.2.1 User Equipment (UE)

For the purpose of SIP based conferences, the UE shall implement the role of a conference participant as described in subclause 6.3.1.

6.2.2 Media Resource Function Controller (MRFC)

As the function split between the MRFC and the conferencing AS is out of scope of this document, the procedures for the MRFC are described together with those for the conferencing AS in subclause 5.2.2.

6.2.3 Conferencing Application Server (Conferencing AS)

The conferencing AS may include MRFC functionality. As the function split between the conferencing AS and the MRFC is out of scope of this specification, only the procedures related to the conferencing AS are described here.

For the purpose of SIP based conferences, the conferencing AS shall act as a conference focus, as described in subclause 6.3.2. The conferencing AS may act as a conference Participant as described in section 5.3.1.

6.2.4 Media Gateway Control Function (MGCF)

The MGCF implements the role of conference participant (see clause 6.3.1),

6.3 Role

6.3.1 Conference participant

Editor's Note: It is not expected that there are specific procedures for SDP usage at the conference participant for IMS conferencing.

6.3.2 Conference Focus

When the conference focus receives any SIP request or response containing SDP, the conference focus shall examine the media parameters in the received SDP.

Provided that the INVITE request received by the conference focus contains an SDP offer including one or more "m=" media descriptions, the SDP answer shall

- reflect the media capabilities and policies as available for the conference; and
- contain a request confirmation for the result of the resource reservation at the originating end point for every "m=" media line if preconditions were required by the originator.

During session establishment procedure for a conference, SIP messages shall only contain SDP payload if that is intended to modify the session description.

For "video" and "audio" media types that utilize the RTP/RTCP, the conference focus shall specify the proposed bandwidth for each media stream utilizing the "b=" media descriptor in the SDP. For other media streams the "b=" media descriptor may be included. The value or absence of the "b=" parameter will affect the assigned QoS which is defined in 3GPP TS 29.208 [15].

The conference focus shall include the DTMF media format at the end of the "m=" media descriptor in the SDP for audio media flows that support both audio codec and DTMF payloads in RTP packets as described in RFC 2833 [16].

Upon receipt of a SDP answer or sending a SDP answer that changes the resource requirements for the conference, the conference focus shall provide the corresponding changes of conference resources.

Upon receipt of a SDP offer during conference creation, that confirms that the conference participant has reserved the required resources, the conference focus shall through-connect the conference resources.

7 Protocol for conference policy control at the Ut reference point

Editor's Note: This clause holds material concerning the Conference Policy Control Protocol (CPCP).

Editor's note: The work on conference policy control is related to the work under the work item for IMS group management, WID: 11036, and the decision is to be made on contributed text as in which document it will appear.

7.1 Introduction

Editor's note: No material currently in 29.847 for this clause

7.2 Functional entities

7.2.1 User Equipment (UE)

7.2.1 Conferencing Application Server (Conferencing AS)

7.3 Role

8 Protocol for floor control for conferencing at the Ut reference point

Editor's Note: This clause holds material on concerning floor control for IMS based conferences. As it is currently suggested to implement floor control for SIP based conferences by using the Simple Object Access Protocol (SOAP), information concerning SOAP (or other protocols used for floor control purposes) should be in this extra clause.

8.1 Introduction

8.2 Functional entities

8.2.1 User Equipment (UE)

8.2.1 Conferencing Application Server (Conferencing AS)

8.3 Role

9 Identified material for 3GPP documents other than 3GPP TS 24.147

Editor's Note: Thisclause holds material that has to be moved to 3GPP documentation other than 3GPP TS 24.147.

9.1 General

Editor's Note: Text needs to be added that clarifies, that the text in clause 9 needs to be aligned with the text of the document it finally gets shifted to. The text introduced here initially will be written specifically for the conference functionality.

Editor's Note: References within other subclauses to the material in clause 9 needs to be updated accordingly.

9.2 Material identified for 3GPP TS 24.229

9.2.1 Conference participant identity verification and request authorization

Editor's Note: This section shall be kept in-line with the section in the presence TR 29.841, that describes watcher identity verification and request authorization.

9.2.1.1 Conference participant identify verification at the conference focus

When the conference user receives an initial request from a conference participant who is either

a) creating a conference;

b) joining a conference;

c) inviting another user to a conference; or

d) subscribing to the conference event state of a conference;

the conference focus shall attempt to verify the identity of the conference participant prior to authorizing the conference participants request according to the procedures described in subclause 9.2.1.2.

When the conference focus receives an initial request that does not contain credentials, the conference focus shall:

NOTE: Mechanisms for transporting the credentials can include, among others, P-Asserted-Identity, Authorization header, digital signatures, S/MIME body, etc.

a) if a Privacy header is present in the initial request and the Privacy header value is set to "id" or "user", then the conference participant and the request are considered as anonymous, and no further actions are required. The conference focus shall continue with authorizing the users request according to the procedures described in 9.2.1.2;

b) if there is no Privacy header present in the initial request, or if the Privacy header contains a value other than "id" or "user", then the conference foucs shall check for the presence of a P-Asserted-Identity header in the initial request. Two cases exists:

   i) the initial request contains a P-Asserted-Identity header. This is typically the case when the user is located inside a trusted domain as defined by 3GPP TS 24.229 [5] subclause 4.4. In this case, the conference focus is aware of the identity of the conference participant and no extra actions are needed. The conference focus shall continue with authorization of the request according to the procedures described in 9.2.1.2;

   ii) the initial request does not contain a P-Asserted-Identity header. This is typically the case when the user is located outside a trusted domain as defined by 3GPP TS 24.229 [5] subclause 4.4. In this case, the conference focus does not have a verified identity of the conference participant. The conference focus shall check the From header of the initial request. If the From header value in the initial request is set to "Anonymous", then the conference participant and the request are considered as anonymous and no further actions are required. If the From header value does not indicate anonymity, then the conference focus shall challenge the conference participant by issuing a 401 (Unauthorized) response including a challenge as per procedures described in RFC 3261 [7].

When the conference focus receives an initial request that contains credentials but it does not contain a P-Asserted-Identity the conference focus shall check the correctness of the credentials. If the credentials are correct, then the conference focus shall consider the identity of the conference participant verified, and the conference focus shall continue with authorizing the conference participants request according to the procedures described in 9.2.1.2.

If the credentials are not correct, the conference focus may either re-challenge the conference participant (up to a predetermined maximum number of times predefined in the conference focus configuration data), or consider the conference participant as anonymous. If the conference participant is considered anonymous, the conference focus shall continue with the request authorization procedures described in subclause 9.2.1.2.

Editor's Note: It needs to be investigated whether the *maximum number of times predefined in the conference focus configuration data* creates a potential denial of service attack, as it requires the conference focus to keep states between different authentications trials.

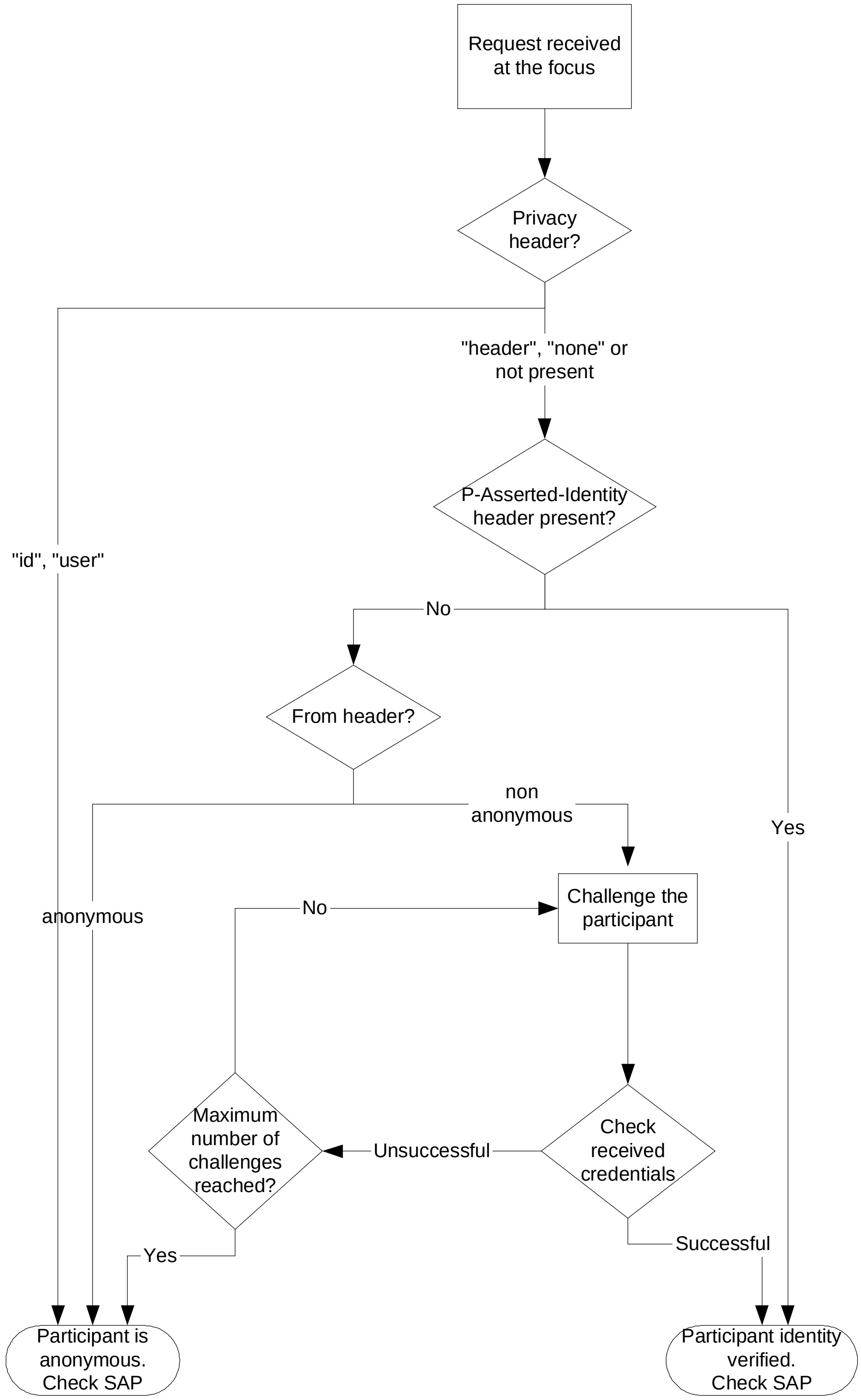


Figure 9.2.1-1: Conference participant identity verification flow at the conference foucs

9.2.1.2 Authorization of a request

Requests received by the conference focus from a conference participant can be for one of the following conference related functionalities:

a) request for conference creation

b) request for joining a conference;

c) request for inviting another user to the conference; or

d) request for subscription to the conference event state.

Depending on the requested functionality, the conference focus has to perform specific actions after the request was authorized or not. This subclause only describes the authorization of a request, the actions to be taken if the authorization succeeds are described in

a) subclause 5.3.2.3 for conference creation;

b) subclause 5.3.2.4 for joining a conference;

c) subclause 5.3.2.5 for inviting another user to a conference; or

d) subclause 5.3.3.1 for subscription to the conference event state.

Once the conference focus has tried to verify the identity of the conference participant (see subclause 9.2.1.1), the conference focus either has a verified identity of the conference participant or it considers the conference participant as anonymous.

If the conference participant is considered anonymous, the conference focus shall check if the policy of the conference allows an anonymous request for the requested functionality. If the conference policy allows anonymous requests for the requested functionality then the conference focus shall perform the requested functionality, otherwise it shall not.

If the conference participant is identified by an identity, the conference focus shall apply the conference authorization policy of the conference to detect whether the particular conference participant is allowed to perform the requested functionality for the specific conference. The conference authorization policy can include the verified identity as a possible conference participant. In this case the conference focus shall perform the requested functionality.

If the requested functionality is performed, the conference focus shall return a 200 (OK) response to the conference participant.

If the requested functionality cannot be performed, the conference focus shall either:

- reject the request according to the procedures of RFC 3261 [7] and RFC 3265 [10] e.g., by issuing a 403 (Forbidden) response.

- if the conference authorization policy dictates it, do a polite blocking (as defined in 3GPP TS 22.141 [7.53]) by sending a 200 (OK) response.

Annex A (informative): Example signalling flows of conferencing operation

A.1 Scope of signalling flows

This annex gives examples of signalling flows for conferencing within the IP Multimedia CN Subsystem (IMS) based on the Session Initiation Protocol (SIP), SIP Events, the Session Description Protocol (SDP) and other protocols.

These signalling flows provide detailed signalling flows, which expand on the overview information flows provided in 3GPP TS 23.228 [6].

A.2 Introduction

This subclause breaks down the signalling flows for establishing sessions into a number of individual procedures, following the same principles as 3GPP TS 23.228 [3] subclause 5.4.9.

For the purposes of this document, a further breakdown has been necessary, and therefore a number of signalling flows have been given an (a) or (b) suffix, so that the signalling flows for establishing sessions where configuration independence is applied may be distinguished from those where it is not, e.g.:

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

A.2.1 General

A.2.2 Key required to interpret signalling flows

The key to interpret signalling flows specified in 3GPP TS 24.228 [4] subclause 4.1 applies with the additions specified below.

Editor's note: Additional material yet to be specified.

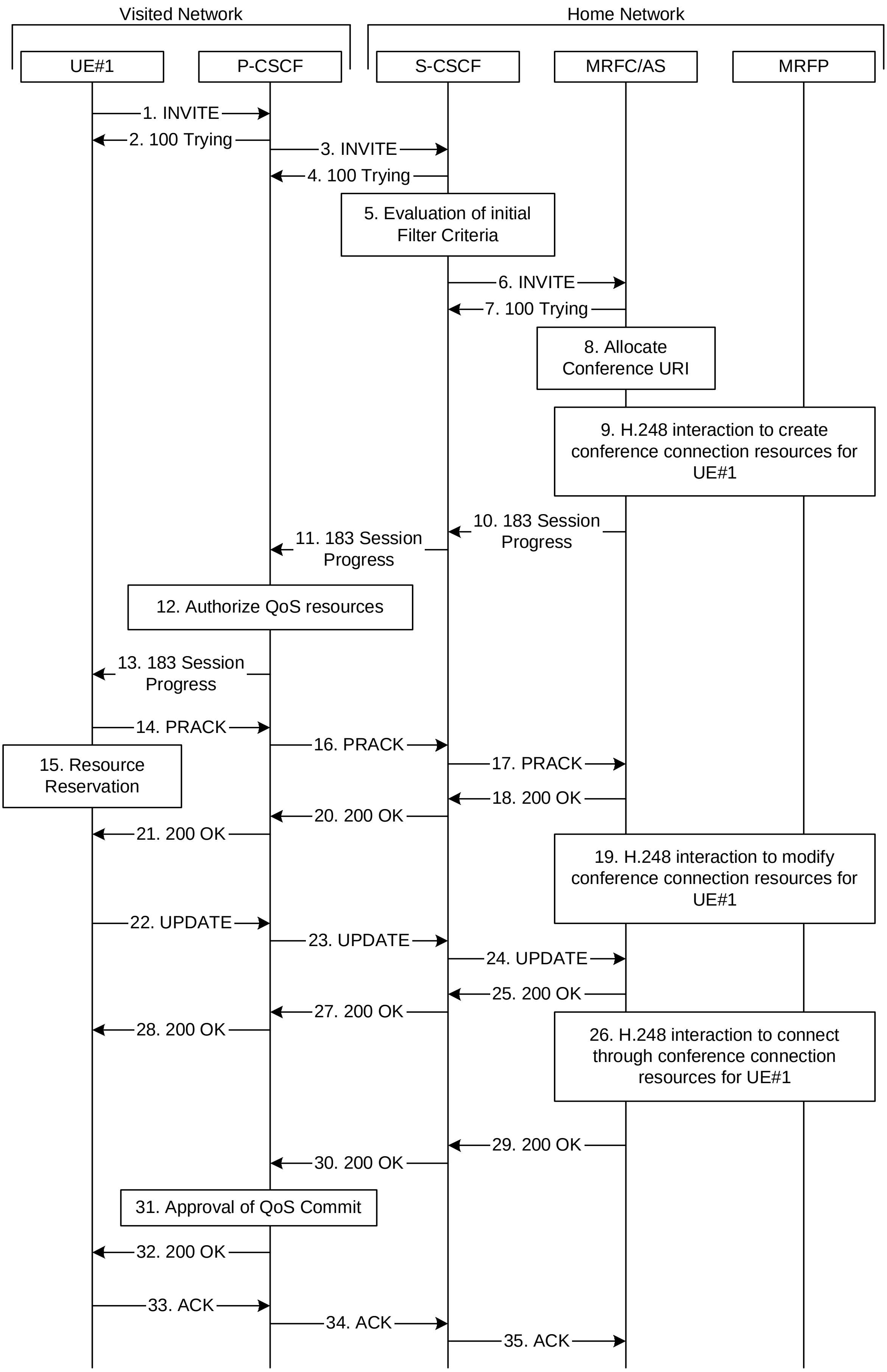
A.3 Flows demonstrating the creation of a conference

A.3.1 Introduction

This subclause covers the flows that show how a user can create conferences at a MRFC/AS.

A.3.2 User automatically creating a conference with a Conference Factory URI

A.3.2.1 User in home network



Visited Network
Home Network
UE#1
P-CSCF
S-CSCF
MRFC/AS
MRFP
1. INVITE
2. 100 Trying
3. INVITE
4. 100 Trying
5. Evaluation of initial Filter Criteria
6. INVITE
7. 100 Trying
8. Allocate Conference URI
9. H.248 interaction to create conference connection resources for UE#1
10. 183 Session Progress
11. 183 Session Progress
12. Authorize QoS resources
13. 183 Session Progress
14. PRACK
15. Resource Reservation
16. PRACK
17. PRACK
18. 200 OK
19. H.248 interaction to modify conference connection resources for UE#1
20. 200 OK
21. 200 OK
22. UPDATE
23. UPDATE
24. UPDATE
25. 200 OK
26. H.248 interaction to connect through conference connection resources for UE#1
27. 200 OK
28. 200 OK
29. 200 OK
30. 200 OK
31. Approval of QoS Commit
32. 200 OK
33. ACK
34. ACK
35. ACK

Figure A.3.2.1-1: User automatically creating a conference with a conference factory URI – User in home network

Figure A.3.2.1-1 shows an IMS user creating a conference by using a conference-factory URI. The conference is created at a MRFC/AS of the users home network.

The details of the flows are as follows:

1. **INVITE (UE to P-CSCF) - see example in table A.3.2.1-1**

   A user agent wants to create a conference. For this purpose the user agent is aware of a conference-factory URI that was obtained by means outside this specification (e.g. due to pre-configuration or via other protocols, such as http)

   The UE determines the complete set of codecs that it is capable of supporting for this conference. It builds a SDP Offer 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 to the P-CSCF.

Table A.3.2.1-1: INVITE (UE to P-CSCF)

```
INVITE sip:conference-factory1@mrfc1.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=171828
To: <sip:conference-factory1@mrfc1.home1.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=87654321; port1=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:MPVMP4V-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 conference factory URI.

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.

To: same as the Request-URI.

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.

2. **100 Trying (P-CSCF to UE) - see example in table A.3.2.1-2**

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

Table A.3.2.1-2: 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 S-CSCF) - see example in table A.3.2.1-3**

   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.

   The P-CSCF examines the media parameters, and does not find any choices that the local policy does not allow.

   The INVITE request is forwarded to the S-CSCF.

Table A.3.2.1-3: INVITE (P-CSCF to S-CSCF)

```
INVITE sip:conference-factory1@mrfc1.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.visited1.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:
Require: precondition
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=
```

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.

4. **100 Trying (S-CSCF to P-CSCF) - see example in table A.3.2.1-4**

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

Table A.3.2.1-4: 100 Trying (S-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: 0
```

5. **Evaluation of initial filter criteria**

   S-CSCF validates the service profile of this subscriber and evaluates the initial filter criteria.

6. **INVITE (S-CSCF to MRFC/AS) - see example in table A.3.2.1-6**

   S-CSCF examines the media parameters based on the network operators policy. For this example, assume the subscriber is allowed requested parameters.

   S-CSCF forwards the INVITE request to the MRFC/AS that is indicated in the host part of the request URI. The S-CSCF does not re-write the request URI.

Table A.3.2.1-6: INVITE request (S-CSCF to MRFC/AS)

```
INVITE sip:conference-factory1@mrfc1.home1.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:+358-50-4821437>
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=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
```

P-Asserted-Identity: The S-CSCF inserts the corresponding TEL URL to the P-Asserted-Identity header.

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

7. **100 Trying (MRFC/AS to S-CSCF) - see example in table A.3.2.1-7 (related to table A.3.2.1-6)**

   MRFC/AS responds to the INVITE request (6) with a 100 Trying provisional response.

Table A.3.2.1-7: 100 Trying (MRFC/AS 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
```

8. **Allocate Conference URI**

   MRFC/AS allocates a conference URI, based on local information and information gained from the conference-factory URI, as well as information gained from other elements of the SIP signalling.

9. **H.248 interaction to Create Connection**

   MRFC initiates a H.248 interaction to create an IMS connection point for UE#1 in MRFP and to determine media capabilities of MRFP.

10. **183 Session Progress (MRFC/AS to S-CSCF) - see example in table A.3.2.1-13 (related to table A.3.2.1-6)**

    The MRFC determines the complete set of codecs that it is capable of supporting for this conference. It determines the intersection with those appearing in the SDP in the INVITE request.

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

Table A.3.2.1-10: 183 Session Progress (MRFC/AS 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.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity: "Conference Server" <sip:mrfc1.home1.net>
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy: none
From:
To: <sip:conference-factory1@mrfc1.home1.net>; tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:lmaa234269@mrfc1.home1.net >
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::aaa:bbb:ccc:ddd
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
```

To: a tag is added to the To header.

Contact: contains the IP address or FQDN of the MRFC/AS and a temporary identifier of the conference being created in the user part. The URI for the allocated conference is not indicated yet.

SDP: contains the set of codecs supported by the MRFC. It requests confirmation of the QoS preconditions for establishing the session.

P-Charging-Vector: The MRFC/AS inserts this header and populates the icid parameters with a unique value.

11. **183 Session Progress (S-CSCF to P-CSCF) - see example in table A.3.2.1-11**

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

Table A.3.2.1-11: 183 Session Progress (S-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:
P-Asserted-Identity:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net;
   term-ioi=home1.net
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=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
```

P-Charging-Vector: The S-CSCF inserts the originating and terminating IOI (both are in the home network).

12. **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 (39) based on operator local policy.

13 **183 Session Progress (P-CSCF to UE) – see example in table A.3.2.1-13**

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

Table A.3.2.1-13: 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:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>
P-Asserted-Identity:
Privacy:
P-Media-Authorization:
   0020000100100101706466322e76697369746564322e6e6574000c020139425633303732
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-Media-Authorization: a P-CSCF generated authorization token. This particular example shows a Policy-Element generated by "pdf2.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.

14. **PRACK (UE to P-CSCF) - see example in table A.3.2.1-14**

The UE 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 includes a new SDP offer in the PRACK message sent to the MRFC/AS.

For this example, assume the UE 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 A.3.2.1-14: PRACK (UE to P-CSCF)

```
PRACK sip:lmaa234269@mrfc1.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
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr> From:
   <sip:user1_public1@home1.net>; tag=171828
To: <sip:conference-factory1@mrfc1.home1.net>;tag=314159
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=87654321; port1=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 [5].

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.

15. **Resource Reservation**

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

16. **PRACK (P-CSCF to S-CSCF) – see example in table A.3.2.1-16**

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

Table A.3.2.1-16: PRACK (P-CSCF to S-CSCF)

```
PRACK sip:lmaa234269@mrfc1.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:
Route: <sip:scscf1.home1.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.

17. **PRACK (S-CSCF to MRFC/AS) – see example in table A.3.2.1-17**

S-CSCF forwards the PRACK request to the MRFC/AS.

Table A.3.2.1-17: PRACK (S-CSCF to MRFC/AS)

```
PRACK sip:lmaa234269@mrfc1.home1.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
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

18. **200 OK (MRFC/AS to S-CSCF) – see example in table A.3.2.1-18 (related to table A.3.2.1-17)**

The MRFC/AS acknowledges the PRACK request (17) with a 200 (OK) response.

Table A.3.2.1-18: 200 OK (MRFC/AS to S-CSCF)

```
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: application/sdp
Content-Length: (…)

v=0
o=- 2987933623 2987933624 IN IP6 5555::aaa:bbb:ccc:ddd
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
```

19. **H.248 interaction to Modify Connection**

MRFC initiates a H.248 interaction to modify the connection established in step #9 and instructs MRFP to reserve the IMS multimedia processing resources for UE#1 according to the preceding resource negotiation between the UE#1 and the MRFC.

20. **200 OK (S-CSCF to P-CSCF) - see example in table A.3.2.1-20**

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

Table A.3.2.1-20: 200 OK (S-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-Type:
Content-Length:

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

21. **200 OK (P-CSCF to UE) - see example in table A.3.2.1-21**

P-CSCF forwards the 200 OK response to UE.

Table A.3.2.1-21: 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=
a=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
```

22. **UPDATE (UE to P-CSCF) – see example in table A.3.2.1-22**

    When the resource reservation is completed, UE sends the UPDATE request to the MRFC/AS, via the signalling path established by the INVITE request.

Table A.3.2.1-22: UPDATE (UE to P-CSCF)

```
UPDATE sip:lmaa234269@mrfc1.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:scscf1.home1.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>; tag=171828
To: <sip:conference-factory1@mrfc1.home1.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 129 UPDATE
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=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 0 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 telphone-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.

23. **UPDATE (P-CSCF to S-CSCF) – see example in table A.3.2.1-23**

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 S-CSCF.

Table A.3.2.1-23: UPDATE (P-CSCF to S-CSCF)

```
UPDATE sip:lmaa234269@mrfc1.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:
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>
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=
```

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.

24. **UPDATE (S-CSCF to MRFC/AS) - see example in table A.3.2.1-24**

S-CSCF forwards the UPDATE request to MRFC/AS.

Table A.3.2.1-24: UPDATE (S-CSCF to MRFC/AS)

```
UPDATE sip:lmaa234269@mrfc1.home1.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
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=
```

25. **200 OK (MRFC/ASto S-CSCF) – see example in table A.3.2.1-25 (related to table A.3.2.1-24)**

The MRFC/AS acknowledges the UPDATE request (24) with a 200 OK response.

Table A.3.2.1-25: 200 OK (MRFC/AS to S-CSCF)

```
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: application/sdp
Content-Length: (…)

v=0
o=- 2987933623 2987933625 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 0 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
```

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

26. **H.248 interaction to Modify Connection**

    MRFC initiates a H.248 interaction to connect through the IMS multimedia processing resources for UE#1 in MRFP.

27. **200 OK (S-CSCF to P-CSCF) - see example in table A.3.2.1-27**

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

Table A.3.2.1-27: 200 OK (S-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-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=
```

28. **200 OK (P-CSCF to UE) – see example in table A.3.2.1-28**

P-CSCF forwards the 200 OK response to UE.

Table A.3.2.1-28: 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=
```

29. **200 OK (MRFC/AS to S-CSCF) – see example in table A.3.2.1-29 (related to table A.3.2.1-6)**

After the success modification of the session (26), the MRFC/AS sends a 200 OK final response to the INVITE request (6) to the S-CSCF.

Table A.3.2.1-29: 200 OK (MRFC/AS to S-CSCF)

```
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
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: <sip:conference1@mrfc1.home1.net>:2342;isfocus
Content-Length:0
```

Contact: contains the conference URI for the conference allocated at the MRFC/AS and the isfocus tag.

30. **200 OK (S-CSCF to P-CSCF) – see example in table A.3.2.1-30**

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

Table A.3.2.1-30: 200 OK (S-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:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

31. **Approval of QoS Commit**

The P-CSCF approves the commitment of the QoS resources if it was not approved already in step (12).

32. **200 OK (P-CSCF to UE) – see example in table A.3.2.1-32**

P-CSCF forwards the 200 OK final response to the session originator. UE can start the media flow(s) for this session.

Table A.3.2.1-32: 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:scscf1.home1.net;lr>, <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.

33. **ACK (UE to P-CSCF) – see example in table A.3.2.1-33**

UE starts the media flow for this session, and responds to the 200 OK (32) with an ACK request sent to P-CSCF.

Table A.3.2.1-33: ACK (UE to P-CSCF)

```
ACK sip:conference1@mrfc1.home1.net:2342 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>From:
   <sip:user1_public1@home1.net>; tag=171828
To: <sip:conference-factory1@mrfc1.home1.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
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].

34. **ACK (P-CSCF to S-CSCF) – see example in table A.3.2.1-34**

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

Table A.3.2.1-34: ACK (P-CSCF to S-CSCF)

```
ACK sip:conference1@mrfc1.home1.net:2342 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>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

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

35. **ACK (S-CSCF to MRFC/AS) - see example in table A.3.2.1-35**

S-CSCF forwards the ACK request to the MRFC/AS.

Table A.3.2.1-35: ACK (S-CSCF to MRFC/AS)

```
ACK sip:conference1@mrfc1.home1.net:2342 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
From:
To:
Call-ID:
Cseq:
Content-Length:
```

A.3.2.2 User in different network

Figure A.3.2.2-1 shows an IMS user creating a conference by using a conference-factory URI. The conference is created at a MRFC/AS located in a different network than user’s S-CSCF.

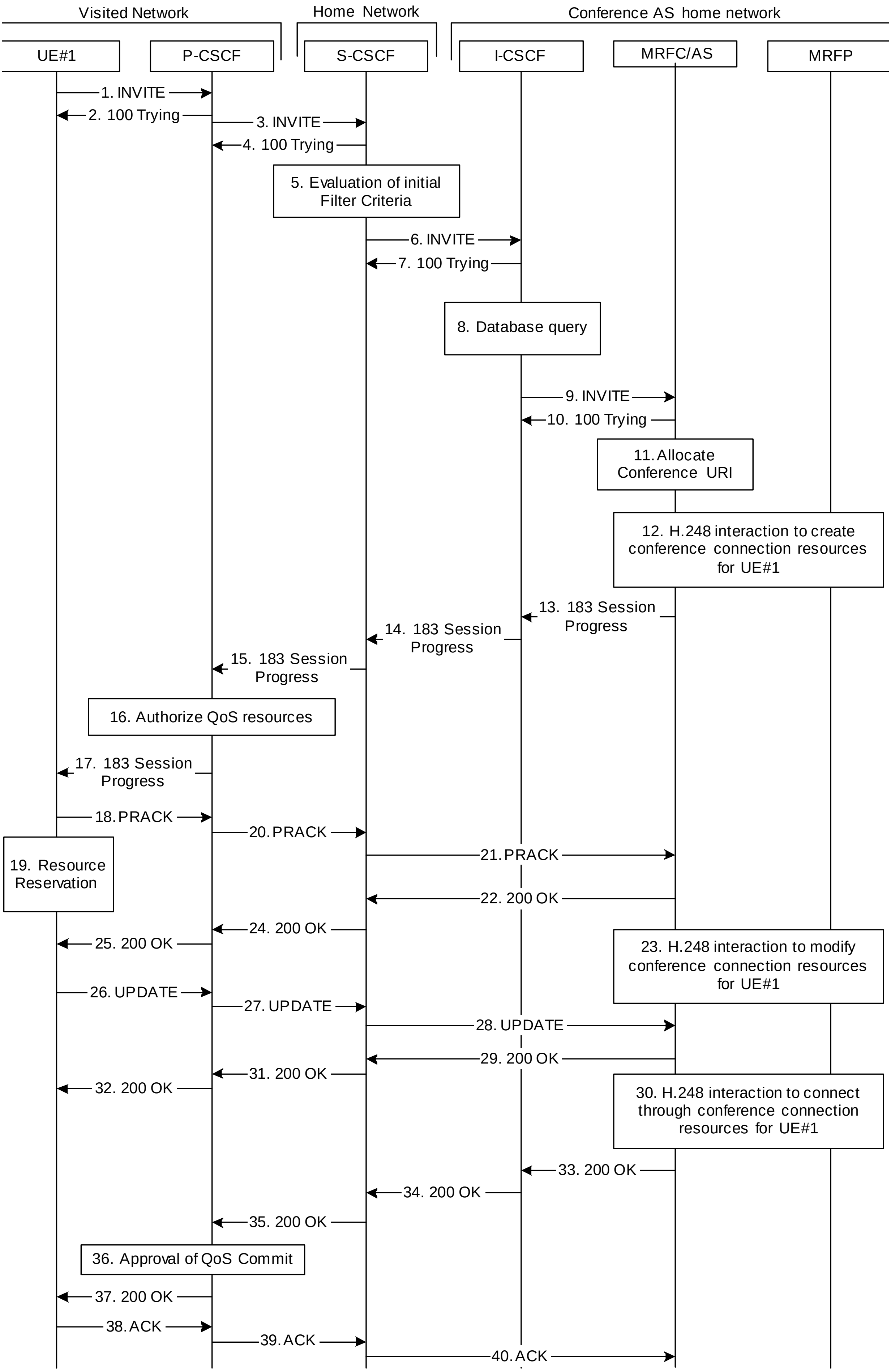

Visited Network
Home Network
Conference AS home network
UE#1
P-CSCF
S-CSCF
I-CSCF
MRFC/AS
MRFP
1. INVITE
2. 100 Trying
3. INVITE
4. 100 Trying
5. Evaluation of initial Filter Criteria
6. INVITE
7. 100 Trying
8. Database query
9. INVITE
10. 100 Trying
11. Allocate Conference URI
12. H.248 interaction to create conference connection resources for UE#1
13. 183 Session Progress
14. 183 Session Progress
15. 183 Session Progress
16. Authorize QoS resources
17. 183 Session Progress
18. PRACK
19. Resource Reservation
20. PRACK
21. PRACK
22. 200 OK
23. H.248 interaction to modify conference connection resources for UE#1
24. 200 OK
25. 200 OK
26. UPDATE
27. UPDATE
28. UPDATE
29. 200 OK
30. H.248 interaction to connect through conference connection resources for UE#1
31. 200 OK
32. 200 OK
33. 200 OK
34. 200 OK
35. 200 OK
36. Approval of QoS Commit
37. 200 OK
38. ACK
39. ACK
40. ACK

Figure A.3.2.2-1: User automatically creating a conference with a conference factory URI – user in different network

The details of the flows are as follows:

1. **INVITE (UE to P-CSCF) - see example in table A.3.2.2-1**

    A user agent wants to create a conference to a MRFC/AS in other network. For this purpose the user agent is aware of a conference-factory URI that was obtained by means outside this specification (e.g. due to pre-configuration or via other protocols, such as http)

    The UE determines the complete set of codecs that it is capable of supporting for this conference. It builds a SDP Offer 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 to the P-CSCF.

Table A.3.2.2-1: INVITE (UE to P-CSCF)

```
INVITE sip:conference-factory@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: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=171828
To: <sip:conference-factory@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=87654321; port1=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:MPVMP4V-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 conference factory URI.

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.

To: same as the Request-URI.

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.

2. **100 Trying (P-CSCF to UE) - see example in table A.3.2.2-2**

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

Table A.3.2.2-2: 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 A.3.2.2-3**

   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.

   The P-CSCF examines the media parameters, and does not find any choices that the local policy does not allow.

   The INVITE request is forwarded to the S-CSCF.

Table A.3.2.2-3: INVITE (P-CSCF to S-CSCF)

```
INVITE sip:conference-factory@home2.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.visited1.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:
Require: precondition
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=
```

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.

4. **100 Trying (S-CSCF to P-CSCF) - see example in table A.3.2.2-4**

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

Table A.3.2.2-4: 100 Trying (S-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: 0
```

5. **Evaluation of initial filter criteria**

   S-CSCF validates the service profile of this subscriber and evaluates the initial filter criteria.

6. **INVITE (S-CSCF to I-CSCF) - see example in table A.3.2.2-6**

   S-CSCF examines the media parameters based on the network operators policy. For this example, assume the subscriber is allowed requested parameters.

   S-CSCF determines the network where the INVITE request should be forwarded. The S-CSCF resolves the I-CSCF as the next hop for this request.

Table A.3.2.2-6: INVITE request (S-CSCF to I-CSCF)

```
INVITE sip:conference-factory@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:+358-50-4821437>
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=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
```

P-Asserted-Identity: The S-CSCF inserts the corresponding TEL URL to the P-Asserted-Identity header.

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

7. **100 Trying (I-CSCF to S-CSCF) - see example in table A.3.2.2-7**

   I-CSCF responds to the INVITE request (6) with a 100 Trying provisional response.

Table A.3.2.2-7: 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.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. **Database query**

I-CSCF resolves the conference-factory URI. In this example the I-CSCF queries a generic database to resolve the MRFC/AS address to be contacted.

Editor's Note: It is still under discussion in SA2, which functional entity will fulfil the database capabilities. This section has to be changed later on, when a decision has been taken on this issue.

9. **INVITE (I-CSCF to MRFC/AS) - see example in table A.3.2.2-9**

I-CSCF forwards the INVITE request to the MRFC/AS. The I-CSCF does not add itself to the Record-Route header since it does not need to stay on the signalling path for subsequent requests.

Table A.3.2.2-9: INVITE request (I-CSCF to MRFC/AS)

```
INVITE sip:conference-factory@home2.net SIP/2.0
Via: SIP/2.0/UDP icscf1.home2.net;branch=z9hG4bK32f432.1, 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
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:
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=
```

10. **100 Trying (MRFC/AS to I-CSCF) - see example in table A.3.2.2-10 (related to table A.3.2.2-9)**

MRFC/AS responds to the INVITE request (6) with a 100 Trying provisional response.

Table A.3.2.2-10: 100 Trying (MRFC/AS to I-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf1.home2.net;branch=z9hG4bK32f432.1, 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
```

11. **Allocate Conference URI**

MRFC/AS allocates a conference URI, based on local information and information gained from the conference-factory URI, as well as information gained from other elements of the SIP signalling.

12. **H.248 interaction to Create Connection**

MRFC initiates a H.248 interaction to create an IMS connection point for UE#1 in MRFP and to determine media capabilities of MRFP.

13. **183 Session Progress (MRFC/AS to I-CSCF) - see example in table A.3.2.2-13 (related to table A.3.2.2-9)**

The MRFC determines the complete set of codecs that it is capable of supporting for this conference. It determines the intersection with those appearing in the SDP in the INVITE request.

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

Table A.3.2.2-13: 183 Session Progress (MRFC/AS to I-CSCF)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP icscf1.home2.net;branch=z9hG4bK32f432.1, 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:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity: "Conference Server" <sip:mrfc1.home2.net>
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: none
From:
To: <sip:conference-factory1@home2.net>; tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:conference1@mrfc1.home2.net;isfocus>
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::aaa:bbb:ccc:ddd
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
```

To: a tag is added to the To header.

Contact: contains the IP address or FQDN of the MRFC/AS and the Request-URI of the conference.

SDP: contains the set of codecs supported by the MRFC. It requests confirmation of the QoS preconditions for establishing the session.

P-Charging-Vector: The MRFC/AS inserts the terminating IOI parameter.

P-Charging-Function-Addresses: The MRFC/AS inserts the P-Charging-Function-Addresses header field to be passed to the I-CSCF.

14. **183 Session Progress (I-CSCF to S-CSCF) - see example in table A.3.2.2-14**

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

Table A.3.2.2-14: 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.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity:
P-Charging-Vector:
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=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
```

15. **183 Session Progress (S-CSCF to P-CSCF) - see example in table A.3.2.2-15**

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

Table A.3.2.2-15: 183 Session Progress (S-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:
P-Asserted-Identity:
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=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
```

16. **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.

17. **183 Session Progress (P-CSCF to UE) – see example in table A.3.2.2-17**

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

Table A.3.2.2-17: 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:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>
P-Asserted-Identity:
Privacy:
P-Media-Authorization:
   0020000100100101706466322e76697369746564322e6e6574000c02013942563303732
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-Media-Authorization: a P-CSCF generated authorization token. This particular example shows a Policy-Element generated by "pdf2.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.

18. **PRACK (UE to P-CSCF) - see example in table A.3.2.2-18**

The UE 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 includes a new SDP offer in the PRACK message sent to the MRFC/AS.

For this example, assume the UE 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 A.3.2.2-18: PRACK (UE to P-CSCF)

```
PRACK sip:conference1@mrfc1.home2.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.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
From: <sip:user1_public1@home1.net>; tag=171828
To: <sip:conference-factory1@home2.net>;tag=314159
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=87654321; port1=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 [5].

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.

19. **Resource Reservation**

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

20. **PRACK (P-CSCF to S-CSCF) – see example in table A.3.2.2-20**

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

Table A.3.2.2-20: PRACK (P-CSCF to S-CSCF)

```
PRACK sip:conference1@mrfc1.home2.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:
Route: <sip:scscf1.home1.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.

21. **PRACK (S-CSCF to MRFC/AS) – see example in table A.3.2.2-21**

S-CSCF resolves the Request-URI and forwards the PRACK request directly to MRFC/AS.

Table A.3.2.2-21: PRACK (S-CSCF to MRFC/AS)

```
PRACK sip:conference1@mrfc1.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
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

22. **200 OK (MRFC/AS to S-CSCF) – see example in table A.3.2.2-22 (related to table A.3.2.2-21)**

The MRFC/AS acknowledges the PRACK request (20) with a 200 (OK) response.

Table A.3.2.2-22: 200 OK (MRFC/AS to S-CSCF)

```
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: application/sdp
Content-Length: (…)

v=0
o=- 2987933623 2987933624 IN IP6 5555::aaa:bbb:ccc:ddd
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
```

23. **H.248 interaction to Modify Connection**

MRFC initiates a H.248 interaction to modify the connection established in step #11 and instructs MRFP to reserve the IMS multimedia processing resources for UE#1 according to the preceding resource negotiation between the UE#1 and the MRFC.

24. **200 OK (S-CSCF to P-CSCF) - see example in table A.3.2.2-24**

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

Table A.3.2.2-24: 200 OK (S-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-Type:
Content-Length:

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

25. **200 OK (P-CSCF to UE) - see example in table A.3.2.2-25**

P-CSCF forwards the 200 OK response to UE.

Table A.3.2.2-25: 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=
a=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
```

26. **UPDATE (UE to P-CSCF) – see example in table A.3.2.2-26**

When the resource reservation is completed, UE sends the UPDATE request to the MRFC/AS, via the signalling path established by the INVITE request.

Table A.3.2.2-26: UPDATE (UE to P-CSCF)

```
UPDATE sip:conference1@mrfc1.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-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>; tag=171828
To: <sip:conference-factory1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 129 UPDATE
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=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 0 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 telphone-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.

27. **UPDATE (P-CSCF to S-CSCF) – see example in table A.3.2.2-27**

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 S-CSCF.

Table A.3.2.2-27: UPDATE (P-CSCF to S-CSCF)

```
UPDATE sip:conferece1@mrfc1.home2.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:
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>
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=
```

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.

28. **UPDATE (S-CSCF to MRFC/AS) - see example in table A.3.2.2-28**

S-CSCF forwards the UPDATE request to MRFC/AS.

Table A.3.2.2-28: UPDATE (S-CSCF to MRFC/AS)

```
UPDATE sip:conference1@mrfc1.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
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=
```

29. **200 OK (MRFC/ASto S-CSCF) – see example in table A.3.2.2-29 (related to table A.3.2.2-28)**

The MRFC/AS acknowledges the UPDATE request (27) with a 200 OK response.

Table A.3.2.2-29: 200 OK (MRFC/AS to S-CSCF)

```
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: application/sdp
Content-Length: (…)

v=0
o=- 2987933623 2987933625 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 0 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
```

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

30. **H.248 interaction to Modify Connection**

    MRFC initiates a H.248 interaction to connect through the IMS multimedia processing resources for UE#1 in MRFP.

31. **200 OK (S-CSCF to P-CSCF) - see example in table A.3.2.2-31**

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

Table A.3.2.2-31: 200 OK (S-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-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. **200 OK (P-CSCF to UE) – see example in table A.3.2.2-32**

P-CSCF forwards the 200 OK response to UE.

Table A.3.2.2-32: 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=
```

33. **200 OK (MRFC/AS to I-CSCF) – see example in table A.3.2.2-33 (related to table A.3.2.2-9)**

After the success modification of the session (29), the MRFC/AS sends a 200 OK final response to the INVITE request (8) to the I-CSCF.

Table A.3.2.2-33: 200 OK (MRFC/AS to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf1.home2.net;branch=z9hG4bK32f432.1, 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:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: <sip:conference1@mrfc1.home2.net;isfocus>;isfocus
Content-Length:0
```

Contact: contains the conference URI for the conference allocated at the MRFC/AS and the isfocus tag.

34. **200 OK (I-CSCF to S-CSCF) – see example in table A.3.2.2-34**

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

Table A.3.2.2-34: 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.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:0
```

35. **200 OK (S-CSCF to P-CSCF) – see example in table A.3.2.2-35**

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

Table A.3.2.2-35: 200 OK (S-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:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

36. **Approval of QoS Commit**

The P-CSCF approves the commitment of the QoS resources if it was not approved already in step (12).

37. **200 OK (P-CSCF to UE) – see example in table A.3.2.2-37**

P-CSCF forwards the 200 OK final response to the session originator. UE can start the media flow(s) for this session.

Table A.3.2.2-37: 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:scscf1.home1.net;lr>, <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.

38. **ACK (UE to P-CSCF) – see example in table A.3.2.2-38**

UE starts the media flow for this session, and responds to the 200 OK (32) with an ACK request sent to P-CSCF.

Table A.3.2.2-38: ACK (UE to P-CSCF)

```
ACK sip:conference1@mrfc1.home2.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.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
From: <sip:user1_public1@home1.net>; tag=171828
To: <sip:conference-factory1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
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 A.3.2.2-39**

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

Table A.3.2.2-39: ACK (P-CSCF to S-CSCF)

```
ACK sip:conference1@mrfc1.home2.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:
Route: <sip:scscf1.home1.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

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

40. **ACK (S-CSCF to MRFC/AS) - see example in table A.3.2.2-40**

S-CSCF forwards the ACK request to the MRFC/AS.

Table A.3.2.2-40: ACK (S-CSCF to MRFC/AS)

```
ACK sip:conference1@mrfc1.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
From:
To:
Call-ID:
Cseq:
Content-Length:
```

A.3.3 User automatically creating a conference with a Conference URI

A.3.3.1 User in home network

A.3.4 User creating a conference by manually dialing into the IMS

A.3.4.1 User in home network

A.3.5 User creating a conference from two existing connections (Three-way session), users in different networks

A.3.5.1 User in home network

Editor's Note: This section shows how a Three-way session (see 3GPP TS 23.228, section 5.11.A.3.3) can be established

A.4 Flows demonstrating a user joining a conference

A.4.1 Introduction

A.4.2 User calling into a conference

A.4.2.1 User in a different network

A.4.2.1.1 Conference URI does not include a FQDN

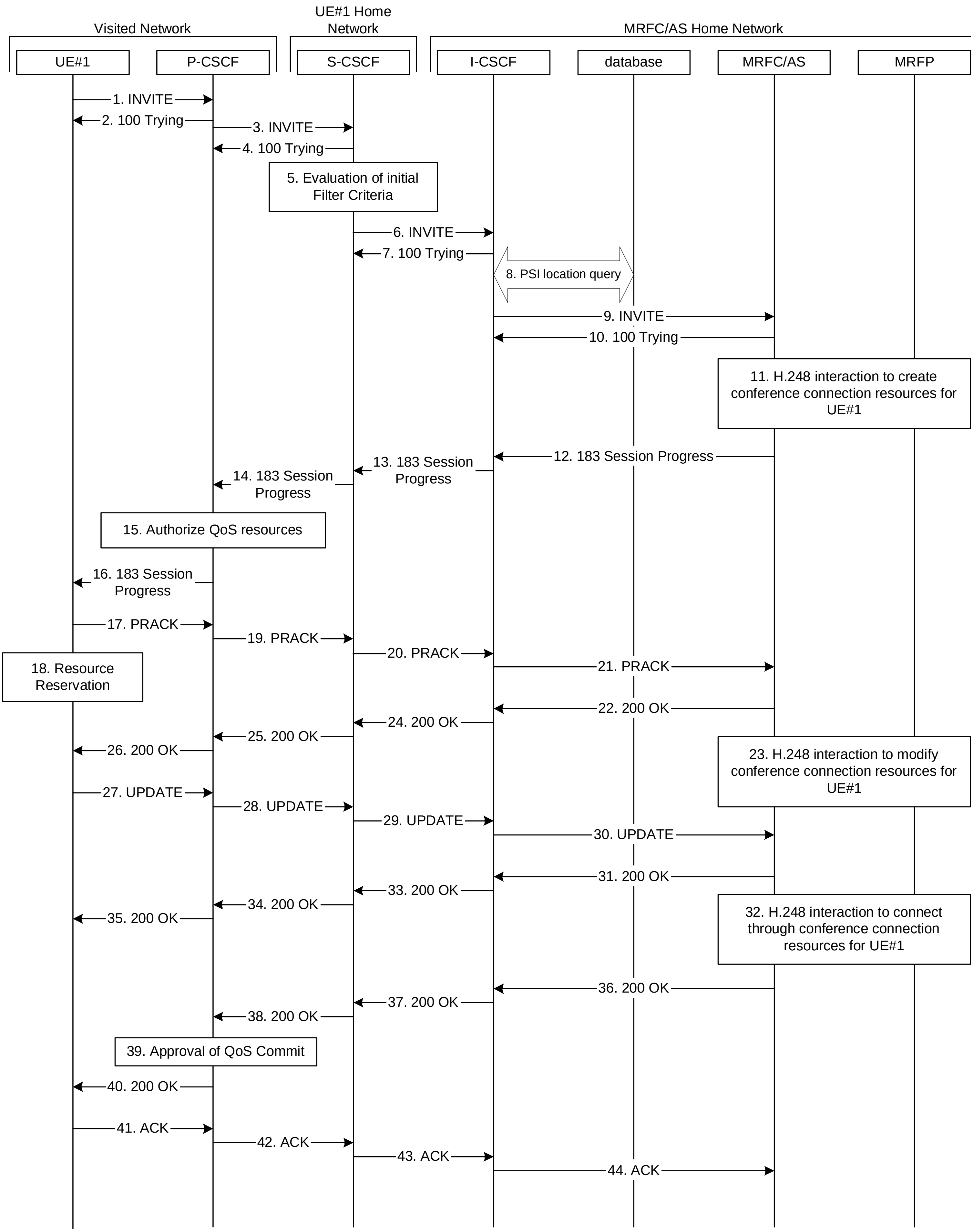

Visited Network
UE#1 Home Network
MRFC/AS Home Network
UE#1
P-CSCF
S-CSCF
I-CSCF
database
MRFC/AS
MRFP
1. INVITE
2. 100 Trying
3. INVITE
4. 100 Trying
5. Evaluation of initial Filter Criteria
6. INVITE
7. 100 Trying
8. PSI location query
9. INVITE
10. 100 Trying
11. H.248 interaction to create conference connection resources for UE#1
12. 183 Session Progress
13. 183 Session Progress
14. 183 Session Progress
15. Authorize QoS resources
16. 183 Session Progress
17. PRACK
18. Resource Reservation
19. PRACK
20. PRACK
21. PRACK
22. 200 OK
23. H.248 interaction to modify conference connection resources for UE#1
24. 200 OK
25. 200 OK
26. 200 OK
27. UPDATE
28. UPDATE
29. UPDATE
30. UPDATE
31. 200 OK
32. H.248 interaction to connect through conference connection resources for UE#1
33. 200 OK
34. 200 OK
35. 200 OK
36. 200 OK
37. 200 OK
38. 200 OK
39. Approval of QoS Commit
40. 200 OK
41. ACK
42. ACK
43. ACK
44. ACK

Figure A.4.2.1.1-1: User calling into a conference – user in a different network – conference URI does not include a FQDN

Figure A.4.2.1.1-1 shows an IMS user calling into a conference by using a conference URI. The focus of that conference is at a MRFC/AS which are located in another network. The conference URI in this example does not include a FQDN in the host part.

The details of the flows are as follows:

1. **INVITE (UE to P-CSCF) - see example in table A.4.2.1.1-1**

   A user agent wants to join a conference. For this purpose the user agent is aware of the related conference URI that was obtained by means outside this specification (e.g. via other protocols, such as http)

   The UE determines the complete set of codecs that it is capable of supporting for this conference. It builds a SDP Offer 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.capable of sending two simultaneous video streams, either H261 orUE sends the INVITE request to the P-CSCF.

Table A.4.2.1.1-1: INVITE (UE to P-CSCF)

```
INVITE sip:conference1@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: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=171828
To: <sip:conference1@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=87654321; port1=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:MPVMP4V-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 conference URI.

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.

To: same as the Request-URI.

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.

2. **100 Trying (P-CSCF to UE) - see example in table A.4.2.1.1-2**

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

Table A.4.2.1.1-2: 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 S-CSCF) - see example in table A.4.2.1.1-3**

   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.

   The P-CSCF examines the media parameters, and does not find any choices that the local policy does not allow.

   The INVITE request is forwarded to the S-CSCF.

Table A.4.2.1.1-3: INVITE (P-CSCF to S-CSCF)

```
INVITE sip:conference1@home2.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.visited1.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:
Require: precondition
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=
```

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.

4. **100 Trying (S-CSCF to P-CSCF) - see example in table A.4.2.1.1-4**

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

Table A.4.2.1.1-4: 100 Trying (S-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: 0
```

5. **Evaluation of initial filter criteria**

   S-CSCF validates the service profile of this subscriber and evaluates the initial filter criteria.

6. **INVITE (S-CSCF to I-CSCF) - see example in table A.4.2.1.1-6**

   S-CSCF 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 forwards the INVITE request directly to 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 A.4.2.1.1-6: INVITE request (S-CSCF to I-CSCF)

```
INVITE sip:conference1@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:+358-50-4821437>
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=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
```

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.

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

7. **100 Trying (I-CSCF to S-CSCF) - see example in table A.4.2.1.1-7 (related to table A.4.2.1.1-6)**

   I-CSCF responds to the INVITE request (6) with a 100 Trying provisional response.

Table A.4.2.1.1-7: 100 Trying (MRFC/AS 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
```

8. **Public service identity (PSI) location query**

   The I-CSCF sends a query to the database to find out the MRFC/AS at which the conference has been created. The database responds with the address of the MRFC/AS at which the conference is hosted.

Editor's Note: It is still under discussion in SA2 which entity in the IMS shall act as the database. Therefore the text of the above paragraph has to be updated according to SA2 decision.

Editor's Note: More detailed information is needed here, similar to the Cx interface information given in 24.228.

9. **INVITE (I-CSCF to MRFC/AS) - see example in table A.4.2.1.1-9**

   I-CSCF forwards the INVITE request to the MRFC/AS that was resolved during the PSI location query (8). The I-CSCF does not re-write the request URI.

Table A.4.2.1.1-9: INVITE request (I-CSCF to MRFC/AS)

```
INVITE sip:conference1@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
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:
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=
```

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

10. **100 Trying (MRFC/AS to I-CSCF) - see example in table A.4.2.1.1-10 (related to table A.4.2.1.1-9)**

MRFC/AS responds to the INVITE request (9) with a 100 Trying provisional response.

Table A.4.2.1.1-10: 100 Trying (MRFC/AS 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
```

11. **H.248 interaction to create conference connection resources for UE#1**

MRFC initiates a H.248 interaction to create an IMS connection point for UE#1 in MRFP.

12. **183 Session Progress (MRFC/AS to I-CSCF) - see example in table A.4.2.1.1-12 (related to table A.4.2.1.1-9)**

The media stream capabilities of the conference are returned along the signalling path, in a 183 Session Progress provisional response (to 9).

Table A.4.2.1.1-12: 183 Session Progress (MRFC/AS 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.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity: "Conference Server" <sip:mrfc1.home2.net>
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net;
   term-ioi=home2.net
Privacy: none
From:
To: <sip:conference1@home2.net>; tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:conference1@home2.net;isfocus>
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::aaa:bbb:ccc:ddd
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
```

To: a tag is added to the To header.

Contact: contains the conference URI for the conference allocated at the MRFC/AS and the isfocus tag.

SDP: contains the set of codecs supported for this conference. It requests confirmation of the QoS preconditions for establishing the session.

P-Charging-Vector: The MRFC/AS inserts this header and populates the icid parameters with an unique value and the terminating Inter Operator Identifier (IOI) for the home network of the MRFC/AS and puts back the originating IOI.

13. **183 Session Progress (I-CSCF to S-CSCF) - see example in table A.4.2.1.1-13**

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

Table A.4.2.1.1-13: 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.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity:
P-Charging-Vector:
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=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
```

14. **183 Session Progress (S-CSCF to P-CSCF) - see example in table A.4.2.1.1-14**

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

Table A.4.2.1.1-14: 183 Session Progress (S-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:
P-Asserted-Identity:
P-Charging-Vector:
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=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
```

15. **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 (38) based on operator local policy.

16. **183 Session Progress (P-CSCF to UE) – see example in table A.4.2.1.1-16**

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

Table A.4.2.1.1-16: 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:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>
P-Asserted-Identity:
Privacy:
P-Media-Authorization:
   0020000100100101706466322e76697369746564322e6e6574000c02013942563303732
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-Media-Authorization: a P-CSCF generated authorization token. This particular example shows a Policy-Element generated by "pdf2.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.

17. **PRACK (UE to P-CSCF) - see example in table A.4.2.1.1-17**

The UE 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 includes a new SDP offer in the PRACK message sent to the MRFC/AS.

For this example, assume the UE 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 A.4.2.1.1-17: PRACK (UE to P-CSCF)

```
PRACK sip:conference1@home2.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.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
From: <sip:user1_public1@home1.net>; tag=171828
To: <sip:conference1@home2.net>;tag=314159
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=87654321; port1=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 [5].

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.

18. **Resource Reservation**

After determining the final media streams in step #17, UE initiates the reservation procedures for the resources needed for this session.

19. **PRACK (P-CSCF to S-CSCF) – see example in table A.4.2.1.1-19**

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

Table A.4.2.1.1-19: PRACK (P-CSCF to S-CSCF)

```
PRACK sip:conference1@home2.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:
Route: <sip:scscf1.home1.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.

20. **PRACK (S-CSCF to I-CSCF) – see example in table A.4.2.1.1-20**

S-CSCF 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 forwards the PRACK request directly to 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 A.4.2.1.1-20: PRACK (S-CSCF to I-CSCF)

```
PRACK sip:conference1@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
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

21. **PRACK (I-CSCF to MRFC/AS) – see example in table A.4.2.1.1-21**

I-CSCF forwards the PRACK request to the MRFC/AS that was resolved during the PSI location query (8).

Table A.4.2.1.1-21: PRACK (I-CSCF to MRFC/AS)

```
PRACK sip:conference1@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
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

22. **200 OK (MRFC/AS to I-CSCF) – see example in table A.4.2.1.1-22 (related to table A.4.2.1.1-21)**

The MRFC/AS acknowledges the PRACK request (21) with a 200 (OK) response.

Table A.4.2.1.1-22: 200 OK (MRFC/AS 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.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::aaa:bbb:ccc:ddd
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=2a=rtpmap:96 telephone-event
```

23. **H.248 interaction to Modify Connection for UE#1**

MRFC initiates a H.248 interaction to modify the connection established in step #11 and instructs MRFP to reserve the IMS multimedia processing resources for UE#1 according to the preceding resource negotiation between the UE#1 and the MRFC.

24. **200 OK (I-CSCF to S-CSCF) - see example in table A.4.2.1.1-24**

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

Table A.4.2.1.1-24: 200 OK (I-CSCF to S-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.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=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
```

25. **200 OK (S-CSCF to P-CSCF) - see example in table A.4.2.1.1-25**

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

Table A.4.2.1.1-25: 200 OK (S-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-Type:
Content-Length:

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

26. **200 OK (P-CSCF to UE) - see example in table A.4.2.1.1-26**

P-CSCF forwards the 200 OK response to UE.

Table A.4.2.1.1-26: 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=
a=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
```

27. **UPDATE (UE to P-CSCF) – see example in table A.4.2.1.1-27**

When the resource reservation is completed, UE sends the UPDATE request to the MRFC/AS, via the signalling path established by the INVITE request.

Table A.4.2.1.1-27: UPDATE (UE to P-CSCF)

```
UPDATE sip:conference1@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-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>; tag=171828
To: <sip:conference1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 129 UPDATE
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=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 0 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 telphone-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.

28. **UPDATE (P-CSCF to S-CSCF) – see example in table A.4.2.1.1-28**

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 S-CSCF.

Table A.4.2.1.1-28: UPDATE (P-CSCF to S-CSCF)

```
UPDATE sip:conference1@home2.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:
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>
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=
```

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.

29. **UPDATE (S-CSCF to I-CSCF) - see example in table A.4.2.1.1-29**

S-CSCF 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 forwards the UPDATE request directly to 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 A.4.2.1.1-29: UPDATE (S-CSCF to I-CSCF)

```
UPDATE sip:conference1@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
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. **UPDATE (I-CSCF to MRFC/AS) - see example in table A.4.2.1.1-30**

I-CSCF forwards the UPDATE request to the MRFC/AS that was resolved during the PSI location query (8). The I-CSCF does not re-write the request URI.

Table A.4.2.1.1-30: UPDATE (I-CSCF to MRFC/AS)

```
UPDATE sip:conference1@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
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=
```

31. **200 OK (MRFC/AS to I-CSCF) – see example in table A.4.2.1.1-31 (related to table A.4.2.1.1-30)**

The MRFC/AS acknowledges the UPDATE request (30) with a 200 OK response.

Table A.4.2.1.1-31: 200 OK (MRFC/AS 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.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::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 0 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
```

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

32. **H.248 interaction to Modify Connection**

    MRFC initiates a H.248 interaction to connect through the IMS multimedia processing resources for UE#1 in MRFP.

33. **200 OK (I-CSCF to S-CSCF) – see example in table A.4.2.1.1-31**

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

Table A.4.2.1.1-31: 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.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=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
```

34. **200 OK (S-CSCF to P-CSCF) - see example in table A.4.2.1.1-34**

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

Table A.4.2.1.1-34: 200 OK (S-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-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=
```

35. **200 OK (P-CSCF to UE) – see example in table A.4.2.1.1-35**

P-CSCF forwards the 200 OK response to UE.

Table A.4.2.1.1-35: 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=
```

36. **200 OK (MRFC/AS to I-CSCF) – see example in table A.4.2.1.1-36 (related to table A.4.2.1.1-9)**

After the success modification of the session (32), the MRFC/AS sends a 200 OK final response to the INVITE request (9) to the I-CSCF.

Table A.4.2.1.1-36: 200 OK (MRFC/AS 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.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: <sip:conference1@home2.net>;isfocus
Content-Length:0
```

Contact: contains the conference URI for the conference allocated at the MRFC/AS and the isfocus tag.

37. **200 OK (I-CSCF to S-CSCF) – see example in table A.4.2.1.1-37**

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

Table A.4.2.1.1-37: 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.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:
```

38. **200 OK (S-CSCF to P-CSCF) – see example in table A.4.2.1.1-38**

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

Table A.4.2.1.1-38: 200 OK (S-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:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

39. **Approval of QoS Commit**

    The P-CSCF approves the commitment of the QoS resources if it was not approved already in step (15).

40. **200 OK (P-CSCF to UE) – see example in table A.4.2.1.1-40**

    P-CSCF forwards the 200 OK final response to the session originator. UE can start the media flow(s) for this session.

Table A.4.2.1.1-40: 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:scscf1.home1.net;lr>, <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.

41. **ACK (UE to P-CSCF) – see example in table A.4.2.1.1-41**

    UE starts the media flow for this session, and responds to the 200 OK (40) with an ACK request sent to P-CSCF.

Table A.4.2.1.1-41: ACK (UE to P-CSCF)

```
ACK sip:conference1@home2.net:2342 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>
From: <sip:user1_public1@home1.net>; tag=171828
To: <sip:conference1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
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].

42. **ACK (P-CSCF to S-CSCF) – see example in table A.4.2.1.1-42**

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

Table A.4.2.1.1-42: ACK (P-CSCF to S-CSCF)

```
ACK sip:conference1@home2.net:2342 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>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

43. **ACK (S-CSCF to I-CSCF) - see example in table A.4.2.1.1-43**

S-CSCF 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 forwards the ACK request directly to 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 A.4.2.1.1-43: ACK (S-CSCF to I-CSCF)

```
ACK sip:conference1@home2.net:2342 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
From:
To:
Call-ID:
Cseq:
Content-Length:
```

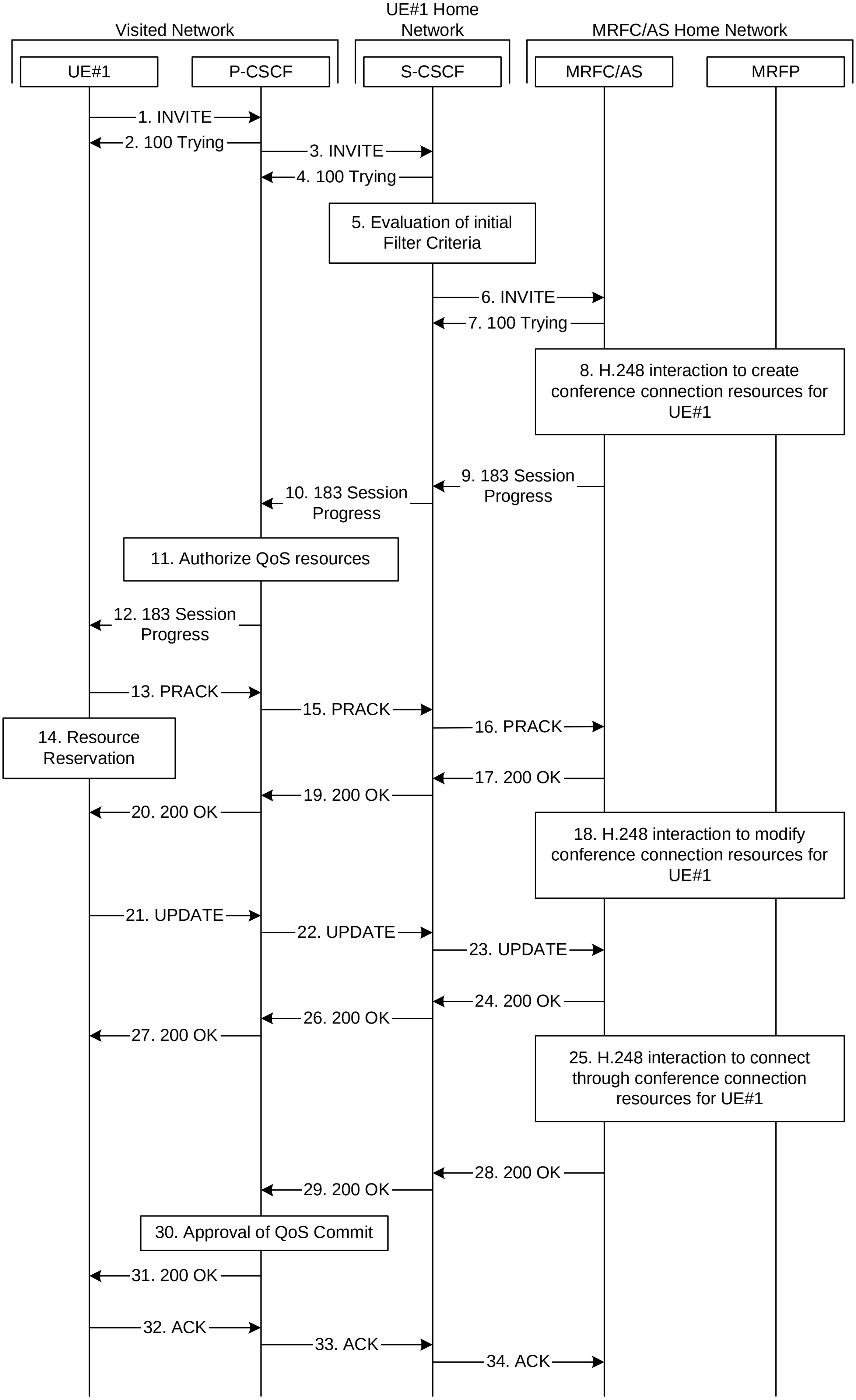
44. **ACK (I-CSCF to MRFC/AS) - see example in table A.4.2.1.1-44**

I-CSCF forwards the ACK request to the MRFC/AS that was resolved during the PSI location query (8). The I-CSCF does not re-write the request URI.

Table A.4.2.1.1-44: ACK (I-CSCF to MRFC/AS)

```
ACK sip:conference1@home2.net:2342 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
From:
To:
Call-ID:
Cseq:
Content-Length:
```

A.4.2.1.2 Conference URI includes a FQDN



Visited Network
UE#1 Home Network
MRFC/AS Home Network
UE#1
P-CSCF
S-CSCF
MRFC/AS
MRFP
1. INVITE
2. 100 Trying
3. INVITE
4. 100 Trying
5. Evaluation of initial Filter Criteria
6. INVITE
7. 100 Trying
8. H.248 interaction to create conference connection resources for UE#1
9. 183 Session Progress
10. 183 Session Progress
11. Authorize QoS resources
12. 183 Session Progress
13. PRACK
14. Resource Reservation
15. PRACK
16. PRACK
17. 200 OK
18. H.248 interaction to modify conference connection resources for UE#1
19. 200 OK
20. 200 OK
21. UPDATE
22. UPDATE
23. UPDATE
24. 200 OK
25. H.248 interaction to connect through conference connection resources for UE#1
26. 200 OK
27. 200 OK
28. 200 OK
29. 200 OK
30. Approval of QoS Commit
31. 200 OK
32. ACK
33. ACK
34. ACK

Figure A.4.2.1.2-1: User calling into a conference – user in a different network – conference URI does include a FQDN

Figure A.4.2.1.2-1 shows an IMS user calling into a conference by using a conference URI. The focus of that conference is at a MRFC/AS which are located in another network. The conference URI in this example include a FQDN in the host part.

The details of the flows are as follows:

1. **INVITE (UE to P-CSCF) - see example in table A.4.2.1.2-1**

   A user agent wants to join a conference. For this purpose the user agent is aware of the related conference URI that was obtained by means outside this specification.

   The UE determines the complete set of codecs that it is capable of supporting for this conference. It builds a SDP Offer 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.

Table A.4.2.1.2-1: INVITE (UE to P-CSCF)

```
INVITE sip:conference1@mrfc2.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: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=171828
To: <sip:conference1@mrfc2.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=87654321; port1=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 conference URI.

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.

To: same as the Request-URI.

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.

2. **100 Trying (P-CSCF to UE) - see example in table A.4.2.1.2-2**

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

Table A.4.2.1.2-2: 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 A.4.2.1.2-3**

   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.

   The P-CSCF examines the media parameters, and does not find any choices that the local policy does not allow.

   The INVITE request is forwarded to the S-CSCF.

Table A.4.2.1.2-3: INVITE (P-CSCF to S-CSCF)

```
INVITE sip:conference1@mrfc2.home2.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.visited1.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:
Require: precondition
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=
```

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.

4. **100 Trying (S-CSCF to P-CSCF) - see example in table A.4.2.1.2-4**

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

Table A.4.2.1.2-4: 100 Trying (S-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: 0
```

5. **Evaluation of initial filter criteria**

   S-CSCF validates the service profile of this subscriber and evaluates the initial filter criteria.

6. **INVITE (S-CSCF to MRFC/AS) - see example in table A.4.2.1.2-6**

   S-CSCF forwards the INVITE request to the MRFC/AS based on the request URI of the INVITE request. The S-CSCF does not re-write the request URI.

Table A.4.2.1.2-6: INVITE request (S-CSCF to MRFC/AS)

```
INVITE sip:conference1@mrfc2.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:+358-50-4821437>
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=
o=
s=
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
m=
b=
a=
a=
a=
a=
a=
a=
a=
```

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.

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

7. **100 Trying (MRFC/AS to S-CSCF) - see example in table A.4.2.1.2-7 (related to table A.4.2.1.2-6)**

   MRFC/AS responds to the INVITE request (6) with a 100 Trying provisional response.

Table A.4.2.1.2-7: 100 Trying (MRFC/AS 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
```

8. **H.248 interaction to create conference connection resources for UE#1**

   MRFC initiates a H.248 interaction to create an IMS connection point for UE#1 in MRFP.

9. **183 Session Progress (MRFC/AS to S-CSCF) - see example in table A.4.2.1.2-9 (related to table A.4.2.1.2-6)**

   The media stream capabilities of the conference are returned along the signalling path, in a 183 Session Progress provisional response (to 6).

Table A.4.2.1.2-9: 183 Session Progress (MRFC/AS 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.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net;
   term-ioi=home2.net
Privacy: none
From:
To: <sip:conference1@mrfc2.home2.net>; tag=314159
Call-ID:
CSeq:
Require: 100rel
Contact: <sip:conference1@mrfc2.home2.net;isfocus>
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::1111:2222:3333:4444
s=-
c=IN IP6 5555::1111:2222:3333:4444
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
```

To: a tag is added to the To header.

Contact: contains the conference URI for the conference allocated at the MRFC/AS and the isfocus tag.

SDP: contains the set of codecs supported for this conference. It requests confirmation of the QoS preconditions for establishing the session.

P-Charging-Vector: The MRFC/AS inserts this header and populates the icid parameters with an unique value and the terminating Inter Operator Identifier (IOI) for the home network of the MRFC/AS and puts back the originating IOI.

Editor's Note: It has to be investigated if the MRFC/AS includes a P-Asserted-Identity header. If it includes this header, it needs to be investigated which value needs to be populated in it.

10. **183 Session Progress (S-CSCF to P-CSCF) - see example in table A.4.2.1.2-10**

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

Table A.4.2.1.2-10: 183 Session Progress (S-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:
P-Asserted-Identity:
P-Charging-Vector:
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=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
```

11. **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 (30) based on operator local policy.

12. **183 Session Progress (P-CSCF to UE) – see example in table A.4.2.1.2-12**

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

Table A.4.2.1.2-12: 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:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>
P-Asserted-Identity:
Privacy:
P-Media-Authorization:
   0020000100100101706466322e76697369746564322e6e6574000c020139425633303732
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-Media-Authorization: a P-CSCF generated authorization token. This particular example shows a Policy-Element generated by "pdf2.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.

13. **PRACK (UE to P-CSCF) - see example in table A.4.2.1.2-13**

The UE 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 includes a new SDP offer in the PRACK message sent to the MRFC/AS.

For this example, assume the UE 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 A.4.2.1.2-13: PRACK (UE to P-CSCF)

```
PRACK sip:conference1@mrfc2.home2.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.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
From: <sip:user1_public1@home1.net>; tag=171828
To: <sip:conference1@mrfc2.home2.net>;tag=314159
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=87654321; port1=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 [5].

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.

14. **Resource Reservation**

After determining the final media streams in step #13, UE initiates the reservation procedures for the resources needed for this session.

15. **PRACK (P-CSCF to S-CSCF) – see example in table A.4.2.1.2-15**

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.

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

Table A.4.2.1.2-15: PRACK (P-CSCF to S-CSCF)

```
PRACK sip:conference1@mrfc2.home2.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:
Route: <sip:scscf1.home1.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.

16. **PRACK (S-CSCF to MRFC/AS) – see example in table A.4.2.1.2-16**

S-CSCF forwards the PRACK request to the MRFC/AS based on the request URI of the PRACK request. The S-CSCF does not re-write the request URI.

Table A.4.2.1.2-16: PRACK (S-CSCF to MRFC/AS)

```
PRACK sip:conference1@mrfc2.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
From:
To:
Call-ID:
Cseq:
Require:
RAck:
Content-Type:
Content-Length:

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

17. **200 OK (MRFC/AS to S-CSCF) – see example in table A.4.2.1.2-17 (related to table A.4.2.1.2-16)**

The MRFC/AS acknowledges the PRACK request (16) with a 200 (OK) response.

Table A.4.2.1.2-17: 200 OK (MRFC/AS to S-CSCF)

```
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: application/sdp
Content-Length: (…)

v=0
o=- 2987933623 2987933624 IN IP6 5555::aaa:bbb:ccc:ddd
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=2a=rtpmap:96 telephone-event
```

18. **H.248 interaction to Modify Connection for UE#1**

    MRFC initiates a H.248 interaction to modify the connection established in step #11 and instructs MRFP to reserve the IMS multimedia processing resources for UE#1 according to the preceding resource negotiation between the UE#1 and the MRFC.

19. **200 OK (S-CSCF to P-CSCF) - see example in table A.4.2.1.2-19**

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

Table A.4.2.1.2-19: 200 OK (S-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-Type:
Content-Length:

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

20. **200 OK (P-CSCF to UE) - see example in table A.4.2.1.2-20**

P-CSCF forwards the 200 OK response to UE.

Table A.4.2.1.2-20: 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=
a=
m=
m=
b=
a=
a=
a=
a=
a=
a=
a=
a=
```

21. **UPDATE (UE to P-CSCF) – see example in table A.4.2.1.2-21**

When the resource reservation is completed, UE sends the UPDATE request to the MRFC/AS, via the signalling path established by the INVITE request.

Table A.4.2.1.2-21: UPDATE (UE to P-CSCF)

```
UPDATE sip:conference1@mrfc2.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-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>; tag=171828
To: <sip:conference1@mrfc2.home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 129 UPDATE
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=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 0 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 telphone-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.

22. **UPDATE (P-CSCF to S-CSCF) – see example in table A.4.2.1.2-22**

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 S-CSCF.

Table A.4.2.1.2-22: UPDATE (P-CSCF to S-CSCF)

```
UPDATE sip:conference1@mrfc2.home2.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:
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>
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=
```

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.

23. **UPDATE (S-CSCF to MRFC/AS) - see example in table A.4.2.1.2-23**

S-CSCF forwards the UPDATE request to the MRFC/AS based on the request URI of the UPDATE request. The S-CSCF does not re-write the request URI.

Table A.4.2.1.2-23: UPDATE (S-CSCF to MRFC/AS)

```
UPDATE sip:conference1@mrfc2.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
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=
```

24. **200 OK (MRFC/AS to S-CSCF) – see example in table A.4.2.1.2-24 (related to table A.4.2.1.2-23)**

The MRFC/AS acknowledges the UPDATE request (23) with a 200 OK response.

Table A.4.2.1.2-24: 200 OK (MRFC/AS to S-CSCF)

```
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: application/sdp
Content-Length: (…)

v=0
o=- 2987933623 2987933625 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 0 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
```

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

25. **H.248 interaction to Modify Connection**

    MRFC initiates a H.248 interaction to connect through the IMS multimedia processing resources for UE#1 in MRFP.

26. **200 OK (S-CSCF to P-CSCF) - see example in table A.4.2.1.2-26**

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

Table A.4.2.1.2-26: 200 OK (S-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-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=
```

27. **200 OK (P-CSCF to UE) – see example in table A.4.2.1.2-27**

P-CSCF forwards the 200 OK response to UE.

Table A.4.2.1.2-27: 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=
```

28. **200 OK (MRFC/AS to S-CSCF) – see example in table A.4.2.1.2-28 (related to table A.4.2.1.2-7)**

After the success modification of the session (25), the MRFC/AS sends a 200 OK final response to the INVITE request (6) to the I-CSCF.

Table A.4.2.1.2-28: 200 OK (MRFC/AS to S-CSCF)

```
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
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
CSeq: 127 INVITE
Contact: <sip:conference1@mrfc2.home2.net>;isfocus
Content-Length:0
```

Contact: contains the conference URI for the conference allocated at the MRFC/AS and the isfocus tag.

29. **200 OK (S-CSCF to P-CSCF) – see example in table A.4.2.1.2-29**

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

Table A.4.2.1.2-29: 200 OK (S-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:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

30. **Approval of QoS Commit**

The P-CSCF approves the commitment of the QoS resources if it was not approved already in step (14).

31. **200 OK (P-CSCF to UE) – see example in table A.4.2.1.2-31**

P-CSCF forwards the 200 OK final response to the session originator. UE can start the media flow(s) for this session.

Table A.4.2.1.2-31: 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
Record-Route: <sip:scscf1.home1.net;lr>, <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.

32. **ACK (UE to P-CSCF) – see example in table A.4.2.1.2-32**

UE starts the media flow for this session, and responds to the 200 OK (31) with an ACK request sent to P-CSCF.

Table A.4.2.1.2-32: ACK (UE to P-CSCF)

```
ACK sip:conference1@mrfc2.home2.net:2342 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>
From: <sip:user1_public1@home1.net>; tag=171828
To: <sip:conference1@mrfc2.home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
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].

33. **ACK (P-CSCF to S-CSCF) – see example in table A.4.2.1.2-33**

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

Table A.4.2.1.2-33: ACK (P-CSCF to S-CSCF)

```
ACK sip:conference1@mrfc2.home2.net:2342 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>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

34. **ACK (S-CSCF to MRFC/AS) - see example in table A.4.2.1.2-34**

S-CSCF forwards the ACK request to the MRFC/AS based on the request URI of the ACK request. The S-CSCF does not re-write the request URI.

Table A.4.2.1.2-34: ACK (S-CSCF to MRFC/AS)

```
ACK sip:conference1@mrfc2.home2.net:2342 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
From:
To:
Call-ID:
Cseq:
Content-Length:
```

A.4.3 User inviting another IMS user to a conference

A.4.3.1 User in a different network

A.4.3.1.1 User inviting another user to conference – sending REFER request

Figure A.4.3.1.1-1 shows how UE#1 invites UE#2 to a conference by sending UE#2 a REFER message. UE#1 has created a conference by using the mechanisms described in Subclause 6.2, and UE#1 has learned the Conference URI that identifies this conference.

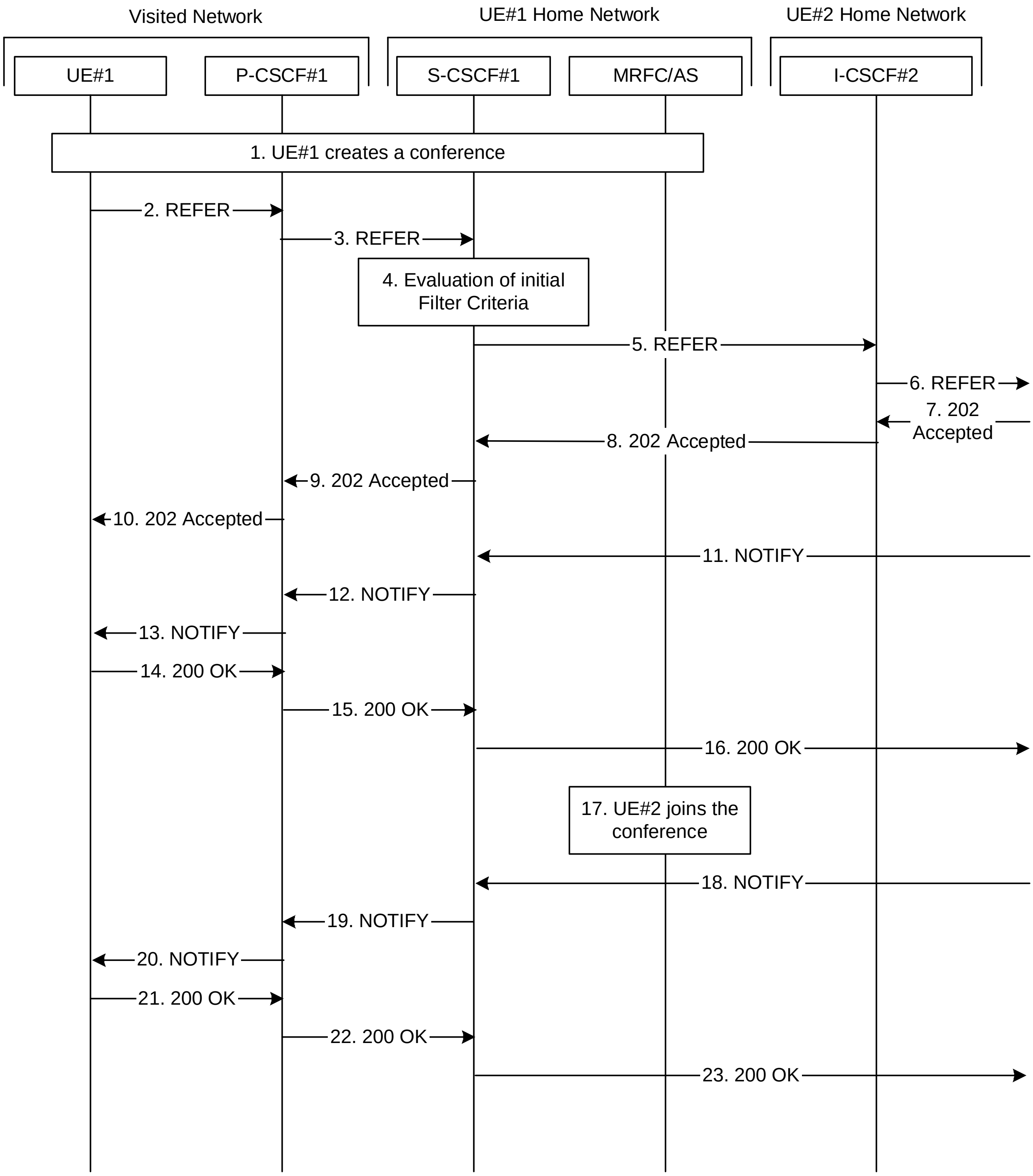


Figure A.4.3.1.1-1: User inviting another user to a conference by sending a REFER to the other user.

The details of the flows are as follows:

1. **UE#1 creates a conference**

   UE#1 creates a conference as described in Subclause 6.3.2. Once the conference creation is accomplished, UE#1 has learned the Conference URI allocated for this conference.

2. **REFER (UE to P-CSCF) - see example in table A.4.3.1.1-1**

   A user agent has created a conference and learned the conference URI. Now the user agent wants to invite another user agent to that conference.

Table A.4.3.1.1-1: REFER (UE to P-CSCF)

```
REFER 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: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=171828
To: <sip:user2_public1@home2.net>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 REFER
Require: sec-agree
Refer-To: <sip:conference1@mrfc1.home1.net;isfocus;method=INVITE>
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=7531
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Length: 0
```

Request-URI: contains the public user identity of UE#2.

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.

To: same as the Request-URI.

Cseq: is a random starting number.

Refer-To: contains the conference URI as learned during the conference establishment, including the isfocus parameter. Additionally the method parameter indicates that the other user shall send an INVITE request to this conference URI.

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.

The message does not contain a body.

3. **REFER (P-CSCF to S-CSCF) - see example in table A.4.3.1.1-2**

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 and Require headers are empty, the P-CSCF removes these headers completely.

The REFER request is forwarded to the S-CSCF.

Table A.4.3.1.1-2: REFER (P-CSCF to S-CSCF)

```
REFER sip:user2_public1@home2.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.visited1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
P-Access-Network-Info:
Privacy:
From:
To:
Call-ID:
Cseq:
Refer-To:
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.

4. **Evaluation of initial Filter Criteria**

   S-CSCF validates the service profile of this subscriber and evaluates the initial filter criteria.

5. **REFER (S-CSCF to I-CSCF in UE#2 home network) - see example in table A.4.3.1.1-3**

   S-CSCF 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 forwards the REFER request directly to the destination network.

Table A.4.3.1.1-3: REFER (S-CSCF to I-CSCF)

```
REFER 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:+358-50-4821437>
P-Charging-Vector:  icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net
Privacy:
From:
To:
Call-ID:
Cseq:
Refer-To:
Contact:
Content-Length:
```

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.

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

6. **REFER (I-CSCF towards S-CSCF of UE#2) - see example in table A.4.3.1.1-4**

   I-CSCF performs a Cx location query to the HSS (not shown in this flow) to find out the S-CSCF of UE#2.

I-CSCF then forwards the REFER request to that S-CSCF that will handle the session termination.

Table A.4.3.1.1-4: REFER (I-CSCF towards S-CSCF of UE#2)

```
REFER sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP icscf2.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:
P-Asserted-Identity:
P-Charging-Vector:
Privacy:
From:
To:
Call-ID:
Cseq:
Refer-To:
Contact:
Content-Length:
```

Note that the I-CSCF does not add itself to the Record-Route, as it has no need to stay on the signalling path once the session is established.

7. **202 Accepted (S-CSCF of UE#2 to I-CSCF) - see example in table A.4.3.1.1-5**

UE#2 home network indicates that it has received the REFER request by sending a 202 Accepted response. This means that UE#2 home network has begun to process the request. This does not mean, however, that the referred-to resource would have been contacted.

Table A.4.3.1.1-5: 202 Accepted (S-CSCF of UE#2 to I-CSCF)

```
SIP/2.0 202 Accepted
Via: SIP/2.0/UDP icscf2.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>, <tel:+1-212-555-2222>
P-Charging-Vector: icid-value=1234bcd9876e; icid-generated-at=[5555::f5f:e4e:d3d:c2c]; 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:none
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=151170
Call-ID: cb03a0s09a2sdfglkj490333
CSeq: 127 REFER
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Content-Length:0
```

8. **202 Accepted (I-CSCF to S-CSCF) - see example in Table A.4.3.1.1-6**

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

Table A.4.3.1.1-6: 202 Accepted (I-CSCF to S-CSCF)

```
SIP/2.0 202 Accepted
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
Record-Route:
P-Asserted-Identity:
P-Charging-Vector:
Privacy:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

9. **202 Accepted (S-CSCF to P-CSCF) - see example in Table A.4.3.1.1-7**

   S-CSCF forwards the response to P-CSCF.

Table A.4.3.1.1-7: 202 Accepted (S-CSCF to P-CSCF)

```
SIP/2.0 202 Accepted
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:
P-Asserted-Identity:
P-Charging-Vector:
Privacy:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:
```

10. **202 Accepted (P-CSCF to UE#1) - see example in Table A.4.3.1.1-8**

    P-CSCF forwards the response to the UE.

Table 6.3.3.1-8: 202 Accepted (P-CSCF to UE#1)

```
SIP/2.0 202 Accepted
Via: 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:7531;lr;comp=sigcomp>
P-Asserted-Identity:
Privacy:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:0
```

11. **NOTIFY (from S-CSCF of UE#2 to S-CSCF) - see example in Table A.4.3.1.1-9**

    S-SCSF receives a NOTIFY message corresponding the the REFER request. The NOTIFY contains information about the progress of the REFER processing. The body of the NOTIFY message contains a fragment of the response as received by the notifying UE for the request that was initiated due to the REFER request. The NOTIFY is forwarded to the P-CSCF.

Table A.4.3.1.1-9: NOTIFY (from S-CSCF of UE#2 to S-CSCF)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch= z9hG4bK764z87.1, SIP/2.0/UDP
   pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
   [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
Max-Forwards: 68
Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
To: <sip:user1_public1@home1.net>;tag=171828
From: <sip:user2_public1@home2.net>;tag=151170
Call-ID: cb03a0s09a2sdfglkj490333
CSeq: 42 NOTIFY
Subscription-State: active;expires:7200
Event: refer
Contact: sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp
Content-Length: (…)
Content-Type: message/sipfrag

SIP/2.0 100 Trying
```

To: matches the From field of the original REFER message.

From: matches the To field of the original REFER message.

Call-ID: matches the Call-ID of the original REFER message.

12. **NOTIFY (from S-CSCF to P-CSCF) - see example in Table A.4.3.1.1-10**

S-CSCF forwards the message to P-CSCF.

Table: A.4.3.1.1-10: NOTIFY (from S-CSCF to P-CSCF)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK23436s.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
   [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
Max-Forwards: 67
Route: <sip:pcscf1.visited1.net;lr>
To:
From:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Length: (…)
Content-Type:

(...)
```

13. **NOTIFY (from P-CSCF to UE#1) - see example in Table A.4.3.1.1-11.**

P-CSCF forwards the message to UE#1.

Table A.4.3.1.1-11: NOTIFY (from P-CSCF to UE#1)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net:7531;comp=sigcomp;branch=z9hG4bK23433.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK23436s.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
   [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
Max-Forwards: 66
To:
From:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Length: (…)
Content-Type:

(...)
```

14. **200 OK (UE to P-CSCF) – see example in Table A.4.3.1.1-12.**

    The UE acknowledges the NOTIFY request with a 200 (OK) response to the P-CSCF.

Table A.4.3.1.1-12: 200 OK (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net:7531;comp=sigcomp;branch=z9hG4bK23433.1, SIP/2.0/UDP
      scscf1.home1.net;branch=z9hG4bK23436s.1, SIP/2.0/UDP
      scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
      pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
      [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

15. **200 OK (P-CSCF to S-CSCF) – see example in Table A.4.3.1.1-13.**

    The P-CSCF forwads the 200 OK response to the S-CSCF.

Table A.4.3.1.1-13: 200 OK (P-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK23436s.1, SIP/2.0/UDP
      scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
      pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
      [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

16. **200 OK (S-CSCF to S-CSCF of UE#2) – see example in Table A.4.3.1.1-14.**

    The S-CSCF forwards the 200 OK response to the S-CSCF of UE#2 according to the information in the Via field.

Table A.4.3.1.1-14: 200 OK (S-CSCF to S-CSCF of UE#2)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
      pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
      [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

17. **UE#2 joins the conference.**

    UE#2 joins the conference. The message flows are depicted in Subclause 6.3.2.

18. **NOTIFY (from S-CSCF of UE#2 to S-CSCF) - see example in Table A.4.3.1.1-15.**

    S-SCSF receives a NOTIFY message corresponding the the REFER request.

Table A.4.3.1.1-15: NOTIFY (from S-CSCF of UE#2 to S-CSCF)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK23d244.1, SIP/2.0/UDP
   pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
   [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
Max-Forwards: 68
Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
To: <sip:user1_public1@home1.net>; tag=171828
From: <sip:user2_public1@home2.net>;tag=151170
Call-ID: cb03a0s09a2sdfglkj490333
CSeq: 43 NOTIFY
Subscription-State: terminated
Event: refer
Contact:
Content-Length: (…)
Content-Type: message/sipfrag

SIP/2.0 200 OK
```

To: matches the From field of the original REFER message.

From: matches the To field of the original REFER message.

Call-ID: matches the Call-ID of the original REFER message.

Subscription-State: indicates that the implicit subscription to the REFER event has been terminated.

19. NOTIFY (from S-CSCF to P-CSCF) - see example in Table A.4.3.1.1-16.

S-CSCF forwards the message to P-CSCF.

Table A.4.3.1.1-16: NOTIFY (from S-CSCF to P-CSCF)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK23436s.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK23d244.1, SIP/2.0/UDP
   pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
   [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
Max-Forwards: 67
Route: <sip:pcscf1.visited1.net;lr>
To:
From:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Length: (…)
Content-Type:

(...)
```

20. **NOTIFY (from P-CSCF to UE#1) - see example in Table A.4.3.1.1-17.**

    P-CSCF forwards the message to UE#1.

Table A.4.3.1.1-17: NOTIFY (from P-CSCF to UE#1)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net:7531;comp=sigcomp;branch=z9hG4bK23433.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK23436s.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK23d244.1, SIP/2.0/UDP
   pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
   [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
Max-Forwards: 66
To:
From:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Length: (…)
Content-Type:

(...)
```

21. **200 OK (UE to P-CSCF) – see example in Table A.4.3.1.1-18.**

    The UE acknowledges the NOTIFY request with a 200 (OK) response to the P-CSCF.

Table A.4.3.1.1-18: 200 OK (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net:7531;comp=sigcomp;branch=z9hG4bK23433.1, SIP/2.0/UDP
      scscf1.home1.net;branch=z9hG4bK23436s.1, SIP/2.0/UDP
      scscf2.home2.net;branch=z9hG4bK23d244.1, SIP/2.0/UDP
      pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
      [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

22. **200 OK (P-CSCF to S-CSCF) – see example in Table A.4.3.1.1-19.**

    The P-CSCF forwads the 200 OK response to the S-CSCF.

Table A.4.3.1.1-19: 200 OK (P-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK23436s.1, SIP/2.0/UDP
      scscf2.home2.net;branch=z9hG4bK23d244.1, SIP/2.0/UDP
      pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
      [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

23. **200 OK (S-CSCF to S-CSCF of UE#2) – see example in Table A.4.3.1.1-20.**

    The S-CSCF forwards the 200 OK response to the home network of UE#2 according to the information in the Via field.

Table A.4.3.1.1-20: 200 OK (S-CSCF to S-SCSF of UE#2)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK23d244.1, SIP/2.0/UDP
      pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
      [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

A.4.3.1.2 User getting invited to a conference

Figure A.4.3.1.2-1 shows how UE#2 gets invited to a conference by receiving a REFER message. The REFER contains the Conference URI where UE#2 should use when joining the conference.

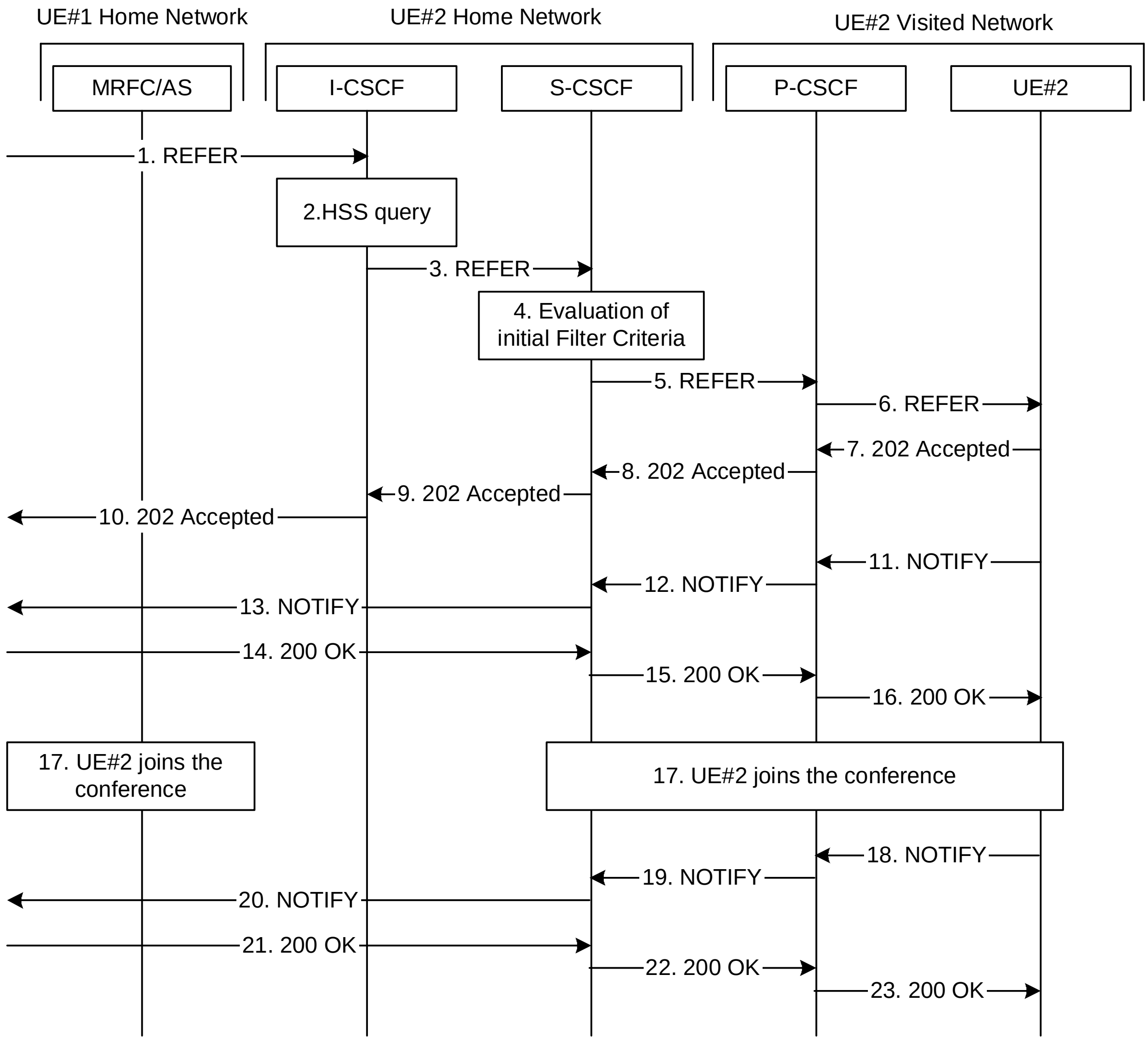


Figure A.4.3.1.2-1: User getting invited to a conference by receiving a REFER.

The details of the flows are as follows:

1. **REFER (S-CSCF of UE#1 to I-CSCF) - see example in table A.4.3.1.2-1**

   REFER message is sent by the S-CSCF of UE#1 to UE#2 home network. S-SCSF of UE#1 has resolved the address of I-CSCF as the entry point to UE#2 home network. See Subclause 6.3.3.1.1 for originating side of the call flow.

Table A.4.3.1.2-1: REFER (S-CSCF of UE#1 to I-CSCF)

```
REFER 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:+358-50-4821437>
P-Charging-Vector:  icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net
Privacy: none
From: <sip:user1_public1@home1.net>; tag=171828
To: <sip:user2_public1@home2.net>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 REFER
Refer-To: <sip:conference1@mrfc1.home1.net;isfocus;method=INVITE>
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Length: 0
```

Request-URI: contains the public user identity of UE#2.

Via: contains the IP addresses or FQDNs of visited nodes.

P-Asserted-Identity: The S-CSCF has inserted UE#1 TEL URL to the P-Asserted-Identity header in order that the TEL URL is known to the UE#2 home network.

Privacy: UE#1 does not require privacy, therefore the Privacy header is set to the value "none" as specified in RFC 3325 [17] and RFC 3323 [13].

From: the user does not require privacy, the From header contains the value requested by the user.

To: same as the Request-URI.

Cseq: is a random starting number.

Refer-To: contains the conference URI as learned during the conference establishment, including the isfocus parameter. Additionally the method parameter indicates that the other user shall send an INVITE request to this conference URI.

Contact: is a SIP URI that contains the IP address or FQDN of the originating UE.

The message does not contain a body.

2. **I-CSCF performs HSS query**

   I-CSCF performs HSS query to find out the S-CSCF serving UE#2.

3. **REFER (I-CSCF to S-CSCF) - see example in Table A.4.3.1.2-2**

   After finding out the S-CSCF assigned to UE#2, I-CSCF forwards the REFER request to that S-CSCF. I-CSCF does not add itself to the Record-route since it does not have to remain on the signalling path for subsequent requests within the same dialog.

Table A.4.3.1.2-2: REFER (I-CSCF to S-CSCF)

```
REFER sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP icscf2.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
Record-Route:
Route: <sip:scscf2.home2.net;lr>
P-Asserted-Identity:
P-Charging-Vector:
Privacy:
From:
To:
Call-ID:
Cseq:
Refer-To:
Contact:
Content-Length:

(...)
```

Route: I-CSCF adds S-CSCF to the Route header.

4. **Evaluation of initial Filter Criteria**

   S-CSCF validates the service profile of this subscriber, and evaluates the initial Filter Criteria.

5. **REFER (S-CSCF to P-CSCF) - see example in Table A.4.3.1.2-3**

   S-CSCF remembers (from registration procedures) the contact address of UE#2 and determins the P-CSCF assigned for UE#2 and routes message there.

Table A.4.3.1.2-3: REFER (S-CSCF to P-CSCF)

```
REFER sip:[5555::eeee:ffff:aaaa:bbbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK234974.3, SIP/2.0/UDP
   icscf2.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
Record-Route: <sip:scscf2.home2.net;lr>, <sip:scscf1.home1.net;lr>,
   <sip:pcscf1.visited1.net;lr>
Route: <pcscf2.visited2.net;lr>
P-Asserted-Identity:
P-Charging-Vector:
Privacy:
From:
To:
Call-ID:
Cseq:
Refer-To:
Contact:
P-Called-Party-ID: <sip:user2_public1@home2.net>
Content-Length:

(...)
```

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

6. **REFER (P-CSCF to UE#2) - see example in Table A.4.3.1.2-4**

   P-CSCF forwards the request to UE#2.

Table A.4.3.1.2-4: REFER (P-CSCF to UE#2)

```
REFER sip:[5555::eeee:ffff:aaaa:bbbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK249354.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK234974.3, SIP/2.0/UDP
   icscf2.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:
From:
To:
Call-ID:
Cseq:
Refer-To:
Contact:
P-Called-Party-ID:
Content-Length:

(...)
```

7. **202 Accepted (UE#2 to P-CSCF) - see example in table A.4.3.1.2-5**

   UE# accepts the REFER request by sending a 202 Accepted response.

Table A.4.3.1.2-5: 202 Accepted (UE#2 to P-CSCF)

```
SIP/2.0 202 Accepted
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK249354.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK234974.3, SIP/2.0/UDP
   icscf2.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: <sip:user2_public1@home2.net>;tag=151170
Call-ID:
CSeq:
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Content-Length:0
```

To: UE#2 has appended the tag to the original To-header.

Contact: Contains the UE#2 contact address.

8. **202 Accepted (P-CSCF to S-CSCF) - see example in Table A.4.3.1.2-6**

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

Table A.4.3.1.2-6: 202 Accepted (P-CSCF to S-CSCF)

```
SIP/2.0 202 Accepted
Via: scscf2.home2.net;branch=z9hG4bK234974.3, SIP/2.0/UDP
   icscf2.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=1234bcd9876e; icid-generated-at=[5555::f5f:e4e:d3d:c2c]
Privacy:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:0
```

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

9. **202 Accepted (S-CSCF to I-CSCF) - see example in Table A.4.3.1.2-7**

   S-CSCF forwards the response to I-CSCF.

Table A.4.3.1.2-7: 202 Accepted (S-CSCF to I-CSCF)

```
SIP/2.0 202 Accepted
Via: SIP/2.0/UDP icscf2.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=1234bcd9876e; icid-generated-at=[5555::f5f:e4e:d3d:c2c]; 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:
Contact:
Content-Length:0
```

S-CSCF adds charging related headers to the 202 Accepted message before forwarding it to I-CSCF. S-CSCF also adds the Tel-URL to the P-Asserted-Identity header.

10. **202 Accepted (I-CSCF to UE#1 home network) - see example in Table A.4.3.1.2-8**

    I-CSCF forwards the response to S-CSCF of UE#1.

Table A.4.3.1.2-8: 202 Accepted (I-CSCF to S-CSCF of UE#1)

```
SIP/2.0 202 Accepted
Via: 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:
P-Charging-Vector:
Privacy:
From:
To:
Call-ID:
CSeq:
Contact:
Content-Length:0
```

11. **NOTIFY (from UE#2 to P-CSCF) - see example in Table A.4.3.1.2-9**

    According to [RFC3515], UE#2 creates a subscription and sends a notification of the status of the refer.

Table A.4.3.1.2-9: NOTIFY (from UE#2 to P-CSCF)

```
NOTIFY 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=z9hG4bK23dh42.1
Max-Forwards: 70
Route: <sip:pcscf2.home2.net:5088;lr>,<sip:scscf2.home2.net;lr>, <sip:scscf1.home1.net;lr>,
   <sip:pcscf1.visited1.net;lr>
To: <sip:user1_public1@home1.net>;tag=171828
From: <sip:user2_public1@home2.net>;tag=151170
Call-ID: cb03a0s09a2sdfglkj490333
CSeq: 42 NOTIFY
Subscription-State: active;expires:7200
Event: refer
Contact: sip:[5555::eeee:ffff:aaaa:bbbb]:8805;comp=sigcomp
Content-Length: (…)
Content-Type: message/sipfrag

SIP/2.0 100 Trying
```

To: matches the From field of the original REFER message.

From: matches the To field of the original REFER message.

Call-ID: matches the Call-ID of the original REFER message.

12. **NOTIFY (from P-CSCF to S-CSCF) - see example in Table A.4.3.1.2-10**

P-CSCF forwards the message to S-CSCF.

Table: A.4.3.1.2-10: NOTIFY (from P-CSCF to S-CSCF)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
   [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
Max-Forwards: 69
Route: <sip:scscf2.home2.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
To:
From:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Length: (…)
Content-Type:

(...)
```

13. **NOTIFY (from S-CSCF to UE#1 home network) - see example in Table A.4.3.1.2-11.**

S-CSCF forwards the message to UE#1 home network (S-CSCF#1).

Table A.4.3.1.2-11: NOTIFY (from S-CSCF to UE#1 home network)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
   [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
Max-Forwards: 68
Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
To:
From:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Length: (…)
Content-Type:

(...)
```

14. **200 OK (S-CSCF of UE#1 to S-CSCF) – see example in Table A.4.3.1.2-12.**

S-CSCF receives a 200 OK to NOTIFY from UE#1 home network.

Table A.4.3.1.2-12: 200 OK (S-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
      pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
      [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

15. **200 OK (S-CSCF to P-CSCF) – see example in Table A.4.3.1.2-13.**

    The S-CSCF forwads the 200 OK response to the P-CSCF.

Table A.4.3.1.2-13: 200 OK (S-CSCF to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
      [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

16. **200 OK (P-CSCF to UE#2) – see example in Table A.4.3.1.2-14.**

    The P-CSCF forwards the 200 OK response to UE#2.

Table A.4.3.1.2-14: 200 OK (P-CSCF to UE#2)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

17. **UE#2 joins the conference.**

    UE#2 joins the conference. The message flows are depicted in Subclause 6.3.2.

18. **NOTIFY (from UE#2 to P-CSCF) - see example in Table A.4.3.1.2-15.**

    P-SCSF receives a NOTIFY from UE#2 indicating the status of the refer.

Table A.4.3.1.2-15: NOTIFY (from UE#2 to P-CSCF)

```
NOTIFY 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=z9hG4bK23dh42.1
Max-Forwards: 70
Route: <sip:pcscf2.visited2.net:5088;lr>,<sip:scscf2.home2.net;lr>, <sip:scscf1.home1.net;lr>,
   <sip:pcscf1.visited1.net;lr>
To: <sip:user1_public1@home1.net>; tag=171828
From: <sip:user2_public1@home2.net>;tag=151170
Call-ID: cb03a0s09a2sdfglkj490333
CSeq: 43 NOTIFY
Subscription-State: terminated
Event: refer
Contact:
Content-Length: (…)
Content-Type: message/sipfrag

SIP/2.0 200 OK
```

To: matches the From field of the original REFER message.

From: matches the To field of the original REFER message.

Call-ID: matches the Call-ID of the original REFER message.

Subscription-State: indicates that the implicit subscription to the REFER event has been terminated.

19. NOTIFY (from P-CSCF to S-CSCF) - see example in Table A.4.3.1.2-16.

P-CSCF forwards the message to S-CSCF.

Table A.4.3.1.2-16: NOTIFY (from P-CSCF to S-CSCF)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
   [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
Max-Forwards: 69
Route: <sip:scscf2.home2.net;lr>, <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
To:
From:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Length: (…)
Content-Type:

(...)
```

20. **NOTIFY (from S-CSCF to S-CSCF of UE#1) - see example in Table A.4.3.1.2-17.**

    S-CSCF forwards the message to UE#1 home network.

Table A.4.3.1.2-17: NOTIFY (from S-CSCF to S-CSCF of UE#1)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK23d244.1, SIP/2.0/UDP
   pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
   [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
Max-Forwards: 68
Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
To:
From:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Length: (…)
Content-Type:

(...)
```

21. **200 OK (S-CSCF of UE#1 to S-CSCF) – see example in Table A.4.3.1.2-18.**

    S-CSCF receives a 200 OK to NOTIFY from UE#1 home network.

Table A.4.3.1.2-18: 200 OK (S-CSCF of UE#1 to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK23d244.1, SIP/2.0/UDP
      pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
      [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

22. **200 OK (P-CSCF to S-CSCF) – see example in Table A.4.3.1.2-19.**

    The S-CSCF forwads the 200 OK response to the P-CSCF.

Table A.4.3.1.2-19: 200 OK (S-CSCF to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net;branch=z9hG4bK234223.1, SIP/2.0/UDP
      [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

23. **200 OK (P-CSCF to UE#2) – see example in Table A.4.3.1.2-20.**

    The P-CSCF forwards the 200 OK response to UE#2.

Table A.4.3.1.2-20: 200 OK (P-CSCF UE#2)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp;branch=z9hG4bK23dh42.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

A.4.4 User requesting IMS to join another user

A.4.4.1 User in a different network

A.4.5 User joins a private conversation to a conference

A.4.5.1 User in a different network

A.5 Flows demonstrating a user subscribing to the conference event package

A.5.1 Introduction

A.5.2 User subscribing to the conference state event package

A.5.2.1 User in a different network

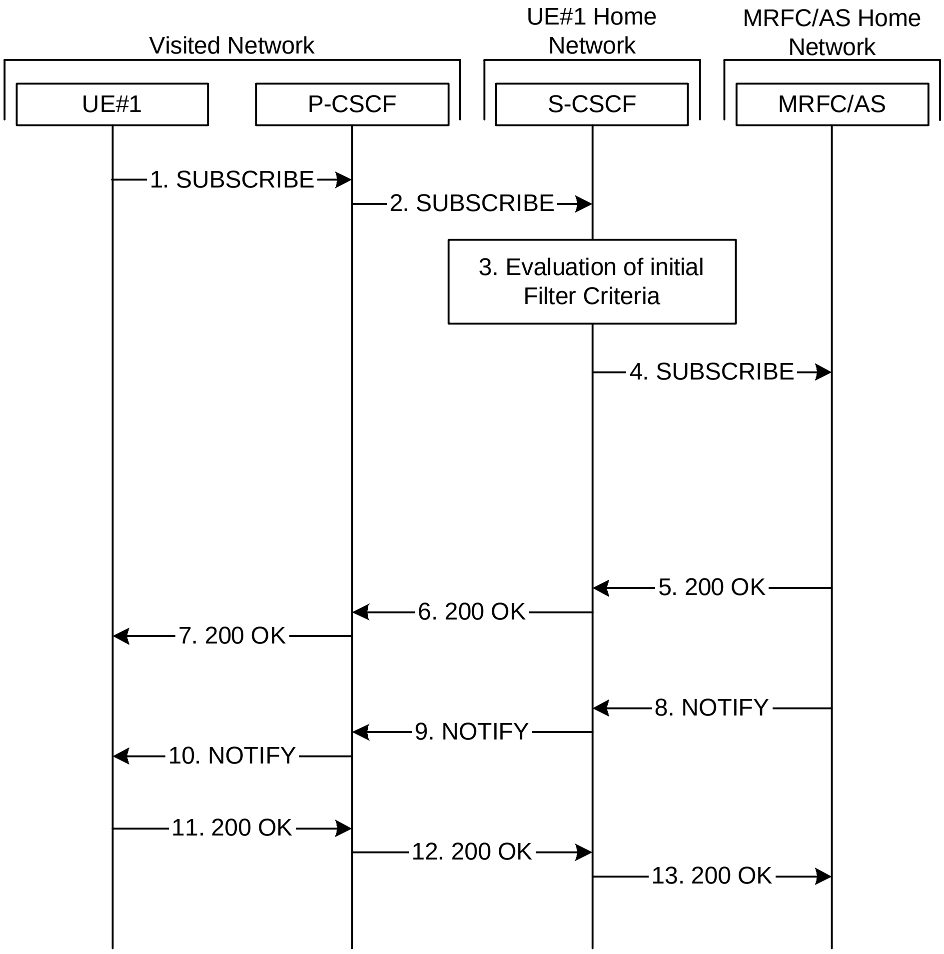


Figure A.5.2.1-1: User subscribing to conference state event package – user in a different network

Figure A.5.2.1-1 shows an IMS user subscribing to the conference state event for a specific conference that is provided at a MRFC/AS located in another network. The conference URI, which is used for subscription to the conference event package, does include a FQDN in the host part in this example.

The details of the flows are as follows:

1. **SUBSCRIBE (UE to P-CSCF) - see example in table A.5.2.1-1**

   A user agent wants to get informed about the state of a certain conference, the involved users and their related media states. The conference is identified by a conference URI. In order to initiate a subscription to the MRFC/AS, the UE generates a SUBSCRIBE request containing the 'conference' event, together with the length of time this periodic subscription should last. For this example it is assumed that the UE is only interested in information about "membership" and "basic media".

Table A.5.2.1-1: SUBSCRIBE (UE to P-CSCF)

```
SUBSCRIBE sip:conference1@mrfc2.home2.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.visited1.net:7531;lr;comp=sigcomp>, <sip:orig@scscf1.home1.net;lr>
P-Preferred-Identity: <sip:user1_public1@home1.net>
Privacy: none
From: <sip:user1_public1@home1.net>;tag=31415
To: <sip:conference1@mrfc2.home2.net>
Call-ID: b89rjhnedlrfjflslj40a222
CSeq: 61 SUBSCRIBE
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=7531
Event: conference;recurse;type="membership,basic-media"
Expires: 7200
Accept: application/conference-info+xml
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Content-Length: 0
```

Request-URI: contains the conference URI.

Route: The Route header is populated with the service route from registration.

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.

From: the user does not require privacy, the From header contains the value requested by the user.

Event: This field is populated with the value 'conference;recurse;type="membership,basic-media"' to specify the use of the conference state event package and to indicate that also the participants of conferences that act as participants to this conference shall be listed. The type parameter is used to indicate what conference information is requested.

Accept: This field is populated with the value 'application/conference-info+xml'.

To: same as the Request-URI.

Contact: is a SIP URI that contains the IP address or FQDN of the originating UE.

2. **SUBSCRIBE (P-CSCF to S-CSCF) - see example in table A.5.2.1-2**

   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.

   The SUBSCRIBE request is forwarded to the S-CSCF.

Table A.5.2.1-2: SUBSCRIBE (P-CSCF to S-CSCF)

```
SUBSCRIBE sip:conference1@mrfc2.home2.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
P-Asserted-Identity: <sip:user1_public1@home1.net>
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy:
Route: <sip:orig@scscf1.home1.net;lr>
Record-Route: <sip:pcscf1.visited1.net;lr>
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-Charging-Vector: The P-CSCF inserts this header and populates the icid parameters with a globally unique value

3. **Evaluation of initial filter criteria**

   S-CSCF validates the service profile of this subscriber and evaluates the initial filter criteria.

4. **SUBSCRIBE (S-CSCF to MRFC/AS) - see example in table A.5.2.1-4**

   S-CSCF forwards the SUBSCRIBE request to the MRFC/AS based on the request URI of the SUBSCRIBE request. The S-CSCF does not re-write the request URI.

Table A.5.2.1-4: SUBSCRIBE request (S-CSCF to MRFC/AS)

```
SUBSCRIBE sip:conference1@mrfc2.home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.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
P-Asserted-Identity:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net
Privacy:
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1;lr>
From:
To:
Call-ID:
CSeq:
Event:
Expires:
Accept:
Contact:
Content-Length:
```

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. **200 OK (MRFC/AS to S-CSCF) – see example in table A.5.2.1-5 (related to table A.5.2.1-4)**

   The MRFC/AS performs the necessary authorisation checks on the originator to ensure that he/she is allowed to subscribe to this specific conference. In this example the conditions have been met, so the MRFC/AS acknowledges the SUBSCRIBE request (6) with a 200 (OK) response.

Table A.5.2.1-5: 200 OK (MRFC/AS to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.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-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net;
      term-ioi=home2.net
From:
To: <sip:conference1@mrfc2.home2.net>;tag=151170
Call-ID:
CSeq:
Event:
Expires:
Contact: <sip:conference1@mrfc2.home2.net>
Content-Length:
```

6. **200 OK (S-CSCF to P-CSCF) - see example in table A.5.2.1-6**

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

Table A.5.2.1-6: 200 OK (S-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:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
From:
To:
Call-ID:
CSeq:
Event:
Expires:
Contact:
Content-Length:
```

7. **200 OK (P-CSCF to UE) - see example in table A.5.2.1-7**

   P-CSCF forwards the 200 OK response to UE.

Table A.5.2.1-7: 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:
From:
To:
Call-ID:
CSeq:
Event:
Expires:
Contact:
Content-Length:
```

8. **NOTIFY (MRFC/AS to S-CSCF) – see example in table A.5.2.1-8**

   The MRFC/AS generates a NOTIFY message that includes information about all participants that the subscribing user is allowed to see. The information about one participant includes

   - the SIP URI identifying the user;
   - the dialog state associated for that users attachment to the conference;
   - the users status in the conference (active, declined, departed); and

- the users status in terms of receiving media in the conference.

Table A.5.2.1-8: NOTIFY (MRFC/AS to S-CSCF)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP mrfc2.home2.net;branch=z9hG4bK348923.1
Max-Forwards: 70
Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From: <sip:conference1@mrfc2.home2.net>;tag=151170
To: <sip:user1_public1@home1.net>;tag=31415
Call-ID: b89rjhnedlrfjflslj40a222
CSeq: 42 NOTIFY
Subscription-State: active ;expires=7200
Event: conference;recurse
Contact: <sip:conference1@mrfc2.home2.net>
Content-Type: application/conference-info+xml
Content-Length: (...)

   <?xml version="1.0" encoding="UTF-8"?>
   <conference-info   version="0"
                      state="full"
                      entity="conference1@mrfc2.home2.net"
                      xmlns="urn:ietf:params:xml:ns:conference-info">
     <user uri="sip:user1_public1@home1.net" display-name="John Doe">
       <status>active</status>
       <media-status>
         <media-stream media-type="audio"/>
       </media-status>
     </user>
     <user uri="sip:user3_public1@home3.net" display-name="Simon Moon">
       <status>active</status>
     </user>
   </conference-info>
```

From: The tag of this field matches that of the To; field in the received 200 (OK) for the SUBSCRIBE.

Content-Type: Set to the value of the Accept: header received in the SUBSCRIBE request.

The message body in the NOTIFY request that carries the conference state information of the conference participants is formed as indicated in draft-ietf-sipping-conference-package-00 [7.82].

9. **NOTIFY (S-CSCF to P-CSCF) – see example in table A.5.2.1-9**

   The S-CSCF forwards the NOTIFY request to the P-CSCF.

Table A.5.2.1-9: NOTIFY (S-CSCF to P-CSCF)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
      mrfc2.home2.net;branch=z9hG4bK348923.1
Max-Forwards: 69
Route: <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Type:
Content-Length:

(...)
```

10. **NOTIFY (P-CSCF to UE) – see example in table A.5.2.1-10**

    P-CSCF forwards the NOTIFY request to UE.

Table A.5.2.1-10: NOTIFY (P-CSCF to UE)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UPD
      scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
      mrfc2.home2.net;branch=z9hG4bK348923.1
Max-Forwards: 68
From:
To:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Type:
Content-Length:

(...)
```

11. **200 OK (UE to P-CSCF) – see example in table A.5.2.1-11 (related to table A.5.2.1-10)**

    The UE acknowledges the NOTIFY request with a 200 (OK) response to the P-CSCF.

Table A.5.2.1-11: 200 OK (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UPD
      scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
      mrfc2.home2.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

12. **200 OK (P-CSCF to S-CSCF) – see example in table A.5.2.1-12**

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

Table A.5.2.1-12: 200 OK (I-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UPD scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
      mrfc2.home2.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
CSeq:
Content-Length:
```

13. **200 OK (S-CSCF to MRFC/AS) – see example in table A.5.2.1-13**

    S-CSCF forwards the 200 (OK) response to the MRFC/AS.

Table A.5.2.1-13: 200 OK (S-CSCF to MRFC/AS)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP mrfc2.home2.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
CSeq:
Content-Length:
```

A.6 Flows demonstrating a user leaving a conference

A.6.1 Introduction

A.6.2 User leaving the conference

A.6.2.1 User in a different network

Figure A.6.2.1-1 shows an IMS user leaving a conference. The example shows the flow for the user, who created the conference with a conference-factory URI. For this example it is assume that the user is subscribed to the conference state event package at the MRFC/AS.

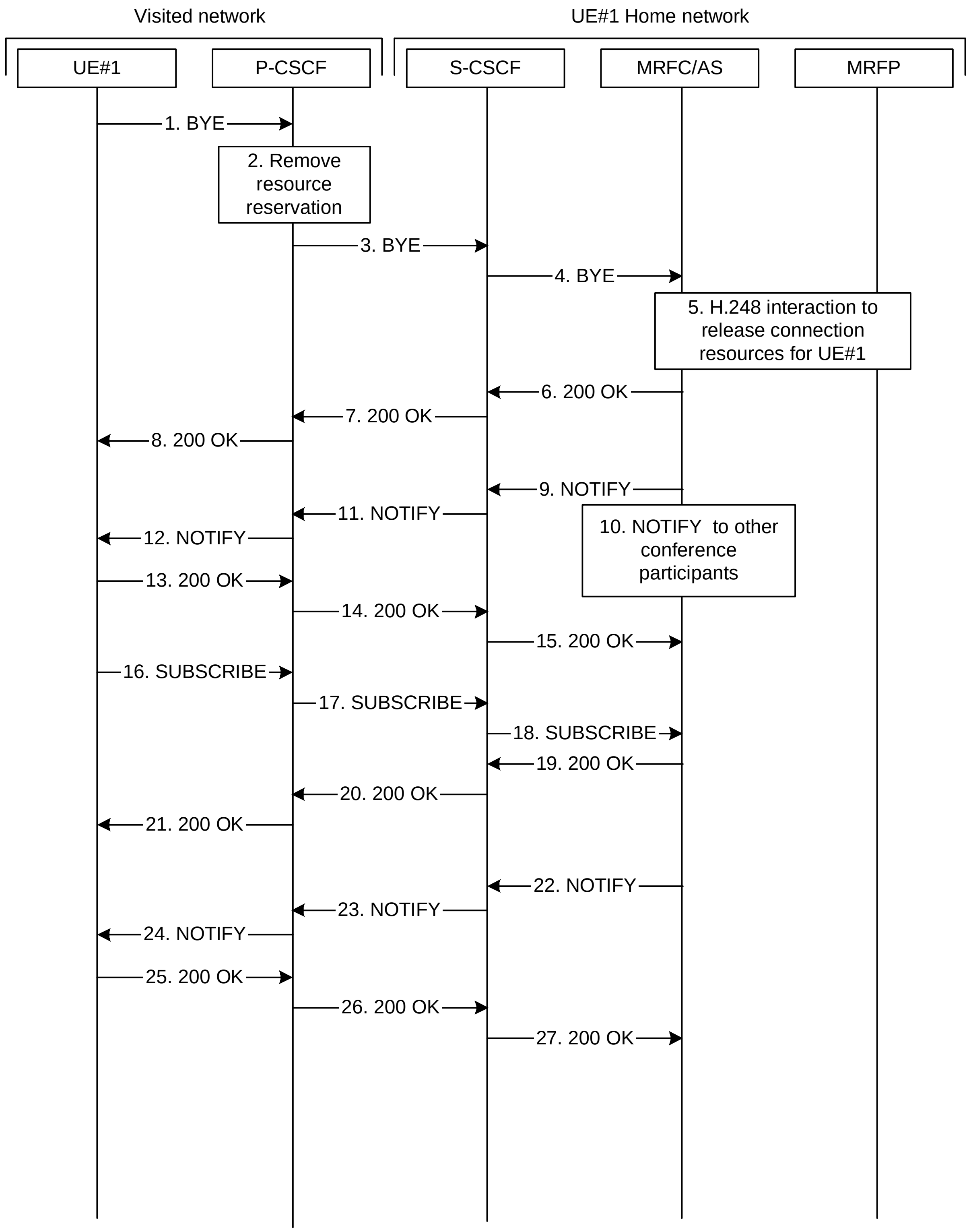


Figure A.6.2.1-1. User leaving a conference

The details of the flows are as follows.

1. BYE (UE to P-CSCF) – see example in Table A.6.2.1-1

A user agent wants to leave a conference. For this purpose the user agent sends a BYE message to the P-CSCF with the Conference-URI as the Request-URI.

Table A.6.2.1-1: BYE (UE to P-CSCF)

```
BYE sip:conference1@mrfc1.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-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>; tag=171828
To: <sip:conference-factory1@mrfc1.home1.net>; tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=7531
Cseq: 153 BYE
Content-Length: 0
```

Request-URI: contains the value of the Conference-URI as learned during conference creation.

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

To: contains the conference-factory URI, that was used by this user to create the conference.

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

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

2. **Remove resource reservation**

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

3. **BYE (P-CSCF to S-CSCF) - see example in table A.6.2.1-2**

   The P-CSCF removes the Security-Verify header, and the sec-agree tag from the Require and Proxy-Require headers. As the Require and Proxy-Require headers are empty, it removes these headers completely.

Table A.6.2.1-2: BYE (P-CSCF to S-CSCF)

```
BYE sip:conference1@mrfc1.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>
P-Access-Network-Info:
From:
To:
Call-ID:
Cseq:
Content-Length: 0
```

4. **BYE (S-CSCF to MRFC/AS) - see example in table A.6.2.1-3**

   The S-CSCF forwards the BYE to the MRFC/AS.

Table A.6.2.1-3: BYE (S-CSCF to MFRC/AS)

```
BYE sip:conference1@mrfc1.home1.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
From:
To:
Call-ID:
Cseq:
Content-Length:
```

5. **H.248 interaction to release resources**

   MRFC/AS interacts with the MRFP to release the resources reserved for UE#1 in this conference.

6. **200 OK (MRFC/AS to S-CSCF) - see example in table A.6.2.1-4**

   After succesfully releasing the resources from the MRFP, the MRFC/AS sends a 200 OK message to the S-CSCF.

Table A.6.2.1-4: 200 OK (MRFC/AS to S-CSCF)

```
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: 0
```

7. **200 OK (S-CSCF to P-CSCF) - see example in table A.6.2.1-5**

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

Table A.6.2.1-5: 200 OK (S-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: 0
```

8. **200 OK (P-CSCF to UE) - see example in table A.6.2.1-6**

   P-CSCF forwards the message to the UE.

Table A.6.2.1-6: 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: 0
```

9. **NOTIFY (MRFC/AS to S-CSCF) – see example in table A.6.2.1-7**

   The MRFC/AS generates a NOTIFY message to indicate that UE1 has left the conference.

Table A.6.2.1-7: NOTIFY (MRFC/AS to S-CSCF)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP mrfc1.home1.net;branch=z9hG4bK348923.1
Max-Forwards: 70
Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From: <sip:conference1@mrfc1.home1.net>;tag=151170
To: <sip:user1_public1@home1.net>;tag=31415
Call-ID: b89rjhnedlrfjflslj40a222
CSeq: 42 NOTIFY
Subscription-State: active ;expires=7200
Event: conference
Contact: <sip:conference1@mrfc1.home1.net>
Content-Type: application/conference-info+xml
Content-Length: (...)

   <?xml version="1.0" encoding="UTF-8"?>
   <conference-info   version="0"
                      state="full"
                      entity="conference1@mrfc1.home1.net"
                      xmlns="urn:ietf:params:xml:ns:conference-info">
     <user uri="sip:user1_public1@home1.net" display-name="John Doe">
       <status>departed</status>
       <media-status>
         <media-stream media-type="audio"/>
       </media-status>
     </user>
     <user uri="sip:user3_public1@home3.net" display-name="Simon Moon">
       <status>active</status>
     </user>
   </conference-info>
```

From: The tag of this field matches that of the To: field in the received 200 (OK) for the initial SUBSCRIBE.

To: The tag of this field matches the of the From: field in the intial SUBSCRIBE.

Call-ID: Matches that of the initial SUBSCRIBE.

Content-Type: Set to the value of the Accept: header received in the SUBSCRIBE request.

Subscription-State: Set to the value "active", as the user stays still subscribed to the conference state event package. The BYE request does only terminate the session and INVITE created dialog, but not the subscription.

Content-Type: Set to the value of the Accept: header received in the SUBSCRIBE request.

The message body in the NOTIFY request that carries the conference state information of the conference participants is formed as indicated in draft-ietf-sipping-conference-package-00 [7.82].

10. **Other conference participants are notified**

    MRFC/AS similarly notifies other conference participants that have subscribed to the event notification service that UE1 has left the conference.

11. **NOTIFY (S-CSCF to P-CSCF) – see example in table A.6.2.1-9**

    The S-CSCF forwards the NOTIFY request to the P-CSCF.

Table A.6.2.1-9: NOTIFY (S-CSCF to P-CSCF)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
      mrfc1.home1.net;branch=z9hG4bK348923.1
Max-Forwards: 69
Route: <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Type:
Content-Length:

(...)
```

12. **NOTIFY (P-CSCF to UE) – see example in table A.6.2.1-10**

    P-CSCF forwards the NOTIFY request to UE.

Table A.6.2.1-10: NOTIFY (P-CSCF to UE)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net:7531;comp=sigcomp;branch=z9hG4bK240f34.1, SIP/2.0/UPD
      scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
      mrfc1.home1.net;branch=z9hG4bK348923.1
Max-Forwards: 68
From:
To:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Type:
Content-Length:

(...)
```

13. **200 OK (UE to P-CSCF) – see example in table A.6.2.1-11 (related to table A.6.2.1-10)**

    The UE acknowledges the NOTIFY request with a 200 (OK) response to the P-CSCF.

Table A.6.2.1-11: 200 OK (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/UPD
      scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
      mrfc1.home1.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

14. **200 OK (P-CSCF to S-CSCF) – see example in table A.6.2.1-12**

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

Table A.6.2.1-12: 200 OK (P-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UPD scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
      mrfc1.home1.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
CSeq:
Content-Length:
```

15. **200 OK (S-CSCF to MRFC/AS) – see example in table A.6.2.1-13**

    S-CSCF forwards the 200 (OK) response to the MRFC/AS.

Table A.6.2.1-13: 200 OK (S-CSCF to MRFC/AS)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP mrfc1.home1.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
CSeq:
Content-Length:
```

16. **SUBSCRIBE (UE to P-CSCF) - see example in table A.6.2.1-14**

    User agent wants to terminate the subscription to the conference state event package. Therefore, it sends a SUBSCRIBE request to the P-CSCF with Expires: value of 0.

Table A.6.2.1-14: SUBSCRIBE (UE to P-CSCF)

```
SUBSCRIBE sip:conference1@mrfc1.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>
Privacy: none
From: <sip:user1_public1@home1.net>;tag=31415
To: <sip:conference1@mrfc1.home1.net>;tag=151170
Call-ID: b89rjhnedlrfjflslj40a222
CSeq: 62 SUBSCRIBE
Event: conference
Expires: 0
Content-Length: 0
```

Request-URI: contains the conference URI.

Route: The Route header is populated with the recorded route that was recorded during the initial subscription.

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].

From: The tag value in this header field matches that of the initial SUBSCRIBE.

To: The tag value in this header field matches that of the 200 OK to the intial SUBSCRIBE.

Call-ID: Matches that of the initial SUBSCRIBE.

Event: Identifies the event notification package.

Expires: A value of 0 indicates that the UE would like to unsubscribe from the notification service.

17. **SUBSCRIBE (P-CSCF to S-CSCF) - see example in table A.6.2.1-15**

    The SUBSCRIBE request is forwarded to the S-CSCF.

Table A.6.2.1-15: SUBSCRIBE (P-CSCF to S-CSCF)

```
SUBSCRIBE sip:conference1@mrfc1.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
Privacy:
Route: <sip:orig@scscf1.home1.net;lr>
From:
To:
Call-ID:
CSeq:
Event:
Expires:
```

18. **SUBSCRIBE (S-CSCF to MRFC/AS) - see example in table A.6.2.1-16**

    The SUBSCRIBE request is forwarded to the MRFC/AS.

Table A.6.2.1-16: SUBSCRIBE (S-CSCF to MRFC/AS)

```
SUBSCRIBE sip:conference1@mrfc1.home1.net SIP/2.0
Via: SIP/2.0/UDP scscf1.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
Privacy:
From:
To:
Call-ID:
CSeq:
Event:
Expires:
```

19. **200 OK (MRFC/AS to S-CSCF) – see example in table A.6.2.1-17 (related to table A.6.2.1-16)**

    The MRFC/AS removes the UE from the conference notification service and sends back a 200 OK message to the SUBSCRIBE.

Table A.6.2.1-17: 200 OK (MRFC/AS to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.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:
Content-Length:
```

20. **200 OK (S-CSCF to P-CSCF) – see example in table A.6.2.1-18**

    S-CSCF forwards the message to P-CSCF.

Table A.6.2.1-18: 200 OK (S-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:
Content-Length:
```

21. **200 OK (P-CSCF to UE) – see example in table A.6.2.1-19**

    P-CSCF forwards the message to UE.

Table A.6.2.1-19: 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:
Content-Length:
```

22. **NOTIFY (MRFC/AS to S-CSCF) – see example in table A.6.2.1-20**

The MRFC/AS generates a NOTIFY that confirmes that the subscription to the conference notification service is terminated.

Table A.6.2.1-20: NOTIFY (MRFC/AS to S-CSCF)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP mrfc1.home1.net;branch=z9hG4bK348923.1
Max-Forwards: 70
Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From: <sip:conference1@mrfc1.home1.net>;tag=151170
To: <sip:user1_public1@home1.net>;tag=31415
Call-ID: b89rjhnedlrfjflslj40a222
CSeq: 43 NOTIFY
Subscription-State: terminated
Event: conference
Contact: <sip:conference1@mrfc1.home1.net>
Content-Length: 0
```

From: The tag of this field matches that of the To: field in the received 200 (OK) for the SUBSCRIBE.

To: The tag of this field matches the of the From: field in the intial SUBSCRIBE.

Call-ID: Matches that of the initial SUBSCRIBE.

Content-Type: Set to the value of the Accept: header received in the SUBSCRIBE request.

Subscription-State: Value of "terminated" indicates that the UE has been unsubscribed from the conference notification service.

23. **NOTIFY (S-CSCF to P-CSCF) – see example in table A.6.2.1-21**

The S-CSCF forwards the NOTIFY request to the P-CSCF.

Table A.6.2.1-21: NOTIFY (S-CSCF to P-CSCF)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
      mrfc1.home1.net;branch=z9hG4bK348923.1
Max-Forwards: 69
Route: <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Length:
```

24. **NOTIFY (P-CSCF to UE) – see example in table A.6.2.1-22**

P-CSCF forwards the NOTIFY request to UE.

Table A.6.2.1-22: NOTIFY (P-CSCF to UE)

```
NOTIFY sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net:7531;comp=sigcomp;branch=z9hG4bK240f34.1, SIP/2.0/UPD
      scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
      mrfc1.home1.net;branch=z9hG4bK348923.1
Max-Forwards: 68
From:
To:
Call-ID:
CSeq:
Subscription-State:
Event:
Contact:
Content-Length: 0
```

25. **200 OK (UE to P-CSCF) – see example in table A.6.2.1-23 (related to table A.6.2.1-22)**

    The UE acknowledges the NOTIFY request with a 200 (OK) response to the P-CSCF.

Table A.6.2.1-23: 200 OK (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/UPD
      scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
      mrfc1.home1.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

26. **200 OK (P-CSCF to S-CSCF) – see example in table A.6.2.1-24**

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

Table A.6.2.1-24: 200 OK (P-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UPD scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
      mrfc1.home1.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
CSeq:
Content-Length:
```

27. **200 OK (S-CSCF to MRFC/AS) – see example in table A.6.2.1-25**

    S-CSCF forwards the 200 (OK) response to the MRFC/AS.

Table A.6.2.1-25: 200 OK (S-CSCF to MRFC/AS)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP mrfc1.home1.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
CSeq:
Content-Length:
```

A.6.3 User requesting the IMS to remove another user from conference

A.6.3.1 User in a different network

A.6.4 MRFC/AS drops a user from a conference

A.6.4.1 User in a different network

Figure A.6.4.1-1 shows an MRFC/AS dropping a user from a conference.

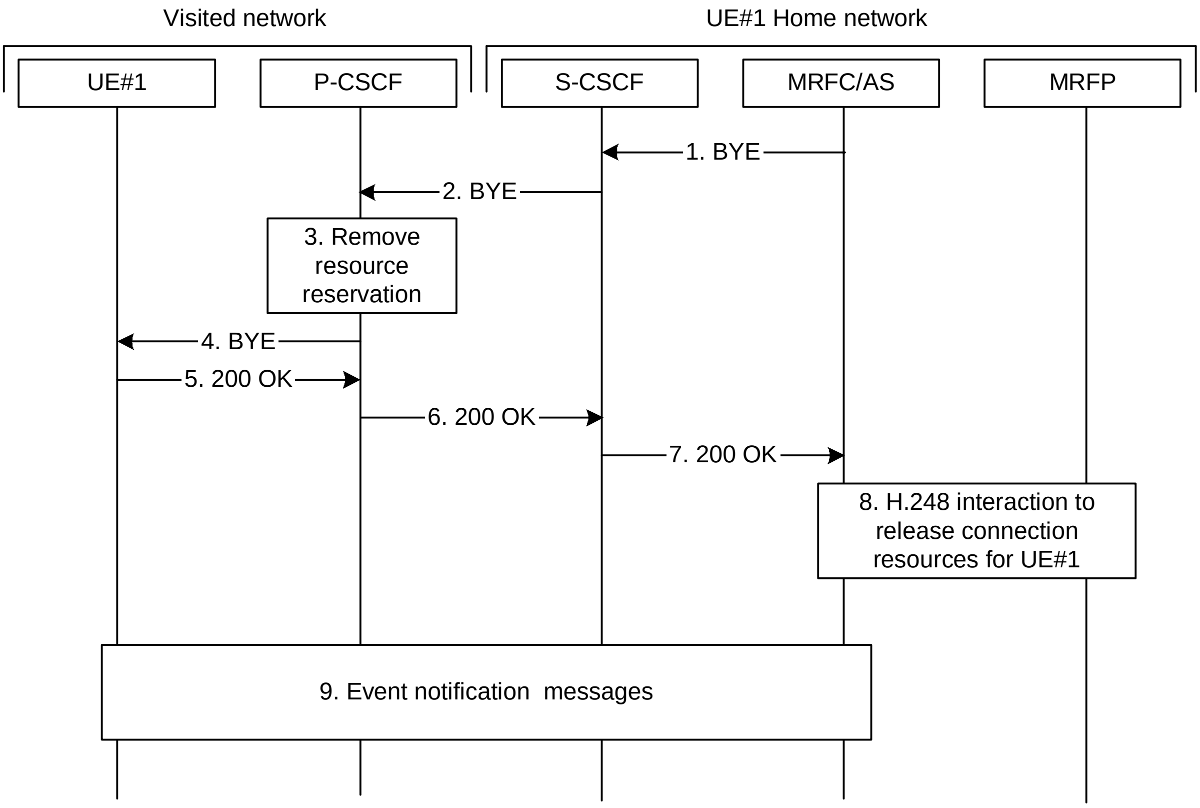


Figure A.6.4.1-1. MRFC/AS dropping a user from a conference

The details of the flows are as follows.

1. BYE (MRFC/AS to S-CSCF) – see example in Table A.6.4.1-1

MRFC/AS decides to drop a user from a conference. The decision may be based on a change in the conference policy, because the conference lifetime is exceeded, or some other reason.

The MRFC/AS issues a BYE request to the S-CSCF.

Table A.6.4.1-1: BYE (MRFC/AS to S-CSCF)

```
BYE sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP mrfc1.home1.net;branch=z9hG4bK348923.1
Max-Forwards: 70
Route: Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From: <sip:conference1@mrfc1.home1.net>; tag=314159
To: <sip:user1_public1@home1.net>; tag=171828
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 73 BYE
Content-Length: 0
```

Request-URI: contains the value of the Conference-URI as learned during conference creation.

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

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

CSeq: the content of the Cseq header must have a higher sequence number than the previous transaction. Here it is assumed that a Cseq value no greater than 72 has been previously used.

2. **BYE (S-CSCF to P-CSCF) - see example in table A.6.4.1-2**

The S-CSCF forwards the BYE request to the P-CSCF.

Table A.6.4.1-2: BYE (S-CSCF to P-CSCF)

```
BYE sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   mrfc1.home1.net;branch=z9hG4bK348923.1
Max-Forwards: 69
Route: <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length: 0
```

3. **Remove resource reservation**

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

4. **BYE (P-CSCF to UE) - see example in table A.6.4.1-3**

The P-CSCF forwards the BYE to the UE.

Table A.6.4.1-3: BYE (P-CSCF to UE)

```
BYE sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP mrfc1.home1.net;branch=z9hG4bK348923.1
Max-Forwards: 68
From:
To:
Call-ID:
Cseq:
Content-Length:
```

5. **200 OK (UE to P-CSCF) - see example in table A.6.4.1-4**

After successfully releasing the resources from the MRFP, the MRFC/AS sends a 200 OK message to the S-CSCF.

Table A.6.4.1-4: 200 OK (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP mrfc1.home1.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
Cseq:
Content-Length: 0
```

6. **200 OK (P-CSCF to S-CSCF) - see example in table A.6.4.1-5**

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

Table A.6.4.1-5: 200 OK (P-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   mrfc1.home1.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
Cseq:
Content-Length: 0
```

7. **200 OK (S-CSCF to MRFC/AS) - see example in table A.6.4.1-6**

   S-CSCF forwards the message to the MRFC/AS.

Table A.6.4.1-6: 200 OK (S-CSCF to MRFC/AS)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP mrfc1.home1.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
Cseq:
Content-Length: 0
```

8. **H.248 interaction to release resources**

   MRFC/AS interacts with the MRFP to release the resources reserved for UE#1 in this conference.

9. **Event notification messages**

   The MRFC/AS also terminates the user's subscription to the conference state event package. The message flow is identical to messages 6.5.2.1-22 to 6.5.2.1-27 in subclause 6.5.2.1. for an user leaving a conference.

A.7 Flows demonstrating conference termination

A.7.1 Introduction

A.7.2 Last user leaving the conference

A.7.2.1 User in a different network

A.7.3 User requesting IMS to terminate the conference

A.7.3.1 User in a different network

A.8 Flows demonstrating usage of hold and resume during conferences

A.9 Flows demonstrating conference participation from non-IMS networks

Annex B: Bibliography

The following documents constitute essential reading for the understanding of the conferencing service, and its provision by SIP. Unless additionally included in clause 2 of this specification, they do not constitute provisions for the support of conferencing by SIP in the IM CN subsystem, or of the related technical specifications 3GPP TS 23.218, 3GPP TS 24.228 or 3GPP TS 24.229.

Editor's Note: The material in this Annex will not be included in TS 23.218, TS 24.228 or TS 24.229.

Editor's Note: IETF drafts included in this annex are not being tracked as part of the IETF 3GPP coordination process as until they appear as a normative reference in another document, 3GPP is not dependent on them.

Editor's Note: Some of the below listed IETF drafts have not been adopted as working group items up till now. They are listed here as they are part of the outcome of the IETF conference design team.

[B1] IETF RFC 3261 (June 2002): "SIP: Session Initiation Protocol".

[B2] IETF RFC 3265 (June 2002): "Session Initiation Protocol (SIP)-Specific Event Notification".

[B3] "A Framework for Conferencing with the Session Initiation Protocol", J. Rosenberg, Internet-Draft, http://www.ietf.org/internet-drafts/draft-ietf-sipping-conferencing-framework-00.txt, February 2003

[B4] "Session Initiation Protocol Call Control - Conferencing for User Agents", A. Johnston, O. Levin, Internet-Draft, http://www.ietf.org/internet-drafts/draft-ietf-sipping-cc-conferencing-00.txt, August 2003

[B5] "Requirements for conference policy data", P. Koskelainen, Internet-Draft, http://www.ietf.org/internet-drafts/draft-koskelainen-sipping-conf-policy-req-00.txt, February 2003

[B6] "A Session Initiation Protocol (SIP) Event Package for Conference State", J. Rosenberg, H. Schulzrinne, Internet-Draft, http://www.ietf.org/internet-drafts/draft-ietf-sipping-conference-package-00.txt, June 2004

[B7] "Requirements for Tightly Coupled SIP Conferencing", O. Levin, R. Even, Internet-Draft http://www.ietf.org/internet-drafts/draft-levin-sipping-conferencing-requirements-03.txt, March 2003

[B8] "Conferencing media policy requirements", R. Even, O. Levin, N. Ismail, Internet-Draft, http://www.ietf.org/internet-drafts/draft-even-sipping-media-policy-requirements-00.txt, February 2003

[B9] "Requirements for Floor Control", P. Koskelainen, H. Schulzrinne, J. Ott, Internet-Draft, http://www.ietf.org/internet-drafts/draft-koskelainen-mmusic-floor-req-01.txt, October 2003

[B10] "Use of Session Initiation Protocol (SIP) and Simple Object Access Protocol (SOAP) for Conference Floor Control", Wu, Koskelainen, Schulzrinne, Internet-Draft, http://www.ietf.org/internet-drafts/draft-wu-sipping-floor-control-04.txt, September 2003

[B11] "Additional Requirements to Conferencing", Koskelainen, Schulzrinne, Wu, Internet-Draft, http://www.cs.columbia.edu/~petkos/draft-koskelainen-sipping-conf-requirements-00.txt, April 2002

[B12] "Media Policy Manipulation in the Conference Policy Control Protocol", R. Mahy, N. Ismail, Internet-Draft, http://www.ietf.org/internet-drafts/draft-mahy-sipping-media-policy-control-00.txt, February 2003

Annex C: Change history

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
17.03.03					Version 0.0.0 Editor's 1st draft to CN1		
04.04.03					Version 0.1.0 produced as a result of CN1#29. TR number assigned by MCC. Incorporating agreements from - N1-030541 - initial material - N1-030542 - structure of section 6 for call flows; and - N1-030565 - call flow for conference creation with conference-factory URI		
02.06.03					Version 0.2.0 produced as a result of CN1#30 Incorporating agreements from - N1-030602 – Flow: User joining a conference – flow 1 - N1-030775 – Update of references - N1-030909 – Text: Generic Procedures for Conferencing - N1-030910 – Flow: Update of conference factory URI flow - N1-030913 – Flow: User joining a conference – flow 2 - N1-030914 – Flow: Subscription to conference event package - N1-030936 – Text: Conference creation with conference factory URI - N1-030937 – Text: User joining a conference Updated subclause numbering as described in cover sheet		N1-031121
01.09.03					Version 0.3.0 produced as a result of CN1#31 Incorporating agreements from: - N1-031288 – Revised TR structure, to align with TS 24.124 The following CR's were incorporated and the editor adopted their content / structure to the revised TR structure: - N1-031131 – Flow: User getting invited to conference - N1-031134 – Text: Three way conference - N1-031266 – Flow corrections - N1-031268 – Text: Additions to clause 4 - Overview - N1-031282 – Flow: Usage of "Type" parameter in subscription - N1-031286 – Flow: Conference creation in other network - N1-031291 – Text: User Authentication at AS - N1-031322 – Text: AS invites other participant - N1-031292 – Text: AS procedures: User subscribes to conf event - N1-031293 – Text: User invites other user to conference (REFER) - N1-031294 – Flow: User invites other user to conference - N1-031297 – Flow: User leaving a conference - N1-031298 – Flow: AS drops user from conference	N1-031121	
10.09.03					mindor editorial updates		