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Technical Specification

**3rd Generation Partnership Project;
Technical Specification Group Core Network and Terminals;
IP Multimedia (IM) Core Network (CN) subsystem
inter-UE transfer enhancements;
Stage 3
(Release 10)**

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Contents

Foreword

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

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

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

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1 Scope

This technical report intends to develop enhancements to Rel-9 IMS service continuity stage 3 within the scope of 3GPP TS 24.237 [6], specifically in the area of inter-UE transfer. This technical report serves as a collection and a base for decision on alternative solution proposals for the different enhancement to Rel-9 IMS service continuity stage 3.

This technical report will be used to move the agreed solutions into the main specifications, once the content has stabilized.

Editor's Note: This TR reflects those inter-UE transfer issues, which are currently reflected in 3GPP TR 23.837. As currently SA2 did not move any of the Rel-10 inter-UE transfer topics to 3GPP TS 24.237, it is not sure which of these features will be finally part of Rel-10. The content of this TR will be scoped to those features, which SA2 decides to make part of the Rel-10 version of 3GPP TS 24.237.

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*.

Editor's Note: Internet Drafts referenced from this TR do not automatically constitute a 3GPP IETF dependency. If a new 3GPP IETF dependency needs to be created will be evaluated when the related material is shifted to the main 3GPP TS.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.237: "IP Multimedia subsystem (IMS) Service Continuity; Stage 2".

[3] 3GPP TR 23.831: "IP Multimedia Subsystem (IMS) Inter-UE transfer enhancements, Stage 2".

[4] 3GPP TS 24.229: "IP Multimedia Call Control Protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3".

[5] IETF RFC 2976: "The SIP INFO Method".

[6] 3GPP TS 24.237: "IP Multimedia Subsystem (IMS) Service Continuity; Stage 3".

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

[8] IETF RFC 3515: "The Session Initiation Protocol (SIP) Refer Method".

[9] IETF RFC 3840 (August 2004): "Indicating User Agent Capabilities in the Session Initiation Protocol (SIP)".

[10] IETF RFC 3891: "The Session Initiation Protocol (SIP) "Replaces" Header".

[11] IETF RFC 3903: "The Session Initiation Protocol (SIP) Publish Extension for Event State Publication".

[12] IETF RFC 4235: "An INVITE– Initiated Dialog Event Package for the Session Initiation Protocol (SIP)".

[13] IETF RFC 4661: "An Extensible Markup Language (XML) – Based Format for Event Notification Filtering".

[14]   draft-ietf-sipcore-info-events-09 (September 2010): "Session Initiation Protocol (SIP) INFO Method and Package Framework".

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

[15]   draft-ietf-mmusic-sdp-misc-cap-00 (March 2010) "Miscellaneous Capabilities Negotiation in the Session Description Protocol (SDP)".

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

[16]   draft-yang-dispatch-SIP-connection-address-type-01 (June 2010) " Session Description Protocol (SDP) Extension for A SIP Connection Address Type".

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

[17]   3GPP TS 24.605: "Conference (CONF) using IP Multimedia (IM) Core Network (CN) subsystem; Protocol specification".

[18]   3GPP TS 24.629: "Explicit Communication Transfer (ECT) using IP Multimedia (IM) Core Network (CN) subsystem; Protocol specification".

[19]   IETF RFC 4538: "Request Authorization through Dialog Identification in the Session Initiation Protocol".

[20]   IETF RFC 3261: "SIP: Session Initiation Protocol".

[21]   IETF RFC 3023: "XML Media Types".

[22]   draft-holmberg-sipcore-proxy-feature-00 (September 2010): "Indication of features supported by proxy".

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

[23]   IETF RFC 5368: " Referring to Multiple Resources in the Session Initiation Protocol (SIP)".

[24]   IETF RFC 5364: "Extensible Markup Language (XML) Format Extension for Representing Copy Control Attributes in Resource Lists".

[25]   3GPP TS 24.623: "Extensible Markup Language (XML) Configuration Access Protocol (XCAP) over the Ut interface for Manipulating Supplementary Services".

3   Definitions, symbols and abbreviations

3.1   Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1], 3GPP TS 24.237 [6] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1] and 3GPP TS 24.237 [6].

Editor's Note: This subclause will only capture definitions from 3GPP TS 24.237 [2] which need modification or completely new definitions.

Controller capable UE: A UE that is capable of becoming a controller UE.

3.2   Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1], 3GPP TS 24.237 [6] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1] and 3GPP TS 24.237 [6].

Editor's Note: This subclause will only capture new abbreviations compared to those defined in 3GPP TS 24.237 [2].

4 Procedures and issues

4.1 General

4.1.1 Subscription to dialog events filtering

In order to reduce the number of redundant notifications when subscribing to dialog events using RFC 4235 [12] a filtering mechanism based on the mechanism defined in RFC 4661 [13] should be defined.

4.1.2 Routing incoming session requests to a controller capable UE

In order to route incoming session request to controller capable UEs the controller capable UE includes the media feature tag g.3gpp.iut-controller in the Contact header field of the SIP REGISTER request when registering, (this is already required Controller UE functionality in release 9). When the SCC AS receives an incoming initial session establishment request it checks the request against the following stored user preference criteria to see if collaborative sessions are enabled for this session:

- URI in the P-Asserted-Identity header field

- URI in the Request-URI

- Any ICSI value in the Accept-Contact header field; and

- Media types in the SDP offer.

If the stored user preference criteria indicates that collaborative sessions are enabled for this session then the SCC AS shall include the media feature tag g.3gpp.iut-controller along with the explicit parameter in an Accept-Contact header field in the request before forwarding.

The UE configures the user preference criteria in the SCC AS using the XCAP over the Ut reference point.

Editor's Note: The XCAP usage still has to be defined.

NOTE: Other possibilities for user configuration, such as web-based provisioning or pre-provisioning by the operator are outside the scope of the present document, but are not precluded.

4.2 Inter-UE transfer and collaborative session procedures for UEs belonging to different IMS subscriptions under the same operator

Editor's Note: This subclause corresponds to various subclauses under 6.1.3 of 3GPP TR 23.831 [3]

4.2.1 General

Editor's Note: This subclause will identify the generic procedures for IUT with UEs belonging to different IMS subscriptions (under the same operator). It is assumed that the related extensions and mechanisms can be specified independently from the other IUT procedures in 3GPP Rel-9 and 3GPP Rel-10.

4.2.2 Procedures

4.2.2.1 Extension of existing Rel-9 procedures for inter-UE transfer and collaborative session for UEs belonging to different IMS subscriptions under the same operator

There are no changes needed to existing Rel-9 procedures.

Before sending the inter-UE transfer request towards the remote party, the SCC AS serving the collaborative session, shall act as follows:

1) if the Contact header field containing the address of SCC AS, insert the media feature tag g.3gpp.iut-focus as described in subclause 6.2 into the Contact header field; or

2) if the Contact header field not containing the address of SCC AS, insert the media feature tag g.3gpp.iut-focus into the Record-Route header field as described in IETF draft-holmberg-sipcore-proxy-feature [22].

Editor's note: The insertion of the g.3gpp.atcf media feature tag is inline with the current solution in the draft-holmberg-sipcore-proxy-feature [22]. The actual solution needs to align with the IETF accepted solution.

When the SCC AS in the home network of the controllee UE recievies the inter-UE transfer request containing the media feature tag g.3gpp.iut-focus, it will forward the inter-UE transfer request to the controllee UE without applying inter-UE transfer functionality.

NOTE: The SCC AS in the home network of the controller UE takes full control of the collaborative session. Further SCC AS added in the home networks of controllee UEs do not influence the collaborative session call flows in a way which would cause additional signalling from/to the SCC AS in the home network of the controller UE. The SCC AS in the home network of the controller UE therefore does not need to distinguish whether a request is sent to / received from a controllee UE directly or via an SCC AS in the controllee UEs home network.

4.2.2.2 New Rel-10 procedures for inter-UE transfer and collaborative session for UEs belonging to different IMS subscriptions under the same operator

An IUT capable UE shall insert the media feature-tag g.3gpp.iut-xyz as described in annex A, in the Accept-Contact header field with explicit and require tags at the time of sending an inter-UE transfer request.

The SCC AS controlling the collaborative session, shall remove the media feature-tag g.3gpp.iut-xyz from the Accept-Contact header field when sending the inter-UE transfer request towards the remote party.

Editor's Note: It is FFS what the syntax of the media feature tag g.3gpp.iut-xyz is.

Where an MRF is required as part of Inter-UE transfer procedures (e.g. during media flow replication by the network), the SCC AS which acts as the anchor of the collaborative session shall control the MRF.

4.2.3 Identified issues

(Closed) Issue 4.2.3-1: For call flows in all other sections it needs to be decided base on which type of flows the comparison of the different solutions should be done, i.e.

- either one subscription

- or two subscriptions.

In the end all flows should be of the same nature, before selecting a protocol solution.

Issue closed – the SCC AS of the controller UE takes full control of the collaborative session. The SCC AS of the controller UE cannot be aware whether there are additional SCC AS added in the home networks of controllee UEs. Therefore the signalling between the SCC AS of the controller UE and the controllee UE is not influenced by the presence or absence of an additional SCC AS.

(Closed) Issue 4.2.3-2: It needs to be clarified (maybe for every individual sub-feature) whether the call flows and state machines for the cases when AS1 and AS2 are split or when there is only one AS are straight forward to be aligned.

Issue closed – a split is not needed. See reason for closing Issue 4.2.3-1

(Closed) Issue 4.2.3-3: In the case when there are two or more AS's and a MRF is in the flow, can only the AS which anchors the collaborative session control the MRF or can the MRF be located in a different network?

Issue closed – in this version of the specification, only the AS where the session is anchored controls the MRF, if an MRF is required in the IUT procedures. In which network the MRF is located is dependent on inter-operator agreements, See subclause 4.2.2.2 for the statement which resolves this issue.

(Closed) Issue 4.2.3-4: Within the messages between the two AS's, is there a protocol indication needed, which indicates which of the two AS's is anchoring the session? If yes, how should this indication be transported / look like?

Issue closed- The media feature tag g.3gpp.iut-focus is defined to indicate that one of the ASs has the control of the collaborative session. See the definition in subclause 6.2

Issue 4.2.3-5: Is it necessary for the controller UE or the SCC AS1 to discover the address of SCC AS2 and if yes, how could this be done?

Issue 4.2.3-6: It must be possible in all scenarios for UEs to address SIP requests to a SCC AS (which takes the controlling role) which is assigned to a controller UE under a different subscription.

4.2.4 Call flows

4.2.4.1 Controller UE initiated media transfer from controller UE to controllee UE belonging to different subscriptions under the same operator

In the example flow at the figure 4.2.4.1, UE-1 has an ongoing multimedia session with UE-3 anchored at SCC AS-1. UE-1 and UE-2 belong to the different subscribers. UE-1 decides to transfer video media to UE-2 and keep the collaborative session control in itself.

HPLMN of the local UE participating in session

HPLMN of the remote UE participating in session

| UE-1 | UE-2 | SCC AS-1 | SCC AS-2 | Intermediate IM CN subsystem entities | | Intermediate IM CN subsystem entities | UE-3 |

1. Media path(audio,video)

2. UE-1 decides to transfer video media to UE-2

3. REFER

4. REFER

5. Authorization in SCC AS-1

6. 202 Accepted to REFER

7. 202 Accepted to REFER

8. NOTIFY

9. NOTIFY

10. 200 OK to NOTIFY

11. 200 OK to NOTIFY

12. INVITE

13. INVITE

14. INVITE

15. INVITE

16. 200 OK to INVITE

17. 200 OK to INVITE

18. 200 OK to INVITE

19. 200 OK to INVITE

20. re-INVITE

21. re-INVITE

22. re-INVITE

23. 200 OK to re-INVITE

24. 200 OK to re-INVITE

25. 200 OK to re-INVITE

26. ACK

27. ACK

28. ACK

29. ACK

30. ACK

31. ACK

32. ACK

33. NOTIFY

34. NOTIFY

35. 200 OK to NOTIFY

36. 200 OK to NOTIFY

Media (audiao)

Media (video)

Figure 4.2.4.1-1:   Signalling flow for controller UE initiated media transfer from controller UE to controllee UE belonging to different subscriptions under the same operator

NOTE: For clarity, the SIP 100 (Trying) responses are not shown in the signalling flow.

1. UE-1 is in session with UE-3

There is a multimedia session comprising audio and video media between the UE-1 and the remote UE-3 anchored at SCC AS-1.

2. UE-1 decides to transfer the video portion of the session from UE-1 to UE-2 and keep the collaborative session control in itself.

3-4. SIP REFER request (UE-1 to SCC AS-1) - see example in table 4.2.4.1-3

The UE-1 sends SIP REFER request to SCC AS-1 to request the media transfer.

Table 4.2.4.1-3: SIP REFER request (UE-1 to SCC AS-1)

```
REFER sip:interUEtransfer@example.net SIP/2.0
Refer-To: <sip:user2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6?body=
 m%3Daudio%200%20RTP%2FAVP%97%0Dm%3Dvideo%203002%20RTP%2FAVP%2098%2099>
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
Max-Forwards: 70
P-Preferred-Identity: <sip:user1@home1.net>
From: <sip:user1@home1.net>;tag=171828
To: <sip:user2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-2222-222222222222>
Call-ID: Asdasd23123366
Cseq: 4897924 REFER
Contact: <sip:user1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>
Referred-by: sip:user1@home1.net
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Length: 0
```

5. When SCC AS-1 receives the SIP REFER request, the SCC AS-1 authorizes the request.

6-7. SIP 202 (Accepted) response to SIP REFER request (SCC AS-1 to UE-1).

8-9. SIP NOTIFY request (SCC AS-2 to UE-1)

The SCC AS-1 informs the UE-1 to notify the implicit subscription to the SIP REFER request results.

10-11. SIP 200 (OK) response to SIP NOTIFY request (UE-1 to SCC AS-1)

The UE-1 confirms the SIP NOTIFY request by sending SIP 200 (OK) response to SIP NOTIFY request.

12-15. SIP INVITE request (SCC AS-1 to UE-2) - see example in table 4.2.4.1-12

The SCC AS-1 sends the SIP INVITE towards UE-2 to establish a session based on the information provided in the SIP REFER request.

Table 4.2.4.1-12: SIP INVITE request (SCC AS-1 to UE-2)

```
INVITE sip:user2@home2.net SIP/2.0
Via: SIP/2.0/UDP
Max-Forwards:
From: <sip:interUEtransfer@example.net>;tag=38789
To: <sip:user2@home2.net; >
Call-ID: duie4hr3896
Cseq: 41 INVITE
Contact: <sip:sccas1.home1.example.net>;g.3gpp.iut-focus
Referred-By: sip:user1@home1.net
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.112.67.87
s=-
c=IN IP4 123.112.67.87
t=0 0
m=audio 0 RTP/AVP 97
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

16-19. SIP 200 (OK) response to SIP INVITE request(UE-2 to SCC AS-1)

UE-2 acknowledges the SIP INVITE request by sending SIP 200 (OK) response to SCC AS-1.

20-22. SIP re-INVITE request (SCC AS-1 to UE-3)- see example in table 4.2.4.1-20

SCC AS-1 sends SIP re-INVITE request to the remote UE to update the video media.

Table 4.2.4.1-20: SIP INVITE request (SCC AS-1 to UE-3)

```
INVITE sip:user3@home3.net SIP/2.0
Via:
To: sip:user3_public3@home3.net;tag = 66666
From: sip:interUEtransfer@example.net; tag=33333
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:user1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 1300 RTP/AVP 96 97
c=IN IP4 123.45.67.89
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 145.23.77.88
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

23-25. SIP 200 (OK) response to re-INVITE request (UE-3 to SCC AS-1)

After successful media update, UE-3 sends the SIP 200 (OK) response towards SCC AS-1.

26-28. SIP ACK request (SCC AS-1 to UE-3)

SCC AS-1 sends SIP ACK request to the remote UE-3.

29-32. SIP ACK request (SCC AS-1 to UE-2)

SCC AS-1 sends SIP ACK request to UE-2 to confirm the session establishment.

33-34. SIP NOTIFY request (SCC AS-1 to UE-1)

The SCC AS-1 informs the UE-1 that the action triggered by SIP REFER request was successfully completed.

35-36. SIP 200 (OK) response to SIP NOTIFY request (UE-1 to SCC AS-1)

The UE-1 confirms the SIP NOTIFY request by sending SIP 200 (OK) response to SIP NOTIFY request.

4.3 Discovery of UEs of different IMS subscriptions which can participate in collaborative sessions

4.3.1 General

Editor's Note: This subclause will describe the UE discovery procedures, especially for the case when UEs belong to different IMS subscriptions.

4.3.2 Procedures

4.3.3 Identified issues

4.3.4 Call flows

4.4 Establishment of collaborative session upon session setup

4.4.1 General

The following subclauses describe the procedures and call flows of collaborative session establishment without the pre-requisite of having an IMS session established.

4.4.2 Procedures

4.4.2.1 Establishment of collaborative session upon originating IMS session setup

Editor's Note: This subclause corresponds to subclause 6.1.3.2 of 3GPP TR 23.831 [3]

4.4.2.1.1 Alternative 1 – indicating collaborative session establishment by providing controllee UE SIP URI in SDP

4.4.2.1.1.1 Alternative 1a- media negotiation with remote party first

4.4.2.1.1.1.1 Controller UE

To establish a collaborative session upon originating session setup, the controller UE sends a SIP INVITE request to the remote party in accordance with the procedures specified in 3GPP TS 24.229 [4]. The controller UE shall populate the SIP INVITE request as follows:

1) the Request-URI set to the URI of remote party; and

2) the SDP information as follows:

    a) for the media component(s) served by itself, containing the port numbers of the UE; and

    b) for the media component(s) that to be established in the controllee UE, set as follows:

      - the port numbers set to 9; and

      - the SIP URI of controllee UE in the c line as described in draft-yang-dispatch-SIP-connection-address-type [16].

Upon receiving a SIP 200 (OK) response with the SDP answer from SCC AS, the controller UE shall send a SIP ACK request to the SCC AS.

4.4.2.1.1.1.2 SCC AS serving the collaborative session

Upon receiving a SIP INVITE request due to the c line containing a SIP address as described in draft-yang-dispatch-SIP-connection-address-type [16], the SCC AS shall remove the ccap line containing the SIP address and uses the 0.0.0.0 address instead, and forward the SIP INVITE request to the remote party.

on receiving a SIP 18x response from remote party, the SCC AS shall send a SIP INVITE request to the controllee UE includes:

1) the Request-URI set to the URI of controllee UE;

2) the Referred-by header field set to the URI of the controller UE; and

Editor's Note: Whether containing the "Referred-by" header in the INVITE request to indicate the request comes from the controller UE is FFS.

3) the SDP information as follows:

    a) for the media component(s) that are to be established on the controller UE containing the port number set to zero; and

    b) for the media component(s) that are to be established on the controllee UE containing the port number for the corresponding media received in the media line of the SDP received during the last successful SDP offer/answer exchange.

Upon receiving a SIP 18x response from the controllee UE, the SCC AS shall send a SIP UPDATE request to the remote party to update the media includes:

1) the Request-URI set to the URI of remote party; and

2) the SDP offer with

    a) for the media component(s) that are to be established on the controller UE with the port number received from the initial SIP INVITE request sent by the controller UE; and

    b) for the media component(s) that are to be established on the controllee UE containing the port number for the corresponding media received in the media line of the SDP received during the last successful SDP offer/answer exchange.

Upon receiving a SIP 200 (OK) response from the controllee UE, the SCC AS shall send a SIP ACK request to the controllee UE.

4.4.2.1.1.2 Alternative 1b- media negotiation with controllee UE first

4.4.2.1.1.2.1 Controller UE

To establish a collaborative session upon originating session setup, the controller UE sends a SIP INVITE request to the remote party in accordance with the procedures specified in 3GPP TS 24.229 [4]. The controller UE shall populate the SIP INVITE request as follows:

1) the Request-URI set to the URI of remote party; and

2) the SDP information as follows:

   a) for the media component(s) served by itself, containing the port numbers of the UE; and

   b) for the media component(s) that to be established in the controllee UE, as follows:

   - the port numbers set to 9;

   - the connection address set to 0.0.0.0; and

   - "a=3gpp.iut.controllee" attribute set to the SIP URI of the controllee UE.

Upon receiving a SIP 200 (OK) response with the SDP answer from the remote party, the controller UE shall send a SIP ACK request to the remote party.

4.4.2.1.1.2.2 SCC AS serving the collaborative session

Upon receiving a SIP INVITE request due to the "a=3gpp.iut.controllee" attribute, the SCC AS shall send a SIP INVITE request to the controllee UE includes:

1) the Request-URI set to the URI of controllee UE which is indicated in the "a=3gpp.iut.controllee" attribute;

2) the Referred-by header field set to the URI of the controller UE; and

3) the SDP information as follows:

   a) for the media component(s) that are to be established on the controller UE containing the port number set to zero; and

   b) for the media component(s) that are to be established on the controllee UE containing the port number set to 9.

Upon receiving a SIP 18x/200 response from the controllee UE, the SCC AS shall send a SIP INVITE request to the remote party includes:

1) the Request-URI set to the URI of remote party using the URI from the Request-URI of the original SIP INVITE request; and

2) the SDP offer with

   a) for the media component(s) that are to be established on the controller UE with the port number received from the initial SIP INVITE request sent by the controller UE; and

   b) for the media component(s) that are to be established on the controllee UE containing the port number for the corresponding media received in the media line of the SDP received during the last successful SDP offer/answer exchange.

Upon receiving a SIP 200 (OK) response from the remote UE, the SCC AS shall forward the SIP 200(OK) respose to the controller UE and send a SIP re-INVTE/UPDATE request to the controllee UE includes:

1) the Request-URI set to the URI of remote party; and

2) the SDP offer with

   a) for the media component(s) that are to be established on the controller UE with the port number set to zero; and

   b) for the media component(s) that are to be established on the controllee UE containing the port number for the corresponding media received in the media line of the SDP received during the last successful SDP offer/answer exchange.

Upon receiving a SIP 200 (OK) response from the controllee UE, the SCC AS shall send a SIP ACK request to the controllee UE.

4.4.2.1.2 Alternative 2 – indicating collaborative session establishment by multipart/related Content-Type parameter

4.4.2.1.2.1 Controller UE

To establish a collaborative session upon originating session setup the controller UE sends a SIP INVITE request to the remote party in accordance with the procedures specified in 3GPP TS 24.229 [4]. The controller UE shall populate the SIP INVITE request as follows:

1) the Request-URI set to the URI of the remote party;

2) the Contact header field containing the +g.3gpp.iut-controller media feature-tag as described in 3GPP TS 24.237 [6], annex C;

3) the Content-Type header field set to multipart/related with a start-info parameter value "collaborative-session"; and

4) the body including:

    a) SDP for the media component(s) served by itself, containing the port numbers of the UE; and

    b) SIPfrag of a SIP REFER request, indicating the media component(s) to be established on the controllee UE, with a Refer-To header including:

       - the SIP URI of the controllee UE where the media stream(s) should be established; and

    NOTE 1: The SIP URI of the controllee UE needs to be a GRUU if the controllee UE and any other UEs share the same public user identity.

       - the SIP URI additionally containing the URI header field with the hname "body" containing SDP media (m=) line(s) for the media to be added to the controllee UE with the port numbers set to 9.

    NOTE 2: The SIP INVITE request will be forwarded to the SCC AS through means of intial filter criteria.

Upon receiving a SIP 200 (OK) response with an SDP answer from the SCC AS, the controller UE shall send a SIP ACK request to the SCC AS.

4.4.2.1.2.2 SCC AS serving the collaborative session

Upon receiving a SIP INVITE request including a Contact header field containing the +g.3gpp.iut-controller media feature-tag as described in 3GPP TS 24.237 [6], annex C, and including a multipart/related Content-Type header field with a start-info parameter value "collaborative-session", the SCC AS shall remove the SIPfrag and add the SDP of the body parameter of the SIP REFER request of the SIPfrag to the SDP of the SIP INVITE request with a connection (c=) line using the unspecified (0.0.0.0) address if IPv4 is being used or a domain name within the ".invalid" DNS top-level domain as described in draft-ietf-sipping-v6-transition if IPv6 is being used and forward the SIP INVITE request to the remote party.

Upon receiving a SIP 18x response from the remote party, the SCC AS shall send a SIP INVITE request to the controllee UE including:

1) the Request-URI set to the URI of the controllee UE;

2) the Referred-by header field set to the URI of the controller UE; and

3) the SDP information as follows:

    a) for the media component(s) that are to be established on the controller UE contain the port numbers set to zero; and

    b) for the media component(s) that are to be established on the controllee UE contain the port numbers of the corresponding media lines of the SDP received during the last successful SDP offer/answer exchange.

Upon receiving a SIP 18x response from the controllee UE, the SCC AS shall send a SIP UPDATE request to the remote party to update the media, including:

1) the Request-URI set to the URI of the remote party; and

2) the SDP offer as follows:

    a) for the media component(s) that are to be established on the controller UE contain the port numbers received in the initial SIP INVITE request sent by the controller UE; and

    b) for the media component(s) that are to be established on the controllee UE contain the port numbers received in the SIP 18x response from the controllee UE.

Upon receiving a SIP 200 (OK) response from the controllee UE, the SCC AS shall send a SIP ACK request to the controllee UE.

4.4.2.1.3 Alternative 3 – indicating collaborative session establishment by providing controllee UE SIP URI in SDP attribute and using P-Asserted-Identity

4.4.2.1.3.1 Controller UE

To establish a collaborative session upon originating session setup the controller UE sends a SIP INVITE request to the remote party in accordance with the procedures specified in 3GPP TS 24.229 [4]. The controller UE shall populate the SIP INVITE request as follows:

1) the Request-URI set to the URI of the remote party; and

2) the SDP information as follows:

    a) for the media component(s) served by itself, containing the port numbers of the UE; and

    b) for the media component(s) that to be established in the controllee UE, as follows:

      - the port numbers set to 9;

      - the connection address set to 0.0.0.0; and

      - "a=3gpp.iut.controllee" attribute set to the SIP URI of controllee UE.

Upon receiving a SIP 200 (OK) response with the SDP answer from SCC AS, the controller UE shall send a SIP ACK request to the SCC AS.

4.4.2.1.3.2 SCC AS serving the collaborative session

Upon receiving a SIP INVITE request including SDP containing media with the "a=3gpp.iut.controllee" attribute, the SCC AS shall send a SIP INVITE request to the controllee UE including:

1) the Request-URI set to the URI of the controllee UE which is indicated in the "a= 3gpp. iut.controllee" attribute;

2) the P-Asserted-Identity header field set to the URI of the controller UE; and

3) the SDP information as follows:

    a) for the media component(s) that are to be established on the controller UE containing the port number set to zero; and

    b) for the media component(s) that are to be established on the controllee UE:

      - remove the attribute "a=3gpp.iut.controllee";

      - the port number set to 9; and

      - the connection address set to 0.0.0.0.

Upon receiving a SIP 18x or 200 (OK) response from the controllee UE that includes an SDP answer, the SCC AS shall send a SIP INVITE request to the remote party including:

1) the Request-URI set to the URI of the remote party using the URI from the Request-URI of the original SIP INVITE request;

2) the P-Asserted-Identity header field set to the URI of the controller UE; and

3) the SDP information as follows:

    a) for the media component(s) that are to be established on the controller UE containing the port number set to zero; and

    b) for the media component(s) that are to be established on the controllee UE containing the port number for the corresponding media received in the media line of the SDP received during the last successful SDP offer/answer exchange.

Upon receiving a SIP 200 (OK) response from the remote UE, the SCC AS shall forward the SIP 200(OK) respose to the controller UE and send a SIP re-INVTE/UPDATE request to the controllee UE to update the media description based upon the last successful SDP offer/answer exchange with the remote party

Upon receiving a SIP 200 (OK) response from the controllee UE, the SCC AS shall send a SIP ACK request to the controllee UE.

4.4.2.1.3A Alternative 3A – indicating collaborative session establishment by providing controllee UE SIP URI in SDP connection line and using P-Asserted-Identity

4.4.2.1.3A.1 Controller UE

To establish a collaborative session upon originating session setup, the controller UE sends a SIP INVITE request to the remote party in accordance with the procedures specified in 3GPP TS 24.229 [4]. The controller UE shall populate the SIP INVITE request as follows:

1) the Request-URI set to the URI of remote party; and

2) the SDP information as follows:

    a) for the media component(s) served by itself, containing the port numbers of the UE; and

    b) for the media component(s) that to be established in the controllee UE, as follows:

      - the port numbers set to 9; and

      - the SIP URI of controllee UE in the c line as described in draft-yang-dispatch-SIP-connection-address-type [16].

Upon receiving a SIP 200 (OK) response with the SDP answer from SCC AS, the controller UE shall send a SIP ACK request to the SCC AS.

4.4.2.1.3A.2 SCC AS serving the collaborative session

Upon receiving a SIP INVITE request including SDP containing media containing a SIP address in the c line as described in draft-yang-dispatch-SIP-connection-address-type [16], the SCC AS shall send a SIP INVITE request to the controllee UE including.

1) the Request-URI set to the URI of the controllee UE which is indicated in the c line as described in draft-yang-dispatch-SIP-connection-address-type [16];

2) the P-Asserted-Identity header field set to the URI of the controller UE; and

2) the SDP information as follows:

    a) for the media component(s) that are to be established on the controller UE containing the port number set to zero; and

    b) for the media component(s) that are to be established on the controllee UE:

      - the port number set to 9; and

      - the connection address set to 0.0.0.0.

Upon receiving a SIP 18x or 200 (OK) response from the controllee UE that includes an SDP answer, the SCC AS shall send a SIP INVITE request to the remote party including:

1) the Request-URI set to the URI of the remote party using the URI from the Request-URI of the original SIP INVITE request;

2) the P-Assserted-Identity header field set to the URI of the controller UE; and

3) the SDP information as follows:

   a) for the media component(s) that are to be established on the controller UE containing the port number set to zero; and

   b) for the media component(s) that are to be established on the controllee UE containing the port number for the corresponding media received in the media line of the SDP received during the last successful SDP offer/answer exchange.

Upon receiving a SIP 200 (OK) response from the remote UE, the SCC AS shall forward the SIP 200(OK) respose to the controller UE and send a SIP re-INVTE/UPDATE request to the controllee UE to update the media description based upon the last successful SDP offer/answer exchange with the remote party

Upon receiving a SIP 200 (OK) response from the controllee UE, the SCC AS shall send a SIP ACK request to the controllee UE.

4.4.2.1.4 Alternative 4 – indicating collaborative session establishment using multiple REFER

4.4.2.1.4.1 Controller UE

To establish a collaborative session upon originating session setup, the controller UE sends a SIP REFER request to the SCC AS in accordance with the procedures specified in 3GPP TS 24.229 [4]. The controller UE shall populate the SIP REFER request as follows:

1) the Request-URI set to the Inter UE Transfer SCC AS URI;

2) the Refer-To header field containing a Content-ID URL as specified in RFC 5368 [23];

3) the Require header field containing the option-tags "multiple-refer" and "norefersub";

4) the Refer-Sub header field set to "false";

5) the Content-Type header field containing the MIME type "application/resource-lists+xml";

6) the Content-Disposition header field containing "recipient-list";

7) the Content-Id header field containing the content ID;

8) the Accept header field containing the MIME types "application/sdp " and "message/sipfrag";

9) the Contact header field containing the media feature tags g.3gpp.iut-controller and the "g.3gpp current-iut-controller" set to "active" as described in annex C;

10) the Referred-By header field containing a currently registered public user identity of the user to be delivered to the controllee UE(s) and remote UE; and

11) a recipient-list MIME body formatted as follows:

    a) an <entry uri> element containing:

       i) the SIP URI of the remote UE being invited to the session;

       ii) the SIP URI additionally containing the URI header field with the hname "body" containing SDP for the media type for each of the media (m=) lines for the session with port numbers set to zero; and

       iii) a copyControl attribute set to "to" as specified in RFC 5364 [24];

    b) an <entry uri> element containing:

       i) the SIP URI of the controller UE;

NOTE 1: The SIP URI of the controllee UE needs to be a GRUU if the controllee UE and other UEs share the same public user identity.

       ii) the SIP URI additionally containing the URI header field with the hname "body" containing SDP for the media type for each of the media (m=) lines for the session with port numbers set as follows:

         - media lines that are being added on controllee UE(s) with the port number set to zero;

         - media line(s)that are to be added on the controller UE containing the media type(s) to be added and the discard port number "9" ; and

NOTE 2: The discard port number "9" indicates that this port number should be ignored.

       iii) a copyControl attribute set to "bcc" as specified in RFC 5364 [24];

    c) an <entry uri> element for each controllee UE containing:

       i) the SIP URI of the controller UE;

NOTE 3: The SIP URI of the controllee UE needs to be a GRUU if the controllee UE and other UEs share the same public user identity.

       ii) the SIP URI additionally containing the URI header field with the hname "body" containing SDP for the media type for each of the media (m=) lines for the session with port numbers set as follows:

         - media lines that are not being added on the controllee UE with the port number set to zero;

         - media line(s)that are to be added on the controllee UE containing the media type(s) to be added and the discard port number "9" ; and

NOTE 4: The discard port number "9" indicates that this port number should be ignored.

       iii) a copyControl attribute set to "bcc" as specified in RFC 5364 [24].

The controller UE shall handle any response to the SIP REFER request and the subsequent SIP NOTIFY requests according to 3GPP TS 24.229 [2] and IETF RFC 3515 [13].

Upon receiving a SIP INVITE request containing the Referred-By header field contents provided in the SIP REFER request, the controller UE shall send a SIP 183 (Session Progress) response containing an SDP answer and the media feature tag "g.3gpp current-iut-controller" set to "active" in the Contact header field.

The controller UE shall send a SIP 200 (OK) response to the SCC AS in accordance with the procedures specified in 3GPP TS 24.229 [4]

4.4.2.1.4.2   SCC AS serving the collaborative session

Upon receiving a SIP REFER request with the Request-URI set to the Inter UE Transfer SCC AS URI and containing a recipient-list MIME body the SCC AS shall send a SIP INVITE request to the remote party identified by the <entry uri> element containing the copyControl attribute set to "to" containing:

1) Request-URI with SIP URI from the Refer-To header field of the received SIP REFER request;

2) the Referred-By header field containing the values from the Referred-By header field of the received SIP REFER request according to the procedures of RFC 3892 [59];

3) the P-Asserted-Identity header field containing the URI of the Controller UE from the Referred-By header field of the received SIP REFER request; and

4) the SDP information for the media component to be offered from the media type(s) from the media (m=) lines from the hname "body" URI header field in the SIP URI in the <entry uri> element of remote UE from the received SIP REFER request.

Upon receiving a SIP 18x response from remote party, the SCC AS shall send a SIP INVITE request to the controller and controllee UEs identified by the <entry uri> elements containing the copyControl attribute set to "bcc" containing:

1) the Request-URI set to the URI from <entry uri> element;

2) the Referred-By header field containing the values from the Referred-By header field of the received SIP REFER request according to the procedures of RFC 3892 [59];

3) the P-Assserted-Identity header field set to the URI of the controller UE from the Referred-By header field of the received SIP REFER request; and

4) the SDP information as from the media type(s) from the media (m=) lines from the hname "body" URI header field in the SIP URI in the <entry uri> element of the UE from the received SIP REFER request follows:

   a) for the media component(s) that are not to be established on the UE containing the port number set to zero; and

   b) for the media component(s) that are to be established on the UE containing the port number for the corresponding media received in the media line of the SDP received during the last successful SDP offer/answer exchange.

After receiving a SIP 18x response containing an SDP answer from all the controllee UEs and the controller UE, the SCC AS shall send a SIP UPDATE request to the remote party to update the media as follows:

1) the Request-URI set to the URI of remote party; and

2) the SDP offer with the active port number received in the SDP answers from the controllee UEs and the controller UE

The SCC AS identifies the controller UE from the media feature tag "g.3gpp current-iut-controller" set to "active" in the Contact header field of the response.

Upon receiving a SIP 200 (OK) response from the remote UE then once a SIP 200 (OK) response has been received from a controllee UEs or the controller UE, the SCC AS shall send a SIP ACK request to that UE. The SCC AS also shall send a SIP ACK request to the remote UE.

Upon receiving a 4xx, 5xx or 6xx response from the remote UE or upon a timeout on the dialog towards the remote UE before the SIP 200 (OK) response is received from the remote UE the SCC AS shall send a SIP CANCEL request to the controller UE and controllee UEs and consider the establishment of the collaborative session terminated.

4.4.2.2 Establishment of collaborative session upon terminating IMS session setup

Editor's Note: This subclause corresponds to subclause 6.1.3.3 of 3GPP TR 23.831 [3]

4.4.2.2.1 Alternative 1: Using SIP 183 (Session Progress) response

4.4.2.2.1.1 Controller UE

Upon receiving a SIP initial INVITE request from the remote party, the controller UE shall send a SIP 18x response to the remote party in accordance with the procedures specified in 3GPP TS 24.229 [4] with the SDP information as follows:

1) for the media component(s) that are to be established on the controller UE containing the port numbers of the controller UE; and

2) for the media component(s) that to be established in the controllee UE with the port set to 9.

After sending the SIP 18x response, to establish the media on the controllee UE, the controller UE sends a SIP UPDATE request to the remote party includes:

1) the Request-URI set to the URI of remote party; and

2) the SDP information as follows:

   a) for the media component(s) served by controller UE, containing the port numbers of the controller UE; and

    b) for the media component(s) that to be established in the controllee UE, set as follows:

      - the port numbers set to 9; and

      - the SIP URI of controllee UE in the c line as described in draft-yang-dispatch-SIP-connection-address-type [16].

When the controller UE answers the call, the controller UE sends a SIP 200 (OK) response to the remote party.

4.4.2.2.1.2 SCC AS serving the collaborative session

Upon receiving a SIP INVITE request from the remote party, the SCC AS shall forward the SIP INVITE request to the controller UE.

Upon receiving a SIP UPDATE request from the controller UE, the SCC AS authorizes the request for the session setup in controllee UE. To establish the media on the controllee UE, the SCC AS sends a SIP INVITE request to the controllee UE includes:

    1) the Request-URI set to the URI of controllee UE; and

    2) the SDP information as follows:

      a) for the media component(s) that are to be established on the controller UE with the port number set to zero; and

      b) for the media component(s) that are to be established on the controllee UE containing the port number for the corresponding media received in the media line of the SDP received during the last successful SDP offer/answer exchange.

Upon receiving a SIP 18x response from the controllee UE, the SCC AS shall forward the SIP UPDATE request with the updated SDP offer to the remote party to update the media.

Upon receiving a SIP 200 (OK) response from the controllee UE, the SCC AS shall send a SIP ACK request to the controllee UE.

4.4.2.2.2 Alternative 2 – indicating collaborative session establishment by multipart/related Content-Type parameter

4.4.2.2.2.1 Controller UE

Upon receiving a SIP initial INVITE request from the remote party, the controller UE shall send a SIP 18x response to the remote party in accordance with the procedures specified in 3GPP TS 24.229 [4] with the SDP information as follows:

    1) for the media component(s) that are to be established on the controller UE contain the port numbers of the controller UE; and

    2) for the media component(s) that are to be established on the controllee UE contain the port numbers set to 9.

When the controller UE answers the call, the controller UE sends a SIP 200 (OK) response to the remote party, including:

    1) the Request-URI set to the URI of the remote party;

    2) the Contact header field containing the g.3gpp.iut-controller media feature-tag as described in 3GPP TS 24.237 [6], annex C;

    3) the Content-Type header field set to multipart/related with a start-info parameter value "collaborative-session"; and

    4) the body including:

      a) SDP for the media component(s) served by itself, containing the port numbers of the UE; and

b) SIPfrag of a SIP REFER request, indicating the media component(s) to be established on the controllee UE, with a Refer-To header including:

- the SIP URI of the controllee UE where the media stream(s) should be established; and

NOTE: The SIP URI of the controllee UE needs to be a GRUU if the controllee UE and any other UEs share the same public user identity.

- the SIP URI additionally containing the URI header field with the hname "body" containing SDP media (m=) line(s) for the media to be added to the controllee UE with the port numbers set to 9.

4.4.2.2.2.2 SCC AS serving the collaborative session

Upon receiving a SIP INVITE request from the remote party, the SCC AS shall forward the SIP INVITE request to the terminating UE.

NOTE: The SIP INVITE request will be forwarded to the SCC AS through means of intial filter criteria.

When the SCC AS receives a SIP 200 (OK) response from the terminating UE including a Contact header field containing the g.3gpp.iut-controller media feature-tag as described in 3GPP TS 24.237 [6], annex C, and including a multipart/related Content-Type header field with a start-info parameter value "collaborative-session", the SCC AS shall authorize the request for the session setup in the controllee UE. To establish the media on the controllee UE, the SCC AS shall send a SIP INVITE request to the controllee UE including:

1) the Request-URI set to the URI of the controllee UE; and

2) the SDP information as follows:

a) for the media component(s) that are to be established on the controller UE contain the port numbers set to zero; and

b) for the media component(s) that are to be established on the controllee UE contain the port numbers of the corresponding media lines of the SDP received during the last successful SDP offer/answer exchange.

Upon receiving a SIP 18x response from the controllee UE, the SCC AS shall send a SIP UPDATE request to the remote party to update the media, including:

1) the Request-URI set to the URI of the remote party; and

2) the SDP offer as follows:

a) for the media component(s) that are to be established on the controller UE contain the port numbers received in the SIP 200 (OK) response from the controller UE; and

b) for the media component(s) that are to be established on the controllee UE contain the port numbers received in the SIP 18x response from the controllee UE.

Upon receiving a SIP 200 (OK) response from the controllee UE, the SCC AS shall send a SIP ACK request to the controllee UE.

4.4.2.2.3 Alternative 3 – indicating collaborative session establishment by SIP REFER request before SIP 200 (OK) response

4.4.2.2.3.1 Controller UE

Upon receiving a SIP initial INVITE request from the remote party, the controller UE shall send a SIP 18x response reliably to the remote party in accordance with the procedures specified in 3GPP TS 24.229 [4] with the SDP information as follows:

1) for the media component(s) that are to be established on the controller UE contain the port numbers of the controller UE; and

2) for the media component(s) that are to be established on the controllee UE contain the port numbers set to 9.

Upon receiving a SIP PRACK request from the SCC AS acknowledging the reception of the SIP 18x response, the controller UE shall send a SIP 200 (OK) response to the SIP PRACK request.

After sending the SIP 200 (OK) response the controller UE shall send a SIP REFER request outside the dialog initiated by the received SIP INVITE request to the SCC AS as specified in IETF RFC 3515 [8] and include:

1) the Request-URI set to the URI of the SCC AS;

2) the Refer-To header field, including:

   a) the SIP URI of the controllee UE;

   NOTE: The SIP URI of the controllee UE needs to be a GRUU if the controllee UE and other UEs share the same public user identity.

   b) the body parameter containing SDP media (m=) line(s) for the media to be transferred to the controllee UE with the port numbers set to 9.

3) the Accept header field containing the MIME type "message/sipfrag";

4) the Target-Dialog header field containing the dialog parameters for the dialog of the session initiated by the received SIP INVITE request;

5) the Contact header field containing the g.3gpp.iut-controller media feature-tag as described in 3GPP TS 24.237 [6], annex C; and

6) the Referred-By header field containing a currently registered public user identity of the controller UE.

The controller UE shall handle any response to the SIP REFER request and the subsequent SIP NOTIFY requests according to 3GPP TS 24.229 [4] and IETF RFC 3515 [8]. The controller UE shall save the media information (e.g. media line(s) and port number(s)) received in the sipfrag body of the SIP NOTIFY requests in order to perform further inter-UE transfer operations on the controllee UE.

If an error response is received for the SIP REFER request or the subsequent SIP NOTIFY requests including a non-2xx final response, the controller UE shall consider the transfer operation failed and continue the existing session.

When the controller UE answers the call, the controller UE sends a SIP 200 (OK) response to the remote party.

4.4.2.2.3.2 SCC AS serving the collaborative session

Upon receiving a SIP INVITE request from the remote party, the SCC AS shall forward the SIP INVITE request to the terminating UE. When the SCC AS receives a SIP REFER request in a new dialog from the terminating UE including a Contact header field containing the g.3gpp.iut-controller media feature-tag as described in 3GPP TS 24.237 [6], annex C, the SCC AS shall check whether the Target-Dialog header field of the SIP REFER request contains the dialog parameters for the dialog of the session initiated by the forwarded SIP INVITE request. If the Target-Dialog header field contains the dialog parameters for the dialog of the session initiated by the forwarded SIP INVITE request a collaborative session shall be established with the terminating UE as the controller UE.

The SCC AS shall authorize the request for the session setup in the controllee UE indicated by the SIP REFER request and send a SIP 202 (Accepted) response to the controller UE, if the session setup in the controllee UE has been authorized.

Upon receiving a SIP 200 (OK) response from the controller UE, the SCC AS shall send a SIP INVITE request to the controllee UE including:

1) the Request-URI set to the URI of controllee UE; and

2) the SDP information as follows:

   a) for the media component(s) that are to be established on the controller UE contain the port numbers set to zero; and

   b) for the media component(s) that are to be established on the controllee UE contain the port numbers of the corresponding media lines of the SDP received during the last successful SDP offer/answer exchange.

Upon receiving a SIP 18x response from the controllee UE, the SCC AS shall send a SIP UPDATE request to the remote party to update the media, including:

1) the Request-URI set to the URI of the remote party; and

2) the SDP offer as follows:

    a) for the media component(s) that are to be established on the controller UE contain the port numbers received in the SIP 200 (OK) response from the controller UE; and

    b) for the media component(s) that are to be established on the controllee UE contain the port numbers received in the SIP 18x response from the controllee UE.

Upon receiving a SIP 200 (OK) response from the controllee UE, the SCC AS shall send a SIP ACK request to the controllee UE.

4.4.2.2.4 Alternative 4 – Using SIP 300 (Multiple Choices) response

4.4.2.2.4.1 Controller capable UE

Upon receiving a SIP initial INVITE request from the remote party, the controller capable UE shall send a SIP 300 (Multiple Choices) response to the remote party in accordance with the procedures specified in 3GPP TS 24.229 [4] as follows:

1) a Contact header field for each UE that is to be a participant in the collaborative session (including the controller capable UE if the controller capable UE is also a participant) containing the SIP URI of that UE

NOTE: The SIP URI of the UE needs to be a GRUU if any of the UEs that are participants of the collaborative session share the same public user identity.

2) a Content-Type header field containing the MIME type application/vnd.3gpp.iut+xml; and

3) an application/vnd.3gpp.iut+xml MIME body containing a <controlTransfer> element as containing

    i) an <activeController> element containing the SIP URI of the controller UE for the collaborative session and additionally containing the URI header field with the hname "body" containing SDP for the media type for each of the media (m=) lines in the session set as follows:

       - media lines that are not being assigned to the controller capable UE with the port number set to zero

       - media line(s) that are to be assigned to the controller capable UE containing the port number for the corresponding media types received in the media line of the SDP offer in the SIP INVITE request; and

    ii) a <Controllee> element for each controllee UE that is to be a participant in the collaborative session containing the SIP URI of the controllee UE for the collaborative session and additionally containing the URI header field with the hname "body" containing SDP for the media type for each of the media (m=) lines in the session set as follows:

       - media lines that are not being assigned to that controllee UE with the port number set to zero

       - media line(s) that are to be assigned to that controllee UE containing the port number for the corresponding media types received in the media line of the SDP offer in the SIP INVITE request;

If the controller capable UE indicated in the SIP 300 (Multiple Choices) response that it will be a participant in the collaborative session then the controller capable UE will receive a SIP INVITE request containing an SDP offer . The controller capable UE shall handle the SIP INVITE request in accordance with the procedures specified in 3GPP TS 24.229 [4].

If the controller capable UE indicated in the SIP 300 (Multiple Choices) response that it will be the controller UE for the collaborative session then the controller capable UE shall when accepting the session behave as a controller UE of the collaborative session, otherwise the controller capable UE shall act as a controllee UE for the collaborative session.

4.4.2.2.4.2 SCC AS serving the collaborative session

Upon receiving a SIP INVITE request from the remote party, the SCC AS shall forward the SIP INVITE request to the controller capable UE in accordance with the procedures specified in 3GPP TS 24.229 [4] adding the following:

1) an Accept-Contact header field containing the media feature tag g.3gpp.iut-controller along with the explicit parameter; and

2) an Accept header field containing the MIME type application/vnd.3gpp.iut+xml.

Upon receiving a SIP 300 (Multiple Choices) response containing the MIME body application/vnd.3gpp.iut+xml from the controller capable UE in response to the initial SIP INVITE request, the SCC AS sends a SIP ACK request to the controller capable UE in accordance with the procedures specified in 3GPP TS 24.229 [4] and then authorizes the request for the collaborative session setup with the controllee UE(s) identified in the <Controllee> element in the MIME body of the SIP 300 (Multiple Choices) response. The UE identified in <activeController> element in the MIME body of the SIP 300 (Multiple Choices) will become the controller UE for the collaborative session.

If authorised the SCC AS shall send a SIP 183 (Session Progress) response to the remote UE containing an SDP answer for all media lines indicated in the MIME body of the SIP 300 (Multiple Choices) response with a=INACTIVE set and for any media lines in the original offer that are not indicated in the MIME body of the SIP 300 (Multiple Choices) response with port numbers set to zero.

To establish the media the SCC AS sends a SIP INVITE request to each UE identified in the Contact header fields of the SIP 300 (Multiple Choices) response including:

1) the Request-URI set to the URI of UE from a Contact header of the SIP 300 (Multiple Choices) response;

2) the P-Asserted-Identity header field containing the identity of the remote UE as received in the P-Asserted-Identity header field from the remote UE in the original SIP INVITE request; and

3) the SDP information for the media component to be transferred to that UE as follows:

   a) the media type(s) from the media (m=) lines from the hname "body" URI header field in the corresponding SIP URI in the <activeController> element and <Controllee> element(s) in the <controlTransfer> element of the application/vnd.3gpp.iut+xml MIME body of the SIP 300 (Multiple Choices) response; and

   b) for media lines which have non zero port numbers the SDP parameters from the corresponding media lines as received in the SDP offer from the remote UE and extended with

      i) sendonly directionality; and

      ii) bandwidth information with RS set to zero and RR set to zero.

If the SIP final response was a non 2xx response then the SCC AS shall consider the transfer operation failed and the SCC AC shall send to the controller capable UE either a SIP re-INVITE request if a 2xx response has been received from the controller UE or a SIP UPDATE request if a final response has not yet been received from the controller capable UE following the procedures described in 3GPP TS 24.229 [2] as follows:

1) containing SDP reoffering the media component(s) that were offered to the UE that did not accept the SDP offer.

If the a response containing an SDP answer is received from a local UE, the SCC AC shall send a SIP UPDATE request on the dialog for the remote leg to the remote UE as specified in 3GPP TS 24.229 [2]. The SCC AS shall:

1) send a SIP UPDATE request containing SDP information as follows:

   a) for the transferred media component(s), set the SDP information as from the SDP answer received in the response from the UE; and

   b) for all other media components in the collaborative session, include the SDP information as from the previous offer answer exchange with the remote leg.

Upon receipt of a 2xx response for the SIP UPDATE request sent to the remote UE, the SCC AS shall send a SIP UPDATE request to the local UE that terminates the media component accepted in the SDP answer from the remote UE following the procedures described in 3GPP TS 24.229 [2] and set the directionality (i.e.

sendrecv/sendonly/recvonly/inactive) attributes associated to the transferred media component to according to the SDP answer received from the remote UE.

Upon receipt of a 2xx response for the SIP INVITE request sent to the controller capable UE, the SCC AS shall send a SIP 2xx response to the remote UE following the procedures described in 3GPP TS 24.229 [2] to establish the session with the remote UE.

Upon receiving a SIP ACK request from the remote UE, the SCC AS shall send a SIP ACK request to each local UE once a SIP 200 (OK) response has been received from the local UE.

4.4.3   Identified issues

Issue 4.4.3-1: What happens with early media and forked responses during session establishment, when a controllee UE is also added to the session currently being established? Will the related responses e.g. all be all delivered to the controller UE or be intercepted by the SCC AS?

4.4.4   Call flows

4.4.4.1   Call flows for establishment of collaborative session upon originating IMS session setup without forked responses

4.4.4.1.1   Alternative 1 – indicating collaborative session establishment by providing controllee UE SIP URI in SDP

4.4.4.1.1.1   Alternative1a - Media negotiation with remote UE first

In the example flow at the figure 4.4.4.1.1-1, UE-1 wants to establish a collaborative session without the pre-requisite of having an IMS session established. The UE-1 wants to setup a collaborative session with audio media flow in UE-1 and video media flow in UE-2, and wants to control the collaborative session through UE-1. The SCC AS forwards the SIP INVITE request to the remote UE to do the media negotiation with remote UE first.
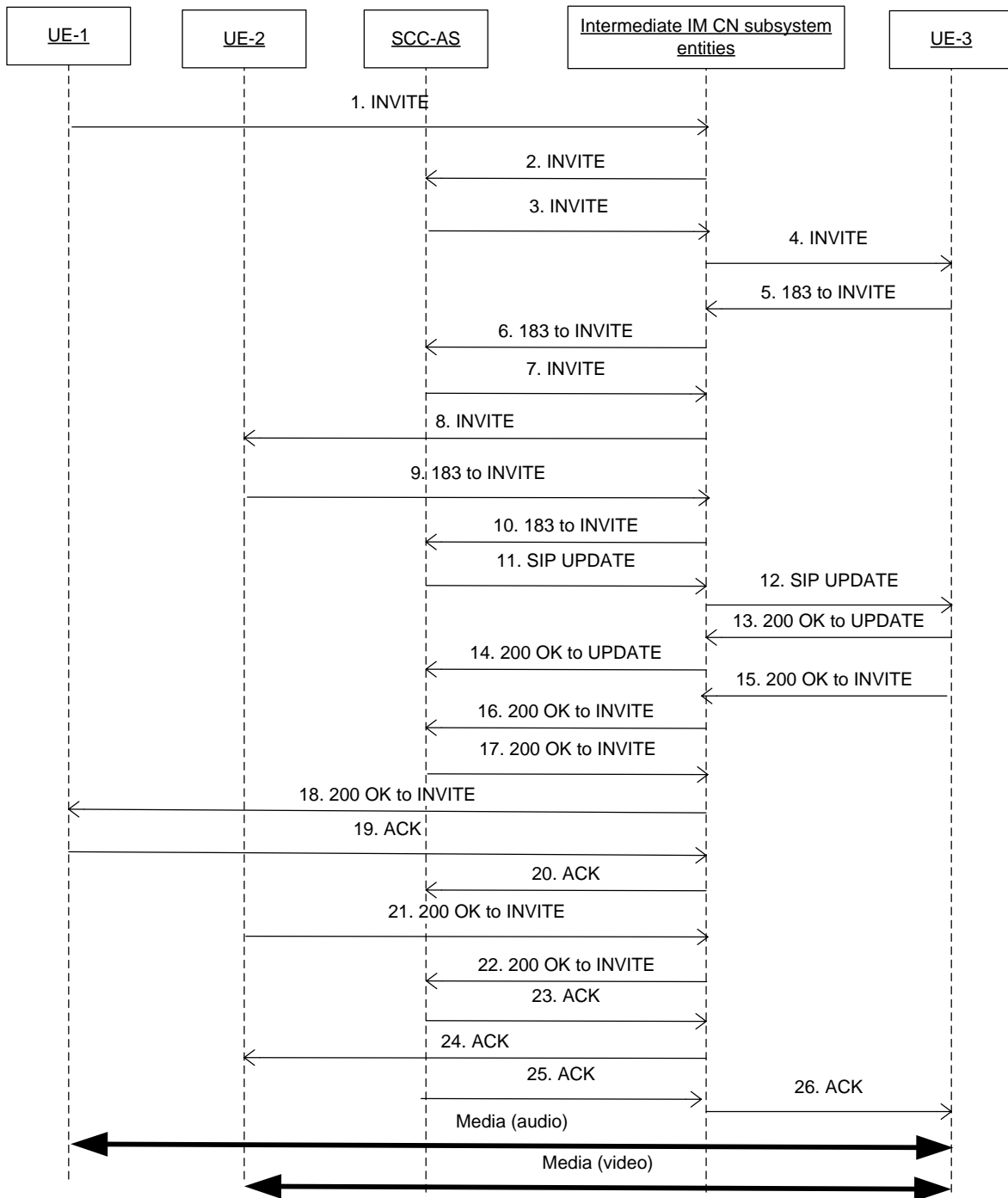
Figure 4.4.4.1.1.1-1: Signalling flow for establishment of collaborative session upon originating IMS session

NOTE: For clarity, the SIP 100 (Trying) messages are not shown in the signalling flow.

1-2. SIP INVITE request (UE-1 to SCC AS) - see example in table 4.4.4.1.1.1-1

The UE-1 sends SIP INVITE request to SCC AS to setup the collaborative session.

Table 4.4.4.1.1.1-1: SIP INVITE request (UE-1 to intermediate IM CN subsystem entities)

```
INVITE SIP: user3@example1.net; SIP/2.0
Via: SIP/2.0/UDP 192.0.2.5;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: sip:pcscf1.home1.net:7531;lr;comp=sigcomp>, <sip:orig@scscf1.home1.net;lr>
P-Preferred-Identity: <sip:uesr1@example1.net>
P-Access-Network-Info:
Privacy: none
From: <sip:user1@example1.net>; tag=171828
To: <sip:user3@example1.net>
Call-ID: cb03a0s09a2sdfglkj490237
Cseq: 127 INVITE
Supported: 100rel; precondition, gruu, 199
Require: sec-agree, replaces
Proxy-Require: sec-agree
Accept-Contact: *;+g.3gpp.icsi-ref="urn%3Aurn-7%3gpp-service.ims.icsi.mmtel"
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=7531
Contact:<sip:user1@example1.net;gr= urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6>;
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE
Accept: application/sdp; application/3gpp-ims+xml
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP4 192.0.2.5
s=
t=0 0
c=IN IP4 192.0.2.5
m=audio 49170 RTP/AVP 0 8 3
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:96 telephone-event
a=maxptime:20
m=video 9 RTP/AVP 98
c= URL SIPURI sip:user2@example2.net
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

SDP: The first media stream (audio) will be terminated by UE-1 of which the IP address is indicated in the c-line in the SDP header.

Editor's Note: The second media stream (video) is destined to be terminated by UE-2, of which the address is only known as a SIP address by UE-1. One possible solution in this example is, UE-1 includes the SIP address of UE-2 in the c line in the SDP media block for the video media stream, as described in draft-yang-dispatch-SIP-connection-address-type [16].

The port number of the remote side, i.e. UE-3 for the video media is currently not known to UE-1, therefore the port number for the video media stream is set to the discard port number "9".

3-4. SIP INVITE request (SCC AS to UE-3) - see example in table 4.4.4.1.1.1-3

SCC AS forwards the SIP INVITE request to UE-3.

Table 4.4.4.1.1.1-3: SIP INVITE request (SCC AS to intermediate IM CN subsystem entities)

```
INVITE   sip:user3@example1.net; SIP/2.0
Via:
Record-Route: sip:sccas1.home1.example.net
To: sip:user3@example1.net;
From: sip:user1@example1.net;tag=acegi
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: <sip:user1@example1.net;gr= urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6>;
Allow:
Content-Type: application/sdp
Content-Length:(…)

v=0
o=- 2987933615 2987933615 IN IP4 192.0.2.5
s=
t=0 0
c=IN IP4 192.0.2.5
m=audio 49170 RTP/AVP 0 8 3
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:96 telephone-event
a=maxptime:20
m=video 9 RTP/AVP 98
c=IN IP4 0.0.0.0
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

5-6. **SIP 183 (Session Progress) response to SIP INVITE request (UE-3 to SCC AS)**

The remote UE-3 responds with SIP 183 (Session Progress) response containing the SDP answer of remote UE.

7-8. **SIP INVITE request (SCC AS to UE-2) – see example in table 4.4.4.1.1.1-7**

The SCC AS sends the SIP INVITE request to UE-2 to establish the media between UE-2 and remote UE-3.

Table 4.4.4.1.1.1-7: SIP INVITE request (SCC AS to intermediate IM CN subsystem entities)

```
INVITE    sip:user2@example1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6 SIP/2.0
Via:
Record-Route: sip:sccas1.home1.example.net
To: sip:user2@example1.net;
From: sip:user3@example1.net;tag=acegi
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity: "remote user" sip:user3@example1.net
Require:
Referred-By: sip: user1@example1.net
Contact: sip:user3@example1.net;gr=urn:uuid:f81d4fae-17oct-11a1-a678-0054c91eabcd
Allow:
Content-Type: application/sdp
Content-Length:(…)

v=0
o=- 1027933615 1027933615 IN IP4 192.0.2.23
s=-
t=0 0
m=audio 0 RTP/AVP 0 8 3
m=video 4390 RTP/AVP 34
a= sendrecv
c=IN IP4 192.0.2.23
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

Editor's Note: Whether containing the "Referred-by" header in the INVITE request to indicate the request comes from the controller UE is FFS.

9-10.   SIP 183 (Session Progress) response to SIP INVITE request (UE-2 to SCC AS)

UE-2 sends the SIP 183 (Session Progress) response towards SCC AS containing the SDP answer of UE-2.

11-12. SIP UPDATE request (SCC AS to UE-3) - see example in table 4.4.4.1.1.1-11

SCC AS sends SIP UPDATE request to UE-3 to update the media in UE-3.

Table 4.4.4.1.1.1-11: SIP UPDATE request (SCC AS to remote intermediate IM CN subsystem entities)

```
UPDATE sip:user3_public3@home3.net SIP/2.0
Via:
To: sip:user3_public3@home3.net;tag = 66666
From: sip:interUEtransfer@example.net; tag=33333
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 1300 RTP/AVP 96 97
c=IN IP4 123.45.67.89
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 145.23.77.88
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

13-14. SIP 200 (OK) response to SIP UPDATE request (remote UE to SCC AS)

The remote UE-3 responds with SIP 200 (OK) response.

15-18. SIP 200 (OK) response to the initial SIP INVITE request (remote UE to UE-1)

When the remote UE answers the call, UE-3 sends the SIP 200 (OK) response back to UE-1.

19-20. SIP ACK request (UE-1 to SCC AS)

UE-1 sends the SIP ACK request to confirm the establishment of call to SCC AS.

21-22. SIP 200 (OK) response to SIP INVITE request (UE-2 to SCC AS)

UE-2 responds SIP 200 (OK) response to the SIP INVITE request.

23-24. SIP ACK request (UE-2 to SCC AS)

UE-2 sends the SIP ACK request to SCC AS.

25-26. SIP ACK request (SCC AS to UE-3)

SCC AS sends SIP ACK request to the remote UE.

4.4.4.1.1.2   Alternative 1b - Media negotiation with controllee UE first

In the example flow at the figure 4.4.4.1.1.2-1, UE-1 wants to establish a collaborative session without the pre-requisite of having an IMS session established. The UE-1 wants to setup a collaborative session with audio media flow in UE-1 and video media flow in UE-2, and wants to control the collaborative session through UE-1. The SCC AS establishes the Access Leg at UE-2 first to obtain the full media description of the video media.
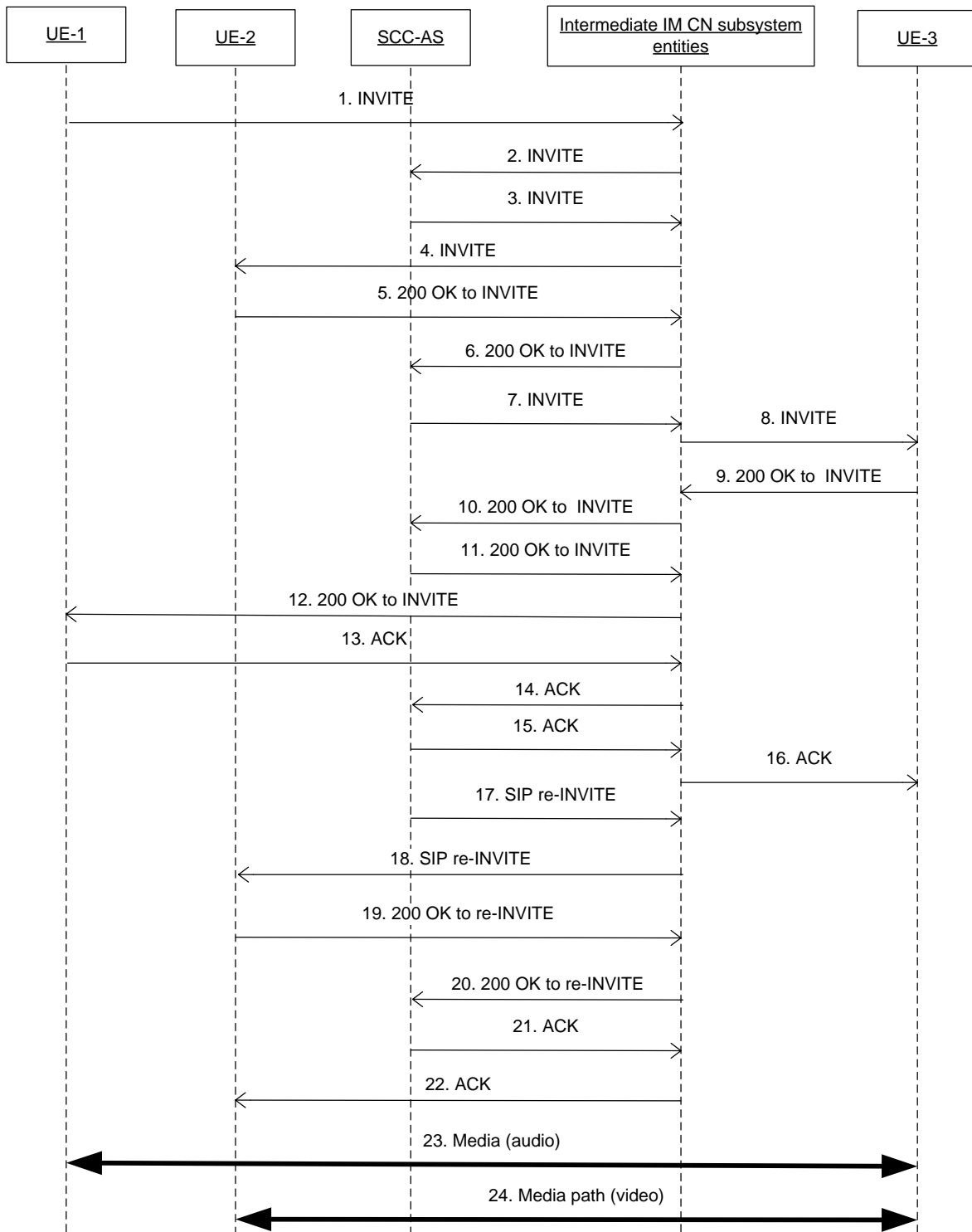
Figure 4.4.4.1.1.2-1: Signalling flow for establishment of collaborative session at IMS session origination

NOTE: For clarity, the SIP 100 (Trying) messages and SIP NOTIFY with SIP 100 (Trying) are not shown in the signalling flow.

1-2. SIP INVITE reuqest (UE-1 to SCC AS) - see example in table 4.4.4.1.1.2-1

The UE-1 sends SIP INVITE request to SCC AS-1 to setup the collaborative session.

Table 4.4.4.1.1.2-1: SIP INVITE request (UE-1 to intermediate IM CN subsystem entities)

```
INVITE SIP: user3@example1.net; SIP/2.0
Via: SIP/2.0/UDP 192.0.2.5;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: sip:pcscf1.home1.net:7531;lr;comp=sigcomp>, <sip:orig@scscf1.home1.net;lr>
P-Preferred-Identity: <sip:uesr1@example1.net>
P-Access-Network-Info:
Privacy: none
From: <sip:user1@example1.net>; tag=171828
To: <sip:user3@example1.net>
Call-ID: cb03a0s09a2sdfglkj490237
Cseq: 127 INVITE
Supported: 100rel; precondition, gruu, 199
Require: sec-agree, replaces
Proxy-Require: sec-agree
Accept-Contact: *;+g.3gpp.icsi-ref="urn%3Aurn-7%3gpp-service.ims.icsi.mmtel"
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=7531
Contact:<sip:user1@example1.net;gr= urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6>;
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE
Accept: application/sdp; application/3gpp-ims+xml
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP4 192.0.2.5
s=
t=0 0
c=IN IP4 192.0.2.5
m=audio 49170 RTP/AVP 0 8 3
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:96 telephone-event
a=maxptime:20
m=video 9 RTP/AVP 98
c=IN IP4 0.0.0.0
a=3gpp.iut.controllee SIPURI sip:user2@example2.net; gr=urn:uuid:f81d4fae-7dec-11d0-a765-
  00a0c91e6bf6
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

SDP: The first media stream (audio) will be terminated by UE-1 of which the IP address is indicated in the c-line in the SDP header.

3-4. SIP INVITE request (SCC AS to UE-2) - see example in table 4.4.4.1.1.2--3

Upon receiving the SIP INVITE request, the SCC AS sends a SIP INVITE request to UE-2 to establish the media between UE-2 and the remote UE-3.

Table 4.4.4.1.1.2-3: SIP INVITE request (SCC AS to intermediate IM CN subsystem entities)

```
INVITE   sip:uesr2@example1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6 SIP/2.0
Via:
Record-Route: sip:scc-as@home1.net
To: <sip:a2@example1.net>
From: <sip:user1@example1.net>; tag=171828
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Referred-By: sip: user1@example1.net
Contact:
Allow:
Content-Type: application/sdp
Content-Length:(…)

v=0
o=- 1027933615 1027933615 IN IP4 192.0.2.5
s=-
t=0 0
m=audio 0 RTP/AVP 0 8 3
m=video 9 RTP/AVP 98
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

Editor's Note: Whether containing the "Referred-by" header in the INVITE request to indicate the request comes from the controller UE is FFS

5-6. SIP 200(OK) response to SIP INVITE request (UE-2 to SCC AS) - see example in table 4.4.4.1.1.2-5.

Table 4.4.4.1.1.2-5: SIP 200 (OK) response (UE-2 to intermediate IM CN subsystem entities)

```
SIP/2.0 200 OK
Via:
To: <sip:user2@example1.net>tag=xyzwv
From: <sip:user1@example1.net>; tag=171828
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: sip:user2@example1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf
Allow: INVITE, PRACK, UPDATE
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 192.0.2.5
s=-
t=0 0
m=audio 0 RTP/AVP 0 8 3
m=video 1300 RTP/AVP 98
a=inactive
c=IN IP4 145.23.77.88
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
```

SDP: The connection information now indicates the IP address of UE-2.

7-8.   SIP INVITE request (SCC AS to UE-3)

The SCC AS sends the SIP INVITE request towards the remote UE-3 containing the SDP information of UE-1 and UE-2.

9-12.SIP 200 (OK) reponse to SIP INVITE request(UE-3 to UE-1)

UE-3 acknowledges the SIP INVITE request by sending SIP 200 (OK) response with the SDP answer to UE-1.S

13-16. SIP ACK request (UE-1 to UE-3)

UE-1 sends SIP ACK request to the remote UE.

17-18. SIP re-INVITE request (SCC AS to UE-2)

SCC AS-2 sends SIP re-INVITE request to UE-2 to update the media in UE-2.

19-20. SIP 200 (OK) response to SIP re-INVITE request (UE-2 to SCC AS)

The UE-2 confirms the SIP re-INVITE request by sending SIP 200 (OK) response to SCC AS.

21-22. SIP ACK request (SCC AS to UE-2)

SCC AS sends SIP ACK request to the remote UE.

23-24. Media path:

The audio media is between controller UE-1 and remote UE-3, and the video media is established between controllee UE-2 and the remote UE. The collaborative session control is in the controller UE-1.

4.4.4.1.2 Alternative 2 – indicating collaborative session establishment by multipart/related Content-Type parameter

In the example flow of figure 4.4.4.1.2-1 UE-1 wants to establish a collaborative session without having established an IMS session. UE-1 wants to setup the collaborative session with audio media on UE-1 and with video media on UE-2. The collaborative session is to be controlled by UE-1.

Figure 4.4.4.1.2-1: Signalling flow for establishment of collaborative session upon originating IMS session setup

NOTE 1: For clarity, SIP 100 (Trying) responses are not shown in the signalling flow.

1-2. SIP INVITE request (UE-1 to SCC AS) - see example in table 4.4.4.1.2-1

UE-1 sends a SIP INVITE request to the SCC AS to setup the collaborative session.

Table 4.4.4.1.2-1: SIP INVITE request (UE-1 to SCC AS)

```
INVITE SIP: user3@example1.net; SIP/2.0
Via: SIP/2.0/UDP 192.0.2.5;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: sip:pcscf1.home1.net:7531;lr;comp=sigcomp>, <sip:orig@scscf1.home1.net;lr>
P-Preferred-Identity: <sip:user1@example1.net>
P-Access-Network-Info:
Privacy: none
From: <sip:user1@example1.net>; tag=171828
To: <sip:user3@example1.net>
Call-ID: cb03a0s09a2sdfglkj490237
Cseq: 127 INVITE
Supported: 100rel; precondition, gruu, 199
Require: sec-agree, replaces
Proxy-Require: sec-agree
Accept-Contact: *;+g.3gpp.icsi-ref="urn%3Aurn-7%3gpp-service.ims.icsi.mmtel"
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=7531
Contact:<sip:user1@example1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6>;+g.3gpp.iut-
   controller
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE
Accept: application/sdp; application/3gpp-ims+xml;message/sipfrag
Content-Type: multipart/related; boundary=boundary42; type="application/sdp"; start-
   info="collaborative-session"
Content-Length: (…)

--boundary42
Content-Type: application/sdp

v=0
o=- 2987933615 2987933615 IN IP4 192.0.2.5
s=
t=0 0
c=IN IP4 192.0.2.5
m=audio 49170 RTP/AVP 0 8 3
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:96 telephone-event
a=maxptime:20

--boundary42
Content-Type: message/sipfrag

REFER sip:interUEtransfer@example.net SIP/2.0

Refer-To: <sip:user2@example2.net;gr=urn:uuid:f81d4fae-7dec-11d0-a762-
   00a0c91e6bf6?body=m%3Dvideo%209%20RTP%2FAVP%2098%2099
   b%3DAS%3A75%0D%0Aa%3Drtpmap%3A98%20H263%0D%0Aa%3Dfmtp%3A98%20profile-level-
   id%3D0%0D%0Aa%3Drtpmap%3A99%20MP4V-ES>
```

The SIP INVITE request includes SDP and a SIPfrag of a SIP REFER request in its body. The SDP describes the audio media for UE-1. The SIP REFER request refers to UE-2 for establishing the video media stream on UE-2.

The start-info parameter of the multipart/related Content-Type header field of the SIP INVITE request indicates to the SCC AS that a collaborative session should be established with media as indicated in the SIP INVITE request's body.

NOTE 2: The SIP REFER request included in the SIP INVITE request is being created by UE-1 and not duplicated from another SIP REFER request.

The port number of the controllee UE, UE-2 for the video media is not known to UE-1. Therefore the port number for the video media stream is set to the discard port number "9".

3-4. SIP INVITE request (SCC AS to UE-3) - see example in table 4.4.4.1.2-3

The SCC AS forwards the SIP INVITE request to UE-3.

Table 4.4.4.1.2-3: SIP INVITE request (SCC AS to UE-3)

```
INVITE sip:user3@example1.net SIP/2.0
Via:
Record-Route: sip:sccas1.home1.example.net
To: sip:user3@example1.net
From: sip:user1@example1.net;tag=acegi
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:user1@example1.net;gr= urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6
Allow:
Content-Type: application/sdp
Content-Length:(…)

v=0
o=- 2987933615 2987933615 IN IP4 192.0.2.5
s=
t=0 0
c=IN IP4 192.0.2.5
m=audio 49170 RTP/AVP 0 8 3
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:96 telephone-event
a=maxptime:20
m=video 9 RTP/AVP 98 99
c=IN IP4 0.0.0.0
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

The forwarded SIP INVITE request includes the SDP from the received SIP INVITE and the SDP from the SIP REFER request included in the received SIP INVITE body.

5-6.   SIP 183 (Session Progress) response to SIP INVITE request (UE-3 to SCC AS)

The remote UE-3 responds with a SIP 183 (Session Progress) response containing its SDP answer.

7-8.   SIP INVITE request (SCC AS to UE-2) – see example in table 4.4.4.1.2-7

The SCC AS sends the SIP INVITE request indicated in the SIP REFER request received from UE-1 to UE-2 for establishing the video media between UE-2 and remote UE-3.

Table 4.4.4.1.2-7: SIP INVITE request (SCC AS to UE-2)

```
INVITE sip:user2@example1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91eg63j SIP/2.0
Via:
Record-Route: sip:sccas1.home1.example.net
To: sip:user2@example1.net;
From: sip:user3@example1.net;tag=zshfk
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity: "remote user" sip:user3@example1.net
Require:
Referred-By: sip: user1@example1.net
Contact: sip:user3@example1.net;gr=urn:uuid:f81d4fae-17oct-11a1-a678-0054c91eabcd
Allow:
Content-Type: application/sdp
Content-Length:(…)

v=0
o=- 1027933615 1027933615 IN IP4 192.0.2.23
s=-
t=0 0
m=audio 0 RTP/AVP 0 8 3
m=video 4390 RTP/AVP 98 99
a=sendrecv
c=IN IP4 192.0.2.23
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

9-10. SIP 183 (Session Progress) response to SIP INVITE request (UE-2 to SCC AS)

UE-2 sends a SIP 183 (Session Progress) response towards the SCC AS containing the SDP answer of UE-2.

11-12. SIP UPDATE request (SCC AS to UE-3)- see example in table 4.4.4.1.2-11

The SCC AS sends a SIP UPDATE request to UE-3 to update the media on UE-3.

Table 4.4.4.1.2-11: SIP UPDATE request (SCC AS to UE-3)

```
UPDATE sip:user3@example1.net SIP/2.0
Via:
To: sip:user3@example1.net;tag=zshfk
From: sip:interUEtransfer@example.net;tag=33333
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:user1@example1.net;gr= urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP4 192.0.2.5
s=
t=0 0
c=IN IP4 192.0.2.5
m=audio 49170 RTP/AVP 0 8 3
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:96 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 145.23.77.88
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

13-14. SIP 200 (OK) response to SIP UPDATE request (UE-3 to SCC AS)

The remote UE, UE-3 responds with a SIP 200 (OK) response.

15-18. SIP 200 (OK) response to the initial SIP INVITE request (UE-3 to UE-1)

When the remote UE, UE-3 answers the call, it sends a SIP 200 (OK) response back to UE-1.

19-20. SIP ACK request (UE-1 to SCC AS)

UE-1 sends a SIP ACK request to the SCC AS to confirm call establishment.

21-22. SIP 200 (OK) response to SIP INVITE request (UE-2 to SCC AS)

UE-2 responds to the SIP INVITE request received from the SCC AS with a SIP 200 (OK) response.

23-24. SIP ACK request (SCC AS to UE-2)

The SCC AS sends a SIP ACK request back to UE-2.

25-26. SIP ACK request (SCC AS to UE-3)

The SCC AS sends a SIP ACK request to the remote UE, UE-3.

4.4.4.1.3 Alternative 3 – indicating collaborative session establishment by providing controllee UE SIP URI in SDP using P-Asserted-Identity

In the example flow at the figure 4.4.4.1.3-1, UE-1 wants to establish a collaborative session without the pre-requisite of having an IMS session established. The UE-1 wants to setup a collaborative session with audio media flow in UE-1 and video media flow in UE-2, and wants to control the collaborative session through UE-1.
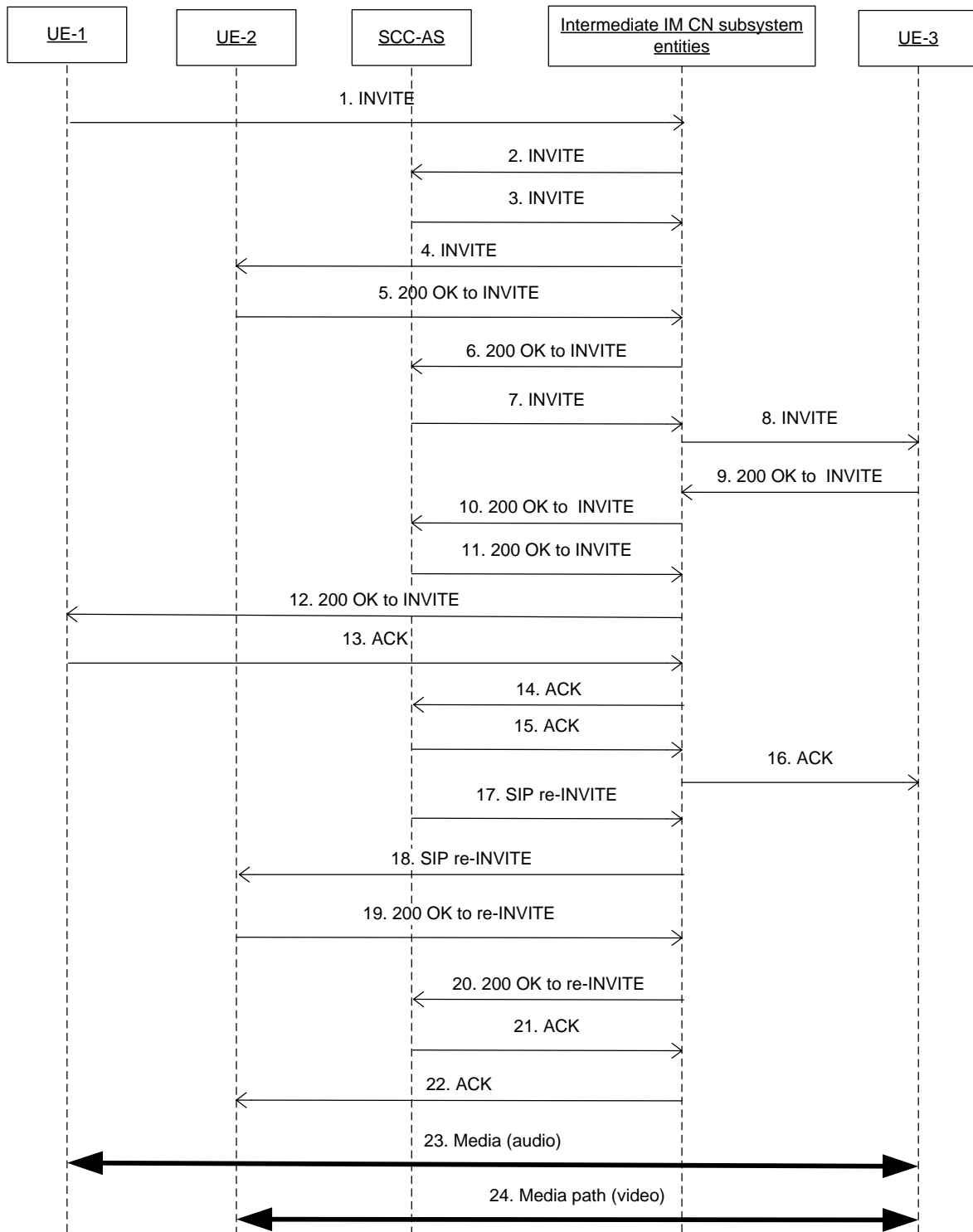
Figure 4.4.4.1.3-1: Signalling flow for establishment of collaborative session upon originating IMS session

NOTE: For clarity, the SIP 100 (Trying) messages are not shown in the signalling flow.

1-2. SIP INVITE request (UE-1 to SCC AS) - see example in table 4.4.4.1.3-1

The UE-1 sends SIP INVITE request to SCC AS to setup the collaborative session.

Table 4.4.4.1.3-1: SIP INVITE request (UE-1 to intermediate IM CN subsystem entities)

```
INVITE SIP: user3@example1.net; SIP/2.0
Via: SIP/2.0/UDP 192.0.2.5;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: sip:pcscf1.home1.net:7531;lr;comp=sigcomp>, <sip:orig@scscf1.home1.net;lr>
P-Preferred-Identity: <sip:uesr1@example1.net>
P-Access-Network-Info:
Privacy: none
From: <sip:user1@example1.net>; tag=171828
To: <sip:user3@example1.net>
Call-ID: cb03a0s09a2sdfglkj490237
Cseq: 127 INVITE
Supported: 100rel; precondition, gruu, 199
Require: sec-agree, replaces
Proxy-Require: sec-agree
Accept-Contact: *;+g.3gpp.icsi-ref="urn%3Aurn-7%3gpp-service.ims.icsi.mmtel"
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=7531
Contact:<sip:user1@example1.net;gr= urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6>;
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE
Accept: application/sdp; application/3gpp-ims+xml
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP4 192.0.2.5
s=
t=0 0
c=IN IP4 192.0.2.5
a=creq:ccap-v0
m=audio 49170 RTP/AVP 0 8 3
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:96 telephone-event
a=maxptime:20
m=video 9 RTP/AVP 98
c=IN IP4 0.0.0.0
a=3gpp.iut.controllee SIPURI sip:user2@example2.net; gr=urn:uuid:f81d4fae-7dec-11d0-a765-
   00a0c91e6bf6
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

SDP: The first media stream (audio) will be terminated by UE-1 of which the IP address is indicated in the c-line in the SDP header.

The port number of the remote side, i.e. UE-3 for the video media is currently not known to UE-1, therefore the port number for the video media stream is set to the discard port number "9".

3-4.   SIP INVITE request (SCC AS to UE-2) - see example in table 4.4.4.1.3-3

Upon receiving the SIP INVITE request, the SCC AS sends a SIP INVITE request to UE-2 to establish the media between UE-2 and the remote UE-3.

Table 4.4.4.1.3-3: SIP INVITE request (SCC AS to intermediate IM CN subsystem entities)

```
INVITE   sip:uesr2@example1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6; SIP/2.0
Via:
Record-Route: sip:sccas1.home1.example.net
To: <sip:user2@example1.net>
From: sip:user1@example1.net;tag=acegi
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity: sip:user1@example1.net
Require:
```

```
Contact: <sip:user1@example1.net;gr= urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6>;
Allow:
Content-Type: application/sdp
Content-Length:(…)

v=0
o=- 2987933615 2987933615 IN IP4 192.0.2.5
s=
t=0 0
c=IN IP4 192.0.2.5
a=creq:ccap-v0
m=audio 49170 RTP/AVP 0 8 3
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:96 telephone-event
a=maxptime:20
m=video 9 RTP/AVP 98
C=IN IP4 0.0.0.0
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

5-6.   SIP 200(OK) response to SIP INVITE request (UE-2 to SCC AS) - see example in table 4.4.4.1.3-5

Table 4.4.4.1.1.2-5: SIP 200 (OK) response (UE-2 to intermediate IM CN subsystem entities)

```
SIP/2.0 200 OK
Via:
To: <sip:user2@example1.net>;tag=xyzwv
From: <sip:user1@example1.net>; tag=171828
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: sip:user2@example1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6
Allow: INVITE, PRACK, UPDATE
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 192.0.2.5
s=-
t=0 0
m=audio 0 RTP/AVP 0 8 3
m=video 1300 RTP/AVP 98
a=inactive
c=IN IP4 145.23.77.88
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
```

SDP: The connection information now indicates the IP address of UE-2.

7-8.   SIP INVITE request (SCC AS to UE-3)

The SCC AS sends the SIP INVITE request towards the remote UE-3 containg the SDP information of UE-1 and UE-2.

9-13.9-13.

9-14.SIP 200 (OK) reponse to SIP INVITE request(UE-3 to UE-1)

UE-3 acknowledges the SIP INVITE request by sending SIP 200 (OK) response with the SDP answer to UE-1.S

13-17. SIP ACK request (UE-1 to UE-3)

UE-1 sends SIP ACK request to the remote UE.

17-19. SIP re-INVITE request (SCC AS to UE-2)

SCC AS-2 sends SIP re-INVITE request to UE-2 to update the media in UE-2.

19-20. SIP 200 (OK) response to SIP re-INVITE request (UE-2 to SCC AS)

The UE-2 confirms the SIP re-INVITE request by sending SIP 200 (OK) response to SCC AS.

21-23. SIP ACK request (SCC AS to UE-2)

SCC AS sends SIP ACK request to the remote UE.

23-24. Media path:

The audio media is between controller UE-1 and remote UE-3, and the video media is established between controllee UE-2 and the remote UE. The collaborative session control is in the controller UE-1.

4.4.4.1.4 Alternative 4 – indicating collaborative session establishment using multiple REFER

In the example flow at the figure 4.4.4.1.4-1, UE-1 wants to establish a collaborative session without the pre-requisite of having an IMS session established. The UE-1 wants to setup a collaborative session with audio media flow in UE-1 and video media flow in UE-2, and wants to control the collaborative session through UE-1. UE-1 sends a SIP REFER request containing a recipient-list to cause the SCC AS to send SIP INVITE requests to the remote UE, the controllee UE and controller UE.
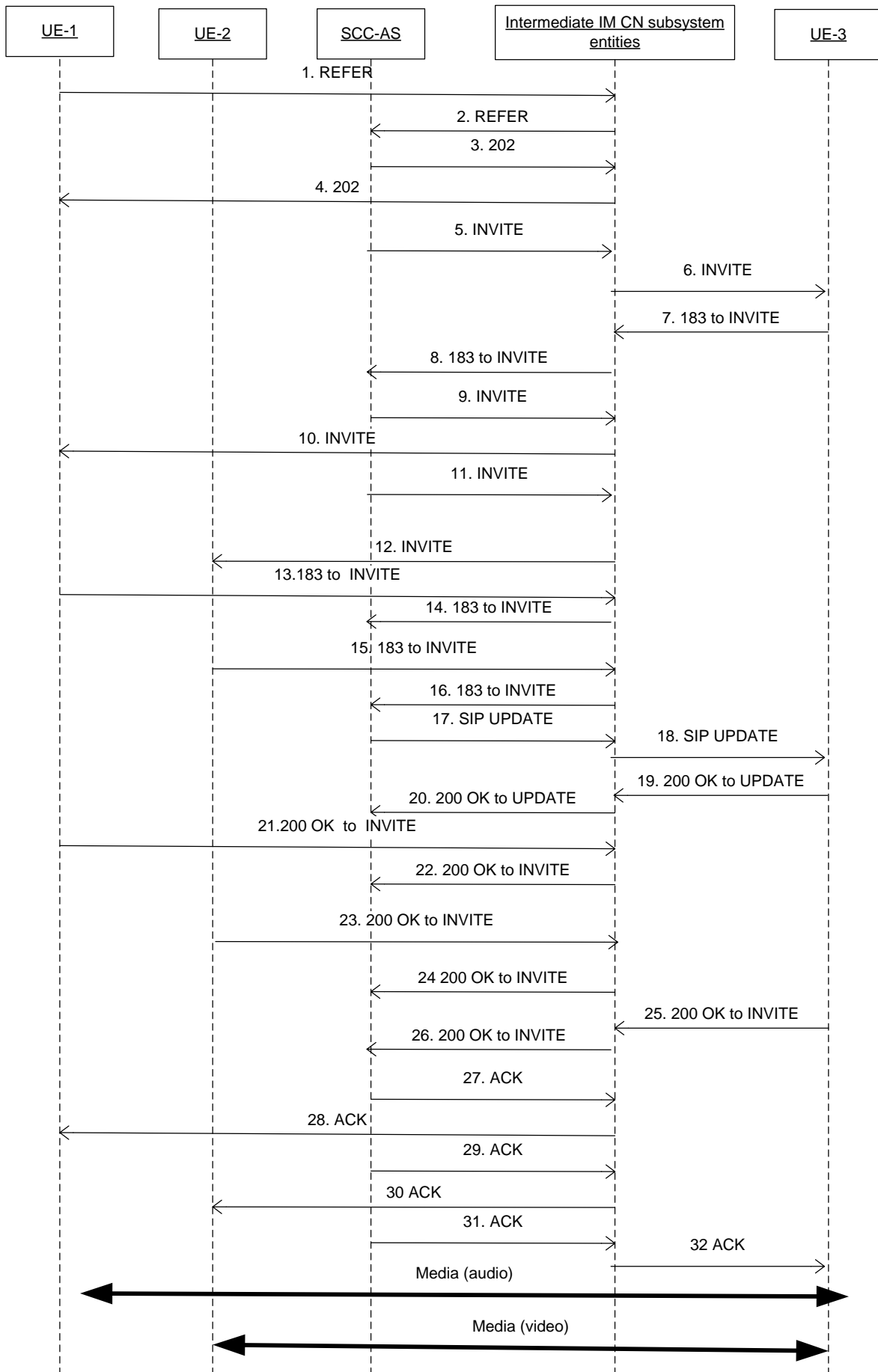
Figure 4.4.4.1.4-1: Signalling flow for establishment of collaborative session upon originating IMS session using multiple REFER

NOTE: For clarity, the SIP 100 (Trying) messages are not shown in the signalling flow.

1-2. SIP REFER request (UE-1 to SCC AS) - see example in table 4.4.4.1.4-1

The UE-1 sends SIP REFER request to SCC AS to initate the setup of the collaborative session.

Table 4.4.4.1.4-1: SIP REFER request (UE-1 to intermediate IM CN subsystem entities)

```
REFER sip:scc-as@home1.net SIP/2.0
Via: SIP/2.0/UDP 192.0.2.5;comp=sigcomp;branch=z9hG4bKnashds7
To: sip:scc-as@home1.net; tag= 24680
From: sip:user1@home1.net; tag=13579
Call-ID: cb03a0s09a2sdfglkj490333
CSeq: 93809824 REFER
Max-Forwards: 70
P-Preferred-Identity: sip:user1@home1.net
Refer-To: cid:cn35t8jf02@home1.net
Refer-Sub: false
Require: recipient-list, norefersub
Contact: <sip:user1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz>;+g.3gpp.iut-
   controller,+g.3gpp-current-iut-controller=active
Referred-By: sip:user1@home1.net
Accept: application/sdp, message/sipfrag
Content-Length: ..
Content-Type: application/resource-lists+xml
Content-Disposition: recipient-list
Content-ID: <cn35t8jf02@home1.net>

<?xml version="1.0" encoding="UTF-8"?>
<resource-lists xmlns="urn:ietf:params:xml:ns:resource-lists"
            xmlns:cp="urn:ietf:params:xml:ns:copycontrol">
   <list>
     <entry uri=
   "<sip:user3@home1.net?body=m%3Daudio%200%20RTP%2FAVP%200%3Dvideo%200%20RTP%2FAVP%>"
   cp:copyControl="to"/>
     <entry uri="<sip:user1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz?
   body=m%3Daudio%209%20RTP%2FAVP%20%0Dm%video%200%20RTP%2FAVP%20" cp:copyControl="bcc"/>
     <entry uri="<sip:user2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6?
   body=m%3Daudio%200%20RTP%2FAVP%20%0Dm%3Dvideo%209%20RTP%2FAVP%20>" cp:copyControl="bcc"/>
   </list>
</resource-lists>
```

The SIP REFER request contains a recipient-list MIME body containng <entry-uri> elements containing the SIP URIs of UE-3, UE-1 and UE-2. Each SIP URI contains a "body" URI header field identifying the media types to be assigned. The copyControl attribute set to "to" is used to indicate the remote UE.

3-4. SIP 202 (Accepted) response (from SCC AS to UE-1)

The SCC-AS sends a SIP 202 (Accepted) response to controller UE-1 as response to the SIP REFER request.

5-6. SIP INVITE request (SCC AS to UE-3) - see example in table 4.4.4.1.4-5

SCC AS sends a SIP INVITE request to UE-3.

Table 4.4.4.1.4-5: SIP INVITE request (SCC AS to intermediate IM CN subsystem entities)

```
INVITE   sip:user3@example1.net; SIP/2.0
Via:
Record-Route: sip:sccas1.home1.example.net
Route: <sip:scscf1.home1.net;lr>
To: sip:user3@example1.net;
From: sip:user1@example1.net;tag=acegi
Call-ID: cb03a0s09a2sdfglkj490237
Cseq: 127 INVITE
Max-Forwards:70
P-Asserted-Identity: sip:user1@example1.net
Supported: 100rel; precondition, gruu,
Contact: <sip:user1@example1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE
Content-Type: application/sdp
Content-Length:(…)

v=0
o=- 2987933615 2987933615 IN IP4 192.0.2.5
s=
t=0 0
c=IN IP4 192.0.2.5
m=audio 0 RTP/AVP 0 8 3
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:96 telephone-event
a=maxptime:20
m=video 0 RTP/AVP 98
c=IN IP4 0.0.0.0
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

SDP: The first media stream (audio) will be terminated by UE-1.

The port number of the remote side, i.e. UE-3 for the video media is currently not known to UE-1, therefore the port number for the video media stream is set to the discard port number "9".

7-8.   SIP 183 (Session Progress) response to SIP INVITE request (UE-3 to SCC AS)

The remote UE-3 responds with SIP 183 (Session Progress) response containing the SDP answer of remote UE.

9-10. SIP INVITE request (SCC AS to UE-1) – see example in table 4.4.4.1.4-9

The SCC AS sends a SIP INVITE request to UE-1 to establish the media between UE-1 and remote UE-3.

Table 4.4.4.1.4-9: SIP INVITE request (SCC AS to intermediate IM CN subsystem entities)

```
INVITE sip:user1@example1.net; gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz SIP/2.0
Require:
Referred-By: sip: user1@example1.net
Contact: sip:user3@example1.net;gr=urn:uuid:f81d4fae-17oct-11a1-a678-0054c91eabcd
Allow:
Via:
Record-Route: sip:sccas1.home1.example.net
To: sip:user2@example1.net;
From: sip:user3@example1.net;tag=acegi
Call-ID:
CSeq:
Max-Forwards: 70
P-Asserted-Identity: sip:user1@example1.net
Content-Type: application/sdp
Content-Length:(…)

v=0
o=- 1027933615 1027933615 IN IP4 192.0.2.23
s=-
t=0 0
m=audio 4788 RTP/AVP 0 8 3
m=video 0 RTP/AVP 34
a= sendrecv
c=IN IP4 192.0.2.23
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

11-12. SIP INVITE request (SCC AS to UE-2) – see example in table 4.4.4.1.4-11

The SCC AS sends a SIP INVITE request to UE-2 to establish the media between UE-2 and remote UE-3.

Table 4.4.4.1.4-11: SIP INVITE request (SCC AS to intermediate IM CN subsystem entities)

```
INVITE sip:user2@example1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6 SIP/2.0
Require:
Referred-By: sip:user1@example1.net
Contact: sip:user3@example1.net;gr=urn:uuid:f81d4fae-17oct-11a1-a678-0054c91eabcd
Allow:
Via:
Record-Route: sip:sccas1.home1.example.net
To: sip:user2@example1.net;
From: sip:user3@example1.net;tag=acegi
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity: sip:user1@example1.net
Content-Type: application/sdp
Content-Length:(…)

v=0
o=- 1027933615 1027933615 IN IP4 192.0.2.23
s=-
t=0 0
m=audio 0 RTP/AVP 0 8 3
m=video 4390 RTP/AVP 34
a= sendrecv
c=IN IP4 192.0.2.23
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

13-14. SIP 183 (Session Progress) response to SIP INVITE request (UE-1 to SCC AS)

UE-1 sends the SIP 183 (Session Progress) response towards SCC AS containing the SDP answer of UE-1.

15-16. SIP 183 (Session Progress) response to SIP INVITE request (UE-2 to SCC AS)

UE-2 sends the SIP 183 (Session Progress) response towards SCC AS containing the SDP answer of UE-2.

17-18. SIP UPDATE request (SCC AS to UE-3)- see example in table 4.4.4.1.4-17

SCC AS sends SIP UPDATE request to UE-3 to update the media in UE-3.

Table 4.4.4.1.4-17: SIP UPDATE request (SCC AS to remote intermediate IM CN subsystem entities)

```
UPDATE sip:user3_public3@home3.net SIP/2.0
Via:
To: sip:user3_public3@home3.net;tag = 66666
From: sip:interUEtransfer@example.net; tag=33333
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 1300 RTP/AVP 96 97
c=IN IP4 123.45.67.89
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 145.23.77.88
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

19-20. SIP 200 (OK) response to SIP UPDATE request(remote UE to SCC AS)

The remote UE-3 responds with SIP 200 (OK) response.

21-22. SIP 200 (OK) response to SIP INVITE request (UE-1 to SCC AS)

UE-1 responds SIP 200 (OK) response to the SIP INVITE request.

23-24. SIP 200 (OK) response to SIP INVITE request (UE-2 to SCC AS)

UE-2 responds SIP 200 (OK) response to the SIP INVITE request.

25-26. SIP 200 (OK) response to the initial SIP INVITE request (remote UE to SCC AS)

When the remote UE answers the call, UE-3 sends the SIP 200 (OK) response to SCC AS.

27-28. SIP ACK request (SCC AS to UE-1)

SCC AS sends the SIP ACK request to confirm the establishment of call to UE-1.

29-30. SIP ACK request (SCC AS to UE-2)

SCC AS sends the SIP ACK request to UE-2.

31-32. SIP ACK request (SCC AS to UE-3)

SCC AS sends SIP ACK request to the remote UE.

5.4.1.4 Pros and cons of alternative 3 – indicating collaborative session establishment using multiple REFER

Advantages:

Disadvantages:

- Additional overhead of use of REFER.

- Session is established with Initiating UE before the remote UE answers.

- Intermediate responses such as SIP 180 (Ringing) response are not indicated to initiating UE.

4.4.4.2 Call flows for establishment of collaborative session upon terminating IMS session setup

4.4.4.2.1 Alternative 1: Using SIP 183 (Session Progress) response
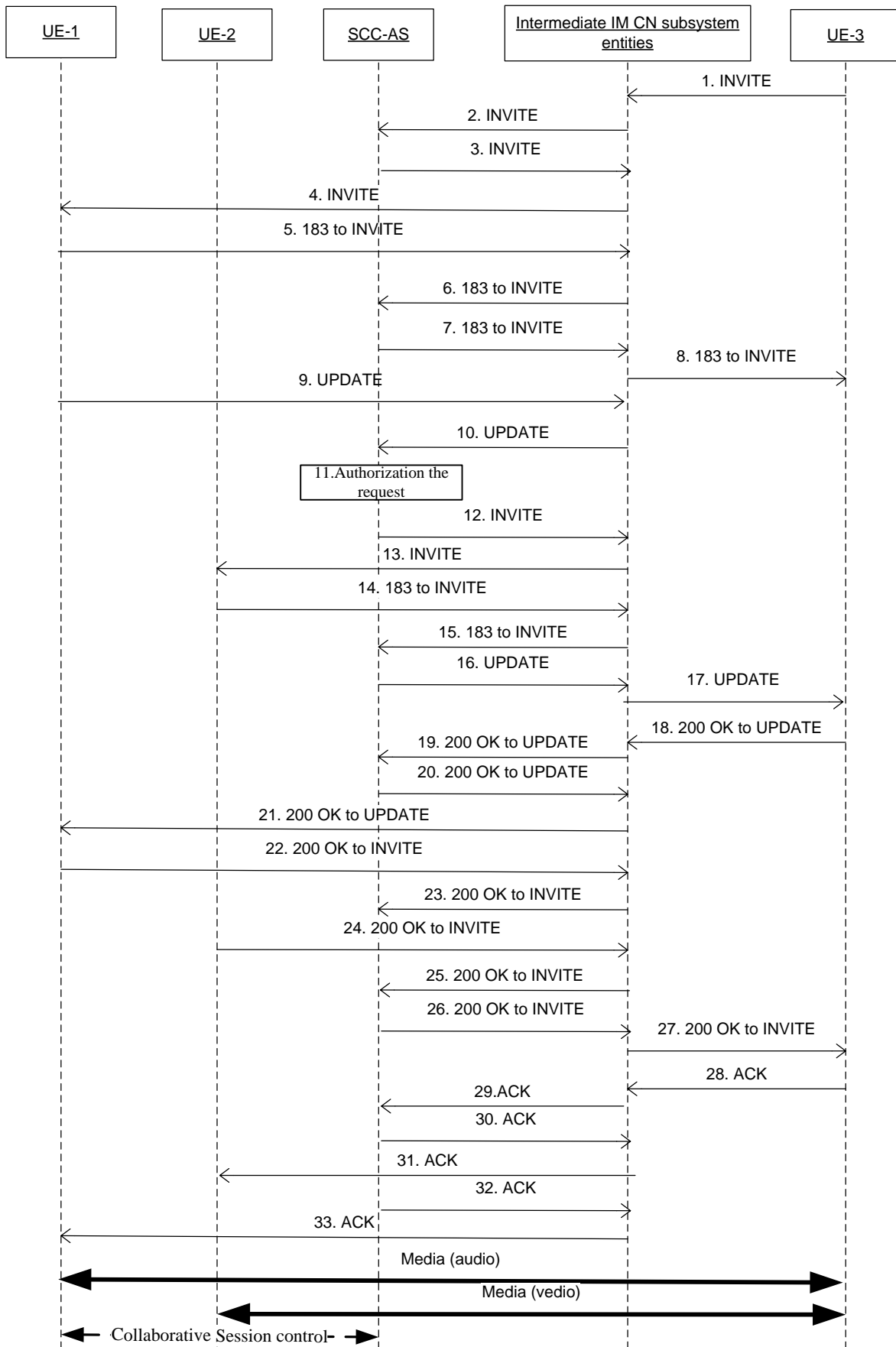
Figure 4.4.4.2.1-1: Call flows for establishment of collaborative session upon terminating IMS session setup using SIP 183 (Session Progress) response

NOTE: For clarity, the SIP 100 (Trying) responses are not shown in the signalling flow.

1-4.   SIP INVITE request (UE-3 to UE-1) - see example in table 4.4.4.2.1-1

The UE-3 sends SIP INVITE request to UE-1 to setup the session.

Table 4.4.4.2.1-1: SIP INVITE request (UE-3 to Intermediate IM CN subsystem entities)

```
INVITE sip:user1@example1.net SIP/2.0
Via: SIP/2.0/UDP 192.0.2.5;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: sip:pcscf1.home1.net:7531;lr;comp=sigcomp>, <sip:orig@scscf1.home1.net;lr>
P-Preferred-Identity: <sip:uesr3@example1.net>
P-Access-Network-Info:
Privacy: none
From: <sip:user3@example1.net>; tag=171828
To: <sip:user1@example1.net>
Call-ID: cb03a0s09a2sdfglkj490237
Cseq: 127 INVITE
Supported: 100rel; precondition, gruu, 199
Require: sec-agree, replaces
Proxy-Require: sec-agree
Accept-Contact: *;+g.3gpp.icsi-ref="urn%3Aurn-7%3gpp-service.ims.icsi.mmtel"
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=7531
Contact:<sip:user3@example1.net;gr= urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6>;
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE
Accept: application/sdp; application/3gpp-ims+xml
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP4 192.0.2.5
s=
t=0 0
c=IN IP4 192.0.2.5
a=creq:ccap-v0
m=audio 49170 RTP/AVP 0 8 3
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:96 telephone-event
a=maxptime:20
m=video 28540 RTP/AVP 98
a=creq:ccap-v0
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

5-8.   SIP 183 (session progress) response to SIP INVITE request (UE-1 to UE-3)

The UE-1 responds with SIP 183 (session progress) response to UE-3 including its SDP answer.

Editor's Note: The SDP contents of this response need to be shown in order to understand this flow.

9-10.   SIP UPDATE request (UE-1 to SCC AS)- - see example in table 4.4.4.2.1-9

The UE-1 sends the SIP UPDATE request to initiate the video media setup in UE-2.

Table 4.4.4.2.1-9: SIP UPDATE request (UE-1 to Intermediate IM CN subsystem entities)

```
UPDATE sip:user3@example1.net SIP/2.0
Via:
To: sip:user3@example.net;tag = 66666
From: sip:user1@example.net; tag=33333
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:user1@example.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 1300 RTP/AVP 96 97
c=IN IP4 123.45.67.89
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 9 RTP/AVP 98 99
a=creq:ccap-v0
a=ccap:1 URL SIPURI sip:user2@example2.net
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

Editor's Note: The second media stream (video) is destined to be terminated by UE-2, of which the address is only known as a SIP address by UE-1. One possible solution in this example is, UE-1 includes the SIP address of UE-2 in the a=ccap line in the SDP media block for the video media stream, as described in draft-ietf-mmusic-sdp-misc-cap [15] and draft-yang-dispatch-SIP-connection-address-type [16].

11. **SCC AS authorizes the request for the collaborative session setup involving UE-2.**

12-13. **SIP INVITE request (SCC AS to UE-2)**

The SCC AS sends the SIP INVITE request to the UE-2 based on the SDP content in the SIP UPDATE request sent by the UE-1.

14-15. **SIP 183 (session progress) response to the SIP INVITE request (UE-2 to SCC AS)**

UE-2 responds with SIP 183 (session progress) response to SCC AS.

16-17. **SIP UPDATE request (SCC AS to UE-3)**

The SCC AS then sends the SIP UPDATE request to UE-3 with the SDP answer of UE-1 and UE-2.

18-21. **SIP 200 (OK) response to SIP UPDATE request (UE-3 to UE-1)**

Editor's Note: Do SIP UPDATE requests need to be sent to UE-1 and UE-2 to activate the media.

22-23. **SIP 200 (OK) response to SIP INVITE request (UE-1 to SCC AS)**

When the UE-1 answers the call, it sends the SIP 200 (OK) response to the initial SIP INVITE request.

24-25. **SIP 200 (OK) response to SIP INVITE request (UE-2 to SCC AS)**

When the UE-2 answers the call, it sends the SIP 200 (OK) response to the initial SIP INVITE request.

26-27. **SIP 200 (OK) response to SIP INVITE request (SCC AS to UE-3)**

The SCC AS forwards the SIP 200 (OK) response to the UE-3.

28-29. SIP ACK request (UE-3 to SCC AS)

30-31. SIP ACK request (SCC AS to UE-2)

32-33. SIP ACK request (SCC AS to UE-1)

4.4.4.2.2 Alternative 2 – indicating collaborative session establishment by multipart/related Content-Type parameter

In the example flow of figure 4.4.4.2.2-1 UE-3 wants to setup a call with UE-1. When receiving the invitation to the call UE-1 wants to establish a collaborative session without having established an IMS session. UE-1 wants to setup the collaborative session with audio media on UE-1 and with video media on UE-2. The collaborative session is to be controlled by UE-1.
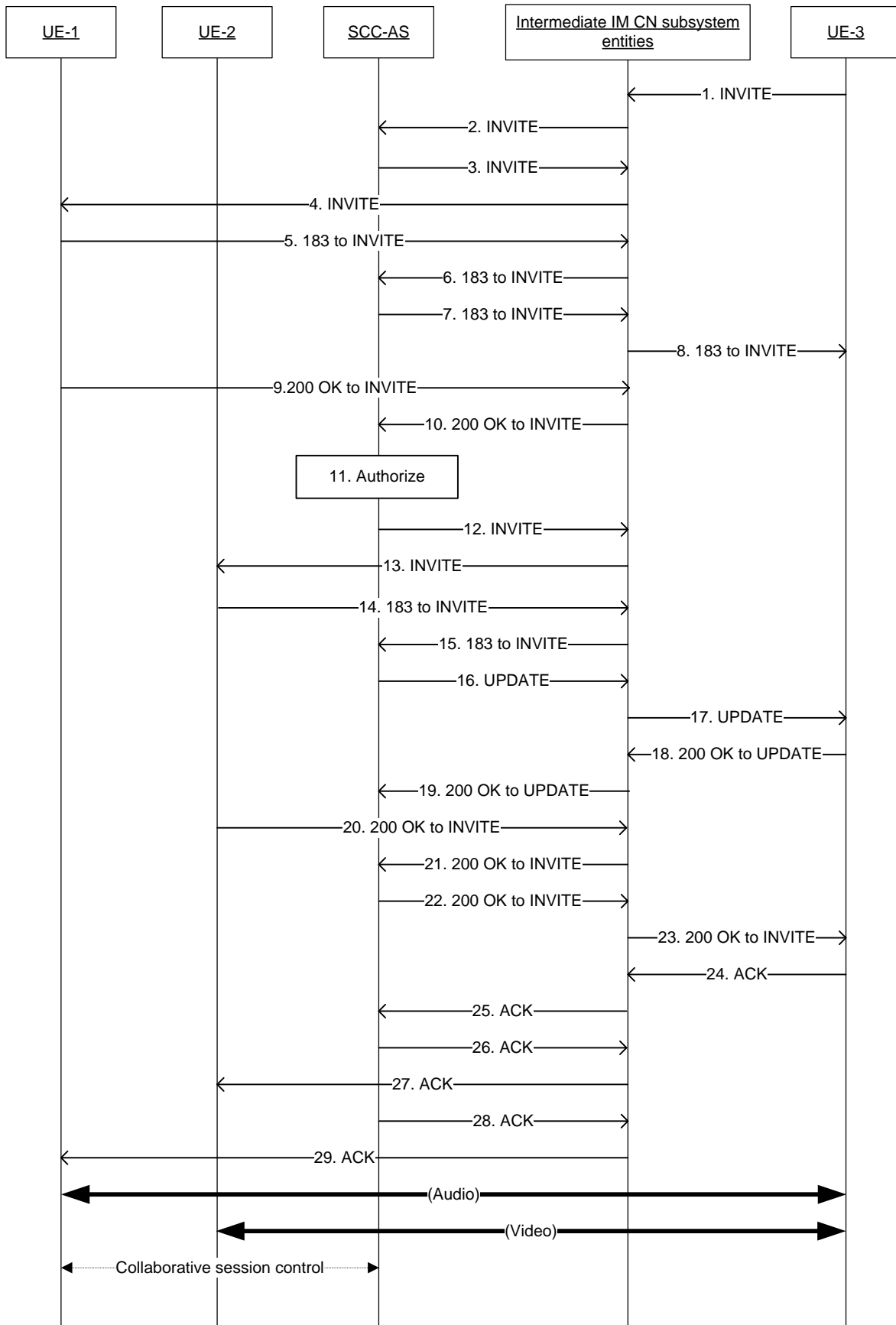
Figure 4.4.4.2.2-1: Signalling flow for establishment of collaborative session upon terminating IMS session setup

NOTE: For clarity, the SIP 100 (Trying) responses are not shown in the signalling flow.

1-4.   SIP INVITE request (UE-3 to UE-1) - see example in table 4.4.4.2.2-1

UE-3 sends a SIP INVITE request to UE-1 to setup the call.

Table 4.4.4.2.2-1: SIP INVITE request (UE-3 to UE-1)

```
INVITE SIP: user1@example1.net; SIP/2.0
Via: SIP/2.0/UDP 192.0.2.5;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: sip:pcscf1.home1.net:7531;lr;comp=sigcomp>, <sip:orig@scscf1.home1.net;lr>
P-Preferred-Identity: <sip:user3@example1.net>
P-Access-Network-Info:
Privacy: none
From: <sip:user3@example1.net>; tag=171828
To: <sip:user1@example1.net>
Call-ID: cb03a0s09a2sdfglkj490237
Cseq: 127 INVITE
Supported: 100rel; precondition, gruu, 199
Require: sec-agree, replaces
Proxy-Require: sec-agree
Accept-Contact: *;+g.3gpp.icsi-ref="urn%3Aurn-7%3gpp-service.ims.icsi.mmtel"
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=7531
Contact:<sip:user3@example1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6>;
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE
Accept: application/sdp; application/3gpp-ims+xml
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP4 192.0.2.5
s=
t=0 0
c=IN IP4 192.0.2.5
m=audio 49170 RTP/AVP 0 8 3
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:96 telephone-event
a=maxptime:20
m=video 28540 RTP/AVP 98
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

5-8.   SIP 183 (Session Progress) response to SIP INVITE request (UE-1 to UE-3)

UE-1 responds with a SIP 183 (Session Progress) response to UE-3 including its SDP answer.

9-10.   SIP 200 (OK) response (UE-1 to SCC AS) – see example in table 4.4.4.2.2-9

UE-1 sends a SIP 200 (OK) response to the SCC AS to accept the call.

Table 4.4.4.2.2-9: SIP 200 (OK) response (UE-1 to SCC AS)

```
200 OK sip:user3@example1.net SIP/2.0
Via:
To: sip:user3@example1.net;tag=171828
From: sip:user1@example1.net; tag=33333
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:user1@example1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz;+g.3gpp.iut-
   controller
Accept: message/sipfrag
Allow:
Content-Type: multipart/related; boundary=boundary42; type="application/sdp"; start-
   info="collaborative-session"
Content-Length: (…)

--boundary42
Content-Type: application/sdp

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=
t=0 0
c=IN IP4 123.45.67.89
m=audio 1300 RTP/AVP 96 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20

--boundary42
Content-Type: message/sipfrag

REFER sip: interUEtransfer@example.net SIP/2.0
Refer-To: <sip: user2@example2.net;gr=urn:uuid:f81d4fae-7dec-11d0-a762-
   00a0c91e6bf6?body=m%3Dvideo%209%20RTP%2FAVP%2098%2099
   b%3DAS%3A75%0D%0Aa%3Drtpmap%3A98%20H263%0D%0Aa%3Dfmtp%3A98%20profile-level-
   id%3D0%0D%0Aa%3Drtpmap%3A99%20MP4V-ES>
```

The SIP 200 (OK) response includes SDP and a SIPfrag of a SIP REFER request in its body. The SDP describes the accepted audio media for UE-1. The SIP REFER request refers the video media stream to UE-2.

The start-info parameter of the multipart/related Content-Type header field of the SIP 200 (OK) response indicates to the SCC AS that a collaborative session should be established with media as indicated in the SIP 200 (OK) response's body.

11. SCC AS authorizes the request for session setup in UE-2.

12-13. SIP INVITE request (SCC AS to UE-2)

The SCC AS sends a SIP INVITE request to UE-2 based on the SIP REFER request included in the SIP 200 (OK) response received from UE-1.

14-15. SIP 183 (Session Progress) response to the SIP INVITE request (UE-2 to SCC AS)

UE-2 responds with a SIP 183 (Session Progress) response to the SCC AS.

16-17. SIP UPDATE request (SCC AS to UE-3)

The SCC AS sends a SIP UPDATE request to UE-3 with the SDP answers of UE-1 and UE-2.

18-19. SIP 200 (OK) response to SIP UPDATE request (UE-3 to SCC AS)

Editor's Note: It is FFS how and when H.245 inband negotiation with the remote UE, UE-3 takes place if UE-3 is a PSTN UE.

20-21. SIP 200 (OK) response to SIP INVITE request (UE-2 to SCC AS)

When UE-2 answers the call, it sends a SIP 200 (OK) response to the SCC AS.

22-23. SIP 200 (OK) response to SIP INVITE request (SCC AS to UE-3)

The SCC AS sends a SIP 200 (OK) response to UE-3.

24-25. SIP ACK request (UE-3 to SCC AS)

26-27. SIP ACK request (SCC AS to UE-2)

28-29. SIP ACK request (SCC AS to UE-1)

4.4.4.2.3 Alternative 3 – indicating collaborative session establishment by SIP REFER request before SIP 200 (OK) response

In the example flow of figure 4.4.4.2.3-1 UE-3 wants to setup a call with UE-1. When receiving the invitation to the call UE-1 wants to establish a collaborative session without having established an IMS session. UE-1 wants to setup the collaborative session with audio media on UE-1 and with video media on UE-2. The collaborative session is to be controlled by UE-1.
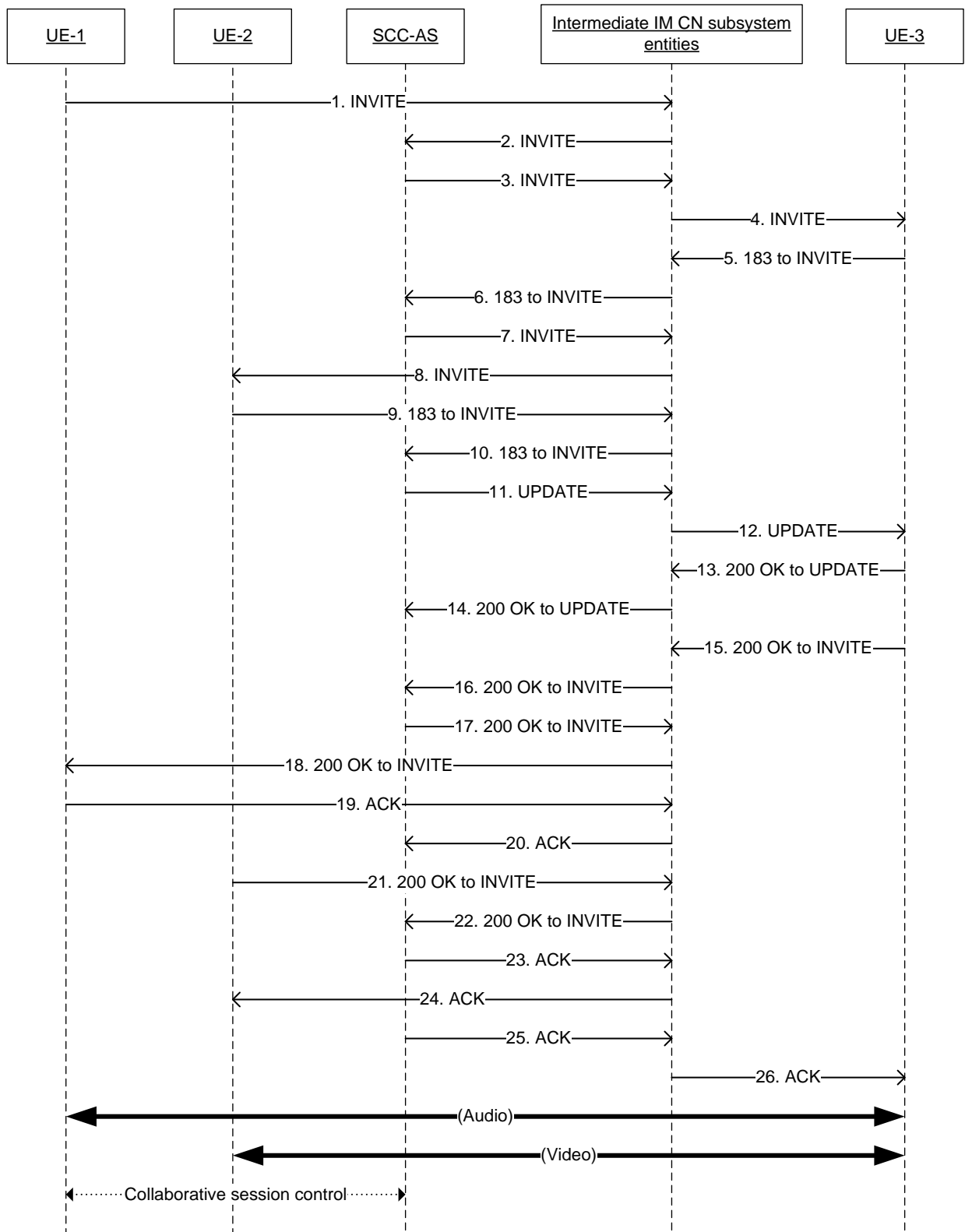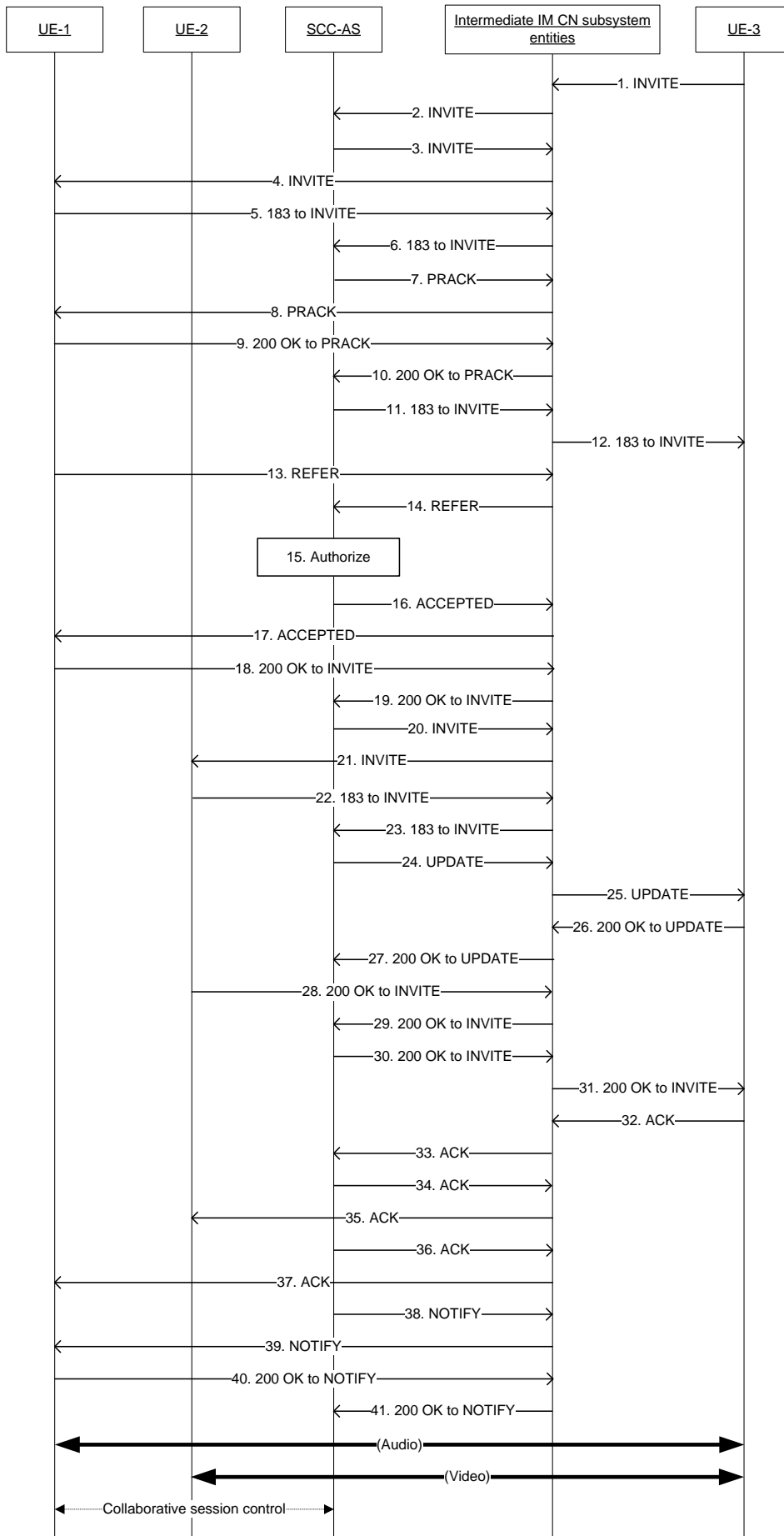
Figure 4.4.4.2.3-1: Signalling flow for establishment of collaborative session upon terminating IMS session setup

NOTE: For clarity, the SIP 100 (Trying) responses are not shown in the signalling flow.

1-4. SIP INVITE request (UE-3 to UE-1) - see example in table 4.4.4.2.3-1

UE-3 sends a SIP INVITE request to UE-1 to setup the call.

Table 4.4.4.2.3-1: SIP INVITE request (UE-3 to UE-1)

```
INVITE SIP: user1@example1.net; SIP/2.0
Via: SIP/2.0/UDP 192.0.2.5;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: sip:pcscf1.home1.net:7531;lr;comp=sigcomp>, <sip:orig@scscf1.home1.net;lr>
P-Preferred-Identity: <sip:user3@example1.net>
P-Access-Network-Info:
Privacy: none
From: <sip:user3@example1.net>; tag=171828
To: <sip:user1@example1.net>
Call-ID: cb03a0s09a2sdfglkj490237
Cseq: 127 INVITE
Supported: 100rel; precondition, gruu, 199
Require: sec-agree, replaces
Proxy-Require: sec-agree
Accept-Contact: *;+g.3gpp.icsi-ref="urn%3Aurn-7%3gpp-service.ims.icsi.mmtel"
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=7531
Contact:<sip:user3@example1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6>;
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE
Accept: application/sdp; application/3gpp-ims+xml
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP4 192.0.2.5
s=
t=0 0
c=IN IP4 192.0.2.5
m=audio 49170 RTP/AVP 0 8 3
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:96 telephone-event
a=maxptime:20
m=video 28540 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

5-6. SIP 183 (Session Progress) response to SIP INVITE request (UE-1 to SCC AS)

UE-1 responds with a reliably SIP 183 (Session Progress) response to UE-3 including its SDP answer.

7-8. SIP PRACK request (SCC AS to UE-1)

The SCC AS acknowledges the reception of the SIP 183 response by sending a SIP PRACK request to UE-1.

9-10. SIP 200 (OK) response (UE-1 to SCC AS)

UE-1 responds with a SIP 200 (OK) response to the SIP PRACK request.

11-12. SIP 183 (Session Progress) response to SIP INVITE request (SCC AS to UE-3)

The SCC AS forwards the SIP 183 (Session Progress) response to UE-3.

13-14. SIP REFER request (UE-1 to SCC AS) – see example in table 4.4.4.2.3-9

UE-1 sends a SIP REFER request to the SCC AS to transfer the video media to controllee UE, UE-2.

Table 4.4.4.2.3-13: SIP REFER request (UE-1 to SCC AS)

```
REFER sip: interUEtransfer@example.net SIP/2.0
Via:
To: sip: interUEtransfer@example.net
From: <sip:user1@example1.net>; tag=33333
Call-ID: cb03a0s09a2sdfglkj490333
CSeq: 93809824 REFER
Max-Forwards: 70
P-Preferred-Identity: sip:user1@example1.net
Refer-To: <sip: user2@example2.net;gr=urn:uuid:f81d4fae-7dec-11d0-a762-
   00a0c91e6bf6?body=m%3Dvideo%209%20RTP%2FAVP%2098%2099
   b%3DAS%3A75%0D%0Aa%3Drtpmap%3A98%20H263%0D%0Aa%3Dfmtp%3A98%20profile-level-
   id%3D0%0D%0Aa%3Drtpmap%3A99%20MP4V-ES>
Require: target-dialog
Target-dialog: cb03a0s09a2sdfglkj490237;remote-tag=171828;local-tag=33333
Referred-By: sip:user1@example1.net
Contact: < sip:user1@example1.net; gr=urn:uuid:f81d4fae-7dec-11d0-a765-
   00a0c91ewxyz>;+g.3gpp.iut-controller
Allow:
Accept: message/sipfrag
Content-Length:0
```

15. SCC AS authorizes the request for session setup in UE-2.

16-17. SIP 202 (Accepted) response (SCC AS to UE-1)

The SCC-AS sends a SIP 202 (Accepted) response to the controller UE-1 as response to the SIP REFER request.

18-19. SIP 200 (OK) response (UE-1 to SCC AS) – see example in table 4.4.4.2.3-18

UE-1 sends a SIP 200 (OK) response to the SCC AS to accept the call.

Table 4.4.4.2.3-18: SIP 200 (OK) response (UE-1 to SCC AS)

```
200 OK sip:user3@example1.net SIP/2.0
Via:
To: sip:user3@example1.net;tag=171828
From: sip:user1@example1.net; tag=33333
Call-ID: cb03a0s09a2sdfglkj490237
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:user1@example1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=
t=0 0
c=IN IP4 123.45.67.89
m=audio 1300 RTP/AVP 96 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 0 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

20-21. SIP INVITE request (SCC AS to UE-2)

The SCC AS sends a SIP INVITE request to UE-2 based on the SIP REFER request received from UE-1.

22-23. SIP 183 (Session Progress) response to the SIP INVITE request (UE-2 to SCC AS)

UE-2 responds with a SIP 183 (Session Progress) response to the SCC AS.

24-25. SIP UPDATE request (SCC AS to UE-3)

The SCC AS sends a SIP UPDATE request to UE-3 with the SDP answers of UE-1 and UE-2.

26-27. SIP 200 (OK) response to SIP UPDATE request (UE-3 to SCC AS)

28-29. SIP 200 (OK) response to SIP INVITE request (UE-2 to SCC AS)

When UE-2 answers the call, it sends a SIP 200 (OK) response to the SCC AS.

30-31. SIP 200 (OK) response to SIP INVITE request (SCC AS to UE-3)

The SCC AS sends a SIP 200 (OK) response to UE-3.

32-33. SIP ACK request (UE-3 to SCC AS)

34-35. SIP ACK request (SCC AS to UE-2)

36-37. SIP ACK request (SCC AS to UE-1)

38-39. SIP NOTIFY request (SCC AS to UE-1)

The SCC AS informs UE-1 that the action triggered by the SIP REFER request was successfully completed.

40-41. SIP 200 (OK) response to SIP NOTIFY request (UE-1 to SCC AS)

The UE-1 confirms the SIP NOTIFY request by sending a SIP 200 (OK) response to the SIP NOTIFY request.

4.4.4.2.4 Alternative 4: Using SIP 300 (Multiple Choices) response
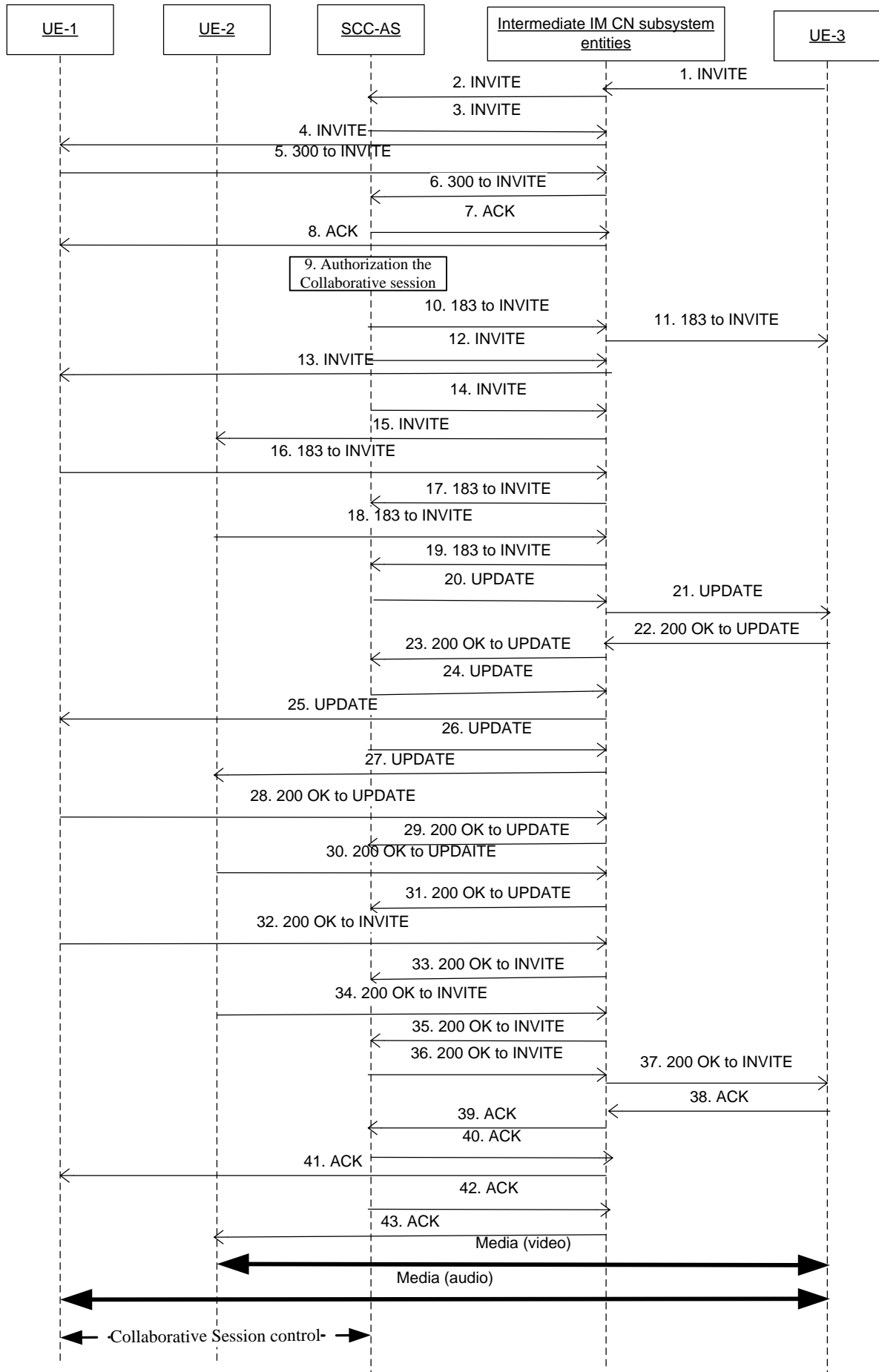
Figure 4.4.4.2.4-1: Call flows for establishment of collaborative session upon terminating IMS session setup using SIP 300 (Multiple Choices) response

NOTE: For clarity, the SIP 100 (Trying) responses are not shown in the signalling flow.

1-2. SIP INVITE request (UE-3 to SCC AS) - see example in table 4.4.4.2.4-1

The UE-3 sends SIP INVITE request to UE-1 to setup the session.

Table 4.4.4.2.4-1: SIP INVITE request (UE-3 to Intermediate IM CN subsystem entities)

```
INVITE sip:user1@example1.net SIP/2.0
Via: SIP/2.0/UDP 192.0.2.5;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: sip:pcscf1.home1.net:7531;lr;comp=sigcomp>, <sip:orig@scscf1.home1.net;lr>
P-Preferred-Identity: <sip:uesr3@example1.net>
P-Access-Network-Info:
Privacy: none
From: <sip:user3@example1.net>; tag=171828
To: <sip:user1@example1.net>
Call-ID: cb03a0s09a2sdfglkj490237
Cseq: 127 INVITE
Supported: 100rel; precondition, gruu, 199
Require: sec-agree, replaces
Proxy-Require: sec-agree
Accept-Contact: *;+g.3gpp.icsi-ref="urn%3Aurn-7%3gpp-service.ims.icsi.mmtel"
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=7531
Contact:<sip:user3@example1.net;gr= urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE
Accept: application/sdp; application/3gpp-ims+xml
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP4 192.0.2.5
s=
t=0 0
c=IN IP4 192.0.2.5
m=audio 49170 RTP/AVP 0 8 3
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:96 telephone-event
a=maxptime:20
m=video 28540 RTP/AVP 98
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

3-4. SIP INVITE request (SCC AS to UE-1) - see example in table 4.4.4.2.4-3

The SCC AS adds an Accept-Contact header field containing the media feature tag g.3gpp.iut-controller along with the explicit parameter to indicate a preference to reach a controller capable UE and also includes the MIME type application/vnd.3gpp.iut+xml to indicate that it supports the MIME type and then sends the SIP INVITE request to UE-1 to setup the session.

Table 4.4.4.2.4-3: SIP INVITE request (SCC AS to Intermediate IM CN subsystem entities)

```
INVITE sip:user1@example1.net SIP/2.0
Via:
Max-Forwards:
Route:
P-Asserted-Identity: <sip:uesr3@example1.net>
Privacy: none
From:
To:
Cseq:
Supported:
Require:
Accept-Contact: *;+g.3gpp.icsi-ref="urn%3Aurn-7%3gpp-service.ims.icsi.mmtel"
Accept-Contact: *;+g.3gpp.iut-controller;explicit
Contact:
Allow:
Accept: application/sdp; application/3gpp-ims+xml; application/vnd.3gpp.iut+xml
Content-Type:
Content-Length: (…)

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

5-6. SIP 300 (Multiple Choices) response to SIP INVITE request (UE-1 to SCC AS) see example in table 4.4.4.2.4-5

The UE-1 responds with SIP 300 (Multiple choices) response to SCC AS including in the body the media characteristics (Audio and Video) associated with the contact addresses of UE-1 and UE-2 respectively.

Table 4.4.4.2.4-5: SIP 300 (Multiple Choices) response (UE-1 to SCC-AS)

```
SIP/2.0 300 Multiple Choices
Via:
To:
From:
Call-ID:
CSeq:
P-Asserted-Identity: sip:user1@example.net
Contact: <sip:user1@example.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz>,
<sip:user1@example.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6>
Allow:
Content-Type=application/vnd.3gpp.iut+xml
Content-Length: (…)


<controlTransfer>
 <activeController=<<sip:user1@example.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-
   00a0c91ewxyz?body=m%3Daudio%2049170%20RTP%2FAVP%97%0D>/>
 <Controllee=<<sip:user1@example.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-
   00a0c91e6bf6?body=m%3Dvideo%2028540%20RTP%2FAVP%98%0D>/>
</ControlTansfer>
```

7-8. SIP ACK request (SCC AS to UE-1)

9. SCC AS authorizes the request for the collaborative session setup involving UE-2.

10-11. SIP 183 (session progress) response to SIP INVITE request (SCC AS to UE-3)

The SCC AS responds with SIP 183 (session progress) response to UE-3 including an SDP answer based on the media types contained in the SIP 300 (Multiple choices) response and containing the discard port number "9" for those media lines.

12-13. SIP INVITE request (SCC AS to UE-1)- - see example in table 4.4.4.2.4-12

The SCC AS sends the SIP INVITE request to initiate the audio media setup in UE-1.

Table 4.4.4.2.4-12: SIP INVITE request (SCC AS to Intermediate IM CN subsystem entities)

```
INVITE sip:user1@example.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz SIP/2.0
Via: SIP/2.0/UDP 192.0.2.5;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route:
P-Preferred-Identity: <sip:uesr3@example1.net>
P-Access-Network-Info:
Privacy: none
From: <sip:user3@example1.net>; tag=171828
To: <sip:user1@example1.net>
Call-ID: cb03a0s09a2sdfglkj490237
Cseq: 127 INVITE
Supported: 100rel; precondition, gruu, 199
Require: sec-agree, replaces
Proxy-Require: sec-agree
Accept-Contact: *;+g.3gpp.icsi-ref="urn%3Aurn-7%3gpp-service.ims.icsi.mmtel"
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=7531
Contact:<sip:user3@example1.net;gr= urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6>;
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE
Accept: application/sdp; application/3gpp-ims+xml
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP4 192.0.2.5
s=
t=0 0
c=IN IP4 192.0.2.5
m=audio 49170 RTP/AVP 0 8 3
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:96 telephone-event
a=maxptime:20
m=video 0 RTP/AVP 98
```

14-15. SIP INVITE request (SCC AS to UE-2)- - see example in table 4.4.4.2.4-14

The SCC AS sends the SIP INVITE request to initiate the video media setup in UE-2.

Table 4.4.4.2.4-14: SIP INVITE request (SCC AS to Intermediate IM CN subsystem entities)

```
INVITE sip:user1@example.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6 SIP/2.0
Via: SIP/2.0/UDP 192.0.2.5;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route:
P-Preferred-Identity: <sip:uesr3@example1.net>
P-Access-Network-Info:
Privacy: none
From: <sip:user3@example1.net>; tag=171828
To: <sip:user1@example1.net>
Call-ID: cb03a0s09a2sdfglkj490237
Cseq: 127 INVITE
Supported: 100rel; precondition, gruu, 199
Require: sec-agree, replaces
Proxy-Require: sec-agree
Accept-Contact: *;+g.3gpp.icsi-ref="urn%3Aurn-7%3gpp-service.ims.icsi.mmtel"
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=7531
Contact:<sip:user3@example1.net;gr= urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6>;
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE
Accept: application/sdp; application/3gpp-ims+xml
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP4 192.0.2.5
s=
t=0 0
c=IN IP4 192.0.2.5
m=audio 0 RTP/AVP 97
m=video 28540 RTP/AVP 98
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

20-21. SIP UPDATE request (SCC AS to UE-3)- - see example in table 4.4.4.2.4-20

The SCC AS then sends the SIP UPDATE request to UE-3 with the SDP answer of UE-1 and UE-2 received in the SIP 183 (session progress) responses.

Table 4.4.4.2.4-20: SIP UPDATE request (SCC AS to Intermediate IM CN subsystem entities)

```
UPDATE sip:user3@example1.net SIP/2.0
Via:
To: sip:user3@example.net;tag = 66666
From: sip:user1@example.net; tag=33333
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:user1@example.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 1300 RTP/AVP 96 97
c=IN IP4 123.45.67.89
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1500 RTP/AVP 98
c=IN IP4 123.45.67.42
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

22-23. SIP 200 (OK) response to SIP UPDATE request (UE-3 to SCC AS)

UE-3 sends the SIP 200 (OK) response to the SIP UPDATE request.

24-25. SIP UPDATE request (SCC AS to UE-1)

The SCC AS sends the SIP INVITE request to the UE-1 based on the SDP content in the SIP 200 (OK) response to the SIP UPDATE request received from UE-3.

26-27. SIP UPDATE request (SCC AS to UE-2)

The SCC AS sends the SIP INVITE request to the UE-2 based on the SDP content in the SIP 200 (OK) response to the SIP UPDATE request received from UE-3.

28-29. SIP 200 (OK) response to SIP UPDATE request (UE-1 to SCC AS)

30-31. SIP 200 (OK) response to SIP UPDATE request (UE-2 to SCC AS)

32-33. SIP 200 (OK) response to SIP INVITE request (UE-1 to SCC AS)

When the UE-1 answers the call, it sends the SIP 200 (OK) response to the initial SIP INVITE request.

34-35. SIP 200 (OK) response to SIP INVITE request (UE-2 to SCC AS)

When the UE-2 answers the call, it sends the SIP 200 (OK) response to the initial SIP INVITE request.

36-37. SIP 200 (OK) response to SIP INVITE request (SCC AS to UE-3)

The SCC AS sends the SIP 200 (OK) response to the UE-3.

38-39. SIP ACK request (UE-3 to SCC AS)

40-41. SIP ACK request (SCC AS to UE-1)

42-43. SIP ACK request (SCC AS to UE-2)

4.4.4.3 Call flows for establishment of collaborative session upon originating IMS session setup with forked responses

4.4.4.3.1 Alternative 1 – indicating collaborative session establishment by providing controllee UE SIP URI in SDP

In the information flow at the figure 4.4.4.3.1-1, UE-1 wants to establish a collaborative session without the pre-requisite of having an IMS session established. The UE-1 wants to setup a collaborative session with audio media flow in UE-1 and video media flow in UE-2, and wants to control the collaborative session through UE-1.

The SIP INVITE request is forked to the remote party. This flow assumes that the second Remote UE accepts the call.

| UE-1 | UE-2 | SCC-AS | Intermediate IM CN subsystem entities | UE-3 | UE-4 |

1. INVITE

2. INVITE

3. INVITE

4a. INVITE

4b. INVITE

6a. 183 to INVITE

5a. 183 to INVITE

7a. 183 to INVITE

8a. 183 to INVITE

9a. INVITE

10a. INVITE

11a. 183 to INVITE

12a. 183 to INVITE

13a. SIP UPDATE

14a. SIP UPDATE

16a. 200 OK to UPDATE

15a. 200 OK to UPDATE

6b. 183 to INVITE

5b. 183 to INVITE

7b. 183 to INVITE

8b. 183 to INVITE

9b. intercept and save the SIP 183 when determining that the session is forked

17a. SIP UPDATE

18a. SIP UPDATE

20a. 200 OK to UPDATE

19a. 200 OK to UPDATE

22. 200 OK to INVITE

21. 200 OK to INVITE

23. 200 OK to INVITE

24. 200 OK to INVITE

25. ACK

26. ACK

27. SIP UPDATE(saved response in step 9b)

28. SIP UPDATE(saved response in step 9b)

29. 200 OK to UPDATE

30. 200 OK to UPDATE

31. SIP UPDATE

32. SIP UPDATE

34. 200 OK to UPDATE

33. 200 OK to UPDATE

35. 200 OK to INVITE

36. 200 OK to INVITE

37. ACK

38. ACK

39. ACK

40. ACK

41. CANCEL

42. CANCEL

43. CANCEL

45. 200 OK to CANCEL

44. 200 OK to CANCEL

46. 200 OK to CANCEL

Media (audio)

Media (video)

Figure 4.4.4.3.1-1: Signalling flow for establishment of collaborative session upon originating IMS session with forked response

NOTE: For clarity, the SIP 100 (Trying), SIP PRACK requests to 183 (Session Progress) responses and SIP 200 (OK) responses to SIP PRACK requests are not shown in the signalling flow.

1-2. SIP INVITE request (UE-1 to SCC AS) - see example in table 4.4.4.3.1-1

The UE-1 sends SIP INVITE request to SCC AS to setup the collaborative session.

Table 4.4.4.3.1-1: SIP INVITE request (UE-1 to SCC AS)

```
INVITE SIP: user3@example1.net; SIP/2.0
Via: SIP/2.0/UDP 192.0.2.5;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: sip:pcscf1.home1.net:7531;lr;comp=sigcomp>, <sip:orig@scscf1.home1.net;lr>
P-Preferred-Identity: <sip:uesr1@example1.net>
P-Access-Network-Info:
Privacy: none
From: <sip:user1@example1.net>; tag=171828
To: <sip:user3@example1.net>
Call-ID: cb03a0s09a2sdfglkj490237
Cseq: 127 INVITE
Supported: 100rel; precondition, gruu, 199
Require: sec-agree, replaces
Proxy-Require: sec-agree
Accept-Contact: *;+g.3gpp.icsi-ref="urn%3Aurn-7%3gpp-service.ims.icsi.mmtel"
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=7531
Contact:<sip:user1@example1.net;gr= urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6>;
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE
Accept: application/sdp; application/3gpp-ims+xml
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP4 192.0.2.5
s=
t=0 0
c=IN IP4 192.0.2.5
a=creq:ccap-v0
m=audio 49170 RTP/AVP 0 8 3
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:96 telephone-event
a=maxptime:20
m=video 9 RTP/AVP 98
a=creq:ccap-v0
a=ccap:1 URL SIPURI sip:user2@example2.net
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

SDP: The first media stream (audio) will be terminated by UE-1 of which the IP address is indicated in the c-line in the SDP header. The second media stream (video) will be terminated by UE-2.

Editor's Note: The SDP indicates that the second media stream (video) is destined to be terminated by UE-2, of which the address is only known as a SIP address by UE-1. One possible solution in this example is, UE-1 includes the SIP address of UE-2 in the a=ccap line in the SDP media block for the video media stream, as described in draft-ietf-mmusic-sdp-misc-cap [15] and draft-yang-dispatch-SIP-connection-address-type [16].

The port number of the UE-2 for the video media is currently not known to UE-1, therefore the port number for the video media stream is set to the discard port number "9".

3. SIP INVITE request (SCC AS to Intermediate IM CN subsystem entities) - see example in table 4.4.4.3.1-3

SCC AS sends a SIP INVITE request to intermediate IM CN subsystem entities.

Table 4.4.4.3.1-3: SIP INVITE request (SCC AS to Intermediate IM CN subsystem entities)

```
INVITE sip:user3@example1.net; SIP/2.0
Via:
Record-Route: sip:sccas1.home1.example.net
To: sip:user3@example1.net;
From: sip:user1@example1.net;tag=acegi
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: <sip:user1@example1.net;gr= urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6>;
Allow:
Content-Type: application/sdp
Content-Length:(…)

v=0
o=- 2987933615 2987933615 IN IP4 192.0.2.5
s=
t=0 0
c=IN IP4 192.0.2.5
a=creq:ccap-v0
m=audio 49170 RTP/AVP 0 8 3
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:96 telephone-event
a=maxptime:20
m=video 9 RTP/AVP 98
C=IN IP4 0.0.0.0
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

Editor's Note: Whether sending the SIP-URI c-line to remote UE or just using 0.0.0.0 address is FFS.

4a. SIP INVITE request (Intermediate IM CN subsystem entities to UE-3)

Intermediate IM CN subsystem entities, i.e. S-CSCF serving for remote UE, determine that the SIP INVITE request should be forked, and send the SIP INVITE request to UE-3.

4b. SIP INVITE request (Intermediate IM CN subsystem entities to UE-4)

Intermediate IM CN subsystem entities, i.e. S-CSCF serving for remote UE, determine that the SIP INVITE request should be forked, and send the SIP INVITE request to UE-4.

5a-6a. SIP 183 (Session Progress) response to SIP INVITE request (UE-3 to SCC AS)

The remote UE-3 responds with SIP 183 (Session Progress) response containing the SDP answer of remote UE.

Table 4.4.4.3.1-5a: SIP 183 (Session Progress) response (UE-3 to Intermediate IM CN subsystem entities)

```
SIP/2.0 183 Session Progress
Via:
Record-Route: sip:sccas1.home1.example.net
To: sip:user3@example1.net;tag = 66666
From: sip:user1@example1.net;tag=acegi
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: <sip:user3@example1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6>;
Allow:
Content-Type: application/sdp
Content-Length:(…)

v=0
o=- 2987933615 2987933615 IN IP4 192.1.3.9
s=
t=
c=IN IP4 192.1.3.9
a=creq:ccap-v0
m=audio 3370 RTP/AVP 0 8 3
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:96 telephone-event
a=maxptime:20
m=video 4390 RTP/AVP 98
C=IN IP4 192.1.3.9
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

7a-8a. SIP 183 (Session Progress) response to SIP INVITE request (SCC AS to UE-1)

The SCC AS responds UE-1 with SIP 183 (Session Progress) response containing the SDP answer of UE-3.

9a-10a. SIP INVITE request (SCC AS to UE-2) – see example in table 4.4.4.3.1-9a

The SCC AS sends a SIP INVITE request to UE-2 according to the indication in step 1 to establish the connection between SCC AS and UE-2.

Table 4.4.4.3.1-9a: SIP INVITE request (SCC AS to UE-2)

```
INVITE    sip:user2@example1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6 SIP/2.0
Via:
Record-Route:
To: sip:user2@example1.net;
From: sip:interUEtransfer@example.net;tag=acegi
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity: "remote user" sip:user3@example1.net
Require:
Referred-By: sip: user1@example1.net
Contact: sip:user3@example1.net;gr=urn:uuid:f81d4fae-17oct-11a1-a678-0054c91eabcd
Allow:
Content-Type: application/sdp
Content-Length:(…)

v=0
o=- 1027933615 1027933615 IN IP4 192.0.2.23
s=-
t=0 0
m=audio 0 RTP/AVP 0 8 3
m=video 4390 RTP/AVP 34
a= sendrecv
c=IN IP4 192.0.2.23
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

Editor's Note: Whether containing the "Referred-by" header in the INVITE request to indicate the request comes from the controller UE is FFS.

11a-12a.   SIP 183 (Session Progress) response to SIP INVITE request (UE-2 to SCC AS)

UE-2 sends the SIP 183 (Session Progress) response towards SCC AS containing the SDP answer of UE-2.

13a-14a.   SIP UPDATE request (SCC AS to UE-3) - see example in table 4.4.4.3.1-13a

SCC AS sends SIP UPDATE request to UE-3 to update the SDP in UE-3.

Table 4.4.4.3.1-13a: SIP UPDATE request (SCC AS to remote UE-3)

```
UPDATE sip:user3@example1.net SIP/2.0
Via:
To: sip:user3@example1.net;tag = 66666
From: sip:interUEtransfer@example.net; tag=33333
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 49170 RTP/AVP 96 97
c=IN IP4 123.45.67.89
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 145.23.77.88
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

15a-16a. SIP 200 (OK) response to SIP UPDATE request (UE-3 to SCC AS)

The remote UE-3 responds with SIP 200 (OK) response.

5b-6b. SIP 183 (Session Progress) response to SIP INVITE request (UE-4 to SCC AS)

The remote UE-4 responds with SIP 183 (Session Progress) response containing the SDP answer of remote UE.

Table 4.4.4.3.1-5b: SIP 183 (Session Progress) response (UE-4 to Intermediate IM CN subsystem entities)

```
SIP/2.0 183 Session Progress
Via:
Record-Route:
To: sip:user3@example1.net;tag=77777
From: sip:user1@example1.net;tag=acegi
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: <sip:user3@example1.net;gr= urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e87f7>;
Allow:
Content-Type: application/sdp
Content-Length:(…)

v=0
o=- 2987933615 2987933615 IN IP4 192.1.4.8
s=
t=
c=IN IP4 192.1.4.8
a=creq:ccap-v0
m=audio 3570 RTP/AVP 0 8 3
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:96 telephone-event
a=maxptime:20
m=video 3580 RTP/AVP 98
C=IN IP4 192.1.4.8
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

7b-8b. SIP 183 (Session Progress) response to SIP INVITE request (SCC AS to UE-1)

The SCC AS responds UE-1 with SIP 183 (Session Progress) response containing the SDP answer of UE-4.

9b. The SCC AS saves the SIP 183 when determining that the session is forked

The SCC AS determines that the call is forked according to step 6a and 6b and saves the SIP 183 message of step 6b.

17a-18a.   SIP UPDATE request (SCC AS to UE-4) - see example in table 4.4.4.3.1-17a

SCC AS sends SIP UPDATE request to UE-4 to update the SDP.

Table 4.4.4.3.1-17a: SIP UPDATE request (SCC AS to remote UE-4)

```
UPDATE sip:user3@example1.net SIP/2.0
Via:
To: sip:user3@example1.net;
From: sip:interUEtransfer@example.net; tag=55555
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:user1@example1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 49170 RTP/AVP 96 97
c=IN IP4 123.45.67.89
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 145.23.77.88
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

19a-20a.   SIP 200 (OK) response to SIP UPDATE request (UE-4 to SCC AS)

The remote UE-4 responds with SIP 200 (OK) response.

21-22. SIP 200 (OK) response to the initial SIP INVITE request (UE-4 to SCC AS)

When the remote UE answers the call, UE-4 sends the SIP 200 (OK) response back to UE-1 via the SCC AS.

23-24. SIP 200 (OK) response to the initial SIP INVITE request (SCC AS to UE-1)

The SCC AS sends the SIP 200 (OK) response to UE-1.

25-26. SIP ACK request (UE-1 to SCC AS)

UE-1 sends the SIP ACK request to confirm the establishment of call to SCC AS.

27-28. SIP UPDATE request (SCC AS to UE-2)

SCC AS sends a SIP UPDATE request with the saved information in SIP 183 (Session Progress) response in step 9b to control the renegotiation of the video media when determining that the UE-4 has answered the call.

29-30. SIP 200 (OK) response to SIP UPDATE request (UE-2 to SCC AS)

The UE-2 responds with SIP 200 (OK) response.

31-32. SIP UPDATE request (SCC AS to UE-4) - see example in table 4.4.4.3.1-31

SCC AS sends SIP UPDATE request to UE-4 to update the media in UE-4.

Table 4.4.4.3.1-31: SIP UPDATE request (SCC AS to UE-4)

```
UPDATE sip:user3@example1.net SIP/2.0
Via:
To: sip:user3@example1.net;tag = 77777
From: sip:interUEtransfer@example.net; tag=55555
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:user1@example1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 49170 RTP/AVP 96 97
c=IN IP4 123.45.67.89
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 145.23.77.88
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

33-34. SIP 200 (OK) response to SIP UPDATE request (UE-4 to SCC AS)

UE-4 responds with SIP 200 (OK) response.

35-36 SIP 200 (OK) response to SIP INVITE request (UE-2 to SCC AS)

UE-2 responds SIP 200 (OK) response to the SIP INVITE request.

37-38. SIP ACK request (SCC AS to UE-2)

SCC AS sends the SIP ACK request to UE-2.

39-40. SIP ACK request (SCC AS to UE-4)

SCC AS sends the SIP ACK request to UE-4.

41-43. SIP CANCEL request (Intermediate IM CN subsystem entities to UE-3)

The intermediate IM CN subsystem entities sends the SIP CANCEL request to UE-3.

44-46. SIP 200 (OK) response to SIP CANCEL request (UE-3 to Intermediate IM CN subsystem entities)

UE-3 responds SIP 200 (OK) response to the SIP CANCEL request.

4.4.4.3.2 Alternative 2 – indicating collaborative session establishment by multipart/related Content-Type parameter

In the example flow of figure 4.4.4.3.2-1 UE-1 wants to establish a collaborative session without having established an IMS session. UE-1 wants to setup the collaborative session with audio media on UE-1 and with video media on UE-2. The collaborative session is to be controlled by UE-1.

The SIP INVITE request is forked to the remote party. This flow assumes that the second remote UE accepts the call.

UE-1 | UE-2 | SCC-AS | Intermediate IM CN subsystem entities | UE-3 | UE-4

1. INVITE
2. INVITE
3. INVITE
4a. INVITE
4b. INVITE
6a. 183 to INVITE
5a. 183 to INVITE
7a. 183 to INVITE
8a. 183 to INVITE
9a. INVITE
10a. INVITE
11a. 183 to INVITE
12a. 183 to INVITE
13a. SIP UPDATE
14a. SIP UPDATE
16a. 200 OK to UPDATE
15a. 200 OK to UPDATE
6b. 183 to INVITE
5b. 183 to INVITE
7b. 183 to INVITE
8b. 183 to INVITE

9b. intercept and save the SIP 183 when determining that the session is forked

17a. SIP UPDATE
18a. SIP UPDATE
20a. 200 OK to UPDATE
19a. 200 OK to UPDATE
22. 200 OK to INVITE
21. 200 OK to INVITE
23. 200 OK to INVITE
24. 200 OK to INVITE
25. ACK
26. ACK
27. SIP UPDATE(saved response in step 9b)
28. SIP UPDATE(saved response in step 9b)
29. 200 OK to UPDATE
30. 200 OK to UPDATE
31. SIP UPDATE
32. SIP UPDATE
34. 200 OK to UPDATE
33. 200 OK to UPDATE
35. 200 OK to INVITE
36. 200 OK to INVITE
37. ACK
38. ACK
39. ACK
40. ACK
41. CANCEL
42. CANCEL
43. CANCEL
45. 200 OK to CANCEL
44. 200 OK to CANCEL
46. 200 OK to CANCEL
Media (audio)
Media (video)

Figure 4.4.4.3.2-1: Signalling flow for establishment of collaborative session upon originating IMS session with forked response

NOTE 1: For clarity, the SIP 100 (Trying) responses, SIP PRACK requests to 183 (Session Progress) responses and SIP 200 (OK) responses to SIP PRACK requests are not shown in the signalling flow.

1-2. SIP INVITE request (UE-1 to SCC AS) - see example in table 4.4.4.3.2-1

UE-1 sends a SIP INVITE request to the SCC AS to setup the collaborative session.

Table 4.4.4.3.2-1: SIP INVITE request (UE-1 to SCC AS)

```
INVITE SIP: user3@example1.net; SIP/2.0
Via: SIP/2.0/UDP 192.0.2.5;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: sip:pcscf1.home1.net:7531;lr;comp=sigcomp>, <sip:orig@scscf1.home1.net;lr>
P-Preferred-Identity: <sip:user1@example1.net>
P-Access-Network-Info:
Privacy: none
From: <sip:user1@example1.net>; tag=171828
To: <sip:user3@example1.net>
Call-ID: cb03a0s09a2sdfglkj490237
Cseq: 127 INVITE
Supported: 100rel; precondition, gruu, 199
Require: sec-agree, replaces
Proxy-Require: sec-agree
Accept-Contact: *;+g.3gpp.icsi-ref="urn%3Aurn-7%3gpp-service.ims.icsi.mmtel"
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=7531
Contact:<sip:user1@example1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6>;+g.3gpp.iut-
   controller
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE
Accept: application/sdp; application/3gpp-ims+xml;message/sipfrag
Content-Type: multipart/related; boundary=boundary42; type="application/sdp"; start-
   info="collaborative-session"
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP4 192.0.2.5
s=
t=0 0
c=IN IP4 192.0.2.5
m=audio 49170 RTP/AVP 0 8 3
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:96 telephone-event
a=maxptime:20

--boundary42
Content-Type: message/sipfrag

REFER sip:interUEtransfer@example.net SIP/2.0

Refer-To: <sip:user2@example2.net;gr=urn:uuid:f81d4fae-7dec-11d0-a762-
   00a0c91e6bf6?body=m%3Dvideo%209%20RTP%2FAVP%2098%2099
   b%3DAS%3A75%0D%0Aa%3Drtpmap%3A98%20H263%0D%0Aa%3Dfmtp%3A98%20profile-level-
   id%3D0%0D%0Aa%3Drtpmap%3A99%20MP4V-ES>
```

The SIP INVITE request includes SDP and a SIPfrag of a SIP REFER request in its body. The SDP describes the audio media for UE-1. The SIP REFER request refers to UE-2 for establishing the video media stream on UE-2.

The start-info parameter of the multipart/related Content-Type header field of the SIP INVITE request indicates to the SCC AS that a collaborative session should be established with media as indicated in the SIP INVITE request's body.

NOTE 2: The SIP REFER request included in the SIP INVITE request is being created by UE-1 and not duplicated from another SIP REFER request.

The port number of the controllee UE, UE-2 for the video media is not known to UE-1. Therefore the port number for the video media stream is set to the discard port number "9".

3. **SIP INVITE request (SCC AS to Intermediate IM CN subsystem entities) - see example in table 4.4.4.3.2-3**

The SCC AS sends a SIP INVITE request to the intermediate IM CN subsystem entities.

Table 4.4.4.3.2-3: SIP INVITE request (SCC AS to Intermediate IM CN subsystem entities)

```
INVITE sip:user3@example1.net; SIP/2.0
Via:
Record-Route: sip:sccas1.home1.example.net
To: sip:user3@example1.net;
From: sip:user1@example1.net;tag=acegi
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: <sip:user1@example1.net;gr= urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6>;
Allow:
Content-Type: application/sdp
Content-Length:(…)

v=0
o=- 2987933615 2987933615 IN IP4 192.0.2.5
s=
t=0 0
c=IN IP4 192.0.2.5
m=audio 49170 RTP/AVP 0 8 3
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:96 telephone-event
a=maxptime:20
m=video 9 RTP/AVP 98
C=IN IP4 0.0.0.0
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

The forwarded SIP INVITE request includes the SDP from the received SIP INVITE and the SDP from the SIP REFER request included in the received SIP INVITE body.

4a. **SIP INVITE request (Intermediate IM CN subsystem entities to UE-3)**

The intermediate IM CN subsystem entities, i.e. the S-CSCF serving the remote UE, determine that the SIP INVITE request should be forked and send the SIP INVITE request to UE-3.

4b. **SIP INVITE request (Intermediate IM CN subsystem entities to UE-4)**

The intermediate IM CN subsystem entities, i.e. the S-CSCF serving the remote UE, determine that the SIP INVITE request should be forked and send the SIP INVITE request to UE-4.

5a-6a. **SIP 183 (Session Progress) response to SIP INVITE request (UE-3 to SCC AS) – see example in table 4.4.4.3.2-5a**

The remote UE-3 responds with a SIP 183 (Session Progress) response containing its SDP answer.

Table 4.4.4.3.2-5a: SIP 183 (Session Progress) response (UE-3 to Intermediate IM CN subsystem entities)

```
SIP/2.0 183 Session Progress
Via:
Record-Route: sip:sccas1.home1.example.net
To: sip:user3@example1.net;tag = 66666
From: sip:user1@example1.net;tag=acegi
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: <sip:user3@example1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6>;
Allow:
Content-Type: application/sdp
Content-Length:(…)

v=0
o=- 2987933615 2987933615 IN IP4 192.1.3.9
s=
t=
c=IN IP4 192.1.3.9
m=audio 3370 RTP/AVP 0 8 3
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:96 telephone-event
a=maxptime:20
m=video 4390 RTP/AVP 98
C=IN IP4 192.1.3.9
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

7a-8a. SIP 183 (Session Progress) response to SIP INVITE request (SCC AS to UE-1)

The SCC AS responds to UE-1 with a SIP 183 (Session Progress) response containing the SDP answer of UE-3.

9a-10a. SIP INVITE request (SCC AS to UE-2) – see example in table 4.4.4.3.2-9a

The SCC AS sends the SIP INVITE request indicated in the SIP REFER request received from UE-1 to UE-2 for establishing the video media between the SCC AS and UE-2.

Table 4.4.4.3.2-9a: SIP INVITE request (SCC AS to UE-2)

```
INVITE   sip:user2@example1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6 SIP/2.0
Via:
Record-Route:
To: sip:user2@example1.net;
From: sip:interUEtransfer@example.net;tag=acegi
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity: "remote user" sip:user3@example1.net
Require:
Referred-By: sip: user1@example1.net
Contact: sip:user3@example1.net;gr=urn:uuid:f81d4fae-17oct-11a1-a678-0054c91eabcd
Allow:
Content-Type: application/sdp
Content-Length:(…)

v=0
o=- 1027933615 1027933615 IN IP4 192.0.2.23
s=-
t=0 0
m=audio 0 RTP/AVP 0 8 3
m=video 4390 RTP/AVP 34
a= sendrecv
c=IN IP4 192.0.2.23
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

Editor's Note: Whether containing the "Referred-by" header in the INVITE request to indicate the request comes from the controller UE is FFS.

11a-12a. SIP 183 (Session Progress) response to SIP INVITE request (UE-2 to SCC AS)

UE-2 sends a SIP 183 (Session Progress) response towards the SCC AS containing the SDP answer of UE-2.

13a-14a. SIP UPDATE request (SCC AS to UE-3) - see example in table 4.4.4.3.2-13a

The SCC AS sends a SIP UPDATE request to UE-3 to update the media on UE-3.

Table 4.4.4.3.2-13a: SIP UPDATE request (SCC AS to remote UE-3)

```
UPDATE sip:user3@example1.net SIP/2.0
Via:
To: sip:user3@example1.net;tag = 66666
From: sip:interUEtransfer@example.net; tag=33333
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 49170 RTP/AVP 96 97
c=IN IP4 123.45.67.89
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 145.23.77.88
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

15a-16a. SIP 200 (OK) response to SIP UPDATE request (UE-3 to SCC AS)

The remote UE, UE-3 responds with a SIP 200 (OK) response.

5b-6b. SIP 183 (Session Progress) response to SIP INVITE request (UE-4 to SCC AS) – see example in table 4.4.4.3.2-5b

The remote UE-4 responds with a SIP 183 (Session Progress) response containing its SDP answer.

Table 4.4.4.3.2-5b: SIP 183 (Session Progress) response (UE-4 to Intermediate IM CN subsystem entities)

```
SIP/2.0 183 Session Progress
Via:
Record-Route:
To: sip:user3@example1.net;tag=77777
From: sip:user1@example1.net;tag=acegi
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: <sip:user3@example1.net;gr= urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e87f7>;
Allow:
Content-Type: application/sdp
Content-Length:(…)

v=0
o=- 2987933615 2987933615 IN IP4 192.1.4.8
s=
t=
c=IN IP4 192.1.4.8
m=audio 3570 RTP/AVP 0 8 3
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:96 telephone-event
a=maxptime:20
m=video 3580 RTP/AVP 98
C=IN IP4 192.1.4.8
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

7b-8b. SIP 183 (Session Progress) response to SIP INVITE request (SCC AS to UE-1)

The SCC AS responds to UE-1 with a SIP 183 (Session Progress) response containing the SDP answer of UE-4.

9b. The SCC AS saves the SIP 183 (Session Progress) response when determining that the session is forked

The SCC AS determines that the call is forked according to step 6a and 6b and saves the SIP 183 (Session Progress) response of step 6b.

17a-18a.   SIP UPDATE request (SCC AS to UE-4) - see example in table 4.4.4.3.2-17a

The SCC AS sends a SIP UPDATE request to UE-4 to update the media on UE-4.

Table 4.4.4.3.2-17a: SIP UPDATE request (SCC AS to remote UE-4)

```
UPDATE sip:user3@example1.net SIP/2.0
Via:
To: sip:user3@example1.net;
From: sip:interUEtransfer@example.net; tag=55555
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:user1@example1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 49170 RTP/AVP 96 97
c=IN IP4 123.45.67.89
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 145.23.77.88
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

19a-20a. SIP 200 (OK) response to SIP UPDATE request (UE-4 to SCC AS)

The remote UE, UE-4 responds with a SIP 200 (OK) response.

21-22. SIP 200 (OK) response to the initial SIP INVITE request (UE-4 to SCC AS)

When the remote UE, UE-4 answers the call, it sends a SIP 200 (OK) response back to UE-1 via the SCC AS.

23-24. SIP 200 (OK) response to the initial SIP INVITE request (SCC AS to UE-1)

The SCC AS forwards the SIP 200 (OK) response to UE-1.

25-26. SIP ACK request (UE-1 to SCC AS)

UE-1 sends a SIP ACK request to the SCC AS to confirm call establishment.

27-28. SIP UPDATE request (SCC AS to UE-2)

The SCC AS sends a SIP UPDATE request with the saved information of the SIP 183 (Session Progress) response of step 9b to re-negotiate the video media when determining that UE-4 has answered the call.

29-30. SIP 200 (OK) response to SIP UPDATE request (UE-2 to SCC AS)

UE-2 responds with a SIP 200 (OK) response.

31-32. SIP UPDATE request (SCC AS to UE-4) - see example in table 4.4.4.3.2-31

The SCC AS sends a SIP UPDATE request to UE-4 to update the media on UE-4.

Table 4.4.4.3.2-31: SIP UPDATE request (SCC AS to UE-4)

```
UPDATE sip:user3@example1.net SIP/2.0
Via:
To: sip:user3@example1.net;tag = 77777
From: sip:interUEtransfer@example.net; tag=55555
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:user1@example1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 49170 RTP/AVP 96 97
c=IN IP4 123.45.67.89
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 145.23.77.88
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

33-34. SIP 200 (OK) response to SIP UPDATE request (UE-4 to SCC AS)

UE-4 responds with a SIP 200 (OK) response.

35-36 SIP 200 (OK) response to SIP INVITE request (UE-2 to SCC AS)

UE-2 responds to the SIP INVITE request received from the SCC AS with a SIP 200 (OK) response.

37-38. SIP ACK request (SCC AS to UE-2)

The SCC AS sends a SIP ACK request back to UE-2.

39-40. SIP ACK request (SCC AS to UE-4)

The SCC AS sends a SIP ACK request to UE-4.

41-43. SIP CANCEL request (Intermediate IM CN subsystem entities to UE-3)

The intermediate IM CN subsystem entities send a SIP CANCEL request to UE-3.

44-46. SIP 200 (OK) response to SIP CANCEL request (UE-3 to Intermediate IM CN subsystem entities)

UE-3 responds with a SIP 200 (OK) response to the SIP CANCEL request.

4.5 Assignment and transfer of control of a collaborative session

Editor's Note: This subclause corresponds to subclause 6.1.3.4 of 3GPP TR 23.831 [3]

4.5.1 General

The mechanism for transferring control of a collaborative session involves five aspects that can be considered separately:

i) the Controller UE indicating whether or not it wishes to remain the [a] controller of the collaborative session,

ii) the Controller UE identifying to the SCC AS that another UE is requested to become the [a] controller of the collaborative session.

iii) the SCC AS indicating to another controller capable UE that it is requested to become the [a] controller of the collaborative session.

iv) the target controller UE indicating to the SCC AS that it has accepted to become the [a] controller of the collaborative session.

v) the (former) Controller UE being informed that another UE has become the [a] controller of the collaborative session.

While in release 10 there is no requirement for multiple controller UEs controlling a collaborative session, such a requirement has been included in TR 23.831 [3] for potential implementation in a future release. In addition based on other future potential requirements in TR 23.831 [3] a target Controller UE could itself request transfer of session control or the SCC AS could transfer collaborative session control from one Controller UE to a target Controller UE on behalf of the UEs involved in the collaborative session. Therefore the procedures for transfer of collaborative session control should take into account the future possibility that assigning another UE as a Controller UE of the Collaborative Session might not always be the same as relinquishing control of the Collaborative Session. For this reason also "[a]" has been used in the above bullets.

It also should be considered that transfer of control of a collaborative session could be a standalone operation or be combined with other collaborative session control procedures such as Transfer of Media, Addition of a Media or Removal of a media. Therefore steps i) (relinquishing control) and ii) (assigning a new controller) above should be considered as potentially separate procedures.

4.5.2   Procedures

4.5.2.1   Indicating whether controller UE wishes to be the controller of the collaborative session

4.5.2.1.0   General

The following procedures from TS 24.237 make use of this procedure to indicate whether the UE wishes to be the controller of the collaborative session:

-    16.2.1 SC UE procedures for collaborative session establishment by transferring media used in an existing session/ 16.2.1.1 Controller UE procedures

-    16.2.2 SC UE procedures for collaborative session establishment with new media/ 16.2.2.1 Controller UE procedures

-    17.2.1 Procedures for controller UE initiated media transfer from controller UE to controllee UE/ 17.2.1.1 Controller UE procedures

-    17.2.2 Procedures for controller UE initiated media transfer from controllee UE to another controllee UE /17.2.2.1 Controller UE procedures

-    19.2.1 Procedures for adding new media on controllee UE by controller UE

The following procedures from TS 24. 837 make use of this procedure to indicate whether the UE wishes to be the controller of the collaborative session:

-    4.7.2.2 Session replication by the SCC AS – push mode/ 4.7.2.2.1.1.1 Controller UE

4.5.2.1.1   Alternative 1 – Indicating whether controller UE wishes to be the controller of the collaborative session using the iut-controller media feature tag

If the controller UE wishes to not be the controller of the collaborative session then it does not include the g.3gpp.iut-controller media feature tag in the Contact header field of the SIP REFER request.

NOTE: In release 9 the g.3gpp.iut-controller media feature tag was only used to identify that the UE had the IUT controller capability. With the above proposal this means that when including the g.3gpp.iut-controller media feature tag in the Contact header field of session related requests the presence of the media feature tag indicates that the UE wishes to be the controller UE for the collaborative session.

4.5.2.1.2 Alternative 2 – Indicating whether Controller UE wishes to remain a controller of the collaborative Session using an XML body

4.5.2.1.2.1 General

4.5.2.1.2.2 Alternative 2A - Indicating whether Controller UE wishes to remain a controller of the collaborative Session using SIP INFO request

To indicate that the controller UE wishes to remain the controller UE it sends a SIP INFO request to the SCC AS including in the SIP INFO request's body a list of SIP URIs including the SIP URI of the controller UE.

4.5.2.1.2.3 Alternative 2B - Indicating whether Controller UE wishes to remain a controller of the collaborative Session using an XML body in the transfer request

To indicate that the controller UE wishes to remain the controller UE includes the XML MIME body application/vnd.3gpp.iut+xml in the transfer request (i.e SIP REFER request) containing a <controlTransfer> element containing an <activeController> element containing its own SIP URI. To indicate that the controller UE does not wish to remain the controller UE includes the XML MIME body application/vnd.3gpp.iut+xml in the transfer request (i.e SIP REFER request) containing a <controlTransfer> element containing a <Controllee> element containing its own SIP URI.

4.5.2.1.3 Alternative 3 – Indicating whether controller UE wishes to be the controller of the collaborative session using a new media feature tag

If the controller UE wishes to not be the controller of the collaborative session then the controller UE includes a new media feature tag "g.3gpp current-iut-controller" in the Contact header field of the SIP REFER request with the value of "passive" to " indicate that the UE is not the active controller for the collaborative session. If the controller UE wishes to be the controller of the collaborative session then the controller UE includes a new media feature tag "g.3gpp current-iut-controller" in the Contact header field of the SIP REFER request with the value of "active" to indicate that the UE is currently the active controller for the collaborative session. For backward compatibility with release 9 the absence of the media feature tag "g.3gpp current-iut-controller" in the Contact header field of the SIP REFER request means the UE wishes to be the controller of the collaborative session

4.5.2.2 Identifying that another UE is requested to become a controller of the collaborative session

4.5.2.2.1 Alternative 1 – Identifying a new controller UE using SIP REFER with method= REFER

The controller UE role is requested for another UE other than the requesting UE by sending a SIP REFER request with the "method" URI parameter in the Refer-To header field set to "REFER" to the SCC AS.

Editor's Note: The use of a SIP REFER request with the "method" URI parameter set to "REFER" for controller UE transfer is motivated by the Rel-9 controller UE assignment mechanism. In Rel-9 the controller UE role is requested by SIP REFER requests for media transfer.

If no media transfer is wanted then the referred SIP REFER requests is to be specified as to transfer media according to already existing media connections, meaning that no media transfer will occur.

The Refer-To header field of the referred SIP REFER request points to the SCC AS. This means that the referred SIP REFER request is to be sent from the SCC AS to the SCC AS. This follows the Rel-9 procedure for media transfer where a SIP REFER request for media transfer is always sent to the SCC AS.

NOTE: In an actual implementation the SCC AS might not actually send the SIP REFER request to the SCC AS but just behave as if it had sent and received the SIP REFER request.

4.5.2.2.2 Alternative 2 - Identifying a new controller UE using an XML Body

4.5.2.2.2.1 General

The Controller includes an XML body in the request to transfer collaborative session control. The XML body contains a <controlTransfer> element that contains a <targetController> element that contains the identity of the intended target Controller UE which is requested to become a controller of the collaborative session along with a <requestedBy> element that contains the identity of the Controller UE that is requesting the assignment. The <targetController> and <requestedBy> elements may contain either the GRUU or the public user identity of the UE.

> NOTE: The GRUUs can be obtained during registration procedures and can be included in existing SIP header fields to identify the source and target of the request for collaborative session control transfer.

4.5.2.2.2.2 Alternative 2A - Identifying a new controller UE using SIP INFO

For requesting assignment of a new Controller UE the requesting UE sends a SIP INFO request associated with the "collaborativeSessionControl" Info Package to the SCC AS.

> Editor's note: Once the Info Package is defined, a reference needs to be added to the text above.

> Editor's note: The negotiation of the Info Package needs to be specified.

> Editor's note: The "collaborativeSessionControl" Info Package needs to be defined.

The SIP INFO request includes an application/vnd.3gpp.iut+xml MIME body containing a <controlTransfer> element that contains the <targetController> element from subclause 4.5.2.2.2.1 that identifies the Controller UE that is requested to become a controller of the collaborative session.

4.5.2.2.2.3 Alternative 2B - Identifying a new controller UE using an Event Package

For requesting transfer the requesting UE sends a SIP PUBLISH method as defined in RFC 3903 [11] to the SCC AS.

The SIP PUBLISH method includes in the body an IUT-Controller Event Package containing the <controlTransfer> element that contains the <targetController> element from subclause 4.5.2.2.2.1 that identifies the Controller UE that is requested to become a controller of the collaborative session.

> NOTE: The IUT controller Event Package would need to be defined in an IETF internet draft.

4.5.2.2.2.4 Alternative 2C - Identifying a new controller UE using XML embedded in Refer-To URI

For requesting transfer the requesting UE sends embedded in the Refer-To URI using the hname "body" the XML body containing the <controlTransfer> element that contains the <targetController> element from subclause 4.5.2.2.2.1 that identifies the Controller UE that is requested to become a controller of the collaborative session. The Refer-To header field may also contain a method parameter for the request to be sent to the target controller UE (e.g. SIP INFO method).

4.5.2.2.3 Alternative 3 - Identifying a new controller UE using a SIP header field

A new header field is defined "IUT-Controller-Assignment" which indicates:

- type of transfer of control request (i.e. "transfer control" in the case the existing Controller UE initiates the transfer of collaborative session control towards another Controller capable UE);

- identity (i.e. GRUU or public user identity) of originator of transfer of control request;

- identity (i.e. GRUU or public user identity) of the controller UE.

This header field is included in the request (e.g. SIP REFER request) that requests the transfer of the control of the collaborative session.

4.5.2.2.4 Alternative 4 - Identifying a new controller UE using Accept-Contact in the Refer-To URI

For requesting transfer the requesting UE sends in the Refer-TO URI the GRUU or public user identity of the Controller UE that is requested to become a controller of the collaborative session and embedded in the Refer-To URI an Accept-Contact header field containing the g.3gpp.iut-controller media feature tag along with "require" and "explicit" parameters. The SCC AS send the request (identified by the method parameter if present or a SIP INVITE request if no method parameter) to the UE identified by the Refer-To URI.

4.5.2.3 Indicating to another UE that it is requested to become a controller of the collaborative Session

4.5.2.3.1 General

4.5.2.3.2 Alternative 1 – Requesting a UE to become a controller UE using an XML Body

4.5.2.3.2.1 General

The SCC AS includes an XML body in the request to transfer collaborative session control. The XML body contains a <controlTransfer> element that itself contains a <targetController> and a <requestedBy> element as in subclause 4.5.2.2.2.1. The SCC AS includes these XML elements in the request sent to the target Controller UE.

4.5.2.3.2.2 Alternative 1A - Assigning a new controller UE using SIP INFO request

For requesting assignment of a new Controller UE the SCC AS sends a SIP INFO method to the SCC AS.

The SIP INFO method includes in the body an Info Package containing the <controlTransfer> element that contains a <targetController> and a <requestedBy> element as defined in subclause 4.5.2.2.3.1.

To clearly indicate the purpose of the SIP INFO request, the Info Package mechanism is being utilized according to draft-ietf-sipcore-info-events [14]. The purpose is indicated by the Info-Package header field value "collaborativeSessionControl".

4.5.2.3.2.3 Alternative 1B - Assigning a new controller UE using an Event Package

For requesting assignment of a new Controller UE the SCC AS sends a SIP PUBLISH method as defined in RFC 3903 [11] to the UE.

The SIP PUBLISH method includes in the body an IUT-Controller Event Package containing the <controlTransfer> element that contains a <targetController> and a <requestedBy> element as defined in subclause 4.5.2.2.3.1..

NOTE: The IUT controller Event Package would need to be defined in an IETF internet draft.

4.5.2.3.2.4 Alternative 1C - Assigning a new controller UE using XML Body as a MIME type in the request

For requesting assignment of a new Controller UE the SCC AS includes in the body of the request sent to the UE (e.g. SIP INVITE request) an XML body containing the <controlTransfer> element that contains a <targetController> and a <requestedBy> element as defined in subclause 4.5.2.2.3.1. When this request also contains SDP multipart MIME is needed to additionally include this XML body in the request. The Content-Disposition is set to "application/vnd.3gpp.iut+xml" with the handling parameter set to "optional". When this alternative is aligned with Alternative 2C in subclause 4.5.2.2.2.4 the XML body is obtained from the hname "body" in the Refer-To URI.

4.5.2.3.3 Alternative 2 – Requesting a UE to become a controller UE using a SIP header field

This is the same header field as the header field defined in subclause 4.5.2.2.3 except that this header field is included in the request (e.g. SIP INVITE request) that requests the UE to become a controller of the collaborative session.

4.5.2.3.4 Alternative 3 – Requesting a UE to become a controller UE using a media feature tag in an Accept-Contact header field

The SCC includes an Accept-Contact header field in the request (e.g. SIP INVITE request) that requests the UE to become a controller of the collaborative session. The receiving UE uses the presence of the Accept-Contact header field containing the g.3gpp.iut-controller media feature tag to determine that it is being requested to become a Controller UE for the collaborative session. When this alternative is aligned with Alternative 4 in subclause 4.5.2.2.3 the Accept-Contact header is obtained from the Refer-To URI

4.5.2.4 Indicating acceptance of becoming a controller of the collaborative session

4.5.2.4.1 Alternative 1 – Indicating acceptance of becoming a controller using an XML Body

4.5.2.4.1.1 General

Since a request to transfer control of a collaborative session may be combined with a request to Transfer Media, Add a Media or Remove a media the target UE may accept the media operation but be unwilling to accept the transfer of control. In addition the target UE may not support transfer of control so a positive (i.e. 200 (OK) response) to the request to assign control might not definitively indicate acceptance of control. Therefore for at least some alternatives a specific means needs to be defined to enable the target UE to indicate whether it has accepted to become a Controller UE for the collaborative session.

The target Controller UE includes an XML body in a message sent after receiving the request to transfer collaborative session control. The XML body contains a <controlTransfer> element that itself contains a <activeController> element that contains the identity of the UE which was requested to become a controller of the collaborative session if the target UE accepts to become a controller UE otherwise it includes the identity of the current Controller UE. The <activeController> XML element may contain either the GRUU or the public user identity of the Controller UE.

4.5.2.4.1.2 Alternative 1A – Indicating acceptance of becoming a controller using an XML Body in SIP 200 (OK) response

When responding to a request to become a controller UE the UE indicates that it accepts to become the controller UE by sending a SIP 200 (OK) response to the SCC AS including in the SIP 200 (OK) response's body an application/vnd.3gpp.iut+xml MIME body according to the IUT transfer feature XML schema defined in annex D.2 containing the <controlTransfer> XML element with the URI of the controllee UE in the <activeController> element.

> NOTE: The SIP URI of the controllee UE needs to be a GRUU if the controllee UE and any other UEs share the same public user identity.

4.5.2.4.1.3 Alternative 1B – Indicating acceptance of becoming a controller using an XML Body in SIP INFO request

To indicate that the controllee UE accepts to become the controller UE it sends a SIP INFO request to the SCC AS including in the SIP INFO request's body a list of SIP URIs including the SIP URI of the controllee UE.

4.5.2.4.2 Alternative 2 – Indicating acceptance of becoming a controller using a SIP header field

This is the same header field as the header field defined in subclause 4.5.2.2.3 except that this header field is included in the response to the request that the UE become a controller of the collaborative session.

4.5.2.4.3 Alternative 3 – Indicating acceptance of becoming a controller using a new feature tag

The UE includes a new media feature tag "g.3gpp current-iut-controller" in the Contact header of the response to the request to transfer control to indicate that the UE is a controller for the collaborative session. The new feature tag has have values of "active" and "passive" where "active" indicates that a UE is currently an active controller for the collaborative session and "passive" indicates that the UE is not an active controller for the collaborative session but is willing to become an active controller for the collaborative session

NOTE: The existing g.3gpp iut-controller media feature tag cannot be used for this as it is possible in release 9 for non active controller UEs to include this media feature tag in a response.

4.5.2.5 Informing that another UE has become a controller of the collaborative session

4.5.2.5.1 Alternative 1 – Informing that another UE has become a controller UE using an XML Body

4.5.2.5.1.1 General

The SCC AS includes an XML body in the request to transfer collaborative session control. The XML body contains a <controlTransfer> element that itself contains a <activeController> element that contains the identity of the UE which was requested to become a controller of the collaborative session if the target UE accepts to become a controller UE otherwise it includes the identity of the current Controller UE. The <activeController> XML element may contain either the GRUU or the public user identity of the Controller UE.

4.5.2.5.1.2 Alternative 1A - Informing that another UE has become a controller UE using SIP INFO

For informing that another Controller UE has become a controller of the collaborative session the SCC AS sends a SIP INFO method to the UE that requested the assignment of the new controller UE..

The SIP INFO method includes in the body an Info Package containing the <controlTransfer> element that itself contains an <activeController> element from subclause 4.5.2.4.2.1 that identifies the Controller UE that is the controller of the collaborative session.

To clearly indicate the purpose of the SIP INFO request, the Info Package mechanism is being utilized according to draft-ietf-sipcore-info-events [14]. The purpose is indicated by the Info-Package header field value "collaborativeSessionControl".

4.5.2.5.1.3 Alternative 1B - Informing that another UE has become a controller UE using a new Event Package

For informing that another Controller UE the UE that sent the request to transfer control subscribes to the IUT-Controller Event Package. The SCC AS sends a SIP NOTIFY request to the UE that requested the assignment of the new controller UE..

The SIP NOTIFY request includes in the body the IUT-Controller Event Package containing <controlTransfer> element that itself contains an <activeController> XML element from subclause 4.5.2.4.2.1 that identifies the Controller UE that is the controller of the collaborative session.

NOTE: The IUT controller Event Package would need to be defined in an IETF internet draft.

4.5.2.5.2 Alternative 2 – Informing that another UE has become a controller UE using a SIP header field

This is the same header field as the header field defined in subclause 4.5.2.2.3 except that this header field is included in the SIP NOTIFY request (e.g. SIP NOTIFY for the refer package or dialog events package) that is sent to the imitator of the transfer of control of the collaborative session.

4.5.2.5.3 Alternative 3 – Informing that another UE has become a controller UE using a SIPfrag in an events package

4.5.2.5.3.1 Alternative 3A - Informing that another UE has become a controller UE using a SIPfrag of the XML body in the response

This alternative is aligned with Alternative 1 in subclause 4.5.2.4.1. In this case the XML body in the response is included in a SIPfrag in the SIP NOTIFY of the refer events package.

4.5.2.5.3.2 Alternative 3B - Informing that another UE has become a controller UE using a SIPfrag of the new header field

This alternative is aligned with Alternative 2 in subclause 4.5.2.4.2. In this case the new SIP header field in the response is included in a SIPfrag in the SIP NOTIFY of the refer events package.

4.5.2.5.3.3 Alternative 3C - Informing that another UE has become a controller UE using a SIPfrag of a feature tag in the Contact header field

This alternative is aligned with Alternative 3 in subclause 4.5.2.4.3. In this case the new feature tag in the Contact header field in the response is included in a SIPfrag in the SIP NOTIFY of the refer events package.

4.5.3 Identified issues and advantages for each alternative

Editor's Note: This subclause will discuss issues and advantages for each alternative

4.5.4 Call flows

4.5.4.1 Indicating whether Controller UE wishes to remain a controller of the collaborative Session

4.5.4.1.1 Alternative 1 – Indicating whether Controller UE wishes to remain a controller of the collaborative Session using the iut-controller media feature tag
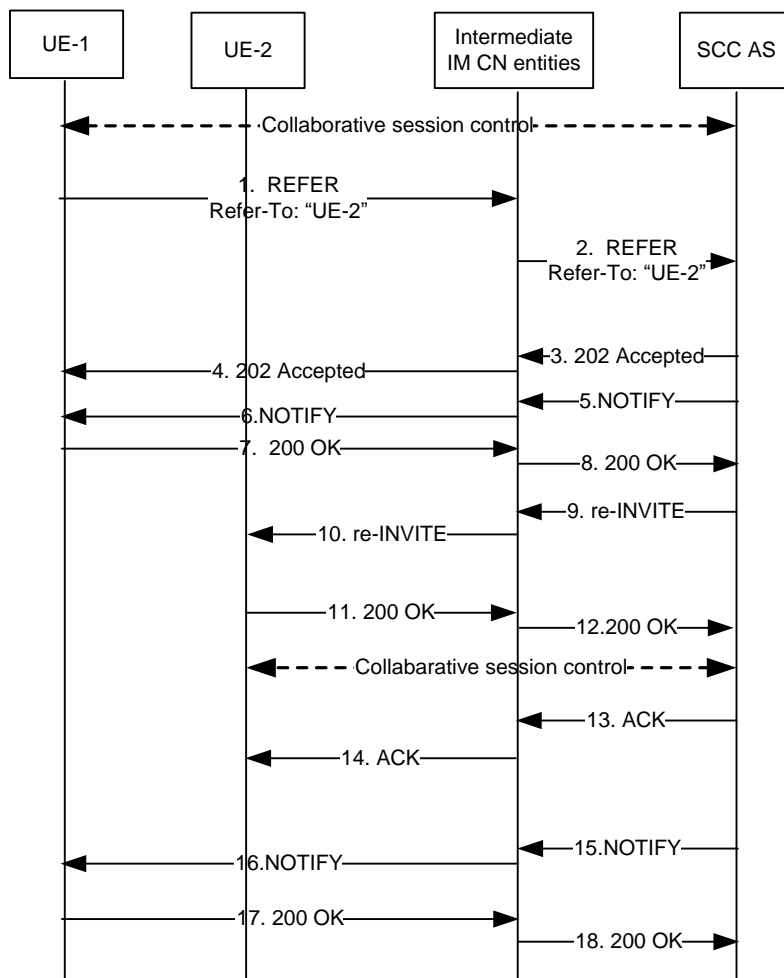
NOTE: For clarity, the SIP 100 (Trying) responses are not shown in the signalling flow.

Figure 4.5.4.1.1-1: Signalling flow for collaborative session controller transfer by SIP REFER

1-2. SIP REFER request (controller UE to intermediate IM CN subsystem entities) – see example in table 4.5.4.1.1-1

It is assumed that UE-1 and UE-2 have the controller UE functionality. The controller UE wants to transfer control of the collaborative session control to UE-2.

UE-1 sends a SIP REFER request to the SCC AS containing in the Refer-To header a SIP URI containing:

i) The GRUU of UE 2

ii) A "body" URI header field containing SDP media lines for the media types for the collaborative session with those media types on other UEs having their port numbers set to zero and others that terminate on UE2 to their actual port numbers (or the reserved port number '9' if a media is being added to UE-2).

iii) An Accept-Contact header field containing the g.3gpp.iut-controller media feature tag along with the parameters require and explicit to indicate that UE-2 is requested to become a controller for the collaborative session

UE-1 does not include the g.3gpp.iut-controller media feature tag in the Contact header field of the SIP REFER request as it is indicating to the SCC-AS that it is transferring control of the collaborative session to UE-2.

Table 4.5.4.1.1-1: SIP REFER request (UE-1 to SCC AS)

```
REFER sip:interUEtransfer@example.net SIP/2.0
Via:
To: sip:interUEtransfer@example.net
From: sip:user1_public1@home1.net;tag =13579
Call-ID: cb03a0s09a2sdfglkj490333
CSeq: 93809824 REFER
Max-Forwards: 70
P-Preferred-Identity: "John Doe" <sip:user1_public1@home1.net>
Refer-To: <sip:user2_public2@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-a762-00a0c91e6bf6?
    Accept-Contact="*;+g.3gpp.iut-controller;require;explicit"&body=
    m%3Daudio%200%20RTP%2FAVP%97%0Dm%3Dvideo%203002%20RTP%2FAVP%2098%2099>
Require: target-dialog
Target-dialog: cb03a0s09a2sdfglkj13579;to-tag=abcdef;from-tag=123456
Referred-By: sip:user1_public1@home1.net
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz>
Accept: message/sipfrag
```

3-4. SIP 202 (Accepted) response

The SCC-AS sends a SIP 202 (Accepted) response to the controller UE-1 as response to the SIP REFER request

5-6. SIP NOTIFY request (SCC AS to UE-1 through intermediate IM CN subsystem entities)-

The SCC-AS sends a SIP NOTIFY request to UE-1 to notify implicit subscription to the SIP REFER request results..

7-8. SIP 200 (OK) response (UE-1 to SCC-AS through intermediate IM CN subsystem entities)

The controller UE, UE-1, acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC AS.

9. SIP re-INVITE request (SCC AS to intermediate IM CN subsystem entities) - see example in table 4.5.4.1.1-9

The SCC AS sends a SIP re-INVITE request towards UE-2 including the Accept-Contact header field containing the g.3gpp.iut-controller media feature tag and the parameters require and explicit from the URI in the Refer-To header field from the SIP REFER request.

Table 4.5.4.1.1-9: SIP re-INVITE request (SCC-AS to IM CN subsystem entities)

```
INVITE sip:user2_public1@home1.net;gr=urn:uuid:f 81d4fae-7dec-11d0-a765-00a0c91e6bf6 SIP/2.0
Via:
Route:
To: sip:user2_public1@home1.net;abcdef
From: sip:user3_public3@home3.net;tag=123456
Call-ID:
CSeq:
Max-Forwards:
Accept-Contact:*;+g.3gpp.iut-controller;require;explicit
Require:
Referred-By: sip:user1_public1@home1.net
Contact: sip:user3_public3@home3.net;gr=urn:uuid:f81d4fae-17oct-11a1-a678-0054c91eabcd
Allow:
Accept: application/vnd.3gpp.iut+xml
Content-Type=application/sdp
Content-Length: {...}

v=0
o=- 1027933615 1027933615 IN IP4 123.112.67.87
s=-
c=IN IP4 123.112.67.87
t=0 0
m=audio 0 RTP/AVP 97
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

10. SIP re-INVITE request (intermediate IM CN subsystem entities to UE-2)

11-12. SIP 200 (OK) response (UE-2 to SCC AS through intermediate IM CN subsystem entities)

UE-2 accepts the transfer of control and indicates this by including a g.3gpp.current-iut-controller media feature tag set to Active in the SIP 200 (OK) response it sends to the SCC AS.

Table 4.5-4.1.1-11: SIP 200 (OK) response (UE-2 to SCC-AS)

```
SIP/2.0 200 OK
Via:
To: sip:user1_public2@home1.net;tag=xyzwv
From: sip:interUEtransfer@example.net; tag = 12486
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: sip:user1_public2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6;+g.3gpp
    current-iut-controller=Active
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 145.23.77.88
s=-
c=145.23.77.88
t=0 0
m=audio 0 RTP/AVP 97
m=video 1302 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

13-14. SIP ACK request (from SCC-AS to UE-2)

15-16. SIP NOTIFY request (SCC-AS to UE-1)-see example table 4.5.4.1.1-15

The SCC AS sends a SIP NOTIFY request to the controller UE, UE-1 to inform about the success status of the control transfer. The body of the SIP NOTIFY request contains a SIPfrag including the Contact header field

containing the g.3gpp.current-iut-controller media feature tag set to Active from the received SIP 200 (OK) response from UE-2

Table 4.5-4.1.1-15: SIP NOTIFY request (SCC AS to UE-1)

```
NOTIFY sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz SIP/2.0
Via:
To: sip:user1_public1@home1.net;tag = 13579
From: sip:interUEtransfer@example.net;tag=2255
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Event: refer
Subscription-State:terminated; reason=noresource
Content-Type: message/sipfrag ;version=2.0
Content-Length: (…)

SIP/2.0 200 OK
Content-Type=application/sdp
Contact: sip:user1_public2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6;+g.3gpp
     current-iut-controller=Active

v=0
s=-
m=audio 0 RTP/AVP 97
m=video 1302 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

17-18. SIP 200 (OK) response (UE-1 to SCC AS)

The controller UE, UE-1 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC AS.

4.5.4.1.2   Alternative 2 – Indicating whether Controller UE wishes to remain a controller of the collaborative Session using an XML body

4.5.4.1.2.1   General

4.5.4.1.2.2   Alternative 2A - Indicating whether Controller UE wishes to remain a controller of the collaborative Session using SIP INFO request

The flow for this alternative is shown in subclause 4.5.4.2.2.2.

In steps 2-3. a SIP INFO request is sent from the controller UE, UE-1 to the SCC AS. Instead of sending the SIP INFO request as shown in table 4.5.4.2.2-2, a SIP INFO request as shown in table 4.5.4.2.2-2, but listing the SIP URI of UE-1 instead of the SIP URI of UE-2 is being sent. The listed SIP URI of UE-1 indicates that the controller UE wishes to remain the controller UE.

4.5.4.2   Identifying that another UE is requested to become a controller of the collaborative session

4.5.4.2.1   Alternative 1 - controller UE transfer by SIP REFER with method=REFER

The following flow depicts the procedure for control transfer from UE-1 to UE-2 using SIP REFER:
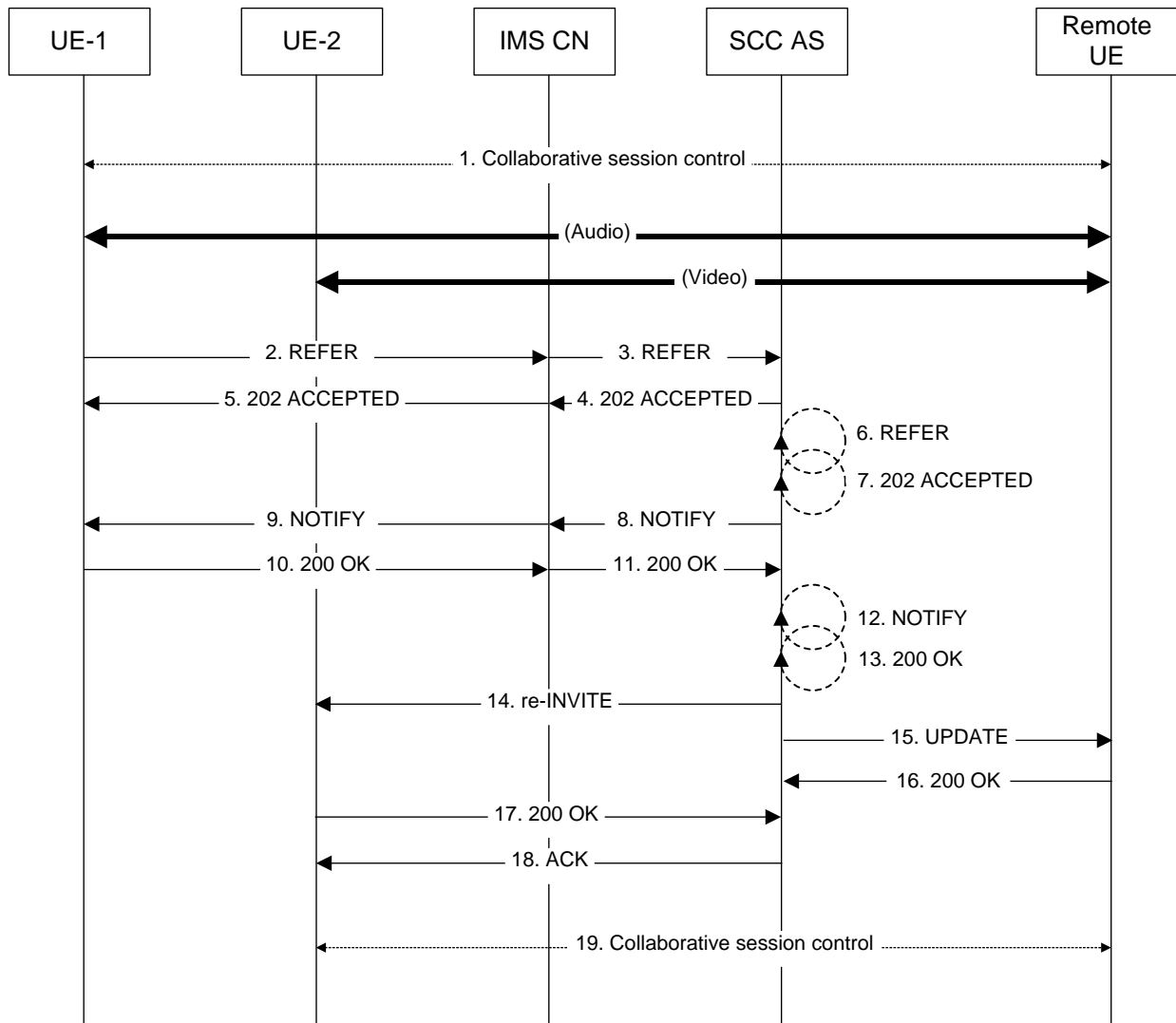
Figure 4.5.4.2.1-1: Signalling flow for collaborative session controller transfer by SIP REFER

1. Collaborative session controlled by UE-1

A collaborative session is established between UE-1 and UE-2 and the remote UE with UE-1 acting as the controller UE and UE-2 acting as a controllee UE. Each UE has a media flow with the remote UE.

2-3. SIP REFER request (UE-1 to SCC AS) - see example in table 4.5.4.1-2

Table 4.5.4.2.1-2: SIP REFER request (UE-1 to SCC-AS)

```
REFER sip:interUEtransfer@example.net SIP/2.0
Via:
To: sip:interUEtransfer@example.net
From: sip:user1_public1@home1.net; tag=13579
Call-ID: cb03a0s09a2sdfglkj490333
CSeq: 93809824 REFER
Max-Forwards: 70
P-Preferred-Identity:
Refer-To: <sip:interUEtransfer@example.net;method=REFER?Request-
   URI=%3CinterUEtransfer@example.net%3E%3BTo=%3CinterUEtransfer%40example.net%3E%3BFrom=%3Csi
   p:user1_public2%40home1.net%3Bgr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6%3E%3BRefer-
   To=%3Csip:user1_public2@home1.net%3Bgr=urn:uuid:f81d4fae-7dec-11d0-a765-
   00a0c91e6bf6%3BContent-Type=multipart%2Fmixed%3Bboundary%3Dboundary42?body=%0D--
   boundary42%0DContent-
```

```
    Type%3Aapplication%2Fsdp%0Dm%3Daudio%200%20RTP%2FAVP%2097%0Dm%3Dvideo%203002%20RTP%2FAVP%20
    98%2099%0D%0D--boundary42%0DContent-
    Type%3Aapplication%2Fvnd.3gpp.iut+xml%0D%3CcontrolTransfer%3E%3CtargetController%3D%3Csip%3
    Auser1_public2@home1.net%3Bgr%3Durn%3Auuid%3Af81d4fae-7dec-11d0-a765-
    00a0c91e6bf6%3E%2F%3E%3C %2FControlTansfer%3E%3E%3BTarget-
    dialog=cb03a0s09a2sdfglkj321576%3Bremote-tag=abcdef%3Blocal-tag=123456>
Require: target-dialog
Target-dialog: cb03a0s09a2sdfglkj321576;remote-tag=abcdef;local-tag=123456
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-
    00a0c91ewxyz>;+g.3gpp.iut-controller
Accept: application/sdp, message/sipfrag
Content-Length: 0
```

The SIP REFER request is targeted at the SCC AS. Through the request the SCC AS is requested to issue a SIP REFER request as if it would have been sent from UE-2 (From header field of nested REFER request in Refer-To header field is set to UE-2's SIP URI) to the SCC AS (Request-URI of nested REFER request is set to SCC AS SIP URI).

4-5.   SIP 202 (ACCEPTED) response to the SIP REFER request (SCC AS to UE-1)

6. SIP REFER request (SCC AS to SCC AS)

The SCC AS sends the SIP REFER request specified in the Refer-To header of the SIP REFER request received from UE-1 to the SCC AS.

7. SIP 202 (Accepted) response (SCC AS to SCC AS)

8-9.   SIP NOTIFY request (SCC AS to UE-1)

The SCC AS generates a SIP NOTIFY request and sends it to UE-1 to inform about the result of the SIP REFER request.

10-11. SIP 200 (OK) response to the SIP NOTIFY request (UE-1 to SCC AS)

12. SIP NOTIFY request (SCC AS to SCC AS)

The SCC AS informs the SCC AS that the action triggered by the SIP REFER request was successfully completed.

13. SIP 200 (OK) response to SIP NOTIFY request (SCC AS to SCC AS)

The SCC AS confirms the SIP NOTIFY request by sending a SIP 200 (OK) response to the SIP NOTIFY request.

NOTE: In an actual implementation the SCC AS might not actually send the messages of steps 6, 7, 12 and 13 to itself but just behave as if it had sent and received the messages.

14. SIP re-INVITE request (SCC AS to UE-2) - see example in table 4.5.4.2.1-14

The SCC AS sends a SIP re-INVITE request towards the controllee UE (UE-2). The re-INVITE request contains an XML body indicating to UE-2 that UE-2 is requested to assume the controller role by including the <controlTransfer> XML element with the GRUU of UE-2 in the <activeController> element.

Table 4.5.4.2.1-14: SIP re-INVITE request (SCC-AS to UE-2)

```
INVITE sip:user1_public2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6 SIP/2.0
Via:
Route:
To: sip:user1_public2@home1.net;123456
From: sip:interUEtransfer@example.net; tag = 12486
Call-ID:
CSeq:
Max-Forwards:
Required:
Referred-By: sip:user1_public2@home1.net
Contact: sip:sccas1.home1.example.net; tag = 12486
Allow:
Accept: application/vnd.3gpp.iut+xml
Content-Length: …
Content-Type: multipart/mixed; boundary=boundary42

--boundary42
Content-Type: application/sdp
m=audio 0 RTP/AVP 97
m=video 3002 RTP/AVP 98 99

--boundary42
Content-Type: application/vnd.3gpp.iut+xml

<controlTransfer>
 <targetController=<sip:user1_public2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-
   00a0c91e6bf6>/>
</ControlTansfer>
```

15. **SIP UPDATE request (SCC AS to UE-3)**

The SCC AS sends a SIP UPDATE request to UE-3 with the SDP answers of UE-1 and UE-2.

16. **SIP 200 (OK) response to SIP UPDATE request (UE-3 to SCC AS)**

17. **SIP 200 (OK) response (UE-2 to SCC AS) - see example in table 4.5.4.2.1-17**

UE-2 accepts the transfer of control and indicates this by including an XML body element in the SIP 200 (OK) response it sends to the SCC AS containing the <controlTransfer> XML element with the GRUU of UE-2 in the <activeController> element.

Table 4.5.4.2.1-17: SIP 200 (OK) response (UE-2 to SCC-AS)

```
SIP/2.0 200 OK
Via:
To: sip:user1_public2@home1.net;abcdef
From: sip:interUEtransfer@example.net; tag = 12486
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: sip:user1_public2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6
Allow:
Content-Length: …
Content-Type: multipart/mixed; boundary=boundary42

--boundary42
Content-Type: application/sdp
m=audio 0 RTP/AVP 97
m=video 3002 RTP/AVP 98 99

--boundary42
Content-Type: application/vnd.3gpp.iut+xml

<controlTransfer>
 <activeController=<sip: user1_public2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-
   00a0c91e6bf6>/>
</ControlTansfer>
```

18. **SIP ACK request (SCC-AS to UE-2)**

4.5.4.2.2 Alternative 2 - Identifying a new controller UE using an XML Body

4.5.4.2.2.1 General

4.5.4.2.2.2 Alternative 2A - Identifying a new controller UE transfer by using SIP INFO

The following flow depicts the procedure for control transfer from UE-1 to UE-2 using SIP INFO:
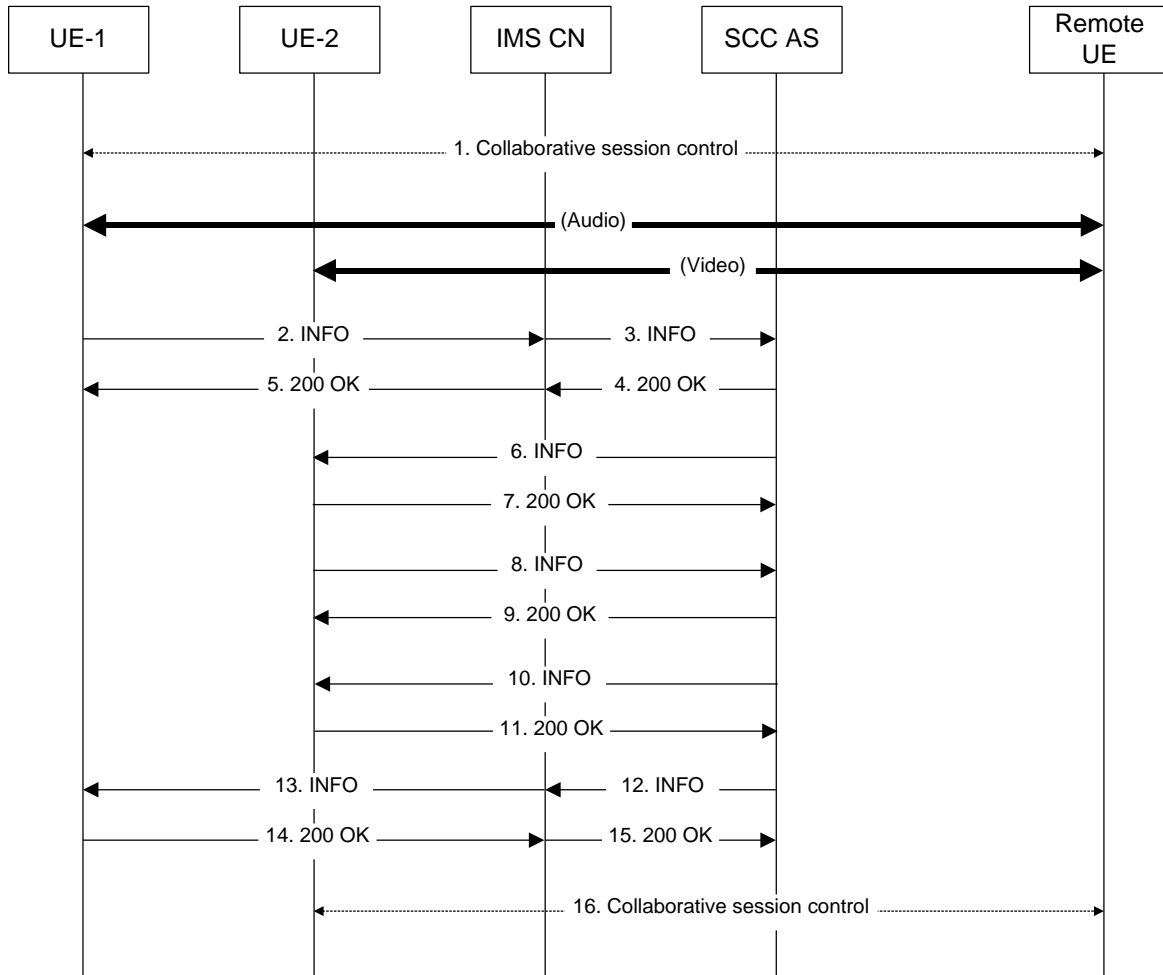
Figure 4.5.4.2.2.2-1: Signalling flow for collaborative session controller transfer by SIP INFO

1. Collaborative session controlled by UE-1

A collaborative session is established between UE-1 and UE-2 and the remote UE with UE-1 acting as the controller UE and UE-2 acting as a Controllee UE. Each UE has a media flow with the remote UE.

2-3. SIP INFO request (UE-1 to SCC AS) - see example in table 4.5.4.2.2-2

Table 4.5.4.2.2.2-2: SIP INFO request (UE-1 to SCC-AS)

```
INFO sip:interUEtransfer@example.net SIP/2.0
Via:
To: sip:interUEtransfer@example.net
From: sip:user1_public1@home1.net; tag=13579
Call-ID: cb03a0s09a2sdfglkj490333
CSeq: 93809824 INFO
Max-Forwards: 70
P-Preferred-Identity:
Require: target-dialog
Target-dialog: cb03a0s09a2sdfglkj321576;remote-tag=abcdef;local-tag=123456
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-
    00a0c91ewxyz>;+g.3gpp.iut-controller
```

```
Accept: application/sdp, message/sipfrag
Info-Package: collaborativeSessionControl
Content-Type: application/vnd.3gpp.iut+xml
Content-Disposition: Info-Package
Content-Length: ...

<?xml version="1.0" encoding="UTF-8" ?>
<controlTransfer>
   <targetController=<sip:user1_public2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-
   00a0c91e6bf6>/>
</ControlTansfer>
```

In the SIP INFO request an XML body according to the IUT transfer feature XML schema defined in annex A.4 is being included containing a <controlTransfer> element that contains a <targetController> element identifying UE-2 to become a controller of the collaborative session. UE-1 is not being listed in the SIP INFO request's body indicating that UE-1 is not requested to remain controller UE.

To indicate the (controller transfer) purpose of the SIP INFO request, the Info Package mechanism is being utilized. The controller transfer purpose is indicated by the Info-Package header field value "collaborativeSessionControl".

Editor's note: The negotiation of the Info Package needs to be specified.

4-5.   SIP 200 (OK) response to the SIP INFO request (SCC AS to UE-1)

6. SIP INFO request (SCC AS to UE-2)

Upon receiving the SIP REFER request the SCC AS asks UE-2 to assume the controller role by sending a SIP INFO request to UE-2.

To indicate the (controller transfer) purpose of the SIP INFO request, the Info Package mechanism is being utilized. The controller transfer purpose is indicated by the Info-Package header field value "collaborativeSessionControl".

Editor's note: The Info Package name to be used and its detailed specification is FFS.

7. SIP 200 (OK) response to SIP INFO request (UE-2 to SCC AS)

8. SIP INFO request (UE-2 to SCC AS)

UE-2 confirms the collaborative session control transfer request by sending a SIP 200 (OK) response to the SIP INFO request to the SCC AS.

To indicate the (controller transfer) purpose of the SIP INFO request, the Info Package mechanism is being utilized. The controller transfer purpose is indicated by the Info-Package header field value "collaborativeSessionControl".

9. SIP 200 (OK) response to SIP INFO request (SCC AS to UE-2)

10. SIP INFO request (SCC AS to UE-2)

Upon receiving the confirmation from UE-2 the SCC AS informs UE-2 about the new controller assignment by sending a SIP INFO request to UE-2.

To indicate the purpose of the SIP INFO request, the Info Package mechanism is being utilized. The controller transfer purpose is indicated by the Info-Package header field value "collaborativeSessionControl".

11. SIP 200 (OK) response to SIP INFO request (UE-2 to SCC AS)

12-13. SIP INFO request (SCC AS to UE-1)

The SCC AS sends another SIP INFO request back to UE-1 that requested the controller transfer in order to inform UE-1 about the operation's outcome. The SIP INFO also uses the "collaborativeSessionControl" Info Package and lists the new controller UE in its message body.

14-15. SIP 200 (OK) response to the SIP INFO request (UE-1 to SCC AS)

16. Collaborative session controlled by UE-2

4.5.4.2.2.3 Alternative 2B - Identifying a new controller UE using an Event Package

4.5.4.2.2.4 Alternative 2C - Identifying a new controller UE using XML embedded in Refer-To URI
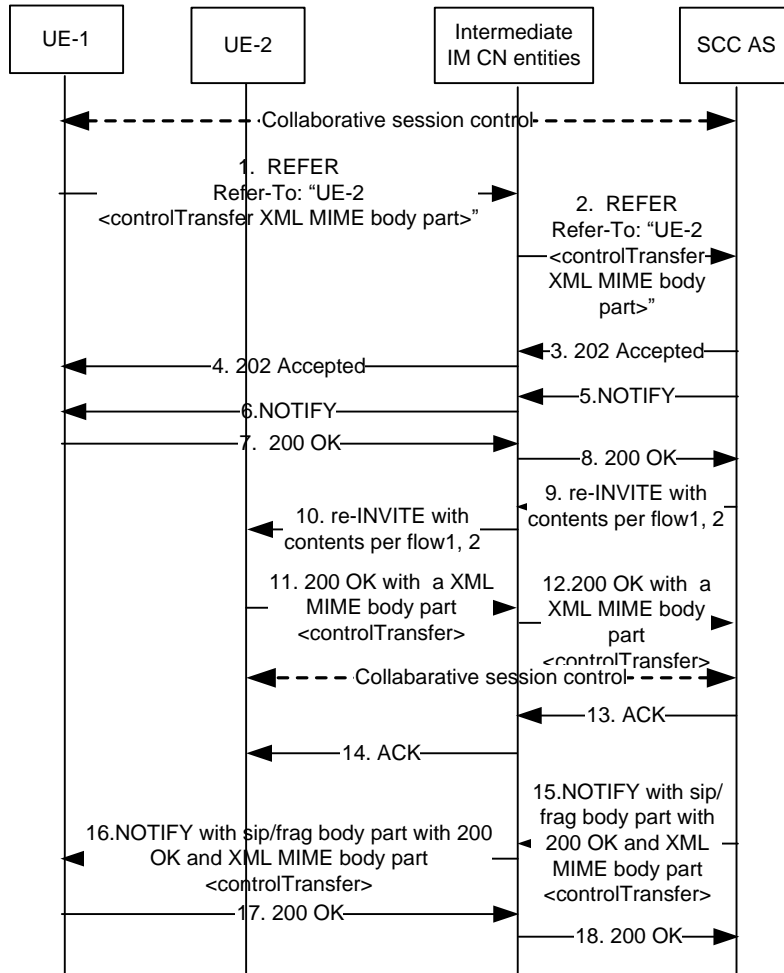
NOTE: For clarity, the SIP 100 (Trying) responses are not shown in the signalling flow.

Figure 4.5.4.2.2.4-1:Controller UE remove media at the controllee UE

1-2. SIP REFER request (controller UE to intermediate IM CN subsystem entities) – see example in table 4.5.4.2.2.4-1

It is assumed that UE-1 and UE-2 have the controller UE functionality. The controller UE wants to transfer control of the collaborative session control to UE-2.

UE-1 sends a SIP REFER request to the SCC AS containing in the Refer-To header a SIP URI containing:

i) The GRUU of UE 2

ii) A "body" URI header field containing the <controlTransfer> XML element including the <targetController> element set to the GRUU of UE-2.

iii) A Content-Type header field containing the application/vnd.3gpp.iut+xml MIME type for the XML body along with the handling parameter set to optional..

UE-1 does not include the g.3gpp.iut-controller media feature tag in the Contact header field of the SIP REFER request as it is indicating to the SCC-AS that it is transferring control of the collaborative session to UE-2.

Table 4.5.4.2.2.4-1: SIP REFER request (UE-1 to SCC AS)

```
REFER sip:interUEtransfer@example.net SIP/2.0
Via:
To: sip:interUEtransfer@example.net
From: sip:user1_public1@home1.net;tag =13579
Call-ID: cb03a0s09a2sdfglkj490333
CSeq: 93809824 REFER
Max-Forwards: 70
P-Preferred-Identity: "John Doe" <sip:user1_public1@home1.net>
Refer-To: <sip:user2_public2@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-a762-00a0c91e6bf6?
    Content-Type="application/vnd.3gpp.iut+xml";handling=optional & body=<controlTransfer>
    <targetController=<sip: user2_public2@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-a762-
    00a0c91e6bf6>/> </ControlTansfer>>
Require: target-dialog
Target-dialog: cb03a0s09a2sdfglkj13579;to-tag=abcdef;from-tag=123456
Referred-By: sip:user1_public1@home1.net
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz>
Accept: message/sipfrag,application/vnd.3gpp.iut+xml
Content-Length: 0
```

3-4.   SIP 202 (Accepted) response

The SCC-AS sends a SIP 202 (Accepted) response to the controller UE-1 as response to the SIP REFER request.

5-6.   SIP NOTIFY request (SCC AS to UE-1 through intermediate IM CN subsystem entities)-

The SCC-AS sends a SIP NOTIFY request to UE-1 to notify implicit subscription to the SIP REFER request results..

7-8.   SIP 200 (OK) response (UE-1 to SCC-AS through intermediate IM CN subsystem entities)

The controller UE, UE-1, acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC AS.

9. SIP re-INVITE request (SCC AS to intermediate IM CN subsystem entities) - see example in table 4.5.4.2.2.4-9

The SCC AS sends a SIP re-INVITE request towards the Controllee UE (UE-2). The re-INVITE request contains the XML body from the URI in the Refer-To header field from the SIP REFER request.

Table 4.5.4.2.2.4-9: SIP re-INVITE request (SCC-AS to IM CN subsystem entities)

```
INVITE sip:user2_public1@home1.net;gr=urn:uuid:f 81d4fae-7dec-11d0-a765-00a0c91e6bf6 SIP/2.0
Via:
Route:
To: sip:user2_public1@home1.net;abcdef
From: sip:user3_public3@home3.net;tag=123456
Call-ID:
CSeq:
Max-Forwards:
Require:
Referred-By: sip:user1_public1@home1.net
Contact: sip:user3_public3@home3.net;gr=urn:uuid:f81d4fae-17oct-11a1-a678-0054c91eabcd
Allow:
Accept: application/vnd.3gpp.iut+xml
Content-Length: {...}
Content-Type=application/vnd.3gpp.iut+xml;handling=optional

<controlTransfer>
 <targetController=<sip:user2_public2@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-a762-
    00a0c91e6bf6>/>
</ControlTansfer>
```

10. SIP re-INVITE request (intermediate IM CN subsystem entities to UE-2)

11-12. SIP 200 (OK) response (UE-2 to SCC AS through intermediate IM CN subsystem entities)

UE-2 accepts the transfer of control and indicates this by including an XML body element in the SIP 200 (OK) response it sends to the SCC AS containing the <controlTransfer> XML element with the GRUU of UE-2 in the <activedController>.

Table 4.5.4.2.2.4-11: SIP 200 (OK) response (UE-2 to SCC-AS)

```
SIP/2.0 200 OK
Via:
To: sip:user1_public2@home1.net;tag=xyzwv
From: sip:interUEtransfer@example.net; tag = 12486
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: sip:user1_public2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6
Allow:
Content-Type: application/sdp
Content-Length: (…)
Content-Type=application/vnd.3gpp.iut+xml

controlTransfer>
 <activeController=<sip:user2_public2@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-a762-
    00a0c91e6bf6>/>
</ControlTansfer
```

13-14. SIP ACK request (from SCC-AS to UE-2)

15-16. SIP NOTIFY request (SCC-AS to UE-1)-see example table 4.5.4.2.2.4-15

The SCC AS sends a SIP NOTIFY request to the controller UE, UE-1 to inform about the success status of the control transfer. The body of the SIP NOTIFY request contains a SIPfrag including the Content-Type header field containing the application/vnd.3gpp.iut+xml MIME type and the XML body from the received SIP 200 (OK) response from UE-2

Table 4.5.4.2.2.4-15: SIP NOTIFY request (SCC AS to UE-1)

```
NOTIFY sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz SIP/2.0
Via:
To: sip:user1_public1@home1.net;tag = 13579
From: sip:interUEtransfer@example.net;tag=2255
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Event: refer
Subscription-State:terminated; reason=noresource
Content-Type: message/sipfrag ;version=2.0
Content-Length: (…)

SIP/2.0 200 OK
Content-Type=application/vnd.3gpp.iut+xml

controlTransfer>
 <activeController=<sip:user2_public2@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-a762-
    00a0c91e6bf6>/>
</ControlTansfer>
```

17-18. SIP 200 (OK) response (UE-1 to SCC AS)

The controller UE, UE-1 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC AS.

4.5.4.2.3   Alternative 3 - Identifying a new controller UE using a SIP header field

4.5.4.2.4   Alternative 4 - Identifying a new controller UE using Accept-Contact in the Refer-
                   To URI

The flow for this alternative is shown in subclause 4.5.4.1.1.

4.5.4.3   Indicating to another UE that it is requested to become a controller of the collaborative Session

4.5.4.3.1   General

4.5.4.3.2   Alternative 1 – Requesting a UE to become a controller UE using an XML Body

4.5.4.3.2.1   General

4.5.4.3.2.2   Alternative 1A - Assigning a new controller UE using SIP INFO request

The flow for this alternative is shown in subclause 4.5.4.2.2.2.

4.5.4.3.2.3   Alternative 1B - Assigning a new controller UE using an Event Package

4.5.4.3.2.4   Alternative 1C - Assigning a new controller UE using XML Body as a MIME type in the request

The flow for this alternative is shown in subclauses 4.5.4.2.1 and 4.5.4.2.2.4.

4.5.4.3.3   Alternative 2 – Requesting a UE to become a controller UE using a SIP header field

4.5.4.3.4   Alternative 3 – Requesting a UE to become a controller UE using a media feature tag in an Accept-Contact header field

The flow for this alternative is shown in subclause 4.5.4.1.1

4.5.4.4   Indicating acceptance of becoming a controller of the collaborative session

4.5.4.4.1   Alternative 1 – Indicating acceptance of becoming a controller using an XML Body

4.5.4.4.1.1   General

4.5.4.4.1.2   Alternative 1A – Indicating acceptance of becoming a controller using an XML Body in SIP 200 (OK) response

The flow for this alternative is shown in subclauses 4.5.4.2.1 and 4.5.4.2.2.4.

4.5.4.4.1.3   Alternative 1B – Indicating acceptance of becoming a controller using an XML Body in SIP INFO request

The flow for this alternative is shown in subclause 4.5.4.2.2.2.

4.5.4.4.2   Alternative 2 – Indicating acceptance of becoming a controller using a SIP header field

4.5.4.4.3   Alternative 3 – Indicating acceptance of becoming a controller using a new feature tag

The flow for this alternative is shown in subclause 4.5.4.1.1

4.5.4.5   Informing that another UE has become a controller of the collaborative session

4.5.4.5.1   Alternative 1 – Informing that another UE has become a controller UE using an XML Body

4.5.4.5.1.1   General

4.5.4.5.1.2   Alternative 1A - Informing that another UE has become a controller UE using SIP INFO

The flow for this alternative is shown in subclause 4.5.4.2.2.2.

4.5.4.5.1.3   Alternative 1B - Informing that another UE has become a controller UE using a new Event Package

4.5.4.5.2   Alternative 2 – Informing that another UE has become a controller UE using a SIP header field

4.5.4.5.3   Alternative 3 – Informing that another UE has become a controller UE using a SIPfrag in an events package

4.5.4.5.3.1   Alternative 3A - Informing that another UE has become a controller UE using a SIPfrag of the XML body in the response

The flow for this alternative is shown in subclause 4.5.4.2.2.4.

4.5.4.5.3.2   Alternative 3B - Informing that another UE has become a controller UE using a SIPfrag of the new header field

4.5.4.5.3.3   Alternative 3C - Informing that another UE has become a controller UE using a SIPfrag of a feature tag in the Contact header field

The flow for this alternative is shown in subclause 4.5.4.1.1

4.6   Media flows transfer

NOTE: This subclause corresponds to subclauses 6.1.3.5 and 6.1.3.6 of 3GPP TR 23.831 [3]

4.6.1　General

4.6.2　Procedures

4.6.2.1　Media flows transfer initiated by the target UE

4.6.2.1.1　Media flows transfer initiated by a UE not participating in the ongoing collaborative session

4.6.2.1.1.1　Alternative 1 (REFER with media feature tag)

4.6.2.1.1.1.1　Same/Different subscription

4.6.2.1.1.1.1.1　SC UE

For requesting media transfer to the requesting UE (the target UE), the target UE sends a SIP REFER to the controller UE in the ongoing collaborative session with transferred media. The SIP REFER request includes:

NOTE 1: Before requesting media flow transfer, the target UE of media transfer discovers the ongoing collaborative session with transferred media and gets information about its media flows by subscribing to dialog event.

1) the Request-URI set to the SIP URI of the controller UE in the ongoing collaborative session with transferred media;

NOTE 2: The SIP URI of the controller UE needs to be a GRUU if multiple UEs share the same public user identity.

2) The Refer-To header field set as follows:

 a) The SIP URI of the Target UE;

NOTE 3: The SIP URI of Target UE needs to be a GRUU if the Target UE and any other UEs share the same public user identity.

 b) the SIP URI additionally containing the URI header field with the hname "body" containing SDP for the media type for each of the media (m=) lines in the session set as follows:

 - Media lines which are not being transferred with the port numbers set to zero

 - Media lines which are to be transferred containing the port number of the Remote UE;

3) The Accept-Contact header field containing the g.3gpp.iut-xyz media feature tag as described in annex A with explicit and require tags;

4) The Accept header field containing the MIME type "message/sipfrag";

5) The Target-Dialog header field containing the dialog parameters for the dialog of the ongoing collaborative session with the transferred media; and

NOTE 3: The dialog parameters are obtained by subscribing to dialog event package.

6) The Referred-By header field containing a currently registered public user identity of the user.

4.6.2.1.1.1.1.2　SCC AS

On receiving the SIP REFER, the SCC AS requests the controller UE to authorize the pull request or the SCC AS authorizes the request on behalf of the controller UE (e.g. pre-configured).

The SCC AS performs the steps as described in 3GPP TS 24.237 [6], subclause 17.3.1, except that the target UE serves as the controllee UE and the NOTIFY request is sent to target UE instead of controller UE.

4.6.2.1.1.2 Alternative 2 (SIP REFER with method= REFER)

4.6.2.1.1.2.1 Same/Different subscription

4.6.2.1.1.2.1.1 SC UE

The SC UE will perform as described in 3GPP TS 24.237 [6], subclause 16.2.1 except described in this subclause.

For requesting media transfer, the target UE sends a SIP REFER (referred REFER) request to the controller UE. The referred SIP REFER request includes:

NOTE 1: Before requesting media flow transfer, the target UE of media transfer discovers the ongoing collaborative session with transferred media and gets information about its media flows by subscribing to dialog event.

1) the Request-URI set to the SIP URI of the controller UE;

NOTE 2: The SIP URI of the controller UE needs to be a GRUU if the controller UE and any other UEs share the same public user identity.

2) the Refer-To header field set as follows:

   a) the SIP URI of the Inter UE Transfer SCC AS URI

   b) the method parameter set to the REFER; and

   c) the SIP URI additionally containing the following URI header fields:

   - the From header field set to the SIP URI of the controller UE;

   - the To header field set to the Inter UE Transfer SCC AS URI; and

   - the Refer-To header field set as follows:

     i   the SIP URI of the target UE; and

NOTE 3: The SIP URI of the target UE needs to be a GRUU if the target UE and any other UEs share the same public user identity.

     ii   the SIP URI additionally containing the URI header field with the hname "body" containing SDP for the media type for each of the media (m=) lines in the session set as follows:

       o media lines that are not being transferred in ongoing collaborative session with the port number set to zero; and

       o media line(s) that are to be transferred containing the port number for the corresponding media received in the media line of the SDP received during the last successful SDP offer/answer exchange; and

3) the Referred-By header field containing a currently registered public user identity of the user.

On receiving the referred REFER, the controller UE makes the REFER request based on the Refer-To header field and sends the REFER request to SCC AS.

4.6.2.1.1.2.1.2 SCC AS

On receiving the SIP referred REFER request, SCC AS routes the SIP referred REFER to the controller UE.

On receiving the SIP REFER request in the case of same subscription, SCC AS performs the media transfer according to the 3GPP TS 24.237 [6], subclause 16.3.2.

On receiving the SIP REFER request in the case of different subscription, SCC AS performs the media transfer according to the media transfer procedure requested by controller UE as described in the 3GPP TS 24.237 [6], subclause 4.2.2.1.

4.6.2.1.1.3   Alternative 3 (Based on SIP INVITE request)

4.6.2.1.1.3.1   Same/Different subscription

4.6.2.1.1.3.1.1   SC UE

In order to transfer media to itself, the target UE sends a SIP INVITE request to the SCC AS. The SIP INVITE request shall include:

  NOTE 1: Before requesting media flow transfer, the target UE of media transfer discovers the ongoing collaborative session with transferred media and gets information about its media flows by subscribing to dialog event.

  1) the Request-URI set to the SIP URI of the controller UE in the ongoing collaborative session with transferred media;

  NOTE 2: The SIP URI of the controller UE needs to be a GRUU if multiple UEs share the same public user identity.

  2) the Accept-Contact header field containing the g.3gpp.iut-xyz media feature tag as described in annex A with explicit and require tags;

  3) the Target-Dialog header field containing the dialog parameters for the dialog of the ongoing collaborative session with the transferred media; and

  NOTE 3: The dialog parameters are obtained by subscribing to dialog event package.

  4) the SDP information as follows:

    a) for the media component already served by the target UE, include the SDP information from the original session;

    b) for the transferred media component(s), containing the port numbers of the target UE; and

    c) for the media component(s) not transferred from the controller UE, containing the port numbers set to zero.

Upon receiving the SIP 2xx response for the INVITE request from the SCC AS, the UE shall send a SIP ACK request to the SCC AS.

4.6.2.1.1.3.1.2   SCC AS serving the collaborative session

On receiving the SIP INVITE request, the SCC AS requests the controller UE to authorize the pull request or the SCC AS authorizes the request on behalf of the controller UE(e.g. pre-configured).

The SCC AS shall send a SIP re-INVITE request on the dialog for the remote leg to the remote UE containing SDP information as follows:

  1) for the transferred media component(s), set the SDP information as from the SDP offer received in the SIP INVITE request from the target UE; and

  2) for all other media components in the collaborative session, include the SDP information as from the original session to the remote leg.

Upon receiving a SIP 2xx response for the re-INVITE request sent to the remote UE, the SCC AS shall send a SIP ACK request on the remote leg and send a SIP re-INVITE request to the controller UE to remove the media for the transferred media component.

4.6.2.1.1a Media flow transfer initiated by a UE not participating in the ongoing collaborative session - media on controllee UE

4.6.2.1.1a.1 Alternative 1 (SIP REFER with media feature tag)

4.6.2.1.1a.1.1 Same/Different subscription

4.6.2.1.1a.1.1.1 SC UE

The procedures of the SC UE are identical as described in subclause 4.6.2.1.1.1.1.1.

4.6.2.1.1a.1.1.2 SCC AS

On receiving the SIP REFER request, the SCC AS requests the controller UE to authorize the pull request or the SCC AS authorizes the request on behalf of the controller UE (e.g. pre-configured).

The SCC AS performs the steps as described in 3GPP TS 24.237 [6], subclause 17.3.2, except that:

- the SCC AS sends a SIP INVITE request to the controllee UE to which the media component(s) is to be transferred (i.e. the target UE), instead of a SIP re-INVITE request;

- the SCC AS sends the SIP NOTIFY request to the target UE instead of the controller UE.

4.6.2.1.1a.2 Alternative 2 (SIP REFER with method= REFER)

4.6.2.1.1a.2.1 Same/Different subscription

4.6.2.1.1a.2.1.1 SC UE

The procedures of the SC UE are identical as described in subclause 4.6.2.1.1.2.1.1.

4.6.2.1.1a.2.1.2 SCC AS

On receiving the SIP REFER request from the controller UE, SCC AS performs the media transfer according to the 3GPP TS 24.237 [6], subclause 17.3.2, except that:

- the SCC AS sends a SIP INVITE request to the controllee UE to which the media component(s) is to be transferred (i.e. the target UE), instead of a SIP re-INVITE request;

- the SCC AS also sends the SIP NOTIFY request to the target UE, as subscribed by the SIP REFER request from the target UE.

4.6.2.1.1a.3 Alternative 3 (Based on SIP INVITE request)

4.6.2.1.1a.3.1 Same/Different subscription

4.6.2.1.1a.3.1.1 SC UE

The procedures of the SC UE are identical as described in subclause 4.6.2.1.1.3.1.1.

4.6.2.1.1a.3.1.2 SCC AS

On receiving the SIP INVITE request, the SCC AS requests the controller UE to authorize the pull request or the SCC AS authorizes the request on behalf of UE-1(e.g. pre-configured).

If the SIP INVITE request is authorized, the SCC AS shall send a SIP re-INVITE request on the dialog for the remote leg to the remote UE containing SDP information as follows:

1) for the transferred media component(s), set the SDP information as from the SDP offer received in the SIP INVITE request from the target UE; and

2) for all other media components in the collaborative session, include the SDP information as from the original session to the remote leg.

Upon receiving a SIP 2xx response for the re-INVITE request sent to the remote UE, the SCC AS shall:

1) send a SIP ACK request on the remote leg;

2) if the transferred media component was the only media component active at the controllee UE from which the media component was transferred, send a SIP BYE request to the controllee UE from which the media was transferred; or

3) if after the transfer of the media component the controllee UE from which the media was transferred still has other media components within the collaborative session, send a SIP re-INVITE request to the controllee UE from which the media component was transferred, following the procedures described in 3GPP TS 24.229 [2] and set the port value of the associated media descriptions (m) for the transferred media to 0.

Upon receiving a SIP 200 (OK) response with the SDP answer on the remote leg, the SCC AS shall send a SIP ACK request on the remote leg.

4.6.2.1.2 Media flows transfer initiated when no collaborative session has been established

4.6.2.1.2.1 Alternative 1 (REFER with media feature tag)

4.6.2.1.2.1.1 Same/Different subscription

4.6.2.1.2.1.1.1 SC UE

To transfer a media component when no collaborative session has been established, the Target UE shall send a SIP REFER request to the SCC AS as specified in IETF RFC 3515 [8] and include:

NOTE 1: Before requesting media flow transfer, the target UE of media transfer discovers the ongoing session with transferred media and gets information about its media flow by subscribing to dialog event.

1) the Request-URI set to the SIP URI of the local UE that currently holds the media for the session;

NOTE 2: The SIP URI of the local UE need to be a GRUU if multiple UEs share the same public user identity.

2) the Refer-To header field set as follows:

   a) the SIP URI of the Target UE to which the media m-lines are to be transferred; and

NOTE 3: The SIP URI of Target UE needs to be a GRUU if the Target UE and any other UEs share the same public user identity.

   b) the SIP URI additionally containing the URI header field with the hname "body" containing SDP for the media type for each of the media (m=) lines in the session set as follows:

   - media lines which are not being transferred with the port numbers set to zero; and

   - media lines which are to be transferred containing the port numbers of the remote UE.

3) an Accept-Contact header field containing the g.3gpp.iut-xyz media feature tag as described in annex A with explicit and require tags;

4) an Accept header field containing the MIME type "message/sipfrag";

5) the Target-Dialog header field containing the dialog parameters for the dialog of the existing session; and

NOTE 4: The dialog parameters are obtained by subscribing to dialog event package.

6) the Referred-By header field containing a currently registered public user identity of the user.

4.6.2.1.2.1.1.2 SCC AS

On receiving the SIP REFER, the SCC AS requests the local UE to authorize the pull request or the SCC AS authorizes the request on behalf of local UE (e.g. pre-configured).

In the case of same subscription, the SCC AS performs the steps as described in 3GPP TS 24.237 [6], subclause 16.3.2, except that the NOTIFY request is sent to target UE instead of local UE.

In the case of different subscription, the SCC AS performs the steps as described in 3GPP TS 24.237 [6], subclause 17.3.1, except that the request URI of the NOTIFY request is set to the address of the target UE instead of local UE.

4.6.2.1.2.2 Alternative 2 (SIP REFER with method= REFER)

4.6.2.1.2.2.1 Same/Different subscription

4.6.2.1.2.2.1.1 SC UE

For requesting media transfer, the target UE sends a SIP REFER (referred REFER) request to the UE with transferred media. The referred SIP REFER request includes:

NOTE 1: Before requesting media flow transfer, the target UE of media transfer discovers the ongoing session with transferred media and gets information about its media flows by subscribing to dialog event.

1) the Request-URI set to the SIP URI of the local UE that currently holds the media for the session;

NOTE 2: The SIP URI of the local UE needs to be a GRUU if multiple UEs share the same public user identity.

2) the Refer-To header field set as follows:

   a) the SIP URI of the Inter UE Transfer SCC AS URI

   b) the method parameter set to the REFER

   c) the SIP URI additionally containing the following URI header fields

      - the From header field set to the SIP URI of the local UE;

      - the To header field set to the Inter UE Transfer SCC AS URI; and

      - the Refer-To header field set as follows.

         i   the SIP URI of the target UE

NOTE 3: The SIP URI of the target UE needs to be a GRUU if the target UE and any other UEs share the same public user identity.

         ii the SIP URI additionally containing the URI header field with the hname "body" containing SDP for the media type for each of the media (m=) lines in the session set as follows:

            o media lines which are not being transferred in ongoing session with the port number set to zero

            o media line(s) that are to be transferred containing the port number for the corresponding media received in the media line of the SDP received during the last successful SDP offer/answer exchange;

3) the Referred-By header field containing a currently registered public user identity of the user.

On receiving the referred REFER, the local UE makes the REFER request based on the Refer-To header field and sends the REFER request to SCC AS.

4.6.2.1.2.2.1.2 SCC AS

On receiving the SIP referred REFER request, SCC AS routes the SIP referred REFER to the local UE.

On receiving the SIP REFER request in the case of same subscription, SCC AS performs the media transfer according to the 3GPP TS 24.237 [6], subclause 16.3.2.

On receiving the SIP REFER request in the case of different subscription, SCC AS performs the media transfer according to the 3GPP TS 24.237 [6], subclause 4.2.2.1.

4.6.2.1.2.3 Alternative 3 (Based on SIP INVITE request)

4.6.2.1.2.3.1 Same/Different subscription

4.6.2.1.2.3.1.1 SC UE

In order to transfer a media component when no collaborative session has been established, the target UE sends a SIP INVITE request to the SCC AS. The SIP INVITE request shall include:

NOTE 1: Before requesting media flow transfer, the target UE of media transfer discovers the ongoing collaborative session with transferred media and gets information about its media flows by subscribing to dialog event.

1) the Request-URI set to the SIP URI of the local UE that currently holds the media for the session;

NOTE 2: The SIP URI of the controller UE needs to be a GRUU if multiple UEs share the same public user identity.

2) the Accept-Contact header field containing the g.3gpp.iut-xyz media feature tag as described in annex A with explicit and require tags;

3) the Target-Dialog header field containing the dialog parameters for the dialog of the ongoing session with the transferred media; and

NOTE 3: The dialog parameters are obtained by subscribing to dialog event package.

4) the SDP information as follows:

    a) for the media component already served by the target UE, include the SDP information from the original session;

    b) for the transferred media component(s), containing the port numbers of the target UE; and

    c) for the media component(s) not transferred from the controller UE, containing the port numbers set to zero.

Upon receiving the SIP 2xx response for the INVITE request from the SCC AS, the UE shall send a SIP ACK request to the SCC AS.

4.6.2.1.2.3.1.2 SCC AS serving the collaborative session

On receiving the SIP INVITE request, the SCC AS requests the local UE to authorize the pull request or the SCC AS authorizes the request on behalf of the local UE (e.g. pre-configured). The SCC AS will also authorize that the target UE is of the same subscription in the case of the same subscription. The SCC AS will also authorize that the target UE is of the different subscription in the case of the different subscription.

The SCC AS shall send a SIP re-INVTE request to the local UE, indicating the media streams, which are about to be transferred to the target UE, as inactive.

Upon receiving a SIP 200 (OK) response with the SDP answer from the local UE, the SCC AS shall send a SIP ACK request to the local UE. After that, the SCC AS shall send a SIP re-INVITE request on the dialog for the remote leg to the remote UE containing SDP information as follows:

1) for the transferred media component(s), set the SDP information as from the SDP offer received in the SIP INVITE request from the target UE; and

2) for all other media components in the collaborative session, include the SDP information as from the original session to the remote leg.

Upon receiving a SIP 2xx response for the re-INVITE request sent to the remote UE, SCC AS shall send a SIP ACK request on the remote leg and shall send a SIP re-INVITE request to the local UE to remove the media for the transferred media component.

4.6.2.1.3 Media flows transfer initiated by a controllee UE of an ongoing collaborative session

4.6.2.1.3.1 Alternative 1 (REFER with media feature tag)

4.6.2.1.3.1.1 Same/Different subscription

4.6.2.1.3.1.1.1 SC UE

The controllee UE initiates the transfer of Media flow from the controller UE to itself by sending a SIP REFER request to the SCC AS outside the existing dialog as specified in IETF RFC 3515 [8] and include:

NOTE 1: Before requesting media flow transfer, the target UE of media transfer discovers the ongoing session with transferred media and gets information about its media flow by subscribing to dialog event.

1) the Request-URI set to the SIP URI of the local UE that currently holds the media for the session;

NOTE 2: The SIP URI of the local UE needs to be a GRUU if multiple UEs share the same public user identity.

2) The Refer-To header field set as follows:

   a) The SIP URI of the Target UE;

NOTE 3: The SIP URI of Target UE needs to be a GRUU if the Target UE and any other UEs share the same public user identity.

   b) the SIP URI additionally containing the URI header field with the hname "body" containing SDP for the media type for each of the media (m=) lines in the session set as follows:

      - Media lines which are not being transferred with the port numbers set to zero;

      - Media lines which are to be transferred containing the port number of the Remote UE.

3) The Accept-Contact header field containing the g.3gpp.iut-xyz media feature tag as described in annex A with explicit and require tags; and

4) The Accept header field containing the MIME type "message/sipfrag"; and

5) The Target-Dialog header field containing the dialog parameters for the dialog of the existing session; and

NOTE 2: The dialog parameters are obtained by subscribing to dialog event package.

6) The Referred-By header field containing a currently registered public user identity of the user.

4.6.2.1.3.1.1.2 SCC AS

On receiving the SIP REFER, the SCC AS requests the local UE to authorize the pull request or the SCC AS authorizes the request on behalf of the local UE (e.g. pre-configured).

In the case of same subscription, the SCC AS performs the steps as described in 3GPP TS 24.237 [6], subclause 16.3.2, except that the NOTIFY request is sent to target UE instead of local UE.

In the case of different subscription, the SCC AS performs the steps as described in 3GPP TS 24.237 [6], subclause 17.3.1, except that the request URI of the NOTIFY request is set to the address of the target UE instead of local UE.

4.6.2.1.3.2   Alternative 2 (SIP REFER with method= REFER)

4.6.2.1.3.2.1   Same/Different subscription

4.6.2.1.3.2.1.1   SC UE

For requesting media transfer, the target UE sends a SIP REFER (referred REFER) request to the controller UE. The referred SIP REFER request includes:

> NOTE 1: Before requesting media flow transfer, the target UE of media transfer discovers the ongoing collaborative session with transferred media and gets information about its media flows by subscribing to dialog event.

1) the Request-URI set to the SIP URI of the controller UE;

> NOTE 2: The SIP URI of the controller UE needs to be a GRUU if the controller UE and any other UEs share the same public user identity.

2) the Refer-To header field set as follows:

   a) the SIP URI of the Inter UE Transfer SCC AS URI;

   b) the method parameter set to the REFER; and

   c) the SIP URI additionally containing the following URI header fields:

      - the From header field set to the SIP URI of the controller UE;

      - the To header field set to the Inter UE Transfer SCC AS URI; and

      - the Refer-To header field set as follows:

         i   the SIP URI of the target UE; and

> NOTE 3: The SIP URI of the target UE needs to be a GRUU if the target UE and any other UEs share the same public user identity.

         ii   The for the media type for each of the media (m=) lines in the session set as follows:

            o media lines which are not served by the target controllee UE and which are not being transferred with the port numbers set to zero;

            o media lines which are already served by the target controllee UE, therefore are not to be transferred containing the port numbers of the remote UE; and

            o media line(s) that are to be transferred containing the port number for the corresponding media received in the media line of the SDP received during the last successful SDP offer/answer exchange 3)   the Referred-By header field containing a currently registered public user identity of the user.

On receiving the referred REFER, the controller UE makes the REFER request based on the Refer-To header field and sends the REFER request to SCC AS.

4.6.2.1.3.2.1.2   SCC AS

On receiving the SIP referred REFER request, SCC AS routes the SIP referred REFER to the controller UE.

On receiving the SIP REFER request in the case of same subscription, SCC AS performs the media transfer according to the 3GPP TS 24.237 [6], subclause 16.3.2.

On receiving the SIP REFER request in the case of different subscription, SCC AS performs the media transfer according to the media transfer procedure requested by controller UE in the case of different subscription as described in the 3GPP TS 24.837 [6], subclause 4.2.2.1.

4.6.2.1.3.3   Alternative 3 (Based on SIP re-INVITE request)

4.6.2.1.3.3.1   Same/Different subscription

4.6.2.1.3.3.1.1   Controllee UE

In order to transfer the media to itself, the target UE sends a SIP re-INVITE request to the SCC AS serving the collaborative session. The SIP INVITE request shall include:

NOTE 1:   Before requesting media flow transfer, the UE discovers the ongoing collaborative session with transferred media and gets information about its media flows by subscribing to dialog event.

1)   the Request-URI set to the SCC AS of the on-going SIP dialog;

NOTE 2:   The SIP URI of the controller UE needs to be a GRUU if multiple UEs share the same public user identity.

2)   the Accept-Contact header field containing the g.3gpp.iut-xyz media feature tag as described in annex A with explicit and require tags;

3)   the Target-Dialog header field containing the dialog parameters for the dialog of the ongoing collaborative session with the transferred media; and

NOTE 3:   The dialog parameters are obtained by subscribing to dialog event package.

4)   the SDP information as follows:

   a)   for the media component(s) already served by the target UE, include the SDP information from the original session;

   b)   for the transferred media component(s), containing the port numbers of the target UE; and

   c)   for the media component(s) not served by the UE, containing the port numbers set to zero.

Upon receiving the SIP 2xx response for the re-INVITE request from the SCC AS, the UE shall send a SIP ACK request to the SCC AS.

4.6.2.1.3.3.1.2   SCC AS serving the collaborative session

On receiving the SIP re-INVITE request, the SCC AS requests the controller UE to authorize the transfer request or the SCC AS authorizes the request on behalf of controller UE (e.g. pre-configured).

The SCC AS shall send a SIP re-INVTE request to the controller UE, indicating the media streams, which are about to be transferred to the controllee UE, as inactive.

Upon receiving a SIP 200 (OK) response with the SDP answer from the controller UE, the SCC AS shall send a SIP ACK request to the controller UE. After that, the SCC AS shall send a SIP re-INVITE request on the dialog for the remote leg to the remote UE containing SDP information as follows:

1)   for the transferred media component(s), set the SDP information as from the SDP offer received in the SIP INVITE request from the target controllee UE; and

2)   for all other media components in the collaborative session, include the SDP information as from the original session to the remote leg.

Upon receiving a SIP 2xx response for the re-INVITE request sent to the remote UE, the SCC AS shall send a SIP ACK request on the remote log and shall send a SIP re-INVITE request to the controller UE to remove the media for the transferred media component.

4.6.2.1.4 Inter-UE transfer solicited by a target UE without prior information about the existing session

4.6.2.1.4.1 Alternative 1 (Based on "reg" event package using a Contact header)

4.6.2.1.4.1.1 Same/Different subscription

This clause specifies the procedures for transferring a media when the target of an IUT dose not have information about ongoing session.

4.6.2.1.4.1.1.1 SC UE

For IUT solicited by a target UE, other UEs shall subscribe to the reg event package to get the availability and capabilities of potential target UEs and also to receive the solicitation request for IUT from the target UE.

In order to update status of the target UE, the target UE performs the reregistration of a previously registered public user identity bound to any one of its contact addresses as described in 3GPP TS 24.229 [4], subclause 5.1.1.4 and includes information in a Contact header field of REGISTER method as follows:

1) the g.3gpp.iut.solicit media feature tag which represent the solicit IUT request;

2) the requested-ue is set by the identifier of UE which has the media session requested for IUT by the target UE is set to SIP URI of the requested UE as defined in IETF RFC 3261 [20];

3) the media-type is set by the media information that requested to be transferred; and

4) the service-type is set by the service information that associated with the media and that is serving for the requested UE;

When the requested UE receives the NOTIFY request from the IMS entity, the requested UE checcjs that it controls the media which is requested by the solicitation request. If the requested UE controls the media, the requested UE decides whether to initiate the IUT solicited by the target UE or not. If the requested UE decides to initiate the IUT, then the requested UE proceedes the relevant IUT procedures to transfer the media to the target UE as described in 3GPP TS 24.237[6], subclause 15, 16, and 17.

4.6.2.1.4.1.1.2 SCC AS

On receiving the IUT request, the SCC AS proceedes the relevant IUT procedures to transfer media to the target UE.

4.6.2.1.4.1.1.3 IMS Entities

On receiving the re-registration request, the S-CSCF shall send a NOTIFY request to the requested UE as specified in 3GPP TS 24.229, subclause 5.4.2.1.2.

4.6.2.2 Media flows transfer initiated by a UE other than the target UE

4.6.2.2.1 Void

4.6.2.2.2 Controllee UE initiated addition of media to another controllee UE

4.6.2.2.2.1 Alternative 1 (SIP REFER with media feature tag)

4.6.2.2.2.1.1 Same/Different subscription

4.6.2.2.2.1.1.1 SC UE

For requesting addition of media to another controllee UE, the requesting controllee UE sends a SIP REFER request to the controller UE. The referred SIP REFER request includes:

NOTE 1: Before requesting addition of media, the requesting controllee UE of addition of media discovers the ongoing collaborative session and gets information about its media flows by subscribing to dialog event.

1) the Request-URI set to the SIP URI of the controller UE in the ongoing collaborative session to be added media;

NOTE 2: The SIP URI of the controller UE needs to be a GRUU if the controller UE and any other UEs share the same public user identity.

2) the Refer-To header field set as follows:

    a) the SIP URI of the target UE;

NOTE 3: The SIP URI of Target UE needs to be a GRUU if the Target UE and any other UEs share the same public user identity.

    b) the SIP URI additionally containing the URI header field with the hname "body" containing SDP for the media type for each of the media (m=) lines in the session set as follows:

      - media lines which are not served by the target controllee UE and which are not being added with the port numbers set to zero;

      - media lines which are already served by the target controllee UE, therefore are not to be added containing the port numbers of the remote UE; and

      - media line(s) that are to be added containing the media type(s) to be added and the discard port number "9".

3) the Accept-Contact header field containing the g.3gpp.iut-xyz media feature tag as described in annex A with explicit and require tags;

4) the Accept header field containing the MIME type "message/sipfrag";

5) the Target-Dialog header field containing the dialog parameters for the dialog of the existing session; and

NOTE 3: The dialog parameters are obtained by subscribing to dialog event package.

6) the Referred-By header field containing a currently registered public user identity of the user.

4.6.2.2.2.1.1.2 SCC AS

On receiving the SIP REFER, the SCC AS requests the controller UE to authorize the adding media request or the SCC AS authorizes the request on behalf of the controller UE (e.g. pre-configured).

The SCC AS performs the steps as described in 3GPP TS 24.237 [6], subclause 19.3.1, except that the NOTIFY request is sent to request UE instead of controller UE.

4.6.2.2.2.2 Alternative 2(SIP REFER with method= REFER)

4.6.2.2.2.2.1 Same subscription

4.6.2.2.2.2.1.1 Controllee UE

The SC UE shall perform as described in 3GPP TS 24.237 [6], subclause 19.2.1 except described in this subclause.

For requesting addition of media to another controllee UE, the requesting controllee UE sends a SIP REFER (referred REFER) request to the controller UE. The referred SIP REFER request includes:

NOTE 1: Before requesting addition of media, the requesting controllee UE of addition of media discovers the ongoing collaborative session and gets information about its media flows by subscribing to dialog event.

1) the Request-URI set to the SIP URI of the controller UE;

NOTE 2: The SIP URI of the controller UE needs to be a GRUU if the controller UE and any other UEs share the same public user identity.

2) the Refer-To header field set as follows:

   a) the SIP URI of the Inter UE Transfer SCC AS URI;

   b) the method parameter set to the REFER; and

   c) the SIP URI additionally containing the following URI header fields:

   - the From header field set to the SIP URI of the controller UE;

   - the To header field set to the Inter UE Transfer SCC AS URI; and

   - the Refer-To header field set as follows:

     i the SIP URI of the target UE; and,

NOTE 3: The SIP URI of the target UE needs to be a GRUU if the target UE and any other UEs share the same public user identity.

     ii the SIP URI additionally containing the URI header field with the hname "body" containing SDP for the media type for each of the media (m=) lines in the session set as follows:

     o media lines which are not served by the target controllee UE and which are not being added with the port numbers set to zero;

     o media lines which are already served by the target controllee UE, therefore are not to be added containing the port numbers of the remote UE; and

     o media line(s) that are to be added containing the media type(s) to be added and the discard port number "9".

3) the Referred-By header field containing a currently registered public user identity of the user; and

4) the Target-Dialog header field containing the dialog parameters for the dialog of the existing session;

NOTE 4: The dialog parameters are obtained by subscribing to dialog event package.

4.6.2.2.2.2.1.2 Controller UE

The Controller UE shall perform as described in 3GPP TS 24.237 [6], subclause 19.2.1 except described in this subclause.

On receiving the referred REFER, the controller UE authorizes the request and makes the REFER request based on the Refer-To header field and sends the REFER request to SCC AS.

4.6.2.2.2.2.1.3 SCC AS

On receiving the SIP REFER, SCC AS performs addition of the media according to the media transfer procedure requested by controller UE as described in the 3GPP TS 24.237 [6], subclause 19.3.1.

4.6.2.2.2.2.2 Different subscription

4.6.2.2.2.2.2.1 Controllee UE

For requesting addition of media to another controllee UE, the requesting controllee UE sends a SIP REFER (referred REFER) request to the controller UE. The referred SIP REFER request includes:

NOTE 1: Before requesting addition of media, the requesting controllee UE of addition of media discovers the ongoing collaborative session and gets information about its media flows by subscribing to dialog event.

1) the Request-URI set to the SIP URI of the controller UE;

NOTE 2: The SIP URI of the controller UE needs to be a GRUU if the controller UE and any other UEs share the same public user identity.

2) the Refer-To header field set as follows:

   a) the SIP URI of the Inter UE Transfer SCC AS URI;

   b) the method parameter set to the REFER; and

   c) the SIP URI additionally containing the following URI header fields:

     - the From header field set to the SIP URI of the controller UE;

     - the To header field set to the Inter UE Transfer SCC AS URI; and

     - the Refer-To header field set as follows:

       i   the SIP URI of the target UE;

NOTE 3: The SIP URI of the target UE needs to be a GRUU if the target UE and any other UEs share the same public user identity.

       ii   the SIP URI additionally containing the URI header field with the hname "body" containing SDP for the media type for each of the media (m=) lines in the session set as follows:

          o media lines which are not served by the target controllee UE and which are not being added with the port numbers set to zero;

          o media lines which are already served by the target controllee UE, therefore are not to be added containing the port numbers of the remote UE; and

          o media line(s) that are to be added containing the media type(s) to be added and the discard port number "9".

3) the Referred-By header field containing a currently registered public user identity of the user; and

4) the Target-Dialog header field containing the dialog parameters for the dialog of the existing session.

NOTE 4: The dialog parameters are obtained by subscribing to dialog event package.

4.6.2.2.2.2.2.2 Controller UE

On receiving the referred REFER, the controller UE authorizes the request and makes the REFER request based on the Refer-To header field and sends the REFER request to SCC AS.

4.6.2.2.2.2.2.3 SCC AS

On receiving the SIP REFER, SCC AS performs addition of the media according to the media transfer procedure requested by controller UE in the case of different subscription as described in the 3GPP TS 24.237 [6], subclause 19.3.1.

4.6.3 Identified issues

Following issues were all resolved.

Issue 4.6.3-1: To which entity (SCC AS or controller UE) does the target UE requests to pull the existed media flow? There are two approaches:

   Approach 1 (to SCC AS): SCC AS authorizes and executes the request instead of controller UE

   Approach 2 (to controller UE): The target UE sends the referred REFER to controller UE. The controller UE authorizes the request and sends the REFER message to SCC AS for media transfer

Issue 4.6.3-2: How the controller UE receives the final status of the Media transfer is FFS.

Issue 4.6.3-3: (relevant only to 4.6.2.1.2): Which UE takes the role of controller is FFS when there is no collaboration and the target UE establishes the collaboration session by pulling the media from the existing non collaboration session.

4.6.4 Call flows

4.6.4.1 Media flows transfer initiated by the target UE

4.6.4.1.1 Media flows transfer initiated by a UE not participating in the ongoing collaborative session

4.6.4.1.1.1 Alternative 1 (REFER with media feature tag)

4.6.4.1.1.1.1 Same/Different subscription

This subclause describes the scenario when the Media flow is transferred from UE-1 to UE-3 requested by UE-3 and the UE-3 becomes a new Controllee UE. The flow diagram shows when UE-1 and UE-3 belong to the different subscription. The SCC AS-1 is controlling the colloaborative session.

UE-1(123.45.67.89) and UE-2 (123.112.67.87) are included in a Collaborative Session with the remote UE (132.54.76.98), in which UE-1 is the Controller UE and UE-2 is the Controllee UE. Media paths exist between UE-1 and remote UE(video) and between UE-2 and remote UE(audio). The video component is bidirectional from the remote UE to the controller UE, UE-1. The UE-3(123.23.45.67) wants to pull the media flow between UE-1 and remote UE. After this procedure, the UE-3 will be in collaborative session.

Figure 4.6.4.1.1.1.1-1: Signalling flow for Media flows transfer initiated by a UE not participating in the ongoing collaborative session

1. **UE-3 discovers the sessions of UE-1.**

2-6. **SIP REFER request (from UE-3 to controller UE, UE-1)**

The UE-3 sends SIP REFER request to the controller UE, UE-1 to request the media transfer. The SIP REFER request is finally routed to the SCC AS-1 serving UE-1.

Editor's Note: How the SCC AS-1 authorize the request is FFS.

Table 4.6.4.1.1.1.1-2: SIP REFER request (UE-3 to UE-1)

```
REFER sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via: SIP/2.0/UDP [3333::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
To: <sip:user1_public1@home1.net>
From: <sip:user2_public1@home2.net>;tag=294756
Call-ID: Asdasd23123366
Cseq: 4897924 REFER
Max-Forwards: 70
P-Preferred-Identity: <sip:user2_public1@home2.net>;
Refer-To: <sip:user2_public1@home2.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333?body=
    m%3Daudio%200%20RTP%2FAVP%97%0Dm%3Dvideo%203002%20RTP%2FAVP%2098%2099>
Require: target-dialog
Target-dialog: cb03a0s09a2sdfglkj11111;remote-tag=27364;local-tag=11928
Referred-By: sip:user2_public1@home2.net
Contact: sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333
Accept-Contact:+g.3gpp.iut-xyz;explicit;require
Accept: application/sdp, message/sipfrag
Content-Length: 0
```

7-11. SIP 202 (Accepted) response (from SCC AS-1 serving UE-1 to UE-3)

SCC AS-1 serving UE-1 sends a SIP 202 (Accepted) response to UE-3 as response to the SIP REFER request.

12-16. SIP NOTIFY request (from SCC AS-1 serving UE-1 to UE-3)

The SCC AS-1 serving UE-1 sends a SIP NOTIFY request to UE-3 to notify implicit subscription to the SIP REFER request results.

17-21. SIP 200 (OK) response (from UE-3 to SCC AS-1 serving UE-1)

The UE-3 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC AS-1.

22-26. SIP INVITE request (from SCC AS-1 serving UE-1 to UE-3)

Since the message 2-6 contains a Refer-to header field addressed to UE-3 and the URI paramaters, listing an video line which is not currently supported by another UE than controller UE, the SCC AS-1 realizes the procedure is for transferring the media from that controller UE (UE-1) to UE-3. The SCC AS-1 sends a SIP INVITE request to the UE-3, to transfer the video media component.

Table 4.6.4.1.1.1.1-22: SIP INVITE request (SCC AS-1 serving UE-1 to UE-3)

```
INVITE sip:user2_public1@home2.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333 SIP/2.0
Via: SIP/2.0/UDP sccas1.home1.net; branch=z9hG4bK332b33.3;
To: sip:user2_public1@home2.net;
From: sip:interUEtransfer@sccas1.home1.net; tag=12486
Call-ID: cb03a0s09a2sdfglkj33333
Cseq: 111 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:interUEtransfer@sccas1.home1.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 3002 RTP/AVP 98 99
a=sendonly
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

27-31. SIP 200 (OK) response (from UE-3 to SCC AS-1 serving UE-1)

The target UE, UE-3, acknowledges the SIP INVITE request by sending a SIP 200 (OK) response to the SCCAS-1.

Table 4.6.4.1.1.1.1-27: SIP 200 (OK) response (UE-3 to SCC AS-1 serving UE-1)

```
SIP/2.0 200 OK
Via:
To: sip:user2_public1@home2.net; tag = 24861
From: sip:interUEtransfer@sccas1.home1.net; tag = 12486
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.23.45.67
s=-
c=123.23.45.67
t=0 0
m=audio 0 RTP/AVP 97
m=video 1302 RTP/AVP 98 99
a=recvonly
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

32-36. SIP ACK request (from SCC AS-1 serving UE-1 to target UE; UE-3)

The SCC AS-1 serving UE-1 sends a SIP ACK request to the UE-3.

37-38. SIP re-INVITE request (from SCC AS-1 serving UE-1 to controller UE; UE-1)

Table 4.6.4.1.1.1.1-37: SIP INVITE request (SCC AS-1 serving UE-1 to UE-1)

```
INVITE sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via:
To: sip:user1_public1@home1.net;Tag=11928
From: sip:userR_public1@homeR.net; tag=27364
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:interUEtransfer@sccas1.home1.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
a=sendonly
```

39-40. SIP 200 (OK) response (from controller UE, UE-1 to SCC AS-1 serving UE-1)

The UE-1 sends a SIP 200 (OK) response with an SDP answer.

Table 4.6.4.1.1.1.1-39: SIP 200 (OK) response (UE-1 to SCC AS-1 serving UE-1)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>;
    +g.3gpp.iut-controller
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
c=123.45.67.89
t=0 0
m=audio 0 RTP/AVP 97
m=video 1302 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
a=inactive
```

41-42. SIP ACK request (from SCC AS-1 serving UE-1 to controller UE; UE-1)

The SCC AS-1 serving UE-1 sends a SIP ACK request to the UE-1.

43-45. SIP re-INVITE request (from SCC AS-1 serving UE-1 to remote UE)

The SCC AS-1 serving UE-1 sends a SIP re-INVITE request to the remote UE.

Table 4.6.4.1.1.1.1-43: SIP INVITE request (SCC AS-1 serving UE-1 to remote UE)

```
INVITE sip:userR_public1@homeR.net SIP/2.0
Via:
To: sip:userR_public1@homeR.net;tag=27364
From: sip:user1_public1@home1.net;tag=11928
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: <sip:interUEtransfer@sccas1.home1.net>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 1300 RTP/AVP 96 97
c=IN IP4 123.112.67.87
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 123.23.45.67
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

46-48. SIP 200 (OK) response (from remote UE to SCC AS-1 serving UE-1)

The remote UE acknowledges the SIP re-INVITE request by sending a SIP 200 (OK) response to the SCC AS-1.

Table 4.6.4.1.1.1.1-46: SIP 200 (OK) response (remote UE to SCC AS-1 serving UE-1)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Asserted-Identity:
Contact: sip:userR_public1@homeR.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

49-51. SIP ACK request (from SCC AS-1 serving UE-1 to remote UE)

The SCC AS-1 serving UE-1 sends a SIP ACK request to the remote UE.

52-56. SIP re-INVITE request (from SCC AS-1 serving UE-1 to UE-3)

The SCC AS-1 serving UE-1 sends a SIP re-INVITE request to UE-3 to activate the video media component.

Table 4.6.4.1.1.1.1-52: SIP INVITE request (SCC AS-1 serving UE-1 to UE-3)

```
INVITE sip:user2_public1@home2.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333 SIP/2.0
Via: SIP/2.0/UDP sccas1.home1.net; branch=z9hG4bK332b33.3;
To: sip:user2_public1@home2.net;
From: sip:interUEtransfer@sccas1.home1.net; tag=12486
Call-ID: cb03a0s09a2sdfglkj33333
Cseq: 111 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:interUEtransfer@sccas1.home1.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

57-61. SIP 200 (OK) response (from UE-3 to SCC AS-1 serving UE-1)

The target UE, UE-3, acknowledges the SIP INVITE request by sending a SIP 200 (OK) response to the SCCAS-1 serving UE-1.

Table 4.6.4.1.1.1.1-57: SIP 200 (OK) response (UE-3 to SCC AS-1 serving UE-1)

```
SIP/2.0 200 OK
Via:
To: sip:user2_public1@home2.net; tag = 24861
From: sip:interUEtransfer@sccas1.home1.net; tag = 12486
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333>
Allow:
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 1027933615 1027933615 IN IP4 123.23.45.67
s=-
c=123.23.45.67
t=0 0
m=audio 0 RTP/AVP 97
m=video 1302 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

62-66. SIP ACK request (from SCC AS-1 serving UE-1 to target UE; UE-3)

The SCC AS-1 serving UE-1 sends a SIP ACK request to the UE-3.

67-68. SIP re-INVITE request (from SCC AS-1 serving UE-1 to controller UE; UE-1)

The SCC AS-1 sends a SIP re-INVITE request to the controller UE. Since UE-1 keep the collaborative session control, SCC AS-1 sends the re-INVITE instead of BYE in spite of no media flow at UE-1.

Table 4.6.4.1.1.1.1-67: SIP INVITE request (SCC AS-1 serving UE-1 to UE-1)

```
INVITE sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via:
To: sip:user1_public1@home1.net;Tag=11928
From: sip:userR_public1@homeR.net; tag=27364
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:interUEtransfer@sccas1.home1.net
Allow:
Content-Type: application/sdp
Content-Length: (...)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 0 RTP/AVP 98 99
```

69-70. SIP 200 (OK) response (from controller UE, UE-1 to SCC AS-1 serving UE-1)

The UE-1 sends a SIP 200 (OK) response with an SDP answer.

Table 4.6.4.1.1.1.1-69: SIP 200 (OK) response (UE-1 to SCC AS-1 serving UE-1)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>;
    +g.3gpp.iut-controller
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
c=123.45.67.89
t=0 0
m=audio 0 RTP/AVP 97
m=video 0 RTP/AVP 98 99
```

71-72. SIP ACK request (from SCC AS-1 serving UE-1 to controller UE; UE-1)

The SCC AS-1 sends a SIP ACK request to the UE-1.

73-77. SIP NOTIFY request (from SCC AS-1 serving UE-1 to UE-3)

The SCC AS-1 serving UE-1 sends a SIP NOTIFY request to the UE-3 to inform about the success status of the inter-UE transfer.

78-82. SIP 200 (OK) response (from UE-3 to SCC AS-1 serving UE-1)

The UE-3 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC AS-1.

4.6.4.1.1.2   Alternative 2 (SIP REFER with method= REFER)

4.6.4.1.1.2.1   Same subscription

This subclause describes the scenario when the Media flow is transferred from UE-1 to UE-3 requested by UE-3. The flow diagram shows when UE-1, UE-2, and UE-3 belong to the same subscription.

UE-1(123.45.67.89) and UE-2 (123.112.67.87) are included in a Collaborative Session with the remote UE (132.54.76.98), in which UE-1 is the Controller UE and UE-2 is the Controllee UE. Media paths exist between UE-1 and remote UE(video) and between UE-2 and remote UE(audio). The UE-3(123.23.45.67) wants to pull the media flow between UE-1 and remote UE. After this procedure, the UE-3 will be in collaborative session.

HPLMN of the local UE participating in session   HPLMN of the remote UE participating in session

| UE-1 | UE-2 | UE-3 | Intermediate IM CN Subsystem entities | SCC AS | Intermediate IM CN Subsystem entities | Remote UE |

Collaborative Session control

Media path (video)

Media path (audio)

1. UE-3 discovers the sessions of UE-1and gets information about their media flows

2. REFER   3. REFER

5. REFER   4. REFER

6. 202 ACCEPTED   7. 202 ACCEPTED

9. 202 ACCEPTED   8. 202 ACCEPTED

10. NOTIFY   11. NOTIFY

13. NOTIFY   12. NOTIFY

14. 200 OK   15. 200 OK

17. 200 OK   16.200 OK

18. REFER   19. REFER

21. 202 ACCEPTED   20. 202 ACCEPTED

22. NOTIFY   23. NOTIFY

25. NOTIFY   24. NOTIFY

26. 200 OK   27. 200 OK

29. 200 OK   28.200 OK

31. NOTIFY   30. NOTIFY

32. 200 OK   33. 200 OK

35. INVITE   34. INVITE

36. 200 OK   37. 200 OK

39. ACK   38. ACK

41. re-INVITE   40. re-INVITE

42. 200 OK   43.200 OK

45. ACK   44. ACK

46. re-INVITE

47. re-INVITE   48. re-INVITE

50. 200 OK   49. 200 OK

51. 200 OK

52. ACK

53. ACK   54. ACK

56. re-INVITE   55. re-INVITE

57. 200 OK   58. 200 OK

60. ACK   59. ACK

62. re-INVITE   61. re-INVITE

63. 200 OK   64.200 OK

66. ACK   65. ACK

68. NOTIFY   67. NOTIFY

69. 200 OK   70. 200 OK

Media path (video)

Media path (audio)

Collaborative Session control

Figure 4.6.4.1.1.2.1-1: Signalling flow for Media flows transfer initiated by a UE not participating in the ongoing collaborative session

1. **UE-3 discovers the sessions of UE-1.**

2-5. **SIP REFER request (from UE-3 to UE-1)**

The UE-3 sends SIP REFER (referred REFER) request to the controller UE, UE-1 to request the media transfer from UE-1 to UE-3.

Table 4.6.4.1.1.2.1-2: SIP REFER request (UE-3 to UE-1)

```
REFER sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111  SIP/2.0
Via: SIP/2.0/UDP [3333::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
To: <sip:user1_public1@home1.net>
From: <sip:user1_public3@home1.net>;tag=294756
Call-ID: Asdasd23123366
Cseq: 4897924 REFER
Max-Forwards: 70
P-Preferred-Identity: <sip:user1_public3@home1.net>;
Refer-To: <sip:interUEtransfer@example.net;method=REFER?
   To=%3CinterUEtransfer%40example.net%3E%3BFrom=%3Csip:user1_public1%40home1.net%3BRefer-
   To=%3Csip:user1_public3@home1.net%3B gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333?body=
   m%3Daudio%200%20RTP%2FAVP%2098%209%3E%3BTarget-dialog=
   cb03a0s09a2sdfglkj11111%3Bremote-tag=27364%3Blocal-tag=11928>
Referred-By: sip:user1_public3@home1.net
Contact: <sip:user1_public3@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333>
Accept: application/sdp, message/sipfrag
Content-Length: 0
```

6-9. **SIP 202 (Accepted) response (from UE-1 to UE-3)**

UE-1 sends a SIP 202 (Accepted) response to UE-3 as response to the SIP REFER request.

10-13. **SIP NOTIFY request (from UE-1 to UE-3)**

The UE-1 sends a SIP NOTIFY request to UE-3 to notify implicit subscription to the SIP REFER request results.

14-17. **SIP 200 (OK) response (from UE-3 to UE-1)**

The UE-3 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC-AS.

18-19. **SIP REFER request (from UE-1 to SCC AS)**

The UE-1 sends SIP REFER request to SCC AS to request the media transfer from UE-1 to UE-3.

Table 4.6.4.1.1.2.1-18: SIP REFER request (UE-1 to SCC-AS)

```
REFER sip:interUEtransfer@example.net SIP/2.0
Via: SIP/2.0/UDP [1111::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
To: <sip:interUEtransfer@example.net>
From: <sip:user1_public1@home1.net>;tag=223457
Call-ID: Asdasd23123377
Cseq: 112 REFER
Max-Forwards: 70
P-Preferred-Identity: <sip:user1_public1@home1.net>;
Refer-To: <sip:user1_public3@home1.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333?body=
   m%3Daudio%200%20RTP%2FAVP%97%0Dm%3Dvideo%203002%20RTP%2FAVP%2098%2099>
Require: target-dialog
Target-dialog: cb03a0s09a2sdfglkj11111;remote-tag=27364;local-tag=11928
Referred-By: sip:user1_public3@home1.net
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>
Accept: application/sdp, message/sipfrag
Content-Length: 0
```

20-21. **SIP 202 (Accepted) response (from SCC AS to UE-1)**

SCC-AS sends a SIP 202 (Accepted) response to UE-1 as response to the SIP REFER request.

22-25. SIP NOTIFY request (from UE-1 to UE-3)

The UE-1 sends a SIP NOTIFY request to the UE-3 to inform the success status about sending the SIP REFER requested by the referred REFER.

26-29. SIP 200 OK response (from UE-3 to UE-1)

The UE-3 acknowledges the SIP NOTIFY request by sending a SIP 200 OK response to the UE-1.

30-31. SIP NOTIFY request (from SCC AS to UE-1)

The SCC-AS sends a SIP NOTIFY request to UE-1 to notify implicit subscription to the SIP REFER request results.

32-33. SIP 200 (OK) response (from UE-1 to SCC AS)

The UE-1 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC-AS.

34-35. SIP INVITE request (from SCC-AS to UE-3)

Since the message 18-19 contains a Refer-to header field addressed to UE-3 and the URI parameters, listing a video line which is not currently supported by another UE than controller UE, the SCC AS realizes the procedure is for transferring the media from that controller UE (UE-1) to UE-3. The SCC-AS sends a SIP INVITE request to the UE-3, to transfer the video media component.

Table 4.6.4.1.1.2.1-34: SIP INVITE request (SCC-AS to UE-3)

```
INVITE sip:user1_public3@home1.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333 SIP/2.0
Via: SIP/2.0/UDP sccas1.home1.example.net; branch=z9hG4bK332b33.3;
To: sip:user1_public3@home1.net;
From: sip:interUEtransfer@example.net; tag=12486
Call-ID: cb03a0s09a2sdfglkj33333
Cseq: 115 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 3002 RTP/AVP 98 99
a=sendonly
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

36-37. SIP 200 (OK) response (from UE-3 to SCC-AS)

The target UE, UE-3, acknowledges the SIP INVITE request by sending a SIP 200 (OK) response to the SCC-AS.

Table 4.6.4.1.1.2.1-36: SIP 200 (OK) response (UE-3 to SCC-AS)

```
SIP/2.0 200 OK
Via:
To: sip:user1_public3@home1.net; tag = 24861
From: sip:interUEtransfer@example.net; tag = 12486
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public3@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.23.45.67
s=-
c=123.23.45.67
t=0 0
m=audio 0 RTP/AVP 97
m=video 1302 RTP/AVP 98 99
a=recvonly
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

38-39. SIP ACK request (from SCC-AS to target UE; UE-3)

The SCC-AS sends a SIP ACK request to the UE-3.

40-41. SIP re-INVITE request (from SCC-AS to controller UE; UE-1)

Table 4.6.4.1.1.2.1-40: SIP INVITE request (SCC-AS to UE-1)

```
INVITE sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via:
To: sip:user1_public1@home1.net;Tag=11928
From: sip:userR_public1@home2.net; tag=27364
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
a=sendonly
m=audio 0 RTP/AVP 97
```

42-43. SIP 200 (OK) response (from controller UE, UE-1 to SCC-AS)

The UE-1 sends a SIP 200 (OK) response with an SDP answer.

Table 4.6.4.1.1.2.1-42: SIP 200 (OK) response (UE-1 to SCC-AS)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>;
    +g.3gpp.iut-controller
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
c=123.45.67.89
t=0 0
m=video 1302 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
a=recvonly
m=audio 0 RTP/AVP 97
```

44-45. SIP ACK request (from SCC-AS to controller UE; UE-1)

The SCC-AS sends a SIP ACK request to the UE-1.

46-48. SIP re-INVITE request (from SCC-AS to remote UE)

The SCC-AS sends a SIP re-INVITE request to the remote UE.

Table 4.6.4.1.1.2.1-46: SIP INVITE request (SCC-AS to remote UE)

```
INVITE sip:userR_public1@home2.net SIP/2.0
Via:
To: sip:userR_public1@home2.net;tag=27364
From: sip:user1_public1@home1.net;tag=11928
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: <sip:sccas1.home1.example.net>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 1300 RTP/AVP 96 97
c=IN IP4 123.112.67.87
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 123.23.45.67
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

49-51. SIP 200 (OK) response (from remote UE to SCC-AS)

The remote UE acknowledges the SIP re-INVITE request by sending a SIP 200 (OK) response to the SCC-AS.

Table 4.6.4.1.1.2.1-49: SIP 200 (OK) response (remote UE to SCC-AS)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Asserted-Identity:
Contact: sip:userR_public1@home2.net
Allow:
Content-Type: application/sdp
Content-Length: (…)


v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

52-54. SIP ACK request (from SCC-AS to remote UE)

The SCC-AS sends a SIP ACK request to the remote UE.

55-56. SIP re-INVITE request (from SCC-AS to UE-3)

Table 4.6.4.1.1.2.1-55: SIP INVITE request (SCC-AS to UE-3)

```
INVITE sip:user1_public3@home1.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333 SIP/2.0
Via: SIP/2.0/UDP sccas1.home1.net; branch=z9hG4bK332b33.3;
To: sip:user1_public3@home1.net;
From: sip:interUEtransfer@example.net; tag=12486
Call-ID: cb03a0s09a2sdfglkj33333
Cseq: 111 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

57-58. SIP 200 (OK) response (from UE-3 to SCC-AS)

The target UE, UE-3, acknowledges the SIP INVITE request by sending a SIP 200 (OK) response to the SCC-AS.

Table 4.6.4.1.1.2.1-57: SIP 200 (OK) response (UE-3 to SCC-AS)

```
SIP/2.0 200 OK
Via:
To: sip:user1_public3@home1.net; tag = 24861
From: sip:interUEtransfer@example.net; tag = 12486
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public3@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.23.45.67
s=-
c=123.23.45.67
t=0 0
m=audio 0 RTP/AVP 97
m=video 1302 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

59-60. SIP ACK request (from SCC-AS to target UE; UE-3)

The SCC-AS sends a SIP ACK request to the UE-3.

61-62. SIP re-INVITE request (from SCC-AS to controller UE; UE-1)

The SCC-AS sends a SIP re-INVITE request to the controller UE. Since UE-1 keep the collaborative session control, SCC AS sends the re-INVITE instead of BYE in spite of no media flow at UE-1.

Table 4.6.4.1.1.2.1-61: SIP INVITE request (SCC-AS to UE-1)

```
INVITE sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via:
To: sip:user1_public1@home1.net;Tag=11928
From: sip:userR_public1@home2.net; tag=27364
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=video 0 RTP/AVP 98 99
m=audio 0 RTP/AVP 97
```

63-64. SIP 200 (OK) response (from controller UE, UE-1 to SCC-AS)

The UE-1 sends a SIP 200 (OK) response with an SDP answer.

Table 4.6.4.1.1.2.1-63: SIP 200 (OK) response (UE-1 to SCC-AS)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>;
   +g.3gpp.iut-controller
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
c=123.45.67.89
t=0 0
m=audio 0 RTP/AVP 97
m=video 0 RTP/AVP 98 99
```

65-66. SIP ACK request (from SCC-AS to controller UE; UE-1)

The SCC-AS sends a SIP ACK request to the UE-1.

67-68. SIP NOTIFY request (from SCC-AS to UE-1)

The SCC-AS sends a SIP NOTIFY request to the UE-1 to inform about the success status of the inter-UE transfer from UE-1 to UE-3.

69-70. SIP 200 (OK) response (from UE-1 to SCC-AS)

The UE-1 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC AS.

4.6.4.1.1.2.2 Different subscription

This subclause describes the scenario when the Media flow is transferred from Controller UE, UE-1 to UE-3 requested by UE-3. The flow diagram shows when UE-1 and UE-3 belong to the different subscription.

UE-1 (123.45.67.89) and UE-2 (123.112.67.87) belong to the same subscription and are included in a Collaborative Session with the remote UE (132.54.76.98), in which UE-1 is the Controller UE and UE-2 is the Controllee UE. The call is anchored in the SCC AS of UE-1. Media paths exist between UE-1 and remote UE(video) and between UE-2 and remote UE(audio). The UE-3(123.23.45.67) wants to pull the media flow between UE-1 and remote UE. After this procedure, the UE-3 will be in collaborative session.
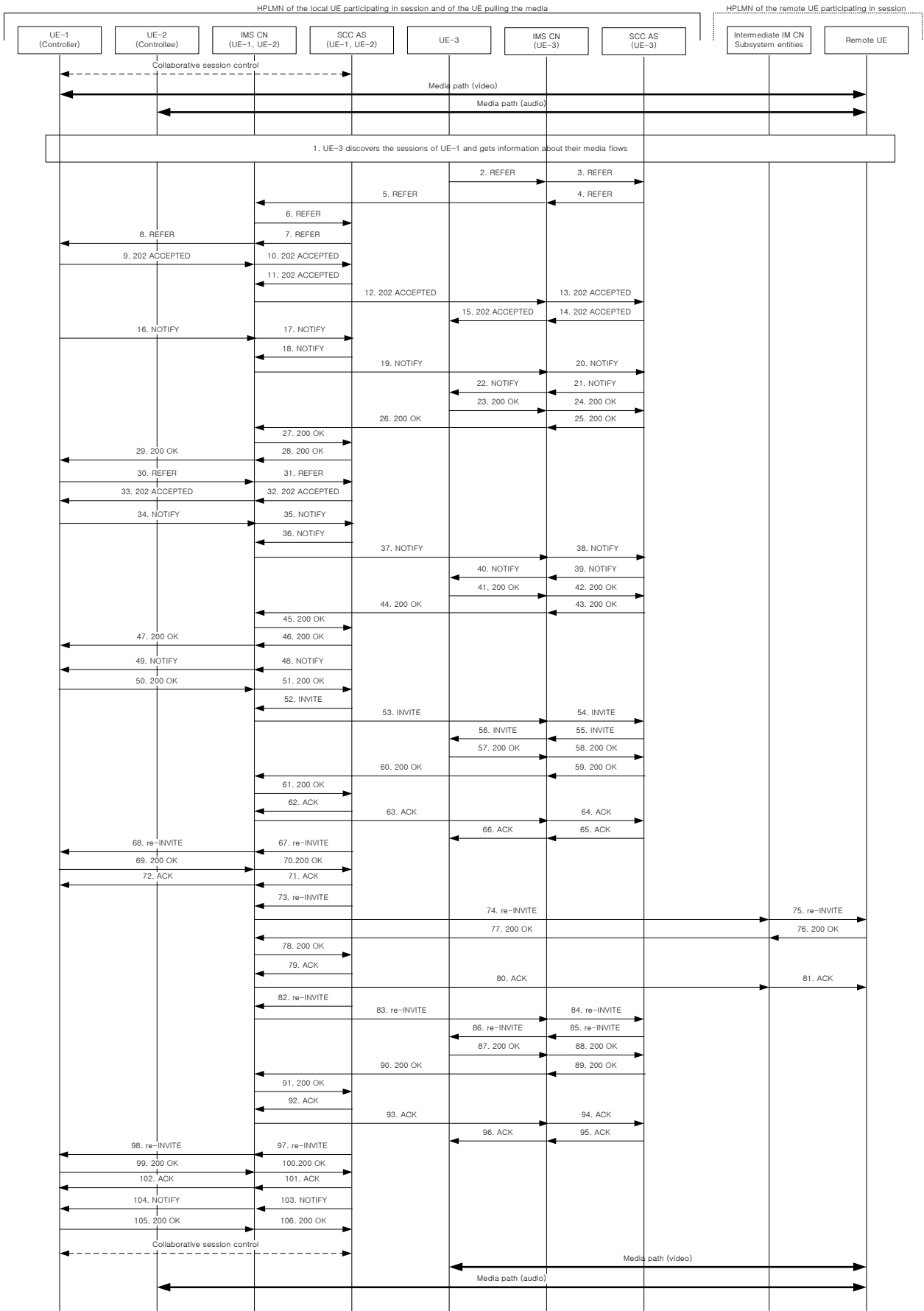
Figure 4.6.4.1.1.2.2-1: Signalling flow for Media flows transfer initiated by a UE not participating in the ongoing collaborative session

NOTE: For clarity, the SIP 100 (Trying) messages are not shown in the signalling flow.

1. UE-3 discovers the sessions of UE-1

2-8. SIP REFER request (from UE-3 to UE-1)

The UE-3 sends SIP REFER (referred REFER) request to the controller UE, UE-1 to request the media transfer from UE-1 to UE-3.

Table 4.6.4.1.1.2.2-2: SIP REFER request (UE-3 to UE-1)

```
REFER sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via: SIP/2.0/UDP [3333::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
To: <sip:user1_public1@home1.net>
From: <sip:user2_public1@home2.net>;tag=294756
Call-ID: Asdasd23123366
Cseq: 4897924 REFER
Max-Forwards: 70
P-Preferred-Identity: <sip:user2_public1@home2.net>;
Refer-To: <sip:interUEtransfer@example.net;method=REFER?
   To=%3CinterUEtransfer%40example.net%3E%3BFrom=%3Csip:user1_public1%40home1.net%3BRefer-
   To=%3Csip:user2_public1@home2.net%3Bgr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333?body=
   m%3Daudio%200%20RTP%2FAVP%97%0Dm%3Dvideo%203002%20RTP%2FAVP%2098%2099%3E%3BTarget-dialog=
   cb03a0s09a2sdfglkj11111%3Bremote-tag=27364%3Blocal-tag=11928>
Referred-By: sip:user2_public1@home2.net
Contact: <sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333>
Accept: application/sdp, message/sipfrag
Content-Length: 0
```

9-15. SIP 202 (Accepted) response (from UE-1 to UE-3)

UE-1 sends a SIP 202 (Accepted) response to UE-3 as response to the SIP REFER request.

16-22. SIP NOTIFY request (from UE-1 to UE-3)

The UE-1 sends a SIP NOTIFY request to UE-3 to notify implicit subscription to the SIP REFER request results.

23-29. SIP 200 (OK) response (from UE-3 to UE-1)

The UE-3 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the UE-1.

30-31. SIP REFER request (from UE-1 to SCC AS serving UE-1)

The UE-1 makes the REFER request based on the Refer-To header field in the received REFER (referred REFER) message and sends the REFER request via IMS CN. The REFER request is routed to the SCC AS serving UE-1. The SCC AS serving UE-1 performs the media transfer.

Table 4.6.4.1.1.2.2-30: SIP REFER request (UE-1 to SCC-AS serving UE-1)

```
REFER sip:interUEtransfer@example.net SIP/2.0
Via: SIP/2.0/UDP [1111::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
To: <sip:interUEtransfer@example.net>
From: <sip:user1_public1@home1.net>;tag=223457
Call-ID: Asdasd23123377
Cseq: 112 REFER
Max-Forwards: 70
P-Preferred-Identity: <sip:user1_public1@home1.net>;
Refer-To: <sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333?body=
   m%3Daudio%200%20RTP%2FAVP%97%0Dm%3Dvideo%203002%20RTP%2FAVP%2098%2099>
Require: target-dialog
Target-dialog: cb03a0s09a2sdfglkj11111;remote-tag=27364;local-tag=11928
Referred-By: sip:user2_public1@home2.net
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>
Accept: application/sdp, message/sipfrag
Content-Length: 0
```

32-33. SIP 202 (Accepted) response (from SCC AS serving UE-1 to UE-1)

SCC-AS sends a SIP 202 (Accepted) response to UE-1 as response to the SIP REFER request.

34-40. SIP NOTIFY request (from UE-1 to UE-3)

The UE-1 sends a SIP NOTIFY request to the UE-3 to inform about the success status of sending the REFER.

41-47. SIP 200 (OK) response (from UE-3 to UE-1)

The UE-3 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the UE-1.

48-49. SIP NOTIFY request (from SCC AS serving UE-1 to UE-1)

The SCC-AS serving UE-1 sends a SIP NOTIFY request to UE-1 to notify implicit subscription to the SIP REFER request results.

50-51. SIP 200 (OK) response (from UE-1 to SCC AS serving UE-1)

The UE-1 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC-AS serving UE-1.

52-56. SIP INVITE request (from SCC-AS serving UE-1 to UE-3)

Since the message 30-31 contains a Refer-to header field addressed to UE-3 and the URI parameters, listing a video line which is not currently supported by UE-3, the SCC AS serving UE-1 realizes the procedure is for transferring the media from that controller UE (UE-1) to UE-3. The SCC-AS serving UE-1 sends a SIP INVITE request to the UE-3, to transfer the video media component.

Table 4.6.4.1.1.2.2-52: SIP INVITE request (SCC-AS serving UE-1 to UE-3)

```
INVITE sip:user2_public1@home2.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333 SIP/2.0
Via: SIP/2.0/UDP sccas1.home1.example.net; branch=z9hG4bK332b33.3;
To: sip:user2_public1@home2.net;
From: sip:interUEtransfer@example.net; tag=12486
Call-ID: cb03a0s09a2sdfglkj33333
Cseq: 115 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 3002 RTP/AVP 98 99
a=sendonly
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

57-61. SIP 200 (OK) response (from UE-3 to SCC-AS serving UE-1)

The target UE, UE-3, acknowledges the SIP INVITE request by sending a SIP 200 (OK) response to the SCC-AS serving UE-1.

Table 4.6.4.1.1.2.2-57: SIP 200 (OK) response (UE-3 to SCC-AS serving UE-1)

```
SIP/2.0 200 OK
Via:
To: sip:user2_public1@home2.net; tag = 24861
From: sip:interUEtransfer@example.net; tag = 12486
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.23.45.67
s=-
c=123.23.45.67
t=0 0
m=audio 0 RTP/AVP 97
m=video 1302 RTP/AVP 98 99
a=inactive
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

62-66. SIP ACK request (from SCC-AS serving UE-1 to target UE; UE-3)

The SCC-AS serving UE-1 sends a SIP ACK request to the UE-3.

67-68. SIP re-INVITE request (from SCC-AS serving UE-1 to controller UE; UE-1)

Table 4.6.4.1.1.2.2-67: SIP INVITE request (SCC-AS serving UE-1 to UE-1)

```
INVITE sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via:
To: sip:user1_public1@home1.net;Tag=11928
From: sip:userR_public1@homeR.net; tag=27364
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
a=sendonly
```

69-70. SIP 200 (OK) response (from controller UE, UE-1 to SCC-AS serving UE-1)

The UE-1 sends a SIP 200 (OK) response with an SDP answer.

Table 4.6.4.1.1.2.2-69: SIP 200 (OK) response (UE-1 to SCC-AS serving UE-1)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>;
   +g.3gpp.iut-controller
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
c=123.45.67.89
t=0 0
m=audio 0 RTP/AVP 97
m=video 1302 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
a=inactive
```

71-72. SIP ACK request (from SCC-AS serving UE-1 to controller UE; UE-1)

The SCC-AS serving UE-1 sends a SIP ACK request to the UE-1.

73-75. SIP re-INVITE request (from SCC-AS serving UE-1 to remote UE)

The SCC-AS serving UE-1 sends a SIP re-INVITE request to the remote UE.

Table 4.6.4.1.1.2.2-73: SIP INVITE request (SCC-AS serving UE-1 to remote UE)

```
INVITE sip:userR_public1@homeR.net SIP/2.0
Via:
To: sip:userR_public1@homeR.net;tag=27364
From: sip:user1_public1@home1.net;tag=11928
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: <sip:sccas1.home1.example.net>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 1300 RTP/AVP 96 97
c=IN IP4 123.112.67.87
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 123.23.45.67
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```
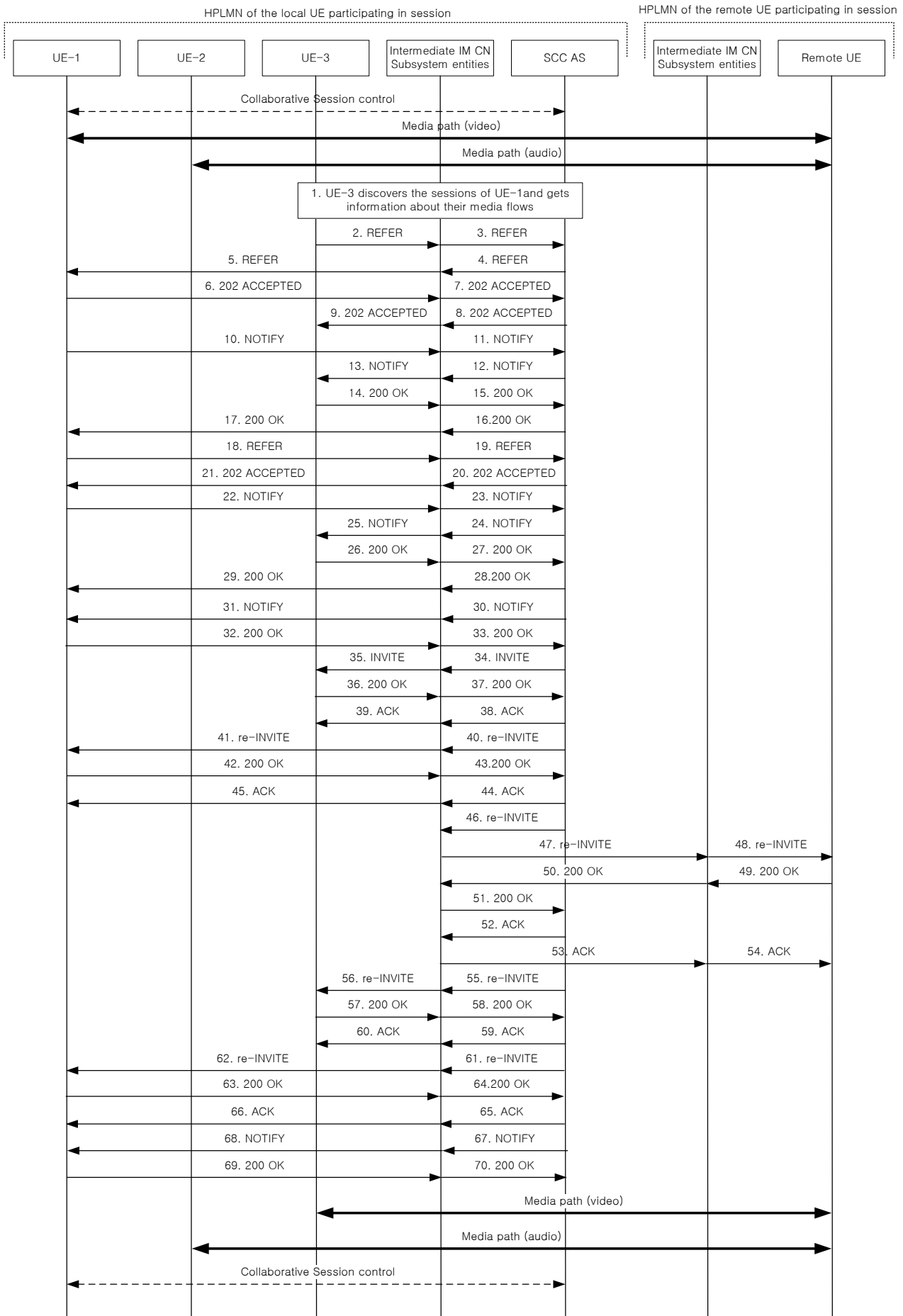
76-78. SIP 200 (OK) response (from remote UE to SCC-AS serving UE-1)

The remote UE acknowledges the SIP re-INVITE request by sending a SIP 200 (OK) response to the SCC-AS serving UE-1.

Table 4.6.4.1.1.2.2-76: SIP 200 (OK) response (remote UE to SCC-AS serving UE-1)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Asserted-Identity:
Contact: sip:userR_public1@homeR.net
Allow:
Content-Type: application/sdp
Content-Length: (…)


v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

79-81. SIP ACK request (from SCC-AS serving UE-1 to remote UE)

The SCC-AS serving UE-1 sends a SIP ACK request to the remote UE.

82-86. SIP re-INVITE request (from SCC-AS serving UE-1 to UE-3)

The SCC-AS serving UE-1 sends a SIP re-INVITE request to the UE-3.

Table 4.6.4.1.1.2.2-82: SIP INVITE request (SCC-AS serving UE-1 to UE-3)

```
INVITE sip:user2_public1@home2.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333 SIP/2.0
Via: SIP/2.0/UDP sccas1.home1.example.net; branch=z9hG4bK332b33.3;
To: sip:user2_public1@home2.net; tag = 24861
From: sip:interUEtransfer@example.net; tag=12486
Call-ID: cb03a0s09a2sdfglkj33333
Cseq: 111 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

87-91. SIP 200 (OK) response (from UE-3 to SCC-AS serving UE-1)

The UE-3 sends a SIP 200 (OK) response with an SDP answer.

Table 4.6.4.1.1.2.2-87: SIP 200 (OK) response (UE-3 to SCC-AS serving UE-1)

```
SIP/2.0 200 OK
Via:
To: sip:user2_public1@home2.net; tag = 24861
From: sip:interUEtransfer@example.net; tag = 12486
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.23.45.67
s=-
t=0 0
m=audio 0 RTP/AVP 97
m=video 1302 RTP/AVP 98 99
c=123.23.45.67
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

92-96. SIP ACK request (from SCC-AS serving UE-1 to UE-3)

The SCC-AS serving UE-1 sends a SIP ACK request to the UE-3.

97-98. SIP re-INVITE request (from SCC-AS serving UE-1 to UE-1)

The SCC-AS serving UE-1 sends a SIP re-INVITE request to the UE-1.

Table 4.6.4.1.1.2.2-97: SIP INVITE request (SCC-AS serving UE-1 to UE-1)

```
INVITE sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via:
To: sip:user1_public1@home1.net;Tag=11928
From: sip:userR_public1@homeR.net; tag=27364
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 0 RTP/AVP 98 99
```

99-100.   SIP 200 (OK) response (from UE-1 to SCC-AS serving UE-1)

The UE-1 sends a SIP 200 (OK) response with an SDP answer.

Table 4.6.4.1.1.2.2-99: SIP 200 (OK) response (UE-1 to SCC-AS serving UE-1)

```
SIP/2.0 200 OK
Via:
To: sip:user1_public1@home1.net; tag= 11928
From: sip:userR_public1@homeR.net; tag=27364
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public1@home1.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
c=123.45.67.89
t=0 0
m=audio 0 RTP/AVP 97
m=video 0 RTP/AVP 98 99
```

101-102.   SIP ACK request (from SCC-AS serving UE-1 to UE-1)

The SCC-AS sends a SIP ACK request to the UE-1.

103-104.   SIP NOTIFY request (from SCC-AS serving UE-1 to UE-1)

The SCC-AS serving UE-1 sends a SIP NOTIFY request to the UE-1 to inform about the success status of the inter-UE transfer from UE-1 to UE-3.

105-106.   SIP 200 (OK) response (from UE-1 to SCC-AS serving UE-1)

The UE-1 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC AS serving UE-1.

4.6.4.1.1.3   Alternative 3 (Based on SIP INVITE request)

This subclause describes the scenario when the Media flow is transferred from UE-1 to UE-3 requested by UE-3 and the UE-3 becomes a new controllee UE. The flow diagram shows when UE-1, UE-2, and UE-3 belong to the same subscription.

UE-1(123.45.67.89) and UE-2 (123.112.67.87) are included in a Collaborative Session with the remote UE (132.54.76.98), in which UE-1 is the controller UE and UE-2 is the controllee UE. Media paths exist between UE-1 and remote UE(video) and between UE-2 and remote UE(audio). The video component is bidirectional from the remote UE to the controller UE, UE-1. The UE-3(123.23.45.67) wants to pull the media flow between UE-1 and remote UE. After this procedure, the UE-3 will be in collaborative session.

Figure 4.6.4.1.1.3-1: Inter UE Transfer initiated by UE not participating in the collaborative session

NOTE: For clarity, the SIP 100 (Trying) responses are not shown in the signalling flow.

1. **UE-3 fetches the dialog information of UE-1 from SCC AS and decides to transfer the media-A (video) from UE-1 to itself.**

2-3. **SIP INVITE request (UE-3 to Intermediate IM CN subsystem entities)**

The UE-3 sends SIP INVITE request to UE-1.

Table 4.6.4.1.1.3-2: SIP INVITE request (UE-3 to Intermediate IM CN subsystem entities)

```
INVITE sip:sip:user1_public1@home1.net; SIP/2.0
Via: SIP/2.0/UDP [3333::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
Max-Forwards: 70
P-Preferred-Identity: <sip:user1_public3@home1.net>
From: <sip:user1_public3@home1.net>;tag=171828
To: <sip:user1_public1@home1.net>;
Call-ID: Asdasd23123366
Cseq: 41277 INVITE
Target-dialog: cb03a0s09a2sdfglkj11111;remote-tag=27364;local-tag=11928
Contact: <sip:user1_public3@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333>
Accept-Contact:+g.3gpp.iut-xyz;explicit;require
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.23.45.67
s=-
c=123.23.45.67
t=0 0
m=video 1302 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H.263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

Editor's Note: 3gpp.iut.transfer: collaborative pull-controller receiver is to be specified.

4-5. **SIP re-INVITE request (SCC AS to remote UE)**

The SCC AS sends the SIP re-INVITE request to the remote UE to update the session.

Table 4.6.4.1.1.3-4 SIP INVITE request (SCC AS to remote UE, UE-4)

```
INVITE sip:user4_public1@home2.net SIP/2.0
Via:
To: sip:user4_public1@home2.net;tag=27364
From: sip:user1_public1@home1.net;tag=11928
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: <sip:interUEtransfer@sccas1.home1.net>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 1300 RTP/AVP 96 97
c=IN IP4 123.112.67.87
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 123.23.45.67
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

6-7. SIP 200 (OK) response for the SIP re-INVITE request (Remote UE to SCC AS)

Remote UE responds with SIP 200 (OK) response to SCC AS.

Table 4.6.4.1.1.3-6: SIP 200 (OK) response (remote UE to SCC AS)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Asserted-Identity:
Contact: sip:user4_public1@home2.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

8-9. SIP 200 (OK) response for the SIP INVITE request (SCC AS to UE-3)

The SCC AS responds with SIP 200 (OK) response to UE-3.

10-13. SIP ACK request (UE-3 to remote UE)

The UE-3 sends the SIP ACK request to remote UE

14-15. SIP re-INVITE request (SCC-AS to UE-1)

The SCC-AS updates the access leg on controller UE-1, and the collaborative session control is kept in the controller UE-1.

Table 4.6.4.1.1.3-14: SIP INVITE request (SCC AS to UE-1)

```
INVITE sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via:
To: sip:user1_public1@home1.net;Tag=11928
From: sip:user4_public1@home2.net; tag=27364
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:interUEtransfer@sccas1.home1.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 0 RTP/AVP 98 99
```

16-17. SIP 200 (OK) response to re-INVITE request (UE-1 to SCC-AS)

After successful media update, UE-1 sends the SIP 200 (OK) reponse towards SCC-AS.

Table 4.6.4.1.1.2-69: SIP 200 (OK) response (UE-1 to SCC AS-1 serving UE-1)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>;
   +g.3gpp.iut-controller
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
c=123.45.67.89
t=0 0
m=audio 0 RTP/AVP 97
m=video 0 RTP/AVP 98 99
```

18-19. SIP ACK request (SCC-AS to UE-1)

The SCC AS sends the SIP ACK request to UE-1.

4.6.4.1.2 Media flows transfer initiated when no collaborative session has been established

4.6.4.1.2.1 Alternative 1 (REFER with media feature tag)

4.6.4.1.2.1.1 Same subscription

This subclause describes the scenario when the media flow is transferred from UE-1 to UE-2 requested by UE-2. The flow diagram shows when UE-1 and UE-2 belong to the same subscription.

Media path exist between UE-1(123.45.67.89) and Remote UE(132.54.76.98). UE-2(123.112.67.87) wants to pull the video media flow between UE-1 and Remote-UE. After this procedure, collaborative session will be established.
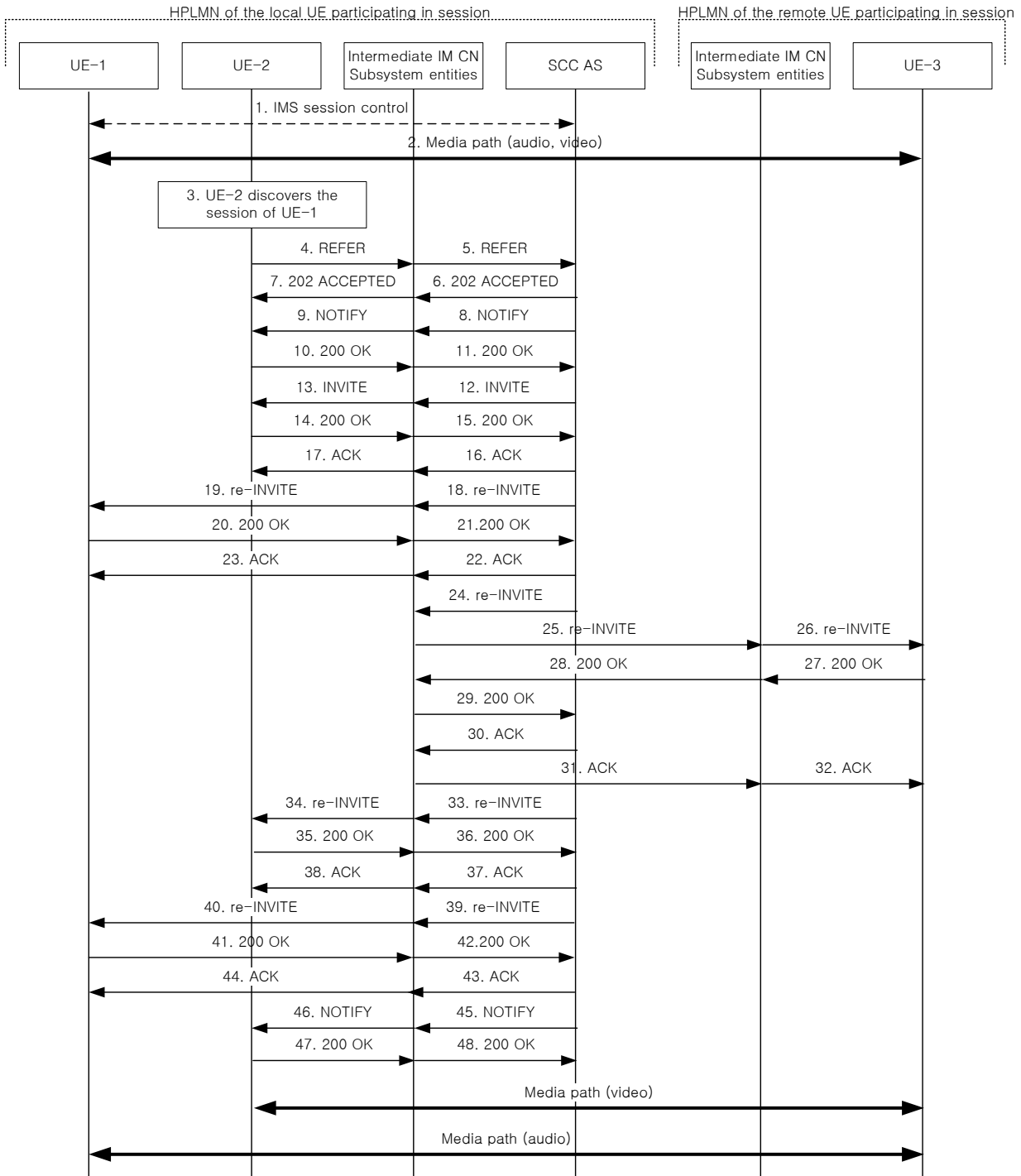
Figure 4.6.4.1.2.1.1-1 Signalling flow for Media flow transfer initiated when no collaborative session has been established

1-2. UE-1 is in session with Remote UE

There is a multimedia session comprising audio and video media between the UE-1 and the Remote UE anchored at SCC AS.

3. UE-2 discovers the session of UE-1

4-5. SIP REFER request (from UE-2 to SCC AS)

The UE-2 sends SIP REFER request to the UE-1 to request the media transfer from UE-1 to UE-2. The SIP REFER request is routed to the SCC AS by filter criteria. The SCC AS does not route the SIP REFER request to the address set in the Request-URI if there is the g.3gpp.iut-xyz media feature tag in the Accept-Contact header field.

Table 4.6.4.1.2.1.1-4: SIP REFER request (UE-2 to SCC AS)

```
REFER sip:user1_public1@home1.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via: SIP/2.0/UDP [3333::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
To: <sip: user1_public1@home1.net>
From: <sip:user1_public2@home1.net>;tag=294756
Call-ID: Asdasd23123366
Cseq: 4897924 REFER
Max-Forwards: 70
P-Preferred-Identity: <sip:user1_public2@home1.net>;
Refer-To: <sip:user1_public2@home1.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222?body=
    m%3Daudio%200%20RTP%2FAVP%97%0Dm%3Dvideo%203002%20RTP%2FAVP%2098%2099>
Require: target-dialog
Target-dialog: cb03a0s09a2sdfglkj11111;remote-tag=27364;local-tag=11928
Referred-By: sip:user1_public2@home1.net
Contact: sip:user1_public2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222
Accept-Contact: +g.3gpp.iut-xyz;explicit;require
Accept: application/sdp, message/sipfrag
Content-Length: 0
```

6-7. SIP 202 (Accepted) response (from SCC AS to UE-2)

SCC AS sends a SIP 202 (Accepted) response to UE-2 as response to the SIP REFER request.

8-9. SIP NOTIFY request (from SCC AS to UE-2)

The SCC AS sends a SIP NOTIFY request to UE-2 to notify implicit subscription to the SIP REFER request results.

10-11. SIP 200 (OK) response (from UE-2 to SCC AS)

The UE-2 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC AS.

12-13. SIP INVITE request (from SCC AS to UE-2)

Since the 4-5 SIP REFER request contains a Refer-to header field addressed to UE-2 and the URI parameters, listing a video line which is transferred and an audio line with port number set to zero which is not transferred, The SCC-AS sends a SIP INVITE request to the UE-2, to transfer the video media component. In order to avoid to UE-2 to start sending video to the Remote UE, the SCC AS add an a line to sendonly in the SDP offer.

Table 4.6.4.1.2.1.1-12: SIP INVITE request (SCC-AS to UE-2)

```
INVITE sip:user1_public2@home1.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222 SIP/2.0
Via: SIP/2.0/UDP sccas.home1.net; branch=z9hG4bK332b33.3;
To: sip:user1_public2@home1.net;
From: sip:interUEtransfer@sccas1.home1.net; tag=27365
Call-ID: cb03a0s09a2sdfglkj22222
Cseq: 111 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:interUEtransfer@sccas1.home1.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 3002 RTP/AVP 98 99
a=sendonly
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

14-15. SIP 200 (OK) response (from UE-2 to SCC-AS)

The target UE, UE-2, acknowledges the SIP INVITE request by sending a SIP 200 (OK) response to the SCC AS.

Table 4.6.4.1.2.1.1-14: SIP 200 (OK) response (UE-2 to SCC AS)

```
SIP/2.0 200 OK
Via:
To: sip:user1_public2@home1.net; tag=36527
From: sip:interUEtransfer@sccas1.home1.net; tag=27365
Call-ID: cb03a0s09a2sdfglkj22222
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.112.67.87
s=-
c=123.112.67.87
t=0 0
m=audio 0 RTP/AVP 97
m=video 1302 RTP/AVP 98 99
a=inactive
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

16-17. SIP ACK request (from SCC AS to UE-2)

The SCC AS sends a SIP ACK request to the UE-2.

18-19. SIP re-INVITE request (from SCC AS to UE-1)

The SCC-AS sends a SIP re-INVITE request to the UE-1 to hold the video media session to be transferred.

Table 4.6.4.1.2.1.1-18: SIP INVITE request (SCC AS to UE-1)

```
INVITE sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via:
To: sip:user1_public1@home1.net;Tag=11928
From: sip:userR_public1@home2.net; tag=27364
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:interUEtransfer@sccas1.home1.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=video 3002 RTP/AVP 98 99
a=sendonly
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=audio 3000 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
```

20-21. SIP 200 (OK) response (from UE-1 to SCC AS)

The UE-1 sends a SIP 200 (OK) response with an SDP answer.

Table 4.6.4.1.2.1.1-20: SIP 200 (OK) response (UE-1 to SCC AS)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>;
   +g.3gpp.iut-controller
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
c=123.45.67.89
t=0 0
m=audio 1300 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1202 RTP/AVP 98 99
a=inactive
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

22-23. SIP ACK request (from SCC AS to UE-1)

The SCC AS sends a SIP ACK request to the UE-1.

24-26. SIP re-INVITE request (from SCC AS to remote UE)

The SCC AS sends a SIP re-INVITE request to the remote UE.

Table 4.6.4.1.2.1.1-24: SIP INVITE request (SCC AS to remote UE)

```
INVITE sip:userR_public1@home2.net SIP/2.0
Via:
To: sip:userR_public1@home2.net;tag=27364
From: sip:user1_public1@home1.net;tag=11928
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: <sip:interUEtransfer@sccas1.home1.net>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 1300 RTP/AVP 96 97
c=IN IP4 123.45.67.89
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 123.112.67.87
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

27-29. SIP 200 (OK) response (from Remote UE to SCC AS)

The Remote UE acknowledges the SIP re-INVITE request by sending a SIP 200 (OK) response to the SCC AS.

Table 4.6.4.1.2.1.1-27: SIP 200 (OK) response (Remote UE to SCC AS)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Asserted-Identity:
Contact: sip:userR_public1@home2.net
Allow:
Content-Type: application/sdp
Content-Length: (…)


v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

30-32. SIP ACK request (from SCC AS to Remote UE)

The SCC-AS sends a SIP ACK request to the Remote UE.

33-34. SIP re-INVITE request (from SCC AS to UE-2)

The SCC AS sends a SIP re-INVITE request to UE-2 to activate the video media component.

Table 4.6.4.1.2.1.1-33: SIP INVITE request (SCC AS to UE-2)

```
INVITE sip:user1_public2@home1.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222 SIP/2.0
Via: SIP/2.0/UDP sccas.home1.net; branch=z9hG4bK332b33.3;
To: sip:user1_public2@home1.net; tag=36527
From: sip:interUEtransfer@sccas1.home1.net; tag=27365
Call-ID: cb03a0s09a2sdfglkj22222
Cseq: 112 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:interUEtransfer@sccas1.home1.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

35-36. SIP 200 (OK) response (from UE-2 to SCC AS)

The UE-2 sends a SIP 200 (OK) response to the SCC AS.

Table 4.6.4.1.2.1.1-35: SIP 200 (OK) response (UE-2 to SCC AS)

```
SIP/2.0 200 OK
Via:
To: sip:user1_public2@home1.net; tag=36527
From: sip:interUEtransfer@sccas1.home1.net; tag=27365
Call-ID: cb03a0s09a2sdfglkj22222
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.112.67.87
s=-
c=123.112.67.87
t=0 0
m=audio 0 RTP/AVP 97
m=video 1302 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

37-38. SIP ACK request (from SCC AS to UE-2)

The SCC AS sends a SIP ACK request to the UE-2.

40-41. SIP re-INVITE request (from SCC AS to UE-1)

The SCC-AS sends a SIP re-INVITE request to the UE-1 to release the video media component.

Table 4.6.4.1.2.1.1-40: SIP INVITE request (SCC AS to UE-1)

```
INVITE sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via:
To: sip:user1_public1@home1.net;Tag=11928
From: sip:userR_public1@home2.net; tag=27364
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:interUEtransfer@sccas1.home1.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 0 RTP/AVP 98 99
```

41-42. SIP 200 (OK) response (from UE-1 to SCC AS)

The UE-1 sends a SIP 200 (OK) response with an SDP answer.

Table 4.6.4.1.2.1.1-41: SIP 200 (OK) response (UE-1 to SCC AS)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>;
    +g.3gpp.iut-controller
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
c=123.45.67.89
t=0 0
m=audio 1300 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 0 RTP/AVP 98 99
```

43-44. SIP ACK request (from SCC AS to UE-1)

The SCC AS sends a SIP ACK request to the UE-1.

45-46. SIP NOTIFY request (from SCC AS to UE-2)

The SCC AS sends a SIP NOTIFY request to the UE-2 to inform about success status of transferring the media from UE-1 to the UE-2.

47-48. SIP 200 (OK) response (from UE-2 to SCC AS)

The UE-2 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC AS.

4.6.4.1.2.1.2   Different subscription

This subclause describes the scenario when the media flow is transferred from UE-1 to UE-2 requested by UE-2. The flow diagram shows when UE-1 and UE-2 belong to the different subscription.

Media path exist between UE-1(123.45.67.89) and Remote UE(132.54.76.98). UE-2(123.112.67.87) wants to pull the video media flow between UE-1 and Remote-UE. After this procedure, collaborative session will be established.

HPLMN of the local UE participating in session HPLMN of the remote UE participating in session

| UE-1 | Intermediate IM CN Subsystem entities | SCC AS-1 | UE-2 | Intermediate IM CN Subsystem entities | SCC AS-2 | Intermediate IM CN Subsystem entities | UE-3 |

1. IMS session control

2. Media path (audio, video)

3. UE-2 discovers the session of UE-1

4. REFER

5. REFER

7. REFER

6. REFER

8. REFER

9. 202 ACCEPTED

10. 202 ACCEPTED

11. 202 ACCEPTED

13. 202 ACCEPTED

12. 202 ACCEPTED

14. NOTIFY

15. NOTIFY

16. NOTIFY

18. NOTIFY

17. NOTIFY

19. 200 OK

20. 200 OK

22. 200 OK

21. 200 OK

23. 200 OK

24. INVITE

25. INVITE

26. INVITE

28. INVITE

27. INVITE

29. 200 OK

30. 200 OK

32. 200 OK

31. 200 OK

33. 200 OK

34. ACK

35. ACK

36. ACK

38. ACK

37. ACK

40. re-INVITE

39. re-INVITE

41. 200 OK

42. 200 OK

44. ACK

43. ACK

45. re-INVITE

46. re-INVITE

47. re-INVITE

49. 200 OK

48. 200 OK

50. 200 OK

51. ACK

52. ACK

53. ACK

54. re-INVITE

55. re-INVITE

56. re-INVITE

58. re-INVITE

57. re-INVITE

59. 200 OK

60. 200 OK

62. 200 OK

61. 200 OK

63. 200 OK

64. ACK

65. ACK

66. ACK

68. ACK

67. ACK

70. re-INVITE

69. re-INVITE

71. 200 OK

72. 200 OK

74. ACK

73. ACK

75. NOTIFY

76. NOTIFY

77. NOTIFY

79. NOTIFY

78. NOTIFY

80. 200 OK

81. 200 OK

83. 200 OK

82. 200 OK

84. 200 OK

Collaborative session control

Media path (video)

Media path (audio)

Figure 4.6.4.1.2.1.2-1: Signalling flow for Media flow transfer initiated when no collaborative session has been established

3GPP

1-2. **UE-1 is in session with Remote UE**

There is a multimedia session comprising audio and video media between the UE-1 and the Remote UE anchored at SCC AS.

3. **UE-2 discovers the session of UE-1**

4-8. **SIP REFER request (from UE-2 to SCC AS serving UE-1)**

The UE-2 sends SIP REFER request to the UE-1 to request the media transfer from UE-1 to UE-2. The SIP REFER request is finally routed to the SCC AS serving UE-1.

Table 4.6.4.1.2.1.2-4: SIP REFER request (UE-2 to SCC AS serving UE-1)

```
REFER sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via: SIP/2.0/UDP [2222::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
To: <sip: user1_public1@home1.net >
From: <sip:user2_public1@home2.net>;tag=294756
Call-ID: Asdasd23123366
Cseq: 4897924 REFER
Max-Forwards: 70
P-Preferred-Identity: <sip:user2_public1@home2.net>;
Refer-To: <sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222?body=
    m%3Daudio%200%20RTP%2FAVP%97%0Dm%3Dvideo%203002%20RTP%2FAVP%2098%2099>
Referred-By: sip:user2_public1@home2.net
Contact: sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222
Accept-Contact:+g.3gpp.iut-xyz;explicit;require
Accept: application/sdp, message/sipfrag
Content-Length: 0
```

9-13. **SIP 202 (Accepted) response (from UE-1 to UE-2)**

UE-1 sends a SIP 202 (Accepted) response to UE-2 as response to the SIP REFER request.

14-18. **SIP NOTIFY request (from UE-1 to UE-2)**

The UE-1 sends a SIP NOTIFY request to UE-2 to notify implicit subscription to the SIP REFER request results.

19-23. **SIP 200 (OK) response (from UE-2 to UE-1)**

The UE-2 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the UE-1.

24-28. **SIP INVITE request (from SCC AS serving UE-1 to UE-2)**

Since the 4-8 SIP REFER request contains a Refer-to header field addressed to UE-2 and the URI parameters, listing a video line which is transferred and an audio line with port number set to zero which is not transferred, the SCC-AS serving UE-1 sends a SIP INVITE request to the UE-2, to transfer the video media component. In order to avoid to UE-2 to start sending video to the Remote UE, the SCC AS serving UE-1 adds an a line to sendonly in the SDP offer.

Table 4.6.4.1.2.1.2-24: SIP INVITE request (SCC AS serving UE-1 to UE-2)

```
INVITE sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222 SIP/2.0
Via: SIP/2.0/UDP sccas1.home1.example.net;branch=z9hG4bK332b33.3;
To: sip:user2_public1@home2.net;
From: sip:interUEtransfer@example.net;tag=27365
Call-ID: cb03a0s09a2sdfglkj22222
Cseq: 111 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 3002 RTP/AVP 98 99
a=sendonly
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

29-33. SIP 200 (OK) response (from UE-2 to SCC-AS serving UE-1)

The target UE, UE-2, acknowledges the SIP INVITE request by sending a SIP 200 (OK) response to the SCC AS serving UE-1.

Table 4.6.4.1.2.1.2-29: SIP 200 (OK) response (UE-2 to SCC AS serving UE-1)

```
SIP/2.0 200 OK
Via:
To: sip:user2_public1@home2.net; tag=36527
From: sip:interUEtransfer@example.net; tag=27365
Call-ID: cb03a0s09a2sdfglkj22222
CSeq:
P-Preferred-Identity:
Contact: <sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.112.67.87
s=-
c=123.112.67.87
t=0 0
m=audio 0 RTP/AVP 97
m=video 1302 RTP/AVP 98 99
a=inactive
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

34-38. SIP ACK request (from SCC AS serving UE-1 to UE-2)

The SCC AS serving UE-1 sends a SIP ACK request to the UE-2.

39-40. SIP re-INVITE request (from SCC AS serving UE-1 to UE-1)

The SCC-AS serving UE-1 sends a SIP re-INVITE request to the UE-1 to hold the video media session to be transferred.

Table 4.6.4.1.2.1.2-39: SIP INVITE request (SCC AS serving UE-1 to UE-1)

```
INVITE sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via:
To: sip:user1_public1@home1.net;Tag=11928
From: sip:userR_public1@homeR.net; tag=27364
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 3002 RTP/AVP 98 99
a=sendonly
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

41-42. SIP 200 (OK) response (from UE-1 to SCC AS serving UE-1)

The UE-1 sends a SIP 200 (OK) response with an SDP answer.

Table 4.6.4.1.2.1.2-41: SIP 200 (OK) response (UE-1 to SCC AS serving UE-1)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>;
    +g.3gpp.iut-controller
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
c=123.45.67.89
t=0 0
m=audio 1300 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1202 RTP/AVP 98 99
a=inactive
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

43-44. SIP ACK request (from SCC AS serving UE-1 to UE-1)

The SCC AS serving UE-1 sends a SIP ACK request to the UE-1.

45-47. SIP re-INVITE request (from SCC AS serving UE-1 to remote UE)

The SCC AS serving UE-1 sends a SIP re-INVITE request to the remote UE.

Table 4.6.4.1.2.1.2-45: SIP INVITE request (SCC AS serving UE-1 to remote UE)

```
INVITE sip:userR_public1@homeR.net SIP/2.0
Via:
To: sip:userR_public1@homeR.net;tag=27364
From: sip:user1_public1@home1.net;tag=11928
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: <sip:sccas1.home1.example.net>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 1300 RTP/AVP 96 97
c=IN IP4 123.45.67.89
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 123.112.67.87
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

48-50. SIP 200 (OK) response (from Remote UE to SCC AS serving UE-1)

The Remote UE acknowledges the SIP re-INVITE request by sending a SIP 200 (OK) response to the SCC AS serving UE-1.

Table 4.6.4.1.2.1.2-48: SIP 200 (OK) response (Remote UE to SCC AS serving UE-1)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Asserted-Identity:
Contact: sip:userR_public1@homeR.net
Allow:
Content-Type: application/sdp
Content-Length: (…)


v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

51-53. SIP ACK request (from SCC AS serving UE-1 to Remote UE)

The SCC-AS serving UE-1 sends a SIP ACK request to the Remote UE.

54-58. SIP re-INVITE request (from SCC AS serving UE-1 to UE-2)

The SCC AS serving UE-1 sends a SIP re-INVITE request to UE-2 to activate the video media component.

Table 4.6.4.1.2.1.2-54: SIP INVITE request (SCC AS serving UE-1 to UE-2)

```
INVITE sip:user2_public1@home2.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222 SIP/2.0
Via: SIP/2.0/UDP sccas1.home1.example.net; branch=z9hG4bK332b33.3;
To: sip:user2_public1@home2.net; tag=36527
From: sip:interUEtransfer@example.net; tag=27365
Call-ID: cb03a0s09a2sdfglkj22222
Cseq: 112 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

59-63. SIP 200 (OK) response (from UE-2 to SCC AS serving UE-1)

The UE-2 sends a SIP 200 (OK) response to the SCC AS serving UE-1.

Table 4.6.4.1.2.1.2-59: SIP 200 (OK) response (UE-2 to SCC AS serving UE-1)

```
SIP/2.0 200 OK
Via:
To: sip:user2_public1@home2.net; tag=36527
From: sip:interUEtransfer@example.net; tag=27365
Call-ID: cb03a0s09a2sdfglkj22222
CSeq:
P-Preferred-Identity:
Contact: <sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.112.67.87
s=-
c=123.112.67.87
t=0 0
m=audio 0 RTP/AVP 97
m=video 1302 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

64-68. SIP ACK request (from SCC AS serving UE-1 to UE-2)

The SCC AS serving UE-1 sends a SIP ACK request to the UE-2.

69-70. SIP re-INVITE request (from SCC AS serving UE-1 to UE-1)

The SCC-AS serving UE-1 sends a SIP re-INVITE request to the UE-1 to release the video media component.

Table 4.6.4.1.2.1.2-69: SIP INVITE request (SCC AS serving UE-1 to UE-1)

```
INVITE sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via:
To: sip:user1_public1@home1.net;Tag=11928
From: sip:userR_public1@homeR.net; tag=27364
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 0 RTP/AVP 98 99
```

71-72. SIP 200 (OK) response (from UE-1 to SCC AS serving UE-1)

The UE-1 sends a SIP 200 (OK) response with an SDP answer.

Table 4.6.4.1.2.1.2-71: SIP 200 (OK) response (UE-1 to SCC AS serving UE-1)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>;
    +g.3gpp.iut-controller
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
c=123.45.67.89
t=0 0
m=audio 1300 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 0 RTP/AVP 98 99
```

73-74. SIP ACK request (from SCC AS serving UE-1 to UE-1)

The SCC AS serving UE-1 sends a SIP ACK request to the UE-1.

75-79. SIP NOTIFY request (from SCC AS serving UE-1 to UE-2)

The SCC AS serving UE-1 sends a SIP NOTIFY request to the UE-2 to inform about success status of transferring the media from UE-1 to the UE-2.

80-84. SIP 200 (OK) response (from UE-2 to SCC AS serving UE-1)

The UE-2 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC AS serving UE-1.

4.6.4.1.2.2   Alternative 2 (SIP REFER with method= REFER)

4.6.4.1.2.2.1   Same subscription

This subclause describes the scenario when the media flow is transferred from UE-1 to UE-2 requested by UE-2. The flow diagram shows when UE-1 and UE-2 belong to the same subscription.

Media path exists between UE-1(123.45.67.89) and Remote UE(132.54.76.98). UE-2(123.112.67.87) wants to pull the video media flow between UE-1 and Remote-UE. After this procedure, collaborative session will be established.

HPLMN of the local UE participating in session   HPLMN of the remote UE participating in session

| UE-1 | UE-2 | Intermediate IM CN Subsystem entities | SCC AS | Intermediate IM CN Subsystem entities | UE-3 |

1. IMS session control

2. Media path (audio, video)

3. UE-2 discovers the Session of UE-1 and gets information about its media flows

4. REFER   5. REFER

7. REFER   6. REFER

8. 202 ACCEPTED   9. 202 ACCEPTED

11. 202 ACCEPTED   10. 202 ACCEPTED

12. NOTIFY   13. NOTIFY

15. NOTIFY   14. NOTIFY

16. 200 OK   17. 200 OK

19. 200 OK   18. 200 OK

20. REFER   21. REFER

23. 202 ACCEPTED   22. 202 ACCEPTED

24. NOTIFY   25. NOTIFY

27. NOTIFY   26. NOTIFY

28. 200 OK   29. 200 OK

31. 200 OK   30. 200 OK

33. NOTIFY   32. NOTIFY

34. 200 OK   35. 200 OK

37. INVITE   36. INVITE

38. 200 OK   39. 200 OK

41. ACK   40. ACK

43. re-INVITE   42. re-INVITE

44. 200 OK   45. 200 OK

47. ACK   46. ACK

48. re-INVITE

49. re-INVITE   50. re-INVITE

52. 200 OK   51. 200 OK

53. 200 OK

54. ACK

55. ACK   56. ACK

58. re-INVITE   57. re-INVITE

59. 200 OK   60. 200 OK

62. ACK   61. ACK

64. re-INVITE   63. re-INVITE

65. 200 OK   66. 200 OK

68. ACK   67. ACK

70. NOTIFY   69. NOTIFY

71. 200 OK   72. 200 OK

Media path (video)

Media path (audio)

Figure 4.6.4.1.2.2.1-1: Signalling flow for Media flow transfer initiated when no collaborative session has been established

1-2. UE-1 is in session with Remote UE

There is a multimedia session comprising audio and video media between the UE-1 and the Remote UE anchored at SCC AS.

3. UE-2 discovers the session of UE-1

4-7. SIP REFER request (from UE-2 to UE-1)

The UE-2 sends SIP REFER (referred REFER) request to the local UE, UE-1 to request the media transfer from UE-1 to UE-2.

Table 4.6.4.1.2.2.1-4: SIP REFER request (UE-2 to UE-1)

```
REFER sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via: SIP/2.0/UDP [2222::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
To: <sip:user1_public1@home1.net>
From: <sip:user1_public2@home1.net>;tag=294756
Call-ID: Asdasd23123366
Cseq: 4897924 REFER
Max-Forwards: 70
P-Preferred-Identity: <sip:user1_public2@home1.net>;
Refer-To: <sip:interUEtransfer@example.net;method=REFER?
   To=%3CinterUEtransfer%40example.net%3E%3BFrom%3Csip:user1_public1%40home1.net%3BRefer-
   To%3Csip:user1_public2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222?body=
   m%3Daudio%200%20RTP%2FAVP%97%0Dm%3Dvideo%203002%20RTP%2FAVP%2098%2099>
Referred-By: sip:user1_public2@home1.net
Contact: <sip:user1_public2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222>
Accept: application/sdp, message/sipfrag
Content-Length: 0
```

8-11. SIP 202 (Accepted) response (from UE-1 to UE-2)

UE-1 sends a SIP 202 (Accepted) response to UE-2 as response to the SIP REFER request.

12-15. SIP NOTIFY request (from UE-1 to UE-2)

The UE-1 sends a SIP NOTIFY request to UE-2 to notify implicit subscription to the SIP REFER request results.

16-19. SIP 200 (OK) response (from UE-2 to UE-1)

The UE-2 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the UE-1.

20-21. SIP REFER request (from UE-1 to SCC AS)

The UE-1 send SIP REFER request to SCC AS to request the media transfer from UE-1 to UE-2.

Table 4.6.4.1.2.2.1-20: SIP REFER request (UE-1 to SCC AS)

```
REFER sip:interUEtransfer@sccas1.home1.net SIP/2.0
Via: SIP/2.0/UDP [1111::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
To: <sip:interUEtransfer@example.net>
From: <sip:user1_public1@home1.net>;tag=223457
Call-ID: Asdasd23123377
Cseq: 112 REFER
Max-Forwards: 70
P-Preferred-Identity: <sip:user1_public1@home1.net>;
Refer-To: <sip:user1_public2@home1.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222?body=
   m%3Daudio%200%20RTP%2FAVP%97%0Dm%3Dvideo%203002%20RTP%2FAVP%2098%2099>
Require: target-dialog
Target-dialog: cb03a0s09a2sdfglkj11111;remote-tag=27364;local-tag=11928
Referred-By: sip:user1_public2@home1.net
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>
Accept: application/sdp, message/sipfrag
Content-Length: 0
```

22-23. SIP 202 (Accepted) response (from SCC AS to UE-1)

SCC AS sends a SIP 202 (Accepted) response to UE-1 as response to the SIP REFER request.

24-27. SIP NOTIFY request (from UE-1 to UE-2)

The UE-1 sends a SIP NOTIFY request to the UE-2 to inform about the success status of sending the REFER.

28-31. SIP 200 (OK) response (from UE-2 to UE-1)

The UE-2 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the UE-1.

32-33. SIP NOTIFY request (from SCC AS to UE-1)

SCC AS sends a SIP NOTIFY request to UE-1 to notify implicit subscription to the SIP REFER request results.

34-35. SIP 200 (OK) response (from UE-1 to SCC AS)

The UE-1 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC AS.

36-37. SIP INVITE request (from SCC AS to UE-2)

Since the 20-21 SIP REFER request contains a Refer-to header field addressed to UE-2 and the URI parameters, listing a video line which is transferred and an audio line with port number set to zero which is not transferred, The SCC AS sends a SIP INVITE request to the UE-2, to transfer the video media component. In order to avoid to UE-2 to start sending video to the Remote UE, the SCC AS adds an a line to sendonly in the SDP offer.

Table 4.6.4.1.2.2.1-36: SIP INVITE request (SCC AS to UE-2)

```
INVITE sip:user1_public2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222 SIP/2.0
Via: SIP/2.0/UDP sccas1.home1.example.net;branch=z9hG4bK332b33.3;
To: sip:user1_public2@home1.net;
From: sip:interUEtransfer@example.net;tag=27365
Call-ID: cb03a0s09a2sdfglkj22222
Cseq: 111 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 3002 RTP/AVP 98 99
a=sendonly
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

38-39. SIP 200 (OK) response (from UE-2 to SCC AS)

The target UE, UE-2, acknowledges the SIP INVITE request by sending a SIP 200 (OK) response to the SCC AS.

Table 4.6.4.1.2.2.1-38: SIP 200 (OK) response (UE-2 to SCC AS)

```
SIP/2.0 200 OK
Via:
To: sip:user1_public2@home1.net; tag=36527
From: sip:interUEtransfer@example.net; tag=27365
Call-ID: cb03a0s09a2sdfglkj22222
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.112.67.87
s=-
c=123.112.67.87
t=0 0
m=audio 0 RTP/AVP 97
m=video 1302 RTP/AVP 98 99
a=inactive
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

40-41. SIP ACK request (from SCC AS to UE-2)

The SCC AS sends a SIP ACK request to the UE-2.

42-43. SIP re-INVITE request (from SCC AS to UE-1)

The SCC AS sends a SIP re-INVITE request to the UE-1 to hold the video media session to be transferred.

Table 4.6.4.1.2.2.1-42: SIP INVITE request (SCC AS to UE-1)

```
INVITE sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via:
To: sip:user1_public1@home1.net;Tag=11928
From: sip:userR_public1@homeR.net; tag=27364
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 3002 RTP/AVP 98 99
a=sendonly
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

44-45. SIP 200 (OK) response (from UE-1 to SCC AS)

The UE-1 sends a SIP 200 (OK) response with an SDP answer.

Table 4.6.4.1.2.2.1-44: SIP 200 (OK) response (UE-1 to SCC AS)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>;
    +g.3gpp.iut-controller
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
c=123.45.67.89
t=0 0
m=audio 1300 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1202 RTP/AVP 98 99
a=inactive
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

46-47. SIP ACK request (from SCC AS to UE-1)

The SCC AS sends a SIP ACK request to the UE-1.

48-50. SIP re-INVITE request (from SCC AS to remote UE)

The SCC AS sends a SIP re-INVITE request to the remote UE.

Table 4.6.4.1.2.2.1-48: SIP INVITE request (SCC AS to remote UE)

```
INVITE sip:userR_public1@homeR.net SIP/2.0
Via:
To: sip:userR_public1@homeR.net;tag=27364
From: sip:user1_public1@home1.net;tag=11928
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: <sip:sccas1.home1.example.net>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 1300 RTP/AVP 96 97
c=IN IP4 123.45.67.89
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 123.112.67.87
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

51-53. SIP 200 (OK) response (from Remote UE to SCC AS)

The Remote UE acknowledges the SIP re-INVITE request by sending a SIP 200 (OK) response to the SCC AS.

Table 4.6.4.1.2.2.1-51: SIP 200 (OK) response (Remote UE to SCC AS)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Asserted-Identity:
Contact: sip:userR_public1@homeR.net
Allow:
Content-Type: application/sdp
Content-Length: (…)


v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

54-56. SIP ACK request (from SCC AS to Remote UE)

The SCC AS sends a SIP ACK request to the Remote UE.

57-58. SIP re-INVITE request (from SCC AS to UE-2)

The SCC AS sends a SIP re-INVITE request to UE-2 to activate the video media component.

Table 4.6.4.1.2.2.1-57: SIP INVITE request (SCC AS to UE-2)

```
INVITE sip:user1_public2@home1.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222 SIP/2.0
Via: SIP/2.0/UDP sccas1.home1.net; branch=z9hG4bK332b33.3;
To: sip:user1_public2@home1.net; tag=36527
From: sip:interUEtransfer@example.net; tag=27365
Call-ID: cb03a0s09a2sdfglkj22222
Cseq: 112 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

59-60. SIP 200 (OK) response (from UE-2 to SCC AS)

The UE-2 sends a SIP 200 (OK) response to the SCC AS.

Table 4.6.4.1.2.2.1-59: SIP 200 (OK) response (UE-2 to SCC AS)

```
SIP/2.0 200 OK
Via:
To: sip:user1_public2@home1.net; tag=36527
From: sip:interUEtransfer@example.net; tag=27365
Call-ID: cb03a0s09a2sdfglkj22222
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.112.67.87
s=-
c=123.112.67.87
t=0 0
m=audio 0 RTP/AVP 97
m=video 1302 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

61-62. SIP ACK request (from SCC AS to UE-2)

The SCC AS sends a SIP ACK request to the UE-2.

63-64. SIP re-INVITE request (from SCC AS to UE-1)

The SCC AS sends a SIP re-INVITE request to the UE-1 to release the video media component.

Table 4.6.4.1.2.2.1-63: SIP INVITE request (SCC AS to UE-1)

```
INVITE sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via:
To: sip:user1_public1@home1.net;Tag=11928
From: sip:userR_public1@homeR.net; tag=27364
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 0 RTP/AVP 98 99
```

65-66. SIP 200 (OK) response (from UE-1 to SCC AS)

The UE-1 sends a SIP 200 (OK) response with an SDP answer.

Table 4.6.4.1.2.2.1-65: SIP 200 (OK) response (UE-1 to SCC AS)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>;
   +g.3gpp.iut-controller
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
c=123.45.67.89
t=0 0
m=audio 1300 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 0 RTP/AVP 98 99
```

67-68. SIP ACK request (from SCC AS to UE-1)

The SCC AS sends a SIP ACK request to the UE-1.

69-70. SIP NOTIFY request (from SCC AS to UE-1)

The SCC AS sends a SIP NOTIFY request to the UE-1 to inform about success status of transferring the media from UE-1 to the UE-2.

Editor's Note: The detail example of sipfrag is FFS.

71-72. SIP 200 (OK) response (from UE-1 to SCC AS)

The UE-1 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC AS.

4.6.4.1.2.2.2 Different subscription

This subclause describes the scenario when the media flow is transferred from UE-1 to UE-2 requested by UE-2. The flow diagram shows when UE-1 and UE-2 belong to the different subscription.

Media path exist between UE-1(123.45.67.89) and Remote UE(132.54.76.98). UE-2(123.112.67.87) wants to pull the video media flow between UE-1 and Remote-UE. After this procedure, collaborative session will be established.

HPLMN of the local UE participating in session   HPLMN of the remote UE participating in session

| UE-1 | Intermediate IM CN Subsystem entities | SCC AS-1 | UE-2 | Intermediate IM CN Subsystem entities | SCC AS-2 | Intermediate IM CN Subsystem entities | UE-3 |

1. IMS session control

2. Media path (audio, video)

3. UE-2 discovers the session of UE-1

4. REFER
5. REFER
7. REFER
6. REFER
8. REFER
10. REFER
9. REFER
11. 202 ACCEPTED
12. 202 ACCEPTED
13. 202 ACCEPTED
14. 202 ACCEPTED
15. 202 ACCEPTED
17. 202 ACCEPTED
16. 202 ACCEPTED
18. NOTIFY
19. NOTIFY
20. NOTIFY
21. NOTIFY
22. NOTIFY
24. NOTIFY
23. NOTIFY
25. 200 OK
26. 200 OK
28. 200 OK
27. 200 OK
29. 200 OK
31. 200 OK
30. 200 OK
32. REFER
33. REFER
35. 202 ACCEPTED
34. 202 ACCEPTED
36. NOTIFY
37. NOTIFY
38. NOTIFY
39. NOTIFY
40. NOTIFY
42. NOTIFY
41. NOTIFY
43. 200 OK
44. 200 OK
46. 200 OK
45. 200 OK
47. 200 OK
49. 200 OK
48. 200 OK
51. NOTIFY
50. NOTIFY
52. 200 OK
53. 200 OK
54. INVITE
55. INVITE
56. INVITE
58. INVITE
57. INVITE
59. 200 OK
60. 200 OK
62. 200 OK
61. 200 OK
63. 200 OK
64. ACK
65. ACK
66. ACK
68. ACK
67. ACK
70. re-INVITE
69. re-INVITE
71. 200 OK
72. 200 OK
74. ACK
73. ACK
75. re-INVITE
76. re-INVITE
77. re-INVITE
79. 200 OK
78. 200 OK
80. 200 OK
81. ACK
82. ACK
83. ACK
84. re-INVITE
85. re-INVITE
86. re-INVITE
88. re-INVITE
87. re-INVITE
89. 200 OK
90. 200 OK
92. 200 OK
91. 200 OK
93. 200 OK
94. ACK
95. ACK
96. ACK
98. ACK
97. ACK
100. re-INVITE
99. re-INVITE
101. 200 OK
102. 200 OK
104. ACK
103. ACK
106. NOTIFY
105. NOTIFY
107. 200 OK
108. 200 OK

Collaborative session control

Media path (video)
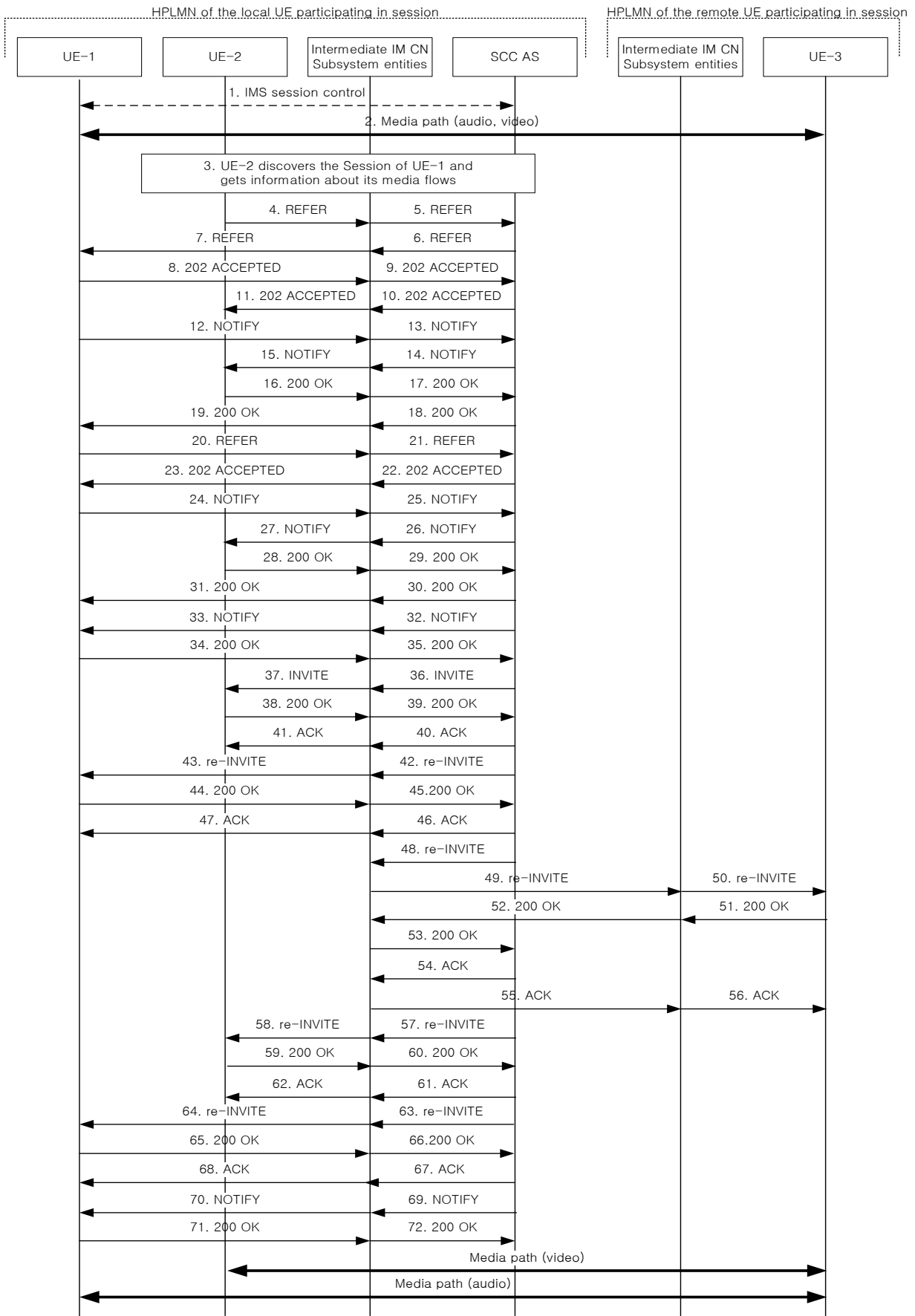
Media path (audio)

Figure 4.6.4.1.2.2.2-1: Signalling flow for Media flow transfer initiated when no collaborative session has been established

1-2.   UE-1 is in session with Remote UE

There is a multimedia session comprising audio and video media between the UE-1 and the Remote UE anchored at SCC AS serving UE-1.

3.   UE-2 discovers the session of UE-1

4-10.   SIP REFER request (from UE-2 to UE-1)

The UE-2 sends SIP REFER (referred REFER) request to the local UE-1, UE-1 to request the media transfer from UE-1 to UE-2.

Table 4.6.4.1.2.2.2-4: SIP REFER request (UE-2 to UE-1)

```
REFER sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via: SIP/2.0/UDP [2222::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
To: <sip:user1_public1@home1.net >
From: <sip:user2_public1@home2.net>;tag=294756
Call-ID: Asdasd23123366
Cseq: 4897924 REFER
Max-Forwards: 70
P-Preferred-Identity: <sip:user2_public1@home2.net>;
Refer-To: <sip:interUEtransfer@example.net;method=REFER?
   To=%3CinterUEtransfer%40example.net%3E%3BFrom=%3Csip:user1_public1%40home1.net%3BRefer-
   To=%3Csip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222?body=
   m%3Daudio%200%200RTP%2FAVP%97%0Dm%3Dvideo%203002%20RTP%2FAVP%2098%2099>
Referred-By: sip:user2_public1@home2.net
Contact: <sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222>
Accept: application/sdp, message/sipfrag
Content-Length: 0
```

11-17. SIP 202 (Accepted) response (from UE-1 to UE-2)

UE-1 sends a SIP 202 (Accepted) response to UE-2 as response to the SIP REFER request.

18-24. SIP NOTIFY request (from UE-1 to UE-2)

The UE-1 sends a SIP NOTIFY request to UE-2 to notify implicit subscription to the SIP REFER request results.

25-31. SIP 200 (OK) response (from UE-2 to UE-1)

The UE-2 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the UE-1.

32-33. SIP REFER request (from UE-1 to SCC AS serving UE-1)

The UE-1 sends SIP REFER request to SCC AS serving UE-1 to request the media transfer from UE-1 to UE-2.

Table 4.6.4.1.2.2.2-32: SIP REFER request (UE-1 to SCC AS serving UE-1)

```
REFER sip:interUEtransfer@example.net SIP/2.0
Via: SIP/2.0/UDP [1111::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
To: <sip:interUEtransfer@example.net>
From: <sip:user1_public1@home1.net>;tag=223457
Call-ID: Asdasd23123377
Cseq: 112 REFER
Max-Forwards: 70
P-Preferred-Identity: <sip:user1_public1@home1.net>;
Refer-To: <sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222?body=
   m%3Daudio%200%200RTP%2FAVP%97%0Dm%3Dvideo%203002%20RTP%2FAVP%2098%2099>
Require: target-dialog
Target-dialog: cb03a0s09a2sdfglkj11111;remote-tag=27364;local-tag=11928
Referred-By: sip:user2_public1@home2.net
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>
Accept: application/sdp, message/sipfrag
Content-Length: 0
```

34-35. SIP 202 (Accepted) response (from SCC AS serving UE-1 to UE-1)

SCC AS serving UE-1 sends a SIP 202 (Accepted) response to UE-1 as response to the SIP REFER request.

36-42. SIP NOTIFY request (from UE-1 to UE-2)

The UE-1 sends a SIP NOTIFY request to the UE-2 to inform about the success status of sending the REFER.

43-49. SIP 200 (OK) response (from UE-2 to UE-1)

The UE-2 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the UE-1.

50-51. SIP NOTIFY request (from SCC AS serving UE-1 to UE-1)

SCC AS serving UE-1 sends a SIP NOTIFY request to UE-1 to notify implicit subscription to the SIP REFER request results.

52-53. SIP 200 (OK) response (from UE-1 to SCC AS serving UE-1)

The UE-1 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC AS.

54-58. SIP INVITE request (from SCC AS serving UE-1 to UE-2)

Since the 32-33 SIP REFER request contains a Refer-to header field addressed to UE-2 and the URI parameters, listing a video line which is transferred and an audio line with port number set to zero which is not transferred, the SCC-AS serving UE-1 sends a SIP INVITE request to the UE-2, to transfer the video media component. In order to avoid to UE-2 to start sending video to the Remote UE, the SCC AS serving UE-1 adds an a line to sendonly in the SDP offer.

Table 4.6.4.1.2.2.2-54: SIP INVITE request (SCC-AS serving UE-1 to UE-2)

```
INVITE sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222 SIP/2.0
Via: SIP/2.0/UDP sccas1.home1.example.net;branch=z9hG4bK332b33.3;
To: sip:user2_public1@home2.net;
From: sip:interUEtransfer@example.net;tag=27365
Call-ID: cb03a0s09a2sdfglkj22222
Cseq: 111 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 3002 RTP/AVP 98 99
a=sendonly
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

59-63. SIP 200 (OK) response (from UE-2 to SCC-AS serving UE-1)

The target UE, UE-2, acknowledges the SIP INVITE request by sending a SIP 200 (OK) response to the SCC AS serving UE-1.

Table 4.6.4.1.2.2.2-59: SIP 200 (OK) response (UE-2 to SCC AS serving UE-1)

```
SIP/2.0 200 OK
Via:
To: sip:user2_public1@home2.net; tag=36527
From: sip:interUEtransfer@example.net; tag=27365
Call-ID: cb03a0s09a2sdfglkj22222
CSeq:
P-Preferred-Identity:
Contact: <sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.112.67.87
s=-
c=123.112.67.87
t=0 0
m=audio 0 RTP/AVP 97
m=video 1302 RTP/AVP 98 99
a=inactive
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

64-68. SIP ACK request (from SCC AS serving UE-1 to UE-2)

The SCC AS sends a SIP ACK request to the UE-2.

69-70. SIP re-INVITE request (from SCC AS serving UE-1 to UE-1)

The SCC-AS serving UE-1 sends a SIP re-INVITE request to the UE-1 to hold the video media session to be transferred.

Table 4.6.4.1.2.2.2-69: SIP INVITE request (SCC AS serving UE-1 to UE-1)

```
INVITE sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via:
To: sip:user1_public1@home1.net;Tag=11928
From: sip:userR_public1@homeR.net; tag=27364
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 3002 RTP/AVP 98 99
a=sendonly
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

71-72. SIP 200 (OK) response (from UE-1 to SCC AS serving UE-1)

The UE-1 sends a SIP 200 (OK) response with an SDP answer.

Table 4.6.4.1.2.2.2-71: SIP 200 (OK) response (UE-1 to SCC AS serving UE-1)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>;
    +g.3gpp.iut-controller
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
c=123.45.67.89
t=0 0
m=audio 1300 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1202 RTP/AVP 98 99
a=inactive
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

73-74. SIP ACK request (from SCC AS serving UE-1 to UE-1)

The SCC AS serving UE-1 sends a SIP ACK request to the UE-1.

75-77. SIP re-INVITE request (from SCC AS serving UE-1 to remote UE)

The SCC AS serving UE-1 sends a SIP re-INVITE request to the remote UE.

Table 4.6.4.1.2.2.2-75: SIP INVITE request (SCC AS serving UE-1 to remote UE)

```
INVITE sip:userR_public1@homeR.net SIP/2.0
Via:
To: sip:userR_public1@homeR.net;tag=27364
From: sip:user1_public1@home1.net;tag=11928
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: <sip:sccas1.home1.example.net>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 1300 RTP/AVP 96 97
c=IN IP4 123.45.67.89
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 123.112.67.87
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

78-80. SIP 200 (OK) response (from Remote UE to SCC AS serving UE-1)

The Remote UE acknowledges the SIP re-INVITE request by sending a SIP 200 (OK) response to the SCC AS serving UE-1.

Table 4.6.4.1.2.2.2-78: SIP 200 (OK) response (Remote UE to SCC AS serving UE-1)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Asserted-Identity:
Contact: sip:userR_public1@homeR.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

81-83. SIP ACK request (from SCC AS serving UE-1 to Remote UE)

The SCC-AS serving UE-1 sends a SIP ACK request to the Remote UE.

84-88. SIP re-INVITE request (from SCC AS serving UE-1 to UE-2)

The SCC AS serving UE-1 sends a SIP re-INVITE request to UE-2 to activate the video media component.

Table 4.6.4.1.2.2.2-84: SIP INVITE request (SCC AS serving UE-1 to UE-2)

```
INVITE sip:user2_public1@home2.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222 SIP/2.0
Via: SIP/2.0/UDP sccas1.home1.example.net; branch=z9hG4bK332b33.3;
To: sip:user2_public1@home2.net; tag=36527
From: sip:interUEtransfer@example.net; tag=27365
Call-ID: cb03a0s09a2sdfglkj22222
Cseq: 112 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

89-93. SIP 200 (OK) response (from UE-2 to SCC AS serving UE-1)

The UE-2 sends a SIP 200 (OK) response to the SCC AS.

Table 4.6.4.1.2.2.2-89: SIP 200 (OK) response (UE-2 to SCC AS serving UE-1)

```
SIP/2.0 200 OK
Via:
To: sip:user2_public1@home2.net; tag=36527
From: sip:interUEtransfer@example.net; tag=27365
Call-ID: cb03a0s09a2sdfglkj22222
CSeq:
P-Preferred-Identity:
Contact: <sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.112.67.87
s=-
c=123.112.67.87
t=0 0
m=audio 0 RTP/AVP 97
m=video 1302 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

94-98. SIP ACK request (from SCC AS serving UE-1 to UE-2)

The SCC AS serving UE-1 sends a SIP ACK request to the UE-2.

99-100.   SIP re-INVITE request (from SCC AS serving UE-1 to UE-1)

The SCC AS serving UE-1 sends a SIP re-INVITE request to the UE-1 to release the video media component.

Table 4.6.4.1.2.2.2-99: SIP INVITE request (SCC AS serving UE-1 to UE-1)

```
INVITE sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via:
To: sip:user1_public1@home1.net;Tag=11928
From: sip:userR_public1@homeR.net; tag=27364
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:interUEtransfer@example.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 0 RTP/AVP 98 99
```

101-102.   SIP 200 (OK) response (from UE-1 to SCC AS serving UE-1)

The UE-1 sends a SIP 200 (OK) response with an SDP answer.

Table 4.6.4.1.2.2.2-101: SIP 200 (OK) response (UE-1 to SCC AS serving UE-1)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>;
    +g.3gpp.iut-controller
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
c=123.45.67.89
t=0 0
m=audio 1300 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 0 RTP/AVP 98 99
```

103-104.   SIP ACK request (from SCC AS serving UE-1 to UE-1)

The SCC AS serving UE-1 sends a SIP ACK request to the UE-1.

105-106.   SIP NOTIFY request (from SCC AS serving UE-1 to UE-1)

The SCC AS serving UE-1 sends a SIP NOTIFY request to the UE-1 to inform about success status of transferring the media from UE-1 to the UE-2.

Editor's Note: The detail example of sipfrag is FFS.

107-108. SIP 200 (OK) response (from UE-1 to SCC AS serving UE-1)

The UE-1 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC AS serving UE-1.

4.6.4.1.2.3 Alternative 3 (Based on SIP re-INVITE request)

The flow for this subclause is same with the flow in the subcluase 4.6.4.1.3.2 Alternative 3 (Based on SIP re-INVITE request) except that the SIP INVITE request is used for steps 2 and 3 instead of SIP re-INVITE request.

4.6.4.1.3 Media flows transfer initiated by a controllee UE of an ongoing collaborative session

4.6.4.1.3.1 Alternative 1 (REFER with media feature tag)

4.6.4.1.3.1.1 Same/Different subscription

This subclause describes the scenario when the Media flow is transferred from Controller UE, UE-1 to Controllee UE, UE-2 requested by UE-2. The flow diagram shows when UE-1 and UE-2 belong to the different subscription.

UE-1 (123.45.67.89) and UE-2 (123.112.67.87) are included in a Collaborative Session with the remote UE (132.54.76.98), in which UE-1 is the Controller UE and UE-2 is the Controllee UE. The call is anchored in the SCC AS-1 controlling the collaborative session. Prior to transfer the Media flow, UE-2 gets the dialog information such as the content type and port numbers on the remote end. This is done by UE-2 having subscribed to dialog event package between UE-1 and the SCC AS-1.

HPLMN of the local UE participating in session HPLMN of the remote UE participating in session

| UE-1 (Controller) | Intermediate IM CN Subsystem entities | SCC AS-1 | UE-2 (Controllee) | Intermediate IM CN Subsystem entities | SCC AS-2 | Intermediate IM CN Subsystem entities | Remote UE |

Collaborative session control

Media path (audio)

Media path (video)

1. UE-2 discovers the session of UE-1

2. REFER
3. REFER
5. REFER
4. REFER
6. REFER
7. 202 ACCEPTED
8. 202 ACCEPTED
9. 202 ACCEPTED
11. 202 ACCEPTED
10. 202 ACCEPTED
12. NOTIFY
13. NOTIFY
14. NOTIFY
16. NOTIFY
15. NOTIFY
17. 200 OK
18. 200 OK
20. 200 OK
19. 200 OK
21. 200 OK
22. re-INVITE
23. re-INVITE
24. re-INVITE
26. re-INVITE
25. re-INVITE
27. 200 OK
28. 200 OK
30. 200 OK
29. 200 OK
31. 200 OK
32. ACK
33. ACK
34. ACK
36. ACK
35. ACK
38. re-INVITE
37. re-INVITE
39. 200 OK
40. 200 OK
42. ACK
41. ACK
43. re-INVITE
44. re-INVITE
45. re-INVITE
47. 200 OK
46. 200 OK
48. 200 OK
49. ACK
50. ACK
51. ACK
52. re-INVITE
53. re-INVITE
54. re-INVITE
56. re-INVITE
55. re-INVITE
57. 200 OK
58. 200 OK
60. 200 OK
59. 200 OK
61. 200 OK
62. ACK
63. ACK
64. ACK
66. ACK
65. ACK
68. re-INVITE
67. re-INVITE
69. 200 OK
70. 200 OK
72. ACK
71. ACK
73. NOTIFY
74. NOTIFY
75. NOTIFY
77. NOTIFY
76. NOTIFY
78. 200 OK
79. 200 OK
81. 200 OK
80. 200 OK
82. 200 OK

Collaborative session control

Media path (audio, video)

Figure 4.6.4.1.3.1.1-1: Signalling flow for Media flows transfer initiated by a controllee UE of an ongoing collaborative session

1. UE-2 discovers the session of UE-1

2-6. SIP REFER request (from UE-2 to SCC AS serving UE-1)

The SIP REFER request contains a Refer-To header field containing a URI of Target UE, UE-2 and a body parameter containing an m line for audio to be pulled with the port number set to the non-zero port numbers use in the SDP parameter from the corresponding media descriptions as received during the last successful SDP offer-answer exchange from the Remote UE. The SIP REFER request also includes a Target-dialog header field containing the details of the dialog for the existing session between UE-1 and Remote-UE.

Table 4.6.4.1.3.1.1-2 SIP REFER request (UE-2 to SCC AS-1 serving UE-1)

```
REFER sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via: SIP/2.0/UDP [2222::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
To: <sip: user1_public1@home1.net >
From: <sip:user2_public1@home2.net>;tag=294756
Call-ID: Asdasd23123366
Cseq: 4897924 REFER
Max-Forwards: 70
P-Preferred-Identity: <sip:user2_public1@home2.net>;
Refer-To: <sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222?
    body=m%3Daudio%203000%20RTP%2FAVP%97%0Dm%3Dvideo%203002%20RTP%2FAVP%2098%2099>
Require: target-dialog
Target-dialog: cb03a0s09a2sdfglkj11111;remote-tag=27364;local-tag=11928
Referred-By: sip:user2_public1@home2.net
Contact: sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222
Accept-Contact:+g.3gpp.iut-xyz;explicit;require
Accept: application/sdp, message/sipfrag
Content-Length: 0
```

7-11. SIP 202 (Accepted) response (from UE-1 to UE-2)

UE-1 sends a SIP 202 (Accepted) response to UE-2 as response to the SIP REFER request.

12-16. SIP NOTIFY request (from UE-1 to UE-2)

The UE-1 sends a SIP NOTIFY request to UE-2 to notify implicit subscription to the SIP REFER request results.

17-21. SIP 200 (OK) response (from UE-2 to UE-1)

The UE-2 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the UE-1.

22-26. SIP re-INVITE request (from SCC AS-1 serving UE-1 to UE-2)

Since the 2-6 SIP REFER request contains a Refer-to header field addressed to UE-2 and the URI paramaters, listing an audio line which is not currently supported by UE-2, the SCC AS-1 realizes the procedure is for transferring the media from that controller UE (UE-1) to UE-2. The SCC-AS-1 sends a SIP re-INVITE request to the UE-2, to transfer the audio media component.

Table 4.6.4.1.3.1.1-22 SIP INVITE request (SCC AS-1 serving UE-1 to UE-2)

```
INVITE sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222 SIP/2.0
Via: SIP/2.0/UDP sccas1.home1.example.net;branch=z9hG4bK332b33.3;
To: sip:user2_public1@home2.net;
From: sip:interUEtransfer@example.net;tag=27365
Call-ID: cb03a0s09a2sdfglkj22222
Cseq: 111 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:interUEtransfer@example.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
a=sendonly
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

27-31. SIP 200 (OK) response (from UE-2 to SCC-AS-1 serving UE-1)

The target UE, UE-2, acknowledges the SIP INVITE request by sending a SIP 200 (OK) response to the SCC AS serving UE-1.

Table 4.6.4.1.3.1.1-27 SIP 200 (OK) response (UE-2 to SCC AS-1 serving UE-1)

```
SIP/2.0 200 OK
Via:
To: sip:user2_public1@home2.net; tag=36527
From: sip:interUEtransfer@example.net; tag=27365
Call-ID: cb03a0s09a2sdfglkj22222
CSeq:
P-Preferred-Identity:
Contact: <sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.23.45.87
s=-
c=123.23.45.87
t=0 0
m=audio 1300 RTP/AVP 97
a=inactive
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

32-36. SIP ACK request (from SCC AS-1 serving UE-1 to UE-2)

The SCC AS-1 serving UE-1 sends a SIP ACK request to the UE-2.

37-38. SIP re-INVITE request (from SCC AS-1 serving UE-1 to UE-1)

The SCC AS-1 serving UE-1 sends a SIP re-INVITE request to the UE-1 to hold the video media session to be transferred.

Table 4.6.4.1.3.1.1-37 SIP INVITE request (SCC AS-1 serving UE-1 to UE-1)

```
INVITE sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via:
To: sip:user1_public1@home1.net;Tag=11928
From: sip:userR_public1@homeR.net; tag=27364
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:interUEtransfer@example.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
a=sendonly
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 0 RTP/AVP 98 99
```

39-40. SIP 200 (OK) response (from UE-1 to SCC AS serving UE-1)

The UE-1 sends a SIP 200 (OK) response with an SDP answer.

Table 4.6.4.1.3.1.1-39 SIP 200 (OK) response (UE-1 to SCC AS-1 serving UE-1)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>;
    +g.3gpp.iut-controller
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
c=123.45.67.89
t=0 0
m=audio 1200 RTP/AVP 97
a=inactive
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 0 RTP/AVP 98 99
```

41-42. SIP ACK request (from SCC AS-1 serving UE-1 to UE-1)

The SCC AS serving UE-1 sends a SIP ACK request to the UE-1.

43-45. SIP re-INVITE request (from SCC AS-1 serving UE-1 to remote UE)

The SCC AS-1 serving UE-1 sends a SIP re-INVITE request to the remote UE.

Table 4.6.4.1.3.1.1-45 SIP INVITE request (SCC AS-1 serving UE-1 to remote UE)

```
INVITE sip:userR_public1@homeR.net SIP/2.0
Via:
To: sip:userR_public1@homeR.net;tag=27364
From: sip:user1_public1@home1.net;tag=11928
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: <sip:interUEtransfer@example.net>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 1300 RTP/AVP 96 97
c=IN IP4 123.112.67.87
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 123.112.67.87
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

46-48. SIP 200 (OK) response (from Remote UE to SCC AS-1 serving UE-1)

The Remote UE acknowledges the SIP re-INVITE request by sending a SIP 200 (OK) response to the SCC AS-1 serving UE-1.

Table 4.6.4.1.3.1.1-46 SIP 200 (OK) response (Remote UE to SCC AS-1 serving UE-1)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Asserted-Identity:
Contact: sip:userR_public1@homeR.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

49-51. SIP ACK request (from SCC AS serving UE-1 to Remote UE)

The SCC-AS serving UE-1 sends a SIP ACK request to the Remote UE.

52-56. SIP re-INVITE request (from SCC AS serving UE-1 to UE-2)

The SCC AS serving UE-1 sends a SIP re-INVITE request to UE-2 to activate the video media component.

Table 4.6.4.1.3.1.1-52 SIP INVITE request (SCC AS-1 serving UE-1 to UE-2)

```
INVITE sip:user2_public1@home2.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222 SIP/2.0
Via: SIP/2.0/UDP sccas1.home1.example.net; branch=z9hG4bK332b33.3;
To: sip:user2_public1@home2.net; tag=36527
From: sip:interUEtransfer@example.net; tag=27365
Call-ID: cb03a0s09a2sdfglkj22222
Cseq: 112 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:interUEtransfer@example.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

57-61. SIP 200 (OK) response (from UE-2 to SCC AS-1 serving UE-1)

The UE-2 sends a SIP 200 (OK) response to the SCC AS serving UE-1.

Table 4.6.4.1.3.1.1-57 SIP 200 (OK) response (UE-2 to SCC AS-1 serving UE-1)

```
SIP/2.0 200 OK
Via:
To: sip:user2_public1@home2.net; tag=36527
From: sip:interUEtransfer@example.net; tag=27365
Call-ID: cb03a0s09a2sdfglkj22222
CSeq:
P-Preferred-Identity:
Contact: <sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.23.45.87
s=-
c=123.23.45.87
t=0 0
m=audio 1300 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

62-66. SIP ACK request (from SCC AS-1 serving UE-1 to UE-2)

The SCC AS serving UE-1 sends a SIP ACK request to the UE-2.

67-68. SIP re-INVITE request (from SCC AS-1 serving UE-1 to UE-1)

The SCC-AS serving UE-1 sends a SIP re-INVITE request to the UE-1 to release the video media component.

Table 4.6.4.1.3.1.1-67 SIP INVITE request (SCC AS-1 serving UE-1 to UE-1)

```
INVITE sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via:
To: sip:user1_public1@home1.net;Tag=11928
From: sip:userR_public1@homeR.net; tag=27364
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:interUEtransfer@example.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 0 RTP/AVP 98 99
```

69-70. SIP 200 (OK) response (from UE-1 to SCC AS-1 serving UE-1)

The UE-1 sends a SIP 200 (OK) response with an SDP answer.

Table 4.6.4.1.3.1.1-69 SIP 200 (OK) response (UE-1 to SCC AS-1 serving UE-1)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>;
    +g.3gpp.iut-controller
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
c=123.45.67.89
t=0 0
m=audio 0 RTP/AVP 97
m=video 0 RTP/AVP 98 99
```

71-72. SIP ACK request (from SCC AS-1 serving UE-1 to UE-1)

The SCC AS serving UE-1 sends a SIP ACK request to the UE-1.

73-77. SIP NOTIFY request (from SCC AS-1 serving UE-1 to UE-2)

The SCC AS serving UE-1 sends a SIP NOTIFY request to the UE-2 to inform about success status of transferring the media from UE-1 to the UE-2.

78-82. SIP 200 (OK) response (from UE-2 to SCC AS-1 serving UE-1)

The UE-2 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC AS-1 serving UE-1.

4.6.4.1.3.2   Alternative 2 (SIP REFER with method= REFER)

4.6.4.1.3.2.1   Same subscription

This subclause describes the scenario when the Media flow is transferred from Controller UE, UE-1 to Controllee UE, UE-2 requested by UE-2. The flow diagram shows when UE-1 and UE-2 belong to the same subscription.

UE-1 (123.45.67.89) and UE-2 (123.112.67.87) are included in a Collaborative Session with the remote UE (132.54.76.98), in which UE-1 is the Controller UE and UE-2 is the Controllee UE. The call is anchored in the SCC AS. Prior to transfer the Media flow, UE-2 gets the dialog information such as the content type and port numbers on the remote end. This is done by UE-2 having subscribed to dialog event package between UE-1 and the SCC AS.
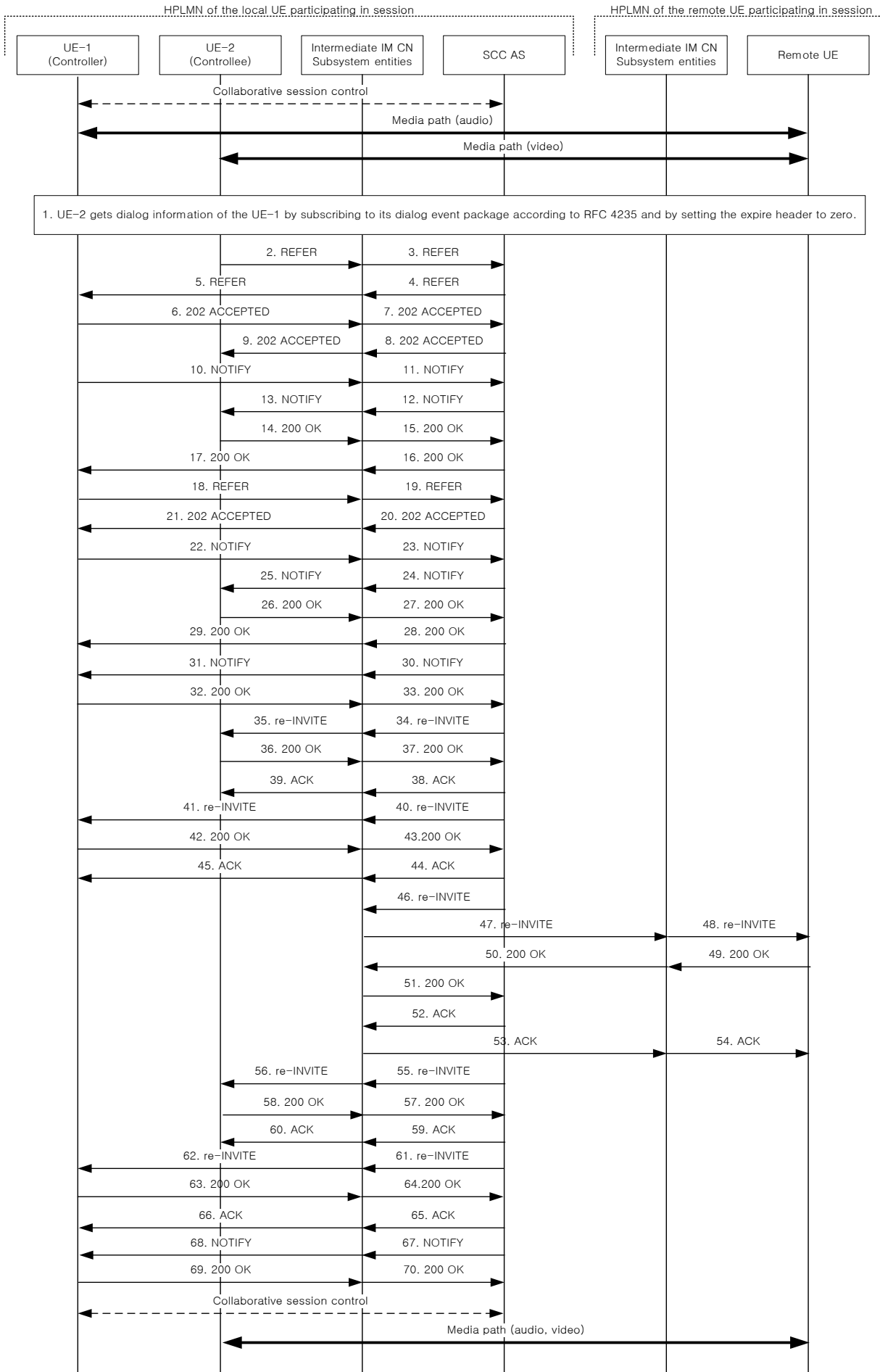
Figure 4.6.4.1.3.2.1-1: Signalling flow for Media flows transfer initiated by a controllee UE of an ongoing collaborative session

NOTE: For clarity, the SIP 100 (Trying) messages are not shown in the signalling flow.

1. UE-2 discovers the sessions of UE-1

2-5. SIP REFER request (from UE-2 to UE-1)

The UE-2 sends SIP REFER (referred REFER) request to the controller UE, UE-1 to request the media transfer from UE-1 to UE-2.

Table 4.6.4.1.3.2.1-2: SIP REFER request (UE-2 to UE-1)

```
REFER sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111  SIP/2.0
Via: SIP/2.0/UDP [2222::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
To: <sip:user1_public1@home1.net>
From: <sip:user1_public2@home1.net>;tag=294756
Call-ID: Asdasd23123366
Cseq: 4897924 REFER
Max-Forwards: 70
P-Preferred-Identity: <sip:user1_public2@home1.net>;
Refer-To: <sip:interUEtransfer@example.net;method=REFER?
   To=%3CinterUEtransfer%40example.net%3E%3BFrom=%3Csip:user1_public1%40home1.net%3BRefer-
   To=%3Csip:user1_public2@home1.net%3B gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222?body=
   m%3Daudio%203000%20RTP%2FAVP%97%0Dm%3Dvideo%203002%20RTP%2FAVP%2098%2099%3E%3BTarget-
   dialog= cb03a0s09a2sdfglkj11111%3Bremote-tag=27364%3Blocal-tag=11928>
Referred-By: sip:user1_public2@home1.net
Contact: <sip:user1_public2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222>
Accept: application/sdp, message/sipfrag
Content-Length: 0
```

6-9. SIP 202 (Accepted) response (from UE-1 to UE-2)

UE-1 sends a SIP 202 (Accepted) response to UE-2 as response to the SIP REFER request.

10-13. SIP NOTIFY request (from UE-1 to UE-2)

The UE-1 sends a SIP NOTIFY request to UE-2 to notify implicit subscription to the SIP REFER request results.

14-17. SIP 200 (OK) response (from UE-2 to UE-1)

The UE-2 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the UE-1.

18-19. SIP REFER request (from UE-1 to SCC AS)

The UE-1 sends SIP REFER request to SCC AS to request the media transfer from UE-1 to UE-2.

Table 4.6.4.1.3.2.1-18: SIP REFER request (UE-1 to SCC-AS)

```
REFER sip:interUEtransfer@example.net SIP/2.0
Via: SIP/2.0/UDP [1111::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
To: <sip:interUEtransfer@example.net>
From: <sip:user1_public1@home1.net>;tag=223457
Call-ID: Asdasd23123377
Cseq: 112 REFER
Max-Forwards: 70
P-Preferred-Identity: <sip:user1_public1@home1.net>;
Refer-To: <sip:user1_public2@home1.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222?body=
   m%3Daudio%203000%20RTP%2FAVP%97%0Dm%3Dvideo%203002%20RTP%2FAVP%2098%2099>
Require: target-dialog
Target-dialog: cb03a0s09a2sdfglkj11111;remote-tag=27364;local-tag=11928
Referred-By: sip:user1_public1@home1.net
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>
Accept: application/sdp, message/sipfrag
Content-Length: 0
```

20-21. SIP 202 (Accepted) response (from SCC AS to UE-1)

SCC-AS sends a SIP 202 (Accepted) response to UE-1 as response to the SIP REFER request.

22-25. SIP NOTIFY request (from UE-1 to UE-2)

The UE-1 sends a SIP NOTIFY request to the UE-2 to inform about the success status of the inter-UE transfer.

26-29. SIP 200 (OK) response (from UE-2 to UE-1)

The UE-2 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the UE-1.

30-31. SIP NOTIFY request (from SCC AS to UE-1)

The SCC-AS sends a SIP NOTIFY request to UE-1 to notify implicit subscription to the SIP REFER request results.

32-33. SIP 200 (OK) response (from UE-1 to SCC AS)

The UE-1 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC-AS.

34-35. SIP re-INVITE request (from SCC-AS to UE-2)

Since the message 18-19 contains a Refer-to header field addressed to UE-2 and the URI parameters, listing an audio line which is not currently supported by UE-2, the SCC AS realizes the procedure is for transferring the media from that controller UE (UE-1) to UE-2. The SCC-AS sends a SIP re-INVITE request to the UE-2, to transfer the audio media component.

Table 4.6.4.1.3.2.1-34: SIP INVITE request (SCC-AS to UE-2)

```
INVITE sip:user1_public2@home1.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222 SIP/2.0
Via: SIP/2.0/UDP sccas1.home1.example.net; branch=z9hG4bK332b33.3;
To: sip:user1_public2@home1.net;
From: sip:interUEtransfer@example.net; tag=27365
Call-ID: cb03a0s09a2sdfglkj22222
Cseq: 115 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
a=sendonly
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

36-37. SIP 200 (OK) response (from UE-2 to SCC-AS)

The target UE, UE-2, acknowledges the SIP re-INVITE request by sending a SIP 200 (OK) response to the SCC-AS.

Table 4.6.4.1.3.2.1-36: SIP 200 (OK) response (UE-2 to SCC-AS)

```
SIP/2.0 200 OK
Via:
To: sip:user1_public2@home1.net; tag = 36527
From: sip:interUEtransfer@example.net; tag = 27365
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.112.67.87
s=-
c=123.112.67.87
t=0 0
m=audio 1300 RTP/AVP 97
a=inactive
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

38-39. SIP ACK request (from SCC-AS to target UE; UE-2)

The SCC-AS sends a SIP ACK request to the UE-2.

40-41. SIP re-INVITE request (from SCC-AS to controller UE; UE-1)

Table 4.6.4.1.3.2.1-40: SIP INVITE request (SCC-AS to UE-1)

```
INVITE sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via:
To: sip:user1_public1@home1.net;Tag=11928
From: sip:userR_public1@home2.net; tag=27364
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
a=sendonly
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 0 RTP/AVP 98 99
```

42-43. SIP 200 (OK) response (from controller UE, UE-1 to SCC-AS)

The UE-1 sends a SIP 200 (OK) response with an SDP answer.

Table 4.6.4.1.3.2.1-42: SIP 200 (OK) response (UE-1 to SCC-AS)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>;
    +g.3gpp.iut-controller
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
c=123.45.67.89
t=0 0
m=audio 1200 RTP/AVP 97
a=inactive
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 0 RTP/AVP 98 99
```

44-45. SIP ACK request (from SCC-AS to controller UE; UE-1)

The SCC-AS sends a SIP ACK request to the UE-1.

46-48. SIP re-INVITE request (from SCC-AS to remote UE)

The SCC-AS sends a SIP re-INVITE request to the remote UE.

Table 4.6.4.1.3.2.1-46: SIP INVITE request (SCC-AS to remote UE)

```
INVITE sip:userR_public1@home2.net SIP/2.0
Via:
To: sip:userR_public1@home2.net;tag=27364
From: sip:user1_public1@home1.net;tag=11928
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: <sip:sccas1.home1.example.net>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 1300 RTP/AVP 96 97
c=IN IP4 123.112.67.87
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 123.112.67.87
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

49-51. SIP 200 (OK) response (from remote UE to SCC-AS)

The remote UE acknowledges the SIP re-INVITE request by sending a SIP 200 (OK) response to the SCC-AS.

Table 4.6.4.1.3.2.1-49: SIP 200 (OK) response (remote UE to SCC-AS)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Asserted-Identity:
Contact: sip:userR_public1@home2.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

52-54. SIP ACK request (from SCC-AS to remote UE)

The SCC-AS sends a SIP ACK request to the remote UE.

55-56. SIP re-INVITE request (from SCC-AS to controllee UE; UE-2)

The SCC-AS sends a SIP re-INVITE request to the controllee UE.

Table 4.6.4.1.3.2.1-55: SIP INVITE request (SCC-AS to UE-2)

```
INVITE sip:user1_public2@home1.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222 SIP/2.0
Via: SIP/2.0/UDP sccas1.home1.example.net; branch=z9hG4bK332b33.3;
To: sip:user1_public2@home1.net; tag=36527
From: sip:interUEtransfer@example.net; tag=27365
Call-ID: cb03a0s09a2sdfglkj22222
Cseq: 112 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

57-58. SIP 200 (OK) response (from UE-2 to SCC-AS)

The UE-2 sends a SIP 200 (OK) response with an SDP answer.

Table 4.6.4.1.3.2.1-57: SIP 200 (OK) response (UE-2 to SCC-AS)

```
SIP/2.0 200 OK
Via:
To: sip:user1_public2@home1.net; tag = 36527
From: sip:interUEtransfer@example.net; tag = 27365
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.112.67.87
s=-
c=123.112.67.87
t=0 0
m=audio 1300 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

59-60. SIP ACK request (from SCC-AS to UE-2)

The SCC-AS sends a SIP ACK request to the UE-2.

61-62. SIP re-INVITE request (from SCC-AS to UE-1)

The SCC-AS sends a SIP re-INVITE request to the UE-1.

Table 4.6.4.1.3.2.1-61: SIP INVITE request (SCC-AS to UE-1)

```
INVITE sip:user1_public1@home1.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via: SIP/2.0/UDP sccas1.home1.example.net; branch=z9hG4bK332b33.3;
To: sip:user1_public1@home1.net; tag= 11928
From: sip:userR_public1@home2.net; tag=27364
Call-ID: cb03a0s09a2sdfglkj11111
Cseq: 222 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 0 RTP/AVP 98 99
```

63-64. SIP 200 (OK) response (from UE-1 to SCC-AS)

The UE-1 sends a SIP 200 (OK) response with an SDP answer.

Table 4.6.4.1.3.2.1-63: SIP 200 (OK) response (UE-1 to SCC-AS)

```
SIP/2.0 200 OK
Via:
To: sip:user1_public1@home1.net; tag= 11928
From: sip:userR_public1@home2.net; tag=27364
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public1@home1.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
c=123.45.67.89
t=0 0
m=audio 0 RTP/AVP 97
m=video 0 RTP/AVP 98 99
```

65-66. SIP ACK request (from SCC-AS to UE-1)

The SCC-AS sends a SIP ACK request to the UE-1.

67-68. SIP NOTIFY request (from SCC-AS to UE-1)

The SCC-AS sends a SIP NOTIFY request to the UE-1 to inform about the success status of the inter-UE transfer from UE-1 to UE-2.

**69-70. SIP 200 (OK) response (from UE-1 to SCC-AS)**

The UE-1 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC AS.

4.6.4.1.3.2.2 Different subscription

This subclause describes the scenario when the Media flow is transferred from Controller UE, UE-1 to Controllee UE-2 requested by UE-2. The flow diagram shows when UE-1 and UE-2 belong to the different subscription.

UE-1 (123.45.67.89) and UE-2 (123.112.67.87) are included in a Collaborative Session with the remote UE (132.54.76.98), in which UE-1 is the Controller UE and UE-2 is the Controllee UE. The call is anchored in the SCC AS of UE-1. Prior to transfer the Media flow, UE-2 gets the dialog information such as the content type and port numbers on the remote end. This is done by UE-2 having subscribed to dialog event package between UE-1 and the SCC AS.
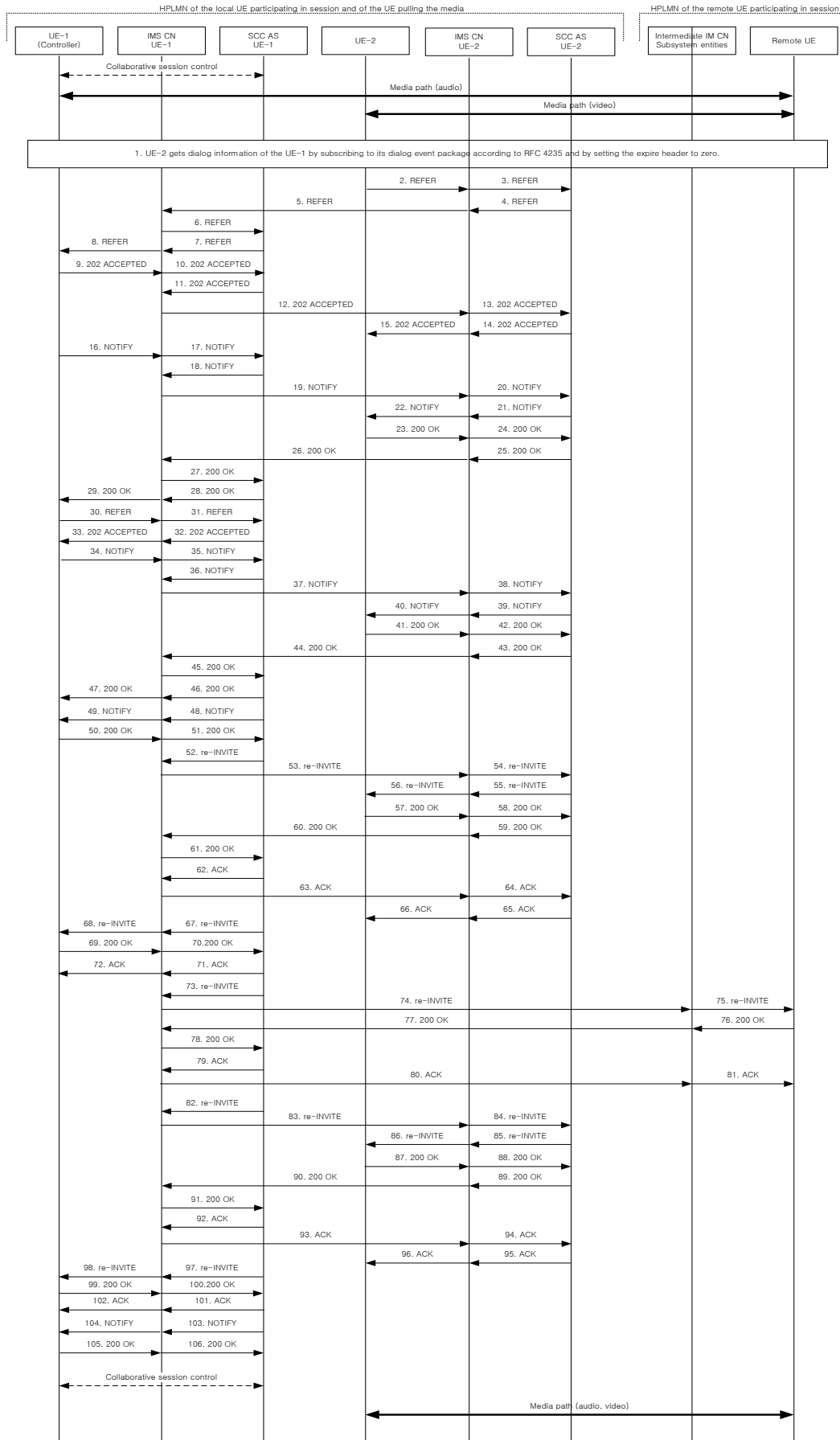
Figure 4.6.4.1.3.2.2-1: Signalling flow for Media flows transfer initiated by a controllee UE of an ongoing collaborative session

NOTE: For clarity, the SIP 100 (Trying) messages are not shown in the signalling flow.

1. UE-2 discovers the sessions of UE-1

2-8. SIP REFER request (from UE-2 to UE-1)

The UE-2 sends SIP REFER (referred REFER) request to the controller UE, UE-1 to request the media transfer from UE-1 to UE-2.

Table 4.6.4.1.3.2.2-2: SIP REFER request (UE-2 to UE-1)

```
REFER sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via: SIP/2.0/UDP [2222::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
To: <sip:user1_public1@home1.net>
From: <sip:user2_public1@home2.net>;tag=294756
Call-ID: Asdasd23123366
Cseq: 4897924 REFER
Max-Forwards: 70
P-Preferred-Identity: <sip:user2_public1@home2.net>;
Refer-To: <sip:interUEtransfer@example.net;method=REFER?
   To=%3CinterUEtransfer%40example.net%3E%3BFrom=%3Csip:user1_public1%40home1.net%3BRefer-
   To=%3Csip:user2_public1@home2.net%3B gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222?body=
   m%3Daudio%203000%20RTP%2FAVP%97%0Dm%3Dvideo%203002%20RTP%2FAVP%2098%2099%3E%3BTarget-
   dialog=cb03a0s09a2sdfglkj11111%3Bremote-tag=27364%3Blocal-tag=11928>
Referred-By: sip:user2_public1@home2.net
Contact: <sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222>
Accept: application/sdp, message/sipfrag
Content-Length: 0
```

9-15. SIP 202 (Accepted) response (from UE-1 to UE-2)

UE-1 sends a SIP 202 (Accepted) response to UE-2 as response to the SIP REFER request.

16-22. SIP NOTIFY request (from UE-1 to UE-2)

The UE-1 sends a SIP NOTIFY request to UE-2 to notify implicit subscription to the SIP REFER request results.

23-29. SIP 200 (OK) response (from UE-2 to UE-1)

The UE-2 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the UE-1.

30-31. SIP REFER request (from UE-1 to SCC AS serving UE-1)

The UE-1 sends SIP REFER request to SCC AS serving UE-1 to request the media transfer from UE-1 to UE-2.

Table 4.6.4.1.3.2.2-30: SIP REFER request (UE-1 to SCC-AS serving UE-1)

```
REFER sip:interUEtransfer@example.net SIP/2.0
Via: SIP/2.0/UDP [1111::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
To: <sip:interUEtransfer@example.net>
From: <sip:user1_public1@home1.net>;tag=223457
Call-ID: Asdasd23123377
Cseq: 112 REFER
Max-Forwards: 70
P-Preferred-Identity: <sip:user1_public1@home1.net>;
Refer-To: <sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222?body=
   m%3Daudio%203000%20RTP%2FAVP%97%0Dm%3Dvideo%203002%20RTP%2FAVP%2098%2099>
Require: target-dialog
Target-dialog: cb03a0s09a2sdfglkj11111;remote-tag=27364;local-tag=11928
Referred-By: sip:user2_public1@home2.net
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>
Accept: application/sdp, message/sipfrag
Content-Length: 0
```

32-33. SIP 202 (Accepted) response (from SCC AS serving UE-1 to UE-1)

SCC-AS sends a SIP 202 (Accepted) response to UE-1 as response to the SIP REFER request.

34-40. SIP NOTIFY request (from UE-1 to UE-2)

The UE-1 sends a SIP NOTIFY request to the UE-2 to inform about the success status of sending the REFER.

41-47. SIP 200 (OK) response (from UE-2 to UE-1)

The UE-2 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the UE-1.

48-49. SIP NOTIFY request (from SCC AS serving UE-1 to UE-1)

The SCC-AS serving UE-1 sends a SIP NOTIFY request to UE-1 to notify implicit subscription to the SIP REFER request results.

50-51. SIP 200 (OK) response (from UE-1 to SCC AS serving UE-1)

The UE-1 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC-AS serving UE-1.

52-56. SIP re-INVITE request (from SCC-AS serving UE-1 to UE-2)

Since the message 30-31 contains a Refer-to header field addressed to UE-2 and the URI parameters, listing an audio line which is not currently supported by UE-2, the SCC AS serving UE-1 realizes the procedure is for transferring the media from that controller UE (UE-1) to UE-2. The SCC-AS serving UE-1 sends a SIP re-INVITE request to the UE-2, to transfer the audio media component.

Table 4.6.4.1.3.2.2-52: SIP INVITE request (SCC-AS serving UE-1 to UE-2)

```
INVITE sip:user2_public1@home2.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222 SIP/2.0
Via: SIP/2.0/UDP sccas1.home1.example.net; branch=z9hG4bK332b33.3;
To: sip:user2_public1@home2.net; tag=36527
From: sip:interUEtransfer@example.net; tag=27365
Call-ID: cb03a0s09a2sdfglkj22222
Cseq: 115 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
a=sendonly
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

57-61. SIP 200 (OK) response (from UE-2 to SCC-AS serving UE-1)

The target UE, UE-2, acknowledges the SIP re-INVITE request by sending a SIP 200 (OK) response to the SCC-AS serving UE-1.

Table 4.6.4.1.3.2.2-57: SIP 200 (OK) response (UE-2 to SCC-AS serving UE-1)

```
SIP/2.0 200 OK
Via:
To: sip:user2_public1@home2.net; tag = 36527
From: sip:interUEtransfer@example.net; tag = 27365
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.112.67.87
s=-
c=123.112.67.87
t=0 0
m=audio 1300 RTP/AVP 97
a=inactive
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

62-66. SIP ACK request (from SCC-AS serving UE-1 to target UE; UE-2)

The SCC-AS serving UE-1 sends a SIP ACK request to the UE-2.

67-68. SIP re-INVITE request (from SCC-AS serving UE-1 to controller UE; UE-1)

Table 4.6.4.1.3.2.2-67: SIP INVITE request (SCC-AS serving UE-1 to UE-1)

```
INVITE sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via:
To: sip:user1_public1@home1.net;Tag=11928
From: sip:userR_public1@homeR.net; tag=27364
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
a=sendonly
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 0 RTP/AVP 98 99
```

69-70. SIP 200 (OK) response (from controller UE, UE-1 to SCC-AS serving UE-1)

The UE-1 sends a SIP 200 (OK) response with an SDP answer.

Table 4.6.4.1.3.2.2-69: SIP 200 (OK) response (UE-1 to SCC-AS serving UE-1)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>;
    +g.3gpp.iut-controller
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
c=123.45.67.89
t=0 0
m=audio 1200 RTP/AVP 97
a=inactive
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 0 RTP/AVP 98 99
```

71-72. SIP ACK request (from SCC-AS serving UE-1 to controller UE; UE-1)

The SCC-AS serving UE-1 sends a SIP ACK request to the UE-1.

73-75. SIP re-INVITE request (from SCC-AS serving UE-1 to remote UE)

The SCC-AS serving UE-1 sends a SIP re-INVITE request to the remote UE.

Table 4.6.4.1.3.2.2-73: SIP INVITE request (SCC-AS serving UE-1 to remote UE)

```
INVITE sip:userR_public1@homeR.net SIP/2.0
Via:
To: sip:userR_public1@homeR.net;tag=27364
From: sip:user1_public1@home1.net;tag=11928
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: <sip:sccas1.home1.example.net>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 1300 RTP/AVP 96 97
c=IN IP4 123.112.67.87
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 123.112.67.87
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

76-78. SIP 200 (OK) response (from remote UE to SCC-AS serving UE-1)

The remote UE acknowledges the SIP re-INVITE request by sending a SIP 200 (OK) response to the SCC-AS serving UE-1.

Table 4.6.4.1.3.2.2-76: SIP 200 (OK) response (remote UE to SCC-AS serving UE-1)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Asserted-Identity:
Contact: sip:userR_public1@homeR.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

79-81. SIP ACK request (from SCC-AS serving UE-1 to remote UE)

The SCC-AS serving UE-1 sends a SIP ACK request to the remote UE.

82-86. SIP re-INVITE request (from SCC-AS serving UE-1 to controllee UE; UE-2)

The SCC-AS serving UE-1 sends a SIP re-INVITE request to the controllee UE.

Table 4.6.4.1.3.2.2-82: SIP INVITE request (SCC-AS serving UE-1 to UE-2)

```
INVITE sip:user2_public1@home2.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222 SIP/2.0
Via: SIP/2.0/UDP sccas1.home1.example.net; branch=z9hG4bK332b33.3;
To: sip:user2_public1@home2.net; tag=36527
From: sip:interUEtransfer@example.net; tag=27365
Call-ID: cb03a0s09a2sdfglkj22222
Cseq: 112 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

87-91. SIP 200 (OK) response (from controllee UE, UE-2 to SCC-AS serving UE-1)

The UE-2 sends a SIP 200 (OK) response with an SDP answer.

Table 4.6.4.1.3.2.2-87: SIP 200 (OK) response (UE-2 to SCC-AS serving UE-1)

```
SIP/2.0 200 OK
Via:
To: sip:user2_public1@home2.net; tag = 36527
From: sip:interUEtransfer@example.net; tag = 27365
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.112.67.87
s=-
c=123.112.67.87
t=0 0
m=audio 1300 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

92-96. SIP ACK request (from SCC-AS serving UE-1 to UE-2)

The SCC-AS serving UE-1 sends a SIP ACK request to the UE-2.

97-98. SIP re-INVITE request (from SCC-AS serving UE-1 to UE-1)

The SCC-AS serving UE-1 sends a SIP re-INVITE request to the UE-1.

Table 4.6.4.1.3.2.2-97: SIP INVITE request (SCC-AS serving UE-1 to UE-1)

```
INVITE sip:user1_public1@home1.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via: SIP/2.0/UDP sccas1.home1.example.net; branch=z9hG4bK332b33.3;
To: sip:user1_public1@home1.net; tag= 11928
From: sip:userR_public1@homeR.net; tag=27364
Call-ID: cb03a0s09a2sdfglkj11111
Cseq: 222 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 0 RTP/AVP 98 99
```

99-100. SIP 200 (OK) response (from UE-1 to SCC-AS serving UE-1)

The UE-1 sends a SIP 200 (OK) response with an SDP answer.

Table 4.6.4.1.3.2.2-99: SIP 200 (OK) response (UE-1 to SCC-AS serving UE-1)

```
SIP/2.0 200 OK
Via:
To: sip:user1_public1@home1.net; tag= 11928
From: sip:userR_public1@homeR.net; tag=27364
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public1@home1.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
c=123.45.67.89
t=0 0
m=audio 0 RTP/AVP 97
m=video 0 RTP/AVP 98 99
```

101-102. SIP ACK request (from SCC-AS serving UE-1 to UE-1)

The SCC-AS serving UE-1 sends a SIP ACK request to the UE-1.

103-104. SIP NOTIFY request (from SCC-AS serving UE-1 to UE-1)

The SCC-AS serving UE-1 sends a SIP NOTIFY request to the UE-1 to inform about the success status of the inter-UE transfer from UE-1 to UE-2.

105-106. SIP 200 (OK) response (from UE-1 to SCC-AS serving UE-1)

The UE-1 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC AS serving UE-1.

4.6.4.1.3.3 Alternative 3 (Based on SIP re-INVITE request)

This subclause describes the scenario when the Media flow is transferred from controller UE, UE-1 to controllee UE, UE-2 requested by UE-2. The flow diagram shows when UE-1 and UE-2 belong to the same subscription.

UE-1 (123.45.67.89) and UE-2 (123.112.67.87) are included in a Collaborative Session with the remote UE (132.54.76.98), in which UE-1 is the controller UE and UE-2 is the controllee UE. The call is anchored in the SCC AS controlling the collaborative session. Prior to transfer the Media flow, UE-2 gets the dialog information such as the content type and port numbers on the remote end. This is done by UE-2 having subscribed to dialog event package between UE-1 and the SCC AS.
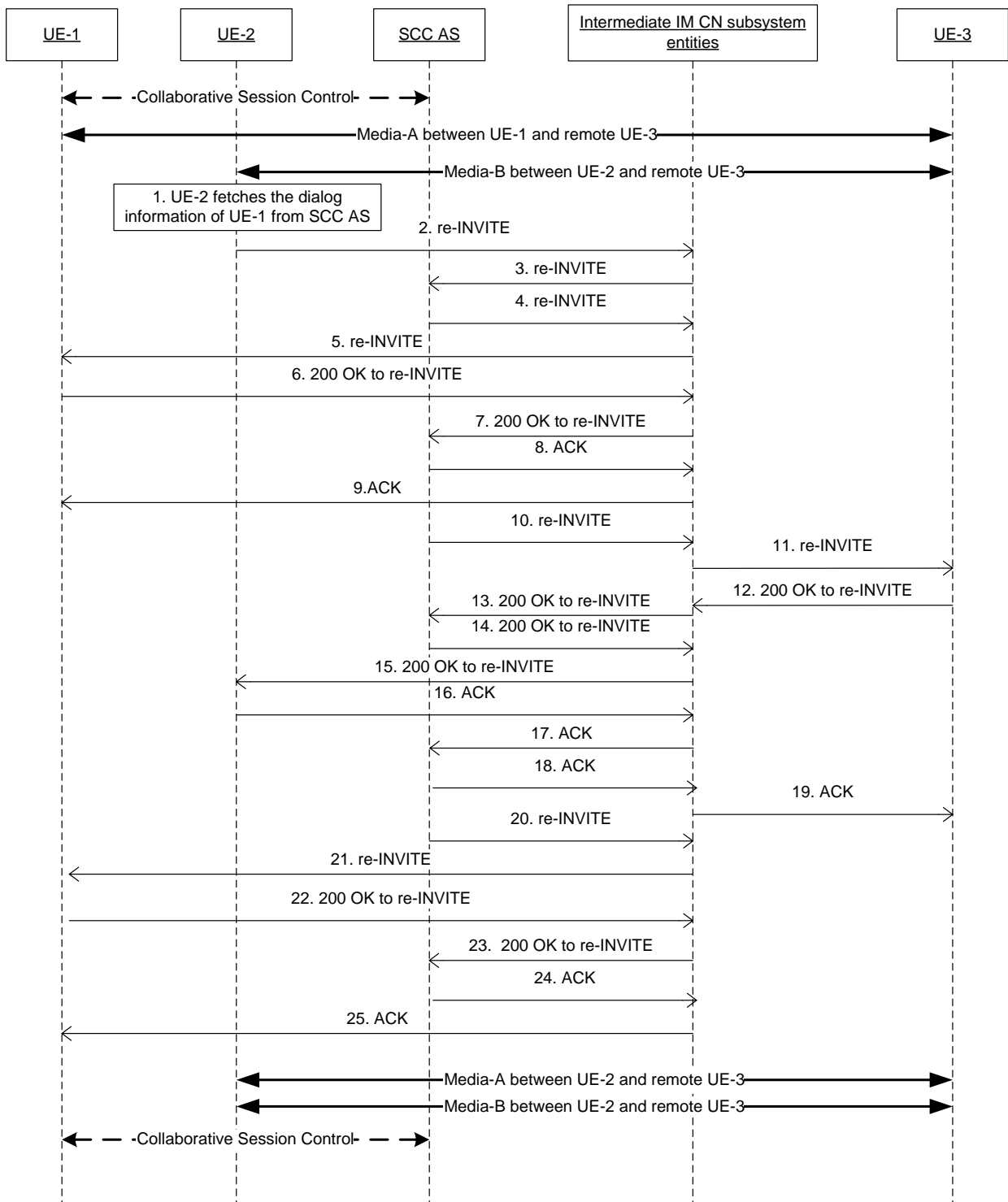
Figure 4.6.4.1.3.3-1: Inter UE Transfer initiated by controllee UE in ongoing Collaborative Session

NOTE: For clarity, the SIP 100 (Trying) responses are not shown in the signalling flow.

1. **UE-2 fetches the dialog information of UE-1 from SCC AS and decides to transfer the media-A (audio) from UE-1 to UE-2.**

2-3. **SIP re-INVITE request (UE-2 to Intermediate IM CN subsystem entities)**

The UE-2 sends SIP re-INVITE request to SCC AS.

Table 4.6.4.1.3.3-2: SIP INVITE request (UE-2 to Intermediate IM CN subsystem entities)

```
INVITE sip:interUEtransfer@sccas1.home1.net; SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:eee]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
Max-Forwards: 70
P-Preferred-Identity: <sip:user2_public1@home1.net>
From: <sip:user2_public1@home1.net>;tag=171828
To: <sip:interUEtransfer@sccas1.home1.net>;tag=756430
Call-ID: Asdasd23123366
Cseq: 41277 INVITE
Target-dialog: cb03a0s09a2sdfglkj11111;remote-tag=27364;local-tag=11928
Contact: <sip:user2_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-2222-222222222222>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Accept-Contact:+g.3gpp.iut-xyz;explicit;require
Content-Type: application/sdp
Content-Length: (…)


v=0
o=- 1027933615 1027933615 IN IP4 123.23.45.87
s=-
c=123.23.45.87
t=0 0
m=audio 1300 RTP/AVP 97
a=rtpmap:97 PCMU/8000
m=video 1302 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

m=video 1302 RTP/AVP 98: The video media is transferred from controller UE to controllee UE.

4-5. SIP re-INVITE request (SCC AS to UE-1)

The SCC AS sends the SIP re-INVITE request to UE-1 to hold the session.

Table 4.6.4.1.3.3-4 SIP INVITE request (SCC AS to UE-1)

```
INVITE sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via:
To: sip:user1_public1@home1.net;Tag=11928
From: sip:user3_public1@home2.net; tag=27364
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:interUEtransfer@sccas1.home1.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
a=sendonly
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 0 RTP/AVP 98 99
```

6-7.   SIP 200 (OK) response to the SIP re-INVITE request (UE-1 to SCC AS)

The UE-1 responds with SIP 200 (OK) to the SIP re-INVITE request.

8-9.   SIP ACK request (SCC AS to UE-1)

The SCC AS sends the SIP ACK request to UE-1.

10-11. SIP re-INVITE request (SCC AS to UE-3)

The SCC sends the SIP re-INVITE request to the remote UE-3 to update the session.

Table 4.6.4.1.3.3-10 SIP INVITE request (SCC AS to remote UE)

```
INVITE sip:user3_public1@home2.net SIP/2.0
Via:
To: sip:user3_public1@home2.net;tag=27364
From: sip:user1_public1@home1.net;tag=11928
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: <sip:interUEtransfer@sccas1.home1.net>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 1300 RTP/AVP 96 97
c=IN IP4 123.112.67.87
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 123.112.67.87
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

12-13. SIP 200 (OK) response to the SIP re-INVITE request (UE-3 to SCC AS)

The UE-3 responds with SIP 200 (OK) response to the SCC AS.

Table 4.6.4.1.3.3-12 SIP 200 (OK) response (UE-3 to SCC AS)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Asserted-Identity:
Contact: sip:user3_public1@home2.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

14-15. SIP 200 (OK) response to the SIP re-INVITE request (SCC AS to UE-2)

After successful media transfer, the SCC AS responds with SIP 200 (OK) response to UE-2.

16-17. SIP ACK request (UE-2 to SCC AS)

The UE-2 sends the SIP ACK request to SCC AS.

18-19. SIP ACK request (SCC AS to UE-3)

The SCC AS sends the SIP ACK request to UE-3.

20-21. SIP re-INVITE request (SCC-AS to UE-1)

The SCC-AS updates the access leg on controller UE-1.

Table 4.6.4.1.3.3-20 SIP INVITE request (SCC AS-1 serving UE-1 to UE-1)

```
INVITE sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via:
To: sip:user1_public1@home1.net;Tag=11928
From: sip:user3_public1@home2.net; tag=27364
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:interUEtransfer@example.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 0 RTP/AVP 98 99
```

22-23. SIP 200 (OK) response to re-INVITE request (UE-1 to SCC-AS)

After successful media update, UE-1 sends the SIP 200 (OK) reponse towards SCC-AS.

Table 4.6.4.1.3.3-22 SIP 200 (OK) response (UE-1 to SCC AS)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>;
    +g.3gpp.iut-controller
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
c=123.45.67.89
t=0 0
m=audio 0 RTP/AVP 97
m=video 0 RTP/AVP 98 99
```

24-25. SIP ACK request (SCC-AS to UE-1)

The SCC AS sends the SIP ACK request to UE-1.

4.6.4.1.4 Inter-UE transfer solicited by a target UE without prior information about the existing session

4.6.4.1.4.1 Alternative 1 (Based on "reg" event package using a Contact header)

4.6.4.1.4.1.1 Same/Different subscription

This subclause describes the scenario when the Media flow is transferred from UE-1 (123.45.67.89) to UE-2 (123.112.67.87) by solicitation of UE-2 when the UE-2 does not have information about ongoing session of UE-1.

The call is anchored in the SCC AS. Prior to transfer the Media flow, UE-2 does not have any information such as the media type and port numbers on the remote end.
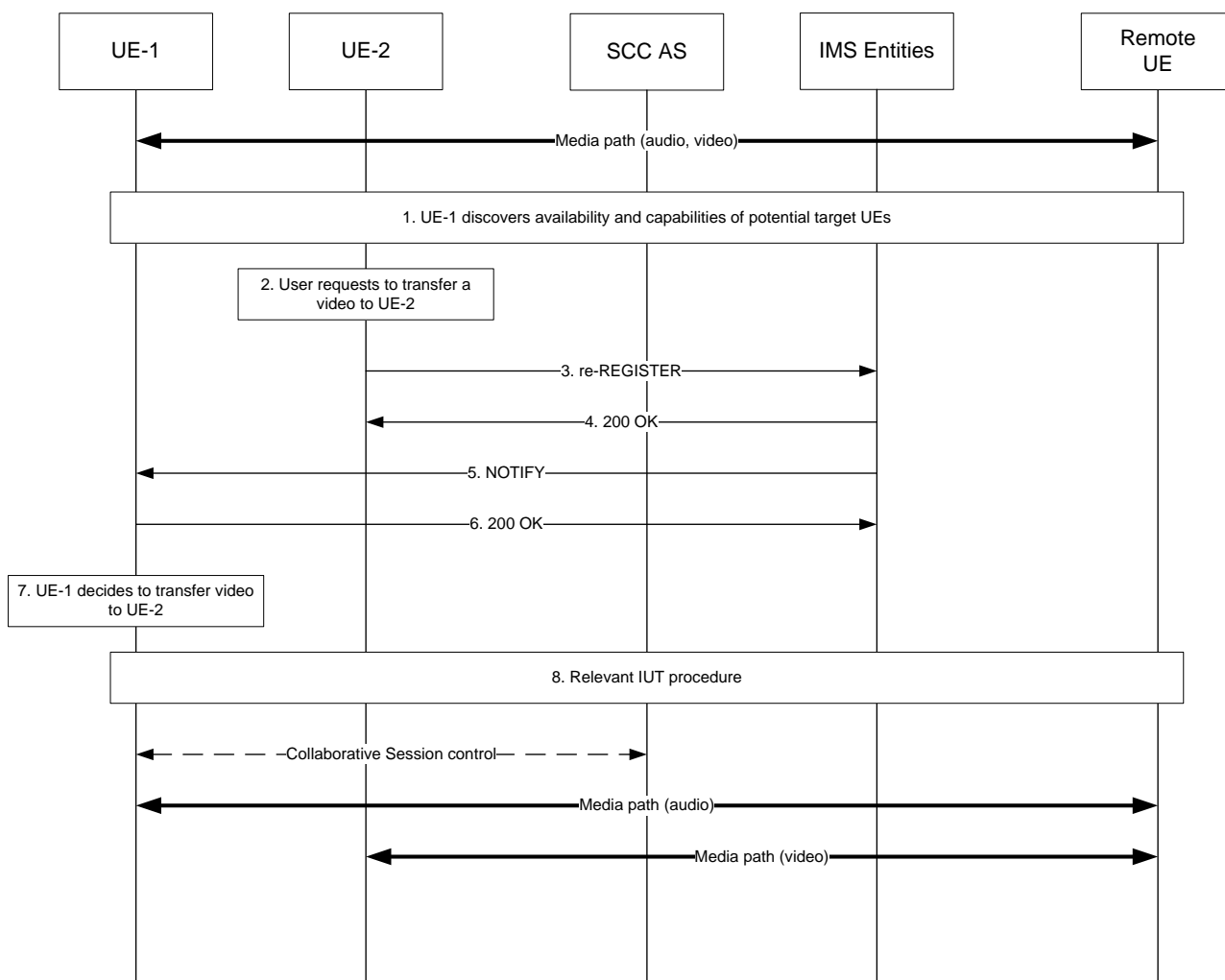
Figure 4.6.4.1.4.1.1-1: Signalling flow for Inter-UE transfer solicited by a target UE without prior information about the existing session

1. **UE-1 discovers potential target UEs**

   In order to discover the availability and capabilities of potential target UEs for inter UE transfer, UE-1 follows the procedures as described in 3GPP TS 24.237 [2], subclause 14.2.

2. **User requests to transfer a video to UE-2**

   Because the target UE, UE-2, does not have any prior information about the existing session, it is needed for user to interact with the target UE, UE-2. When the user interacts with the target UE, UE-2, the user provides the following information:

   IUT request: IUT request indicates that the target UE, UE-2, solicits the IUT of a video flow.

   Media owner: Media owner indicates the SIP URI of UE-1 which has the video session requested for IUT by the target UE, UE-2.

   Media: Media indicates media type that is transferred to the target UE, UE-2.

   Service: Service indicates the application service which includes media session that is transferred to the target UE, UE-2.

3. **SIP re-REGISTER request (from UE-2 to IMS Entities)**

   After performing the user interaction, the target UE, UE-2, sends the re-REGISTER request towards IMS Entities. The Contact header filed should include information for solicitation of IUT and the relevant values which are provided by User interaction in step 2 according to IETF RFC 3261 [20]. This request is sent to the same IMS Entities with which the UE initially registered.

Table 4.6.4.1.4.1.1-3 SIP REGISTER request (UE-2 to IMS Entities)

```
REGISTER sip:registrar.home1.net SIP/2.0
Via: SIP/2.0/UDP 123.112.67.87;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public2@home1.net>;tag=4fa3
To: <sip:user1_public2@home1.net>
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>; reg-id=1; +g.3gpp.icsi-
   ref="urn%3Aurn-7%3A3gpp-service.ims.icsi.mmtel"; +g.3gpp.ics="principal";
   +g.3gpp.iut.solicit; requested-ue="sip:user1_public1@home1.net"; media-type="video";
   service-type="urn%3Aurn-7%3A3gpp-service.ims.icsi.mmtel"; expires=3600
Call-ID: apb03a0s09dkjdfglkj49111
Authorization:
Security-Verify:
Require: sec-agree
Proxy-Require: sec-agree
CSeq: 2 REGISTER
Supported: path, outbound, gruu
Content-Length: 0
```

4. SIP 200 (OK) response (IMS Entities to UE-2)

The IMS Entities (S-CSCF) sends a SIP 200 (OK) response to the target UE, UE-2, indicating that reregistration was successful.

5. SIP NOTIFY request (IMS Entities to UE-1)

The IMS Entities (S-CSCF) sends a first NOTIFY request towards the requested UE, UE-1, in order to inform the UE-1 about the registration status of the target UE, UE-2.

The Route header is constructed from the Record-Route header as constructed during subscription.

Table 4.6.4.1.4.1.1-5: SIP NOTIFY request (IMS Entities to UE-1)

```
NOTIFY sip:user1_public1@home1.net SIP/2.0
Via:
Max-Forwards: 70
From: <sip:user1_public2@home1.net>;tag=151170
To: <sip:user1_public1@home1.net>;tag=31415
Call-ID:
CSeq: 42 NOTIFY
Contact:
Event: reg
Content-Type: application/reginfo+xml
Content-Length: (...)

<?xml version="1.0"?>
<reginfo xmlns="urn:ietf:params:xml:ns:reginfo"
             version="1" state="full">
    <registration aor="sip:user1_public2@home1.net" id="a7" state="active">
        <contact id="76" state="active" event="registered">
            <uri>sip:123.112.67.87</uri>
            <unknown-param name="+g.3gpp.iut.solicit"/>
            <unknown-param name="requested-ue">sip:user1_public1@home1.net</unknown-param>
            <unknown-param name="media-type">video</unknown-param>
            <unknown-param name="service-type">urn:urn-7:3gpp-service.ims.icsi.mmtel
            </unknown-param>
        </contact>
    </registration>
</reginfo>
```

6. SIP 200 (OK) response (UE-1 to IMS Entities)

The UE-1 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the IMS Entities.

7. UE-1 decides Inter-UE transfer

After receiving the SIP NOTIFY containing solicit IUT request, the resuested UE, UE-1, decides whwther to initiate the IUT solicited by the target UE, UE-2, or not.

8. Relevant IUT procedures

If the UE-1 decides to accept the IUT solicited by the target UE, UE-1, then the UE-1 initiates the relevant IUT procedures as decribed in 3GPP TS 24.237 [6], subclause 15, 16, and 17.

4.6.4.2.2   Controllee UE initiated addition of media to another controllee UE

4.6.4.2.2.1   Alternative 1 (SIP REFER with media feature tag)

4.6.4.2.2.1.1   Same/Different subscription

This subclause describes the scenario when controllee UE, UE-2 initiate addition of a media to another controllee UE, UE-3. The flow diagram shows when UE-1 and UE-2, UE-3 belong to the different subscription.

Note: When UE-1 and UE-2, UE-3 belong to the same subscription, Serving SCC AS of UE-1, UE-2 and UE-3 are same.

UE-1(123.45.67.89), UE-2 (123.112.67.87) and UE-3(123.23.45.67) are included in a Collaborative Session with the remote UE (132.54.76.98), in which UE-1 is the controller UE and UE-2 and UE-3 are the controllee UEs. The Collaborative Session is controlled by SCC AS-1. Media paths exist between UE-2 and remote UE(audio) and between UE-3 and remote UE(video). The UE-2(123.23.45.67) wants to add another media flow between UE-3 and remote UE(video).

Figure 4.6.4.2.2.1.1-1: Signalling flow for controllee UE initiated addition of media to another controllee UE

1. UE-2 discovers the information of the collaborative session.

2-6. SIP REFER request (from UE-2 to UE-1)

The UE-2 sends SIP REFER request to the controller UE, UE-1 to request addition of media to UE-3. The SIP REFER request is finally routed to the SCC AS-1 serving UE-1.

Table 4.6.4.2.2.1.1-2: SIP REFER request (UE-2 to UE-1)

```
REFER sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111  SIP/2.0
Via: SIP/2.0/UDP [3333::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
To: <sip:user1_public1@home1.net>
From: <sip:user2_public1@home2.net>;tag=294756
Call-ID: Asdasd23123366
Cseq: 4897924 REFER
Max-Forwards: 70
P-Preferred-Identity: <sip:user2_public1@home2.net>;
Refer-To: <sip:user1_public3@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333?body=
   m%3Daudio%200%20RTP%2FAVP%97%0Dm%3Dvideo%203002%20RTP%2FAVP%2098%2099%3E
   m%3Dvideo%209%20RTP%2FAVP%2098%2099>
Referred-By: sip:user2_public1@home2.net
Target-dialog: cb03a0s09a2sdfglkj11111;remote-tag=27364;local-tag=11928
Contact: sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222
Referred-By: sip:user2_public1@home2.net
Accept: application/sdp, message/sipfrag
Content-Length: 0
```

7-11. SIP 202 (Accepted) response (from SCC AS-1 to UE-2)

SCC AS-1 serving UE-1 sends a SIP 202 (Accepted) response to UE-2 as response to the SIP REFER request.

12-16. SIP NOTIFY request (from SCC AS-1 to UE-2)

The UE-1 sends a SIP NOTIFY request to UE-2 to notify implicit subscription to the SIP REFER request results.

17-21. SIP 200 (OK) response (from UE-2 to SCC AS-1)

The UE-2 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC AS-1.

22-26. SIP re-INVITE request (from SCC AS-1 to UE-3)

Since the message 2-6 contains a Refer-to header field addressed to UE-3 and the URI parameters, listing an audio line which is not currently supported by UE-3, the SCC AS realizes the procedure is for adding the media to UE-3. The SCC AS-1 sends a SIP re-INVITE request to the UE-3, to add the video media component.

Table 4.6.4.2.2.1.1-22: SIP INVITE request (SCC AS-1 to UE-2)

```
INVITE sip:user3_public1@home2.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333 SIP/2.0
Via: SIP/2.0/UDP sccas1.home1.net; branch=z9hG4bK332b33.3;
To: sip:user3_public1@home2.net;
From: sip:interUEtransfer@home.net; tag=12486
Call-ID: cb03a0s09a2sdfglkj33333
Cseq: 115 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:interUEtransfer@sccas1.home1.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=video 9 RTP/AVP 98 99
a=sendonly
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

27-31. SIP 200 (OK) response (from UE-3 to SCC AS-1)

The target UE, UE-3, acknowledges the SIP re-INVITE request by sending a SIP 200 (OK) response to the SCC AS-1.

Table 4.6.4.2.2.1.2-36: SIP 200 (OK) response (UE-2 to SCC AS-1)

```
SIP/2.0 200 OK
Via:
To: sip:user3_public1@home2.net; tag = 24861
From: sip:interUEtransfer@home.net; tag = 12486
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user3_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.23.45.67
s=-
c=123.23.45.67
t=0 0
m=audio 0 RTP/AVP 97
m=video 1302 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=video 1304 RTP/AVP 98 99
a=recvonly
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

32-36. SIP ACK request (from SCC AS-1 to UE-3)

The SCC AS-1 sends a SIP ACK request to the UE-3.

37-39. SIP re-INVITE request (from SCC AS-1 to remote UE)

The SCC AS-1 sends a SIP re-INVITE request to the remote UE.

Table 4.6.4.2.2.1.1-37 SIP INVITE request (SCC AS-1 to remote UE)

```
INVITE sip:user4_public1@home2.net SIP/2.0
Via:
To: sip:user4_public1@home2.net;tag=27364
From: sip:user1_public1@home1.net;tag=11928
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: <sip:interUEtransfer@sccas1.home1.net>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 1300 RTP/AVP 96 97
c=IN IP4 123.112.67.87
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 123.23.45.67
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=video 1304 RTP/AVP 98 99
c=IN IP4 123.23.45.67
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

40-42. SIP 200 (OK) response (from remote UE to SCC AS-1)

The remote UE acknowledges the SIP re-INVITE request by sending a SIP 200 (OK) response to the SCC AS-1.

Table 4.6.4.2.2.1.1-40: SIP 200 (OK) response (remote UE to SCC AS-1)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Asserted-Identity:
Contact: sip:user4_public1@home2.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=video 3004 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

43-45. SIP ACK request (from SCC AS-1 to remote UE)

The SCC AS-1 sends a SIP ACK request to the remote UE.

46-50. SIP re-INVITE request (from SCC AS-1 to UE-3)

The SCC AS-1 sends a SIP re-INVITE request to the controllee UE.

Table 4.6.4.2.2.1.1-46: SIP INVITE request (SCC AS-1 to UE-3)

```
INVITE sip:user3_public1@home2.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333 SIP/2.0
Via: SIP/2.0/UDP sccas.home1.net; branch=z9hG4bK332b33.3;
To: sip:user3_public1@home2.net;
From: sip:interUEtransfer@sccas1.home1.net; tag=12486
Call-ID: cb03a0s09a2sdfglkj33333
Cseq: 111 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:interUEtransfer@sccas1.home1.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=video 3004 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

51-55. SIP 200 (OK) response (from UE-3 to SCC AS-1)

The UE-3 sends a SIP 200 (OK) response with an SDP answer.

Table 4.6.4.2.2.1.1-51: SIP 200 (OK) response (UE-3 to SCC AS-1)

```
SIP/2.0 200 OK
Via:
To: sip:user3_public1@home3.net; tag = 24861
From: sip:interUEtransfer@home.net; tag = 12486
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user3_public1@home3.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.23.45.67
s=-
c=123.23.45.67
t=0 0
m=audio 0 RTP/AVP 97
m=video 1302 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=video 1304 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

56-60. SIP ACK request (from SCC AS-1 to UE-3)

The SCC AS-1 sends a SIP ACK request to the UE-3.

61-65. SIP NOTIFY request (from SCC AS-1 to UE-2)

The SCC AS-1 sends a SIP NOTIFY request to the request UE, UE-2 to inform about the success status of adding media to UE-3.

66-70. SIP 200 (OK) response (from UE-2 to SCC AS-1)

The UE-2 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC AS-1.

4.6.4.2.2.2 Alternative 2 (SIP REFER with method= REFER)

4.6.4.2.2.2.1 Same subscription

This subclause describes the scenario when controllee UE, UE-2 initiate addition of a media to another controllee UE, UE-3. The flow diagram shows when UE-1, UE-2, and UE-3 belong to the same subscription.

UE-1(123.45.67.89), UE-2 (123.112.67.87) and UE-3(123.23.45.67) are included in a Collaborative Session with the remote UE (132.54.76.98), in which UE-1 is the controller UE and UE-2 and UE-3 are the controllee UEs. Media paths exist between UE-2 and remote UE(audio) and between UE-3 and remote UE(video). The UE-2(123.23.45.67) wants to add another media flow between UE-3 and remote UE(video).
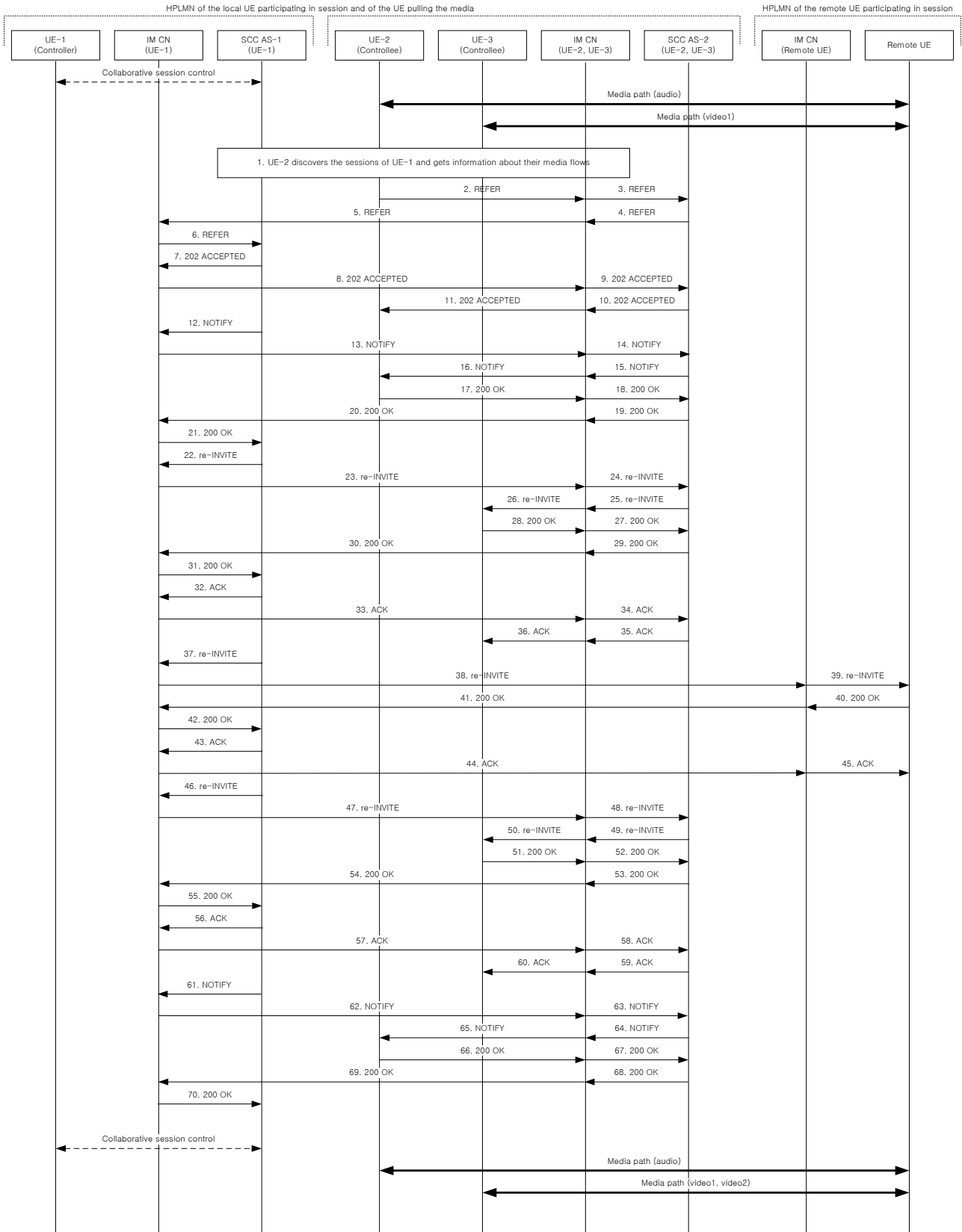
Figure 4.6.4.2.2.2.1-1: Signalling flow for controllee UE initiated addition of media to another controllee UE

1. **UE-2 discovers the sessions of UE-1.**

2-5. **SIP REFER request (from UE-2 to UE-1)**

The UE-2 sends SIP REFER (referred REFER) request to the controller UE, UE-1 to request addition of media to UE-3.

Table 4.6.4.2.2.2.1-2: SIP REFER request (UE-2 to UE-1)

```
REFER sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via: SIP/2.0/UDP [3333::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
To: <sip:user1_public1@home1.net>
From: <sip:user1_public2@home1.net>;tag=294756
Call-ID: Asdasd23123366
Cseq: 4897924 REFER
Max-Forwards: 70
P-Preferred-Identity: <sip:user1_public2@home1.net>;
Refer-To: <sip:interUEtransfer@ sccas1.home1.net;method=REFER?
    To=%3CinterUEtransfer%40sccas1.home1.net%3E%3BFrom=%3Csip:user1_public1%40home1.net%3BRefer
    -To=%3Csip:user1_public3@home1.net%3B gr=urn:uuid:f81d4fae-7dec-11d0-1111-
    333333333333?body= m%3Daudio%200%20RTP%2FAVP%97%0Dm%3Dvideo%203002%20RTP%2FAVP%2098%2099%3E
    m%3Dvideo%209%20RTP%2FAVP%2098%2099%3E%3BTarget-dialog= cb03a0s09a2sdfglkj11111%3Bremote-
    tag=27364%3Blocal-tag=11928>
Referred-By: sip:user1_public2@home1.net
Target-dialog: cb03a0s09a2sdfglkj11111;remote-tag=27364;local-tag=11928
Contact: <sip:user1_public2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222>
Accept: application/sdp, message/sipfrag
Content-Length: 0
```

6-9.   SIP 202 (Accepted) response (from UE-1 to UE-2)

UE-1 sends a SIP 202 (Accepted) response to UE-2 as response to the SIP REFER request.

10-13. SIP NOTIFY request (from UE-1 to UE-2)

The UE-1 sends a SIP NOTIFY request to UE-2 to notify implicit subscription to the SIP REFER request results.

14-17. SIP 200 (OK) response (from UE-2 to UE-1)

The UE-2 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC-AS.

18-19. SIP REFER request (from UE-1 to SCC AS)

The UE-1 sends SIP REFER request to SCC AS to request addition of the media to UE-3.

Table 4.6.4.2.2.2.1-18: SIP REFER request (UE-1 to SCC-AS)

```
REFER sip:interUEtransfer@ sccas1.home1.net SIP/2.0
Via: SIP/2.0/UDP [1111::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
To: <sip:interUEtransfer@ sccas1.home1.net>
From: <sip:user1_public1@home1.net>;tag=223457
Call-ID: Asdasd23123377
Cseq: 112 REFER
Max-Forwards: 70
P-Preferred-Identity: <sip:user1_public1@home1.net>;
Refer-To: <sip:user1_public3@home1.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333?body=
    m%3Daudio%200%20RTP%2FAVP%97%0Dm%3Dvideo%203002%20RTP%2FAVP%2098%2099%0Dm%3Dvideo%209%20RTP
    %2FAVP%2098%2099>
Require: target-dialog
Target-dialog: cb03a0s09a2sdfglkj11111;remote-tag=27364;local-tag=11928
Referred-By: sip:user1_public2@home1.net
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>
Accept: application/sdp, message/sipfrag
Content-Length: 0
```

20-21. SIP 202 (Accepted) response (from SCC AS to UE-1)

SCC-AS sends a SIP 202 (Accepted) response to UE-1 as response to the SIP REFER request.

22-25. SIP NOTIFY request (from UE-1 to UE-2)

The UE-1 sends a SIP NOTIFY request to the UE-2 to inform about the success status of the inter-UE transfer.

26-29. SIP 200 (OK) response (from UE-2 to UE-1)

The UE-2 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the UE-1.

30-31. SIP NOTIFY request (from SCC AS to UE-1)

The SCC-AS sends a SIP NOTIFY request to UE-1 to notify implicit subscription to the SIP REFER request results.

32-33. SIP 200 (OK) response (from UE-1 to SCC AS)

The UE-1 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC-AS.

34-35. SIP re-INVITE request (from SCC-AS to UE-3)

Since the message 18-19 contains a Refer-to header field addressed to UE-3 and the URI parameters, listing an audio line which is not currently supported by UE-3, the SCC AS realizes the procedure is for adding the media to UE-3. The SCC-AS sends a SIP re-INVITE request to the UE-3, to add the video media component.

Table 4.6.4.2.2.2.1-34: SIP INVITE request (SCC-AS to UE-2)

```
INVITE sip:user1_public3@home1.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333 SIP/2.0
Via: SIP/2.0/UDP sccas.home1.net; branch=z9hG4bK332b33.3;
To: sip:user1_public3@home1.net;
From: sip:interUEtransfer@ sccas1.home.net; tag=12486
Call-ID: cb03a0s09a2sdfglkj33333
Cseq: 115 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:interUEtransfer@sccas1.home1.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=video 9 RTP/AVP 98 99
a=sendonly
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

36-37. SIP 200 (OK) response (from UE-3 to SCC-AS)

The target UE, UE-3, acknowledges the SIP re-INVITE request by sending a SIP 200 (OK) response to the SCC-AS.

Table 4.6.4.2.2.2.1-36: SIP 200 (OK) response (UE-3 to SCC-AS)

```
SIP/2.0 200 OK
Via:
To: sip:user1_public3@home1.net; tag = 24861
From: sip:interUEtransfer@ sccas1.home.net; tag = 12486
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public3@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.23.45.67
s=-
c=123.23.45.67
t=0 0
m=audio 0 RTP/AVP 97
m=video 1302 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=video 1304 RTP/AVP 98 99
a=recvonly
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

38-39. SIP ACK request (from SCC-AS to target UE; UE-3)

The SCC-AS sends a SIP ACK request to the UE-3.

40-42. SIP re-INVITE request (from SCC-AS to remote UE)

The SCC-AS sends a SIP re-INVITE request to the remote UE.

Table 4.6.4.2.2.2.1-40 SIP INVITE request (SCC-AS to remote UE)

```
INVITE sip:user4_public1@home2.net SIP/2.0
Via:
To: sip:user4_public1@home2.net;tag=27364
From: sip:user1_public1@home1.net;tag=11928
Call-ID: cb03a0s09a2sdfglkj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: <sip:interUEtransfer@sccas1.home1.net>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 1300 RTP/AVP 96 97
c=IN IP4 123.112.67.87
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 123.23.45.67
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=video 1304 RTP/AVP 98 99
c=IN IP4 123.23.45.67
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

43-45. SIP 200 (OK) response (from remote UE to SCC-AS)

The remote UE acknowledges the SIP re-INVITE request by sending a SIP 200 (OK) response to the SCC-AS.

Table 4.6.4.2.2.2.1-43: SIP 200 (OK) response (remote UE to SCC-AS)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Asserted-Identity:
Contact: sip:user4_public1@home2.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=video 3004 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

46-48. SIP ACK request (from SCC-AS to remote UE)

The SCC-AS sends a SIP ACK request to the remote UE.

49-50. SIP re-INVITE request (from SCC-AS to controllee UE; UE-3)

The SCC-AS sends a SIP re-INVITE request to the controllee UE, UE-3.

Table 4.6.4.2.2.2.1-49: SIP INVITE request (SCC-AS to UE-3)

```
INVITE sip:user1_public3@home1.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333 SIP/2.0
Via: SIP/2.0/UDP sccas.home1.net; branch=z9hG4bK332b33.3;
To: sip:user1_public3@home1.net;
From: sip:interUEtransfer@sccas1.home1.net; tag=12486
Call-ID: cb03a0s09a2sdfglkj33333
Cseq: 111 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:interUEtransfer@sccas1.home1.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=video 3004 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

51-52. SIP 200 (OK) response (from UE-3 to SCC-AS)

The UE-3 sends a SIP 200 (OK) response with an SDP answer.

Table 4.6.4.2.2.1.1-51: SIP 200 (OK) response (UE-3 to SCC-AS)

```
SIP/2.0 200 OK
Via:
To: sip:user1_public3@home1.net; tag = 24861
From: sip:interUEtransfer@sccas1.home1.net; tag = 12486
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public3@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.23.45.67
s=-
c=123.23.45.87
t=0 0
m=audio 0 RTP/AVP 97
m=video 1302 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=video 1304 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

53-54. SIP ACK request (from SCC-AS to UE-3)

The SCC-AS sends a SIP ACK request to the UE-3.

55-56. SIP NOTIFY request (from SCC-AS to UE-1)

The SCC-AS sends a SIP NOTIFY request to the UE-1 to inform about the success status of adding media to UE-3.

57-58. SIP 200 (OK) response (from UE-1 to SCC-AS)

The UE-1 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC AS.

4.6.4.2.2.2.2 Different subscription

This subclause describes the scenario when controllee UE, UE-2 initiate addition of a media to another controllee UE, UE-3. The flow diagram shows when UE-1 and UE-2, UE-3 belong to the different subscription.

UE-1(123.45.67.89), UE-2 (123.112.67.87) and UE-3(123.23.45.67) are included in a Collaborative Session with the remote UE (132.54.76.98), in which UE-1 is the controller UE and UE-2 and UE-3 are the controllee UEs. The Collaborative Session is controlled by SCC AS-1. Media paths exist between UE-2 and remote UE(audio) and between UE-3 and remote UE(video). The UE-2(123.23.45.67) wants to add another media flow between UE-3 and remote UE(video).
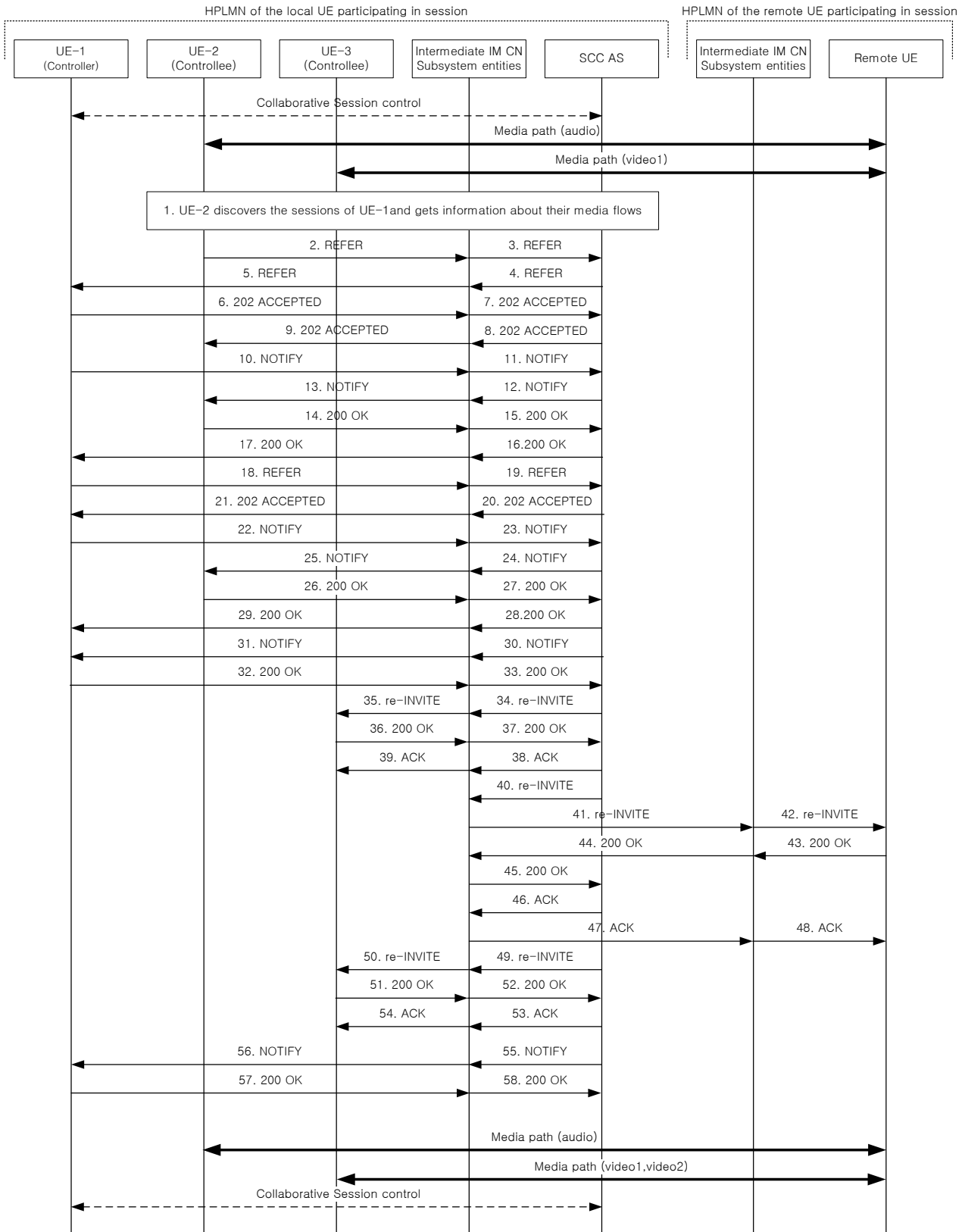
Figure 4.6.4.2.2.2.2-1: Signalling flow for controllee UE initiated addition of media to another controllee UE -

1. **UE-2 discovers the information of the collaborative session.**

2-8. **SIP REFER request (from UE-2 to UE-1)**

The UE-2 sends SIP REFER (referred REFER) request to the controller UE, UE-1 to request addition of media to UE-3.

Table 4.6.4.2.2.2.2-2: SIP REFER request (UE-2 to UE-1)

```
REFER sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111  SIP/2.0
Via: SIP/2.0/UDP [3333::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
To: <sip:user1_public1@home1.net>
From: <sip:user1_public2@home2.net>;tag=294756
Call-ID: Asdasd23123366
Cseq: 4897924 REFER
Max-Forwards: 70
P-Preferred-Identity: <sip:user1_public2@home1.net>;
Refer-To: <sip:interUEtransfer@home.net;method=REFER?
   To=%3CinterUEtransfer%home.net%3E%3BFrom=%3Csip:user1_public1%40home1.net%3BRefer-
   To=%3Csip:user1_public3@home1.net%3B gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333?body=
   m%3Daudio%200%20RTP%2FAVP%97%0Dm%3Dvideo%203002%20RTP%2FAVP%2098%209%3E
   m%3Dvideo%209%20RTP%2FAVP%2098%2099%3E%3BTarget-dialog= cb03a0s09a2sdfglkj11111%3Bremote-
   tag=27364%3Blocal-tag=11928>
Referred-By: sip:user1_public2@home2.net
Target-dialog: cb03a0s09a2sdfglkj11111;remote-tag=27364;local-tag=11928
Contact: <sip:user1_public2@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-222222222222>
Accept: application/sdp, message/sipfrag
Content-Length: 0
```

9-15. **SIP 202 (Accepted) response (from UE-1 to UE-2)**

UE-1 sends a SIP 202 (Accepted) response to UE-2 as response to the SIP REFER request.

16-22. **SIP NOTIFY request (from UE-1 to UE-2)**

The UE-1 sends a SIP NOTIFY request to UE-2 to notify implicit subscription to the SIP REFER request results.

23-29. **SIP 200 (OK) response (from UE-2 to UE-1)**

The UE-2 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC AS-1.

30-31. **SIP REFER request (from UE-1 to SCC AS)**

The UE-1 sends SIP REFER request to SCC AS to request addition of the media to UE-3.

Table 4.6.4.2.2.2.2-30: SIP REFER request (UE-1 to SCC AS-1)

```
REFER sip:interUEtransfer@home.net SIP/2.0
Via: SIP/2.0/UDP [1111::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
To: <sip:interUEtransfer@home.net>
From: <sip:user1_public1@home1.net>;tag=223457
Call-ID: Asdasd23123377
Cseq: 112 REFER
Max-Forwards: 70
P-Preferred-Identity: <sip:user1_public1@home1.net>;
Refer-To: <sip:user1_public3@home1.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333?body=
   m%3Daudio%200%20RTP%2FAVP%97%0Dm%3Dvideo%203002%20RTP%2FAVP%2098%2099%0Dm%3Dvideo%209%20RTP
   %2FAVP%2098%2099>
Require: target-dialog
Target-dialog: cb03a0s09a2sdfglkj11111;remote-tag=27364;local-tag=11928
Referred-By: sip:user1_public2@home2.net
Contact: <sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>
Accept: application/sdp, message/sipfrag
Content-Length: 0
```

32-33. SIP 202 (Accepted) response (from SCC AS to UE-1)

SCC AS-1 sends a SIP 202 (Accepted) response to UE-1 as response to the SIP REFER request.

34-40. SIP NOTIFY request (from UE-1 to UE-2)

The UE-1 sends a SIP NOTIFY request to the UE-2 to inform about the success status of the inter-UE transfer.

41-47. SIP 200 (OK) response (from UE-2 to UE-1)

The UE-2 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the UE-1.

48-49. SIP NOTIFY request (from SCC AS to UE-1)

The SCC AS-1 sends a SIP NOTIFY request to UE-1 to notify implicit subscription to the SIP REFER request results.

50-51. SIP 200 (OK) response (from UE-1 to SCC AS)

The UE-1 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC AS-1.

52-56. SIP re-INVITE request (from SCC AS-1 to UE-3)

Since the message 18-19 contains a Refer-to header field addressed to UE-3 and the URI parameters, listing an audio line which is not currently supported by UE-3, the SCC AS realizes the procedure is for adding the media to UE-3. The SCC AS-1 sends a SIP re-INVITE request to the UE-3, to add the video media component.

Table 4.6.4.2.2.2.2-52: SIP INVITE request (SCC AS-1 to UE-2)

```
INVITE sip:user1_public3@home3.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333 SIP/2.0
Via: SIP/2.0/UDP sccas.home1.net; branch=z9hG4bK332b33.3;
To: sip:user1_public3@home3.net;
From: sip:interUEtransfer@home.net; tag=12486
Call-ID: cb03a0s09a2sdfglkj33333
Cseq: 115 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:interUEtransfer@sccas1.home1.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=video 9 RTP/AVP 98 99
a=sendonly
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

57-61. SIP 200 (OK) response (from UE-3 to SCC AS-1)

The target UE, UE-3, acknowledges the SIP re-INVITE request by sending a SIP 200 (OK) response to the SCC AS-1.

Table 4.6.4.2.2.2.2-57: SIP 200 (OK) response (UE-2 to SCC AS-1)

```
SIP/2.0 200 OK
Via:
To: sip:user1_public3@home3.net; tag = 24861
From: sip:interUEtransfer@home.net; tag = 12486
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public3@home3.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.23.45.67
s=-
c=123.23.45.67
t=0 0
m=audio 0 RTP/AVP 97
m=video 1302 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=video 1304 RTP/AVP 98 99
a=recvonly
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

62-66. SIP ACK request (from SCC AS-1 to target UE; UE-3)

The SCC AS-1 sends a SIP ACK request to the UE-3.

67-69. SIP re-INVITE request (from SCC AS-1 to remote UE)

The SCC AS-1 sends a SIP re-INVITE request to the remote UE.

Table 4.6.4.2.2.2.2-67 SIP INVITE request (SCC AS-1 to remote UE)

```
INVITE sip:user4_public1@home2.net SIP/2.0
Via:
To: sip:user4_public1@home2.net;tag=27364
From: sip:user1_public1@home1.net;tag=11928
Call-ID: cb03a0s09a2sdfg1kj11111
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: <sip:interUEtransfer@sccas1.home1.net>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 1300 RTP/AVP 96 97
c=IN IP4 123.112.67.87
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 123.23.45.67
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=video 1304 RTP/AVP 98 99
c=IN IP4 123.23.45.67
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

70-72. SIP 200 (OK) response (from remote UE to SCC AS-1)

The remote UE acknowledges the SIP re-INVITE request by sending a SIP 200 (OK) response to the SCC AS-1.

Table 4.6.4.2.2.2.2-70: SIP 200 (OK) response (remote UE to SCC AS-1)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Asserted-Identity:
Contact: sip:user4_public1@home2.net
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 3000 RTP/AVP 97
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=video 3004 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

73-75. SIP ACK request (from SCC AS-1 to remote UE)

The SCC AS-1 sends a SIP ACK request to the remote UE.

76-80. SIP re-INVITE request (from SCC AS-1 to controllee UE; UE-3)

The SCC AS-1 sends a SIP re-INVITE request to the controllee UE.

Table 4.6.4.2.2.2.2-76: SIP INVITE request (SCC AS-1 to UE-3)

```
INVITE sip:user1_public3@home3.net; gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333 SIP/2.0
Via: SIP/2.0/UDP sccas.home1.net; branch=z9hG4bK332b33.3;
To: sip:user1_public3@home3.net;
From: sip:interUEtransfer@sccas1.home1.net; tag=12486
Call-ID: cb03a0s09a2sdfglkj33333
Cseq: 111 INVITE
Max-Forwards: 70
P-Asserted-Identity:
Require:
Contact: sip:interUEtransfer@sccas1.home1.net
Allow:
Accept:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 0 RTP/AVP 97
m=video 3002 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=video 3004 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

81-85. SIP 200 (OK) response (from UE-3 to SCC AS-1)

The UE-3 sends a SIP 200 (OK) response with an SDP answer.

Table 4.6.4.2.2.2.2-81: SIP 200 (OK) response (UE-2 to SCC AS-1)

```
SIP/2.0 200 OK
Via:
To: sip:user1_public3@home3.net; tag = 24861
From: sip:interUEtransfer@home.net; tag = 12486
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: <sip:user1_public3@home3.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-333333333333>
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.23.45.67
s=-
c=123.23.45.67
t=0 0
m=audio 0 RTP/AVP 97
m=video 1302 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
m=video 1304 RTP/AVP 98 99
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

86-90. SIP ACK request (from SCC AS-1 to UE-3)

The SCC AS-1 sends a SIP ACK request to the UE-3.

91-92. SIP NOTIFY request (from SCC AS-1 to UE-1)

The SCC AS-1 sends a SIP NOTIFY request to the UE-1 to inform about the success status of adding media to UE-3.
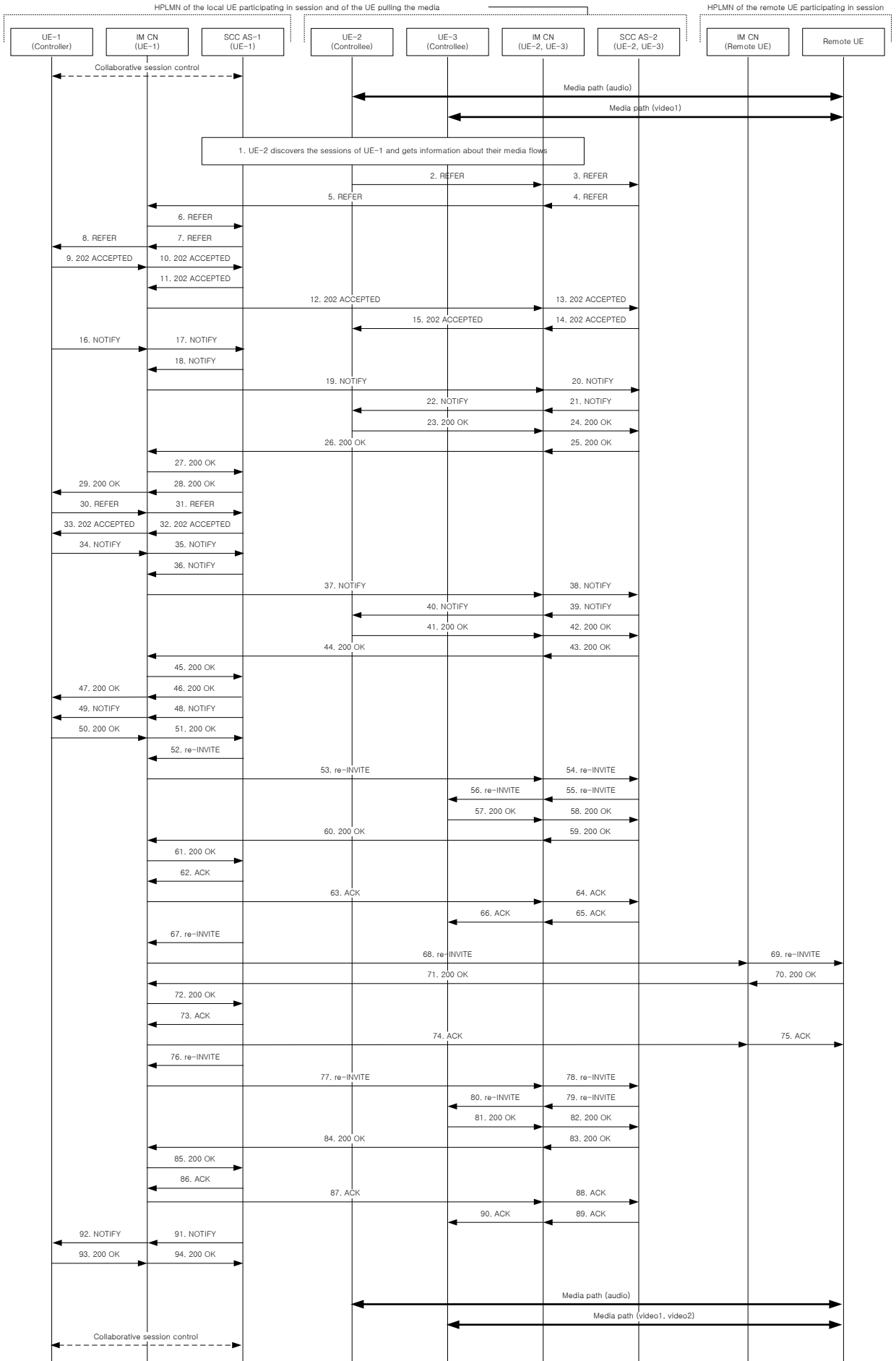
93-94. SIP 200 (OK) response (from UE-1 to SCC AS-1)

The UE-1 acknowledges the SIP NOTIFY request by sending a SIP 200 (OK) response to the SCC AS.

4.7 Session replication

4.7.1 General

4.7.1.1 Alternatives for protocol solutions to identify requests for replication

The issues identified in clause 4.7.3.1 regarding indication of request of session replication can be resolved by one of the options summarised below:

1. UE includes new information in the SDP of the media to be replicated. One example is to define a new attribute within the "i=" field, e.g., "i=replicate". The same method could be also used to define an indication to transfer media, e.g., "i=transfer". However, "i=" field is intended to be human-readable and not for parsing by automata. Alternatively, a new attribute can be introduced to indicate explicitly if a media component is to be replicated. Such an attribute may be used at the session level if all media components are to be replicated, else applied to each media component at the media level. The "a=" field is the main method for extending the SDP in order to meet application demands. Therefore, it is more suitable to be used as an indication of replication.

2. Include a new header field, i.e. "Replicate Header Field" that describe the session/media to be replicated. The "Replicate Header Field" would have similar parameters to the "Replaces Header Field" as defined in IETF RFC 3891 [10]. The Replicate header includes the dialog-id of the session to be replicated (call-id, to and from tags);

3. include an XML body in the request for session/media replication. The XML body contains the instruction to "replicate" session/media from the existing Controller UE to the intended target Controller UE. The XML body may include the identity (i.e. the GRUU) of the existing Controller UE and the identity (i.e. GRUU) of the target Controller UE. Alternatively, these may be included in the appropriate SIP header fields (e.g. Request-URI, Contact, etc);

4. include an feature tag in Accept-Contact as described in subclause 4.7.2.1.4.

4.7.2 Procedures

4.7.2.1 Session replication by the SCC AS – pull mode

4.7.2.1.1 Alternative 1: new SDP attribute to indicate replication of media component

4.7.2.1.1.1 General

A new attribute is introduced to indicate replication of a media component.

a = 3gpp.iut.replication

The replicate attribute can be included either at the session level or at the media level. Inclusion of "a=3gpp.iut.replication" at the session level indicates replication of all media components included in the SDP. Inclusion of "a=3gpp.iut.replication" at the media level indicates replication of the specific media component that the attribute is associated with.

Editor's Note: The syntax of the "a=3gpp.iut.replication" field and the amount of information that it can convey is FFS. See section 4.7.4.1.2.1 for an example of the usage of this attribute.

4.7.2.1.1.2 Single subscription

4.7.2.1.1.2.1 SC UE

In order to replicate an existing session, the UE shall send a SIP INVITE request to the SCC AS containing SDP information as follows:

> NOTE: Before requesting replication, the UE discovers the ongoing collaborative session with the replicated media and gets information about its media flows by subscribing to dialog event.

>> 1) for the replicated media component(s), containing the port numbers of the UE and the "a=3gpp.iut. replication" attribute set to "nw pull receiver" which indicates that the replication request is sent from the controllee UE, and it uses the network based solution; 2)for the media component(s) served by the UE itself, containing the port numbers of the UE; and

>> 2) for the media component(s) not served by the UE, containing the port numbers set to zero.

Upon receiving the SIP 2xx response for the INVITE request from the SCC AS, the UE shall send a SIP ACK request to the SCC AS.

4.7.2.1.1.2.2 SCC AS serving the collaborative session

On receiving the SIP INVITE request, the SCC AS authorizes the request and sends information to MRF to allocate the media resource for the media to be replicated.

> Editor's Note: How the SCC AS authorizes the request for session replication is FFS.

> Editor's Note: There is a need to understand what functionality the MRF is providing. This can either be done by showing the instructions to the MRF or by showing the SDP in other messages thus enabling the activity of the MRF to be seen.

On receiving the SIP INVITE request, the SCC AS shall send a SIP re-INVTE request to the controller UE to updates the access leg on Controller UE for the replicated media flow with MRF. The SIP re-INVITE request includes the SDP offer with the "a=3gpp.iut.replication" attribute which indicates that the request is sent from SCC AS using the network based solution, and it needs controller UE to authorize the media.

Upon receiving a SIP 200 (OK) response with the SDP answer from the controller UE, the SCC AS shall send a SIP ACK request to the controller UE. After that, the SCC AS shall send a SIP re-INVITE request on the dialog for the remote leg to the remote UE update the remote leg to communicate media with MRF.

Upon receiving a SIP 200 (OK) response with the SDP answer on the remote leg, the SCC AS shall send a SIP ACK request on the remote leg.

4.7.2.1.2 Alternative 2: new SIP header field, "Replicate", to distinguish a request for replication

Inclusion of the Replicate header field in a request indicates request for replication of an existing session identified in the Replicate header field. The Replicate header field is optional and shall only be included in INVITE requests, or REFER requests. The syntax of a new header field to explicitly indicate replication is shown in Table 4.7.2.1.2-1.

Table 4.7.2.1.2-1: Syntax of Replicate header

```
Replicate = "Replicate" HCOLON callid * (SEMI replicate-param)
replicate-param = to-tag / from-tage / early-flag / gemeric-param
to-tag = "to-tag" EQUAL token
from-tag = "from-tag" EQUAL token
early-flag = "early-only"
```

4.7.2.1.3 Alternative 3: MIME body indicating replication

Inclusion of MIME body application/vnd.3gpp.replication+xml indicates that the request is related to replication.

4.7.2.1.4 Alternative 4: feature tag indicating replication

Inclusion of Accept-Contact with media feature tag g.3gpp.iut.replicator in a request indicates request for replication.

4.7.2.1.5 Alternative 5: Use of discard port number

4.7.2.1.5.1 Different subscriptions

4.7.2.1.5.1.1 Controller UE procedures

Upon receipt of a SIP MESSAGE request, requesting the permission for a media component replication from a collaborative session, the controller UE shall send a SIP MESSAGE request targeted to the SCC-AS indicating whether the media replication is allowed or disallowed by including an XML body as described in subclause 4.7.2.1.5.1.4.

When the controller UE receives a SIP re-INVITE request or a SIP UPDATE request from the SCC AS to update the status of the replicated media component after a successful replication, the controller UE shall follow the procedures described in 3GPP TS 24.229 [4]. The controller UE shall save the media information (e.g. media line(s) and port number(s)) related to the replicated media(s) and IP address of MRF received in the SIP re-INVITE request or SIP UPDATE request in order to perform further inter-UE transfer operations on the controllee UE.

4.7.2.1.5.1.2 Controllee UE procedures

To replicate a media component from a collaborative session, the controllee UE shall send a SIP REFER request outside the existing dialog as specified in IETF RFC 3515 [8] and include:

1) a Request-URI field containing contact of the controller UE;

2) the Refer-To header field containing:

   a) the SIP URI of the controllee UE; and;

   NOTE 1: The SIP URI of the controllee UE needs to be a GRUU if the controllee UE and any other UEs share the same public user identity.

   b) the SIP URI additionally containing the URI header field with the hname "body" containing SDP for the media type for each of the media (m=) lines in the session to be replicated containing the discard port number "9".

   Editor's Note: The discard port number "9" was used in rel-9 Inter-UE Transfer in the adding new media component where the port number of the target UE was not known, however, in this case the port number of the target UE is known. Therefore, it is not clear if the concept of using this discard port is correct for this case.

   NOTE 2: If there were media lines that would not to be replicated, those media lines would be listed in the SDP however, the port numbers would have been set to zero.

3) a Target-Dialog header field containing the dialog parameters for the dialog of the existing session;

4) an Accept-Contact header field containing the g.3gpp.iut-xyz media feature tag as described in annex A with explicit and require tags; and

5) an Accept header field containing the MIME types "application/sdp" and "message/sipfrag".

The controllee UE shall handle any response to the SIP REFER request and the subsequent SIP NOTIFY requests according to 3GPP TS 24.229 [4] and IETF RFC 3515 [8].

If an error response is received for the SIP REFER request or the subsequent SIP NOTIFY requests include a non-2xx final response, the controllee UE shall consider the replication operation failed and continue the existing session.

4.7.2.1.5.1.3 SCC AS procedures

When the SCC AS replicates a media component as a result of receiving a SIP REFER request from the controllee UE containing the discard port number "9", the SCC AS shall check if the media components can be shared:

   Editor's Note: The discard port number "9" was used in rel-9 Inter-UE Transfer in the adding new media component where the port number of the target UE was not known, however, in this case the port number of the target UE is known. Therefore, it is not clear if the concept of using this discard port is correct for this case.

- if the media component(s) is forbidden to be shared, then the SCC-AS shall send an error code to controllee UE that the session replication is forbidden; or

- if the media needs to be asked to be shared, then the SCC AS shall send a SIP MESSAGE request to the controller UE requesting in the XML body if the controller UE allows this session replication.

Editor's Note: It is FFS if and how this request needs to be communicated with the user. Whether the user should know about these options or the UE makes the decision without the user interaction.

Upon receiving the SIP MESSAGE request indicating that the session replications is allowed, the SCC AS shall send:

1) a SIP 202 (Accepted) response to the SIP REFER request and a SIP NOTIFY request to the controllee UE as specified in IETF RFC 3515 [8]; and

2) a SIP INVITE request to controllee UE, containing:

   a) Request-URI with SIP URI from the Refer-To header field of the received SIP REFER request; and

   b) the SIP URI additionally containing the URI header field with the hname "body" containing SDP for the media type for each of the media (m=) lines in the session set as follows:

      - media lines which are from the body parameter in the Refer-To header field of the received SIP REFER request; and

      - media lines which have non zero port numbers the SDP parameters from the corresponding media lines as received during the last successful SDP offer-answer exchange from the remote UE.

Upon receiving a SIP final response from the controllee UE, the SCC AS shall send, a SIP NOTIFY request to the controllee UE containing the received final response code in the sipfrag body and if the received response was a SIP 200 (OK) response containing an SDP answer then also include in the sipfrag the Content-Type header field from the received 200 (OK) response along with the media (m=) lines from the SDP answer.

If the SIP final response was a non 2xx response then the SCC AS shall consider the replication operation failed and abort the session replication.

If the SIP final response was a SIP 200 (OK) response containing a SDP answer, the SCC AC shall send a SIP re-INVITE request on the dialog for the remote end as sepcified in 3GPP TS 24.229 [4]. The SCC AS shall:

1) send a SIP re-INVITE request containing SDP information as follows:

   a) for the replicated media component(s), set the SDP information as from the SDP answer received in the SIP 200 (OK) response from the controllee UE; and

   b) for all other media components in the collaborative session, include the SDP information as from the original session to the MRF.

2) send a SIP re-INVITE request or SIP UPDATE request to the controller UE following the procedures described in 3GPP TS 24.229 [4] sending the media information (e.g. media line(s) and port number(s)) related to the replicated media(s) and IP address of the MRF.

4.7.2.1.5.1.4   Allowing or disallowing media component replication by use of an XML body

Editor's Note: In order to allow or disallow a media component replication from a collaborative session, the controller UE populates a SIP 200 (OK) response to a SIP MESSAGE request received from the SCC-AS requesting for this permission. It is FFS how to populate this XML body which needs to be populated so that the size of the SIP 200 (OK) be kept less than 1300 bytes.

4.7.2.2   Session replication by the SCC AS – push mode

4.7.2.2.1   Alternative1

Refer to subclause 4.7.2.1 for proposed alternatives to identify requests for replication.

4.7.2.2.1.1 Single subscription

4.7.2.2.1.1.1 Controller UE

In order to replicate an existing session to other UE, the SC UE shall send a SIP REFER request as specified in IETF RFC 3515 [8] and include:

1) the Request-URI set to the inter UE Transfer SCC AS URI; and

2) the Refer-To header field set as follows:

   a) the SIP URI of the controllee UE;

   NOTE: The SIP URI of the controllee UE needs to be a GRUU if the controllee UE and any other UEs share the same public user identity.

   b) the SIP URI additionally containing the URI header field with the hname "body" containing SDP for the media type for each of the media (m=) lines in the session set as follows:

      - media lines that are not being replicated with the port number set to zero; and

      - media line(s) that are to be replicated containing the "a= 3gpp. iut. replication" attribute which indicates that the replication request was sent from controller UE and using the network based solution.

Upon receiving a SIP re-INVITE request from SCC AS, the UE shall send a SIP 200 (OK) response to SCC AS to confirm the successful media update.

Upon receiving a SIP NOTIFY request from SCC AS, the UE shall send a SIP 200 (OK) response to SCC AS.

4.7.2.2.1.1.2 SCC AS serving the collaborative session

Upon receiving a SIP REFER request due to session replication, the SCC AS shall:

1) if not authorized, reject the SIP request with a SIP 403 (Forbidden) response and do not process the remaining steps;

   Editor's note: authorization policy is FFS.

2) send information to MRF to allocate the media resource for the media to be replicated; and

3) send a SIP INVITE request to the controllee UE includes:

   a) the Request-URI with SIP URI from the Refer-To header field of the received SIP REFER request; and

   b) the SDP information as follows:

      - the media type(s) that are to be replicated from the media (m=) lines from the hname "body" URI header field in the SIP URI in the Refer-To header field of the received SIP REFER request and the "a= 3gpp. iut.-replication" attribute set to "nw push replicator " which indicates that the replication request is sent sent by the SCC AS and using the network based solution.

Upon receiving a SIP 200 (OK) response with the SDP answer from the controllee UE, the SCC AS shall send a SIP ACK request to the controllee UE. After that, the SCC AS shall send a SIP re-INVITE request to controller UE to update the access leg for the replicated media flow with MRF.

Upon receiving a SIP 200 (OK) response with the SDP answer from the controller UE, the SCC AS shall send a SIP ACK request to the controller UE. After that, the SCC AS shall send a SIP re-INVITE request on the dialog for the remote leg to the remote UE update the remote leg to communicate media with MRF.

Upon receiving a SIP 200 (OK) response with the SDP answer on the remote leg, the SCC AS shall send a SIP ACK request on the remote leg.

4.7.2.2.2 Alternative 2: Use of discard port number

4.7.2.2.2.1 Different subscriptions

4.7.2.2.2.1.1 Controller UE procedures

To replicate a media component from a collaborative session, the controller UE shall send a SIP REFER request outside the existing dialog as specified in IETF RFC 3515 [8] and include:

1) a Request-URI field containing contact of the SCC AS;

2) the Refer-To header field containing:

   a) the SIP URI of the controllee UE; and;

   NOTE 1: The SIP URI of the controllee UE needs to be a GRUU if the controllee UE and any other UEs share the same public user identity.

   b) the SIP URI additionally containing the URI header field with the hname "body" containing SDP for the media type for each of the media (m=) lines in the session to be replicated containing the discard port number "9".

   Editor's Note: The discard port number "9" was used in rel-9 Inter-UE Transfer in the adding new media component where the port number of the target UE was not known, however, in this case the port number of the target UE is known. Therefore, it is not clear if the concept of using this discard port is correct for this case.

   NOTE 2: If there were media lines that would not to be replicated, those media lines would be listed in the SDP however, the port numbers would have been set to zero.

3) a Target-Dialog header field containing the dialog parameters for the dialog of the existing session;

4) a Referred-By header field containing a currently registered public user identity of the controller UE;

5) a Contact header field containing the g.3gpp.iut-controller media feature tag;

6) an Accept-Contact header field containing the g.3gpp.iut-xyz media feature tag as described in annex A with explicit and require tags; and

7) an Accept header field containing the MIME types "application/sdp" and "message/sipfrag".

The controller UE shall handle any response to the SIP REFER request and the subsequent SIP NOTIFY requests according to 3GPP TS 24.229 [4] and IETF RFC 3515 [8].

If an error response is received for the SIP REFER request or the subsequent SIP NOTIFY requests include a non-2xx final response, the controller UE shall consider the replication operation failed and continue the existing session.

When the controller UE receives a SIP re-INVITE request or a SIP UPDATE request from the SCC AS to update the status of the replicated media component after a successful replication, the controller UE shall follow the procedures described in 3GPP TS 24.229 [4]. The controller UE shall save the media information (e.g. media line(s) and port number(s)) related to the replicated media(s) and IP address of MRF received in the SIP re-INVITE request or SIP UPDATE request in order to perform further inter-UE operations on the controllee UE.

4.7.2.2.2.1.2 Controllee UE procedures

There are no specific procedures for the controllee UE for the collaborative session establishment by transferring media, besides the procedures described in 3GPP TS 24.229 [4].

4.7.2.2.2.1.3 SCC AS procedures

Upon receiving a SIP REFER request from the controller UE containing the discard port number "9", the SCC AS shall send:

Editor's Note: The discard port number "9" was used in rel-9 Inter-UE Transfer in the adding new media component where the port number of the target UE was not known, however, in this case the port number of the target UE is known. Therefore, it is not clear if the concept of using this discard port is correct for this case.

1) a SIP 202 (Accepted) response to the SIP REFER request and a SIP NOTIFY request as specified in IETF RFC 3515 [8]; and

2) a SIP INVITE request to controllee UE, containing:

   a) Request-URI with SIP URI from the Refer-To header field of the received SIP REFER request;

   b) the Referred-By header field containing the SIP URI from the Referred-By header field of the received SIP REFER request;

   c) the P-Asserted-Identity header field containing the identity of the remote UE; and

   d) the SIP URI additionally containing the URI header field with the hname "body" containing SDP for the media type for each of the media (m=) lines in the session set as follows:

     - media lines which are from the body parameter in the Refer-To header field of the received SIP REFER request; and

     - media lines which have non zero port numbers the SDP parameters from the corresponding media lines as received during the last successful SDP offer-answer exchange from the remote UE.

Upon receiving a SIP final response from the controllee UE, the SCC AS shall send, a SIP NOTIFY request to controller UE containing the received final response code in the sipfrag body and if the received response was a SIP 200 (OK) response containing an SDP answer then also include in the sipfrag the Content-Type header field from the received 200 (OK) response along with the media (m=) lines from the SDP answer.

If the SIP final response was a non 2xx response then the SCC AS shall consider the replication operation failed and abort the session replication.

If the SIP final response was a SIP 200 (OK) response containing a SDP answer, the SCC AC shall send a SIP re-INVITE request on the dialog for the remote end as sepcified in 3GPP TS 24.229 [4]. The SCC AS shall:

1) send a SIP re-INVITE request containing SDP information as follows:

   a) for the replicated media component(s), set the SDP information as from the SDP answer received in the SIP 200 (OK) response from the controllee UE;

   b) for all other media components in the collaborative session, include the SDP information as from the original session to the MRF; and

2) send a SIP re-INVITE request or SIP UPDATE request to the controller UE following the procedures described in 3GPP TS 24.229 [4] sending the media information (e.g. media line(s) and port number(s)) related to the replicated media(s) and IP address of the MRF.

4.7.2.3 Session replication by remote UE – pull mode

Refer to subclause 4.7.2.1 for proposed alternatives to identify requests for replication.

4.7.2.3.1 Alternative 1

4.7.2.3.1.0 General

This alternative requires replication support in remote UE as described in 4.7.2.3.1.0A.

4.7.2.3.1.0A Remote UE

The same handling as in subclause 4.7.2.4.1.0A applies.

4.7.2.3.1.1 SC UE

4.7.2.3.1.1.1 Triggering pull mode session replication

The SC UE shall fetch the dialog information of a source UE as described in subclause 4.9 and select an existing session for replication.

The SC UE shall send a SIP INVITE request according to 3GPP TS 24.229 [4]. The SC UE shall populate the SIP INVITE request as follows:

   A. the Request-URI is set to the remote target URI (as defined in IETF RFC 3261 [20]) of the existing session;

   B. an Accept-Contact with

      a. g.3gpp.iut.replicator media feature tag; and

      b. explicit and require; and

   C. Target-Dialog header field containing the value of the g.3gpp.iut.replicator media feature tag in Contact header field provided by remote UE during the establishment of the existing session;

   D. SDP offer containing the same media components as used in the existing session.

4.7.2.3.1.2 SCC AS

No additional requirements above the handling for originating session.

4.7.2.3.1A Alternative 1A

4.7.2.3.1A.0 General

This alternative:

   - assumes that the existing dialog does not need to be indicated in session replication as all sessions established towards a URI of the remote UE provide the same media, e.g. an INVITE to a URI identifying a movie at an AS will always result to playback of the same movie.

   - does not require extension of remote UE as playback state is exchanged between the SC UEs.

4.7.2.3.1A.1 SC UE

4.7.2.3.1A.1.1 Triggering pull mode session replication

The SC UE shall fetch the dialog information of a UE as described in subclause 4.9 and select an existing session for replication.

In order to replicate the session, the SC UE:

   1. shall send a SIP INVITE request according to 3GPP TS 24.229 [2]. The SC UE shall populate the SIP INVITE request as follows:

      A. the Request-URI is set to the remote URI (as defined in IETF RFC 3261 [x]) of the existing session; and

      B. SDP offer containing the same media components as used in the existing session selected for replication.

4.7.2.3.1A.1.2 Requesting playback state

In order to get playback state from another UE participating in an existing session, the SC UE shall send a SIP REFER request as specified in IETF RFC 3515 [13] and 3GPP TS 24.229 [2]. The SC UE shall populate the SIP REFER request as follows:

   1. the Request-URI set to the URI of the UE participating in the existing session;

   NOTE 1: The URI of the UE needs to be a GRUU if several UEs share the same identity.

2. the Refer-To header field set to the own SIP URI extended with:

NOTE 2: The own SIP URI needs to be a GRUU if several UEs share the same identity.

    A. method parameter set to "MESSAGE"; and

    B. In-Reply-To URI header field set to the value of the Call-Id header field of the SIP REFER request;

3. the Target-Dialog header field set to the dialog identifier of the session whose playback state is to be provided;

NOTE 3: The dialog identifiers of sessions of other UEs can be found using dialog event package subscription.

4. the Require header field populated with the option tag value "tdialog"; and

5. application/vnd.3gpp.replication+xml MIME body containing the playback state parameters to be provided.

The SC UE receives the playback state upon receiving SIP MESSAGE request with:

1. In-Reply-To header field containing the call-id of the dialog of the subscription created by SIP REFER request; and

2. application/vnd.3gpp.replication+xml MIME body.

4.7.2.3.1A.1.3 Providing playback state on request of other UE

Upon receiving SIP REFER request containing:

1. the Refer-To header field containing a SIP URI with method parameter equal to "MESSAGE";

2. the Target-Dialog header field containing the dialog identifier of an existing session with playback state; and

3. application/vnd.3gpp.replication+xml MIME body containing the playback state parameters to be provided;

then the SC UE shall handle the SIP REFER request as specified in 3GPP TS 24.229 [2] and IETF RFC 3515 [13]. The UE shall populate the SIP MESSAGE request with

1. header fields which were included as URI header fields in the URI in the Refer-To header field of the received SIP REFER request; and

2. application/vnd.3gpp.replication+xml MIME body containing the playback state of the session identified by Target-Dialog header field as requested in the application/vnd.3gpp.replication+xml MIME body included in the REFER request.

4.7.2.3.1A.2 SCC AS

4.7.2.3.1A.2.1 Distinction of requests sent to the SCC AS

The SCC AS needs to distinguish between the following SIP requests to provide specific functionality relating to session replication:

1. SIP REFER request routed to the SCC AS due to the terminating filter criteria:

    A. where the Refer-To header field contains a SIP URI with method parameter set to "MESSAGE"; and

    B. containing application/vnd.3gpp.replication+xml MIME body;

    In the procedures below, such request is known as "SIP REFER request for providing playback state".

Other SIP initial requests for a dialog and requests for a SIP standalone transaction can be dealt with in any manner conformant with 3GPP TS 24.229 [2].

4.7.2.3.1A.2.2 Providing playback state on request of other UE

Upon receiving a SIP REFER request for providing playback state, the SCC AS shall:

1. if not authorized, reject the SIP request with a SIP 403 (Forbidden) response and do not process the remaining steps; and

Editor's note: authorization policy if FFS

2. forward the SIP REFER request in any manner conformant with 3GPP TS 24.229 [2].

4.7.2.4 Session replication by remote UE – push mode

Refer to subclause 4.7.2.1 for proposed alternatives to identify requests for replication.

Editor's Note: For the above sentence (introduced by C1-103398) it must be decided in which subclause to put it.

4.7.2.4.1 Alternative 1

4.7.2.4.1.0 General

This alternative requires replication support in remote UE as described in 4.7.2.4.1.0A.

4.7.2.4.1.0A Remote UE

4.7.2.4.1.0A.1 General

When the UE establishes a session which can be replicated and which has a playback state, the UE shall include the g.3gpp.iut.replicator media feature tag in Contact header field of sent SIP request and SIP responses establishing the session. The UE shall set the value of the g.3gpp.iut.replicator to the dialog identifier of the session being established.

4.7.2.4.1.0A.1 Session replication request handling

Upon receiving the SIP INVITE request with:

- Accept-Contact header field containing g.3gpp.iut.replicator media feature tag; and

- Target-Dialog header field;

and if the Target-Dialog header field value identifies an existing session and if both sessions are established with the same local resource, then the UE has enough information to set the playback state in the session being established to the same state as the playback state of the existing session.

4.7.2.4.1.1 SC UE

4.7.2.4.1.1.1 Triggering push mode session replication request

In order to replicate an existing session of this SC UE to other UE, the SC UE shall send a SIP REFER request as specified in IETF RFC 3515 [8] and 3GPP TS 24.229 [4]. The SC UE shall populate the SIP REFER request as follows:

1. the Request-URI set to the URI of the UE where the session is to be replicated;

NOTE: The URI of the UE needs to be a GRUU if multiple UEs share the same identity.

2. the Refer-To header field set to the remote target URI (as defined in IETF RFC 3261 [19]) of the existing session and extended with the following URI header field:

   A. if the session is established using an IMS communication service that requires the use of an IMS communication service identifier:

      a. optionally the Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the IMS communication service identifier of the existing session; and

      b. the P-Preferred-Service header field set to the IMS communication service identifier of the existing session;

   B. SDP body listing the media as used in the existing session selected for replication;

    C. Accept-Contact URI header field with:

        a. g.3gpp.iut.replicator media feature tag; and

        b. explicit and require; and

    D. Target-Dialog header field containing the value of the g.3gpp.iut.replicator media feature tag in Contact header field provided by remote UE during the establishment of the existing session.

4.7.2.4.1.1.2 Handling push mode session replication request

Upon receiving SIP REFER request containing Refer-To header field containing a URI with method parameter equal to "INVITE" or without method parameter and with Accept-Contact URI header field containing g.3gpp.iut.replicator media feature tag the UE shall handle the SIP REFER request as specified in 3GPP TS 24.229 [4] and IETF RFC 3515 [8].

4.7.2.4.1.2 SCC AS

4.7.2.4.1.2.1 Distinction of requests sent to the SCC AS

The SCC AS needs to distinguish between the following SIP requests to provide specific functionality relating to session replication:

    1. SIP REFER request routed to the SCC AS due to the originating filter criteria where:

    A. the Refer-To contains a SIP URI with:

        a. method parameter set to "INVITE" or without method parameter; and

        b. Accept-Contact URI header field containing g.3gpp.iut.replicator media feature tag.

    In the procedures below, such request is known as "SIP REFER request due to session replication".

Other SIP initial requests for a dialog and requests for a SIP standalone transaction can be dealt with in any manner conformant with 3GPP TS 24.229 [4].

4.7.2.4.1.2.2 Session replication from the served UE

Upon receiving a SIP REFER request due to session replication, the SCC AS shall:

    1. if not authorized, reject the SIP request with a SIP 403 (Forbidden) response and do not process the remaining steps; and

    Editor's note: authorization policy if FFS

    2. forward the SIP REFER request in any manner conformant with 3GPP TS 24.229 [4].

4.7.2.4.1A Alternative 1A

4.7.2.4.1A.1 SC UE

4.7.2.4.1A.1.1 Triggering push mode session replication request

In order to replicate an existing session of this SC UE to other UE, the SC UE shall send a SIP REFER request as specified in IETF RFC 3515 [8] and 3GPP TS 24.229 [4]. The SC UE shall populate the SIP REFER request as follows:

    1. the Request-URI set to the URI of the UE where the session is to be replicated;

    NOTE: The URI of the UE needs to be a GRUU if multiple UEs share the same identity.

    2. the Refer-To header field set:

    A. if the asserted remote UE identity of the existing session is known, then to the asserted remote UE identity of the existing session; and

    B. if the asserted remote UE identity of the existing session is not known, then to the remote URI (as defined in IETF RFC 3261 [x]) of the existing session;

and extended with the following URI header fields:

    A. if the session is established using an IMS communication service that requires the use of an IMS communication service identifier:

        a. optionally the Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the IMS communication service identifier of the existing session; and

        b. the P-Preferred-Service header field set to the IMS communication service identifier of the existing session; and

    B. SDP body listing the media as used in the existing session selected for replication; and

  3. application/vnd.3gpp.replication+xml MIME body which optionally can include the playback state.

4.7.2.4.1A.1.2 Handling push mode session replication request

Upon receiving SIP REFER request containing:

  1. Refer-To header field containing a URI with method parameter equal to "INVITE" or without method parameter; and

  2. MIME body of MIME type the application/vnd.3gpp.replication+xml;

UE:

  1. shall handle the SIP REFER request as specified in 3GPP TS 24.229 [4] and IETF RFC 3515 [8].

4.7.2.4.1A.2 SCC AS

4.7.2.4.1A.2.1 Distinction of requests sent to the SCC AS

The SCC AS needs to distinguish between the following SIP requests to provide specific functionality related to session replication:

  1. SIP REFER request routed to the SCC AS due to the originating filter criteria containing:

    A. Refer-To header field with a SIP URI with method parameter set to "INVITE" or without method parameter; and

    B. MIME body with MIME type application/vnd.3gpp.replication+xml.

    In the procedures below, such request is known as "SIP REFER request due to session replication".

Other SIP initial requests for a dialog and requests for a SIP standalone transaction can be dealt with in any manner conformant with 3GPP TS 24.229 [4].

4.7.2.4.1A.2.2 Session replication from the served UE

Upon receiving a SIP REFER request due to session replication, the SCC AS shall:

  1. if not authorized, reject the SIP request with a SIP 403 (Forbidden) response and do not process the remaining steps; and

Editor's note: authorization policy if FFS

  2. forward the SIP REFER request in any manner conformant with 3GPP TS 24.229 [4].

4.7.3 Identified issues

Issue 4.7.3-1: Are the call flows between AS and MRF needed in detail?

Issue 4.7.3-2: The communication between AS and MRF needs to be studied in more detail in order to see if the protocol currently used is functionally complete for inter-UE transfer purposes.

Issue 4.7.3-3: Which packages are used for the communication between AS and MRF? The evaluation of the related packets could go into protocol evaluation or protocol extension.

Issue 4.7.3-4: It has to be evaluated, whether specific protocol indications are needed for the following cases and if yes, how these indications should be transported within the protocol:

   a) within the request from the pulling UE to the SCC AS in the pull scenario;

   b) within the request from the SCC AS to the controller UE in the pull scenario;

   c) within the request from the controller UE to the SCC AS in the push scenario;

   d) within the request from the SCC AS to the UE to which the media will be replicated to in the push scenario; and

   e) within the request from the SCC AS to the remote UE to indicate that a specific media is there due to replication.

Issue 4.7.3-5: Are there different protocol indications (as described in issue 4.7.3-4) needed for the individual actions described in issue 4.7.3-4 when:

   a) replication happens in the network; and

   b) replication happens at the UE?

(Closed) Issue 4.7.3-6: Can the UE which the media gets replicated to only receive media or also send media? The abilities of that UE could be based on Offer/Answer negotiation, i.e. the controller UE / AS could indicate in the SDP whether the media towards the UE to which the media gets replicated to is e.g. "receiveonly" or "send/receive".

The following was added to the stage 2 study in 3GPP TS 23.831 [3], subclause 4.1.8 and is reflected in 3GPP TS 23.237 [2]:

Video-1 and video-2 media flows are transferring same downlink video packets from remote party, and only uplink video packets from UE-1 will be transferred to remote party.

For the above example, either UE-1 or UE-2 could request to replicate video-1 from UE-1 to itself. Only the downlink media of Video-1 will be replicated to UE-2.

The limitation of replicating downlink data only of the media flow which is required to be replicated applies to all types of media flows in this release.

The above is applicable only to cases for session replication by the SCC AS.

Issue 4.7.3-7: How does the SCC AS / controller UE authorize the request for replication?

Issue 4.7.3-8: How does the controller UE find out, that a request received for replication authorization is meant for that purpose? A specific protocol indication might be needed. This protocol indication is most likely dependant on the protocol message which is used to transport the authorization request.

Issue 4.7.3-9: It has to be determined if, once duplication has been completed, the duplicated media stream is independent from the original media stream. For example if a duplicated video stream can be forwarded by one UE, whilst the other does not.

4.7.4 Call flows

4.7.4.1 Session replication by SCC AS – pull mode

4.7.4.1.1 Alternative 1

4.7.4.1.1.1 Single subscription

4.7.4.1.1.2 Different subscriptions

This subclause describes the scenario when the session is replicated in the network from the controller UE to the controllee UE. The flow diagram shows when UE-1 and UE-2 belong to two different subscriptions.

> Editor's Note: It is FFS if the session replication can be replication of some of the media components belonging to the session.

UE-1(123.45.67.89) is in an active session with the remote UE (132.54.76.98). The call is anchored in the SCC AS of the UE-1. UE-2 (123.112.67.87) is replicating the media components belonging to the session between UE-1 and the remote UE, by sending a SIP REFER request to the SCC AS anchoring the session. The media components are replicated in an MRF (125.124.123.122). After successful replication, the media flowing between UE-1 and the remote UE is not impacted. The replicated media component(s) are sent towards UE-2. UE-2 cannot send media flows towards UE-1 or the remote UE during this session.

Figure 4.7.4.1.1.2-1: Signalling flow for session replication in the network – Pull mode

1-2.   SIP REFER request (from UE-2 to the serving SCC AS)

The SIP REFER request contains,

1) a Request-URI field containing contact of the controller UE, UE-1;

2) a Refer-To header field containing:

-   the public user identity or if available the GRUU of the controllee UE, UE-2; and

-   the body URI header field containing SDP for the media (m=) line for audio to be replicated containing the discard port number "9" for the media lines to be replicated;

NOTE 1: If there were media lines that would not to be replicated, those media lines would be listed in the SDP however, the port numbers would have been set to zero.

Editor's Note: It is FFS what value the discard port number has.

3) a Target-Dialog header field containing the dialog parameters for the dialog of the existing session;

4) a Referred-By header field containing a currently registered public user identity of the controller UE;

5) an Accept-Contact header field containing the g.3gpp.iut-xyz media feature tag as described in annex A with explicit and require tags; and

6) an Accept header field containing the MIME type "application/sdp, message/sipfrag".

Table 4.7.4.1.1.2-1: SIP REFER request (UE-2 to SCC-AS serving UE-2)

```
REFER sip:user1_public1@home1.net SIP/2.0
Via:
To: sip:user1_public1@home1.net;
From: sip:user2_public1@home2.net;tag=24680
Call-ID: cb03a0s09a2sdfglkj490333
CSeq: 93809824 REFER
Max-Forwards: 70
P-Preferred-Identity:
Refer-To: <sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6?body=
    m%3Daudio%209%20RTP%2FAVP%97%0Dm>
Require: target-dialog
Target-dialog: cb03a0s09a2sdfglkj321576;remote-tag=abcdef;local-tag=123456
Contact: <sip:user1_public1@home1.net; gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz>
Referred-By: sip:user1_public1@home2.net
Accept-Contact: +g.3gpp.iut-xyz;explicit;require
Accept: application/sdp, message/sipfrag
Content-Length: 0
```

3-4.   SIP REFER request (from SCC AS serving UE-2 towards UE-1)

Serving SCC AS forwards the SIP REFER request towards the UE-1.

5.   SIP REFER request (from S-CSCF to SCC AS anchoring the session)

The SIP REFER request is finally routed to the SCC AS anchoring the session. The SCC AS checks the following

i- the content in the Request URI is different than the To header field which is the contact of controller UE, UE-1;

ii- the port number set to the discard port number "9" to indicate adding the audio to the UE with gruu in REFER To header; and

iii- if the media components belong already to an existing session.

Editor's Note: It is FFS if the conditions in this step are adequate for the SCC AS to populate this SIP INVITE request.

6-10.   SIP 202 (Accepted) response (from SCC AS anchoring the session to UE-2)

SCC AS anchoring the session sends a SIP 202 (Accepted) response towards the UE-2.

11-14. SIP NOTIFY request (from SCC AS anchoring the session to UE-2)

SCC-AS anchoring the session sends a SIP NOTIFY request to UE-2 notifying implicit subscription to the SIP REFER request.

Table 4.7.4.1.1.2-11: SIP NOTIFY request (SCC-AS anchoring the session to UE-2)

```
NOTIFY
Via:
To: sip:user2_public1@home2.net;tag=24680
From: sip:interUEtransfer@example.net;tag=13579
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Event: refer
Subscription-State: active;expires=3600
Content-Type: message/sipfrag;version=2.0
Content-Length: (…)

SIP/2.0 100 Trying
```

16-20. SIP 200 (OK) response (from UE-2 to SCC-AS anchoring the session)

The controllee UE, UE-2, acknowledges the SIP NOTIFY request by sending SIP 200 (OK) response to SCC-AS anchoring the session.

21-22. SIP MESSAGE request (from SCC-AS anchoring the session to UE-1)

The controller UE, UE-1, uses media components which can be shared, forbidden to be shared, or need to be asked to be shared. This can be configured in the SCC-AS. If the status for the media components are set to

1- can be shared, the steps 21 through 24 shall be bypassed;

2- forbidden to be shared, then the SCC-AS shall send an error code to UE-2 that the session replication is forbidden; or

2- need to be asked to be shared, then the SCC AS shall send a SIP MESSAGE request to UE-1 requesting in the XML body if the controller UE allows this session replication.

Editor's Note: It is FFS if and how this request needs to be communicated with the user. Whether the user should know about these options or the UE makes the decision without the user interaction.

23-24. SIP 200 (OK) response (from UE-1 to SCC-AS anchoring the session)

The controller UE, UE-1, sends SIP 200 (OK) response with XML body to the SCC-AS indicating this session replication is allowed.

25. SCC-AS anchoring the session fetches MRF information

The information about the media port numbers and IP address.

NOTE 2: The SCC AS anchoring the session controls the MRF.

26-30. SIP INVITE request (from SCC-AS anchoring the session to UE-2)

Based on the conditions in step 5, the SCC-AS anchoring the session sends a SIP INVITE request to the controllee UE, UE-2, adding audio media and establishing collaborative session. The SCC AS sets the a-line for audio m-line to inactive and the remote UE address to 0.0.0.0 in SDP offer to prevent the controllee UE sending media to the remote UE. The SIP INVITE request contains a Referred-By header field containing the identity of UE-1.

Editor's Note: It is FFS if the conditions in step 5 are adequate for the SCC AS to populate this SIP INVITE request.

Table 4.7.4.1.1.2-26: SIP INVITE request (SCC-AS anchoring the session to UE-2)

```
INVITE sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6 SIP/2.0
Via:
Record-Route: sip:sccas1.home1.example.net
To: sip:user2_public1@home2.net;
From: sip:user3_public3@home3.net;tag=acegi
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity: "remote user" sip:user3_public3@home3.net
Require:
Referred-By: sip:user1_public1@home1.net
Contact: sip:user3_public3@home3.net;gr=urn:uuid:f81d4fae-17oct-11a1-a678-0054c91eabcd
Allow:
Content-Type: application/sdp
Content-Length:(…)

v=0
o=- 1027933615 1027933615 IN IP4 125.124.123.122
s=-
t=0 0
m=audio 1300 RTP/AVP 97 0
a=inactive
c=0.0.0.0
```

NOTE 2: The port number is not set to the discard port number "9" since the SCC AS is aware of the port number. The discard port number "9" just indicated the SCC AS not to remove the media from the controller UE, UE-1.

31-35. SIP 200 (OK) response (from UE-2 to SCC-AS anchoring the session)

The controllee UE, UE-2, acknowledges the SIP INVITE request by sending SIP 200 (OK) response to SCC-AS anchoring the session.

Table 4.7.4.1.1.2-31: SIP 200 (OK) response (UE-2 to SCC-AS anchoring the session)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-
  00a0c91e6bf6+g.3gpp.iut-controller
Allow: INVITE, PRACK, UPDATE
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.112.67.87
s=-
t=0 0
m=audio 1456 RTP/AVP 97 0
c=123.112.67.87
```

36-40. SIP ACK request (from SCC-AS Anchoring the session to controllee UE)

SCC-AS sends SIP ACK request to the remote UE.

41-42. SIP re-INVITE request (from SCC-AS anchoring the session to the remote UE)

SCC-AS anchoring the session sends SIP re-INVITE request to the remote UE.

Table 4.7.4.1.1.2-41: SIP re-INVITE request (SCC-AS anchoring the session to the remote UE)

```
INVITE sip:user3_public3@home3.net;gr=urn:uuid:f81d4fae-17oct-11a1-a678-0054c91eabcd SIP/2.0
Via:
To: sip:user3_public3@home3.net;tag=66666
From: sip:user1_public1@home1.net;tag=33333
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip: user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 125.124.123.122
s=-
t=0 0
m=audio 1500 RTP/AVP 96 97
```

43-44. SIP 200 (OK) response (from remote UE to SCC-AS anchoring the session)

The remote UE acknowledges the SIP re-INVITE request by sending SIP 200 (OK) response to the SCC-AS anchoring the session.

Table 4.7.4.1.1.2-43: SIP 200 (OK) response (remote UE to SCC-AS anchoring session)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Asserted-Identity:
Contact: sip:user3_public3@home3.net;gr=urn:uuid:f81d4fae-17oct-11a1-a678-0054c91eabcd
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 1300 RTP/AVP 96 97
```

45-46. SIP ACK request (from SCC-AS anchoring the session to the remote UE)

The SCC-AS anchoring the session sends SIP ACK request to the remote UE.

47-51. SIP re-INVITE request (from SCC-AS anchoring the session to UE-2)

The SCC-AS anchoring the session sends a SIP re-INVITE request to the controllee UE, UE-2 to inform controllee UE adding now an a-line set to active for the audio and c-line to the IP address of the remote UE in the SDP offer.

Table 4.7.4.1.1.2-47: SIP INVITE request (SCC-AS anchoring the session to UE-2)

```
INVITE sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6 SIP/2.0
Via:
Record-Route: sip:sccas1.home1.example.net
To: sip:user2_public1@home2.net;
From: sip:user3_public3@home3.net;tag=acegi
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity: "remote user" sip:user3_public3@home3.net
Require:
Referred-By: sip:user1_public1@home1.net
Contact: sip:user3_public3@home3.net;gr=urn:uuid:f81d4fae-17oct-11a1-a678-0054c91eabcd
Allow:
Content-Type: application/sdp
Content-Length:(…)

v=0
o=- 1027933615 1027933615 IN IP4 125.124.123.122
s=-
t=0 0
m=audio 1300 RTP/AVP 97 0
a=active
```

52-56. SIP 200 (OK) response (from UE-2 to SCC-AS anchoring the session)

The controllee UE, UE-2, acknowledges the SIP INVITE request by sending SIP 200 (OK) response to SCC-AS anchoring the session.

Table 4.7.4.1.1.2-52: SIP 200 (OK) response (UE-2 to SCC-AS anchoring the session)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-
   00a0c91e6bf6+g.3gpp.iut-controller
Allow: INVITE, PRACK, UPDATE
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.112.67.87
s=-
t=0 0
m=audio 1456 RTP/AVP 97 0
```

57-61. SIP ACK request (from SCC-AS anchoring the session to the controllee UE)

The SCC-AS anchoring the session sends SIP ACK request to controllee UE to acknowledge.

62-63. SIP UPDATE request (from SCC-AS anchoring the session to controller UE, UE-1)

A SIP UPDATE.request is sent to the controller UE, UE-1, to inform about the media port numbers and IP address of MRF.

64-65. SIP 200 (OK) response (from controller UE to SCC-AS anchoring the session)

The controller UE acknowledges the SIP UPDATE request by sending SIP 200 (OK) response to the SCC-AS anchoring the session.

66-70. SIP NOTIFY request (from SCC-AS anchoring the session to controllee UE, UE-2)

When the media component is added to the controllee UE, UE-2, the SCC-AS sends SIP NOTIFY request to the controllee UE to inform about the success status of adding the media to the UE-2..

Table 4.7.4.1.1.2-66: SIP NOTIFY request (SCC-AS anchoring the session to UE-2)

```
NOTIFY
Via:
To: sip:user2_public1@home2.net;tag = 13579
From: sip: interUEtransfer@example.net;tag=24680
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Event: refer
Subscription-State:terminated; reason=noresource
Content-Type: message/sipfrag ;version=2.0
Content-Length: (…)

SIP/2.0 200 OK
Content-Type: application/sdp
m=audio 1456 RTP/AVP 97 0
```

71-75. SIP 200 (OK) response (from controllee UE to SCC-AS anchoring the session)

The controllee UE acknowledges the NOTIFY request by sending SIP 200 (OK) response to the SCC-AS anchoring the session.

4.7.4.1.2 Alternative 2

4.7.4.1.2.1 Single subscription

In the example flow at the figure 4.7.4.1.2.1-1, UE-1 has an ongoing multimedia session with UE-3 anchored at SCC AS-1. UE-1 and UE-2 belong to the same IMS subscriber. After successful replication, the media flowing between UE-1 and UE-3 is not impacted. The replicated media component(s) are sent towards UE-2. UE-2 cannot send media flows towards UE-1 or UE-3 during this session.
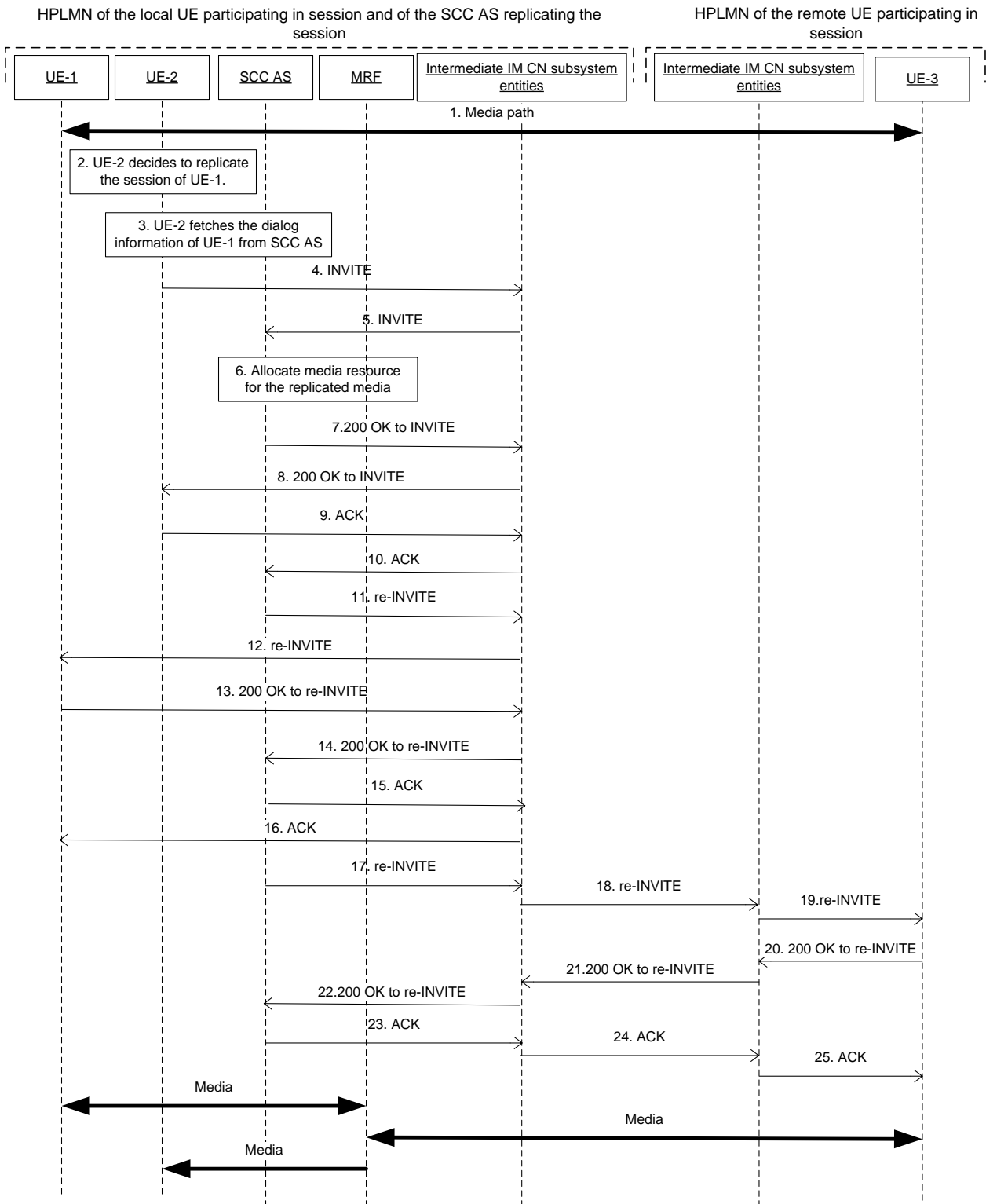
Figure 4.7.4.1.2.1-1: Signalling flows for session replication by SCC AS from controller to another UE belong to same subscription- pull mode

NOTE: For clarity, the SIP 100 (Trying) responses are not shown in the signalling flow.

1. UE-1 is in session with UE-3

There is a multimedia session comprising audio and video media between the UE-1 and the remote UE-3 anchored at SCC AS.

2. UE-2 decides to replicate the session from UE-1 to UE-2.

3. UE-2 fetches the dialog information of UE-1 from SCC AS.

4-5. SIP INVITE request (UE-2 to SCC-AS) - see example in table 4.7.4.1.2.1-4

The UE-2 sends SIP INVITE request to SCC-AS to perform the session replication. When the SCC AS receives the SIP INVITE request, the SCC AS-1 authorizes the request.

Table 4.7.4.1.2.1-4: SIP INVITE request (UE-2 to Intermediate IM CN subsystem entities)

```
INVITE sip:interUEtransfer@example.net; SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:eee]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
Max-Forwards: 70
P-Preferred-Identity: <sip:user2@home1.net>
From: <sip:user2@home1.net>;tag=171828
To: <sip:interUEtransfer@example.net>
Call-ID: Asdasd23123366
Cseq: 41277 INVITE
Contact: <sip:user2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-2222-222222222222>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Length: 0
Content-Length: 0
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP6 4444::aaa:bbb:ccc:eee
s=-
c=IN IP6 4444::aaa:bbb:ccc:eee
t=0 0
m=audio 4444 RTP/AVP 97
a=rtpmap:97 PCMU/8000
m=video 6666 RTP/AVP 98
a=rtpmap:98 MPV/90000
a=3gpp.iut.replication:nw pull receiver
```

a= 3gpp.iut.replication: The replication request is sent from the controllee UE(receiver, i.e. pull mode), and it uses the network based solution.

Editor's Note: How the SCC AS authorizes the request for session replication is FFS.

6. SCC-AS sends information to MRF to allocate the media resource for the media to be replicated.

Editor's Note: There is a need to understand what functionality the MRF is providing. This can either be done by showing the instructions to the MRF or by showing the SDP in other messages thus enabling the activity of the MRF to be seen.

7-8. SIP 200 (OK) response for the SIP INVITE request (SCC AS to UE-2)

SCC AS responds with SIP 200 (OK) response to UE-2.

9-10. SIP ACK request (UE-2 to SCC AS)

The UE-2 sends the SIP ACK request to SCC AS.

11-12. SIP re-INVITE request (SCC-AS to UE-1) - see example in table 4.7.4.1.2.1-11

The SCC-AS updates the access leg on Controller UE-1 for the replicated media flow with MRF.

Table 4.7.4.1.2.1-11: SIP re-INVITE request (SCC AS to Intermediate IM CN subsystem entities)

```
INVITE sip:user1@home1.net; SIP/2.0
Via: SIP/2.0/UDP
Max-Forwards:
P-Preferred-Identity:
From: <sip:interUEtransfer@example.net>;tag=171828
To: <sip:user1@home1.net>; tag=297786
Call-ID:
```

```
Cseq: 41278 INVITE
Contact:
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP6 4444::aaa:bbb:ccc:fff
s=-
c=IN IP6 4444::aaa:bbb:ccc:fff
t=0 0
m=audio 4444 RTP/AVP 97
a=rtpmap:97 PCMU/8000
m=video 6666 RTP/AVP 98
a=rtpmap:98 MPV/90000
a=3gpp.iut.replication nw pull replicator 4444::aaa:bbb:ccc:eee authorize
```

a= 3gpp. iut. replication: The replication request is sent from SCC AS using the network based solution, and it needs controller UE to authorize the media.

13-14. SIP 200 (OK) response to re-INVITE request (UE-1 to SCC-AS) - see example in table 4.7.4.1.2.1-13

After successful media update, UE-1 sends the SIP 200 (OK) reponse towards SCC-AS.

Table 4.7.4.1.2.1-13: SIP 200 (OK) response (UE-1 to Intermediate IM CN subsystem entities)

```
SIP/2.0 200 OK
Via:
Max-Forwards:
P-Preferred-Identity:
From: <sip:interUEtransfer@example.net>;tag=171828
To: <sip:user1@home1.net>; tag=297786
Call-ID:
Cseq:
Contact:
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP6 4444::aaa:bbb:ccc:fff
s=-
c=IN IP6 4444::aaa:bbb:ccc:fff
t=0 0
m=audio 4444 RTP/AVP 97
a=rtpmap:97 PCMU/8000
m=video 6666 RTP/AVP 98
a=rtpmap:98 MPV/90000
a=3gpp.iut.replication nw pull controller 4444::aaa:bbb:ccc:eee authorized
```

a= 3gpp. iut. replication: The replication request is authorized by the controller UE.

15-16. SIP ACK request (SCC-AS to UE-1)

The SCC AS sends the SIP ACK request to UE-1.

17-18. SIP re-INVITE request (SCC-AS to UE-3)

The SCC-AS sends a SIP re-INVITE request towards remote UE to update the remote leg to communicate media with MRF.

20-22. SIP 200 (OK) response to re-INVITE request (UE-3 to SCC-AS)

After successful media update, reomote UE-3 sends the SIP 200 (OK) response towards SCC-AS.

23-25. SIP ACK request (SCC-AS to UE-3)

The SCC AS sends the SIP ACK request to remote UE-3.

4.7.4.1.1.2.2 Dual subscription

4.7.4.1.3 Alternative 3 – Session replication by SCC AS – pull mode by controlling the MRF to active or inactive the media

4.7.4.1.3.1 Single subscription

4.7.4.1.3.2 Different subscriptions

This subclause describes the scenario when the session is replicated in the network from the controller UE to the controllee UE. The flow diagram shows when UE-1 and UE-2 belong to two different subscriptions.

Editor's Note: It is FFS if the session replication can be replication of some of the media components belonging to the session.

UE-1(123.45.67.89) is in an active session with the remote UE (132.54.76.98). The call is anchored in the SCC AS of the UE-1. UE-2 (123.112.67.87) is replicating the media components belonging to the session between UE-1 and the remote UE, by sending a SIP REFER request to the SCC AS anchoring the session. The media components are replicated in an MRF (125.124.123.122). After successful replication, the media flowing between UE-1 and the remote UE is not impacted. The replicated media component(s) are sent towards UE-2. UE-2 cannot send media flows towards UE-1 or the remote UE during this session.

Figure 4.7.4.1.3.2-1: Signalling flow for session replication in the network – Pull mode

1-2. SIP REFER request (from UE-2 to the serving SCC AS)

The SIP REFER request contains,

1) a Request-URI field containing contact of the controller UE, UE-1;

2) a Refer-To header field containing:

- the public user identity or if available the GRUU of the controllee UE, UE-2; and

- the body URI header field containing SDP for the media (m=) line for audio to be replicated containing the discard port number "9" for the media lines to be replicated;

NOTE 1: If there were media lines that would not to be replicated, those media lines would be listed in the SDP however, the port numbers would have been set to zero.

Editor's Note: The discard port number "9" was used in rel-9 Inter-UE Transfer in the adding new media component where the port number of the target UE was not known, however, in this case the port number of the target UE is known. Therefore, it is not clear if the concept of using this discard port is correct for this case.

3) a Target-Dialog header field containing the dialog parameters for the dialog of the existing session;

4) a Referred-By header field containing a currently registered public user identity of the controller UE;

5) an Accept-Contact header field containing the g.3gpp.iut-xyz media feature tag as described in annex A with explicit and require tags; and

6) an Accept header field containing the MIME type "application/sdp, message/sipfrag".

Table 4.7.4.1.3.2-1: SIP REFER request (UE-2 to SCC-AS serving UE-2)

```
REFER sip:user1_public1@home1.net SIP/2.0
Via:
To: sip:user1_public1@home1.net;
From: sip:user2_public1@home2.net;tag=24680
Call-ID: cb03a0s09a2sdfglkj490333
CSeq: 93809824 REFER
Max-Forwards: 70
P-Preferred-Identity:
Refer-To: <sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6?body=
   m%3Daudio%209%20RTP%2FAVP%97%0Dm>
Require: target-dialog
Target-dialog: cb03a0s09a2sdfglkj321576;remote-tag=abcdef;local-tag=123456
Contact: <sip:user1_public1@home1.net; gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz>
Referred-By: sip:user1_public1@home2.net
Accept-Contact: +g.3gpp.iut-xyz;explicit;require
Accept: application/sdp, message/sipfrag
Content-Length: 0
```

3-4. SIP REFER request (from SCC AS serving UE-2 towards UE-1)

Serving SCC AS forwards the SIP REFER request towards the UE-1.

5. SIP REFER request (from S-CSCF to SCC AS anchoring the session)

The SIP REFER request is finally routed to the SCC AS anchoring the session. The SCC AS checks the following

i- the content in the Request URI is different than the To header field which is the contact of controller UE, UE-1;

ii- the port number set to the discard port number "9" to indicate adding the audio to the UE with gruu in REFER To header; and

iii- if the media components belong already to an existing session.

Editor's Note: It is FFS if the conditions in this step are adequate for the SCC AS to populate this SIP INVITE request.

6-10. SIP 202 (Accepted) response (from SCC AS anchoring the session to UE-2)

SCC AS anchoring the session sends a SIP 202 (Accepted) response towards the UE-2.

11-15. SIP NOTIFY request (from SCC AS anchoring the session to UE-2)

SCC-AS anchoring the session sends a SIP NOTIFY request to UE-2 notifying implicit subscription to the SIP REFER request.

Table 4.7.4.1.3.2-11: SIP NOTIFY request (SCC-AS anchoring the session to UE-2)

```
NOTIFY
Via:
To: sip:user2_public1@home2.net;tag=24680
From: sip:interUEtransfer@example.net;tag=13579
```

```
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact:sip:sccas1.home1.example.net
Allow:
Event: refer
Subscription-State: active;expires=3600
Content-Type: message/sipfrag;version=2.0
Content-Length: (…)

SIP/2.0 100 Trying
```

16-20. SIP 200 (OK) response (from UE-2 to SCC-AS anchoring the session)

The controllee UE, UE-2, acknowledges the SIP NOTIFY request by sending SIP 200 (OK) response to SCC-AS anchoring the session.

21-22. SIP MESSAGE request (from SCC-AS anchoring the session to UE-1)

The controller UE, UE-1, uses media components which can be shared, forbidden to be shared, or need to be asked to be shared. This can be configured in the SCC-AS. If the status for the media components are set to

1- can be shared, the steps 21 through 24 shall be bypassed;

2- forbidden to be shared, then the SCC-AS shall send an error code to UE-2 that the session replication is forbidden; or

3- need to be asked to be shared, then the SCC AS shall send a SIP MESSAGE request to UE-1 requesting in the XML body if the controller UE allows this session replication.

Editor's Note: It is FFS if and how this request needs to be communicated with the user. Whether the user should know about these options or the UE makes the decision without the user interaction.

23-24. SIP 200 (OK) response (from UE-1 to SCC-AS anchoring the session)

The controller UE, sends SIP 200 (OK) response to SCC-AS anchoring the session.

25-26. SIP MESSAGE request (from UE-1 to SCC-AS anchoring the session)

The controller UE, UE-1, sends a SIP MESSAGE request to the SCC-AS anchoring the seesion with the XML body indicating this session replication is allowed.

27-28. SIP 200 (OK) response (from SCC-AS anchoring the session to the UE-1)

The SCC-AS anchoring the session sends SIP 200 (OK) response to the controller UE.

29. The SCC-AS sends information to MRF to allocate the media resource for the media to be replicated.

NOTE: The SCC AS anchoring the session controls the MRF.

30-34. SIP INVITE request (from SCC-AS anchoring the session to UE-2)

Based on the conditions in step 5, the SCC-AS anchoring the session sends a SIP INVITE request to the controllee UE, UE-2, adding audio media of the MRF and establishing collaborative session. The SCC AS control MRF to inactive the media to prevent the controllee UE sending media to the remote UE. The SIP INVITE request contains a Referred-By header field containing the identity of UE-1.

Editor's Note: It is FFS if the conditions in step 5 are adequate for the SCC AS to populate this SIP INVITE request.

Table 4.7.4.1.3.2-30: SIP INVITE request (SCC-AS anchoring the session to UE-2)

```
INVITE sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6 SIP/2.0
Via:
Record-Route: sip:sccas1.home1.example.net
To: sip:user2_public1@home2.net;
From: sip:user3_public3@home3.net;tag=acegi
Call-ID:
```

```
CSeq:
Max-Forwards:
P-Asserted-Identity: "remote user" sip:user3_public3@home3.net
Require:
Referred-By: sip:user1_public1@home1.net
Contact: sip:user3_public3@home3.net;gr=urn:uuid:f81d4fae-17oct-11a1-a678-0054c91eabcd
Allow:
Content-Type: application/sdp
Content-Length:(…)

v=0
o=- 1027933615 1027933615 IN IP4 125.124.123.122
s=-
t=0 0
m=audio 1300 RTP/AVP 97 0
c=125.124.123.122
```

NOTE 2:   The port number is not set to the discard port number "9" since the SCC AS is aware of the port number. The discard port number "9" just indicated the SCC AS not to remove the media from the controller UE, UE-1.

35-39. SIP 200 (OK) response (from UE-2 to SCC-AS anchoring the session)

The controllee UE, UE-2, acknowledges the SIP INVITE request by sending SIP 200 (OK) response to SCC-AS anchoring the session.

Table 4.7.4.1.3.2-35: SIP 200 (OK) response (UE-2 to SCC-AS anchoring the session)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-
   00a0c91e6bf6+g.3gpp.iut-controller
Allow: INVITE, PRACK, UPDATE
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.112.67.87
s=-
t=0 0
m=audio 1456 RTP/AVP 97 0
c=123.112.67.87
```

40-44. SIP ACK request (from SCC-AS Anchoring the session to controllee UE)

SCC-AS sends SIP ACK request to the remote UE.

45-46. SIP re-INVITE request (from SCC-AS anchoring the session to the remote UE)

SCC-AS anchoring the session sends SIP re-INVITE request to the remote UE.

Table 4.7.4.1.3.2-45: SIP re-INVITE request (SCC-AS anchoring the session to the remote UE)

```
INVITE sip:user3_public3@home3.net;gr=urn:uuid:f81d4fae-17oct-11a1-a678-0054c91eabcd SIP/2.0
Via:
To: sip:user3_public3@home3.net;tag=66666
From: sip:user1_public1@home1.net;tag=33333
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip: user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz
Allow:
Content-Type: application/sdp
Content-Length: (…)
```

```
v=0
o=- 1027933615 1027933615 IN IP4 125.124.123.122
s=-
t=0 0
m=audio 1500 RTP/AVP 96 97
```

47-48. SIP 200 (OK) response (from remote UE to SCC-AS anchoring the session)

The remote UE acknowledges the SIP re-INVITE request by sending SIP 200 (OK) response to the SCC-AS anchoring the session.

Table 4.7.4.1.3.2-47: SIP 200 (OK) response (remote UE to SCC-AS anchoring session)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Asserted-Identity:
Contact: sip:user3_public3@home3.net;gr=urn:uuid:f81d4fae-17oct-11a1-a678-0054c91eabcd
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 1300 RTP/AVP 96 97
```

49-50. SIP ACK request (from SCC-AS anchoring the session to the remote UE)

The SCC-AS anchoring the session sends SIP ACK request to the remote UE.

51-52. SIP UPDATE request (from SCC-AS anchoring the session to controller UE, UE-1)

A SIP UPDATE.request is sent to the controller UE, UE-1, to inform about the media port numbers and IP address of MRF.

53-54. SIP 200 (OK) response (from controller UE to SCC-AS anchoring the session)

The controller UE acknowledges the SIP UPDATE request by sending SIP 200 (OK) response to the SCC-AS anchoring the session.

55. The SCC-AS sends information to the MRF to acitve the media resource for the media to be replicated

56-60. SIP NOTIFY request (from SCC-AS anchoring the session to controllee UE, UE-2)

When the media component is added to the controllee UE, UE-2, the SCC-AS sends SIP NOTIFY request to the controllee UE to inform about the success status of adding the media to the UE-2..

Table 4.7.4.1.3.2-56: SIP NOTIFY request (SCC-AS anchoring the session to UE-2)

```
NOTIFY
Via:
To: sip:user2_public1@home2.net;tag = 13579
From: sip:interUEtransfer@example.net;tag=24680
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Event: refer
Subscription-State:terminated; reason=noresource
Content-Type: message/sipfrag ;version=2.0
Content-Length: (…)
```

```
SIP/2.0 200 OK
Content-Type: application/sdp
m=audio 1456 RTP/AVP 97 0
```

61-65. SIP 200 (OK) response (from controllee UE to SCC-AS anchoring the session)

The controllee UE acknowledges the NOTIFY request by sending SIP 200 (OK) response to the SCC-AS anchoring the session.

4.7.4.2 Session replication by SCC AS – push mode

4.7.4.2.1 Alternative 1

4.7.4.2.1.1 Single subscription

In the example flow at the figure 4.7.4.2.1.1-1, UE-1 has an ongoing multimedia session with UE-3 anchored at SCC AS-1. UE-1 and UE-2 belong to the same subscriber. After successful replication, the media flowing between UE-1 and UE-3 is not impacted. The replicated media component(s) are sent towards UE-2. UE-2 cannot send media flows towards UE-1 or UE-3 during this session.
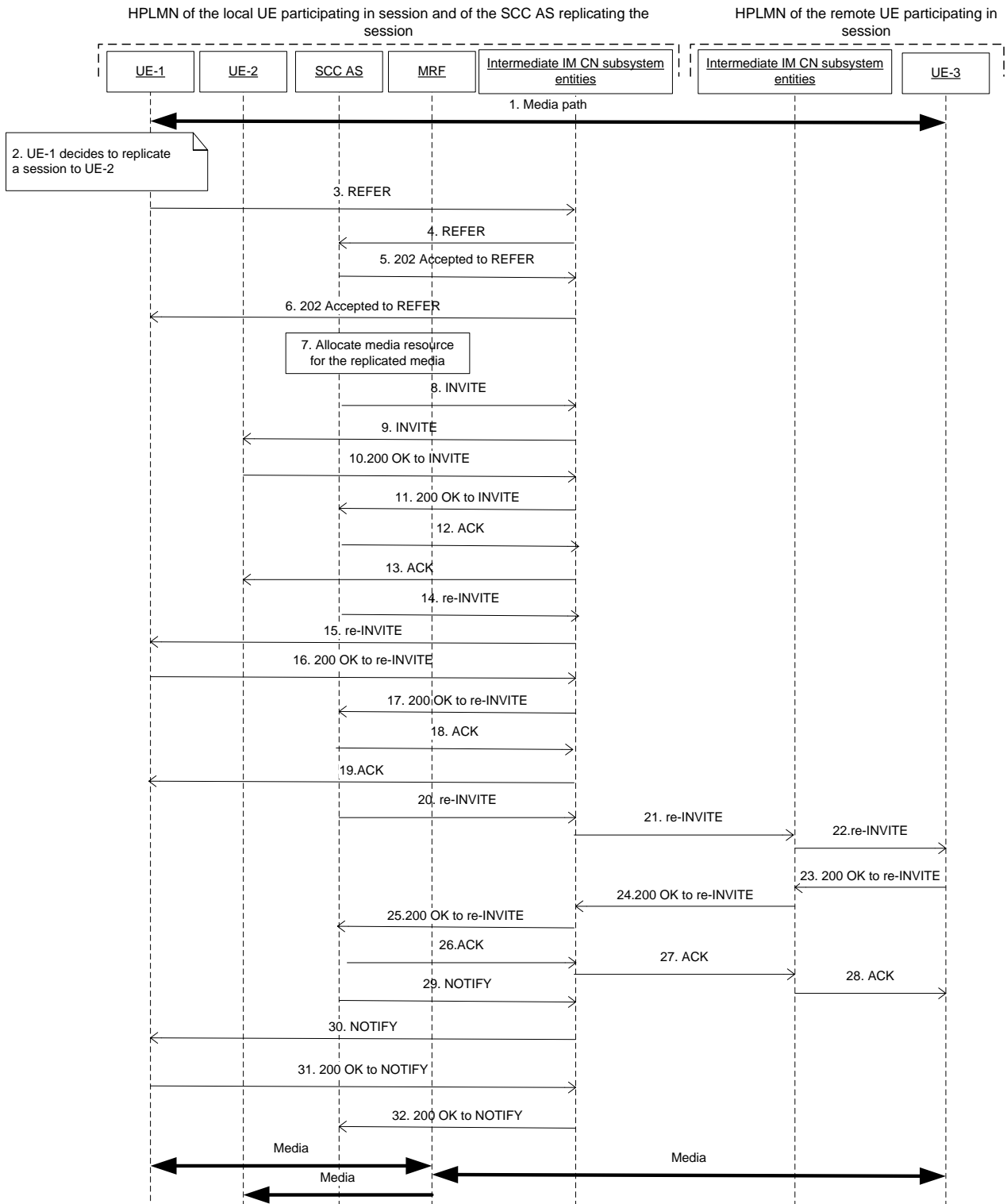
Figure 4.7.4.2.1.1-1: Signalling flow for replicating media in network from controller to another UE belong to same subscription

NOTE: For clarity, the SIP 100 (Trying) responses are not shown in the signalling flow.

1. UE-1 is in session with UE-3

There is a multimedia session comprising audio and video media between the UE-1 and the remote UE-3 anchored at SCC AS-1.

2. UE-1 decides to replicate the session from UE-1 to UE-2.

3-4.   SIP REFER request (UE-1 to SCC-AS) - see example in table 4.7.4.2.1-3

The UE-1 sends SIP REFER request to SCC-AS to request the session replication. When SCC-AS receives the SIP REFER request, the SCC-AS authorizes the request.

Table 4.7.4.2.1-3: SIP REFER request (UE-1 to Intermediate IM CN subsystem entities)

```
REFER sip:interUEtransfer@example.net; SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
Max-Forwards: 70
P-Preferred-Identity: <sip:user1@home1.net>
From: <sip:user1@home1.net>;tag=171828
To: <sip:user2@home1.net; >
Call-ID: Asdasd23123366
Cseq: 41277 REFER
Contact: <sip:user1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Length: 0
Refer-To: <sip:user3@home1.net?;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6?body=
   m%3Dvedio%209%20RTP%2FAVP%98%0Dm% a=3gpp.iut.replication nw push controller
   4444::aaa:bbb:ccc:eee>
Referred-by: sip:user1@home1.net
Content-Type: application/
Content-Length: (…)
```

a= 3gpp. iut. replication: the replication request was sent from controller UE and using the network based solution.

5-6.   SIP 202 (Accepted) response for the SIP REFER request (SCC AS to UE-1)

7. SCC-AS sends information to MRF to allocate the media resource for the media to be replicated.

Editor's Note: There is a need to understand what functionality the MRF is providing. This can either be done by showing the instructions to the MRF or by showing the SDP in other messages thus enabling the activity of the MRF to be seen.

8-9.   SIP INVITE request (SCC-AS to UE-2) - See example in table 4.7.4.2.1.1-8

The SCC-AS sends the SIP INVITE towards UE-2 to establish a session based on the information provided in the SIP REFER request.

Table 4.7.4.2.1.1-8: SIP INVITE request (SCC-AS to UE-2)

```
INVITE sip:user2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-2222-222222222222 SIP/2.0
Via: SIP/2.0/UDP
Max-Forwards: 70
From: <sip:user1@home1.net>;tag=171828
To: <sip:user2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-2222-222222222222>
Referred-By: sip: user1@example1.net
Call-ID: duie4hr3896
Cseq: 41 INVITE-
Contact: <sip:user1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Length: 0
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP6 4444::aaa:bbb:ccc:eee
s=-
c=IN IP6 4444::aaa:bbb:ccc:eee
t=0 0
m=audio 4444 RTP/AVP 97
a=rtpmap:97 PCMU/8000
m=video 6666 RTP/AVP 98
a=rtpmap:98 MPV/90000
a=g.3gpp.iut.replication nw push replicator
```

Referred-By: The SCC AS adds the Referred-By header in order to indicate to UE-2 that this collaborative session request was triggered by UE-1.

a= 3gpp.iut.replication: the replication request is sent by the SCC AS and using the network based solution.

10-11. SIP 200 (OK) reponse to SIP INVITE request(UE-2 to SCC-AS)

UE-2 establish the session by sending the SIP 200 (OK) response towards SCC-AS.

12-13. SIP ACK request (SCC-AS to UE-2)

The SCC AS sends the SIP ACK request to UE-2.

14-15. SIP re-INVITE request (SCC-AS to UE-1)

The SCC-AS updates the access leg on Controller UE-1 for the replicated media flow with MRF.

16-17. SIP 200 (OK) response to re-INVITE request (UE-1 to SCC-AS)

After successful media update, UE-1 sends the SIP 200 (OK) reponse towards SCC-AS.

18-19. SIP ACK request (SCC-AS to UE-1)

The SCC AS sends the SIP ACK request to UE-1.

20-22. SIP re-INVITE request (SCC-AS to UE-3)

The SCC-AS sends a SIP re-INVITE request towards remote UE to update the remote leg to communicate media with MRF.

23-25. SIP 200 (OK) response to re-INVITE request (UE-3 to SCC-AS)

After successful media update, UE-3 sends the SIP 200 (OK) response towards SCC-AS.

26-27. SIP ACK request (SCC-AS to UE-3)

The SCC AS sends the SIP ACK request to remote UE-3.

29-30. SIP NOTIFY request (SCC-AS to UE-1)

The SCC-AS informs the UE-1 that the action triggered by SIP REFER request was successfully completed.

31-32. SIP 200 (OK) response to SIP NOTIFY request (UE-1 to SCC-AS)

The UE-1 confirms the SIP NOTIFY request by sending SIP 200 (OK) response to SIP NOTIFY request.

4.7.4.2.1.2   Different subscriptions

This subclause describes the scenario when the session is replicated in the network from the controller UE to the controllee UE. The flow diagram shows when UE-1 and UE-2 belong to two different subscriptions. After this procedures, the UE will be in collaborative session which is anchored by the SCC AS serving UE-1.

Editor's Note: It is FFS if the session replication can be replication of some of the media components belonging to the session.

UE-1(123.45.67.89) is in an active session with the remote UE (132.54.76.98). The call is anchored in the SCC AS of the UE-1. The controller UE, UE-1, setups a collaborative session by establishing a session between UE-2 (123.112.67.87) and the remote UE. This session is anchored by the SCC-AS serving the controllee UE, UE-2. UE-1 replicates the existing media components within the dialog between itself and the remote UE into the newly established session between UE-2 and the remote UE, by sending a SIP REFER request to the SCC AS anchoring the session. The media components are replicated in an MRF (125.124.123.122). After successful replication, the media flowing between UE-1 and the remote UE is not impacted. The replicated media component(s) are sent towards UE-2. UE-2 cannot send media flows towards UE-1 or the remote UE during this session.
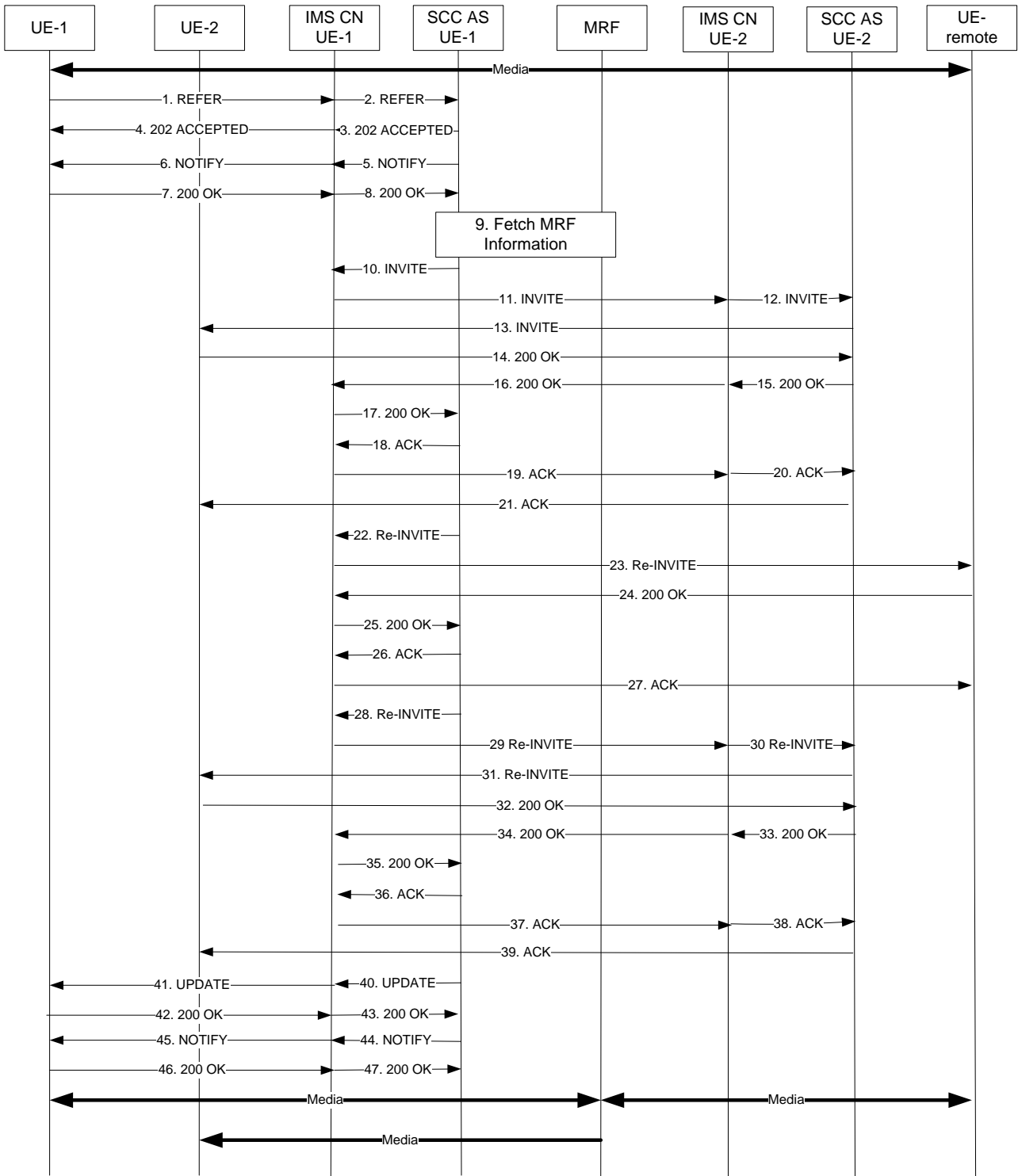
Figure 4.7.4.2.1.2-1: Signalling flow for media replication in the network – Push mode

1-2. SIP REFER request (from UE-1 to the SCC AS anchoring the session)

The SIP REFER request contains:

1) a Request-URI field containing contact of the SCC AS, UE-2;

2) a Refer-To header field containing:

- the public user identity or if available the GRUU of the controllee UE, UE-2; and

- the body URI header containing SDP for the media (m=) line for audio to be replicated containing the discard port number "9" for the media lines to replicated.

NOTE 1: If there were media lines that would not to be replicated, those media lines would be listed in the SDP however, the port numbers would have been set to zero.

3) a Target-Dialog header field containing the dialog parameters for the dialog of the existing session;

4) a Referred-By header field containing a currently registered public user identity of the controller UE;

5) a Contact header field containing the g.3gpp.iut-controller media feature tag; and

6) an Accept header field containing the MIME type "application/sdp, message/sipfrag".

Table 4.7.4.2.1.2-1: SIP REFER request (UE-1 to SCC-AS anchoring the session)

```
REFER sip:interUEtransfer@example.net SIP/2.0
Via:
To: sip:user2_public1@home2.net;
From: sip:user1_public1@home1.net;tag=24680
Call-ID: cb03a0s09a2sdfglkj490333
CSeq: 93809824 REFER
Max-Forwards: 70
P-Preferred-Identity:
Refer-To: <sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6?body=
    m%3Daudio%209%20RTP%2FAVP%97%0Dm>
Require: target-dialog
Target-dialog: cb03a0s09a2sdfglkj321576;remote-tag=abcdef;local-tag=123456
Contact: <sip:user1_public1@home1.net; gr=urn:uuid: e72edef-7efe-11e0-a567-
    00c0c91ewxyz>;+g.3gpp.iut-controller
Referred-By: sip:user1_public1@home1.net
Accept: application/sdp, message/sipfrag
Content-Length: 0
```

3-4. SIP 202 (Accepted) response (from SCC AS anchoring the session to UE-1)

SCC AS anchoring the session sends a SIP 202 (Accepted) response towards the UE-1.

5-6. SIP NOTIFY request (from SCC AS anchoring the session to UE-1)

SCC-AS anchoring the session sends a SIP NOTIFY request to UE-2 notifying implicit subscription to the SIP REFER request.

Table 4.7.4.2.1.2-5: SIP NOTIFY request (SCC-AS anchoring the session to UE-1)

```
NOTIFY
Via:
To: sip:user1_public1@home1.net;tag=24680
From: sip:interUEtransfer@example.net;tag=13579
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Event: refer
Subscription-State: active;expires=3600
Content-Type: message/sipfrag;version=2.0
Content-Length: (…)

SIP/2.0 100 Trying
```

**7-8. SIP 200 (OK) response (from UE-1 to SCC-AS anchoring the session)**

The controller UE, UE-1, acknowledges the SIP NOTIFY request by sending SIP 200 (OK) response to SCC-AS anchoring the session.

9. SCC-AS anchoring the session fetches MRF information

The information about the media port numbers and IP address.

NOTE 2: The SCC AS anchoring the session controls the MRF.

10-13. SIP INVITE request (from SCC-AS anchoring the session to UE-2)

The SCC AS anchoring the session checks the following

i- the content in the Request URI is different than the To header field which is the contact of controllee UE, UE-2;

ii- the port number set to the discard port number "9" to indicate adding the audio to the UE with gruu in REFER To header field; and

iii- if the media components belong already to an existing session.

SCC-AS anchoring the session sends a SIP INVITE request to the controllee UE, UE-2, adding audio media and establishing collaborative session. The SCC AS sets the a-line for audio m-line to inactive and the remote UE address to 0.0.0.0 in SDP offer to prevent the controllee UE sending media to the remote UE. The SIP INVITE request contains a Referred-By header field containing the identity of UE-1.

Table 4.7.4.2.1.2-10: SIP INVITE request (SCC-AS anchoring the session to UE-2)

```
INVITE sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6 SIP/2.0
Via:
Record-Route: sip:sccas1.home1.example.net
To: sip:user2_public1@home2.net;
From: sip:user3_public3@home3.net;tag=acegi
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity: "remote user" sip:user3_public3@home3.net
Require:
Referred-By: sip:user1_public1@home1.net
Contact: sip:user3_public3@home3.net;gr=urn:uuid:f81d4fae-17oct-11a1-a678-0054c91eabcd
Allow:
Content-Type: application/sdp
Content-Length:(…)

v=0
o=- 1027933615 1027933615 IN IP4 125.124.123.122
s=-
t=0 0
m=audio 1300 RTP/AVP 97 0
a=inactive
c=0.0.0.0
```

NOTEX: The port number is not set to the discard port number "9" since the SCC AS is aware of the port number. The discard port number "9" just indicated the SCC AS not to remove the media from the controller UE, UE-1.

14-17. SIP 200 (OK) response (from UE-2 to SCC-AS anchoring the session)

The controllee UE, UE-2, acknowledges the SIP INVITE request by sending SIP 200 (OK) response to SCC-AS anchoring the session.

Table 4.7.4.2.1.2-14: SIP 200 (OK) response (UE-2 to SCC-AS anchoring the session)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-
    00a0c91e6bf6+g.3gpp.iut-controller
Allow: INVITE, PRACK, UPDATE
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.112.67.87
s=-
t=0 0
m=audio 1456 RTP/AVP 97 0
c=123.112.67.87
```

18-21. SIP ACK request (from SCC-AS Anchoring the session to controllee UE)

SCC-AS sends SIP ACK request to the UE-2.

22-23. SIP re-INVITE request (from SCC-AS anchoring the session to the remote UE)

SCC-AS anchoring the session sends SIP re-INVITE request to the remote UE.

Table 4.7.4.2.1.2-22: SIP re-INVITE request (SCC-AS anchoring the session to the remote UE)

```
INVITE sip:user3_public3@home3.net;gr=urn:uuid:f81d4fae-17oct-11a1-a678-0054c91eabcd SIP/2.0
Via:
To: sip:user3_public3@home3.net;tag=66666
From: sip:user1_public1@home1.net;tag=33333
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip: user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 125.124.123.122
s=-
t=0 0
m=audio 1456 RTP/AVP 96 0
```

24-25. SIP 200 (OK) response (from remote UE to SCC-AS anchoring the session)

The remote UE acknowledges the SIP re-INVITE request by sending SIP 200 (OK) response to the SCC-AS anchoring the session.

Table 4.7.4.2.1.2-24: SIP 200 (OK) response (remote UE to SCC-AS anchoring session)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Asserted-Identity:
Contact: sip:user3_public3@home3.net;gr=urn:uuid:f81d4fae-17oct-11a1-a678-0054c91eabcd
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
c=IN IP4 132.54.76.98
t=0 0
m=audio 1300 RTP/AVP 96 97
```

26-27. SIP ACK request (from SCC-AS anchoring the session to the remote UE)

The SCC-AS anchoring the session sends SIP ACK request to the remote UE.

28-31. SIP re-INVITE request (from SCC-AS anchoring the session to UE-2)

The SCC-AS anchoring the session sends a SIP re-INVITE request to the controllee UE, UE-2 to inform controllee UE adding now an a-line set to active for the audio and c-line to the IP address of the remote UE in the SDP offer.

Table 4.7.4.2.1.2-27: SIP INVITE request (SCC-AS anchoring the session to UE-2)

```
INVITE sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6 SIP/2.0
Via:
Record-Route: sip:sccas1.home1.example.net
To: sip:user2_public1@home2.net;
From: sip:user3_public3@home3.net;tag=acegi
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity: "remote user" sip:user3_public3@home3.net
Require:
Referred-By: sip:user1_public1@home1.net
Contact: sip:user3_public3@home3.net;gr=urn:uuid:f81d4fae-17oct-11a1-a678-0054c91eabcd
Allow:
Content-Type: application/sdp
Content-Length:(…)

v=0
o=- 1027933615 1027933615 IN IP4 125.124.123.122
s=-
t=0 0
m=audio 1300 RTP/AVP 97 0
a=active
```

32-35. SIP 200 (OK) response (from UE-2 to SCC-AS anchoring the session)

The controllee UE, UE-2, acknowledges the SIP INVITE request by sending SIP 200 (OK) response to SCC-AS anchoring the session.

Table 4.7.4.2.1.2-31: SIP 200 (OK) response (UE-2 to SCC-AS anchoring the session)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Preferred-Identity:
Contact: sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-
   00a0c91e6bf6+g.3gpp.iut-controller
Allow: INVITE, PRACK, UPDATE
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.112.67.87
s=-
t=0 0
m=audio 1456 RTP/AVP 97 0
c=123.112.67.87
```

36-39. SIP ACK request (from SCC-AS anchoring the session to the controllee UE)

The SCC-AS anchoring the session sends SIP ACK request to controllee UE to acknowledge.

40-41. SIP UPDATE request (from SCC-AS anchoring the session to controller UE, UE-1)

A SIP UPDATE.request is sent to the controller UE, UE-1, to inform about the media port numbers and IP address of MRF.

42-43. SIP 200 (OK) response (from controller UE to SCC-AS anchoring the session)

The controller UE acknowledges the SIP UPDATE request by sending SIP 200 (OK) response to the SCC-AS anchoring the session.

44-45. SIP NOTIFY request (from SCC-AS anchoring the session to controller UE, UE-1)

When the media component is added to the controller UE, UE-1, the SCC-AS sends SIP NOTIFY request to controller UE, UE-1 to inform about the success status of adding the media to the UE-2.

Table 4.7.4.2.1.2-39: SIP NOTIFY request (SCC-AS anchoring the session to UE-1)

```
NOTIFY
Via:
To: sip:user1_public1@home1.net;tag = 13579
From: sip:interUEtransfer@example.net;tag=24680
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Event: refer
Subscription-State:terminated; reason=noresource
Content-Type: message/sipfrag ;version=2.0
Content-Length: (…)

SIP/2.0 200 OK
Content-Type: application/sdp
m=audio 1456 RTP/AVP 97 0
```

41-42. SIP 200 (OK) response (from controller UE to SCC-AS anchoring the session)

The controller UE acknowledges the NOTIFY request by sending SIP 200 (OK) response to the SCC-AS anchoring the session.

4.7.4.3 Session replication by remote UE – pull mode

4.7.4.3.1 Alternative 1

4.7.4.3.1.1 Single subscription

4.7.4.3.1.2 Dual subscription

This subclause describes the scenario when the session is replicated in the remote UE upon request from UE-2. The session is established using IMS communication service identified by ICSI urn:urn-7:3gpp-service.ims.icsi.iptv. The flow diagram shows when UE-1 and UE-2 belong to two different subscriptions.

UE-1(123.45.67.89) is in an active session with the remote UE (132.54.76.98). The remote UE included the g.3gpp.iut.replicator media feature tag with value fa77as7dad8-sd98ajzz@sccas.home3.net;local-tag=kkaz;remote-tag=6544 in the Contact header when establishing the session. The call is anchored in the SCC AS of the UE-1. Prior to pull the session replication, UE-2 gets the dialog information of UE-1 such as the media type and port numbers on the remote end or IMS communication service identifier of each session. This is done by UE-2 having subscribed to dialog event package between UE-1 and the SCC AS.
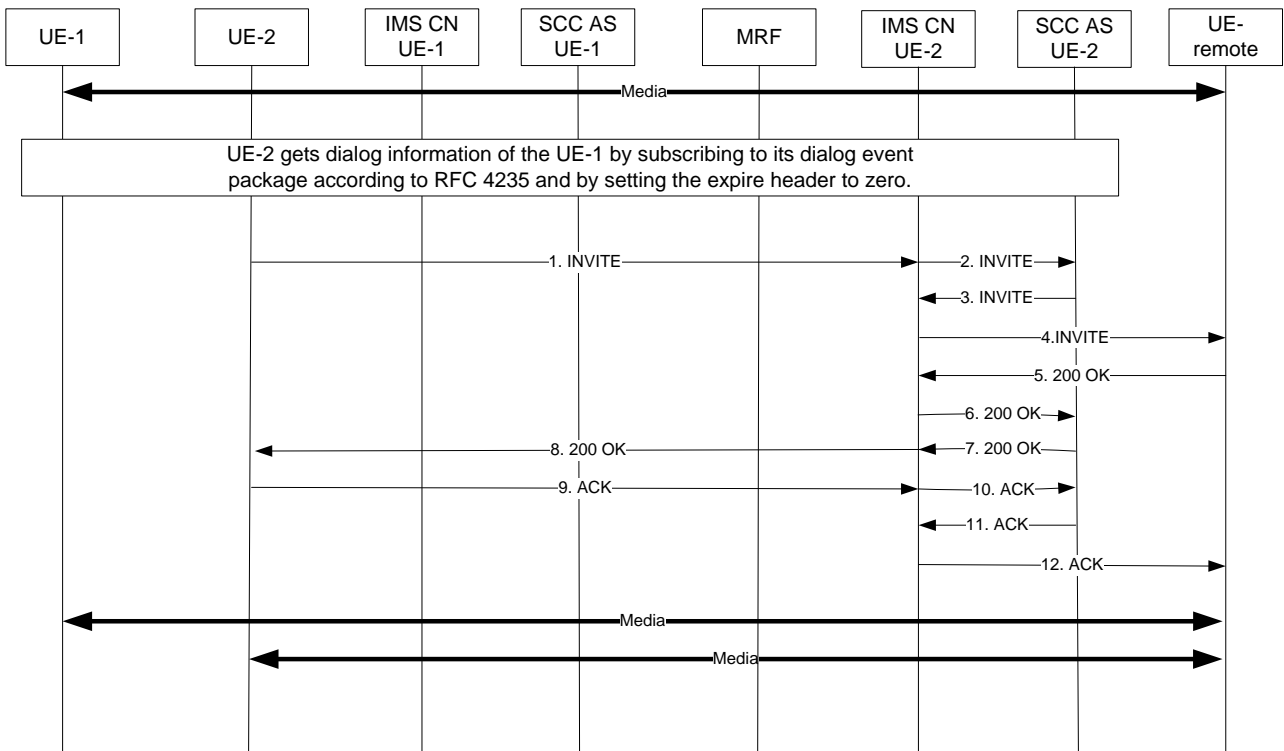
Figure 4.7.4.3.1.2-1: Signalling flow for session replication in the remote UE – Pull mode

1-4. SIP INVITE request (from UE-2 to remote UE)

UE-2 (123.112.67.87) sends a SIP INVITE request to the remote UE.

Table 4.7.4.3.1.2-1: SIP INVITE request (UE-2 to remote UE)

```
INVITE sip:user3_public3@home3.net;gr=urn:uuid:f81d4fae-17oct-11a1-a678-0054c91eabcd SIP/2.0
Via:
Record-Route: sip:sccas2.home2.example.net
To: sip:user3_public3@home3.net;
From: sip:user2_public1@home2.net;tag=acegi
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity: "remote user" sip:user2_public1@home2.net
Contact: <sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-
   00a0c91e6bf6>;+g.3gpp.icsi-ref="urn%3Aurn-7%3gpp-service.ims.icsi.iptv"
P-Preferred-Service: urn:urn-7:3gpp-service.ims.icsi.iptv
Accept-Contact: *;+g.3gpp.icsi-ref="urn%3Aurn-7%3gpp-service.ims.icsi.iptv"
Allow:
Content-Type: application/sdp
Content-Length:(…)
Accept-Contact: *;+g.3gpp.iut.replicator; explicit; require
Target-Dialog: fa77as7dad8-sd98ajzz@sccas.home3.net;local-tag=kkaz;remote-tag=6544

v=0
o=- 1027933615 1027933615 IN IP4 123.112.67.87
s=-
t=0 0
m=audio 1456 RTP/AVP 96 0
c=IN IP4 123.112.67.87
```

5-8. SIP 200 (OK) response (from remote UE to UE-2)

The remote UE acknowledges the SIP INVITE request by sending SIP 200 (OK) response to UE-2. Based on the Accept-Contact header field with the g.3gpp.iut.replicator media feature tag and the dialog identifier provided in the Target-Dialog header field, the remote UE sets the playback state in the session being established to the same state as the playback state of the session being replicated, i.e. fa77as7dad8-sd98ajzz@sccas.home3.net;local-tag=kkaz;remote-tag=6544.

Since the replicated session is a new independent session which can be further replicated, the g.3gpp.iut.replicator media feature tag with a new value is included in the Contact header field.

Table 4.7.4.3.1.2-5: SIP 200 (OK) response (Remote UE to UE-2)

```
SIP/2.0 200 OK
Via:
To: sip:user3_public3@home3.net;tag=aabb
From:
Call-ID:
CSeq:
P-Asserted-Identity:
Contact: <sip:user3_public3@home3.net;gr=urn:uuid:f81d4fae-17oct-11a1-a678-
   0054c91eabcd>;+g.3gpp.icsi-ref="urn%3Aurn-7%3gpp-
   service.ims.icsi.iptv";+g.3gpp.iut.replicator="dkjhlfjgrt@sccas.home3.net;local-
   tag=aabb;remote-tag=acegi"
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
t=0 0
m=audio 1300 RTP/AVP 96 97
c=IN IP4 132.54.76.98
```

9-12. SIP ACK request (from UE-2 to the remote UE)

The controllee UE, UE-2, sends SIP ACK request to the remote UE.

4.7.4.3.1A Alternative 1A

4.7.4.3.1A.1 Single subscription

4.7.4.3.1A.2 Dual subscription

In the example flow at the figure 4.7.4.3.1A.2-1, UE-1 has an ongoing multimedia session with UE-3 anchored at SCC AS-1. The session is established using an IMS communication service identified by ICSI urn:urn-7:3gpp-service.ims.icsi.iptv. UE-1 and UE-2 belong to different subscribers. UE-3 is an application server acting as a terminating UE.
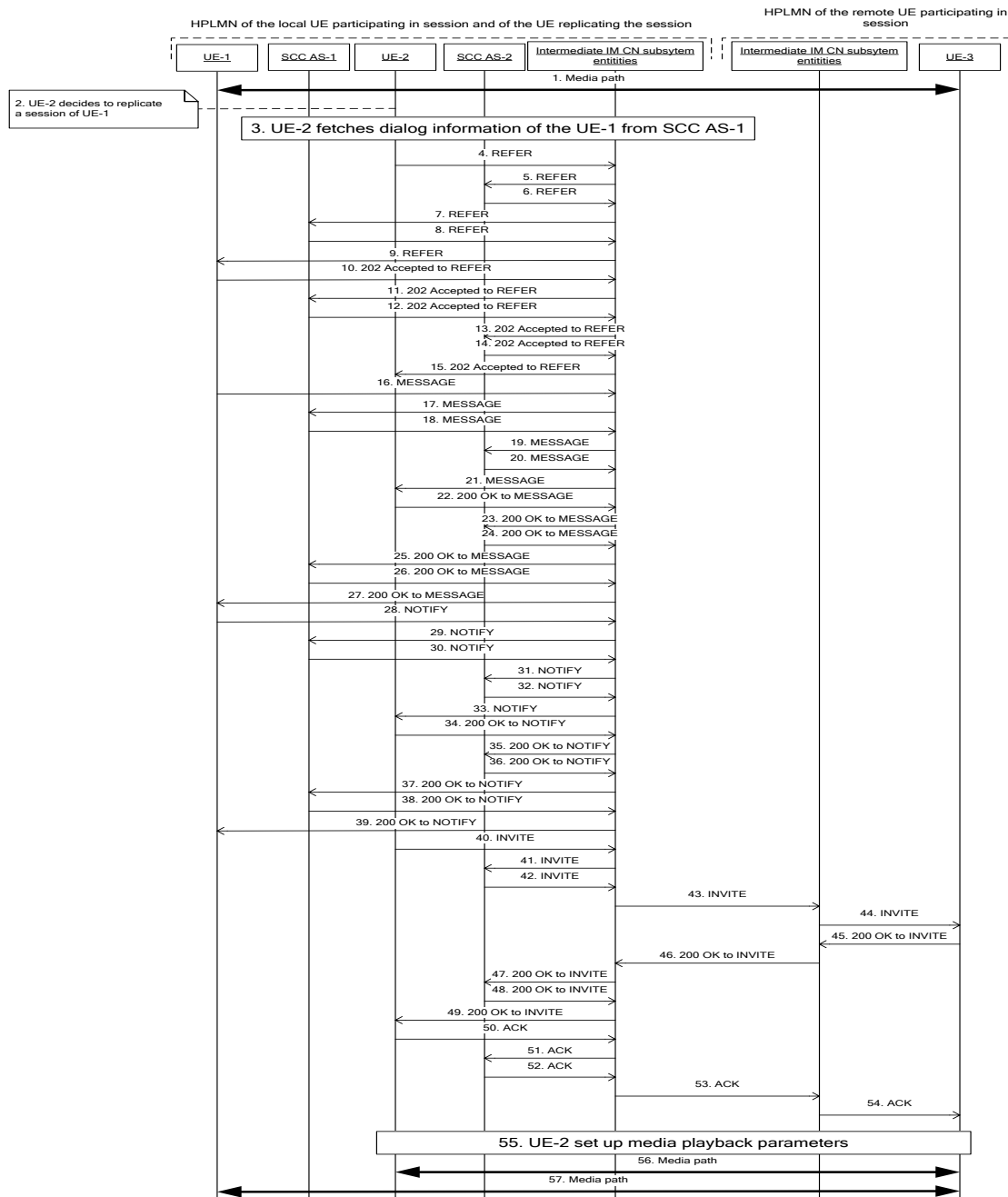
Figure 4.7.4.3.1A.2-1: Signalling flow for session replication in the remote UE – Pull mode

NOTE: For clarity, the SIP 100 (Trying) messages and SIP NOTIFY with SIP 100 (Trying) are not shown in the signalling flow.

1. UE-1 is in session with UE-3

There is a multimedia session comprising audio and video media between the UE-1 and the remote UE-3 anchored at SCC AS-1. The session was established using IMS communication service identified by ICSI urn:urn-7:3gpp-service.ims.icsi.iptv. The dialog identifier of the session between SCC AS-1 and UE-1 is AB03a0s09a2sdfglkj490333, remote-tag=dfg45, local-tag=444.

2. **UE-2 decides to replicate the session of UE-1 to UE-2.**

3. **UE-2 fetches the dialog information of the UE-1 from SCC AS-1.**

4-9.   **SIP REFER request (UE-2 to UE-1) - see example in table 4.7.4.3.1A.2-4**

The UE-2 sends SIP REFER request to UE-1 to request the playback state. When SCC AS-1 forwards the SIP REFER request, the SCC AS-1 authorizes the request.

Table 4.7.4.3.1A.2-4: SIP REFER request

```
REFER sip:user1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111 SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:fff]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Preferred-Identity: <sip:user2@home1.net>
From: <sip:user2@home1.net>;tag=171828
To: <sip:user1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>
Call-ID: ddfftq34gasgaegr
Cseq: 1112 REFER
Contact: <sip:user2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-2222-222222222222>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Type: application/vnd.3gpp.replication+xml
Content-Length: (…)
Supported: 100rel, precondition
Refer-To: <sip:user2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-2222-
   222222222222;method=MESSAGE?In-Reply-To=ddfftq34gasgaegr>
Target-Dialog: AB03a0s09a2sdfglkj490333;remote-tag=dfg45;local-tag=444
Require: tdialog

<?xml version="1.0" encoding="UTF-8"?>
<ms:requestedParameters
  xmlns:ms="urn:3gpp:ns:mediaState:1.0"
>
....
</ms:requestedParameters>
```

Request-URI: set to the URI of UE-1

Refer-To: contains the URI of UE-2 extended with the method parameter set to MESSAGE and with In-Reply-To URI header field containing the call-id of the SIP REFER request

Target-Dialog: contains the dialog identifier of the session being replicated

application/vnd.3gpp.replication+xml: lists the playback state parameters to be provided

10-15. **SIP 202 (Accepted) response for the SIP REFER request (UE-1 to UE-2)**

16-21. **SIP MESSAGE request (UE-1 to UE-2)**

Based on the received SIP REFER request, the UE-2 generate a SIP MESSAGE request with values of the requested playback state parameters.

Table 4.7.4.3.1A.2-16: SIP MESSAGE request

```
MESSAGE sip:user2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-2222-222222222222 SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:32ff]:887;comp=sigcomp;branch=z9hG4bKnashds775
Max-Forwards: 70
P-Preferred-Identity: <sip:user1@home1.net>
From: <sip:user1@home1.net>;tag=aaa171828
To: <sip:user2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-2222-222222222222>
Call-ID: dfsgaerddfftq34gasgaegr
Cseq: 41112 MESSAGE
Contact: <sip:user1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Type: application/vnd.3gpp.replication+xml
Content-Length: (…)
Supported: 100rel, precondition
In-Reply-To: ddfftq34gasgaegr

<?xml version="1.0" encoding="UTF-8"?>
<ms:parameterValues
  xmlns:ms="urn:3gpp:ns:mediaState:1.0"
>
....
</ms:parameterValues>
```

Request-URI: set to the URI of UE-2

In-Reply-To: containing the value of the In-Reply-To URI header field of the Refer-To header field of the SIP REFER request

application/vnd.3gpp.replication+xml: lists the values of the requested playback state parameters

22-27. SIP 200 (OK) response to SIP MESSAGE request (UE-2 to UE-1)

The UE-2 confirms the SIP MESSAGE request by sending SIP 200 (OK) response to SIP MESSAGE request.

28-33. SIP NOTIFY request (UE-1 to UE-2)

The UE-1 informs the UE-2 that the action triggered by SIP REFER request was successfully completed.

34-39. SIP 200 (OK) response to SIP NOTIFY request (UE-2 to UE-1)

The UE-2 confirms the SIP NOTIFY request by sending SIP 200 (OK) response to SIP NOTIFY request.

40-44. SIP INVITE request (UE-2 to UE-3)

The UE-2 establishes a session with UE-3 using the remote URI provided in the dialog event package in the step 3.

45-49. SIP 200 (OK) response to SIP INVITE request (UE-3 to UE-2)

The UE-3 establishes the session by sending SIP 200 (OK) response to SIP INVITE request.

50-54. SIP ACK request (UE-2 to UE-3)

55. UE-2 sets up the playback state based on the playback state parameters received message 21.

56-57. Media path:

Two independent sessions exist - the original session still has the media path between UE-1 and UE-3 and the replicated session has the media path between UE-2 and UE-3.

4.7.4.3.2 Alternative 2

4.7.4.3.2.1 Single subscription

4.7.4.3.2.2 Dual subscription

This subclause describes the scenario when the session is replicated in the remote UE upon request from UE-2. The flow diagram shows when UE-1 and UE-2 belong to two different subscriptions.

> Editor's Note: It is FFS if the session replication can be replication of some of the media components belonging to the session.

UE-1(123.45.67.89) is in an active session with the remote UE (132.54.76.98). The call is anchored in the SCC AS of the UE-1. Prior to pull the session replication, UE-2 gets the dialog information of UE-1 such as the content media type and port numbers on the remote end or IMS communication service identifier of each session. This is done by UE-2 having subscribed to dialog event package between UE-1 and the SCC AS.
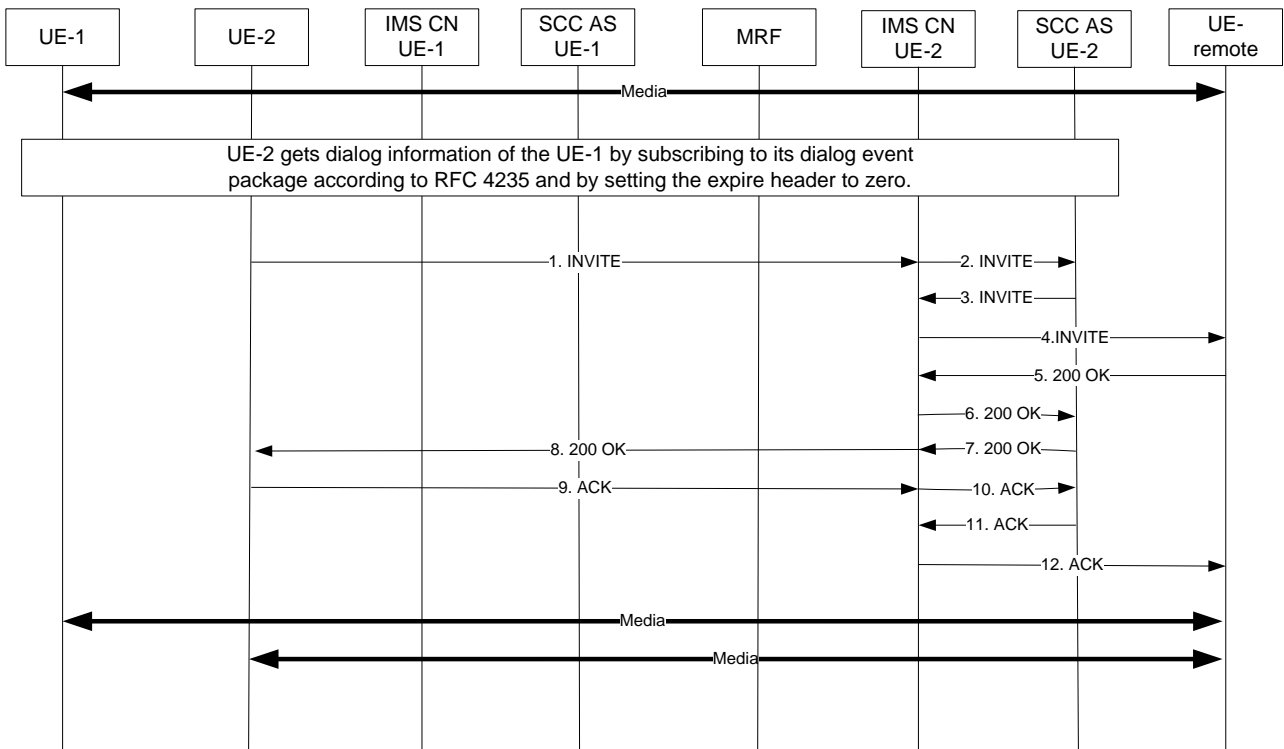
Figure 4.7.4.3.2.2-1: Signalling flow for session replication in the remote UE – Pull mode

1-4.   SIP INVITE request (from UE-2 to remote UE)

UE-2 (123.112.67.87) sends a SIP INVITE request to the remote UE.

> Editor's Note: It is FFS if and how to indicate the association with the existing dialog between UE-1 and the remote UE to the remote UE.

> Editor's Note: It is FFS if and how UE-2 gets the information about the media playback parameters from UE-1.

> Editor's Note: it is FFS if and how to discover and indicate the IMS Communication Service to be used by UE-2. The solution should be designed in a way that any type of IMS Communication Service can be used.

Table 4.7.4.3.2.2-1: SIP INVITE request (UE-2 to remote UE)

```
INVITE sip:user3_public3@home3.net;gr=urn:uuid:f81d4fae-17oct-11a1-a678-0054c91eabcd SIP/2.0
Via:
Record-Route: sip:sccas2.home2.example.net
To: sip:user3_public3@home3.net;
From: sip:user2_public1@home2.net;tag=acegi
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity: "remote user" sip:user2_public1@home2.net
Contact: <sip:user2_public1@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-
   00a0c91e6bf6>;+g.3gpp.icsi-ref="urn%3Aurn-7%3gpp-service.ims.icsi.iptv"
P-Preferred-Service: urn:urn-7:3gpp-service.ims.icsi.iptv
Accept-Contact: *;+g.3gpp.icsi-ref="urn%3Aurn-7%3gpp-service.ims.icsi.iptv"
Allow:
Content-Type: application/sdp
Content-Length:(…)

v=0
o=- 1027933615 1027933615 IN IP4 123.112.67.87
s=-
t=0 0
m=audio 1456 RTP/AVP 96 0
c=IN IP4 123.112.67.87
a=3gpp.iut.replication ue pull receiver
```

a= 3gpp. iut. replication: the replication is sent by the controllee UE (receiver) and using the UE based solution.

5-8.   SIP 200 (OK) response (from remote UE to UE-2)

The remote UE acknowledges the SIP INVITE request by sending SIP 200 (OK) response to UE-2

Table 4.7.4.3.2.2-5: SIP 200 (OK) response (Remote UE to UE-2)

```
SIP/2.0 200 OK
Via:
To:
From:
Call-ID:
CSeq:
P-Asserted-Identity:
Contact: <sip:user3_public3@home3.net;gr=urn:uuid:f81d4fae-17oct-11a1-a678-
   0054c91eabcd>;+g.3gpp.icsi-ref="urn%3Aurn-7%3gpp-service.ims.icsi.iptv"
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 132.54.76.98
s=-
t=0 0
m=audio 1300 RTP/AVP 96 97
c=IN IP4 132.54.76.98
a=3gpp.iut.replication ue pull replicator
```

a= 3gpp. iut. replication: the response is sent by the replicator, i.e. remote UE-3.

9-12.   SIP ACK request (from UE-2 to the remote UE)

The controllee UE, UE-2, sends SIP ACK request to the remote UE.

4.7.4.4 Session replication by remote UE – push mode

4.7.4.4.1 Alternative 1

4.7.4.4.1.1 Single subscription

4.7.4.4.1.2 Dual subscription

In the example flow at the figure 4.7.4.4.1.2-1, UE-1 has an ongoing multimedia session with UE-3 anchored at SCC AS-1. The UE-3 included the g.3gpp.iut.replicator media feature tag with value fa77as7dad8-sd98ajzz@sccas.home3.net;local-tag=kkaz;remote-tag=6544 in the Contact header when establishing the session. UE-1 and UE-2 belong to different subscribers.

Figure 4.7.4.4.1.2-1: Signalling flow for replication of session existing at other UE

NOTE: For clarity, the SIP 100 (Trying) responses and SIP NOTIFY requests with SIP 100 (Trying) are not shown in the signalling flow.

1. UE-1 is in session with UE-3

The dialog identifier of the session between SCC AS-1 and UE-1 is AB03a0s09a2sdfglkj490333, remote-tag=dfg45, local-tag=444.

2. UE-1 decides to replicate the session from UE-1 to UE-2.

3-9. SIP REFER request (UE-1 to UE-2) - see example in table 4.7.4.4.1.2-3

The UE-1 sends SIP REFER request to UE-2 to request the session replication. When SCC AS-2 receives the SIP REFER request, the SCC AS-2 authorizes the request.

Table 4.7.4.4.1.2-3: SIP REFER request (UE-1 to Intermediate IM CN subsystem entities)

```
REFER sip:user2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-2222-222222222222 SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
Max-Forwards: 70
P-Preferred-Identity: <sip:user1@home1.net>
From: <sip:user1@home1.net>;tag=171828
To: <sip:user2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-2222-222222222222>
Call-ID: Asdasd23123366
Cseq: 41277 REFER
Contact: <sip:user1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Length: 0
Refer-To: <sip:user3@home2.net;gr=urn:uuid:f81d4fae-17oct-11a1-a678-0054c91eabcd?P-Preferred-
   Service=urn:urn-7:3gpp-service.ims.icsi.iptv&Accept-Contact=*%3b+g.3gpp.icsi-
   ref%3d%22urn%253Aurn-7%253gpp-service.ims.icsi.iptv%22&Accept-
   Contact:*%3bg.3gpp.iut.replicator%3dexplicit%3brequire&Target-Dialog=fa77as7dad8-
   sd98ajzz%40sccas.home3.net%3Blocal-tag%3Dkkaz%3Bremote-tag%3D6544%0A>
Referred-By: <sip:user1@home1.net>
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; ealg=aes-cbc; spi-c=98765432; spi-
   s=87654321; port-c=8642; port-s=7531
```

Request-URI: contains the GRUU of the UE-2

Refer-To: contains the URI of UE-3 together with Accept-Contact header field indicating that replication is requested and Target-Dialog header field containing the dialog identifier of the session to be replicated.

10-16. SIP 202 (Accepted) response for the SIP REFER request (UE-1 to UE-2)

17-21. SIP INVITE request (UE-2 to UE-3)

The UE-2 establishes a session with UE-3 based on the information provided in the SIP REFER request.

Table 4.7.4.4.1.2-17: SIP INVITE request (UE-2 to UE-3)

```
INVITE sip:user3@home2.net;gr=urn:uuid:f81d4fae-17oct-11a1-a678-0054c91eabcd SIP/2.0
Via:
Record-Route: sip:sccas2.home2.example.net
To: sip:user3@home2.net
From: sip:user2@home1.net;tag=acegi
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity: sip:user2@home1.net
Contact: <sip:user2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-2222-222222222222>;+g.3gpp.icsi-
   ref="urn%3Aurn-7%3gpp-service.ims.icsi.iptv"
P-Preferred-Service: urn:urn-7:3gpp-service.ims.icsi.iptv
Accept-Contact: *;+g.3gpp.icsi-ref="urn%3Aurn-7%3gpp-service.ims.icsi.iptv"
Allow:
Content-Type: application/sdp
Content-Length:(…)
Accept-Contact: *;+g.3gpp.iut.replicator; explicit; require
Target-Dialog: fa77as7dad8-sd98ajzz@sccas.home3.net;local-tag=kkaz;remote-tag=6544

v=0
o=- 1027933615 1027933615 IN IP4 123.112.67.87
s=-
t=0 0
m=audio 1456 RTP/AVP 96 0
c=IN IP4 123.112.67.87
```

22-26. SIP 200 (OK) response to SIP INVITE request (UE-3 to UE-2)

The UE-3 establishes the session by sending SIP 200 (OK) response to SIP INVITE request. Based on the Accept-Contact header field with the g.3gpp.iut.replicator media feature tag and the dialog identifier provided in the Target-Dialog header field, the UE-3 sets the playback state in the session being established to the same state

as the playback state of the session being replicated, i.e. fa77as7dad8-sd98ajzz@sccas.home3.net;local-tag=kkaz;remote-tag=6544.

27-31. SIP ACK request (UE-2 to UE-3)

32-38. SIP NOTIFY request (UE-2 to UE-1)

The UE-2 informs the UE-1 that the action triggered by SIP REFER request was successfully completed.

39-45. SIP 200 (OK) response to SIP NOTIFY request (UE-1 to UE-2)

The UE-1 confirms the SIP NOTIFY request by sending SIP 200 (OK) response to SIP NOTIFY request.

46-47. Media

Two independent sessions exist - the original session still has the media path between UE-1 and UE-3 and the replicated session has the media path between UE-2 and UE-3.

4.7.4.4.1A Alternative 1A

4.7.4.4.1A.1 Single subscription

4.7.4.4.1A.2 Dual subscription

In the example flow at the figure 4.7.4.4.1A.2-1, UE-1 has an ongoing multimedia session with UE-3 anchored at SCC AS-1. UE-1 and UE-2 belong to different subscribers.

Editor's Note: It is FFS if the session replication can be replication of some of the media components belonging to the session.
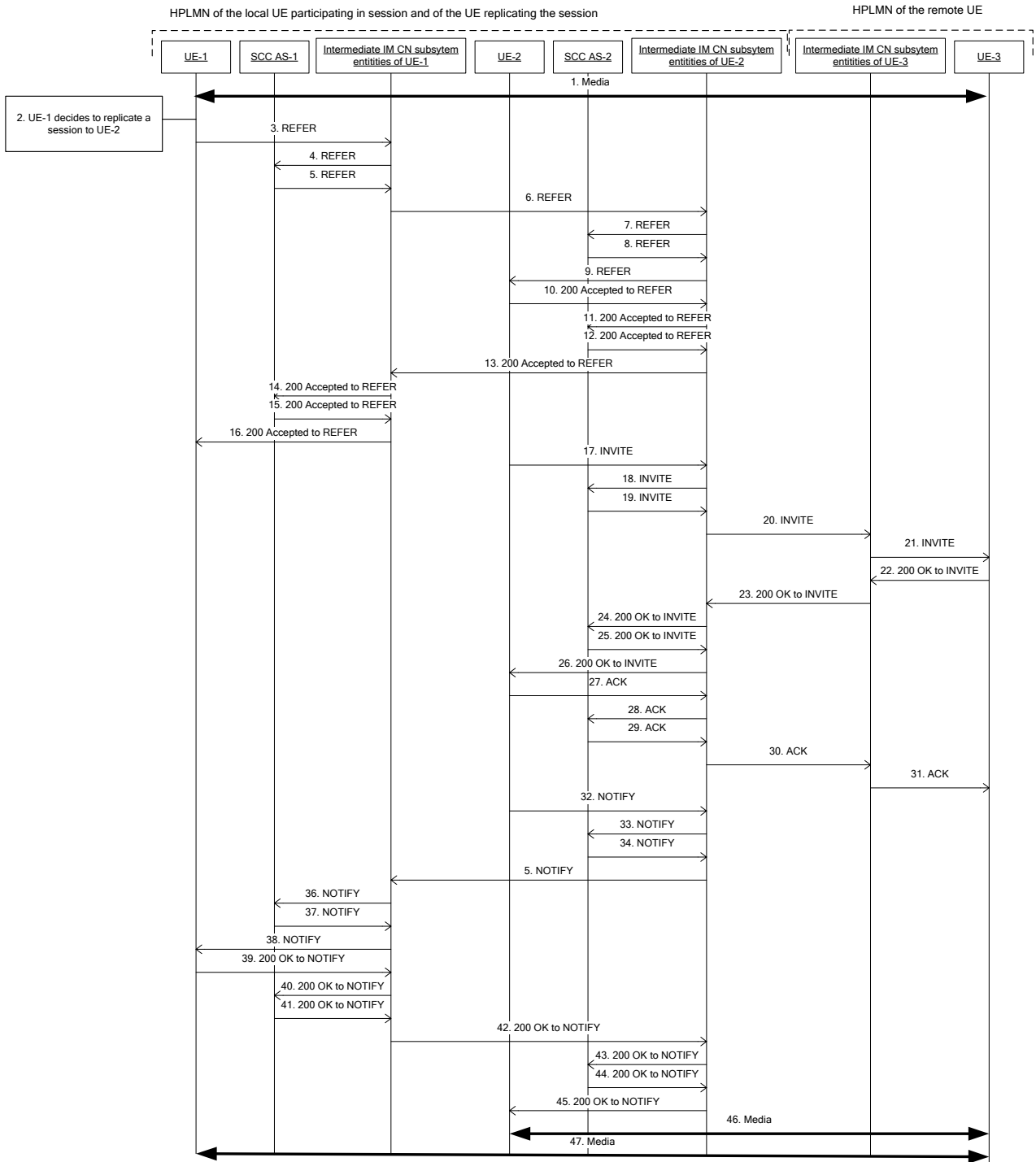
Figure 4.7.4.4.1A.2-1: Signalling flow for replication of session existing at other UE

NOTE: For clarity, the SIP 100 (Trying) responses and SIP NOTIFY requests with SIP 100 (Trying) are not shown in the signalling flow.

1. **UE-1 is in session with UE-3**

   The dialog identifier of the session between SCC AS-1 and UE-1 is AB03a0s09a2sdfglkj490333, remote-tag=dfg45, local-tag=444.

2. **UE-1 decides to replicate the session from UE-1 to UE-2.**

3-9. **SIP REFER request (UE-1 to UE-2) - see example in table 4.7.4.4.1A.2-3**

The UE-1 sends SIP REFER request to UE-2 to request the session replication. When SCC AS-2 receives the SIP REFER request, the SCC AS-2 authorizes the request.

Table 4.7.4.4.1.2-3: SIP REFER request (UE-1 to Intermediate IM CN subsystem entities)

```
REFER sip:user2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-2222-222222222222 SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
Max-Forwards: 70
P-Preferred-Identity: <sip:user1@home1.net>
From: <sip:user1@home1.net>;tag=171828
To: <sip:user2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-2222-222222222222>
Call-ID: Asdasd23123366
Cseq: 41277 REFER
Contact: <sip:user1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Length: 0
Refer-To: <sip:user3@home2.net?P-Preferred-Service=urn:urn-7:3gpp-
   service.ims.icsi.iptv&Accept-Contact=*%3b+g.3gpp.icsi-ref%3d%22urn%253Aurn-7%253gpp-
   service.ims.icsi.iptv%22>
Referred-By: <sip:user1@home1.net>
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; ealg=aes-cbc; spi-c=98765432; spi-
   s=87654321; port-c=8642; port-s=7531
Content-Type: application/vnd.3gpp.replication+xml
Content-Length: (…)

<?xml version="1.0" encoding="UTF-8"?>
<ms:replication>
  <ms:parameterValues
    xmlns:ms="urn:3gpp:ns:mediaState:1.0"
  >
  ....
  </ms:parameterValues>
</ms:replication>
```

Request-URI: contains the GRUU of the UE-2

Refer-To: contains the URI of UE-3 and IMS Communication Service of the existing session.

application/vnd.3gpp.replication+xml: indicates that push mode replication is requested and if available, lists the values of the playback state parameters

10-16. SIP 202 (Accepted) response for the SIP REFER request (UE-1 to UE-2)

17-21. SIP INVITE request (UE-2 to UE-3)

The UE-2 establishes a session with UE-3 based on the information provided in the SIP REFER request.

Table 4.7.4.4.1A.2-17: SIP INVITE request (UE-2 to UE-3)

```
INVITE sip:user3@home2.net SIP/2.0
Via:
Record-Route: sip:sccas2.home2.example.net
To: sip:user3@home2.net
From: sip:user2@home1.net;tag=acegi
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity: sip:user2@home1.net
Contact: <sip:user2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-2222-222222222222>;+g.3gpp.icsi-
    ref="urn%3Aurn-7%3gpp-service.ims.icsi.iptv"
P-Preferred-Service: urn:urn-7:3gpp-service.ims.icsi.iptv
Accept-Contact: *;+g.3gpp.icsi-ref="urn%3Aurn-7%3gpp-service.ims.icsi.iptv"
Allow:
Content-Type: application/sdp

v=0
o=- 1027933615 1027933615 IN IP4 123.112.67.87
s=-
t=0 0
m=audio 1456 RTP/AVP 96 0
c=IN IP4 123.112.67.87
```

22-26. SIP 200 (OK) response to SIP INVITE request (UE-3 to UE-2)

The UE-3 establishes the session by sending SIP 200 (OK) response to SIP INVITE request.

27-31. SIP ACK request (UE-2 to UE-3)

32-38. SIP NOTIFY request (UE-2 to UE-1)

The UE-2 informs the UE-1 that the action triggered by SIP REFER request was successfully completed.

39-45. SIP 200 (OK) response to SIP NOTIFY request (UE-1 to UE-2)

The UE-1 confirms the SIP NOTIFY request by sending SIP 200 (OK) response to SIP NOTIFY request.

46-47. Media

Two independent sessions exist - the original session still has the media path between UE-1 and UE-3 and the replicated session has the media path between UE-2 and UE-3.

4.7.4.4.2   Alternative 2

4.7.4.4.2.1   Single subscription

4.7.4.4.2.2   Dual subscription

In the example flow at the figure 4.7.4.4.2.2-1, UE-1 has an ongoing multimedia session with UE-3 anchored at SCC AS-1. UE-1 and UE-2 belong to different subscribers.

Editor's Note: It is FFS if the session replication can be replication of some of the media components belonging to the session.

Figure 4.7.4.4.2.2-1: Signalling flow for replication of session existing at other UE

NOTE: For clarity, the SIP 100 (Trying) responses and SIP NOTIFY requests with SIP 100 (Trying) are not shown in the signalling flow.

1. UE-1 is in session with UE-3

The dialog identifier of the session between SCC AS-1 and UE-1 is AB03a0s09a2sdfglkj490333, remote-tag=dfg45, local-tag=444.

2. UE-1 decides to replicate the session from UE-1 to UE-2.

3-9. SIP REFER request (UE-1 to UE-2) - see example in table 4.7.4.4.2.2-3

The UE-1 sends SIP REFER request to UE-2 to request the session replication. When SCC AS-2 receives the SIP REFER request, the SCC AS-2 authorizes the request.

Table 4.7.4.4.2.2-3: SIP REFER request (UE-1 to Intermediate IM CN subsystem entities)

```
REFER sip:user2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-2222-222222222222 SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
Max-Forwards: 70
P-Preferred-Identity: <sip:user1@home1.net>
From: <sip:user1@home1.net>;tag=171828
To: <sip:user2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-2222-222222222222>
Call-ID: Asdasd23123366
Cseq: 41277 REFER
Contact: <sip:user1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Length: 0
Refer-To: <sip:user3@home2.net?P-Preferred-Service=urn:urn-7:3gpp-
   service.ims.icsi.iptv&Accept-Contact=*%3b+g.3gpp.icsi-ref%3d%22urn%253Aurn-7%253gpp-
   service.ims.icsi.iptv%22;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6?body=
   m%3Dvedio%209%20RTP%2FAVP%98%0Dm% a=3gpp.iut.replication ue push controller
   4444::aaa:bbb:ccc:eee>
Referred-By: <sip:user1@home1.net>
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; ealg=aes-cbc; spi-c=98765432; spi-
   s=87654321; port-c=8642; port-s=7531
```

Request-URI: contains the GRUU of the UE-2

Refer-To: contains the URI of UE-3.

a= 3gpp.iut.replication: the replication request is sent from the controller UE and using UE based solution.

Editor Note: It is FFS if and how to indicate the association with the existing dialog between UE-1 and the remote UE to the remote UE.

Editor Note: It is FFS if and how UE-2 gets the information about the media playback parameters from UE-1.

10-16. SIP 202 (Accepted) response for the SIP REFER request (UE-1 to UE-2)

17-21. SIP INVITE request (UE-2 to UE-3) - see example in table 4.7.4.4.2.2-17

The UE-2 establishes a session with UE-3 based on the information provided in the SIP REFER request.

Table 4.7.4.4.1.2-17: SIP INVITE request (UE-2 to Intermediate IM CN subsystem entities)

```
INVITE sip:user2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-2222-222222222222 SIP/2.0
Via: SIP/2.0/UDP
Max-Forwards: 70
From: <sip:user1@home1.net>;tag=171828
To: <sip:user2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-2222-222222222222>
Referred-By: sip: user1@example1.net
Call-ID: duie4hr3896
Cseq: 41 INVITE-
Contact: <sip:user1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-1111-111111111111>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Length: 0
Content-Type: application/sdp

Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP6 4444::aaa:bbb:ccc:fff
s=-
c=IN IP6 4444::aaa:bbb:ccc:fff
t=0 0
m=audio 4444 RTP/AVP 97
a=rtpmap:97 PCMU/8000
m=video 6666 RTP/AVP 98
a=rtpmap:98 MPV/90000
a=g.3gpp.iut.replication ue push receiver
```

a= 3gpp.iut.replication: the replication request is sent from the controllee UE to setup the replication session.

22-26. SIP 200 (OK) response to SIP INVITE request (UE-3 to UE-2)

The UE-3 establishes the session by sending SIP 200 (OK) response to SIP INVITE request.

27-31. SIP ACK request (UE-2 to UE-3)

32-38. SIP NOTIFY request (UE-2 to UE-1)

The UE-2 informs the UE-1 that the action triggered by SIP REFER request was successfully completed.

39-45. SIP 200 (OK) response to SIP NOTIFY request (UE-1 to UE-2)

The UE-1 confirms the SIP NOTIFY request by sending SIP 200 (OK) response to SIP NOTIFY request.

46-47. Media

Two independent sessions exist - the original session still has the media path between UE-1 and UE-3 and the replicated session has the media path between UE-2 and UE-3.

4.8 Inter-UE Transfer between UEs connected to the IMS and UEs in the CS domain

Editor's Note: This subclause corresponds to subclauses 6.1.3.9 of 3GPP TR 23.831 [3]

4.8.1 General

4.8.2 Procedures

4.8.3 Identified issues

4.8.4 Call flows

4.9 Session discovery

Editor's Note: This subclause corresponds to subclauses 6.1.3.a of 3GPP TR 23.831 [3]

4.9.1 General

4.9.2 Procedures

4.9.2.1 Alternative 1

4.9.2.1.1 SC UE

In order to discover sessions of a user, the SC UE shall send SIP SUBSCRIBE request according to IETF RFC 4235 [12]. The SC UE shall populate the SIP SUBSCRIBE request as follows:

1. the Request-URI set to the public user identity of the user;

2. the Event header field containing the "dialog" event package name;

3. the Accept-Contact header field with the g.3gpp.iut-xyz media feature tag together with explicit and require; and

4.   the Expires header field set to zero.

4.9.2.1.2   SCC AS

4.9.2.1.2.1   Distinction of requests sent to the SCC AS

The SCC AS distinguish the following initial SIP requests:

1.   SIP SUBSCRIBE request containing Request-URI with the public user identity of a served user, the Event header field with "dialog" event name and the Accept-Contact header field with the g.3gpp.iut-xyz media feature tag along with explicit and require.

     In the procedures below, such request is known as "SIP SUBSCRIBE request for session discovery".

Other SIP requests can be dealt with in any manner conformant with 3GPP TS 24.229 [2].

4.9.2.1.2.2   SCC AS procedures for discovery of sessions

When the SCC AS receives a SIP SUBSCRIBE request for session discovery, the SCC AS shall:

1.   if the subscriber is not authorized to receive the dialog information of the user identified by Request-URI, then reject the SIP request with a SIP 403 (Forbidden) response and do not process the remaining steps; and

Editor's note: authorization policy is FFS

2.   handle the SIP request according to IETF RFC 4235 [48].

4.9.3   Identified issues

4.9.4   Call flows

4.9.4.1   Discovery of sessions of user of same or different IMS subscription using dialog event package subscription

4.9.4.1.1   Alternative 1

In the example flow at the figure 4.9.4.1.1-1, UE-1 has an ongoing multimedia session with UE-3 anchored at SCC AS-1. UE-1 and UE-2 belong to different subscribers.

HPLMN of the local UE participating in session and of the UE transferring the session

HPLMN of the remote UE participating in session
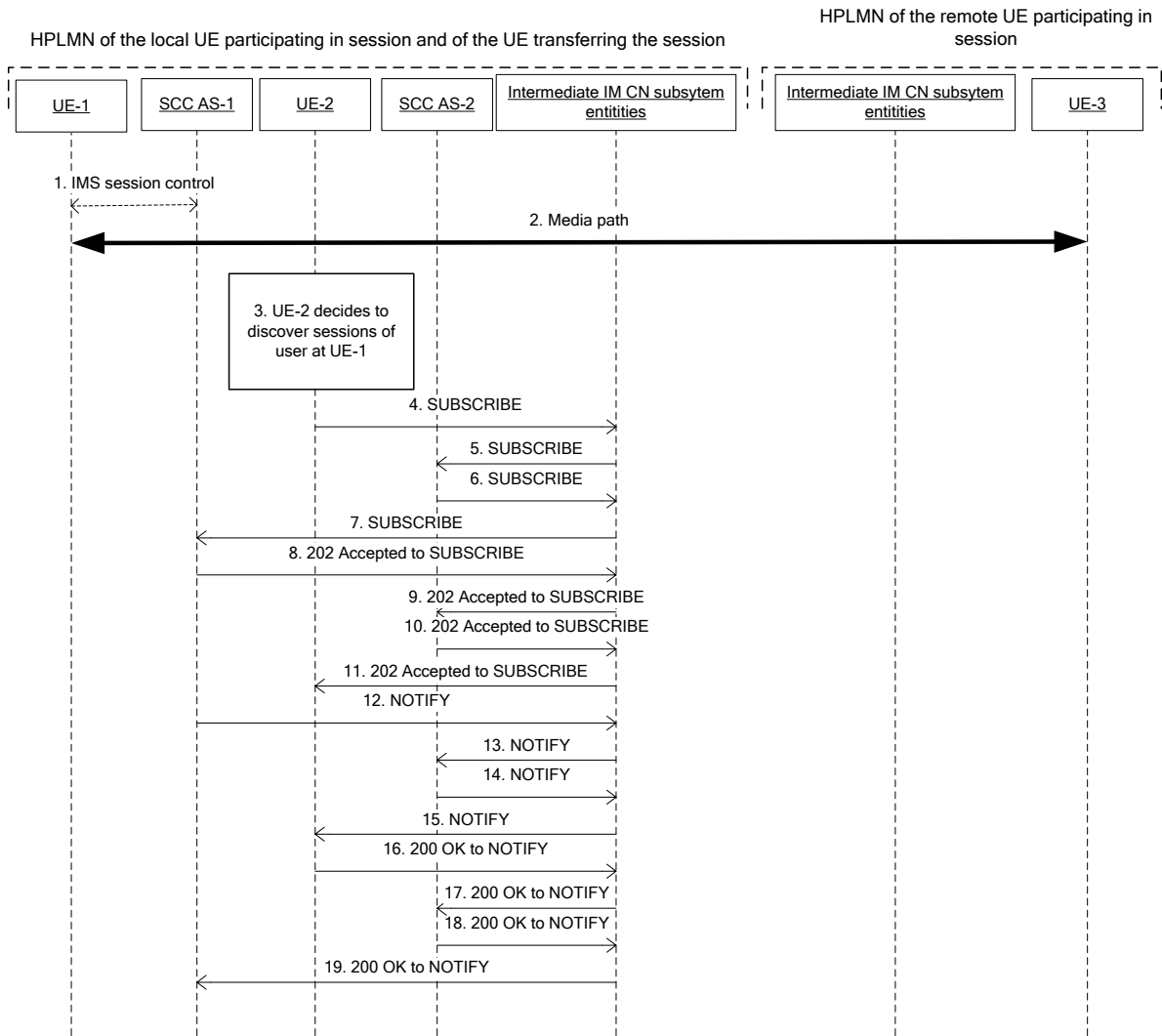
Figure 4.9.4.1.1-1: Signalling flow for discovery of sessions of user at other UE

NOTE: For clarity, the SIP 100 (Trying) messages are not shown in the signalling flow.

1-2. UE-1 is in session with UE-3

There is a multimedia session comprising audio and video media between the UE-1 and the remote UE-3 anchored at SCC AS-1. The dialog identifier of the session between SCC AS-1 and UE-1 is AB03a0s09a2sdfglkj490333, remote-tag=dfg45, local-tag=444.

3. UE-2 decides to discover sessions of user at UE-1

4-7. SIP SUBSCRIBE request (from UE-2 to SCC AS-1) - see example in table 4.9.4.1.1-4

The UE-2 sends SIP SUBSCRIBE request to fetch the dialog information of the dialogs of user at UE-1. SCC AS-2 is invoked upon originating initial filter criteria but since Request-URI does not contain a URI owned by SCC AS, the SCC AS-2 forwards the request.

Table 4.9.4.1.1-4: SIP SUBSCRIBE request

```
SUBSCRIBE sip:user1@home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:fff]:1357;comp=sigcomp;branch=z9hG4bKnashds7664
P-Preferred-Identity: <sip:user2@home1.net>
From: <sip:user2@home1.net>;tag=171828
To: <sip:user1@home1.net>
Call-ID: tq34gasgaeg335r
Event: dialog
CSeq: 145454 SUBSCRIBE
Max-Forwards: 70
Expires: 0
Contact: <sip:user2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-2222-222222222222>
Accept: application/dialog-info+xml
Accept-Contact: *;+g.3gpp.iut-xyz;explicit;require
Content-Length: 0
```

8-11. SIP 202 (Accepted) response (from SCC AS-1 to UE-2)

Since the request is addressed to a user served by SCC AS-1 and since the request contains the g.3gpp.iut-xyz media feature tag in the Accept-Contact header field, the SCC AS-1 acknowledges the SIP SUBSCRIBE request by sending SIP 202 (Accepted) response.

12-15. SIP NOTIFY request (from SCC AS-2 to UE-2) - see example in table 4.9.4.1.1-12

The SCC AS-1 sends SIP NOTIFY request containing the dialog information related to dialogs between the SCC AS-1 and the UEs of user.

Table 4.9.4.1.1-12: SIP NOTIFY request

```
NOTIFY sip:user2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-2222-222222222222 SIP/2.0
Via:
To: <sip:user2@home1.net>;tag=171828
From: <sip:user1@home1.net>;tag=eerr
Call-ID:
CSeq:
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:sccas1.home1.example.net
Allow:
Event: dialog
Content-Type: application/dialog-info+xml
Content-Length: (…)

<?xml version="1.0"?>
<dialog-info xmlns="urn:ietf:params:xml:ns:dialog-info"
             version="0"
             state="full"
             entity="sip:user1@home1.net">
  <dialog id="123456" call-id="AB03a0s09a2sdfglkj490333" local-tag="444" remote-tag="dfg45">
    <state>confirmed</state>
    <local>
      <identity>sip:remoteuser@home2.net</identity>
      <target uri=sip:remoteuser@home2.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-333333333333">
        <param pname="+g.3gpp.icsi-ref" pval="urn:urn-7:3gpp-service.ims.icsi.iptv"/>
      </target>
    </local>
    <remote>
      <identity>sip:user1@home1.net</identity>
      <target uri="sip:user1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-111111111111">
        <param pname="+g.3gpp.icsi-ref" pval="urn:urn-7:3gpp-service.ims.icsi.iptv"/>
      </target>
    </remote>
  </dialog>
</dialog-info>
```

16-19. SIP 200 (OK) response (from UE-2 to SCC AS-1)

The UE-2 acknowledges the SIP NOTIFY request by sending SIP 200 (OK) response to SCC AS-1.

4.10 Collaborative session handling upon loss of collaborative session control

Editor's Note: This subclause corresponds to subclauses 6.1.3.b of 3GPP TR 23.831 [3]

4.10.1 General

4.10.2 Procedures

4.10.2.1 Set controller loss preference using XCAP over Ut interface

User may send or modify controller loss preference at any time during a session using XCAP over Ut interface. Candidate UEs in controller loss preference should be configured in a priority order.

4.10.2.2 Session handling upon controller lost

Since SCC AS inserted itself in record-route header in IUT situation, when radio/bearer resources are no longer available or the signalling bearer is lost to the UE for a session (e.g. abort session request from PCRF) (as specified in 24.229[4] subclause 5.2.8.1.2), the SCC AS will receive a BYE message with a reason header 503 (Service Unavailable) response code. SCC AS should not send 2xx responses for the BYE request if it wants to handle the controller loss, because the P-CSCF will delete all information related to the dialog and the related multimedia session upon receiving 2xx responses for the BYE request (24.229 [4] subclause 5.2.8.1.2).

Editor's note: use SIP signaling timeout or SIP error response returned by P-CSCF for controller loss detection is FFS.

SCC AS uses subscription information and session status to select a controller based on controller loss preference.

SCC AS checks for presence of controller loss preference in case of controller loss. If present, the SCC AS checks for priority among controllees for assuming the controller role. The SCC AS sequentially requests controllees to assume controller role according to the priority assigned in the controller loss preference.

The SCC AS indicates to the selected UE to become a controller of the collaborative session on lost controller UE, using procedures in subclause 4.5.2.3. Selected UE can choose to accept or reject the offer using procedures in subclause 4.5.2.4.

If SCC AS receives a 2xx response, session control is assumed to be accepted by the selected UE. SCC AS then transfers the session control to this new controller using procedures in subclause 4.5.2.4.

If selected UE replies with a non 2xx response, it is assumed by the SCC AS that the selected UE has declined the offer to be a new controller. The SCC AS then repeats the procedure in 4.5.2.3 after selecting another UE to which controller role is offered to. If no suitable candidate UE is left, SCC AS releases the session and sends BYE message to all UEs participating in the session.

4.10.3 Identified issues

4.10.4 Call flows

4.10.4.1 Configuration of controller loss preference

4.10.4.1.1 Introduction

The configuration of the controller loss preferences is described in subclause 4.10.2.1. The mechanism used is via the Ut interface as described in 3GPP TS 23.623 [25]. The following describes the XML document required for configuring the list of preferred UEs that are used in the case of controller loss.

NOTE: Other possibilities for user configuration, such as web-based provisioning or pre-provisioning by the operator are outside the scope of the present document, but are not precluded.

4.10.4.1.2 Structure of the XML document

4.10.4.1.2.1 General

Controller Loss Preferences documents are sub-trees of the *simservs* XML document specified in 3GPP TS 24.623 [25]. As such, Originating Identity documents use the XCAP application usage in 3GPP TS 24.623 [6].

Data semantics: The semantics of the Controller Loss Preferences XML configuration document is specified in subclause 4.10.4.1.2.2.

XML schema: Implementations in compliance with the present document shall implement the XML schema that minimally includes the XML Schema defined in subclause 4.10.4.1.2.3 and the *simservs* XML schema specified in subclause 6.3 of 3GPP TS 24.623 [25].

An instance of an Controller Loss Preferences document is shown:

```
<?xml version="1.0" encoding="UTF-8"?>
<simservs xmlns="http://uri.etsi.org/ngn/params/xml/simservs/xcap"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <controller-loss-preferences active="true">
      <controller> uri </controller>
    </controller-loss-preference>
</simservs>
```

4.10.4.1.2.2 Definitions

Candidate UEs in controller loss preferences can be configured using the active attribute of the <controller-loss-preferences> service element. A list of URIs identifying each UE that is a candidate UE for controller loss preference is configured in a priority order.

4.10.4.1.2.3 XML Schema

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema
xmlns:ss="http://uri.etsi.org/ngn/params/xml/simservs/xcap"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://uri.etsi.org/ngn/params/xml/simservs/xcap"
elementFormDefault="qualified"
attributeFormDefault="unqualified">

  <xs:include schemaLocation="XCAP.xsd"/>

  <xs:element name="controller-loss-preferences" substitutionGroup="ss:absService">
    <xs:complexType>
      <xs:complexContent>
        <xs:extension base="ss:simservType">
          <xs:sequence>
            <xs:element name="controller" type="xs:anyURI" minOccurs="0" maxOccurs="unbounded"/>
            <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
          </xs:sequence>
          <xs:anyAttribute namespace="##any" processContents="lax"/>
        </xs:extension>
      </xs:complexContent>
    </xs:complexType>
  </xs:element>
</xs:schema>
```

4.10.4.2 Session handling upon controller lost
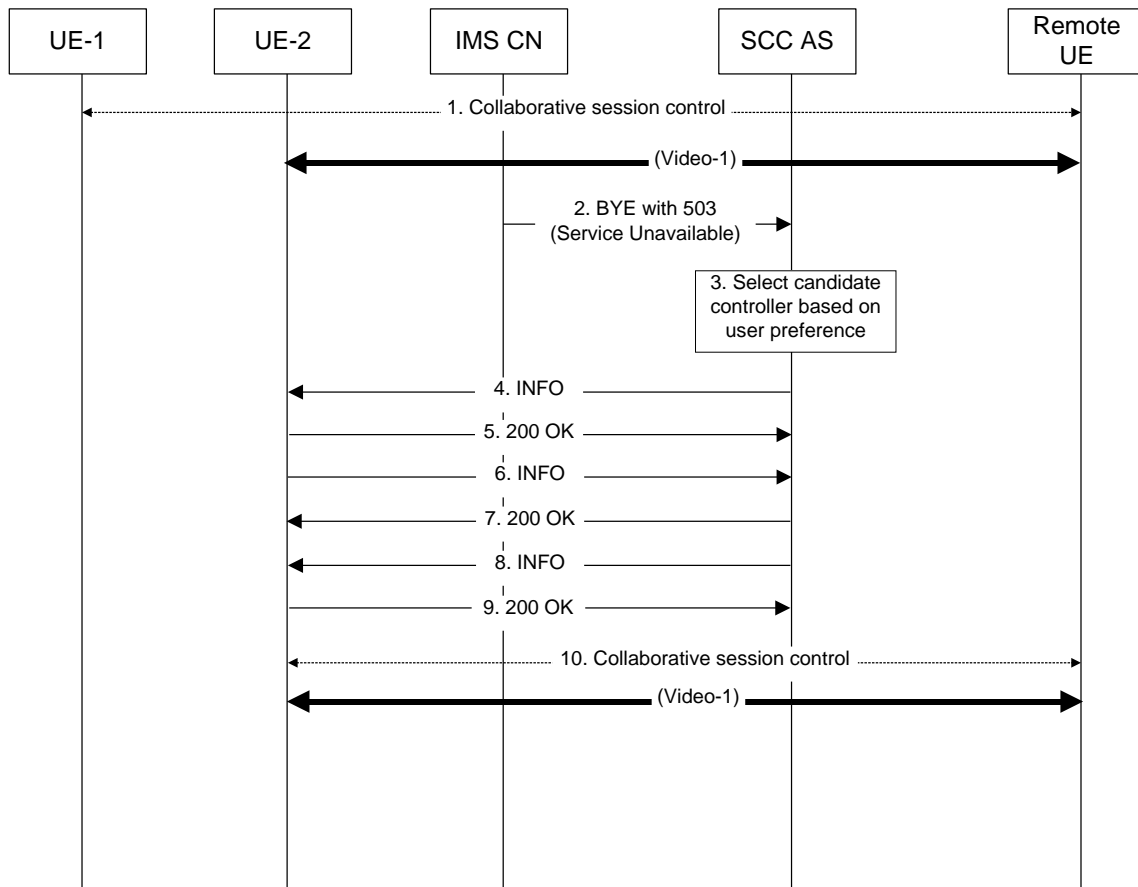
1. **Collaborative session controlled by UE-1**

   A collaborative session is established between UE-1 and UE-2 and the remote UE with UE-1 acting as the controller UE and UE-2 acting as a controllee UE. For simplicity, other UEs participating in the session are not shown in this flow and only controllee UEs have media flows with the remote UE.

2. **SIP BYE (IMS CN to SCC AS)**

   When S-CSCF receives a SIP BYE message with a reason header 503 (Service Unavailable) from P-CSCF that detecting the lost of UE, it routes this SIP BYE message to SCC AS of the session.

3. **SCC AS checks for presence of controller loss preference configuration and if present it selects a candidate UE as new controller. Otherwise the session is released.**

4. **SIP INFO (SCC AS to UE-2)**

   SCC AS asks UE-2 to assume the controller role by sending a SIP INFO transfer request to UE-2.

   To indicate the (controller transfer) purpose of the SIP INFO request, the Info Package mechanism is being utilized. The controller transfer purpose is indicated by the Info-Package header field value "collaborativeSessionControl".

   Editor's note: The Info Package name to be used and its detailed specification is FFS.

   Editor's note: It is FFS whether the request for assuming the controller role should be based on SIP INVITE instead of SIP INFO.

5. **SIP 200 (OK) responses to SIP INFO request (UE-2 to SCC AS)**

6. **SIP INFO request (UE-2 to SCC AS)**

UE-2 confirms the collaborative session control transfer request by sending a SIP INFO request to the SCC AS.

To indicate the (controller transfer) purpose of the SIP INFO request, the Info Package mechanism is being utilized. The controller transfer purpose is indicated by the Info-Package header field value "collaborativeSessionControl".

7. **SIP 200 (OK) response to SIP INFO request (SCC AS to UE-2)**

8. **SIP INFO request (SCC AS to UE-2)**

Upon receiving the confirmation from UE-2 the SCC AS informs UE-2 about the new controller assignment by sending a SIP INFO request to UE-2.

To indicate the purpose of the SIP INFO request, the Info Package mechanism is being utilized. The controller transfer purpose is indicated by the Info-Package header field value "collaborativeSessionControl".

9. **SIP 200 (OK) responses to SIP INFO request (UE-2 to SCC AS)**

10. **Collaborative session controlled by UE-2**

4.11 Media modification

Editor's Note: This subclause corresponds to subclauses 6.1.3.c of 3GPP TR 23.831 [3]

4.11.1 General

4.11.2 Procedures

4.11.2.1 Controller UE initiated media modification on controllee UE

4.11.2.1.1 Controller UE

The controller UE procedures for modifying media on controllee UE by the controller UE is the same as the procedure described in 3GPP TS 24.237[6] subclause 16.2.2.1 with exception that the controller UE additionally sets the port numbers for the media types of the media components (in the hname "body" URI header field in the SIP URI in the Refer-To header field of the SIP REFER request) which are being modified on the controllee UE to values from the corresponding media lines received during the last successful SDP offer and answer exchange with the remote party.

4.11.2.1.2 SCC AS serving for collaborative session

The SCC AS procedures for modifying media on controllee UE by the controller UE is the same as the procedure described in 3GPP TS 24.237[6] subclause 16.3.3.

4.11.2.2 Controllee UE initiated media modification on itself

4.11.2.2.1 Controllee UE

If the controllee UE wants to modify the characteristics of a media component on itself within a collaborative session, the controllee UE shall follow the procedures defined in 3GPP TS 24.229 [4] for modifying media.

4.11.2.2.2 SCC AS serving the collaborative session

When SCC AS receives a SIP re-INVITE request within an existing dialog from the controllee UE to modify a media component on itself, the SCC AS shall send a SIP re-INVITE request to the remote UE. The SCC AS shall construct the SDP information in the SIP re-INVITE request as follows:

1) set the modified media information as the same in the SIP re-INVITE request received from the controllee UE; and

2) include the SDP information for all other media components in the collaborative session as received during the last successful SDP offer-answer exchange from the remote UE.

Upon receiving SIP 200 (OK) response with the SDP answer from the remote UE, the SCC AS shall send:

1) a SIP ACK request to the remote UE; and

2) a SIP 200 (OK) response to the controllee UE with an SDP answer that only contains the media component on the controllee UE.

4.11.3 Identified issues

4.11.4 Call flows

4.11.4.1 Controllee UE initiated media modification on controllee UE

4.11.4.2 Controllee UE initiated media modification on itself
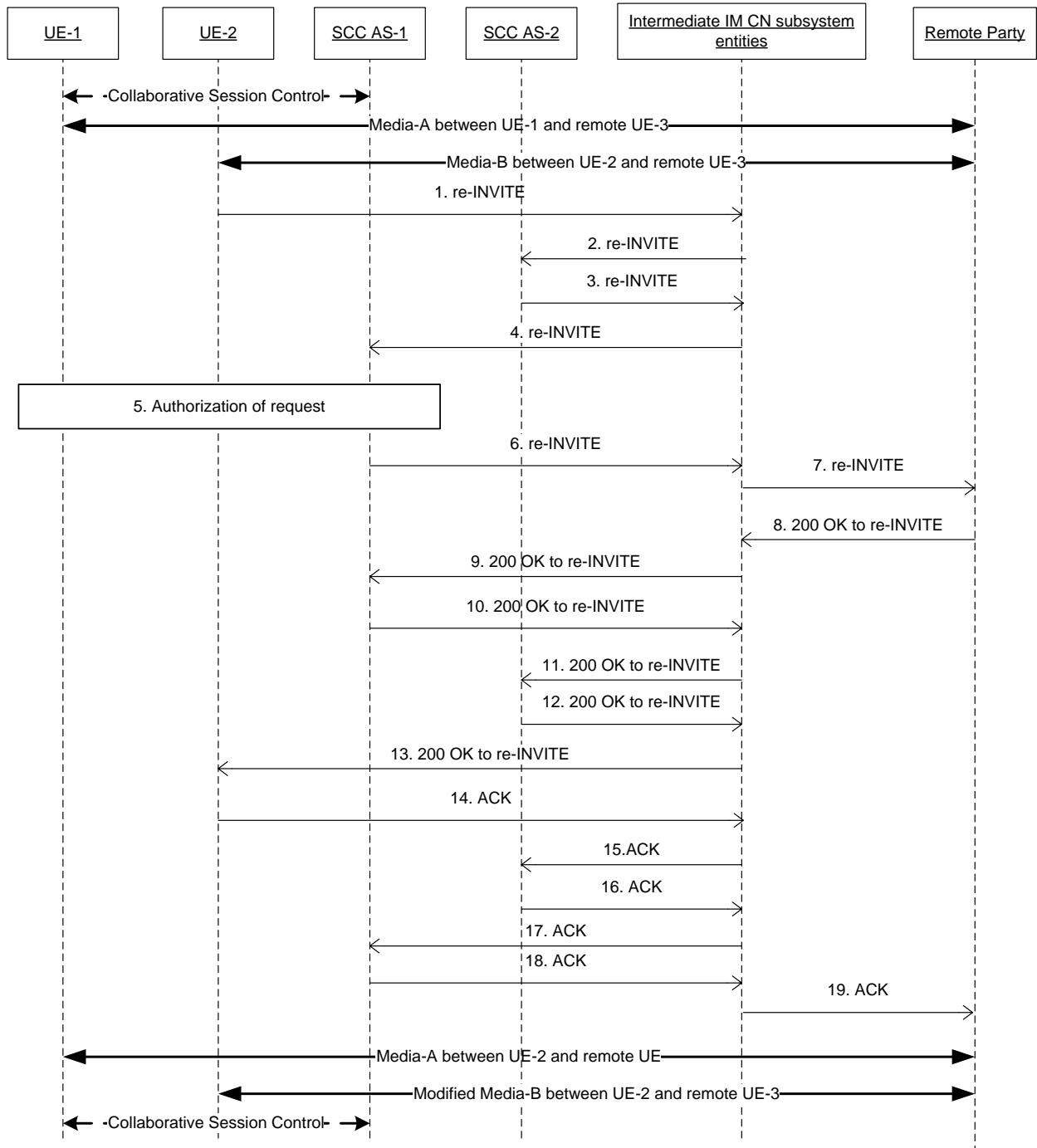
Figure 4.11.2.2-1: Controllee UE initiated media modification on itself

NOTE: For clarity, the SIP 100 (Trying) responses are not shown in the signalling flow.

1-4. SIP re-INVITE request (UE-2 to SCC AS-1) - see example in table 4.11.2.2-2

The UE-2 sends SIP re-INVITE request to remote UE to modify the media on itself.

Table 4.11.2.2-1: SIP re-INVITE request (UE-2 to Intermediate IM CN subsystem entities)

```
INVITE sip:remoteuser@home1.net; SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:eee]:1357;comp=sigcomp;branch=z9hG4bKnashds7dfdsdq
Max-Forwards: 70
P-Preferred-Identity: <sip:user2@home1.net>
From: <sip:user2@home1.net>;tag=171828
To: <sip:remoteuser@home1.net>;tag=986765
Call-ID: Asdasd23123366
Cseq: 41277 INVITE
Contact: <sip:user2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-2222-222222222222>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP6 4444::aaa:bbb:ccc:eee
s=-
c=IN IP6 4444::aaa:bbb:ccc:eee
t=0 0
m=audio 4444 RTP/AVP 97
a=rtpmap:97 PCMU/8000
a=3gpp.iut.modify: collaborative controllee
```

a=3gpp.iut. modify: collaborative controllee: indicates that this media is modified by the controllee UE itself within the collaborative session.

5. Authorizes the request for media modification.

Editor's Note: How the SCC AS/Controller UE authorizes the media modification request is FFS.

6-7. SIP re-INVITE request (SCC AS-1 to remote UE)

After successful authorization, SCC AS-1 sends the SIP re-INVITE to the remote UE.

NOTE: The SDP attribute "a=3gpp.iut. modify: collaborative controlee" is not included in this SIP re-INVITE request.

8-13. SIP 200 (OK) response for the SIP re-INVITE request (Remote UE to UE-2)

Remote UE responds with SIP 200 (OK) response to UE-2.

14-19. SIP ACK request (UE-2 to remote UE)

The UE-2 sends the SIP ACK request to remote UE.

4.12 Collaborative session profile

Editor's Note: This subclause corresponds to subclauses 6.1.3.4 of 3GPP TR 23.831 [3]

4.12.1   General

4.12.2   Procedures

4.12.3   Identified issues

4.12.4   Call flows

4.13   Inter-UE transfer without establishing a collaborative session

Editor's Note: This subclause corresponds to subclauses 6.1.3.d of 3GPP TR 23.831 [3]

4.13.1   General

4.13.2   Procedures

4.13.2.1   Complete transfer triggered by UE belonging to the same subscription

4.13.2.1.1   Complete transfer triggered by UE not participating in session

4.13.2.1.1.1   Alternative 1

4.13.2.1.1.1.1   SC UE

In order to transfer all media streams of an existing session of another UE to the SC UE, the SC UE shall send a SIP INVITE request as specified in 3GPP TS 24.229 [4]. The SC UE shall populate the SIP INVITE request as follows:

1. the Request-URI set to the Inter UE Transfer SCC AS URI;

2. the Replaces header field containing the dialog identifier of the session to be transferred; and

3. the Require header field containing the option tag value "replaces".

4.13.2.1.1.1.2   SCC AS

4.13.2.1.1.1.2.1   Distinction of requests sent to the SCC AS

"SIP INVITE request due to inter UE transfer" as specified in 3GPP TS 24.237 [6], subclause 15.3.1 apply.

4.13.2.1.1.1.2.1   Complete transfer triggered by UE not participating in session

When handling the "SIP INVITE request due to inter UE transfer" as described in 3GPP TS 24.237 [6], subclause 15.3.3, if the SCC AS authorizes the request on behalf of the served user then the SCC AS shall not perform the rejection of the SIP INVITE request (as described in 3GPP TS 24.237 [6], subclause 15.3.3, step 1) and shall continue with remaining steps of 3GPP TS 24.237 [6], subclause 15.3.3.

4.13.3   Identified issues

4.13.4   Call flows

4.13.4.1   Complete transfer triggered by UE belonging to the same subscription

4.13.4.1.1   Complete transfer triggered by UE not participating in session

4.13.4.1.1.1   Alternative 1

In the example flow at the figure 4.13.4.1.1.1-1, UE-1 has an ongoing multimedia session with UE-3 anchored at SCC AS-1. UE-1 and UE-2 belong to the same IMS subscriptions. The SCC AS-1 authorizes the inter UE transfer request on behalf of the UE-1.
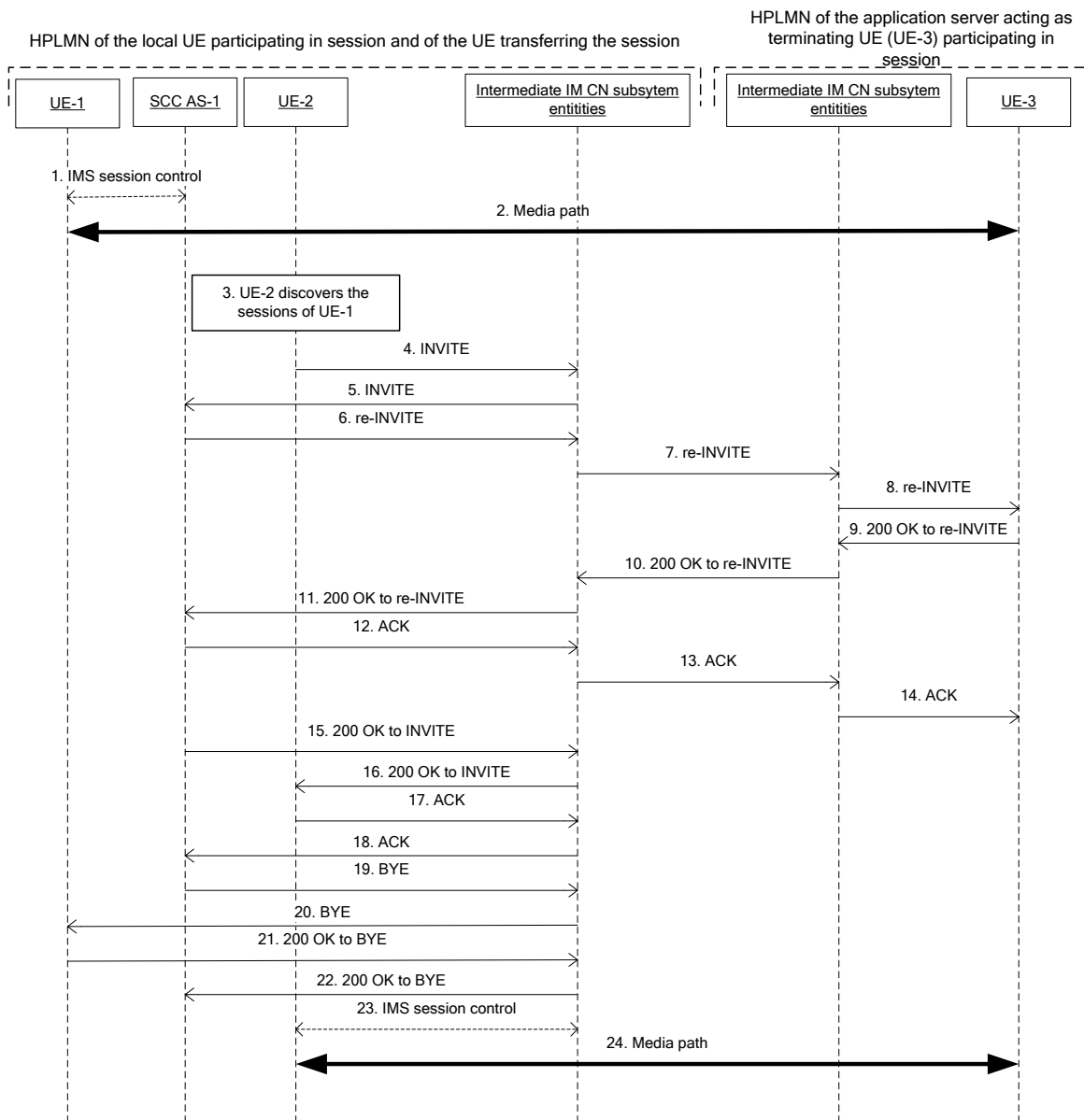
Figure 4.13.4.1.1.1-1: Signalling flow for inter UE transfer without collaborative session establishment triggered by UE not participating in the session

NOTE: For clarity, the SIP 100 (Trying) messages are not shown in the signalling flow.

1-2.   UE-1 is in session with UE-3

There is a multimedia session comprising audio and video media between the UE-1 and the remote UE-3 anchored at SCC AS-1. The dialog identifier of the session between SCC AS-1 and UE-1 is AB03a0s09a2sdfglkj490333, remote-tag=dfg45, local-tag=444.

3.   UE-2 discovers the sessions of UE-1 as shown in subclause 4.9

4-5.   SIP INVITE request (UE-2 to SCC AS-1) - see example in table 4.13.4.1.1.1-4

The UE-2 sends SIP INVITE request to transfer the session to the UE-2.

Table 4.13.4.1.1.1-4: SIP INVITE request

```
INVITE sip:sccas1@home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:fff]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Preferred-Identity: <sip:user2@home1.net>
From: <sip:user2@home1.net>;tag=171828
To: <sip:interUEtransfer@example.net>
Call-ID: tq34gasgaegr
Cseq: 4127 INVITE
Contact: <sip:user2@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-2222-222222222222>;+g.3gpp.icsi-
    ref="urn%3Aurn-7%3A3gpp-service.ims.icsi.iptv"
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Replaces: AB03a0s09a2sdfglkj490333;remote-tag=dfg45;local-tag=444
Require: replaces
Content-Type: application/sdp
Content-Length: (…)
Supported: 100rel, precondition

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:fff
s=
c=IN IP6 5555::aaa:bbb:ccc:fff
t=0 0
m=audio 3456 RTP/AVP 97 96
a=tcap:1 RTP/AVPF
a=pcfg:1 t=1
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:96 telephone-event
a=maxptime:20
m=video 3400 RTP/AVP 98 99
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos none remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

Replaces: set to the dialog information of the session to be transferred

6.-8.   SIP re-INVITE request (SCC AS-1 to UE3) –

Since the request is addressed to SCC AS-1 and since STI in the Replaces header field identifies an dialog anchored in the SCC AS-1, the SCC AS-1 detects that the inter UE transfer is being attempted, authorizes the request of behalf of UE-1, acts as a routing B2BUA and performs remote leg update by sending the SIP re-INVITE request towards the UE-3.

9-11.   SIP 200 (OK) response (UE-3 to intermediate IM CN subsystem entities)

Upon receiving the SIP re-INVITE request containing the SDP offer, since the UE-3 has all resources available, it sends immediately the SIP 200 (OK) response to the SIP re-INVITE request that contains the SDP answer. The SDP answer indicates that the resources are available.

12-14. SIP ACK request (SCC AS-1 to UE-3 via intermediate IM CN subsystem entities)

The SCC AS-1 generates the SIP ACK request to the SIP 200 (OK) response, and forwards the SIP ACK request to the remote UE-3.

15-16. SIP 200 (OK) response (SCC AS-1 to UE-2 via intermediate IM CN subsystem entities)

The SCC AS-1 generates the SIP 200 (OK) response to the SIP INVITE request, and forwards the SIP 200 (OK) response towards the UE-2.

17-18. SIP ACK request (UE-2 to SCC AS-1 via intermediate IM CN subsystem entities)

The UE-2 generates the SIP ACK request to the SIP 200 (OK) response.

19-20. SIP BYE request (SCC AS-1 to UE-1 via intermediate IM CN subsystem entities)

The SCC AS-1 terminates the source access leg by sending a BYE request to the UE-1.

21-22. SIP 200 (OK) response (UE-1 to SCC AS-1 via intermediate IM CN subsystem entities)

Upon receiving the BYE request, the UE-1 sends a SIP 200 (OK) response. Subsequently, the UE-1 releases all resources pertaining to the session.

23-24. UE-2 is now in session with UE-3

4.14 Execution of Supplementary Services

Editor's Note: This subclause corresponds to subclauses 6.1.3.5 of 3GPP TR 23.831 [3]

4.14.1 General

Only the supplementary services impacted by the Rel-10 IUT procedures are listed in the following subclause.

4.14.2 Procedures

4.14.2.1 Conference (CONF)

4.14.2.1.1 SC UE

The controller UE of an existing collaborative session may be invited by the remote party to a conference. In this case, the controller UE performs the same procedures as specified in subclause 4.14.2.2.1.

NOTE: The SIP URI in the Refer-To header field of the SIP REFER request received by the controller UE is the conference URI, which may not be aware by the controller UE. However, this does not affect the controller UE procedures.

4.14.2.1.2 SCC AS

The SCC AS performs the same procedures as specified in subclause 4.14.2.2.2.

NOTE: The SIP URI in the Refer-To header field of the SIP REFER request received by the SCC AS is the conference URI, which may not be aware by the SCC AS. However, this does not affect the SCC AS procedures.

4.14.2.2 Explicit Communication Transfer (ECT)

4.14.2.2.1 SC UE

As the transferor of the ECT service, only the controller UE can invoke the ECT service on behalf of the collaborative session and it shall send a SIP REFER request to the transferee as specified in TS 24.629 [18]. Upon receiving

notification that ECT has been performed successfully, the controller UE shall terminate the previous active session with the transferee UE by terminating all related media control sessions on the controllee UEs.

Upon receiving a SIP REFER request within an existing collaborative session containing:

1) the Referred-By header field set to the URI of the remote party; and

2) the Refer-To header field containing the "method" URI parameter set to INVITE or not including the "method" URI parameter,

the controller UE, if decides to continue using a collaborative session to communicate with the new remote party (i.e. transfer target), may send to the SCC AS a SIP INVITE request including:

1) the Request-URI set to the URI in the Refer-To header field of the SIP REFER request; and

2) the SDP information as follows:

   - for the media component(s) that are to be established on the controller UE containing the port number(s) of the controller UE; and

   - for the media component(s) that are to be established in the same controllee UE with the same port number(s) as in the original collaborative session.

The following procedures of the controller UE for establishing the collaborative session with the transfer target is the same as described in subclause 4.4.4.1.

4.14.2.2.2   SCC AS

Upon receiving a SIP REFER request from the controller UE with Request-URI containing URI not belonging to SCC AS, the SCC AS shall follow the procedures as specified in TS 24.229 [4].

Upon receiving a SIP REFER request from the controllee UE with Request-URI containing URI not belonging to SCC AS, the SCC AS shall reject the request.

Upon receiving from the remote party a SIP REFER request in the existing dialog for which a collaborative session is established in the local party and the SIP REFER request includes:

1) the Referred-By header field set to the URI of the remote party; and

2) the Refer-To header field containing the "method" URI parameter set to INVITE or not including the "method" URI parameter,

the SCC AS shall forward the SIP REFER request towards the controller UE using the procedures as specified in TS 24.229 [4].

Upon receiving a SIP INVITE request from the controller UE due to the SIP RFFER request and the SIP INVITE request includes:

1) the Request-URI set to the URI in the Refer-To header field of the SIP REFER request; and

2) the SDP information as follows:

   - for the media component(s) that are to be established on the controller UE containing the port number(s) of the controller UE; and

   - for the media component(s) that are to be established in the same controllee UE with the same port number(s) as in the original collaborative session,

the SCC AS shall establish a new collaborative session towards the new remote party (i.e. transfer target), using the procedure as described in subclause 4.4.4.1 with the following difference:

   - instead of sending a SIP INVITE request toward the controllee UE to establish a new access leg, the SCC AS may send a SIP re-INVITE request towards the controllee UE using the existing access leg between the controllee UE and the SCC AS, to update the SDP information over the access leg which is now bound to the new collaborative session.

NOTE 1: The SCC AS can not distinguish the SIP REFER request for ECT from the common SIP REFER request. However this does not affect the SCC AS procedures, i.e. the SCC AS can decide, based on the SIP INVITE request from the controller UE due to the SIP RFFER request, to reuse the existing access leg of the controllee UE for the new collaborative session.

NOTE 2: The SCC AS can decide the duration that it keeps the information of the SIP REFER request based on, e.g. the expiration time of the SIP REFER request (the Expires header field in the REFER request) and the duration of the implicit subscription created by the SIP REFER request ("expires" header field parameter in the Subscription-State header field in the first NOTIFY sent in the subscription) as specified in IETF RFC 3515 [8], so that the SIP INVITE request from controller UE can be associated with the SIP REFER request.

4.14.2.3 Customized Alerting Tones (CAT)

For Collaborative Sessions established concurrently with terminating IMS session setup, the CAT provided by the network (under the control of the SCC AS associated with the Controller UE) to the remote party is the CAT associated with the Controller UE.

4.14.2.4 Customized Ringing Signal (CRS)

For Collaborative Sessions established concurrently with terminating IMS session setup, the Customized Ringing Signal (CRS) provided to the Controller UE is the CRS associated with the remote party. For Collaborative Sessions established concurrently with originating IMS session setup, the CRS provided to the remote party is the CRS associated with the Controller UE.

4.14.3 Identified issues

4.14.4 Call flows

4.14.4.1 Explicit Communication Transfer (ECT)

4.14.4.1.1 Alternative1

Figure 4.14.4.1.1-1 describes how IMS blind ECT is performed when the controller UE is playing the role of transfer recipient. The controller UE-1 and controllee UE-2 are in a collaborative session with remote party UE-3 under the control of SCC AS, and the session is on held before transfer.
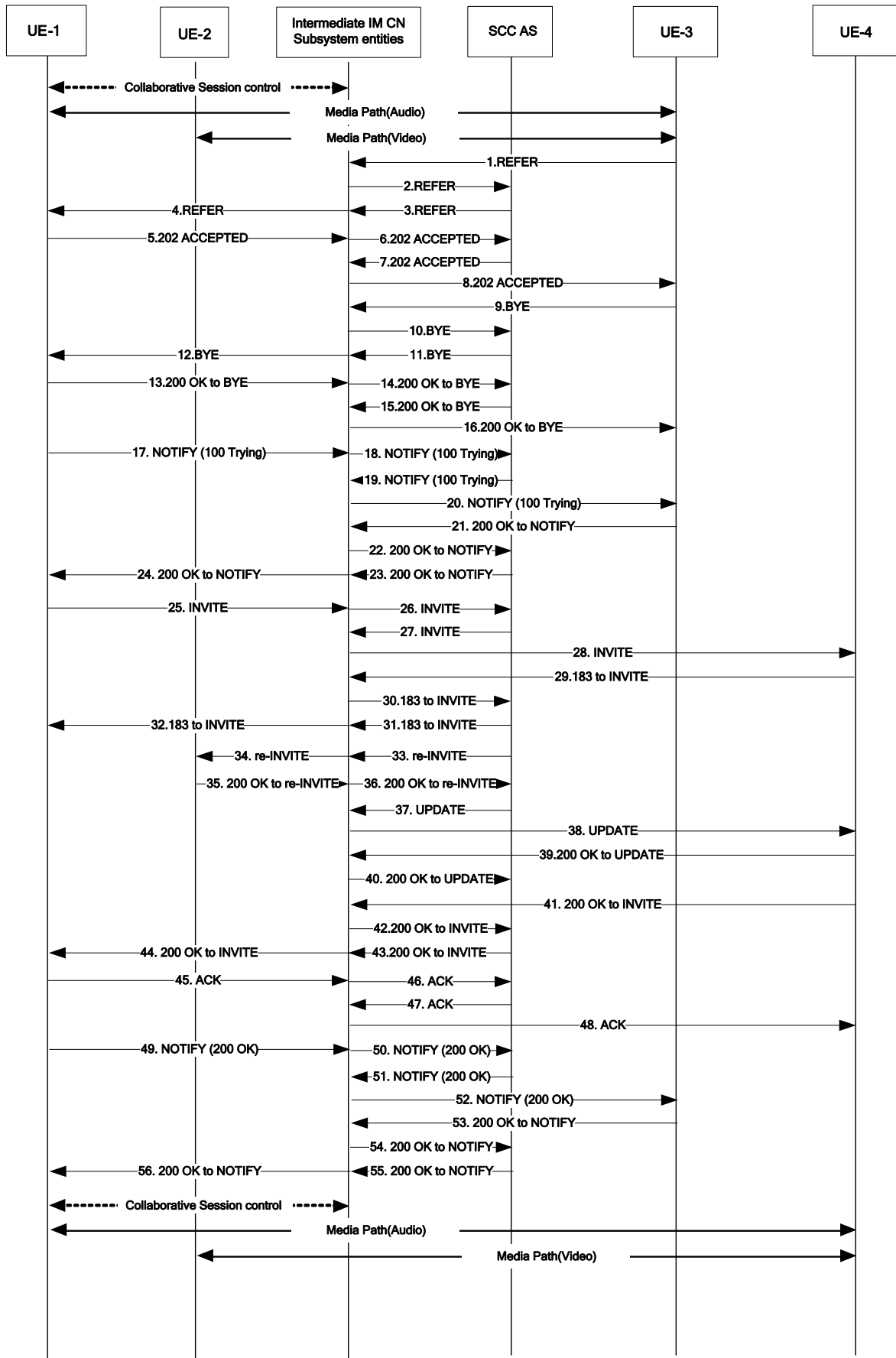
Figure 4.14.4.1.1-1: Signalling flow for the remote party initiate ECT service

NOTE: For clarity, the SIP 100 (Trying), SIP PRACK requests to 183 (Session Progress) responses and SIP 200 (OK) responses to SIP PRACK requests are not shown in the signalling flow.

1-2. SIP REFER request (remote UE-3 to SCC AS) – see example in table 4.14.4.1.1-1

It is assumed that controller UE, UE-1, and controllee UE, UE-2, are in a collaborative session with remote Party UE, UE-3, and the session is on held before transfer.

The UE-3 initiates transfer UE-1 to remote party UE, UE-4, as specified in TS 24.629 [18] by sending SIP REFER request To: UE-1 with Referred-To: UE-4, Referred-By: UE-3. The REFER request is send in the existing collaborative session.

Table 4.14.4.1.1-1: SIP REFER request (UE-3 to SCC AS)

```
REFER sip:user1@example1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6 SIP/2.0
Via:
To: sip:user1@example1.net;tag=abcdef
From: sip:user3@example1.net;tag=123456
Call-ID: cb03a0s09a2sdfglkj490333
CSeq: 93809824 REFER
Max-Forwards: 70
Refer-To: <sip:user4@example1.net >
Referred-By: sip: user3@example1.net
Accept: message/sipfrag
```

3-4. SIP REFER request (SCC AS to UE-1)

The SCC AS acknowledges the REFER message as a blind ECT transfer request for the UE-1 and sends the REFER to the UE-1.

5-6. SIP 202 (Accepted) response(UE-1 to SCC AS)

The UE-1 sends a SIP 202 (Accepted) response to SCC-AS as response to SIP REFER request

7-8. SIP 202 (Accepted) response(SCC AS to UE-3)

The SCC AS sends a SIP 202 (Accepted) response to UE-3 as response to the SIP REFER request

9-10. SIP BYE request (Remote UE-3 to SCC AS)

The UE-3 initiates the session release with the UE-1 by initiating a SIP BYE message to the SCC AS as specified in TS 24.629 [18]

11-12. SIP BYE request (SCC AS to UE-1)

The SCC AS only sends a SIP BYE request to UE-1, the media session between the UE-2 and the SCC AS is kept for further reuse.

13-14. SIP 200 (OK) response(UE-1 to SCC AS)

The UE-1 acknowledges the SIP BYE request by sending a SIP 200 (OK) response to the SCC AS.

15-16. SIP 200 (OK) response(SCC AS to UE-3)

The SCC AS acknowledges the SIP BYE request by sending a SIP 200 (OK) response to the UE-3.

17-18. SIP NOTIFY request (UE-1 to SCC AS)

UE-1 sends a NOTIFY request to SCC AS to indicate the progress of the REFER request processing.

19-20. SIP NOTIFY request (SCC AS to UE-3)

SCC AS sends a NOTIFY request to UE-3 to indicate the progress of the REFER request processing.

21-22. SIP 200 (OK) response to SIP NOTIFY request(UE-3 to SCC AS)

UE-3 responds to SCC AS with SIP 200 (OK) response.

23-24. SIP 200 (OK) response to SIP NOTIFY request (SCC AS to UE-1)

SCC AS responds to UE-1 with SIP 200 (OK) response.

25-26. SIP INVITE request (UE-1 to SCC AS)

The UE-1 sends SIP INVITE request to SCC AS to setup the collaborative session with the UE-4.

27-28. SIP INVITE request (SCC AS to UE-4)

SCC AS forwards the SIP INVITE request to UE-4.

29-30. SIP 183 (Session Progress) response to SIP INVITE request (UE-4 to SCC AS)

The UE-4 responds with SIP 183 (Session Progress) response containing the SDP answer of UE-4.

31-32. SIP 183 (Session Progress) response to SIP INVITE request (SCC AS to UE-1)

The SCC AS responds with SIP 183 (Session Progress) response containing the SDP answer of UE-4.

33-34. SIP RE-INVITE request (SCC AS to UE-2) – see example in table 4.14.4.1.1-33

Based on SIP REFER request received in step 2 and SIP INVITE request in step 18, which indicate the session is to be transferred and the video media is still to be terminated on UE-2, the SCC AS binds the existing access leg of UE-2 to the new collaborative session between UE-1 and UE-4, and reuses the existing access leg to send the SIP RE-INVITE request to UE-2.

Table 4.14.4.1.1-33: SIP INVITE request (SCC AS to UE-2)

```
INVITE   sip:user2@example1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6 SIP/2.0
Via:
Record-Route: sip:sccas1.home1.example.net
To: sip:user2@example1.net;tag=edfex
From: sip:interUEtransfer@example.net;tag=acegi
Call-ID:
CSeq: 127 INVITE
Max-Forwards:
Require:
Referred-By: sip: user1@example1.net
Contact:
Allow:
Content-Type: application/sdp
Content-Length:(…)

v=0
o=- 1027933615 1027933615 IN IP4 192.0.2.23
s=-
t=0 0
m=audio 0 RTP/AVP 0 8 3
m=video 4390 RTP/AVP 34
a= sendrecv
c=IN IP4 192.0.2.23
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

Editor's Note: Whether containing the "Referred-by" header in the INVITE request to indicate the request comes from the controller UE is FFS.

35-36. SIP 183 (Session Progress) response to SIP RE-INVITE request (UE-2 to SCC AS)

UE-2 sends the SIP 183 (Session Progress) response towards SCC AS containing the SDP answer of UE-2.

37-38. SIP UPDATE request (SCC AS to UE-3)- see example in table 4.14.4.1.1-37

SCC AS sends SIP UPDATE request to UE-4 to update the media in UE-4.

Table 4.14.4.1.1-37: SIP UPDATE request (SCC AS to remote UE)

```
UPDATE sip:user4@example1.net SIP/2.0
Via:
To: sip:user4@example1.net;tag = 66666
From: sip:interUEtransfer@example.net; tag=33333
Call-ID:
CSeq: 128 UPDATE
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 1300 RTP/AVP 96 97
c=IN IP4 123.45.67.89
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 145.23.77.88
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

39-40. SIP 200 (OK) response to SIP UPDATE request(UE-4 to SCC AS)

The remote UE-4 responds with SIP 200 (OK) response.

41-42. SIP 200 (OK) response to SIP INVITE request(UE-4 to SCC AS)

The remote UE-4 responds with SIP 200 (OK) response.

43-44. SIP 200 (OK) response to SIP INVITE request(SCC AS to UE-1)

The SCC AS responds with SIP 200 (OK) response.

46-46. SIP ACK request (UE-1 to SCC AS)

UE-1 sends the SIP ACK request to confirm the establishment of call to SCC AS.

47-48. SIP ACK request (SCC AS to UE-4)

SCC AS sends SIP ACK request to the UE-4.

49-50. SIP NOTIFIY request (UE-1 to SCC AS)

UE-1 sends SIP NOTIFIY request to SCC AS to notify the session between the UE-1 and UE-4 has been established.

51-52. SIP NOTIFIY request (SCC AS to UE-3)

SCC AS sends SIP NOTIFIY request to UE-3 to notify the session between the UE-1 and UE-4 has been established.

53-54. SIP 200 (OK) reponse to SIP NOTIFY request (UE-3 to SCC AS)

UE-3 responds to SCC AS with SIP 200 (OK) response.

55-56. SIP 200 (OK) reponse to SIP NOTIFY request (SCC AS to UE-1)

SCC AS sends the SIP 200 (OK) response to UE-1.4.14.4.2   Conference (CONF)

4.14.4.2.1   Alternative1

Figure 4.14.4.2.1-1 shows the remote party invoked the conferencing service. UE-1 and UE-2 are in a collaborative session with remote party under the control of SCC AS before the remote party invites UE-1, the controller UE, to a conference.
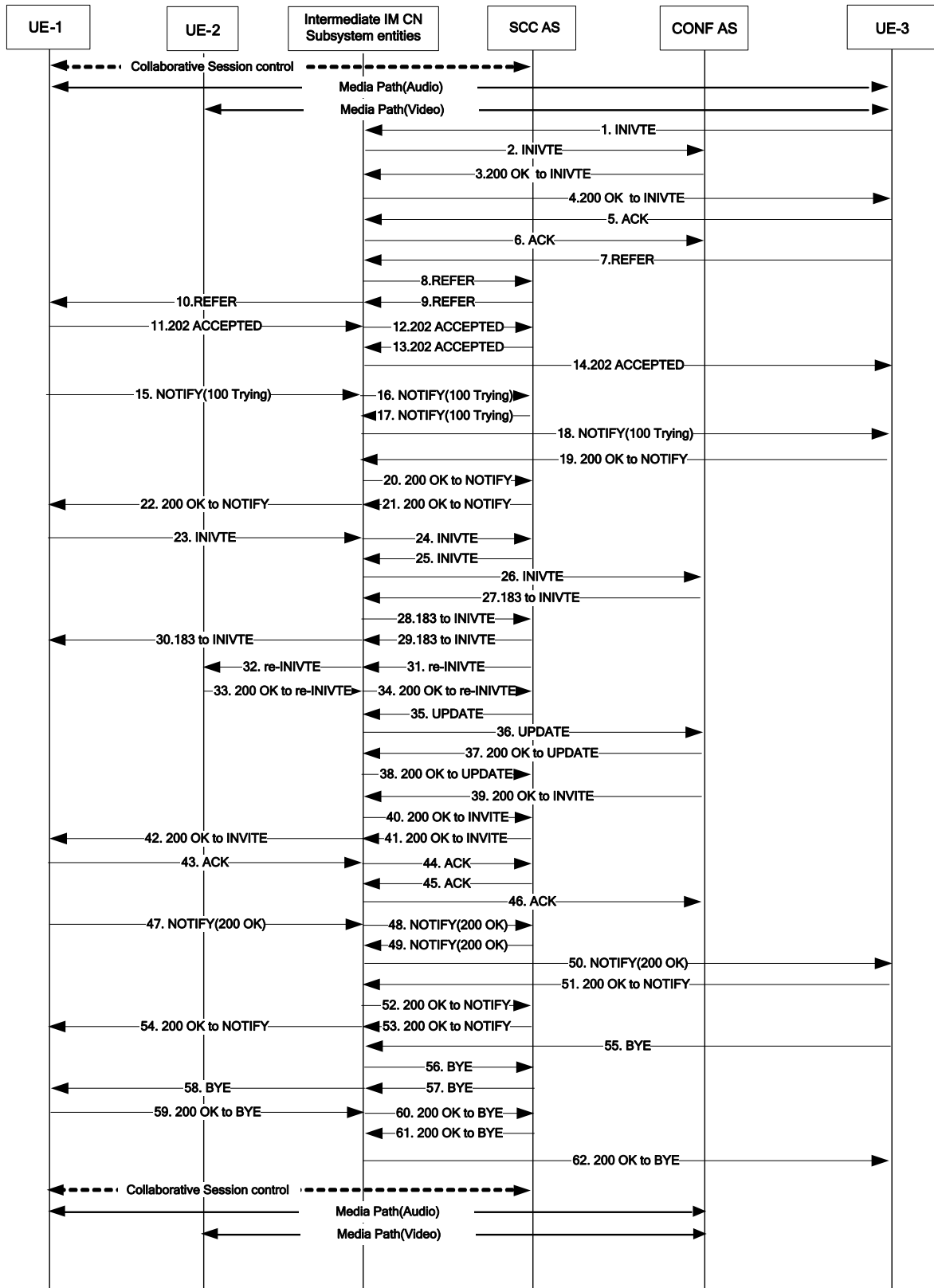
Figure 4.14.4.2.1-1: Signalling flow for the remote party initiated conferencing service

NOTE: For clarity, the SIP 100 (Trying), SIP PRACK requests to SIP 183 (Session Progress) responses and SIP 200 (OK) responses to PRACK requests are not shown in the signalling flow.

1-2. SIP INVITE request (remote UE-3 to conferencing AS)

The remote UE-3 initiates a conferencing session with a conferencing AS by sending a SIP INVITE request as specified in TS 24.605 [17]

3-4. SIP 200 (OK) response (UE-3 to conferencing AS)

The conferencing AS acknowledges the conference establishment request by sending a SIP 200 (OK) response to the SCC AS. The conference URI is contained in the response.

5-6. SIP ACK request (UE-3 to conferencing AS)

The UE-3 sends SIP ACK request to the conferencing AS.

7-8. SIP REFER request (remote UE-3 to SCC AS) – see example in table 4.14.4.2.1-7

The UE-3 initiates transfer UE-1 to the conferencing AS, by sending SIP REFER request To: UE-1 with Referred-To: conference URI, Referred-By: UE-3. The REFER request is sent in the existing session with SCC AS.

Table 4.14.4.2.1-7: SIP REFER request (UE-3 to SCC AS)

```
REFER sip:user1@example1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6 SIP/2.0
Via:
To: sip:user1@example1.net;tag=abcdef
From: sip:user3@example1.net;tag=123456
Call-ID: cb03a0s09a2sdfglkj490333
CSeq: 93809824 REFER
Max-Forwards: 70
Require: 100rel
Refer-To: <sip:confenrece1@example1.net >
Referred-By: sip: user3@example1.net
Accept: message/sipfrag
```

9-10. SIP REFER request (SCC AS to UE-1)

The SCC AS acknowledges the REFER message as a conference invitation request for the UE-1 and sends the REFER to the UE-1.

11-12. SIP 202 (Accepted) response(UE-1 to SCC AS)

The UE-1 sends a SIP 202 (Accepted) response to SCC-AS as response to SIP REFER request

13-14. SIP 202 (Accepted) response(SCC AS to UE-3)

The SCC AS sends a SIP 202 (Accepted) response to UE-3 as response to the SIP REFER request

15-16. SIP NOTIFY request (UE-1 to SCC AS)

UE-1 sends a NOTIFY request to SCC AS to indicate the progress of the REFER request processing.

17-18. SIP NOTIFY request (SCC AS to UE-3)

SCC AS sends a NOTIFY request to UE-3 to indicate the progress of the REFER request processing.

19-20. SIP 200 (OK) response to SIP NOTIFY request(UE-3 to SCC AS)

UE-3 responds to SCC AS with SIP 200 (OK) response.

21-22. SIP 200 (OK) response to SIP NOTIFY request (SCC AS to UE-1)

SCC AS responds to UE-1 with SIP 200 (OK) response.

23-24. SIP INVITE request (UE-1 to SCC AS)

The UE-1 sends a SIP INVITE request towards the SCC AS to setup the collaborative session.

25-26. SIP INVITE request (SCC AS to conferencing AS)

SCC AS forwards the SIP INVITE request to conferencing AS.

27-28. SIP 183 (Session Progress) response to SIP INVITE request (conferencing AS to SCC AS)

The conferencing AS responds with SIP 183 (Session Progress) response containing the SDP answer of conferencing AS.

29-30. SIP 183 (Session Progress) response to SIP INVITE request (SCC AS to UE-1)

The SCC AS sends to UE-1 the SIP 183 (Session Progress) response containing the SDP answer of conferencing AS.

31-32. SIP RE-INVITE request (SCC AS to UE-2) – see example in table 4.14.4.2.1-23

Based on SIP REFER request received in step 8 and SIP INVITE request in step 16, which indicate the session is to be transferred to the conferencing AS and the video media is still to be terminated on UE-2, the SCC AS binds the existing access leg between the SCC AS and UE-2 to the new collaborative session between UE-1 and the conferencing AS, and reuses the existing access leg to send the SIP RE-INVITE request to UE-2.

Table 4.14.4.2.1-23: SIP INVITE request (SCC AS to UE-2)

```
INVITE    sip:user2@example1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91e6bf6 SIP/2.0
Via:
Record-Route: sip:sccas1.home1.example.net
To: sip:user2@example1.net;tag=edfex
From: sip: interUEtransfer@example.net;tag=acegi
Call-ID:
CSeq: 127 INVITE
Max-Forwards:
Require:
Referred-By: sip:user1@example1.net
Contact:
Allow:
Content-Type: application/sdp
Content-Length:(…)

v=0
o=- 1027933615 1027933615 IN IP4 192.0.2.23
s=-
t=0 0
m=audio 0 RTP/AVP 0 8 3
m=video 4390 RTP/AVP 34
a=sendrecv
c=IN IP4 192.0.2.23
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

Editor's Note: Whether containing the "Referred-by" header in the INVITE request to indicate the request comes from the controller UE is FFS.

33-34. SIP 183 (Session Progress) response to SIP RE-INVITE request (UE-2 to SCC AS)

UE-2 sends the SIP 183 (Session Progress) response towards SCC AS containing the SDP answer of UE-2.

35-36. SIP UPDATE request (SCC AS to UE-3)- see example in table 4.14.4.2.1-27

SCC AS sends SIP UPDATE request to conferencing AS to update the media in conferencing AS.

Table 4.14.4.2.1-27: SIP UPDATE request (SCC AS to conferencing AS)

```
UPDATE sip:conference1@example1.net SIP/2.0
Via:
To: sip:conference1@example1.net;tag = 66666
From: sip:interUEtransfer@example.net; tag=33333
Call-ID:
CSeq: 128 UPDATE
Max-Forwards:
P-Asserted-Identity:
Require:
Contact: sip:user1_public1@home1.net;gr=urn:uuid:f81d4fae-7dec-11d0-a765-00a0c91ewxyz
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 1027933615 1027933615 IN IP4 123.45.67.89
s=-
t=0 0
m=audio 49170 RTP/AVP 96 97
c=IN IP4 123.45.67.89
b=AS:25.4
a=rtpmap:96 AMR
a=fmtp:96 mode-set=0,2,5,7; mode-change-period=2
a=rtpmap:97 telephone-event
a=maxptime:20
m=video 1302 RTP/AVP 98 99
c=IN IP4 145.23.77.88
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
a=rtpmap:99 MP4V-ES
```

37-38. SIP 200 (OK) response to SIP UPDATE request(conferencing AS to SCC AS)

The conferencing AS responds with SIP 200 (OK) response.

39-40. SIP 200 (OK) response to SIP INVITE request(conferencing AS to SCC AS)

The conferencing AS responds with SIP 200 (OK) response.

41-42. SIP 200 (OK) response to SIP INVITE request(SCC AS to UE-1)

The SCC AS responds with SIP 200 (OK) response.

43-44. SIP ACK request (UE-1 to SCC AS)

UE-1 sends the SIP ACK request to confirm the establishment of call to SCC AS.

45-46. SIP ACK request (SCC AS to UE-4)

SCC AS sends SIP ACK request to the conferencing AS.

47-48. SIP NOTIFY request (UE-1 to SCC AS)

UE-1 sends a NOTIFY request to UE-3 to indicate that it has finished action required

49-50. SIP NOTIFY request (SCC AS to UE-3)

UE-1 sends a NOTIFY request to UE-3 to indicate that it has finished action required

51-52. SIP 200 (OK) response to SIP NOTIFY request(UE-3 to SCC AS)

The UE-3 responds with SIP 200 (OK) response.

53-54. SIP 200 (OK) response to SIP INVITE request(conferencing AS to SCC AS)

The UE-3 responds with SIP 200 (OK) response.

55-56. SIP BYE request (remote UE-3 to SCC AS)

The UE-3 initiates the session release with the UE-1 by initiating a SIP BYE message to the SCC AS

57-58. SIP BYE request (SCC AS to UE-1)

The SCC AS only sends a SIP BYE request to UE-1, the media session between the UE-2 and the SCC AS is kept for further reuse.

59-60. SIP 200 (OK) response(UE-1 to SCC AS)

The UE-1 acknowledges the SIP BYE request by sending a SIP 200 (OK) response to the SCC AS.

61-62. SIP 200 (OK) response(SCC AS to UE-3)

The SCC AS acknowledges the SIP BYE request by sending a SIP 200 (OK) response to the UE-3.

5 Protocol evaluation

5.1 General

5.2 Evaluation of solutions for inter-UE transfer and collaborative session procedures for UEs belonging to different IMS subscriptions under the same operator

5.2.1 Conclusion

The decision of the CT1 working group is that the procedures as described in subclause 4.2.2.1 will be specified in normative specifications in release 10.

5.3 Discovery of UEs of different IMS subscriptions which can participate in collaborative sessions

5.3.1 Conclusion

The decision of the CT1 working group is that no specific additional procedures need to be described in Rel-10 for the discovery of UEs of different IMS subscriptions which can participate in collaborative sessions.

5.4 Evaluation of solutions for establishment of collaborative session upon session setup

5.4.0 Conclusion

For the originating case, the decision of the CT1 working group is that the procedures as described in subclauses 4.4.2.1.1.1, 4.4.2.1.1.2, 4.4.2.1.3A and 4.4.2.1.4 will NOT be specified in normative specifications in release 10.

For the terinating case, the decision of the CT1 working group is that the procedures as described in subclauses 4.4.2.2.1 and 4.4.2.2.3 will NOT be specified in normative specifications in release 10.

For the originating case, the decision of the CT1 working group is that the procedures as described in subclause 4.4.2.1.1.2 will be specified in normative specifications in release 10.

For the terminating case, the decision of the CT1 working group is that the procedures as described in subclause 4.4.2.2.4 will be specified in normative specifications in release 10.

5.4.1 Evaluation of solutions for establishment of collaborative session upon originating session setup

5.4.1.1 Pros and cons of alternative1 - indicating collaborative session establishment by providing controllee UE SIP URI in SDP

Advantages:

- Media information is kept in one place;

Disadvantages:

- The impact to PCC is FFS.

5.4.1.2 Pros and cons of alternative2 - indicating collaborative session establishment by multipart/related Content-Type parameter

Advantages:

Disadvantages:

5.4.1.3 Pros and cons of alternative 3 – indicating collaborative session establishment by providing controllee UE SIP URI in SDP using P-Asserted-Identity

Advantages:

- Media information is kept in one place;

Disadvantages:

- The impact to PCC is FFS.

5.4.2.2 Evaluation of procedures for establishment of collaborative session upon terminating IMS session setup

5.4.2.2.1 Pros and Cons of Alternative 1 – indicating collaborative session establishment by providing controllee UE SIP URI in SDP

Advantages:

- Media information is kept in one place.

Disadvantages:

- The impact to PCC is FFS.

5.4.2.2.2 Pros and Cons of Alternative 2 – indicating collaborative session establishment by multipart/related Content-Type parameter

Advantages:

Disadvantages:

5.4.2.2.3 Pros and Cons of Alternative 3 – indicating collaborative session establishment by SIP REFER request before SIP 200 (OK) response

Advantages:

Disadvantages:

5.4.2.2.4 Pros and Cons of Alternative 4 – Using SIP 300 (Multiple Choices) response

Advantages:

Disadvantages:

5.5 Evaluation of solutions for transfer of control of a collaborative session

5.5.1 Conclusion

For the indication whether a controller capable UE wants to be a controller, the decision of the CT1 working group is that the procedures as described in subclause 4.5.2.1.1 will NOT be specified in normative specifications in release 10.

For the indication that other UE is requested to become a controller, the decision of the CT1 working group is that the procedures as described in subclauses 4.5.2.2.1, 4.5.2.2.3 and 4.5.2.2.4 will NOT be specified in normative specifications in release 10.

For the indication to another UE that it is requested to become a controller, the decision of the CT1 working group is that the procedures as described in subclauses 4.5.2.3.3 and 4.5.2.3.4 will NOT be specified in normative specifications in release 10.

For the indication of acceptance of becoming a controller, the decision of the CT1 working group is that the procedures as described in subclause 4.5.2.4.2 will NOT be specified in normative specifications in release 10.

For the indication that another UE has become controller UE, the decision of the CT1 working group is that the procedures as described in subclauses 4.5.2.5.2 and 4.5.2.5.3.2 will NOT be specified in normative specifications in release 10.

For the transfer of control of a collaborative session feature, the decision of the CT1 working group is that the procedures as described in subclauses 4.5.2.1.3, 4.5.2.2.2.4, 4.5.2.3.2.4, 4.5.2.4.3 and 4.5.2.5.3.3 will be specified in normative specifications in release 10.

5.5.2 Evaluation of procedures for transfer of control of a collaborative session

5.5.2.1 Indicating whether Controller UE wishes to remain a controller of the collaborative Session

5.5.2.1.1 Pros and Cons of Alternative 1 – Indicating whether Controller UE wishes to remain a controller of the collaborative Session using the iut-controller media feature tag

Advantages:

- Uses existing Release-9 iut-controller media feature tag

- Backward compatible with Release-9 Controller assignment (i.e. the iut-controller media feature tag is already included in the REFER request by release 9 IUT UEs)

Disadvantages:

- If the iut-controller media feature-tag is used it could be considered to overload the release 9 semantics of this feature tag could be considered to overload the release 9 semantics of this feature tag

5.5.2.1.2 Pros and Cons of Alternative 2 – Indicating whether Controller UE wishes to remain a controller of the collaborative Session using an XML body

Advantages:

- Backward compatible with Rel-9 controller assignment (i.e. the SIP INFO request for control transfer will be ignored by Rel-9 equipment)

Disadvantages:

5.5.2.1.3 Pros and Cons of Alternative 3 – Indicating whether Controller UE wishes to be the controller of the collaborative session using a new media feature tag

Advantages:

- Does not overload the release 9 semantics of an existing media feature tag.

Disadvantages:

- Backward compatibility with Release-9 Controller assignment is a little harder to achieve as Release 9 IUT UEs will not include this feature tag. The absence of the feature tag has to be considered to requesting to maintain control.

5.5.2.2 Identifying that another UE is requested to become a controller of the collaborative session

5.5.2.2.1 Pros and Cons of Alternative 1 – Identifying a new controller UE using SIP REFER with method= REFER

Advantages:

- Follows existing Rel-9 mechanism for media transfer

- Allows for controller and media transfer in a single request

Disadvantages:

- Based on special semantics for REFER

5.5.2.2.2 Pros and Cons of Alternative 2 - Identifying a new controller UE using an XML Body

Advantages:

- XML body format is flexible (we can define exactly what we need) including identifying which entities are terminating which media components

Disadvantages:

5.5.2.2.2.1 General

5.5.2.2.2.2 Pros and Cons of Alternative 2A - Identifying a new controller UE using SIP INFO

Advantages:

- SIP INFO request can also be used for requesting a UE to assume the controller role

Disadvantages:

- Requires two separate requests for media transfer and controller transfer

- New Controller UE needs to also receive Media Descriptions for collaborative session

- Requires to define new Info Package

5.5.2.2.2.3 Pros and Cons of Alternative 2B - Identifying a new controller UE using an Event Package

Advantages:

- Events mechanism provides consistent framework for identifying new controller and notification of changes of controller and controllee.

Disadvantages:

- Requires two separate requests for media transfer and controller transfer

- New Controller UE needs to also receive Media Descriptions for collaborative session

- Significant messaging overhead using Events Mechanism

- Requires an RFC to define an Event Package.

5.5.2.2.2.4 Pros and Cons of Alternative 2C - Identifying a new controller UE using XML embedded in Refer-To URI

Advantages:

- Control transfer can be done in the same SIP REFER request between controller UE and SCC AS as is used for requesting media transfer

- Aligns with release 9 Collaborative Session participant assignment mechanism (compatible with use of INVITE)

Disadvantages:

- Probably requires Multipart MIME support in Controllee UE in order to include in INVITE along with SDP.

5.5.2.2.3 Pros and Cons of Alternative 3 - Identifying a new controller UE using a SIP header field

Advantages:

- Complete standardised solution

- Control transfer can be done in the same SIP REFER request between controller UE and SCC AS as is used for requesting media transfer

Disadvantages:

- Requires going through the IETF process for defining a new SIP header field.

5.5.2.2.4 Pros and Cons of Alternative 4 - Identifying a new controller UE using Accept-Contact in the Refer-To URI

Advantages:

- Use of a media feature tag. in an Accept-Contact header in the Refer-To URI is an efficient solution that aligns well semantically with other application level invocation functions

- Control transfer can be done in the same SIP REFER request between controller UE and SCC AS as is used for requesting media transfer

Disadvantages:

- If the iut-controller media feature-tag is being used it could be considered to overload the release 9 semantics of this feature tag

5.5.2.3   Indicating to another UE that it is requested to become a controller of the collaborative Session

5.5.2.3.1   General

5.5.2.3.2   Pros and Cons of Alternative 1 – Requesting a UE to become a controller UE using an XML Body

Advantages:

-   XML body format is flexible (we can define exactly what we need) including identifying which entities are terminating which media components

Disadvantages:

5.5.2.3.2.1   General

5.5.2.3.2.2   Pros and Cons of Alternative 1A - Assigning a new controller UE using SIP INFO

Advantages:

-   INFO package can be used for multiple functions such as indicating which UE to assume the controller role

Disadvantages:

-   Requires two separate requests for media transfer and controller transfer

-   New Controller UE needs to also receive Media Descriptions for collaborative session

-   Requires to define new INFO Package

5.5.2.3.2.3   Pros and Cons of Alternative 1B - Assigning a new controller UE using an Event Package

Advantages:

-   Events mechanism provides consistent framework for identifying new controller and notification of changes of controller and controllee.

Disadvantages:

-   Requires two separate requests for media transfer and controller transfer

-   Significant messaging overhead using Events Mechanism

-   Requires an RFC to define an Event Package.

5.5.2.3.2.4   Pros and Cons of Alternative 1C - Assigning a new controller UE using XML Body as a MIME type in the request

Advantages:

-   Control transfer can be done in the same SIP REFER request between controller UE and SCC AS as is used for requesting media transfer

-   Aligns with release 9 Collaborative Session participant assignment mechanism (compatible with use of INVITE)

Disadvantages:

-   Probably requires Multipart MIME support in Controllee UE in order to include in INVITE along with SDP.

5.5.2.3.3 Pros and Cons of Alternative 2 – Requesting a UE to become a controller UE using a SIP header field

Advantages:

- Complete standardised solution

- Control transfer can be done in the same SIP INVITE request between SCC AS and controllee UE is used for effecting as media transfer

Disadvantages:

- Requires going through the IETF process for defining a new SIP header field.

5.5.2.3.4 Pros and Cons of Alternative 3 – Requesting a UE to become a controller UE using a media feature tag in an Accept-Contact header field

Advantages:

- Use of a media feature tag in an Accept-Contact header field is an efficient solution that aligns well semantically with other application level invocation functions

- Control transfer can be done in the same SIP INVITE request between SCC AS and controllee UE as is used for effecting media transfer

Disadvantages:

- If the iut-controller media feature-tag is being used it could be considered to overload the release 9 semantics of this of this feature tag

5.5.2.4 Indicating acceptance of becoming a controller of the collaborative session

5.5.2.4.1 Pros and Cons of Alternative 1 – Indicating acceptance of becoming a controller using an XML Body

Advantages:

- XML body format is flexible (we can define exactly what we need) including identifying which entities are terminating which media components

Disadvantages:

5.5.2.4.1.1 General

5.5.2.4.1.2 Pros and Cons of Alternative 1A – Indicating acceptance of becoming a controller using an XML Body in SIP 200 (OK) response

Advantages:

- No additional messages exchanged

Disadvantages:

5.5.2.4.1.3 Pros and Cons of Alternative 1B – Indicating acceptance of becoming a controller using an XML Body in SIP INFO request

Advantages:

- INFO package can be used for multiple functions such as indicating which UE to assume the controller role

Disadvantages:

- Requires to define new INFO Package

5.5.2.4.2 Pros and Cons of Alternative 2 – Indicating acceptance of becoming a controller using a SIP header field

Advantages:

- Complete standardised solution

- Control transfer can be done without additional messages when combined with media transfer

Disadvantages:

- Requires going through the IETF process for defining a new SIP header field.

5.5.2.4.3 Pros and Cons of Alternative 3 – Indicating acceptance of becoming a controller using a new feature tag

Advantages:

- Use of a media feature tag is an efficient solution that aligns well semantically with other application level invocation functions

- Control transfer can be done without additional messages when combined with media transfer

Disadvantages:

5.5.2.5 Informing that another UE has become a controller of the collaborative session

5.5.2.5.1 Pros and Cons of Alternative 1 – Informing that another UE has become a controller UE using an XML Body

Advantages:

- XML body format is flexible (we can define exactly what we need) including identifying which entities are terminating which media components

Disadvantages:

5.5.2.5.1.1 General

5.5.2.5.1.2 Pros and Cons of Alternative 1A - Informing that another UE has become a controller UE using SIP INFO

Advantages:

- INFO package can be used for multiple functions such as indicating which UE to assume the controller role

Disadvantages:

- Requires additional messages when combined with media transfer

- Requires to define new INFO Package

5.5.2.5.1.3 Pros and Cons of Alternative 1B - Informing that another UE has become a controller UE using a new Event Package

Advantages:

- Events mechanism provides consistent framework for identifying new controller and notification of changes of controller and controllee.

Disadvantages:

- Requires additional messages when combined with media transfer

- Significant messaging overhead using Events Mechanism

- Requires an RFC to define an Event Package.

5.5.2.5.2 Pros and Cons of Alternative 2 – Informing that another UE has become a controller UE using a SIP header field

Advantages:

- Complete standardised solution

Disadvantages:

- Requires going through the IETF process for defining a new SIP header field.

5.5.2.5.3 Pros and Cons of Alternative 3 – Informing that another UE has become a controller UE using a SIPfrag in an event package

Advantages:

- Use of a SIPfrag is already included in release 9

Disadvantages:

- Significant messaging overhead using Event Mechanism

5.5.2.5.3.1 Pros and Cons of Alternative 3A - Informing that another UE has become a controller UE using a SIPfrag of the XML body in the response

Advantages:

- XML body format is flexible (we can define exactly what we need) including identifying which entities are terminating which media components

Disadvantages:

5.5.2.5.3.2 Pros and Cons of Alternative 3B - Informing that another UE has become a controller UE using a SIPfrag of the new header field

Advantages:

- Complete standardised solution

Disadvantages:

- Requires going through the IETF process for defining a new SIP header field.

5.5.2.5.3.3 Pros and Cons of Alternative 3C - Informing that another UE has become a controller UE using a SIPfrag of a feature tag in the Contact header field

Advantages:

- Use of a media feature tag is an efficient solution that aligns well semantically with other application level invocation functions

Disadvantages

5.6 Evaluation of solutions for media flows transfer

5.6.1 Evaluation of solution for media flows transfer by the target UE

5.6.0 Conclusion

For the media flows transfer initiated by a UE not participating in the ongoing collaborative session, the decision of the CT1 working group is that the procedures as described in subclause 4.6.2.1.1.2 will NOT be specified in normative specifications in release 10.

For the media flows transfer initiated by a UE not participating in the ongoing collaborative session - media on controllee UE, the decision of the CT1 working group is that the procedures as described in subclause 4.6.2.1.1a.2 will NOT be specified in normative specifications in release 10.

For the media flows transfer initiated when no collaborative session has been established, the decision of the CT1 working group is that the procedures as described in subclause 4.6.2.1.2.2 will NOT be specified in normative specifications in release 10.

For the media flows transfer initiated by a controllee UE of an ongoing collaborative session, the decision of the CT1 working group is that the procedures as described in subclause 4.6.2.1.3.2 will NOT be specified in normative specifications in release 10.

For the controllee UE initiated addition of media to another controllee UE, the decision of the CT1 working group is that the procedures as described in subclause 4.6.2.2.2.1 will be specified in normative specifications in release 10.

For the media flows transfer feature, the decision of the CT1 working group is that the procedures as described in subclauses 4.6.2.1.1.1, 4.6.2.1.1a.1, 4.6.2.1.2.1, 4.6.2.1.3.1, 4.6.2.2.2.1 will be specified in normative specifications in release 10.

5.6.1.1 Pros and Cons of Alternative 1 (SIP REFER with media feature tag)

Advantages:

- Same solution for both same subscription and different subscription

- No need to know beforehand the hosting address of the SCC AS in another domain in the case of different subscription

- The UE requesting the media flow transfer is informed the result of IUT after completion

Disadvantages:

- Require another separate signalling than the SIP REFER signalling itself in order for the controller UE to be able to authorize the media flows transfer if authorization is to be performed by the controller UE

- Require the Subscribe/Notify mechanism to inform the result of IUT to controller UE.

5.6.1.2 Pros and Cons of Alternative 2 (SIP REFER with method=REFER)

Advantages:

- Same solution for both same subscription and different subscription

- Most efficient for authorization: does NOT require another separate signalling than the SIP REFER signalling itself in order for the controller UE to be able to authorize the media flows transfer if authorization is to be performed by the controller UE

- No need to know beforehand the hosting address of the SCC AS in another domain in the case of different subscription

- Controller UE knows the result of IUT. No need the Subscribe/Notify mechanism to inform the result of IUT to controller UE.

Disadvantages:

- The UE requesting the media flow transfer is not informed the result of IUT after completion

5.6.1.3 Pros and Cons of Alternative 3 (based on SIP re-INVITE request)

Advantages:

- The UE requesting the media flow transfer is informed the result of IUT after completion

Disadvantages:

- Require another separate signalling than the SIP REFER signalling itself in order for the controller UE to be able to authorize the media flows transfer if authorization is to be performed by the controller UE

- Require the Subscribe/Notify mechanism to inform the result of IUT to controller UE

5.7 Evaluation of solutions for session replication

5.7.1 Evaluation of solutions for session replication by the SCC AS – pull mode

5.7.1.1 General

The following subclauses evaluate the protocol solutions for identifying Inter-UE transfer requests for media or session replication by the SCC AS as described in subclause 4.7.1.1, providing advantages and disadvantages for each solution.

5.7.1.2 New SDP attribute to indicate replication of media component

Advantages:

- since replication is an action on the media, it makes sense to include an indication in the SDP rather than in the SIP message headers.

- it is possible to apply semantics to the session level usage and media level usage of the attribute to distinguish replication of a session, including signalling, compared with replication of specific media flows.

- extending the attributes requires no further specification in IETF, with only IANA registration of the attribute.

Disadvantages:

- An indication in the SDP does not provide a immediate distinction of requests for replication within the SIP header fields.

5.7.1.3 New SIP header field, "Replicate", to distinguish a request for replication

Advantages:

- explicitly identifies the session to be replicated as well as distinguishing requests for replication

Disadvantages:

- may require further specification in IETF and thus may not be a stable solution for release 10

5.7.1.4 New XML body for session and media flow replication

Editor's Note: No protocol solution is currently available to evaluate. If no protocol solution is provided, this subclause can be removed.

5.7.1.5 New media feature tag g.3gpp.iut.replicator in Accept-Contact header field

Advantages:

- The feature tag can be extended to provide more instructions to the network on which media flows are to be replicated.

Disadvantages:

- In conventional usage of media feature tags, such tags are normally registered by UAs. When used by a calling party in the Accept-Contact header field, it intends to reach a UA which has the capabilities that are described by the included feature-tags. In the case of replication, and the use of g.3gpp.iut.replicator, it does not appear to be used for target selection, but as a request for the network or endpoint to perform a specific set of procedures, i.e., replication.

- Therefore, this proposal can be considered to not fit in line with the semantics of the Accept-Contact header.

5.7.1.6 Conclusion on identifying requests for replication by the SCC AS

Based upon the evaluations that have been carried out in the above subclauses, a new SDP attribute is chosen as the working solution for identifying requests for replication by the SCC AS. Thus, the presence of the attribute as specified in subclause 4.7.2.1.1, in the SDP at either a session level or at a media level, identifies that the SIP request is a request for replication by the SCC AS of a session or some or all media components of a session towards another UE.

5.7.2 Evaluation of solutions for session replication by the SCC AS – push mode

Refer to subclause 5.7.1. The evaluations and conclusions in subclause 5.7.1 equally apply to the case for session replication by the SCC AS – push mode.

5.7.3 Evaluation of solutions for session replication by remote UE – pull mode

5.7.3.0 Conclusion

The decision of the CT1 working group is that the alternative 1A (as described in subclause 4.7.2.3.1A) will be specified in normative specifications in release 10.

5.7.3.1 Pros and cons of alternative 1 (as described in subclause 4.7.2.3.1)

Advantages:

- simple signalling

Disadvantages:

- requires replication support in the remote UE

- privacy of the user participating in the session is violated as any UE which is able to fetch dialog event package of the user participating in the session can replicate the user's session and get the same playback state without authorization of the user participating in the session

5.7.3.1A Pros and cons of alternative 1A (as described in subclause 4.7.2.3.1A)

Advantages:

- privacy of the user participating in the session is protected as the UE participating in the session provides the playback state

Disadvantages:

- more complicated signalling due to need to fetch the playback state from the SC UE participating in the session

- requires remote UE to provide the same media in sessions established with the same Request-URI, e.g. an INVITE to a URI identifying a movie at an AS always results to playback of the same movie

5.7.4 Evaluation of solutions for session replication by remote UE – push mode

5.7.4.0 Conclusion

The decision of the CT1 working group is that the alternative 1A (as described in subclause 4.7.2.4.1A) will be specified in normative specifications in release 10.

5.7.4.1 Pros and cons of alternative 1 (as described in subclause 4.7.2.4.1)

Advantages:

- simple signalling

Disadvantages:

- requires replication support in the remote UE

- privacy of the user participating in the session is violated as any UE which is able to fetch dialog event package of the user participating in the session can replicate the user's session and get the same playback state without authorization of the user participating in the session

5.7.4.1A Pros and cons of alternative 1A (as described in subclause 4.7.2.4.1A)

Advantages:

- simple signalling

- privacy of the user participating in the session is protected as the UE participating in the session provides the playback state.

Disadvantages:

- requires remote UE to provide the same media in sessions established with the same Request-URI, e.g. an INVITE to a URI identifying a movie at an AS always results to playback of the same movie.

5.8 Inter-UE transfer between UEs connected to the IMS and UEs in the CS domain

5.8.0 Conclusion

The decision of the CT1 working group is that no specific additional procedures need to be described in Rel-10 for the inter-UE transfer between UEs connected to the IMS and UEs in the CS domain.

5.9 Evaluation of solutions for session discovery

5.9.0 Conclusion

The decision of the CT1 working group is that the alternative 1 (as described in subclause 4.9.2.1) will be specified in normative specifications in release 10.

5.10 Collaborative session handling upon loss of collaborative session control

5.10.0 Conclusion

The decision of the CT1 working group is that the procedures as described in subclause 4.10.2.1 and subclause 4.10.2.2 will be specified in normative specifications in release 10.

5.11 Evaluation of solutions for media modification

5.11.1 Conclusion

The decision of the CT1 working group is that the procedures as described in subclause 4.11.2.1 and 4.11.2.2 will be specified in the normative specification in release 10.

5.12 Collaborative session profile

5.12.0 Conclusion

The decision of the CT1 working group is that no specific additional procedures need to be described in Rel-10 for the collaborative session profile.

5.13 Evaluation of solutions for inter-UE transfer without establishing a collaborative session

5.13.0 Conclusion

The decision of the CT1 working group is that the alternative 1 (as described in subclause 4.13.2.1.1.1) will be specified in normative specifications in release 10.

5.14 Evaluation of solutions for supplementary services

5.14.1 Conclusion

The decision of the CT1 working group is that the procedures as described in subclause 4.14.2.1, 4.14.2.2, 4.14.2.3 and 4.14.2.4 will be specified in the normative specification in release 10.

6 Protocol extensions

6.1 General

Editor's Note: This section will include possibly necessary protocol extensions, such as e.g. SIP feature tags or SIP headers, which might be necessary to resolve the issues found with the new procedures described in this CR. Every new protocol extension has to identify, whether it can be defined within 3GPP or needs involvement from other standardisation bodies, such as IETF.

6.2 Definition of media feature tag g.3gpp.iut-focus

Media feature-tag name: g.3gpp.iut-focus

ASN.1 Identifier: 1.3.6.1.8.2.x

Editor's note: The ASN.1 Identifier will need to be updated once the IANA registration is completed.

Summary of the media feature indicated by this tag: This media feature-tag when used in a SIP request or a SIP response indicates that the function sending the SIP message supports anchoring a IUT session.

Values appropriate for use with this feature-tag: none

The feature-tag is intended primarily for use in the following applications, protocols, services, or negotiation mechanisms: This feature-tag is most useful in a communications application, for describing the capabilities of a device, such as a phone or PDA.

Examples of typical use: Indicating that a SCC AS has anchored the related IUT session.

Related standards or documents: 3GPP TR 24.837: "IP Multimedia Subsystem (IMS) Service Continuity; Stage 3"

Security Considerations: Security considerations for this media feature-tag are discussed in subclause 12.1 of IETF RFC 3840 [9].

6.3 Replication body

6.3.1 General

This subclause defines XML schema and MIME type of the replication body.

NOTE: IMS communication services using the session replication can define parameters describing the playback state parameters by substitution of the parameterAbstract element.

6.3.2 XML schema

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema
  targetNamespace="urn:3gpp:ns:replication:1.0"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns:ms="urn:3gpp:ns:replication:1.0"
  elementFormDefault="qualified"
  attributeFormDefault="unqualified">

  <xs:element name="requestedParameters" type="ms:requestedParametersType"/>
  <xs:complexType name="requestedParametersType">
    <xs:sequence>
      <xs:element ref="ms:parameterAbstract" minOccurs="0" maxOccurs="unbounded"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##any" processContents="lax"/>
  </xs:complexType>

  <xs:element name="parameterValues" type="ms:parameterValuesType"/>
```

```
    <xs:complexType name="parameterValuesType">
      <xs:sequence>
        <xs:element ref="ms:parameterAbstract" minOccurs="0" maxOccurs="unbounded"/>
        <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
      <xs:anyAttribute namespace="##any" processContents="lax"/>
    </xs:complexType>

    <xs:element name="parameterAbstract" type="ms:parameterAbstractType" abstract="true"/>
    <xs:complexType name="parameterAbstractType"/>

    <xs:element name="replication" type="ms:replicationType"/>
    <xs:complexType name="replicationType">
      <xs:sequence>
        <xs:element ref="ms:parameterValues" minOccurs="0"/>
        <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
      <xs:anyAttribute namespace="##any" processContents="lax"/>
    </xs:complexType>

</xs:schema>
```

6.3.3   IANA registration template

Editor's note: The MIME type "application/vnd.3gpp.replication+xml" as defined in this subclause is to be registered in the IANA registry for Application Media Types based upon the following template.

MIME media type name:

application

MIME subtype name:

vnd.3gpp.replication+xml

Required parameters:

None

Optional parameters:

"charset" the parameter has identical semantics to the charset parameter of the "application/xml" media type as specified in IETF RFC 3023 [21].

Encoding considerations:

Same as encoding considerations of application/xml as specified in IETF RFC 3023 [21].

Security considerations:

Same as general security considerations for application/xml as specified in section 10 of IETF RFC 3023 [21]. In addition, this content type provides a format for exchanging information in SIP, so the security considerations from IETF RFC 3261 [x] apply.

Interoperability considerations:

Same as interoperability considerations as specified in section 3.1 of IETF RFC 3023 [21].

The requestedParameters element is the root element, when the body contains the playback state parameters to be provided. The parameterValues element is the root element, when the body contains the playback state parameter values. The replication element is the root element, when the body indicates replication request.

Published specification:

3GPP TS 24.237 "IP Multimedia Subsystem (IMS) Service Continuity", version 10.0.0, available via http://www.3gpp.org/specs/numbering.htm.

Applications which use this media:

Applications support the service continuity as described in the published specification.

Intended usage:

COMMON

Additional information:

1. Magic number(s): none

2. File extension(s): none

3. Macintosh file type code: none

4. Object Identifiers: none

Editor's note: it is FFS whether to have a separate MIME type for playback state

6.4 Media feature tag g.3gpp.iut.solicit

Media feature-tag name: g.3gpp.iut.solicit

ASN.1 Identifier: 1.3.6.1.8.2.x

Editor's note: The ASN.1 Identifier will need to be updated once the IANA registration is completed.

Summary of the media feature indicated by this tag: This media feature-tag when used in a Contact header field of SIP REGISTER request indicates that the UE want to solicit the IUT of media flows through updating its status.

Values appropriate for use with this feature-tag: none

The feature-tag is intended primarily for use in the following applications, protocols, services, or negotiation mechanisms: This feature-tag is most useful in a communications application, for soliciting an Inter UE transfer operation.

Examples of typical use: Indicating that to the IMS Core that the SIP message is the solicited inter-UE transfer operation.

Related standards or documents: 3GPP TS 24.837: "IP Multimedia Subsystem (IMS) inter-UE transfer enhancements; Stage 3"

Editor's note: The document 3GPP TS 24.837 will be replaced by document 3GPP TS 24.237.

Security Considerations: Security considerations for this media feature-tag are discussed in subclause 12.1 of IETF RFC 3840 [9].

6.5 Extension to Contact header field

6.5.1 Introduction

This extension defines a new contact-param for the Contact header field used in re-REGISTER requests. For more information, see RFC 3261 [20] subclause 25.1.

6.5.2 Syntax

The syntax of contact-param for the Contact header field is specified in table 6.5-1.

Table 6.5-1: Syntax of contact-param for Contact header field

```
Contact         = ("Contact" / "m" ) HCOLON
                  ( STAR / (contact-param *(COMMA contact-param)))
contact-param   = (name-addr / addr-spec) *(SEMI contact-params)
name-addr       = [ display-name ] LAQUOT addr-spec RAQUOT
addr-spec       = SIP-URI / SIPS-URI / absoluteURI
display-name    = *(token LWS)/ quoted-string

contact-params    = c-p-q / c-p-expires / contact-extension
                    / c-p-rue / c-p-m-type / c-p-s-type
c-p-q             = "q" EQUAL qvalue
c-p-expires       = "expires" EQUAL delta-seconds
contact-extension = generic-param
c-p-rue           = "requested-ue" EQUAL DQUOTE SIP-URI DQUOTE
c-p-m-type        = "media-type" EQUAL DQUOTE media-type-value DQUOTE
c-p-s-type        = "service-type" EQUAL DQUOTE service-type-value DQUOTE

media-type-value  = ("audio" / "video" / "text" / "application" / "message")
                    ; defined in RFC 4566
service-type-value = Service-ID ; defined in draft-drage-sipping-service-identification-02
```

The BNF for contact-param is taken from IETF RFC 3261 [20] and modified accordingly.

Editor's Note: Contact header field parameter extension needs IETF RFC.

6.5.3   Operation

These contact parameters are appended to the Contact header field of re-REGISTER requests for solicitation of IUT. On receiving the re-registration request, the S-CSCF shall send a NOTIFY request to the requested UE as specified in 3GPP TS 24.229, subclause 5.4.2.1.2.

7   Extensions to 3GPP TS 24.229

7.1   General

Editor's Note: This section will include possibly necessary extensions to 3GPP TS 24.229. It is currently not foreseen that any profile table changes should be reflected in this TR – those should go directly into 3GPP TS 24.229, once the related procedures and extensions have been agreed to be included in the relevant 3GPP TS.

Annex A (informative):
Definition of protocol extensions

A.1. Media feature tag g.3gpp.iut-xyz

Media feature-tag name: g.3gpp.iut-xyz

Editor's Note: It is FFS what the syntax of the media feature tag g.3gpp.iut-xyz is.

ASN.1 Identifier: 1.3.6.1.8.2.x

Editor's note: The ASN.1 Identifier will need to be updated once the IANA registration is completed.

Summary of the media feature indicated by this tag: This media feature-tag when used in a SIP message indicates that the SIP message is an inter-UE transfer operation.

Values appropriate for use with this feature-tag: none

The feature-tag is intended primarily for use in the following applications, protocols, services, or negotiation mechanisms: This feature-tag is most useful in a communications application, for indicating that the SIP message request is an inter-UE transfer operation.

Examples of typical use: Indicating that to the IMS Core that the SIP message is an inter-UE transfer operation.

Related standards or documents: 3GPP TS 24.837: "IP Multimedia Subsystem (IMS) inter-UE transfer enhancements; Stage 3"

> Editor's note: The document 3GPP TS 24.837 will be replaced by document 3GPP TS 24.237.

Security Considerations: Security considerations for this media feature-tag are discussed in subclause 12.1 of IETF RFC 3840 [9].

A.2. Media feature tag g.3gpp.iut.replicator

Media feature-tag name: g.3gpp.iut.replicator

ASN.1 Identifier: 1.3.6.1.8.2.x

> Editor's note: The ASN.1 Identifier will need to be updated once the IANA registration is completed.

Summary of the media feature indicated by this tag:

This media feature-tag when used in a Contact header field of SIP INVITE request or SIP response to the SIP INVITE requests indicates that the session being established can be replicated. The value of the feature tag indicates the unique identity of the session.

This media feature-tag when used in a Accept-Contact header field of SIP INVITE request indicates that originator of the session being established wishes to replicate the session identified by the Target-Dialog header field included in the SIP INVITE request.

Values appropriate for use with this feature-tag: string with syntax as defined for value of the Target-Dialog header field in IETF RFC 4538 [19].

The feature-tag is intended primarily for use in the following applications, protocols, services, or negotiation mechanisms: This feature-tag is most useful in a communications application, for Inter UE replication operation.

Examples of typical use: Indicating that to the IMS Core that the SIP message is an inter-UE replication operation.

Related standards or documents: 3GPP TS 24.837: "IP Multimedia Subsystem (IMS) inter-UE transfer enhancements; Stage 3"

> Editor's note: The document 3GPP TS 24.837 will be replaced by document 3GPP TS 24.237.

Security Considerations: Security considerations for this media feature-tag are discussed in subclause 12.1 of IETF RFC 3840 [9].

A.3. Media feature tag g.3gpp.current-iut-controller

Media feature-tag name: g.3gpp.current-iut-controller

ASN.1 Identifier: 1.3.6.1.8.2.x

> Editor's note: The ASN.1 Identifier will need to be updated once the IANA registration is completed.

Summary of the media feature indicated by this tag:

This media feature-tag when used in a Contact header field of SIP request or SIP response indicates that the UA is the currently active IUT controller for the collaborative session or is a controllee in the collaborative. The values of the feature tag are "Active" and "Passive".

This media feature-tag when used in a Accept-Contact header field of a SIP INVITE request indicates that the target UE is requested to become the active IUT controller for the collaborative session.

Values appropriate for use with this feature-tag: string with syntax as follows:

"Active" indicates that the UA is the currently active IUT controller for the collaborative session.

"Passive" indicates that the UA is a controllee in the collaborative session but is willing to become an active controller for the collaborative session.

The feature-tag is intended primarily for use in the following applications, protocols, services, or negotiation mechanisms: This feature-tag is most useful in a communications application, for Inter UE control transfer operation.

Examples of typical use: Indicating that a UA wishes to relinquish control of the collaborative session and requesting a UA to become the active IUT controller for the collaborative session.

Related standards or documents: 3GPP TS 24.837: "IP Multimedia Subsystem (IMS) inter-UE transfer enhancements; Stage 3".

Editor's note: The document 3GPP TS 24.837 will be replaced by document 3GPP TS 24.237.

Security Considerations: Security considerations for this media feature-tag are discussed in subclause 12.1 of IETF RFC 3840 [9].

A.4   IUT transfer feature XML schema

A.4.1   General

This subclause defines XML schema and MIME type related to the IUT transfer features.

A.4.2   XML schema

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified"
  attributeFormDefault="unqualified">

  <xs:element name="controlTransfer" type="TcontrolTransfer"/>

  <xs:complexType name="TcontrolTransfer">
    <xs:sequence>
      <xs:element name="controllee" type="xs:anyURI" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="targetController" type="xs:anyURI" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="requestedBy" type="xs:anyURI" minOccurs="0" maxOccurs="1"/>
      <xs:element name="activeController" type="xs:anyURI" minOccurs="0" maxOccurs="unbounded"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##any" processContents="lax"/>
  </xs:complexType>

</xs:schema>
```

A.4.3   IANA registration template

Editor's note: The MIME type "application/vnd.3gpp.iut+xml" as defined in this subclause is to be registered in the IANA registry for Application Media Types based upon the following template.

MIME media type name:

application

MIME subtype name:

application/vnd.3gpp.iut+xml

Required parameters:

None

Optional parameters:

"charset" the parameter has identical semantics to the charset parameter of the "application/xml" media type as specified in IETF RFC 3023 [21].

Encoding considerations:

Same as encoding considerations of application/xml as specified in IETF RFC 3023 [21]

Security considerations:

Same as general security considerations for application/xml as specified in section 10 of IETF RFC 3023 [21]. In addition, this content type provides a format for exchanging information in SIP, so the security considerations from IETF RFC 3261 [19] apply.

Interoperability considerations:

Same as interoperability considerations as specified in section 3.1 of IETF RFC 3023 [21].

Published specification:

3GPP TS 24.237 "IP Multimedia Subsystem (IMS) Service Continuity", version 10.X.0, available via http://www.3gpp.org/specs/numbering.htm.

Applications which use this media:

Applications supporting the Inter UE Transfer as described in the published specification.

Intended usage:

COMMON

Additional information:

1. Magic number(s): none

2. File extension(s): none

3. Macintosh file type code: none

4. Object Identifiers: none

A.5 Definition of SDP attribute a=3gpp.iut.controllee

SDP Attribute name: a=3gpp.iut.controllee

ASN.1 Identifier: 1.3.6.1.8.2.x

> Editor's note: The ASN.1 Identifier will need to be updated once the IANA registration is completed.

> Editor's note: The IANA registration needs to be done when Rel-10 frozen.

Summary of the SDP attribute indicated by this attribute: This SDP attribute when used in a SIP request or a SIP response indicates the SIP address of the controllee UE in collaborative session.

Values appropriate for use with this attribute:

> <URI > = SIPURI / TEL URI

> < address> = SIP address of controlee UE

The 3gpp.iut.controllee attribute is a media attribute and it is not dependent on charset.

Examples of typical use: Indicating that the media is established in the controllee UE of the collaborative session.

Related standards or documents: 3GPP TR 24.837: "IP Multimedia Subsystem (IMS) Service Continuity; Stage 3"

Security Considerations: none

Annex B (informative): Example signalling flows

B.1 Scope of signalling flows

This annex gives examples of signalling flows for Service Continuity based on the Session Initiation Protocol (SIP) and SIP Events.

These signalling flows provide detailed signalling flows, which expand on the overview information flows provided in 3GPP TS 23.237 [9].

B.2 Introduction

B.2.1 General

The signalling flows provided in this annex follow the methodology developed in 3GPP TS 24.228 [3].

B.2.2 Key required to interpret signalling flows

Editor's Note: Text different from TS 24.237 needs to be shifted to TS 24.237.

The key to interpret signalling flows specified in 3GPP TS 24.228 [3] subclauses 4.1 and 4.2 applies with the additions specified below:

- tel:+1-237-555-1111 represents the public user indentity of SC UE A.

- tel:+1-237-555-2222 represents the public user indentity of UE B.

- sip:sccas1.home1.example.net represents the Internet host of SCC AS 1.

- sip:sccas2.home2.example.net represents the Internet host of SCC AS 2.

- sip:interUEtransfer@example.net represents the Inter UE Transfer SCC AS URI of the all UA.

- sip:conference1@home1.example.net represents the Conference URI.

Each signalling flow table contains descriptions for headers where the content of the header is new to that signalling flow, as is already performed in 3GPP TS 24.228 [3].

However, 3GPP TS 24.228 [3] includes extensive descriptions for the contents of various headers following each of the tables representing the contents of the signalling flows. Where the operation of the header is identical to that shown in 3GPP TS 24.228 [3], then such text is not reproduced in the present document.

Additional text may also be found on the contents of headers within 3GPP TS 24.228 [3] in addition to the material shown in the present document.

In order to differentiate between messages for SIP and media, the notation in figure C.2-1 is used.

INVITE → SIP message

SETUP ⇢ CS message

← → Media over a PS connection

⇠ ⇢ Media over a CS connection
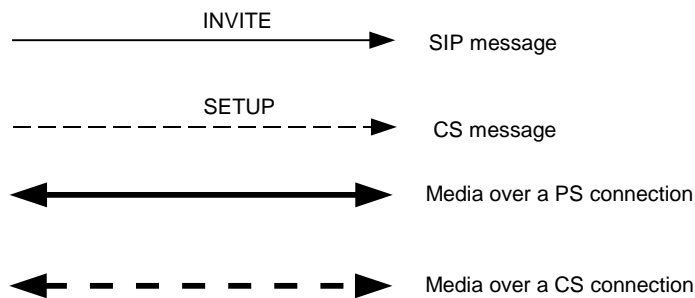
Figure C.2-1: Signalling flow notation

Annex C (informative): Change history

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment		Old	New
2010-05	CT1#64				Initial version (0.0.0) of the TR		-	0.0.0
2010-05	CT1#64				Revision of Scope and editorials		0.0.0	0.0.1
2010-06					Editor: Added TR number		0.0.1	0.1.0
2010-06					Editor: Deleted clauses and subclauses which were wrongly introduced by the editor in version 0.1.0. Corrected Logo-Line in accordance with template.		0.1.0	0.1.1
2010-07	CT1#65	C1-102600			Pseudo-CR on Proposed Skeleton for TR 24.837			
2010-07	CT1#65	C1-102610			Pseudo-CR on how to indicate a request for transfer of collaborative session control			
2010-07	CT1#65	C1-102613			Pseudo-CR on Inter UE Transfer - discovery of sessions of other subscribers - flows			
2010-07	CT1#65	C1-102614			Pseudo-CR on Inter UE transfer pull mode in services defining only originating session set up in UE - flows			
2010-07	CT1#65	C1-102827			Replicating media in the SCC AS – Pull Mode			
2010-07	CT1#65	C1-102831			Establishment of Collaborative Session at origination- Alternative2			
2010-07	CT1#65	C1-102833			Pseudo-CR on Inter UE replication push mode in services defining only originating session set up in UE - flows			
2010-07	CT1#65	C1-102844			Issues Identified for R10 eIUT			
2010-07	CT1#65	C1-102867			Session replication media in network- pull mode			
2010-07	CT1#65	C1-102868			Session replication media in network from Controller UE to another UE			
2010-07	CT1#65	C1-102869			Replicating media in the SCC AS – Push Mode			
2010-07	CT1#65	C1-102870			Replicating media in the Remote UE– Pull Mode			
2010-07	CT1#65	C1-102871			Pseudo-CR on transfer of collaborative session control			
2010-07	CT1#65	C1-102872			Controller UE initiated media transfer from Controller UE to Controllee UE belonging to different subscriptions			
					Editor: - renumbering of subclauses and related numbering (especially under subclause 4.7 (replication and 5). - added EN in section 3, stating that references to new IETF Internet Drafts will not constitute automatically a 3GPP / IETF dependency - introduction of Editor's Notes which cross-reference to TR 23.837 - updated styles - removed / replaced unnecessary characters			
2010-08	CT1#66	C1-103194			TR 24.837 v.0.2.0		0.1.1	0.2.0
2010-08	CT1#66	C1-103125			ICSI of replicated session			
2010-08	CT1#66	C1-103147			Pull mode transfer procedures			
2010-08	CT1#66	C1-103300			Transfer of control of a collaborative session restructuring and subclause 4.5.1 General			
2010-08	CT1#66	C1-103301			Session replication by SCC AS – pull mode			
2010-08	CT1#66	C1-103302			Session replication by SCC AS – Push Mode			
2010-08	CT1#66	C1-103303			New SDP attribute for the indications in session replication			
2010-08	CT1#66	C1-103304			Push mode replication procedures			
2010-08	CT1#66	C1-103306			Editor's notes for controller transfer flows			
2010-08	CT1#66	C1-103307			Transfer of collaborative session control flows			

2010-08	CT1#66	C1-103308			Transfer of Collaborative Session Control		
2010-08	CT1#66	C1-103399			Media flows transfer initiated by a UE not participating in the ongoing collaborative session – Alternative 1		
2010-08	CT1#66	C1-103500			Media flows transfer initiated when no collaborative session has been established		
2010-08	CT1#66	C1-103501			Media flows transfer initiated by a controllee UE of an ongoing collaborative session		
2010-08	CT1#66	C1-103515			Alternative 2-Media flows transfer initiated by a UE not participating in the ongoing collaborative session		
2010-08	CT1#66	C1-103318			Media flows transfer initiated by a UE not participating in the ongoing collaborative session		
2010-08	CT1#66	C1-103320			Establishment of collaborative session upon terminating IMS session setup		
2010-08	CT1#66	C1-103321			Subscription to dialog events package filtering		
2010-08	CT1#66	C1-103398			How to indicate a request for session replication		
2010-08	CT1#66	C1-103502			Media feature tag for the SCC AS		
2010-08	CT1#66	C1-103503			Media flows transfer initiated by a controllee UE of an ongoing collaborative session		
2010-08	CT1#66	C1-103514			Avoiding duplicated flows due to distributed scenarios		
2010-08	CT1#66	C1-103524			Establishment of Collaborative Session at origination with forked responses		
2010-08	CT1#66	C1-103525			flows for Controllee UE initiated media modification on itself		
2010-08					Editor: - renumbering of subclauses and related table/figure numbering wherever necessary due to overlap - introduction of new subclauses (in –rm version highlighted green) in order to align structures between procedures and flows - updated styles - added/removed special characters (tab, blank, etc) where found necessary -re-numbered references - some of the highlighting (yellow in some flows) was left intentionally		
2010-10	CT1#67	C1-103711			TR 24.837 v0.3.0	0.2.0	0.3.0
2010-10	CT1#67	C1-103899			Discard Port for Inter UE Transfer		
2010-10	CT1#67	C1-104117			Pseudo-CR on controller transfer flow references		
2010-10	CT1#67	C1-104120			Pseudo-CR on session discovery - normative procedures and protocol evaluation		
2010-10	CT1#67	C1-104126			Procedures of session replication by the SCC AS-push mode		
2010-10	CT1#67	C1-104128			Procedures of establishment of collaborative session upon terminating IMS session setup		
2010-10	CT1#67	C1-104130			Correct the flow of establishment of Collaborative Session at origination with forked responses		
2010-10	CT1#67	C1-104134			Pseudo-CR on resolving ENs in replication by remote UE by passing playback state in remote UE		
2010-10	CT1#67	C1-104136			Pseudo-CR on Protocol evaluation for replication by remote UE		
2010-10	CT1#67	C1-104137			Media feature-tag for Inter UE Transfer		
2010-10	CT1#67	C1-104140			Establishment of collaborative session upon terminating IMS session setup		
2010-10	CT1#67	C1-104141			Routing incoming IMS session requests to a UE that is capable of becoming a Controller UE.		
2010-10	CT1#67	C1-104142			Pseudo-CR on minor corrections in subclause 4.6.2.1 and 4.6.4.1		
2010-10	CT1#67	C1-104146			Pseudo-CR on 4.6.2.1.1.2.1 Same subscription		
2010-10	CT1#67	C1-104340			Pseudo-CR on editor's notes for controller transfer based on REFER		
2010-10	CT1#67	C1-104341			Pseudo-CR on collaborative session establishment upon originating session setup		
2010-10	CT1#67	C1-104342			Pseudo-CR on collaborative session establishment upon terminating session setup		
2010-10	CT1#67	C1-104343			Pseudo-CR on Session replication Clarification		
2010-10	CT1#67	C1-104350			Pseudo-CR on Media flows transfer initiated when no collaborative session established (different subcription alternative 1)		
2010-10	CT1#67	C1-104380			Way to indicate the request comes from the controller UE in the INVITE request		
2010-10	CT1#67	C1-104381			Procedures of establishment of collaborative session upon originating IMS session setup		
2010-10	CT1#67	C1-104382			ECT Supplementary Services for Collaborative Session		
2010-10	CT1#67	C1-104383			Conference Supplementary Services for Collaborative Session		
2010-10	CT1#67	C1-104384			Controller loss handling methods		
2010-10	CT1#67	C1-104385			Pseudo-CR on resolving ENs in replication by remote UE by passing playback state between local UEs		
2010-10	CT1#67	C1-104386			Indicating whether Controller UE wishes to remain a controller of the collaborative Session		
2010-10	CT1#67	C1-104387			Advantages and Disadvantages of Control Transfer Solutions		

2010-10	CT1#67	C1-104388			Procedures of media flows transfer initiated by a controllee UE of an ongoing collaborative session		
2010-10	CT1#67	C1-104389			Procedures of media flows transfer initiated by a UE not participating in the ongoing collaborative session		
2010-10	CT1#67	C1-104390			Procedures of session replication by the SCC AS-pull mode		
2010-10	CT1#67	C1-104391			Pseudo-CR on Media flows transfer initiated when no collaborative session established (same subscription alternative 2)		
2010-10	CT1#67	C1-104392			Pseudo-CR on Media flows transfer initiated by a controllee UE of an ongoing collaborative session (same subscription alternative3)		
2010-10	CT1#67	C1-104393			Pseudo-CR on Media flows transfer initiated by a UE not participating in the ongoing collaborative session (different subscription alternative2)		
2010-10	CT1#67	C1-104394			Pseudo-CR on Media flows transfer initiated when no collaborative session established (different subcription alternative 2)		
2010-10	CT1#67	C1-104395			Pseudo-CR on Media flows transfer initiated by a controllee UE of an ongoing collaborative session (Different subscription)		
2010-10					Editor: - renumbering of subclauses - added new subclauses where seen necessary - application of correct header-level-styles and other styles - putting colons in tables - putting whitespaces where seen necessary (e.g. references) - re-numbered references		
2010-11	CT1#67	C1-104580			TR 24.837 v0.4.0	0.3.0	0.4.0
2010-11	CT1#68	C1-104829			Pseudo-CR, pair Pseudo-CR of key to interpret signalling flows Used as new base for TR		
2010-11	CT1#68	C1-104457			Pseudo-CR on corrections for collaborative session establishment upon originating session setup		
2010-11	CT1#68	C1-104462			Pseudo-CR on correction and reference update for controller transfer Editor: removed draft-number indication within the text of the TR in order to align with referencing rules for internet-drafts in 3GPP		
2010-11	CT1#68	C1-104480			Pseudo-CR on consistent Info-Package naming		
2010-11	CT1#68	C1-104587			conclusion on media flows transfer between two controllee UEs		
2010-11	CT1#68	C1-104589			Procedures of controllee UE initiated media modification on itself		
2010-11	CT1#68	C1-104590			Procedures of supplementary services		
2010-11	CT1#68	C1-104747			Identifying IUT procedures where UE indicates whether it wishes to remain in Control		
2010-11	CT1#68	C1-104753			Additional alternatives for transporting XML for a UE to indicate whether it wishes to remain in Control		
2010-11	CT1#68	C1-104821			Pseudo-CR, Removing Editor's Note in 4.9 Session Discovery		
2010-11	CT1#68	C1-104831			Pseudo-CR, Revision of C1-104354		
2010-11	CT1#68	C1-104927			XML Schema for IUT Transfer Editor changed proposed sublcause D.2 to A.3 and renamed Annex A to allow more general protocol defintions.		
2010-11	CT1-68	C1-104943			Update of flows of establishment of collaborative session upon originating session setup- by providing controllee UE in SDP		
2010-11	CT1-68	C1-104944			Update of procedures of establishment of collaborative session upon originating session setup- by providing controllee UE in SDP		
2010-11	CT1#68	C1-104947			Pseudo-CR on conclusions for Inter-UE transfer without establishing a collaborative session		
2010-11	CT1#68	C1-104948			Pseudo-CR on conclusions for session discovery		
2010-11	CT1#68	C1-104949			Pseudo-CR on conclusions for pull replication by remote UE		
2010-11	CT1#68	C1-104950			Pseudo-CR on conclusions for push replication by remote UE		
2010-11	CT1#68	C1-104953			P-CR on resolving open issues for MRF and replication See also below comments against C1-105218.		
2010-11	CT1#68	C1-104957			Pseudo-CR on Media flows transfer initiated by a controllee UE of an ongoing collaborative session (different subscription, REFER solution)		
2010-11	CT1#68	C1-104958			Pseudo-CR on Media flows transfer initiated by a UE not participating in the ongoing collaborative session (different subscription, REFER solution)		
2010-11	CT1#68	C1-104962			Pseudo-CR on key to interpret signalling flows		
2010-11	CT1#68	C1-105031			Pseudo-CR on editor's note on collaborative session establishment upon terminating session setup alternative 3		
2010-11	CT1#68	C1-105035			Pseudo-CR on procedures for collaborative session establishment upon terminating session setup alternative 3		
2010-11	CT1#68	C1-105036			Pseudo-CR on procedures for alternative 1A for indicating acceptance of becoming a controller		
2010-11	CT1#68	C1-105037			CR on corrections in procedures for controller transfer alternative 1		
2010-11	CT1#68	C1-105038			Pseudo-CR on corrections in procedures for controller transfer alternative 2A		
2010-11	CT1#68	C1-105039			Pseudo-CR on flow for controller transfer alternative 2A		
2010-11	CT1#68	C1-105045			Procedures of controller UE initiated media modification on		

2010-11	CT1#68				controllee UE		
2010-11	CT1#68	C1-105046			IANA registration template for a new feature tag for UE to indicate whether it wishes to remain in Control		
2010-11	CT1#68	C1-105047			Procédures for establishment of collaborative session upon terminating IMS session setup using 300 (Multiple Choices) response		
2010-11	CT1#68	C1-105062			Pseudo-CR on Controllee UE initiated addition of media to another controllee UE - SIP REFER with method= REFER (Same subscription)		
2010-11	CT1#68	C1-105063			Pseudo-CR on Controllee UE initiated addition of media to another controllee UE - SIP REFER with method= REFER (Different subscription)		
2010-11	CT1#68	C1-105065			Pseudo-CR, reflecting previous comments to the rest in 4.6 Media flows transfer		
2010-11	CT1#68	C1-105084			Conclusion of g.3gpp. iut-focus media feature tag		
2010-11	CT1#68	C1-105085			Pseudo-CR on 5.6 Evaluation of solutions for media flows transfer		
2010-11	CT1#68	C1-105091			Pseudo-CR on Media flows transfer initiated when no collaborative session established (same subscription alternative 1A)		
2010-11	CT1#68	C1-105210			Conference Supplementary Services for Collaborative Session		
2010-11	CT1#68	C1-105211			Procedures of media flow transfer initiated by target UE not participating in the Collaborative Session - media on the controllee UE		
2010-11	CT1#68	C1-105212			Resolving some Editor's Notes		
2010-11	CT1#68	C1-105213			Pseudo-CR on editor's note on collaborative session establishment indication upon terminating session setup alternative 2		
2010-11	CT1#68	C1-105214			Pseudo-CR on editor's notes on collaborative session establishment indication upon originating session setup alternative 2		
2010-11	CT1#68	C1-105215			Pseudo-CR on procedures for collaborative session establishment upon originating session setup alternative 2		
2010-11	CT1#68	C1-105216			Pseudo-CR on procedures for collaborative session establishment upon terminating session setup alternative 2		
2010-11	CT1#68	C1-105222			Evaluation of solutions for establishment of collaborative session upon originating session setup		
2010-11	CT1#68	C1-105223			Pseudo-CR on evaluation of controller transfer solutions		
2010-11	CT1#68	C1-105224			P-CR on selection of solution for identifying requests for replication		
2010-11	CT1#68	C1-105225			ECT Supplementary Services for Collaborative Session		
2010-11	CT1#68	C1-105217			Session Replication by SCC-AS – PullMode: Controllee UE Procedures		
2010-11	CT1#68	C1-105218			Session Replication by SCC-AS – PullMode: SCC AS Procedures Only the second (i.e. the last) change as proposed in this CR was introduced to the TR. For the first change see below. The changed flow diagram clashed between C1-104953 and C1-105218, nevertheless, both changes were independant. The editor of C1-104953 provided a converged version of the flow diagram.		
2010-11	CT1#68	C1-105040 C1-104563 C1-105217 C1-105218 C1-105219 C1-105220			Session Replication by SCC-AS – Pull Mode: Controller UE Procedures Session Replication by SCC-AS – Push Mode: Controllee UE Procedures Session Replication by SCC-AS – Pull Mode: Controllee UE Procedures Session Replication by SCC-AS – Pull Mode: SCC AS Procedures Session Replication by SCC-AS – Push Mode: Controller UE Procedures Session Replication by SCC-AS – Push Mode: SCC AS Procedures These contributions had headline number clashes and therefore they were revised by the editor of the CRs into a single document (after the meeting).		
2010-12	CT#50	CP-100718			V1.0.0 created by MCC for presentation for information at CT-50	0.5.0	1.0.0
2011-01	CT1#69	C1-110388 C1-110389 C1-110390 C1-110391 C1-110392 C1-110512 C1-110513			Pseudo-CR on 4.6.2.1.1.1 Alternative 1 (REFER) Pseudo-CR on 4.6.4.1.1.1 Alternative 1 (REFER) Pseudo-CR on 4.6.2.1.1a "Media flow transfer initiated by a UE not participating in the ongoing collaborative session - media on controllee UE" Pseudo-CR on 4.6.2.1.1.2 Alternative 2 (SIP REFER with method=REFER) Pseudo-CR on 4.6.4.1.1.2 Alternative 2 (SIP REFER with method= REFER) Pseudo-CR on 4.6.2.1.1.3 Alternative 3 based on SIP INVITE request Pseudo-CR on 4.6.4.1.1.3 Alternative 3 based on SIP INVITE		

				request		
		C1-110514		Pseudo-CR on 4.6.2.1.2.1 Alternative 1 (REFER)		
		C1-110396		Pseudo-CR on 4.6.4.1.2.1 Alternative 1 (REFER)		
		C1-110397		Pseudo-CR on 4.6.2.1.2.2 Alternative 2 (SIP REFER with method= REFER)		
		C1-110515		Pseudo-CR on 4.6.4.1.2.2 Alternative 2 (SIP REFER with method= REFER)		
		C1-110516		Pseudo-CR on 4.6.2.1.2.3 Alternative 3 (Based on SIP INVITE request)		
		C1-110400		Pseudo-CR on 4.6.4.1.2.3 Alternative 3 (Based on SIP re-INVITE request)		
		C1-110517		Pseudo-CR on 4.6.2.1.3.1 Alternative 1 (REFER)		
		C1-110402		Pseudo-CR on 4.6.4.1.3.1 Alternative 1 (REFER)		
		C1-110518		Pseudo-CR on 4.6.2.1.3.3 Alternative 3 (SIP REFER with method= REFER)		
		C1-110404		Pseudo-CR on 4.6.4.1.3.3 Alternative 3 (SIP REFER with method= REFER)		
		C1-110519		Pseudo-CR on 4.6.2.1.3.2 Alternative 2 based on SIP re-INVITE request		
		C1-110520		Pseudo-CR on 4.6.4.1.3.2 Alternative 3 based on SIP re-INVITE request		
		C1-110407		Pseudo-CR on 4.6.3 Identified issues		
		C1-110629		Pseudo-CR on 4.6.2.1.4.1 Inter-UE transfer solicited by a target UE without prior information about the existing session-Alternative 1		
		C1-110410		Pseudo-CR on 4.6.2.2.2 Controllee UE initiated addition of media to another controllee UE		
		C1-110522		Pseudo-CR on 4.6.4.2.2.1 Alternative 1 (SIP REFER with media feature tag)		
		C1-110523		Pseudo-CR on 5.6 Evaluation of solutions for media flows transfer		
				These CR's were implemented by the creator of the CR's as a basline for version 1.1.0. The editor has checked the correct implementation.		
2011-01	CT1#69	C1-110049		Pseudo-CR on P-CR implementation correction		
		C1-110052		Pseudo-CR on establishment of collaborative session upon originating session setup alternative 2 with forked responses		
		C1-110217		Conclusion of media modification		
		C1-110505		Resolve Editor's Notes in ECT procedures for Collaborative Session		
		C1-110506		Conclusion of supplementary services		
		C1-110510		Definition of a Controller Capable UE		
		C1-110511		Transfer of collaborative session control cleanup.		
		C1-11526		Originating collaborative session establishment using Multiple REFER		
		C1-110532		Pseudo-CR on establishment of collaborative session upon originating session setup alternative 2		
		C1-110533		Pseudo-CR on establishment of collaborative session upon terminating session setup alternative 2		
		C1-110534		Pseudo-CR on evaluation of establishment of collaborative session upon session setup		
		C1-110639		Update of flows of establishment of collaborative session at origination- alternative 1b		
		C1-110655		Completion of originating collaborative session establishment by providing controllee UE SIP URI in SDP using P-Asserted-Identity		
		C1-110656		Procedures for indicating collaborative session establishment by providing controllee UE SIP URI in SDP using P-Asserted-Identity		
		C1-110658		Procedures of establishment of collaborative session at origination- alternative 1b		
		C1-110668		Add XML schema for controller loss preferences		
		C1-110669		Conclusion of TR 24.837 ("Runtime"-CR)		
2011-02	CT1#70	C1-111031		TR 24.837 v1.1.0	1.0.0	1.1.0
2011-03	CT1#70	C1-111331		Conclusions of TR 24.837 ("Runtime"-CR) – for those issues which were left open in CT1#69	1.1.0	1.2.0
2011-03	CT-51			Version 2.0.0 created by MCC for submission to CT-51 for approval	1.2.0	2.0.0
2011-03	CT-51			Version 10.0.0 created by MCC after approval	2.0.0	10.0.0