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Technical Specification

**Digital cellular telecommunications system (Phase 2+);
Universal Mobile Telecommunications System (UMTS);
LTE;
Messaging service using the IP Multimedia (IM)
Core Network (CN) subsystem;
Stage 3
(3GPP TS 24.247 version 9.7.0 Release 9)**

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650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00   Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
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Contents

Foreword

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1 Scope

The present document provides the protocol details for the messaging service within the IP Multimedia CN Subsystem (IMS) based on the Session Initiation Protocol (SIP), the Session Description Protocol (SDP) and, the Message Session Relay Protocol (MSRP) . The document covers immediate messaging, session based messaging and session-based messaging conferences, as described in 3GPP TS 22.340.

Where possible the present document specifies the requirements for this protocol by reference to specifications produced by the IETF within the scope of SIP, SDP and, MSRP, either directly, or as modified by 3GPP TS 24.229.

The present document is applicable to Application Servers (ASs) , Media Resource Function Controllers (MRFCs), Media Resource Function Processors (MRFPs) and to User Equipment (UE) providing messaging capabilities.

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

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 Release 5: "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]   IETF RFC 3261 (March 2002): "SIP: Session Initiation Protocol".

[8]   IETF RFC 3428 (December 2002): "Session Initiation Protocol (SIP) Extension for Instant Messaging".

[9]   IETF RFC 4975 (September 2007): "The Message Session Relay Protocol (MSRP)".

[10]   3GPP TS 24.147: "Conferencing using the IP Multimedia (IM) Core Network (CN) subsystem; Stage 3".

[11]   3GPP TS 22.340: "IP Multimedia System (IMS) messaging; Stage 1".

[12]   IETF RFC 5365 (October 2008): "Multiple-Recipient MESSAGE Requests in the Session Initiation Protocol (SIP)".

[13]   IETF RFC 3994 (January 2005): "Indication of Message Composition for Instant Messaging".

[14]   3GPP TS 26.141 "IP Multimedia System (IMS) Messaging and Presence; Media formats and codecs".

[15]   RFC 5547.txt (May 2009): "A Session Description Protocol (SDP) Offer/Answer Mechanism to Enable File Transfer".

[16]   IETF RFC 5360 (October 2008): "A Framework for Consent-Based Communications in the Session Initiation Protocol (SIP)".

[17]   3GPP2 C.S0050-B: "3GPP2 File Formats for Multimedia Services".

[18]   IETF RFC 6135 (February 2011): "An Alternative Connection Model for the Message Session Relay Protocol (MSRP)".

[19]   draft-ietf-simple-msrp-cema-07.txt (July 2012): "Connection Establishment for Media Anchoring (CEMA) for the Message Session Relay Protocol (MSRP)".

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

3   Definitions, symbols and abbreviations

3.1   Definitions

IsComposing information   This is a term used to indicate that an indication is sent to the communicating user when a user in entering a new message.

For the purposes of the present document, the following terms and definitions given in 3GPP TS 22.340 [11] apply:

Immediate messaging

Session based messaging

Session based messaging conferences

For the purposes of the present document, the [following] terms and definitions given in RFC 4975 [9] apply:

Host

Page-mode messaging

Session inactivity timer

Session-mode messaging

Session-mode messaging conferences

Visitor

For the purposes of the present document, the following terms and definitions given in 3GPP TS 24.147 [10] apply:

Conferencing Application Server

3.2   Abbreviations

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

AS   Application Server
CN   Core Network
DM   Data manipulator
DMS   Data manipulation server
IM   IP Multimedia
IMS   IP Multimedia CN subsystem

IP	Internet Protocol
MRFC	Media Resource Function Controllers
MRFP	Media Resource Function Processors
MSRP	Message Session Relay Protocol
SBLP	Service Based Local Policy
SDP	Session Description Protocol
SIP	Session Initiation Protocol
UE	User Equipment
URL	Uniform Resource Locator

4 Messaging overview

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 using the Session Initiation Protocol, as defined in RFC 3261 [7]. Although these basic mechanisms already allow the exchange of instant messaging information using SIP, this functionality can be extended to provide a richer service within the IMS.

The messaging service within the IM CN subsystem provides the means for a user to send or receive single messages immediately to / from another user and to create and participate in a messaging conference with one ore more other users. Participants to such message based communication may be internal or external to the home network.

When to use an immediate message and when to use a session-based messaging session will depend on the application.

> NOTE: Some participants may always use session-based messaging, while others may use immediate messaging or a combination of session-based messaging and immediate messaging dependant of the characteristics of the messaging session. The criteria are implementation and application specific.

For immediate messaging the procedures for page-mode messaging, as defined in RFC 3428 [8] or for session-mode messaging, as defined in RFC 4975 [9], draft-ietf-simple-msrp-cema [19] and RFC 6135 [18] are utilized. When to use an page-mode messaging and when to use session-mode messaging session for the purpose of immediate messaging will depend on the application.

For session-based messaging and session-based messaging conferences, the Message Session Relay Protocol (MSRP) is utilized to transport messages.

The architecture for the 3GPP messaging is specified in 3GPP TS 23.228 [6] and 3GPP TS 23.218 [3]. The 3GPP recommended media formats and codecs are specified in 3GPP TS 26.141 [14]. The 3GPP2 recommended media formats and codecs are specified in 3GPP2 C.S0050-B [17].

The functional split for session-mode messaging between an AS, MRFC and MRFP is that same as that described in clause 4 in 3GPP TS 24.147 [10] for SIP based conferences. The functional split between the AS, MRFC and MRFP for page-model messaging is out of scope of the present document.

5 Protocol using SIP for page-mode messaging

5.1 Introduction

5.1.1 Sending immediate message to multiple recipients

The UE may be able to send a single immediate message to multiple recipients by including in the MESSAGE request the list of URIs (i.e., URI-list) that identify the intended recipients.

The UE shall create a MESSAGE request in accordance with 3GPP TS 24.229 [5], and it shall also include a multipart body in the MESSAGE request. The Request-URI shall be set to the SIP URI of the Application Server that implements the role of the List Server. The multipart body shall contain the body carrying the URI-list (in the XML format) whose Content-Disposition type is 'recipient-list', and the body that contains the immediate message payload as specified in the RFC 5365 [12].

The handling of the received response shall be in accordance with 3GPP TS 24.229 [5].

5.2 Functional entities

5.2.1 User Equipment (UE)

For the purpose of page-mode messaging, the UE shall implement the role of a Participant as described in subclause 5.3.1.

5.2.2 Application Server (AS)

As the functional split for the purposes of page mode messaging between the AS and the MRFC is out of scope of the present document, the procedures are described for a combined AS and MRFC. The AS and MRFC may either be collocated, or interoperate using a proprietary protocol and a proprietary functional split.

For the purpose of page-mode messaging, an Application Server may implement the role of a List Server as described in subclause 5.3.3. An Application Server may implement the role of a Participant as described in subclause 5.3.1

5.2.3 Media Resource Function Controller (MRFC)

As the function split for the purposes of page mode messaging between the MRFC and the AS is out of scope of the present document, the procedures for the MRFC are described together with those for the AS in subclause 5.2.2.

5.3 Role

5.3.1 Participant

5.3.1.1 General

For the purpose of page-mode messaging a participant will send a page-mode message using a SIP MESSAGE request as defined in RFC 3428 [8] to another participant.

5.3.1.2 Sending of an immediate message

When sending a page-mode message to another participant or to a list server, the participant shall construct and send a MESSAGE request in accordance with RFC 3428 [8] and subclause 5.1.2A.1 of 3GPP TS 24.229 [5].

The participant may include in a MESSAGE request an isComposing status message as defined in RFC 3994 [13].

The participant shall stop transmitting isComposing status messages if the participant receives a 415 (Unsupported Media Type) status code in a response to a MESSAGE request containing the status indication.

The Request URI shall either be:

- the URI of the other participant; or

- a PSI identifying a group.

5.3.1.3 Receiving an immediate message

Upon receipt of a MESSAGE request, the participant shall perform the procedures as described in RFC 3428 [8] and subclause 5.1.2A.2 of 3GPP TS 24.229 [5].

NOTE: A MESSAGE request can be used for applications other than immediate messaging (e.g. 3GPP TS 23.228 [6] subclause 5.4.9), and the handling of received MESSAGE requests for such applications is outside the scope of this specification.

5.3.1.4 Consent to list server distribution

A participant capable of receiving message requests should support the requirements of a recipient defined in RFC 5360 [16].

5.3.2 Application Server (AS)

5.3.2.1 Receiving an immediate message for unregistered Public User Identity

When an immediate message destined for an unregistered Public User Identity arrives at the user's home network, the I-CSCF and S-CSCF perform the actions as specified in 3GPP TS 24.229 [5].

If the Public User Identity has services related to unregistered state activated (i.e., hold the MESSAGE request temporarily in the network.), the MESSAGE request will be routed to an AS, which processes the request further on. The AS may then hold the MESSAGE request and deliver the MESSAGE request when either the UE becomes reachable or the validity of the message expires as specified in RFC 3428 [8].

5.3.3 List Server

5.3.3.1 List server originating case

In addition to the procedure specified in subclause 5.3.3.2 the list server shall follow the procedures of 3GPP TS 24.229 [5] subclause 5.7.3 when acting as an originating UA.

The PSI is used to address a predefined list of URIs.

The list server shall send a MESSAGE request to each of the entries in the predefined URI list. For each of MESSAGE requests the list server shall populate the header fields as follows:

a) the Request URI header fields set to the URI of one of the entries of the predefined URI list;

b) the From header field set to the same value as the From header field (excluding the "tag" parameter) that was received in the incoming MESSAGE request;

c) the To header fields set to the same value as the To header field that was received in the incoming MESSAGE request;

d) the P-Charging-Vector header that includes:

  1) the value of the icid parameter if available; and

  2) the value of the orig-ioi parameter if available;

e) the P-Charging-Function-Addresses header containing the values received in the incoming MESSAGE request or, if the P-Charging-Function-Addresses header was not received in the incoming MESSAGE request, indicate the values applicable for the list server in the P-Charging-Function-Addresses header; and

f) the P-Asserted Identity header and Privacy header containing the values received in the MESSAGE request;

The handling of the 200 (OK) response shall be in accordance with 3GPP TS 24.229 [5].

5.3.3.2 List server terminating case

Upon receipt of a MESSAGE request that includes a PSI in the request URI the list server shall:

1) check if the PSI is allocated to a predefined URI list and rejects the request in accordance with RFC 3261 [7] if it is not allocated. The following actions in this subclause shall only be performed if the distribution list URI is allocated;

2) verify the identity of the user as described in subclause 5.7.1.4 of 3GPP TS 24.229 [5] and authorize the request as described in subclause 5.7.1.5 of 3GPP TS 24.229 [5]. The following actions in this subclause shall only be performed if the request can be authorized;

3) create a 202 (Accepted) response. The response shall be in accordance with the procedures of 3GPP TS 24.229 [5] subclause 5.7.1.2 in relation to the contents of the P-Charging-Function-Addresses header and the P-Charging-Vector header; and :

   a) include the P-Charging-Vector header including:

      i)   the value of the icid parameter as received in the MESSAGE request;

      ii) the value of the orig-ioi parameter as received in the MESSAGE request; and

      iii) the term-ioi parameter, indicating the network of the list server; and

   b) include the P-Charging-Function-Addresses header as received in the MESSAGE request or, if the P-Charging-Function-Addresses header was not received in the MESSAGE request, indicate the values applicable for the list server in the P-Charging-Function-Addresses header; and

4) send the 202 (Accepted) response.

5.3.3.3   List Server processing the MESSAGE URI-list

Upon receiving the MESSAGE request with the URI-list included in the multipart body, the List Server shall inform the UE that it has received the MESSAGE request by returning the 202 (Accepted) response. Subsequently, the List Server shall create a MESSAGE request for each intended recipient listed in the URI-list, and it shall insert the immediate message payload into the body of each outgoing MESSAGES request.

When creating the outgoing MESSAGE requests destined for each recipient, the List Server shall follow the procedures described in the 3GPP TS 24.229 [5]. The List Server shall populate the header fields of each outgoing MESSAGE request as follows:

- the Request-URI set to the SIP URI of the intended recipient;

- the From header field set to the same value as the From header field that was received in the incoming MESSAGE request;

- the To header set to the SIP URI of the intended recipient; and

- the remaining headers set to the values as specified in 3GPP TS 24.229 [5] subclause 5.7.3.

The List Server shall also compose the multipart body of the outgoing MESSAGE request as specified in the RFC 5365 [12], and included it in the outgoing MESSAGE request.

When sending the MESSAGE request to each recipient, and processing the respective responses, the List Server shall behave as specified in the 3GPP TS 24.229 [5] subclause 5.7.

5.3.3.4   List server support of MESSAGE URI-lists

A list server shall support the relay requirements of RFC 5360 [16]. The list server may also support the store and forward server requirements of RFC 5360 [16].

6   Protocol using SIP for session-mode messaging

6.1   Introduction

6.2   Functional entities

6.2.1   User Equipment (UE)

For the purpose of session-mode messaging, the UE shall implement the role of a Participant as described in subclause 6.3.1.

6.3 Role

6.3.1 Participant

6.3.1.1 General

The participant shall perform SIP related session procedures in accordance with 3GPP TS 24.229 [5] to set up the dialog used for session-based messaging.

6.3.1.2 Session initiation - mobile originating case

When the originating participant wishes to engage the terminating participant in a session-mode message session, it shall use the call initiation procedure specified in 3GPP TS 24.229 [5]. The Request URI header shall include the URI of the terminating participant.

6.3.1.3 Session initiation - mobile terminating case

When the terminating participant receives an initial INVITE request from the originating endpoint proposing a message session, the terminating participant shall apply the procedures as specified in 3GPP TS 24.229 [5].

6.3.2 Intermediate Node

6.3.2.1 General

The intermediate node shall act as a Routeing B2BUA as specified in subclause 5.7 in 3GPP TS 24.229 [5].

6.3.2.2 Generic procedures for all methods at the intermediate node

6.3.2.2.1 Intermediate node – originating case

The intermediate node shall follow the procedures of 3GPP TS 24.229 [5] subclause 5.7.3 when acting as an originating UA.

6.3.2.2.2 Intermediate node – terminating case

Upon receipt of an initial request the intermediate node shall follow the procedures of 3GPP TS 24.229 [5] subclause 5.7.1.2 in relation to the contents of the P-Charging-Function-Addresses header and the P-Charging-Vector header.

When creating the first response for this initial request, the intermediate node shall:

1) include the P-Charging-Vector header including:

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

   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 intermediate node; 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 intermediate node shall additionally send the 200 (OK) response to the initial INVITE request only after the resource reservation has been completed.

6.3.2.3 Session Initiation

6.3.2.3.1 Session initiation – originating case

The intermediate node shall follow the procedures of 3GPP TS 24.229 [5] at call initiation.

The intermediate node shall populate the INVITE as specified for a Routeing B2BUA with the following clarification:

a) the Request URI to the URI as in the received Request URI:

b) the To header to the same display name and URI as in the received To header;

c) the From header sent includes the same display name and URI as in the From header in the received INVITE; and

d) the P-Asserted-Identity header and privacy includes the same information as in the received P-Asserted-Identity header and Privacy header; and

If the intermediate node is not able to establish a TCP connection for the MSRP session the intermediate node shall send BYE towards the participant and release the associated recourses.

6.3.2.3.2 Session initiation – terminating case

Upon receipt of an INVITE request that includes an the terminating participant URI in the request URI, the intermediate node shall:

1) verify the identity of the user as described in subclause 5.7.1.4 of 3GPP TS 24.229 [5] and authorize the request as described in subclause 5.7.1.5 of 3GPP TS 24.229 [5]. The following actions in this subclause shall only be performed if the request can be authorized; and

2) establish the session in accordance with 3GPP TS 24.229 [5].

3) create a 200 (OK) response.

7 Protocol using SIP for session-mode messaging conferences

7.1 Introduction

Void.

7.2 Functional entities

7.2.1 User Equipment (UE)

For the purpose of session-mode messaging conferences, the UE shall implement the role of a Participant as described in subclause 6.3.1 and the the procedures described in subclause 5.2.1 in 3GPP TS 24.147 [10].

7.2.2 Media Resource Function Controller (MRFC)

For the purpose of session-based messaging conferences, the MRFC shall follow the procedures described in subclause 5.2.2 in 3GPP TS 24.147 [10].

7.2.3 Conferencing Application Server (AS)

For the purpose of session-based messaging conferences, the AS shall follow the procedures described in subclause 5.2.3 in 3GPP TS 24.147 [10].

8 Protocol using SDP for session-mode messaging and session-mode messaging conferences

8.1 Introduction

8.2 Functional entities

8.2.1 User Equipment (UE)

For the purpose of session-mode messaging and session-mode messaging conferences, the UE shall implement the role of:

- an SDP offerer as described in subclause 8.3.1; and

- an SDP answerer as described in subclause 8.3.2.

8.2.2 Media Resource Function Controller (MRFC)

The MRFC shall implement the role of an intermediate node as described in subclause 8.3.3.

8.2.3 Application Server (AS)

The AS shall implement the role of an SDP offerer, as described in subclause 8.3.1, and an SDP answerer, as described in subclause 8.3.2 when engaged in a session mode session between a SDP offerer and SDP answerer.

NOTE: An AS, that is on the signalling path for the related SIP signalling, is not mandated to terminate the related MSRP.

8.3 Role

8.3.1 SDP offerer

When an SDP offerer wants to create a session mode massaging session, the SDP offerer shall populate the SDP as specified in subclause 6.1 in 3GPP TS 24.229 [5]. SDP offerer shall also include:

a) a media attribute in accordance with RFC 4975 [9];

b) the supported MIME types in the accept-types or accept-wrapped-types attributes in accordance with RFC 4975 [9];

c) the address of the SDP offerer in the path attribute, in accordance with RFC 4975 [9]; and

d) an a=setup attribute in accordance with RFC 6135 [18].

The SDP may also include an a=max-size attribute. The attribute shall be formatted in accordance with RFC 4975 [9]

The SDP offerer may want to indicate to the other user(s), that the SDP offerer is prepared to receive isComposing information, then it shall add the MIME type 'application/ im-iscomposing+xml to the accept type or access-wrapped types attributes.

At the receipt of the SDP answer, if the SDP answer contains an a=setup attribute with a "passive" value, the SDP offerer shall set up a TCP connection (if not already available) when an IP-CAN bearer with sufficient QoS is available.

In accordance with RFC 6135 [18], the SDP offerer shall not include an a=connection attribute in the initial SDP offer. For file transfer, the SDP shall also include media level attributes in accordance with RFC 5547 [15], with the exception that it shall include the file selector attribute (a=file-selector) with at least a size parameter.

When the 200 (OK) response for the last MSRP SENT is received, the SDP offerer shall close the MSRP media stream(s) for that particular file transfer, by sending an SDP offer where the m line port value for the file transfer media stream is set to zero, unless the MSRP media stream is the only stream in the SIP session, in which case a SIP BYE request shall be sent in order to terminate the SIP session.

8.3.2 SDP answerer

When receiving an SDP offer the SDP answerer shall populate the SDP answer as specified in subclause 6.1 in 3GPP TS 24.229 [5]. In addition the answerer shall include:

    a) a media attribute in accordance with the received media attribute in the SDP offer; and

    b) the supported MIME types in the accept-types or accept-wrapped-types attributes in accordance with RFC 4975 [9];

    c) the MSRP URI of the SDP answerer in the path attribute in accordance with RFC 4975 [9]; and

    d) an a=setup attribute in accordance with RFC 6135 [18].

The SDP answerer may also include an a=max-size attribute. The attribute shall be formatted in accordance with RFC 4975 [9].

If SDP answerer receives the MIME type 'application/im-iscomposing+xml' in the accept-types or accept-wrapped-types attribute and the SDP answerer accepts the exchange of isComposing information the SDP answerer shall add the MIME type 'application/im-iscomposing+xml' to the accept-types or access-wrapped types attributes.

If the SDP answer contains an a=setup attribute with an "active" value, the SDP answerer shall set up a TCP connection (if not already available) when an IP-CAN bearer with sufficient QoS is available.

For file transfer, the answerer shall behave in accordance with RFC 5547 [15].

8.3.3 Intermediate node

8.3.3.1 Intermediate node Originating case

8.3.3.1.1 Sending of an SDP offer

The intermediate node shall create an SDP offer, which shall include:

    a) a media attribute in accordance with the media attribute received in the received in the SDP offer.;

    b) the supported MIME types in the accept-types or accept-wrapped-types attributes as provisioned in the intermediate node. The attribute shall be formatted in accordance with RFC 4975 [9];

    c) a MSRP URI of the Intermediate node in the path attribute to be used when the SDP answerer wants to send a MSRP message to the conference. The attribute shall be formatted in accordance with RFC 4975 [9];

    d) the MIME type 'application/ im-iscomposing+xml to the accept type or access-wrapped types attributes if it is received from the SDP answerer; and

    e) an a=setup attribute in accordance with RFC 6135 [18].

The SDP may also include an a=max-size attribute. The attribute shall be formatted in accordance with RFC 4975 [9].

At the receipt of the SDP answer, if the SDP answer contains an a=setup attribute with a "passive" value the, intermediate node shall set up a TCP connection (if not already available) when an IP-CAN bearer with sufficient QoS is available.

In accordance with RFC 6135 [18], the intermediate node shall not include an a=connection attribute in an SDP offer or answer.

For file transfer, the SDP shall also include media level attributes in accordance with RFC 5547 [15], with the exception that it shall include the file selector attribute (a=file-selector) with at least a size parameter.

8.3.3.2 Intermediate node Terminating case

8.3.3.2.1 Sending of a SDP answer

The intermediate node shall at the receipt of a SDP offer create a SDP answer. The SDP answer shall include:

a) a media attribute in accordance with the received media attribute in the SDP offer;

b) the supported MIME types in the accept-types or accept-wrapped-types attributes in accordance with RFC 4975 [9];

c) a MSRP URI in the path attribute to be used when the SDP answerer shall send a MSRP message to the conference. The attribute shall be formatted in accordance with RFC 4975 [9];

d) the MIME type 'application/ im-iscomposing+xml to the accept type or access-wrapped types attributes if it is received from the SDP offerer; and

e) an a=setup attribute in accordance with RFC 6135 [18].

If the SDP answer contains an a=setup attribute with an "active" value the, SDP intermediate node shall set up a TCP connection (if not already available) when an IP-CAN bearer with sufficient QoS is available.

The SDP may also include an a=max-size attribute. The attribute shall be formatted in accordance with RFC 4975 [9].

9 Protocol using MSRP for session-mode messaging and session-mode messaging conferences

9.1 Introduction

9.2 Functional entities

9.2.1 User Equipment (UE)

9.2.1.1 General

The UE shall:

- implement the role of an MSRP sender as described in subclause 9.3.1; and

- implement the role of an MSRP receiver as described in subclause 9.3.2.

9.2.2 Application Server (AS)

The AS shall implement the role of a MSRP sender, as described in subclause 9.3.1, and a MSRP receiver, as described in subclause 9.3.2 when engaged in a session mode session between a MSRP sender and MSRP receiver.

NOTE: An AS, that is on the signalling path for the related SIP signalling, is not mandated to terminate the related MSRP.

9.2.3 Media Resource Function Processor (MRFP)

The MRFP shall implement the role of an intermediate node as described in subclause 9.3.3.

The MRFP may implement the role of an MSRP sender as described in subclause 9.3.1.

The MRFP may implement the role of an MSRP receiver as described in subclause 9.3.2.

9.3　Role

9.3.1　MSRP sender

9.3.1.1　MSRP sender sends a message

When a MSRP sender wishes to send a message, the MSRP sender shall ensure that the message length is not longer than the a=max-size attribute, as received in a SDP offer or a SDP answer. Depending on the message length the message may be included in one SEND request or chunked into a number of SEND requests. The MSRP sender shall follow the procedures and rules as specified in RFC 4975 [9], when the MSRP sender fragments a message into a number SEND requests.

The SEND request shall include the Byte-Range header. The MSRP sender shall populate the Byte-Range header fields as follows:

- the range end set to * (interruptible), to make the chunks interruptible, if the SEND request is longer than 2048 octets; and

- the total field set to the total size of the message.

The MSRP sender shall create a SEND request in accordance with RFC 4975 [9] and RFC 6135 [18], where the value of To-Path is the MSRP URI shall be set to value of path attribute received in a SDP offer or a SDP answer.

If it is possible to exchange isComposing information, the MSRP sender may include in a SEND request an isComposing status message as defined in RFC 3994 [13].

9.3.2　MSRP receiver

When a MSRP receiver receives a SEND request, the MSRP receiver shall parse the SEND request. The MSRP receiver shall either send a response including:

a) a 200 (OK) status-code , as specified in RFC 4975 [9], for the concerned SEND message if the parsing was successful; or

b) an appropriate status-code, as specified in RFC 4975 [9], for the concerned SEND message if the parsing was unsuccessful.

The MSRP receiver shall send a REPORT request if this is explicit or implicit requested in the SEND request(s) belonging to the message. It shall either be:

a) a successful REPORT request including status-code 200 (OK) if a complete message is received and the Report-Success header in the SEND request was set to "yes"; or

b) an unsuccessful REPORT request including status-code other than 200 (OK) as defined in RFC 4975 [9] if the MSRP receiver can conclude that a complete message is not received and the Report-Failure header is set to "yes" or not included. The criteria to conclude that a complete message is not received are specified in RFC 4975 [9].

9.3.3　Intermediate node

9.3.3.1　Intermediate node terminating case

When an intermediate node receives a SEND request, the intermediate node shall:

1) parse the SEND request and either send a response including:

a) a 200 (OK) status-code, as specified in RFC 4975 [9], for the concerned SEND message, if the parsing was successful; or

b) an appropriate status-code, as specified in RFC 4975 [9], for the concerned SEND message if the parsing was unsuccessful.; and

2) determine that a complete message has been received. The following actions in this subclause shall only be performed if a complete message is received.

The MSRP receiver shall send a REPORT request if this is explicit or implicit requested in the SEND request(s) associated to the same message. It shall either be:

a) a successful REPORT request including status-code 200 (OK) if the intermediate node concludes that all available users on the distribution list has received the complete message or a concerned user has received the complete message and the Report-Success header in the SEND request was set to "yes"; or

b) an unsuccessful REPORT request including status-code other than 200 (OK) as defined in RFC 4975 [9] if the intermediate node conclude that a complete message has not been received or that a complete message has not been able to be delivered to all available users on the distribution list or to a particular member of the distribution list.

9.3.3.2 Intermediate node originating case

When an intermediate node wishes to send a message, the intermediate shall ensure that the message length is not longer than the a=max-size attribute, as received in a SDP offer or a SDP answer. Depending on the message length the message may be included in one SEND request or chunked into a number of SEND requests. The intermediate node shall follow the procedures and rules as specified in RFC 4975 [9], when the intermediate node fragments a message into a number SEND requests.

The SEND request shall include the Byte-Range header. The MSRP sender shall populate the Byte-Range header fields as follows:

- the range-end field set to * (interruptible), to make the chunks interruptible, if the SEND request is longer than 2048 octets; and

- the total field set to the total size of the message.

The intermediate shall create a SEND request in accordance with RFC 4975 [9] and RFC 6135 [18] with the following clarifications:

1) set the Report-Success header as received in the SEND request;

2) set the Report-Failure header as received in the SEND request; and

3) depending on the received MSRP URI

a) either send the SEND request to all available user of the conference; or

b) send the SEND request to one MSRP receiver.

10 Void

Annex A (informative):
Example signalling flows of messaging service 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

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.

In order to differentiate between messages for SIP and MSRP, the following notation is used:
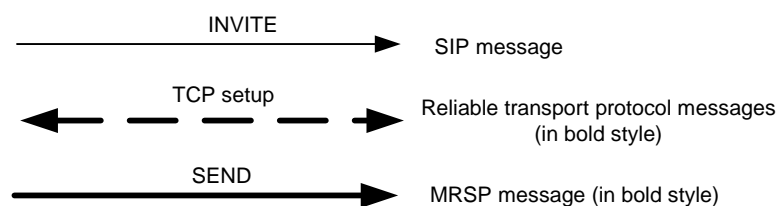
Figure A.2.2-1: Signalling flow notation

A.3 Signalling flows demonstrating immediate messaging

The signalling flow for immediate messaging is shown in subclause 10.6 of 3GPP TS 24.228 [4].

A.4 Signalling flows demonstrating session-based messaging

A.4.1 Introduction

This subclause provides signalling flows for session-based messaging, established both with and without preconditions.

How the signalling flow for session-based messaging looks like depends on the following:

    a) at what point in time the IP-CAN for the media component (MSRP) is set up; or

    b) whether preconditions and reliable provisional responses are used or not.

A.4.2 Establishing a session for session-based messaging without preconditions

Figure A.4.2-1 shows the establishment of an MSRP session between two users without the usage of preconditions and reliable provisional responses as well as the first message being sent over the established connection.

It is assumed that both the originating UE and terminating UE are using an IP-CAN with a separate bearer for SIP signalling which means that each UE needs to reserve a new IP-CAN bearer for the message session media component prior to sending the first MSRP message.
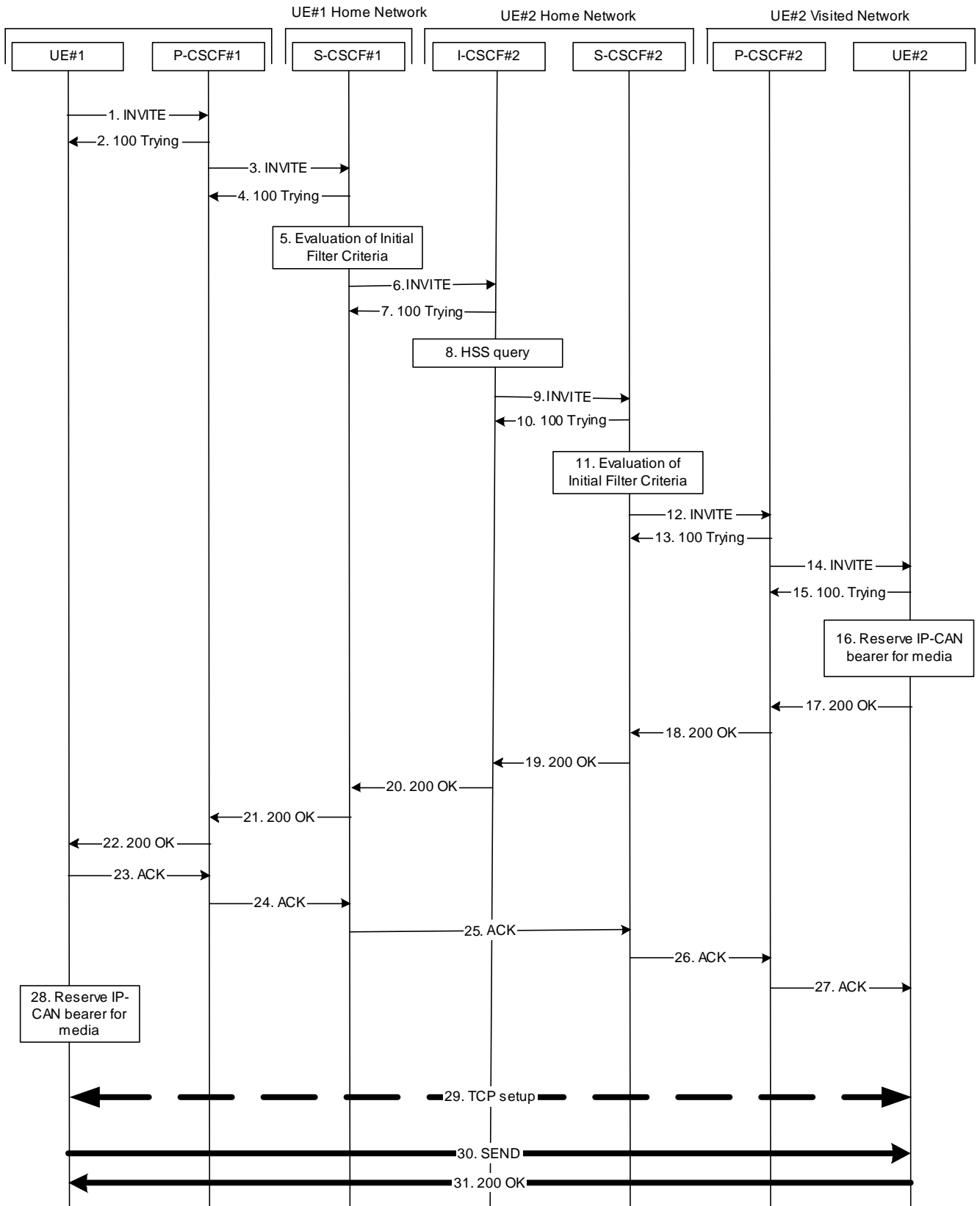
Figure A.4.2-1: Establishment of MSRP session

The details of the signalling flows are as follows:

1. **INVITE request (UE#1 to P-CSCF#1) - see example in table A.4.2-1**

   The originating UE wants to initiate a session-based message session with the terminating UE. The originating UE creates a local MSRP URL, which can be used for the communication between the two user agents. It builds a SDP Offer containing the generated MSRP URL and assigns a local port number for the MSRP communication.

   Table A.4.2-1: INVITE request (UE#1 to P-CSCF#1)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip: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 INVITE
Require: sec-agree
Proxy-Require: sec-agree
Supported: gruu
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321;
    port-c=8642; port-s=7531
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6
    ;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Accept:application/sdp, application/3gpp-ims+xml
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=message 2855 TCP/MSRP*
a=accept-types:message/cpim text/plain text/html
a=path:msrp://[5555::aaa:bbb:ccc:ddd]:2855/s111271;tcp
a=max-size:131072
a=msrp-cema
a=setup:active
```

   SDP   The SDP contains a set of content types supported by UE#1 and desired by the user at UE#1 for this session in the accept-types attribute and indicates the maximum size message that can be received by UE#1 in the max-size attribute.

2. **100 (Trying) response (P-CSCF#1 to UE#1) - see example in table A.4.2-2**

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

   Table A.4.2-2: 100 (Trying) response (P-CSCF#1 to UE#1)

```
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 request (P-CSCF#1 to S-CSCF#1) - see example in table A.4.2-3**

   The INVITE request is forwarded to the S-CSCF.

Table A.4.2-3: INVITE request (P-CSCF#1 to S-CSCF#1)

```
INVITE 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-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy:
From:
To:
Call-ID:
Cseq:
Supported:
Contact:
Allow:
Accept:
Content-Type:
Content-Length: (…)

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

4. **100 (Trying) response (S-CSCF#1 to P-CSCF#1) - see example in table A.4.2-4**

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

Table A.4.2-4: 100 (Trying) response (S-CSCF#1 to P-CSCF#1)

```
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#1 validates the service profile of this subscriber and evaluates the initial filter criteria.

6. **INVITE request (S-CSCF#1 to I-CSCF#2) - see example in table A.41-6**

   S-CSCF#1 forwards the INVITE request to the I-CSCF#2.

Table A.4.2-6: INVITE request (S-CSCF#1 to I-CSCF#2)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>, <tel:+1-212-555-1111>
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net
Privacy:
From:
To:
Call-ID:
Cseq:
Supported:
Contact:
Allow:
Accept:
Content-Type:
Content-Length: (...)

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

7. **100 (Trying) response (I-CSCF#2 to S-CSCF#1) - see example in table A.4.2-7**

   I-CSCF#2 sends a 100 (Trying) response provisional response to S-CSCF#1.

Table A.4.2-7: 100 (Trying) response (I-CSCF#2 to S-CSCF#1)

```
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. **Cx: User Location Query procedure**

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

9. **INVITE request (I-CSCF#2 to S-CSCF#2) – see example in table A.4.2-9**

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

Table A.4.2-9: INVITE request (I-CSCF#2 to S-CSCF#2)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf2.home2.net;lr>
Record-Route:
P-Asserted-Identity:
P-Charging-Vector:
Privacy:
From:
To:
Call-ID:
Cseq:
Supported:
Contact:
Allow:
Accept:
Content-Type:
Content-Length:

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

10. **100 (Trying) response (S-CSCF#2 to I-CSCF#2) – see example in table A.4.2-10**

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

Table A.4.2-10: 100 (Trying) response (S-CSCF#2 to I-CSCF#2)

```
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. **Evaluation of initial filter criteria**

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

12. **INVITE request (S-CSCF#2 to P-CSCF#2) – see example in table A.4.2-12**

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

Table A.4.2-12: INVITE request (S-CSCF#2 to P-CSCF#2)

```
INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:pcscf2.visited2.net;lr>
Record-Route: <sip:scscf2.home2.net;lr>, <sip:scscf1.home1.net;lr>,
   <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024
Privacy:
From:
To:
Call-ID:
Cseq:
Supported:
Contact:
Allow:
Accept:
P-Called-Party-ID: <sip:user2_public1@home2.net>
Content-Type:
Content-Length: (…)

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

13. **100 (Trying) response (P-CSCF#2 to S-CSCF#2) – see example in table A.4.2-13**

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

Table A.4.2-13: 100 (Trying) response (P-CSCF#2 to S-CSCF#2)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

14. **INVITE request (P-CSCF#2 to UE#2) – see example in table A.4.2-14**

P-CSCF#2 forwards the INVITE request to the terminating UE.

Table A.4.2-14: INVITE request (P-CSCF#2 to UE#2)

```
INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 65
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>,
   <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity:
Privacy:
From:
To:
Call-ID:
Cseq:
Supported:
Contact:
Allow:
Accept:
P-Called-Party-ID:
Content-Type:
Content-Length: (...)

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

15. **100 (Trying) response (UE#2 to P-CSCF#2) – see example in table A.4.2-15**

   The terminating UE sends a 100 (Trying) response provisional response to P-CSCF#2.

Table A.4.2-15: 100 (Trying) response (UE#2 to P-CSCF#2)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

16. **Reserve IP-CAN bearer for media**

   The terminating UE accepts the message session. The terminating UE reserves an IP-CAN bearer for the message session media component.

17. **200 (OK) response (UE#2 to P-CSCF#2) – see example in table A.4.2-17**

   After reserving an IP-CAN bearer for the message session media component the terminating UE sends a 200 (OK) response for the INVITE request containing SDP that indicates that the terminating UE has accepted the message session and listens on the MSRP TCP port returned in the path attribute in the answer for a TCP SETUP from the originating UE.

Table A.4.2-17: 200 (OK) response (UE#2 to P-CSCF#2)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>>, <sip:scscf2.home2.net;lr>,
   <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
Privacy: none
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>; tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Supported: gruu
Contact: <sip:user2_public1@home2.net;gr=urn:uuid:2ad8950e-48a5-4a74-8d99-ad76cc7fc74
   ;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933617 IN IP6 5555:: eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=message 2855 TCP/MSRP *
a=accept-types:text/plain text/html message/cpim
a=path:msrp://[5555::eee:fff:aaa:bbb]:2855/s234167;tcp
a=max-size:65536
a=msrp-cema
a=setup:passive
```

SDP   The SDP contains the set of offered content types supported by UE#2 and desired by the user at UE#2 for this session in the accept-types attribute and indicates the maximum size message that can be received by UE#2 in the max-size attribute.

18. **200 (OK) response (P-CSCF#2 to S-CSCF#2) – see example in table A.4.2-18**

   P-CSCF#2 forwards the 200 (OK) response to S-CSCF#2.

Table A.4.2-18: 200 (OK) response (P-CSCF#2 to S-CSCF#2)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.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>
Privacy:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Supported:
Contact:
Allow:
Content-Type:
Content-Length:

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

19. **200 (OK) response (S-CSCF#2 to I-CSCF#2) – see example in table A.4.2-19**

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

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
```

Table A.4.2-19: 200 (OK) response (S-CSCF#2 to I-CSCF#2)

```
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:
P-Asserted-Identity: "John Smith" <sip:user2_public1@home2.net>, <tel:+1-212-555-2222>
Privacy:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net;
   term-ioi=home2.net
P-Charging-Function-Addresses: ccf=[5555::b99:c88:d77:e66]; ccf=[5555::a55:b44:c33:d22];
   ecf=[5555::1ff:2ee:3dd:4cc]; ecf=[5555::6aa:7bb:8cc:9dd]
From:
To:
Call-ID:
CSeq:
Supported:
Contact:
Allow:
Content-Type:
Content-Length:

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

20. **200 (OK) response (I-CSCF#2 to S-CSCF#1) – see example in table A.4.2-20**

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

Table A.4.2-20: 200 (OK) response (I-CSCF#2 to S-CSCF#1)

```
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:
P-Asserted-Identity:
Privacy: none
P-Charging-Vector:
From:
To:
Call-ID:
CSeq:
Supported:
Contact:
Allow:
Content-Type:
Content-Length:

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

21. **200 (OK) response (S-CSCF#1 to P-CSCF#1) – see example in table A.4.2-21**

S-CSCF#1 forwards the 200 (OK) response to P-CSCF#1.

Table A.4.2-21: 200 (OK) response (S-CSCF#1 to P-CSCF#1)

```
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-Asserted-Identity:
Privacy:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
From:
To:
Call-ID:
CSeq:
Require:
Supported:
Contact:
Allow:
Content-Type:
Content-Length:

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

22. **200 (OK) response (P-CSCF#1 to UE#1) – see example in table A.4.2-22**

    P-CSCF#1 forwards the 200 (OK) response to the originating UE.

Table A.4.2-22: 200 (OK) response (P-CSCF#1 to UE#1)

```
SIP/2.0 200 OK
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:
Require:
Supported:
Contact:
Allow:
Content-Type:
Content-Length:

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

23. **ACK request (UE#1 to P-CSCF#1) – see example in table A.4.2-23**

    The UE responds to the 200 (OK) response with an ACK request sent to the P-CSCF#1.

Table A.4.2-23: ACK request (UE#1 to P-CSCF#1)

```
ACK sip: user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6
   ;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>,
   <sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 ACK
Content-Length: 0
```

24. **ACK request (P-CSCF#1 to S-CSCF#1) – see example in table A.4.2-24**

   The P-CSCF#1 forwards the ACK request to S-CSCF#1.

Table A.4.2-24: ACK request (P-CSCF#1 to S-CSCF#1)

```
ACK sip: user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6
   ;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info:
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

25. **ACK request (S-CSCF#1 to S-CSCF#2) - see example in table A.4.2-25**

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

Table A.4.2-25: ACK request (S-CSCF#1 to S-CSCF#2)

```
ACK sip: user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6
   ;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

26. **ACK request (S-CSCF#2 to P-CSCF#2) – see example in table A.4.2-26**

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

Table A.4.2-26: ACK request (S-CSCF#2 to P-CSCF#2)

```
ACK sip: [5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

27. **ACK request (P-CSCF#2 to UE#2) – see example in table A.4.2.27**

   P-CSCF#2 forwards the ACK request to the terminating UE.

Table A.4.2-27: ACK request (P-CSCF#2 to UE#2)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
From:
To:
Call-ID:
Cseq:
Content-Length:
```

28. **Reserve IP-CAN bearer for media**

   The originating UE reserves an IP-CAN bearer for the message session media component.

29. **TCP setup**

   The originating UE establishes a TCP connection using the IP-CAN bearers established in step 16 and step 28 to the host address and the port as specified in the MSRP URL received in the SDP Answer from the terminating UE.

30. **MSRP SEND request (UE#1 to UE#2) – see example in table A.4.2-30**

   The originating UE sends the first message over the MSRP session with an MSRP SEND request using the established TCP connection.

Table A.4.2-30: MSRP SEND request (UE#1 to UE#2)

```
MSRP d93kswow SEND
To-path:msrp://[5555::eee:fff:aaa:bbb]: 3333/s234167;tcp
From-path:msrp://[5555::aaa:bbb:ccc:ddd]:2855/s111271;tcp
Message-ID: 8822
Byte-Range: 1-77/77
Content-Type: "text/plain"

those are my principles. If you don't like them I have others – Groucho Marx.
-------d93kswow$
```

To-path: The sender"s remote path

From-path: The sender"s local URL

Message-ID: A unique message ID for MSRP message.

Byte-Range: The Byte Range for this message.

Content-Type: The format of the body of the request.

31. **MSRP 200 (OK) response (UE#2 to UE#1) – see example in table A.4.2-31**

 The terminating UE acknowledges the reception of the MSRP SEND request with an MSRP 200 (OK) response using the established TCP connection.

Table A.4.2-31: MSRP 200 (OK) response (UE#2 to UE#1)

```
MSRP d93kswow 200 OK
To-path:msrp://[5555::aaa:bbb:ccc:ddd]:2855/s111271;tcp
From-path:msrp://[5555::eee:fff:aaa:bbb]:3333/s234167;tcp

-------d93kswow$
```

A.4.3 Establishing a session for session-based messaging with Intermediate Nodes

Figure A.4.3-1 shows the establishment of a MSRP session between two users with intermediate nodes being added to the signalling path as well as the first message being sent over the established connection.

It is assumed that both the originating UE and terminating UE are using an IP-CAN with a separate bearer for SIP signalling which means that each UE needs to reserve a new IP-CAN bearer for the message session media component.

This example is simplified, the MRFC and MRFP functions are shown as combined with AS#1 and AS#2 in this example.
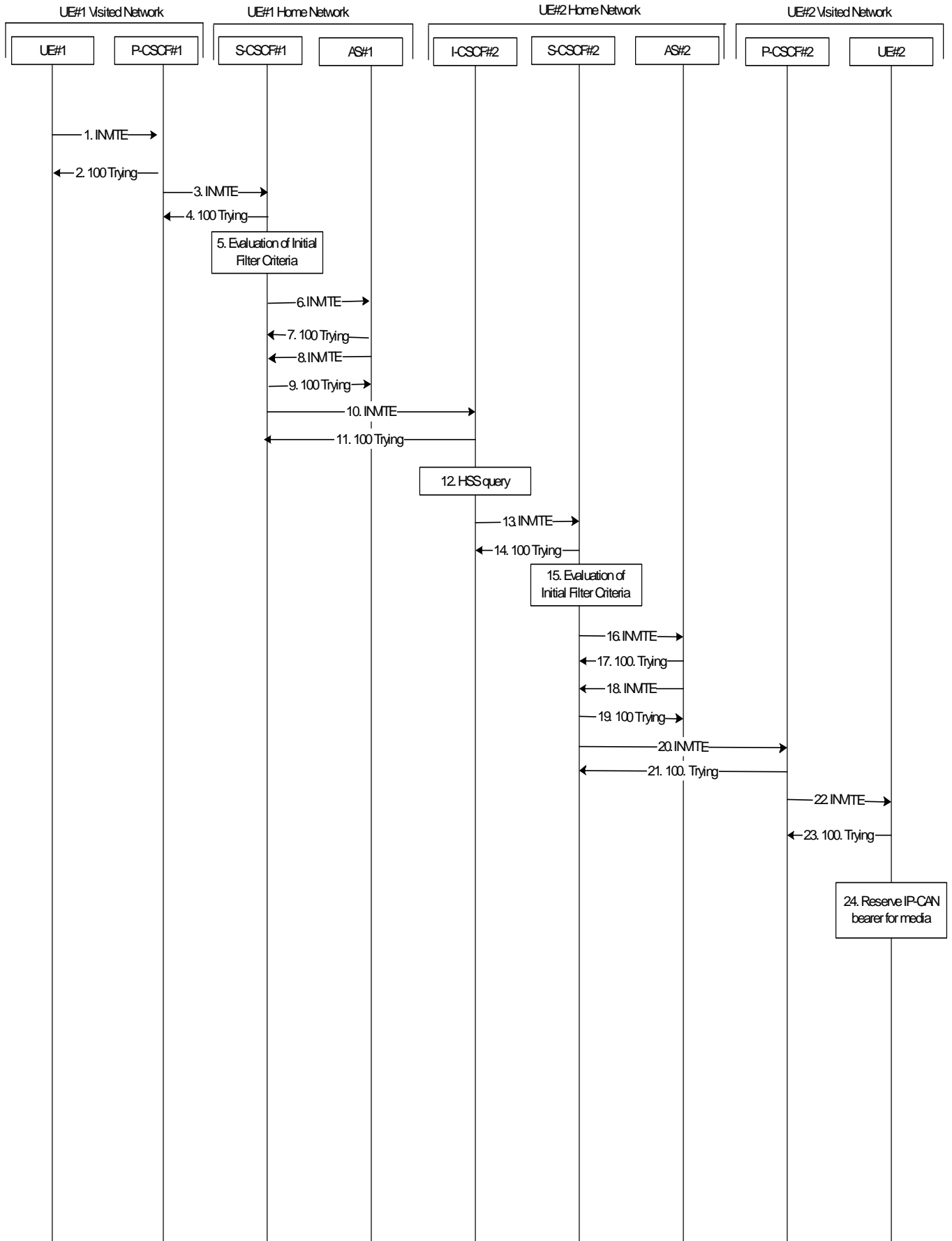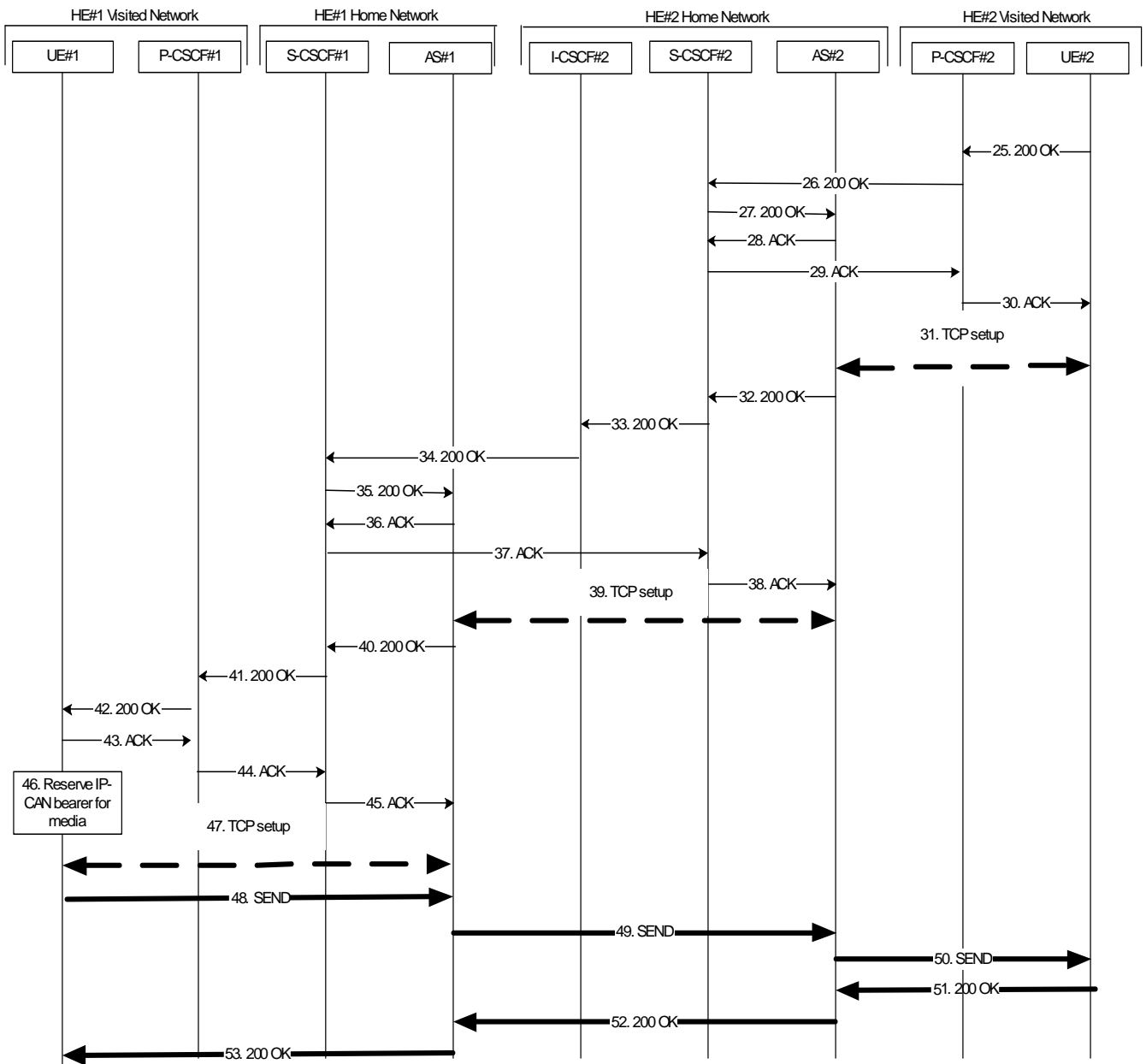
Figure A.4.3-1: Establishment of MSRP session with Intermediate Nodes

The details of the signalling flows are as follows:

1. **INVITE request (UE#1 to P-CSCF#1) - see example in table A.4.3-1**

   The originating UE#1 wants to initiate a session-based message session with the terminating UE#2. UE#1 creates a local MSRP URL, which can be used for the communication between the two user agents. It builds a SDP Offer containing the generated MSRP URL and assigns a local port number for the MSRP communication.

Table A.4.3-1: INVITE request (UE#1 to P-CSCF#1)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip: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 INVITE
Require: sec-agree
Proxy-Require: sec-agree
Supported: gruu
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=7531
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6
   ;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Accept:application/sdp, application/3gpp-ims+xml
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=message 2855 TCP/MSRP *
a=accept-types:message/cpim text/plain text/html
a=path:msrp://[5555::aaa:bbb:ccc:ddd]:2855/s111271;tcp
a=max-size:131072
a=msrp-cema
a=setup:active
```

SDP The SDP contains the set of content types supported by UE#1 and desired by the user at UE#1 for this session in the accept-types attribute and indicates the maximum size message that can be received by UE#1 in the max-size attribute.

2. **100 (Trying) response (P-CSCF#1 to UE#1) - see example in table A.4.3-2**

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

Table A.4.3-2: 100 (Trying) response (P-CSCF#1 to UE#1)

```
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 request (P-CSCF#1 to S-CSCF#1) - see example in table A.4.3-3**

   The INVITE request is forwarded to the S-CSCF.

Table A.4.3-3: INVITE request (P-CSCF#1 to S-CSCF#1)

```
INVITE 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-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy:
From:
To:
Call-ID:
Cseq:
Supported:
Contact:
Allow:
Accept:
Content-Type:
Content-Length: (…)

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

4. **100 (Trying) response (S-CSCF#1 to P-CSCF#1) - see example in table A.4.3-4**

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

Table A.4.3-4: 100 (Trying) response (S-CSCF#1 to P-CSCF#1)

```
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#1 validates the service profile of this subscriber and evaluates the initial filter criteria. For sip:user1_public1@home1.net S-CSCF#1 has origination initial filter criteria with service points of interest of Method = INVITE request and SDP m= 'message' and 'msrp' protocol that informs the S-CSCF to route the INVITE request to the AS sip:as1.home1.net.

6. **INVITE request (S-CSCF#1 to AS#1) - see example in table A.4.3-6**

    S-CSCF#1 forwards the INVITE request to the AS#1.

ETSI

Table A.4.3-6: INVITE request (S-CSCF#1 to AS#1)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK344a65.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:as1.home1.net;lr>, <sip:cb03a0s09a2sdfglkj490333@scscf1.home1.net;lr>
Record-Route: <sip:orig@scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>, <tel:+1-212-555-1111>
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net
P-Charging-Function-Addresses: ccf=[5555::b99:c88:d77:e66]; ccf=[5555::a55:b44:c33:d22];
   ecf=[5555::1ff:2ee:3dd:4ee]; ecf=[5555::6aa:7bb:8cc:9dd]
Privacy:
From:
To:
Call-ID:
Cseq:
Supported:
Contact:
Allow:
Accept:
Content-Type:
Content-Length: (...)

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

7. **100 (Trying) response (AS#1 to S-CSCF#1) - see example in table A.4.3-7**

    AS#1 sends a 100 (Trying) response provisional response to S-CSCF#1.

Table A.4.3-7: 100 (Trying) response (AS#1 to S-CSCF#1)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK344a65.1, 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
```

    AS#1 establishes a TCP connection using the IP-CAN bearers established in step 1 to the host address and port as specified in the MSRP URL received in the SDP Offer from the originating UE#1.

8. **INVITE request (AS#1 to S-CSCF#1) - see example in table A.4.3-8**

    AS#1 sends a new INVITE request to the S-CSCF#1 with the session attribute containing a unique URL for the AS#1 to receive media on.

Table A.4.3-8: INVITE request (AS#1 to S-CSCF#1)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP as1.home1.net;branch=z9hG4bK240f34.1
Max-Forwards: 70
Record-Route: <sip:as1.home1.net;lr>
Route: <sip:cb03a0s09a2sdfglkj490333@scscf1.home1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>, <tel:+1-212-555-1111>
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=323551024"
Privacy: none
From: <sip:user1_public1@home1.net>; tag=234567
To: <sip:user2_public1@home2.net>
Call-ID: s09a233cbsdfglkj490303a0
Cseq: 278 INVITE
Supported:
Contact:
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Accept:
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 2987933620 2987933620 IN IP6 7777::eee:ddd:ccc:aaa
s=-
c=IN IP6 7777::eee:ddd:ccc:aaa
t=0 0
m=message 3927 TCP/MSRP *
a=accept-types:message/cpim text/plain text/html
a=path:msrp://[7777::eee:ddd:ccc:aaa]:3927/s222371;tcp
a=max-size:65536
a=msrp-cema
a=setup:active
```

Record-Route   The AS#1 includes a Record-Route header containing its SIP URI.

SDP   The SDP contains the set of offered content types allowed by the policy of network home1 in the accept-types attribute and indicates the maximum size message that can be received by UE#1 and allowed by the policy of network home1 in the max-size attribute.

9. **100 (Trying) response (S-CSCF#1 to AS#1) - see example in table A.4.3-9**

   S-CSCF#1 sends a 100 (Trying) response provisional response to AS#1.

Table A.4.3-9: 100 (Trying) response (S-CSCF#1 to AS#1)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP as1.home1.net;branch=z9hG4bK240f34.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

10. **INVITE request (S-CSCF#1 to I-CSCF#2) – see example in table A.4.3-10**

   S-CSCF#1 forwards the INVITE request to the I-CSCF#2. As the S-CSCF#1 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.4.3-10: INVITE request (S-CSCF#1 to I-CSCF#2)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   as1.home1.net;branch=z9hG4bK240f34.1
Max-Forwards: 69
Record-Route: <sip:scscf1.home1.net;lr>, <sip:as1.home1.net;lr>
P-Asserted-Identity:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=323551024"; orig-ioi=home1.net
Privacy:
From:
To:
Call-ID:
Cseq:
Supported:
Contact:
Allow:
Accept:
Content-Type:
Content-Length:

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

11. **100 (Trying) response (I-CSCF#2 to S-CSCF#1) - see example in table A.4.3-11**

    I-CSCF#2 sends a 100 (Trying) response provisional response to S-CSCF#1.

Table A.4.3-11: 100 (Trying) response (I-CSCF#1 to S-CSCF#1)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   as1.home1.net;branch=z9hG4bK240f34.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

12. **Cx: User Location Query procedure**

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

13. **INVITE request (I-CSCF#2 to S-CSCF#2) – see example in table A.4.3-13**

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

Table A.4.3-13: INVITE request (I-CSCF#2 to S-CSCF#2)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   as1.home1.net;branch=z9hG4bK240f34.1
Max-Forwards: 68
Route: <sip:scscf2.home2.net;lr>, <sip:as1.home1.net;lr>
Record-Route:
P-Asserted-Identity:
P-Charging-Vector:
Privacy:
From:
To:
Call-ID:
Cseq:
Supported:
Contact:
Allow:
Accept:
Content-Type:
Content-Length:

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

14. **100 (Trying) response (S-CSCF#2 to I-CSCF#2) – see example in table A.4.3-14**

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

Table A.4.3-14: 100 (Trying) response (S-CSCF#2 to I-CSCF#2)

```
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
   as1.home1.net;branch=z9hG4bK240f34.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

15. **Evaluation of initial filter criteria**

   S-CSCF#2 validates the service profile of this subscriber and evaluates the initial filter criteria. For sip:user2_public1@home2.net S-CSCF#2 has termination initial filter criteria with service points of interest of Method = INVITE request and SDP m = 'message' and 'msrp' protocol that informs the S-CSCF to route the INVITE request to the AS sip:as2.home2.net.

16. **INVITE request (S-CSCF#2 to AS#2) – see example in table A.4.3-16**

   S-CSCF#2 forwards the INVITE request to AS#2

Table A.4.3-16: INVITE request (S-CSCF#2 to AS#2)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   as1.home1.net;branch=z9hG4bK240f34.1
Max-Forwards: 67
Route: <sip:as2.home2.net;lr>,<sip:s09a233cbsdfglkj490303a0@scscf2.home2.net;lr>
Record-Route: <sip:scscf2.home2.net;lr>, <sip:scscf1.home1.net;lr>, <sip:as1.home1.net;lr>
P-Asserted-Identity:
P-Charging-Vector:
P-Charging-Function-Addresses: ccf=[6666::b99:c88:d77:e66]; ccf=[6666::a55:b44:c33:d22];
   ecf=[6666::1ff:2ee:3dd:4ee]; ecf=[6666::6aa:7bb:8cc:9dd]
Privacy:
From:
To:
Call-ID:
Cseq:
Supported:
Contact:
Allow:
Accept:
Content-Type:
Content-Length: (…)

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

17. **100 (Trying) response (AS#2 to S-CSCF#2) – see example in table A.4.3-17**

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

Table A.4.3-17: 100 (Trying) response (AS#2 to S-CSCF#2)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   as1.home1.net;branch=z9hG4bK240f34.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

18. **INVITE request (AS#2 to S-CSCF#2) – see example in table A.4.3-18**

    AS#2 sends a new INVITE request to the S-CSCF#2 with the session attribute containing a unique URL for the AS#2 to receive media on.

Table A.4.3-18: INVITE request (AS#2 to S-CSCF#2)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP as2.home2.net;branch=z9hG4bK348923.1
Max-Forwards: 70
Route: <sip:s09a233cbsdfglkj490303a0@scscf2.home2.net;lr>
Record-Route: <sip:as2.home2.net;lr>
P-Asserted-Identity:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=423551024"
Privacy: none
From: <sip:user1_public1@home1.net>; tag=7871654
To: <sip:user2_public1@home2.net>
Call-ID: 0s09glkj4903a2sdf33cb03a
Cseq: 210 INVITE
Supported:
Contact:
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933630 2987933630 IN IP6 9999::ccc:aaa:bbb:ddd
s=-
c=IN IP6 9999::ccc:aaa:bbb:ddd
t=0 0
m=message 3333 TCP/MSRP *
a=accept-types:message/cpim text/plain text/html
a=path:msrp://[9999::ccc:aaa:bbb:ddd]:3333/s317121;tcp
a=max-size:32768
a=msrp-cema
a=setup:active
```

Record-Route   The AS#1 includes a Record-Route header containing its SIP URI.

SDP   The SDP contains the set of offered content types allowed by the policy of network home2 in the accept-types attribute and indicates the maximum size message that can be received by UE#1 and allowed by the policy of network home2 in the max-size attribute.

19. **100 (Trying) response (S-CSCF#2 to AS#2) – see example in table A.4.3-19**

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

Table A.4.3-19: 100 (Trying) response (S-CSCF#2 to AS#2)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP as2.home2.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

20. **INVITE request (S-CSCF#2 to P-CSCF#2) – see example in table A.4.3-20**

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

Table A.4.3-20: INVITE request (S-CSCF#2 to P-CSCF#2)

```
INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   as2.home2.net;branch=z9hG4bK348923.1
Max-Forwards: 69
Route: <sip:pcscf2.visited2.net;lr>
Record-Route: <sip:scscf2.home2.net;lr>, <sip:as2.home2.net;lr>
P-Asserted-Identity:
P-Charging-Vector:
Privacy:
From:
To:
Call-ID:
Cseq:
Supported:
Contact:
Allow:
Accept:
P-Called-Party-ID: <sip:user2_public1@home2.net>
Content-Type:
Content-Length: (…)

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

21. **100 (Trying) response (P-CSCF#2 to S-CSCF#2) – see example in table A.4.3-21**

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

Table A.4.3-21: 100 (Trying) response (P-CSCF#2 to S-CSCF#2)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   as2.home2.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

22. **INVITE request (P-CSCF#2 to UE#2) – see example in table A.4.3-22**

    P-CSCF#2 forwards the INVITE request to the terminating UE.

Table A.4.3-22: INVITE request (P-CSCF#2 to UE#2)

```
INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   as2.home2.net;branch=z9hG4bK348923.1
Max-Forwards: 68
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>,
   <sip:as2.home2.net;lr>
P-Asserted-Identity:
Privacy:
From:
To:
Call-ID:
Cseq:
Supported:
Contact:
Allow:
Accept:
P-Called-Party-ID:
Content-Type:
Content-Length: (...)

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

23. **100 (Trying) response (UE#2 to P-CSCF#2) – see example in table A.4.3-23**

    UE#2 sends a 100 (Trying) response provisional response to P-CSCF#2.

Table A.4.3-23: 100 (Trying) response (UE#2 to P-CSCF#2)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   as2.home2.net;branch=z9hG4bK348923.1
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

24. **Reserve IP-CAN bearer for media**

    The terminating UE#2 accepts the message session and. UE#2 reserves an IP-CAN bearer for the message session media component.

25. **200 (OK) response (UE#2 to P-CSCF#2) – see example in table A.4.3-25**

    After reserving an IP-CAN bearer for the message session media component, the terminating UE#2 sends a 200 (OK) response for the INVITE request containing SDP that indicates that UE#2 has accepted the message session and listens on the MSRP TCP port returned in the path attribute in the answer for a TCP SETUP from AS#2.

Table A.4.3-25: 200 (OK) response (UE#2 to P-CSCF#2)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   as2.home2.net;branch=z9hG4bK348923.1
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>, ,
   <sip:as2.home2.net;lr>
Privacy: none
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>tag=7871654
To: <sip:user2_public1@home2.net>;tag=999456
Call-ID: 0s09glkj4903a2sdf33cb03a
Cseq: 210 INVITE
Supported: gruu
Contact: <sip: user2_public1@home2.net;gr=urn:uuid:2ad8950e-48a5-4a74-8d99-ad76cc7fc74
   ;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 29879336302987933630IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=message 2855 TCP/MSRP *
a=accept-types:text/plain text/html message/cpim
a=path:msrp://[5555::eee:fff:aaa:bbb]:2855/s417121;tcp
a=max-size:65536
a=msrp-cema
a=setup:passive
```

SDP The SDP contains the set of offered content types supported by UE#2 and desired by the user at UE#2 for this session in the accept-types attribute and indicates the maximum size message that can be received by UE#2 in the max-size attribute.

26. **200 (OK) response (P-CSCF#2 to S-CSCF#2) – see example in table A.4.3-26**

P-CSCF#2 forwards the 200 (OK) response to S-CSCF#2.

Table A.4.3-26: 200 (OK) response (P-CSCF#2 to S-CSCF#2)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   as2.home2.net;branch=z9hG4bK348923.1
Record-Route:
P-Asserted-Identity: "John Smith" <sip:user2_public1@home2.net>
Privacy:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=423551024"
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Supported:
Contact:
Allow:
Content-Type:
Content-Length:

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

27. **200 (OK) response (S-CSCF#2 to AS#2) – see example in table A.4.3-27**

S-CSCF#2 forwards the 200 (OK) response to AS#2.

Table A.4.3-27: 200 (OK) response (S-CSCF#2 to AS#2)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP as2.home2.net;branch=z9hG4bK348923.1
Record-Route:
P-Asserted-Identity: "John Smith" <sip:user2_public1@home2.net>, <tel:+1-212-555-2222>
Privacy:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=423551024"; orig-ioi=home1.net;
   term-ioi=home2.net
From:
To:
Call-ID:
CSeq:
Supported:
Contact:
Allow:
Content-Type:
Content-Length:

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

28. **ACK request (AS#2 to S-CSCF#2) – see example in table A.4.3-28**

AS#2 generates a new ACK request and sends it to S-CSCF#2.

Table A.4.3-28: ACK request (AS#2 to S-CSCF#2)

```
ACK sip: user2_public1@home2.net;gr=urn:uuid:2ad8950e-48a5-4a74-8d99-ad76cc7fc74
    ;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP as2.home2.net;branch=z9hG4bK348923.1
Max-Forwards: 70
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
From: <sip:user1_public1@home1.net>;tag=7871654
To: <sip:user2_public1@home2.net>;tag=2217770
Call-ID: 0s09glkj4903a2sdf33cb03a
Cseq: 210 ACK
Content-Length: 0
```

29. **ACK request (S-CSCF#2 to P-CSCF#2) – see example in table A.4.3-29**

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

Table A.4.3-29: ACK request (S-CSCF#2 to P-CSCF#2)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    as2.home2.net;branch=z9hG4bK348923.1
Max-Forwards: 69
Route: <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

30. **ACK request (P-CSCF#2 to UE#2) – see example in table A.4.3.30**

 P-CSCF#2 forwards the ACK request to UE#2.

Table A.4.3-30: ACK request (P-CSCF#2 to UE#2)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
    scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
    as2.home2.net;branch=z9hG4bK348923.1
Max-Forwards: 68
From:
To:
Call-ID:
Cseq:
Content-Length:
```

31. **TCP setup**

 AS#2 establishes a TCP connection using the IP-CAN bearers established in step 24 to the host address and port as specified in the MSRP URL received in the SDP Answer from UE#2.

32. **200 (OK) response (AS#2 to S-CSCF#2) – see example in table A.4.3-32**

 AS#2 generates a 200 (OK) response to S-CSCF#2.

Table A.4.3-32: 200 (OK) response (AS#2 to S-CSCF#2)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   as1.home1.net;branch=z9hG4bK240f34.1
Record-Route: <sip:scscf2.home2.net;lr>, <sip:scscf1.home1.net;lr>, <sip:as2.home2.net;lr>
P-Asserted-Identity: "John Smith" <sip:user2_public1@home2.net>, <tel:+1-212-555-2222>
Privacy:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=323551024"
From: <sip:user1_public1@home1.net>tag=234567
To: <sip:user2_public1@home2.net>;tag=98989823
Call-ID: s09a233cbsdfglkj490303a0
CSeq: 278 INVITE
Supported: gruu
Contact: <sip:user2_public1@home2.net;gr=urn:uuid:2ad8950e-48a5-4a74-8d99-ad76cc7fc74 >
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933640 2987933640 IN IP6 9999::ccc:aaa:bbb:ddd
s=-
c=IN IP6 9999::ccc:aaa:bbb:dddt=0 0
m=message 2855 TCP/MSRP *
a=accept-types:message/cpim text/plain text/html
a=path:msrp://[9999::ccc:aaa:bbb:ddd]:2855/s317122;tcp
a=max-size:32768
a=msrp-cema
a=setup:passive
```

SDP The SDP contains the set of answered content types supported by UE#2 in the accept-types attribute and indicates the maximum size message that can be received by UE#2 and allowed by the policy of network home2 in the max-size attribute.

33. **200 (OK) response (S-CSCF#2 to I-CSCF#2) – see example in table A.4.3-33**

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

Table A.4.3-33: 200 (OK) response (S-CSCF#2 to I-CSCF#2)

```
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
   as1.home1.net;branch=z9hG4bK240f34.1
Record-Route:
P-Asserted-Identity: "John Smith" <sip:user2_public1@home2.net>, <tel:+1-212-555-2222>
Privacy:
P-Charging-Vector: icid-value"AyretyU0dm+6O2IrT5tAFrbHLso=323551024"; orig-ioi=home1.net;
   term-ioi=home2.net
P-Charging-Function-Addresses: ccf=[6666::b99:c88:d77:e66]; ccf=[6666::a55:b44:c33:d22];
   ecf=[6666::1ff:2ee:3dd:4ee]; ecf=[6666::6aa:7bb:8cc:9dd]
From:
To:
Call-ID:
CSeq:
Supported
Contact:
Allow:
Content-Type:
Content-Length:

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

34. **200 (OK) response (I-CSCF#2 to S-CSCF#1) – see example in table A.4.3-34**

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

Table A.4.3-34: 200 (OK) response (I-CSCF#2 to S-CSCF#1)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   as1.home1.net;branch=z9hG4bK240f34.1
Record-Route:
P-Asserted-Identity:
Privacy: none
P-Charging-Vector:
From:
To:
Call-ID:
CSeq:
Supported:
Contact:
Allow:
Content-Type:
Content-Length:

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

35. **200 (OK) response (S-CSCF#1 to AS#1) – see example in table A.4.3-35**

S-CSCF#1 forwards the 200 (OK) response to AS#1.

Table A.4.3-35: 200 (OK) response (S-CSCF#1 to AS#1)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP as1.home1.net;branch=z9hG4bK240f34.1
Record-Route:
P-Asserted-Identity:
Privacy:
P-Charging-Vector:
P-Charging-Function-Addresses: ccf=[5555::b99:c88:d77:e66]; ccf=[5555::a55:b44:c33:d22];
   ecf=[5555::1ff:2ee:3dd:4ee]; ecf=[5555::6aa:7bb:8cc:9dd]
From:
To:
Call-ID:
CSeq:
Supported:
Contact:
Allow:
Content-Type:
Content-Length:

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

36. **ACK request (AS#1 to S-CSCF#1) - see example in table A.4.3-36**

   AS#1 generates an ACK request and sends it to S-CSCF#1.

Table A.4.3-36: ACK request (AS#1 to S-CSCF#1)

```
ACK sip:user2_public1@home2.net;gr=urn:uuid:2ad8950e-48a5-4a74-8d99-ad76cc7fc74  SIP/2.0
Via: SIP/2.0/UDP as1.home1.net;branch=z9hG4bK240f34.1
Max-Forwards: 70
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:as2.home2.net;lr>
From: <sip:user1_public1@home1.net>; tag=234567
To: <sip:user2_public1@home2.net>;tag=98989823
Call-ID: s09a233cbsdfglkj490303a0
Cseq: 278 ACK
Content-Length: 0
```

37. **ACK request (S-CSCF#1 to S-CSCF#2) - see example in table A.4.3-37**

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

Table A.4.3-37: ACK request (S-CSCF#1 to S-CSCF#2)

```
ACK sip: user2_public1@home2.net;gr=urn:uuid:2ad8950e-48a5-4a74-8d99-ad76cc7fc74  SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK344a65.1, SIP/2.0/UDP as1.home1.net;branch=
   z9hG4bK240f34.1
Max-Forwards: 69
Route: <sip:scscf2.home2.net;lr>,<sip:as2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

38. **ACK request (S-CSCF#2 to AS#2) - see example in table A.4.3-38**

   The S-CSCF#2 forwards the ACK request to the AS#2.

Table A.4.3-38: ACK request (S-CSCF#2 to AS#2)

```
ACK sip: user2_public1@home2.net;gr=urn:uuid:2ad8950e-48a5-4a74-8d99-ad76cc7fc74  SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK344a65.1, SIP/2.0/UDP
   as1.home1.net;branch=z9hG4bK240f34.1
Max-Forwards: 68
Route: <sip:as2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

39. **TCP setup**

AS#1 establishes a TCP connection to the host address and port as specified in the MSRP URL received in the SDP Answer from the AS#2.

40. **200 (OK) response (AS#1 to S-CSCF#1) – see example in table A.4.3-40**

AS#1 generates a 200 (OK) response and sends it to S-CSCF#1.

Table A.4.3-40: 200 (OK) response (AS#1 to S-CSCF#1)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK344a65.1, 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:as1.home1.net;lr>, <sip:scscf1.home1.net;lr>,
   <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity:
Privacy:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
CSeq: 127 INVITE
Supported
Contact: <sip:user2_public1@home2.net;gr=urn:uuid:2ad8950e-48a5-4a74-8d99-ad76cc7fc74 >
Allow:
Content-Type:
Content-Length:

v=0
o=- 2987933642 2987933642 IN IP6 7777::eee:ddd:ccc:aaa
s=-
c=IN IP6 7777::eee:ddd:ccc:aaa
t=0 0
m=message 3927 TCP/MSRP *
a=accept-types:message/cpim text/plain text/html
a=path:msrp://[7777::eee:ddd:ccc:aaa]:3927/s222372;tcp
a=max-size:32768
a=msrp-cema
a=setup:passive
```

SDP   The SDP contains the set of answered content types supported by UE#2 in the accept-types attribute and indicates the maximum size message that can be received by UE#2 and allowed by the policy of network home1 in the max-size attribute.

41. **200 (OK) response (S-CSCF#1 to P-CSCF#1) – see example in table A.4.3-41**

S-CSCF#1 forwards the 200 (OK) response to P-CSCF#1.

Table A.4.3-41: 200 (OK) response (S-CSCF#1 to P-CSCF#1)

```
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-Asserted-Identity:
Privacy:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
From:
To:
Call-ID:
CSeq:
Require:
Supported
Contact:
Allow:
Content-Type:
Content-Length:

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

42. **200 (OK) response (P-CSCF#1 to UE#1) – see example in table A.4.3-42**

   P-CSCF#1 forwards the 200 (OK) response to UE#1

Table A.4.3-42: 200 (OK) response (P-CSCF#1 to UE#1)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:as1.home1.net;lr>, <sip:scscf1.home1.net;lr>,
   <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>
P-Asserted-Identity:
Privacy:
From:
To:
Call-ID:
CSeq:
Require:
Supported
Contact:
Allow:
Content-Type:
Content-Length:

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

43. **ACK request (UE#1 to P-CSCF#1) – see example in table A.4.3-43**

   The UE responds to the 200 (OK) response with an ACK request sent to the P-CSCF#1.

Table A.4.3-43: ACK request (UE#1 to P-CSCF#1)

```
ACK sip: user2_public1@home2.net;gr=urn:uuid:2ad8950e-48a5-4a74-8d99-ad76cc7fc74  SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>,
   <sip:as1.home1.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 ACK
Content-Length: 0
```

44. **ACK request (P-CSCF#1 to S-CSCF#1) – see example in table A.4.3-44**

    The P-CSCF#1 forwards the ACK request to the S-CSCF#1.

Table A.4.3-44: ACK request (P-CSCF#1 to S-CSCF#1)

```
ACK sip:user2_public1@home2.net;gr=urn:uuid:2ad8950e-48a5-4a74-8d99-ad76cc7fc74  SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info:
Route: <sip:scscf1.home1.net;lr>, <sip:as1.home1.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

45. **ACK request (S-CSCF#1 to AS#1) - see example in table A.4.3-45**

    The S-CSCF#1 forwards the ACK request to AS#1.

Table A.4.3-45: ACK request (S-CSCF#1 to AS#1)

```
ACK sip:user2_public1@home2.net;gr=urn:uuid:2ad8950e-48a5-4a74-8d99-ad76cc7fc7  SIP/2.0
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK344a65.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 68
Route: <sip:as1.home1.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

46. **Reserve IP-CAN bearer for media**

    UE#1 reserves an IP-CAN bearer for the message session media component.

47. **TCP setup**

    Originating UE#1 establishes a TCP connection using the IP-CAN bearers established in step 46 to the host address and port as specified in the MSRP URL received in the SDP Answer from AS#1.

48. **MSRP SEND (UE#1 to AS#1) – see example in table A.4.3-48**

    The originating UE sends the first message over the MSRP session with a MSRP SEND request using the established TCP connection.

Table A.4.3-48: MSRP SEND (UE#1 to AS#1)

```
MSRP 34kjf94 SEND
To-path:msrp://[7777::eee:ddd:ccc:aaa]:3927/s222372;tcp
From-path:msrp://[5555::aaa:bbb:ccc:ddd]:2855/s111271;tcp
Message-ID: 8822
Byte-Range: 1-89/89
Content-Type: "text/plain"

I will never be a member of a club that accepts people like me as members – Groucho Marx.
-------34kjf94$
```

To-path: The sender"s remote path.

From-path: The sender"s local URL.

Message-ID: A unique message ID for MSRP message.

Byte-Range: The Byte Range for this message.

Content-Type: The format of the body of the request.

49. **MSRP SEND (AS#1 to AS#2) – see example in table A.4.3-49**

AS#1 forwards the first MSRP SEND request to AS#2 over the MSRP session using the established TCP connection.

Table A.4.3-49: MSRP SEND (AS#1 to AS#2)

```
MSRP shfsoi3 SEND
To-path:msrp://[9999::ccc:aaa:bbb:ddd]:3333/s317122;tcp
From-path:msrp://[7777::eee:ddd:ccc:aaa]:3927/s222371;tcp
Message-ID: 2832
Byte-Range: 1-89/89
Content-Type: "text/plain"

I will never be a member of a club that accepts people like me as members – Groucho Marx.
-------shfsoi3$
```

To-path: The sender"s remote path.

From-path: The sender"s local URL.

Message-ID: A unique message ID for MSRP message.

Byte-Range: The Byte Range for this message.

Content-Type: The format of the body of the request.

50. **MSRP SEND (AS#2 to UE#2) – see example in table A.4.3-50**

AS#2 forwards the first MSRP SEND request to UE#2 over the MSRP session using the established TCP connection.

Table A.4.3-50: MSRP SEND (AS#2 to UE#2)

```
MSRP 2oid4sf SEND
To-path:msrp://[5555::eee:fff:aaa:bbb]:3335/s417121;tcp
From-path:msrp://[9999::ccc:aaa:bbb:ddd]:3333/s317121;tcp
Message-ID: 3311
Byte-Range: 1-89/89
Content-Type: "text/plain"

I will never be a member of a club that accepts people like me as members – Groucho Marx.
-------2oid4sf$
```

To-path: The sender"s remote path.

From-path: The sender"s local URL.

Message-ID: A unique message ID for MSRP message.

Byte-Range: The Byte Range for this message.

Content-Type: The format of the body of the request.

51. **MSRP 200 (OK) response (UE#2 to AS#2) – see example in table A.4.3-51**

The receiving UE#2 acknowledges the reception of the MSRP SEND request with a MSRP 200 (OK) response sent using the established TCP connection.

Table A.4.3-51: MSRP 200 (OK) response (UE#2 to AS#2)

```
MSRP 2oid4sf 200 OK
To-path:msrp://[9999::ccc:aaa:bbb:ddd]:3333/s317121;tcp
From-path:msrp://[5555::eee:fff:aaa:bbb]:3335/s417121;tcp

--------2oid4sf2j32ri3$
```

52. **MSRP 200 (OK) response (AS#2 to AS#1) – see example in table A.4.3-52**

AS#2 acknowledges the reception of the MSRP SEND request with a MSRP 200 (OK) response to AS#1 using the established TCP connection.

Table A.4.3-52: MSRP 200 (OK) response (AS#2 to AS#1)

```
MSRP shfsoi3 200 OK
To-path:msrp://[7777::eee:ddd:ccc:aaa]:3927/s222371;tcp
From-path:msrp://[9999::ccc:aaa:bbb:ddd]:3333/s317122;tcp

-------hfsoi3$
```

53. **MSRP 200 (OK) response (AS#1 to UE#1) – see example in table A.4.3-53**

AS#1 acknowledges the reception of the MSRP SEND request with a MSRP 200 (OK) response to UE#1 sent using the established TCP connection.

Table A.4.3-53: MSRP 200 (OK) response (AS#1 to UE#1)

```
MSRP 34kjf94 200 OK
To-path:msrp://[555::aaa:bbb:ccc:ddd]:2855/s111271;tcp
From-path:msrp://[7777::eee:ddd:ccc:aaa]:3927/s222372;tcp
-------34kjf94$
```

A.4.4 Establishing a session for session-based messaging with preconditions

This signalling flow is not provided as it is the same as the session establishment flows with preconditions in 3GPP TS 24.228 [4] except that the SDP contents are for setting up MSRP sessions over TCP rather than RTP sessions over UDP.

A.5 Flows demonstrating session-based messaging conferences

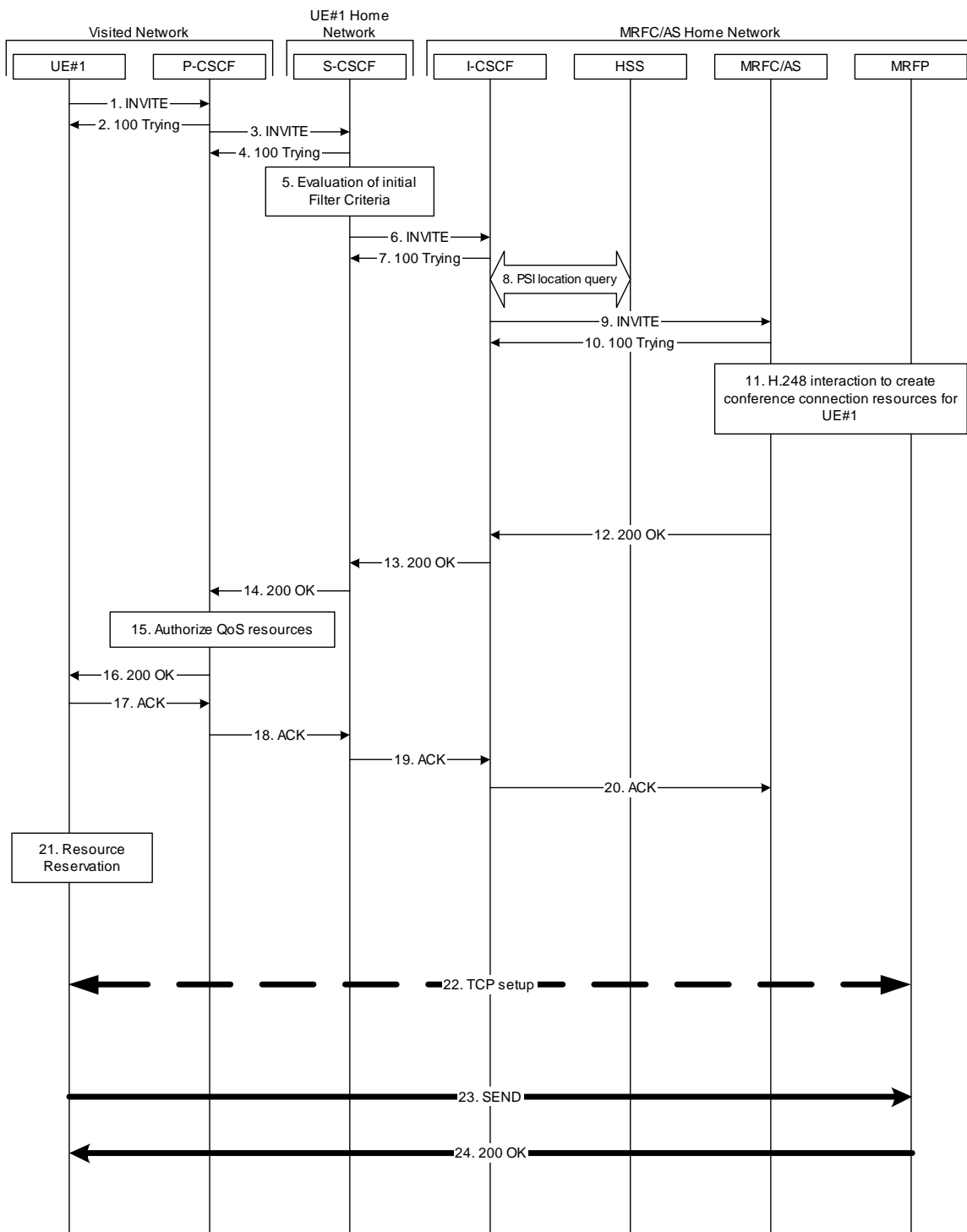## A.5.1 User connecting into a messaging conference

Figure A.5.1-1: User connecting into a messaging conference - network MRFC/AS is not located in user's home network - conference URI resolved by the terminating home network

Figure A.5.1-1 shows an user calling into a messaging 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 cannot be resolved by the originating home network

The details of the flows are as follows:

1. **INVITE request (UE to P-CSCF) - see example in table A.5.1-1**

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

    The originating UE creates a local MSRP URL, which can be used for communication for the messaging conference. It builds a SDP Offer containing the generated MSRP URL and assigns a local port number for the MSRP communication.

    The UE sends the INVITE request to the P-CSCF.

    Table A.5.1-1: INVITE request (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: sec-agree
Proxy-Require: sec-agree
Supported: gruu
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321;
   port-c=8642; port-s=7531
Contact: <sip: user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6
   ;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE, SUBSCRIBE, NOTIFY
Accept:application/sdp, application/3gpp-ims+xml
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=message 2855 TCP/MSRP *
a=accept-types:message/cpim text/plain text/html
a=path:msrp://[5555::aaa:bbb:ccc:ddd]:2855/s111271;tcp
a=max-size:131072
a=msrp-cema
a=setup:active
```

SDP The SDP contains a set of content types supported by UE#1 and desired by the user at UE#1 for this session in the accept-types attribute and indicates the maximum size message that can be received by UE#1 in the max-size attribute.

2. **100 (Trying) response (P-CSCF to UE) - see example in table A.5.1-2**

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

Table A.5.1-2: 100 (Trying) response (P-CSCF to UE)

```
SIP/2.0 100 (Trying) response
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 request (P-CSCF to S-CSCF) - see example in table A.5.1-3**

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

Table A.5.1-3: INVITE request (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:
Supported:
Contact:
Allow:
Accept:
Content-Type:
Content-Length: (…)

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

4. **100 (Trying) response (S-CSCF to P-CSCF) - see example in table A.5.1-4**

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

Table A.5.1-4: 100 (Trying) response (S-CSCF to P-CSCF)

```
SIP/2.0 100 (Trying) response
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**

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

6. **INVITE request (S-CSCF to I-CSCF) - see example in table A.5.1-6**

   The 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, the S-CSCF forwards the INVITE request directly to the 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.5.1-6: 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:
Supported:
Contact:
Allow:
Accept:
Content-Type:
Content-Length: (...)

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

7. **100 (Trying) response (I-CSCF to S-CSCF) - see example in table A.5.1-7 (related to table A.5.1-6)**

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

Table A.5.1-7: 100 (Trying) response (I-CSCF to S-CSCF)

```
SIP/2.0 100 (Trying) response
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 HSS to find out the MRFC/AS at which the conference has been created. The HSS responds with the address of the MRFC/AS at which the conference is hosted. The HSS responds with the address of the MRFC/AS.

   For detailed message flows see [5].

9. **INVITE request (I-CSCF to MRFC/AS) - see example in table A.5.1-9**

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.5.1-9: 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: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net
Privacy:
From:
To:
Call-ID:
Cseq:
Supported:
Contact:
Allow:
Accept:
Content-Type:
Content-Length: (...)

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

10. **100 (Trying) response (MRFC/AS to I-CSCF) - see example in table A.5.1-10 (related to table A.5.1-9)**

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

Table A.5.1-10: 100 (Trying) response (MRFC/AS to I-CSCF)

```
SIP/2.0 100 (Trying) response
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 connection point for UE#1 in MRFP.

12. **200 (OK) response (MRFC/AS to I-CSCF) - see example in table A.5.1-12 (related to table A.5.1-9)**

The MRFC/AS sends a 200 (OK) response for the INVITE request containing SDP that indicates that the MRFC/AS has accepted the message session and listens on the MSRP TCP port returned in the path attribute in the answer for a TCP SETUP from the originating UE. The MRFC/AS sends a 200 (OK) response final response to the INVITE request (9) to the I-CSCF.

Table A.5.1-12: 200 (OK) response (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>
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:conference1@home2.net>; tag=314159
Call-ID:
CSeq:
Contact: <sip:conference1@home2.net>;isfocus
Allow-Events: conference, pending-additions
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE, SUBSCRIBE, NOTIFY, PUBLISH
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933623 2987933623 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=message 2855 TCP/MSRP *
a=accept-types:message/cpim text/plain text/html
a=path:msrp://[9999:: aaa:bbb:ccc:ddd]:2855/s317122;tcp
a=max-size:32768
a=msrp-cema
a=setup:passive
```

SDP   The SDP contains a set of offered content types supported by the MRFC/AS for this session in the accept-types attribute and indicates the maximum size message that can be received by the MRFC/AS in the max-size attribute.

13. **200 (OK) response (I-CSCF to S-CSCF) - see example in table A.5.1-13**

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

Table A.5.1-13: 200 (OK) response (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:
P-Asserted-Identity:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net;
   term-ioi=home2.net
Privacy:
From:
To:
Call-ID:
CSeq:
Contact:
Allow-Events:
Allow:
Content-Type:
Content-Length:

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

14. **200 (OK) response (S-CSCF to P-CSCF) - see example in table A.5.1-14**

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

Table A.5.1-14: 200 (OK) response (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-Asserted-Identity:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
P-Charging-Function-Addresses: ccf=[5555::b99:c88:d77:e66]; ccf=[5555::a55:b44:c33:d22];
   ecf=[5555::1ff:2ee:3dd:4cc]; ecf=[5555::6aa:7bb:8cc:9dd]
Privacy:
From:
To:
Call-ID:
CSeq:
Contact:
Allow-Events:
Allow:
Content-Type:
Content-Length:

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

15. **Authorize QoS Resources**

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

16. **200 (OK) response (P-CSCF to UE) - see example in table A.5.1-16**

   The P-CSCF forwards the 200 (OK) response final response including the media authorisation token to the session originator.

Table A.5.1-16: 200 (OK) response (P-CSCF to UE)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>
P-Asserted-Identity:
Privacy:
From:
To:
Call-ID:
CSeq:
Contact:
Allow-Events:
Allow:
Content-Type:
Content-Length:
```

17. **ACK request (UE to P-CSCF) - see example in table A.5.1-17**

   The UE starts the media flow for this session, and responds to the 200(OK) response (16) with an ACK request sent to the P-CSCF.

Table A.5.1-17: ACK request (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
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
```

18. **ACK request (P-CSCF to S-CSCF) - see example in table A.5.1-18**

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

Table A.5.1-18: ACK request (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
Route: <sip:scscf1.home1.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

19. **ACK request (S-CSCF to I-CSCF) - see example in table A.5.1-19**

   The 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, the S-CSCF forwards the ACK request directly to the 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.5.1-19: ACK request (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:
```

20. **ACK request (I-CSCF to MRFC/AS) - see example in table A.5.1-20**

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.5.1-20: ACK request (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:
```

21. **Reserve IP-CAN bearer for media**

The UE reserves an IP-CAN bearer for the message session media component.

22. **TCP setup**

Originating UE establishes a TCP connection using the IP-CAN bearers established in step 21 to the host address and port as specified in the MSRP URL received in the SDP Answer from MRFC/AS.

23. **MSRP SEND request (UE to MRFP) – see example in table A.5.1-23**

The originating UE sends the first message over the MSRP session with an MSRP SEND request using the established TCP connection.

Table A.5.1-23: MSRP SEND request (UE to MRFP)

```
MSRP a97ghjut SEND
To-path:msrp://[9999::ccc:aaa:bbb:ddd]:2855/s317122;tcp
From-path:msrp://[5555::aaa:bbb:ccc:ddd]:2855/s111271;tcp
Message-ID: 9972
Byte-Range: 1-77/77
Content-Type: "text/plain"
those are my principles. If you don't like them I have others – Groucho Marx.
-------a97ghjut$
```

To-path:	The sender"s remote path
From-path:	The sender"s local URL
Message-ID:	A unique message ID for MSRP message.
Byte-Range:	The Byte Range for this message.
Content-Type:	The format of the body of the request.

24. **MSRP 200 (OK) response (MRFP to UE) – see example in table A.5.1-24**

The MRFP acknowledges the reception of the MSRP SEND request with an MSRP 200 (OK) response using the established TCP connection.

Table A.5.1-24: MSRP 200 (OK) response (MRFP to UE)

```
MSRP a97ghjut 200 OK
To-path:msrp://[9999::ccc:aaa:bbb:ddd]:2855/s317122;tcp
From-path:msrp://[5555::aaa:bbb:ccc:ddd]:2855/s111271;tcp
-------a97ghjut$
```

A.5.2 MRFC/AS invites a user to a messaging conference

Figure A.5.2-1 shows an MRFC/AS inviting a user to a messaging conference. The invitation is sent as a result of user1@home1.net sending a REFER request to the MRFC/AS. The MRFC/AS is located in a different network than user's S-CSCF. The flows for inviting a user to a conference using REFER are shown in TS 24.147 [10].
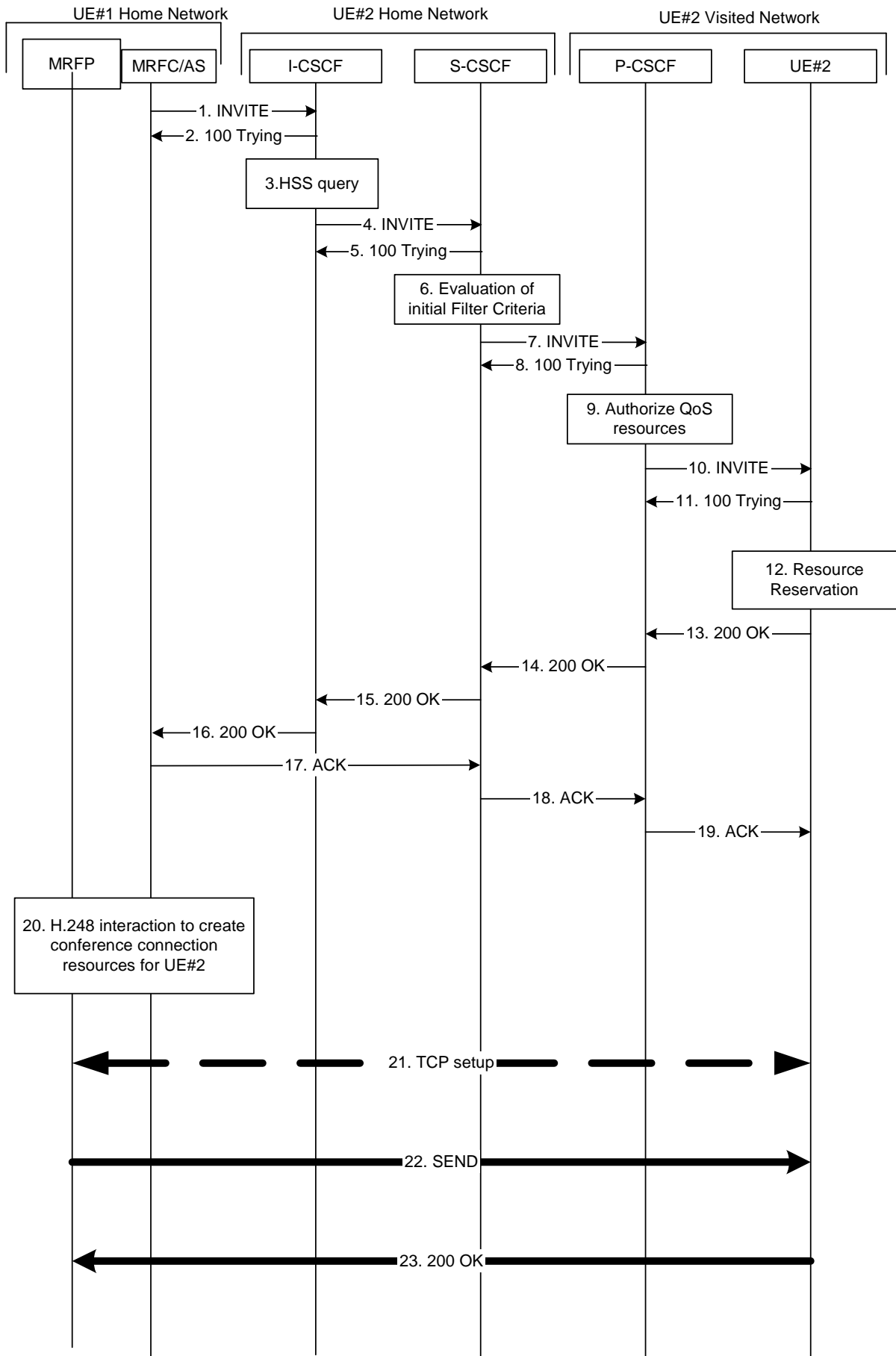
Figure A.5.2-1: MRFC/AS inviting a user to a messaging conference - MRFC/AS routes directly to I-CSCF

The details of the flows are as follows:

1. **INVITE request (MRFC/AS to I-CSCF) - see example in table A.5.2-1**

    In this example, the MRFC/AS is capable of resolving the terminating users I-CSCF address for this request. As a result of a DNS query, it has received the address of the I-CSCF as the next hop.

    The MRFC/AS invites a user to a messaging conference as it received a REFER request from another user.

    The MRFC/AS creates a local MSRP URL, which can be used for communication for the messaging conference. It builds a SDP Offer containing the generated MSRP URL and assigns a local port number for the MSRP communication.

Table A.5.2-1: INVITE request (MRFC/AS to I-CSCF)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP mrfc1.home1.net;branch=z9hG4bK23273846
Max-Forwards: 70
P-Asserted-Identity: <sip:conference1@mrfc1.home1.net>
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net
Privacy: none
From: <sip:conference1@mrfc1.home1.net>;tag=171828
To: <sip:user2_public1@home2.net>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Referred-By: <sip:user1_public1@home1.net>
Contact: <sip:conference1@mrfc1.home1.net>;isfocus
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE, SUBSCRIBE, NOTIFY, PUBLISH
Allow-Events: conference, pending-additions
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP6 5555::abc:def:abc:def
s=-
c=IN IP6 5555::abc:def:abc:def
t=0 0
m=message 2855 TCP/MSRP *
a=accept-types:message/cpim text/plain text/html
a=path:msrp://[5555::abc:def:abc:def]:2855/s111271;tcp
a=max-size:32768
a=msrp-cema
a=setup:active
```

> **SDP** The SDP contains a set of content types supported by the MRFC/AS for this session in the accept-types attribute and indicates the maximum size message that can be received by the MRFC/AS in the max-size attribute.

2. **100 (Trying) response (I-CSCF to MRFC/AS) - see example in table A.5.2-2**

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

Table A.5.2-2: 100 (Trying) response (I-CSCF to MRFC/AS)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP conference1@mrfc1.home1.net;branch=z9hG4bK23273846
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

3. **Cx: User Location Query procedure**

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

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

4. **INVITE request (I-CSCF to S-CSCF) - see example in table A.5.2-4**

   The INVITE request is forwarded to the S-CSCF.

Table A.5.2-4: INVITE request (I-CSCF to S-CSCF)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP icscf2.home2.net;branch=z9hG4bK241d17.2, SIP/2.0/UDP
   mrfc1.home1.net;branch=z9hG4bK23273846
Max-Forwards: 69
P-Asserted-Identity:
P-Charging-Vector:
Privacy:
From:
To:
Call-ID:
Cseq:
Referred-By:
Contact:
Allow:
Allow-Events:
Content-Type:
Content-Length: (…)

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

5. **100 (Trying) response (S-CSCF to I-CSCF) - see example in table A.5.2-5**

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

Table A.5.2-5: 100 (Trying) response (S-CSCF to I-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP icscf2.home2.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   mrfc1.home1.net;branch=z9hG4bK23273846
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

6. **Evaluation of initial filter criteria**

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

7. **INVITE request (S-CSCF to P-CSCF) - see example in table A.5.2-7**

   S-CSCF remembers (from registration procedures) the contact address of UE#2 and determines the P-CSCF assigned for UE#2 and routes message there.

Table A.5.2-7: INVITE request (S-CSCF to P-CSCF)

```
INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   icscf2.home2.net;branch=z9hG4bK241d17.2, SIP/2.0/UDP
   mrfc1.home1.net;branch=z9hG4bK23273846
Max-Forwards: 68
Record-Route: <sip:scscf1.home1.net;lr>
P-Asserted-Identity:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy:
From:
To:
Call-ID:
Cseq:
Referred-By:
Contact:
Allow:
Allow-Events:
P-Called-Party-ID: <sip:user2_public1@home2.net>
Content-Type:
Content-Length: (...)

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

8. **100 (Trying) response (P-CSCF to S-CSCF) - see example in table A.5.2-8**

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

Table A.5.2-8: 100 (Trying) response (P-CSCF to S-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   icscf2.home2.net;branch=z9hG4bK241d17.2, SIP/2.0/UDP
   mrfc1.home1.net;branch=z9hG4bK23273846
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

9. **Authorize QoS resources**

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

10. **INVITE request (P-CSCF to UE#2) - see example in table A.5.2-10**

P-CSCF forwards the request to UE#2 including the Media Authorisation token.

Table A.5.2-10: INVITE request (P-CSCF to UE#2)

```
INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK240f34.1 SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   icscf2.home2.net;branch=z9hG4bK241d17.2, SIP/2.0/UDP
   mrfc1.home1.net;branch=z9hG4bK23273846
Max-Forwards: 67
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>
P-Asserted-Identity:
Privacy:
From:
To:
Call-ID:
Cseq:
Referred-By:
Contact:
Allow:
Allow-Events:
P-Called-Party-ID:
Content-Type:
Content-Length: (...)

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

11. **100 (Trying) response (UE#2 to P-CSCF) - see example in table A.5.2-11**

UE#2 responds to the INVITE request (10) with a 100 (Trying) provisional response.

Table A.5.2-11: 100 (Trying) response (UE#2 to P-CSCF)

```
SIP/2.0 100 Trying
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK240f34.1 SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   icscf2.home2.net;branch=z9hG4bK241d17.2, SIP/2.0/UDP
   mrfc1.home1.net;branch=z9hG4bK23273846
From:
To:
Call-ID:
CSeq:
Content-Length: 0
```

12. **Resource reservation**

After determining the media streams, UE#2 initiates the reservation procedures for the resources needed for this session.

13. **200 (OK) response (UE#2 to P-CSCF) - see example in table A.5.2-13 (related to table A.5.2-10)**

After reserving an IP-CAN bearer for the message session media component the receipt of the MSRP 200 (OK) response to the MSRP VISIT request, the terminating UE#2 sends a 200 (OK) response for the INVITE request containing SDP that indicates that UE#2 has successfully visited AS#2, accepted the message session and listens on the MSRP TCP port returned in the path attribute in the answer for a TCP SETUP from the MRFC/AS.

Table A.5.2-13: 200 (OK) response (UE#2 to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   icscf2.home2.net;branch=z9hG4bK241d17.2, SIP/2.0/UDP
   mrfc1.home1.net;branch=z9hG4bK23273846
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From:
To: <sip:user2_public1@home2.net>; tag=314159
Call-ID:
CSeq: 127 INVITE
Supported: gruu
Contact: <sip: user2_public1@home2.net;gr=urn:uuid:2ad8950e-48a5-4a74-8d99-ad76cc7fc74
   ;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE, SUBSCRIBE, NOTIFY
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933623 2987933623 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=message 2855 TCP/MSRP *
a=accept-types:text/plain text/html message/cpim
a=path:msrp://[5555::eee:fff:aaa:bbb]:2855/s417121;tcp
a=max-size:65536
a=msrp-cema
a=setup:passive
```

SDP   The SDP contains a set of offered content types supported by UE#2 and desired by the user at UE#2 for this session in the accept-types attribute and indicates the maximum size message that can be received by UE#2 in the max-size attribute.

14. **200 (OK) response (P-CSCF to S-CSCF) - see example in table A.5.2-14**

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

Table A.5.2-14: 200 (OK) response (P-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   icscf2.home2.net;branch=z9hG4bK241d17.2, SIP/2.0/UDP
   mrfc1.home1.net;branch=z9hG4bK23273846
Record-Route: <sip:pcscf2.visited2.net;lr>, <sip:scscf2.home2.net;lr>
P-Asserted-Identity: "John Smith" <sip:user2_public1@home2.net>
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy:
From:
To:
Call-ID:
CSeq:
Supported:
Contact:
Allow:
Content-Type:
Content-Length:

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

15. **200 (OK) response (S-CSCF to I-CSCF) - see example in table A.5.2-15**

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

Table A.5.2-15: 200 (OK) response (S-CSCF to I-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP icscf2.home2.net;branch=z9hG4bK241d17.2, SIP/2.0/UDP
   mrfc1.home1.net;branch=z9hG4bK23273846
Record-Route:
P-Asserted-Identity: "John Smith" <sip:user2_public1@home2.net>, <tel:+1-212-555-2222>
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"; orig-ioi=home1.net;
   term-ioi=home2.net
P-Charging-Function-Addresses: ccf=[5555::b99:c88:d77:e66]; ccf=[5555::a55:b44:c33:d22];
   ecf=[5555::1ff:2ee:3dd:4cc]; ecf=[5555::6aa:7bb:8cc:9dd]
Privacy:
From:
To:
Call-ID:
CSeq:
Supported:
Contact:
Allow:
Content-Type:
Content-Length:

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

16. **200 (OK) response (I-CSCF to MRFC/AS) - see example in table A.5.2-16**

The I-CSCF forwards the 200 (OK) response final response to the session originator.

Table A.5.2-16: 200 (OK) response (I-CSCF to MRFC/AS)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP mrfc1.home1.net;branch=z9hG4bK23273846
Record-Route:
P-Asserted-Identity:
Privacy:
From:
To:
Call-ID:
CSeq:
Supported:
Contact:
Allow:
Content-Type:
Content-Length:

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

17. **ACK request (MRFC/AS to S-CSCF) - see example in table A.5.2-17**

The MRFC/AS responds to the 200 (OK) response (16) with an ACK request sent to the S-CSCF.

Table A.5.2-17: ACK request (MRFC/AS to S-CSCF)

```
ACK sip:user2_public1@home2.net;gr=urn:uuid:2ad8950e-48a5-4a74-8d99-ad76cc7fc74
  ;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP mrfc1.home1.net;branch=z9hG4bK23273846
Max-Forwards: 70
Route: <sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
From: <sip:conference1@mrfc1.home1.net>; tag=171828
To: <sip:user2_public1@home2.net>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 ACK
Content-Length: 0
```

18. **ACK request (S-CSCF to P-CSCF) - see example in table A.5.2-18**

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

Table A.5.2-18: ACK request (S-CSCF to P-CSCF)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
  mrfc1.home1.net;branch=z9hG4bK23273846
Max-Forwards: 69
Route: <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Length:
```

19. **ACK request (P-CSCF to UE#2) - see example in table A.5.2-19**

The P-CSCF forwards the ACK request to the UE#2.

Table A.5.2-19: ACK request (P-CSCF to UE#2)

```
ACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK240f34.1, SIP/2.0/UDP
  scscf2.home2.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
  mrfc1.home1.net;branch=z9hG4bK23273846
Max-Forwards: 68
From:
To:
Call-ID:
Cseq:
Content-Length:
```

20. **H.248 interaction to create conference connection resources for UE#2**

MRFC initiates a H.248 interaction to create an connection point for UE#2 in MRFP.

21. **TCP setup**

MRFP establishes a TCP connection using the IP-CAN bearers established in step 12 to the host address and port as specified in the MSRP URL received in the SDP Answer UE#2.

22. **MSRP SEND request (MRFP to UE#2) – see example in table A.5.2-22**

The MRFP sends the first message over the MSRP session with an MSRP SEND request using the established TCP connection.

Table A.5.2-22: MSRP SEND request (MRFP to UE#2)

```
MSRP y56hkseg SEND
To-path:msrp://[5555::eee:fff:aaa:bbb]:2855/s417121;tcp
From-path:msrp://[5555::abc:def:abc:def]:2855/s111271;tcp
Message-ID: 10568
Byte-Range: 1-89/89
Content-Type: "text/plain"
I will never be a member of a club that accepts people like me as members – Groucho Marx.
-------y56hkseg$
```

To-path: The sender"s remote path

From-path: The sender"s local URL

Message-ID: A unique message ID for MSRP message.

Byte-Range: The Byte Range for this message.

Content-Type: The format of the body of the request.

23. **MSRP 200 (OK) response (UE#2 to MRFP) – see example in table A.5.2-23**

The terminating UE acknowledges the reception of the MSRP SEND request with an MSRP 200 (OK) response using the established TCP connection.

Table A.5.2-23: MSRP 200 (OK) response (UE#2 to MRFP)

```
MSRP y56hkseg 200 OK
To-path:msrp://[5555::eee:fff:aaa:bbb]:2855/s417121;tcp
From-path:msrp://[5555::abc:def:abc:def]:2855/s111271;tcp
-------y56hkseg$
```

Annex B (informative):
Change history

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment		Old	New
2003-06					Version 0.0.1: Initial version for discussion			0.0.1
2003-06	CN#31				Version 0.0.2: Title and text changed in order to reflect that Messaging is a service.		N1-031123	N1-031281
2003-09					Version 0.1.0: Title changed		0.0.2	0.1.0
2003-12					Version 0.2.0: Incorporated the following CRs as approved at CN#32 meeting: N1-031676: Message Sessions in IMS – Call Flow N1-031677: Immediate Messaging – Call Flow reference to 24.228 N1-031722: Message Sessions in IMS – Text (created Annex B) N1-031723: Immediate Messaging – Text Additionally the editor took the freedom to change the heading formats in subclause B.5. Also the title <void> of subclause B.5 was replaced with the title of clause 5 in the main part of the text and subclauses B.5.1 and B.5.2 were added (both <void>).		0.1.0	0.2.0
2003-12					Version 0.2.1: Including minor issues that were left out by mistake when creating version 0.2.0		0.2.0	0.2.1
2004-01					Version 0.3.0: Incorporated the following CRs as approved at CN#32bis meeting: N1-040151 – Message Session in IMS N1-040189 – Deletion of imported and unused Definitions N1-040197 – UE to UE message session flow N1-040198 – Message Session Initiation – mobile originating case N1-040199 – Message Session Initiation – mobile terminating case N1-040200 – Use of MESSAGE versus MSRP		0.2.1	0.3.0
2004-01					Version 0.3.1: Including N1-040200, that was left out (although listed) by mistake when creating version 0.3.0		0.3.0	0.3.1
2004-02					Version 0.4.0: Incorporated the following CRs as approved at CN1#33 meeting: - N1-040261 – Update of Scope - N1-040262 – Correction of Flows - N1-040280 – Editorial Changes - N1-040306 – Corections to Annex A.4.3 - N1-040307 – Corrections to Annex B - N1-040426 – SDP for session-based messaging - N1-040429 – Corrections to Annex A.1 – A.4.2 - N1-040486 – Definition of MSRP Role for AS and MRFP - N1-040488 – Session-based Messaging with Intermediate Node Flow A.4.3		0.3.1	0.4.0
2004-02					Version 0.4.1: Added subclause 9.2.2, which was missing from last update. Minor editorials		0.4.0	0.4.1
2004-04					Version 0.5.0: Incorporated the following CRs as approved as CN1#33bis meeting: - N1-040561 – MSRP in AS - N1-040648 – Editorial changes to Annex A - N1-040738 – MSRP terminating UE hosting flow as well as minor editorial changes		0.4.1	0.5.0
2004-05					Version 1.0.0: Incorporated the following CRs as approved during CN1#34 meeting: - N1-041038 – Shifting Material from Annex B to main body - N1-041036 – Corrections to Message Sessions Flows - N1-041040 – Ut for Messaging - N1-040850 – Correction of signalling flow example - N1-041037 – Establishing a session with active intermediate nodes, with originating UE hosting, and without SBLP - N1-041039 – Addition of Note to 5.3.1.1 - several smaller editorial changes Note: the material was first shifted from Annex B to the main body (approved CR in N1-041038), all CRs that were written against material in Annex B were afterwards applied against the material in the main body.		0.5.0	1.0.0
2004-05					Version 1.0.1 produced to correct smaller editorial mistakes.		1.0.0	1.0.1
2004-06					Version 1.1.0 produced as outcome of CN#34bis meeting in Helsinki, Finland. Todc N1-041172 (Changes in MSRP) and		1.0.1	1.1.0

					smaller editorial changes incorporated.		
2004-08					Version 1.2.0 produced as outcome CN#35 meeting in Sophia Antipolis, France. Tdoc N1-041585 (AS section) and smaller editorial changes incorporated.	1.1.0	1.2.0
2004-11					Version 6.0.0 produces as outcome of CN#36 meeting in Seoul, South Korea. The following documents were incorporated: N1-041714 – deletion of intro claus N1-041716 – Terminology alignment N1-041989 – Data Manipulation for IMS Messaging in Rel-6 N1-041995 – Session establishment for session-mode messaging N1-041996 – Session-based messaging conferences N1-041997 – subclause 8 rework N1-041998 – general subclause in participant section N1-041999 – subclause 9 rework N1-042001 – Participant in immediate messaging N1-042114 – subclause 10 rework N1-042115 – subclause 6 rework	1.2.0	2.0.0
2004-12	CN-26	NP-040611			Version 2.0.0 is approved and the TS is brought under the change control. As an erroneous v6.0.0 is presented in CN-26, the first officially published version is 6.0.1.	2.0.0	6.0.1
2005-03	CN-27	NP-050073	011	1	Corrections to Message Session Flows to align with draft-ietf-simple-message-sessions-09	6.0.1	6.1.0
2005-03	CN-27	NP-050073	008	1	Alignment between TS 23.228/ TS 22.340 and TS 24.247 for immediate messaging	6.0.1	6.1.0
2005-03	CN-27	NP-050073	001	1	Resolution of references to 24.228	6.0.1	6.1.0
2005-03	CN-27	NP-050073	003		MESSAGE to unregistered user	6.0.1	6.1.0
2005-03	CN-27	NP-050073	010	2	Removing CPCP from 24.247	6.0.1	6.1.0
2005-03	CN-27	NP-050075	009	2	Clarifications to TS 24.247 subclause 9.3	6.0.1	6.1.0
2005-03	CN-27	NP-050075	002	3	MESSAGE to multiple recipients	6.0.1	6.1.0
2005-03	CN-27	NP-050075	007	2	Alignment between TS 22.340 and on TS 24.247 for "is composing"	6.0.1	6.1.0
2005-06	CP-28	CP-050060	13	1	List server - sending requests	6.1.0	6.2.0
2005-06	CP-28	CP-050060	15	1	Adding of reference TS 26.241 to TS 24.247	6.1.0	6.2.0
2005-06	CP-28	CP-050060	16	1	Corrections to Message Session Flows to Align with draft-IETF-simple-message-sessions-10	6.1.0	6.2.0
2005-09	CP-29	CP-050359	17		Corrections to TS 24.247 to align with draft-ietf-simple-message-sessions-11	6.2.0	6.3.0
2005-12	CP-30	CP-050544	18	1	Call flow corrections	6.3.0	6.4.0
2005-12	CP-30	CP-050544	19		Corrections to TS 24.247 to align with Draft-ietf-simple-message-sessions12	6.3.0	6.4.0
2006-03	CP-31	CP-060110	20		Corrections to references in TS 24.247 to align with draft-ietf-simple-message-sessions-13 and draft-ietf-sipping-uri-list-message-06	6.4.0	6.5.0
2006-09	CP-33	CP-060504	22		Removal of Editor's notes in 24.247	6.5.0	6.6.0
2006-11	CP-34	CP-060655	23	1	Correction of the i-d name for Multiple-Recipient MESSAGE Requests in the Session Initiation Protocol (SIP	6.6.0	6.7.0
2006-11	CP-34	CP-060661	24	2	Addition of MSRP file transfer	6.7.0	7.0.0
2007-03	CP-35	CP-070130	26		IETF reference corrections	7.0.0	7.1.0
2007-06	CP-36	CP-070430	27		File transfer	7.1.0	7.2.0
2007-12	CP-38	CP-070788	32		IETF reference updates	7.2.0	7.3.0
2007-12	CP-38	CP-070810	29		Incorporation of roles relating draft-ietf-consent-framework	7.3.0	8.0.0
2008-03	CP-39	CP-080140	0033	1	Messaging references	8.0.0	8.1.0
2008-12	CP-42	CP-080854	0035		Addition of media control for session-based messaging	8.1.0	8.2.0
2008-12	CP-42	CP-080841	0038		Reference updates (release 6 ietf dependencies)	8.1.0	8.2.0
2008-12	CP-42	CP-080846	0042	1	Corrections of reference and flows in 24.247	8.1.0	8.2.0
2008-12	CP-42				Editorial cleanup by MCC	8.1.0	8.2.0

2009-06	CP-44	CP-090424	0044	1	Alternative connection model for MSRP	8.2.0	8.3.0
2009-12	CP-46				Upgrade to Rel-9	8.3.0	9.0.0
2010-06	CP-48	CP-100351	0046	1	MSRP allignment	9.0.0	9.1.0
2010-12	CP-50	CP-100726	0050	1	Inclusion of file transfer attributes	9.1.0	9.2.0
2010-12	CP-50	CP-100874	0052	2	Reference update: draft-ietf-simple-msrp-sessmatch & draft-ietf-simple-msrp-acm	9.1.0	9.2.0
2011-03	CP-51	CP-110172	0054		Reference update: draft-ietf-simple-msrp-sessmatch & draft-ietf-simple-msrp-acm	9.2.0	9.3.0
2011-06	CP-52	CP-110454	0056		Reference update: RFC 6135	9.3.0	9.4.0
2011-09	CP-53	CP-110662	0059	1	Reference update: draft-ietf-simple-msrp-sessmatch	9.4.0	9.5.0
2011-12	CP-54	CP-110864	0065	1	Reference update: draft-ietf-simple-msrp-cema	9.5.0	9.6.0
2012-09	CP-57	CP-120573	0068	1	Reference update: draft-ietf-simple-msrp-cema	9.6.0	9.7.0

History

Document history		
V9.0.0	January 2010	Publication
V9.1.0	June 2010	Publication
V9.2.0	January 2011	Publication
V9.3.0	April 2011	Publication
V9.4.0	June 2011	Publication
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V9.7.0	October 2012	Publication