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Technical Report

**Digital cellular telecommunications system (Phase 2+);
Universal Mobile Telecommunications System (UMTS);
Signalling flows for the session setup in
the IP Multimedia core network Subsystem (IMS)
based on Session Initiation Protocol (SIP)
and Session Description Protocol (SDP);
Stage 3
(3GPP TR 24.930 version 7.3.0 Release 7)**

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Foreword

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Contents

Foreword

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1 Scope

The present document gives examples of the session setup in the IM CN subsystem based on SIP and SDP.

These signalling flows provide detailed signalling flows, which expand on the overview information flows provided in 3GPP TS 23.228 [2]. The flows focus on a basic session setup, i.e. no flows will be provided for topology hiding, for sessions with IBCF involved or for sessions having certain features.

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.
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[1] 3GPP TS 24.229: "IP Multimedia Call Control Protocol based on SIP and SDP; Stage 3"..

[2] 3GPP TS 24.228 Release 5: "Signalling flows for the IP multimedia call control based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP) - Stage 3".

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

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

[5] IETF RFC 3312: "Integration of Resource Management and Session Initiation Protocol (SIP)".

[6] IETF RFC 3262: "Reliability of Provisional Responses in Session Initiation Protocol (SIP)".

[7] IETF RFC 3311: "The Session Initiation Protocol (SIP) UPDATE Method".

[8] IETF RFC 3264: "An Offer/Answer Model with Session Description Protocol (SDP)".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the [following] terms and definitions [given in ... and the following] apply.

3.2 Symbols

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

3.3 Abbreviations

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

AMR Adaptive Multi-Rate
AS Application Server

CN	Core Network
CSCF	Call Session Control Function
DSL	Digital Subscriber Line
FQDN	Fully Qualified Domain Name
HSS	Home Subscriber Server
HTTP	Hyper Text Transfer Protocol
I-CSCF	Interrogating CSCF
IM	IP Multimedia
IMS	IP Multimedia CN subsystem
IP	Internet Protocol
IP-CAN	IP-Connectivity Access Network
MGCF	Media Gateway Control Function
MRFC	Multimedia Resource Function Controller
MRFP	Multimedia Resource Function Processor
NGN	Next Generation Network
PCRF	Policy and Charging Rules Function
P-CSCF	Proxy CSCF
PSI	Public Service Identity
S-CSCF	Serving CSCF
SDP	Session Description Protocol
SIP	Session Initiation Protocol
UE	User Equipment

4 Methodology

4.1 General

The signalling flows provided in this document follow the methodology developed in 3GPP TS 24.228 [2]. The following additional considerations apply:

a) 3GPP TS 24.228 [2] shows separate signalling flows with no configuration hiding between networks, and with configuration hiding between networks. Separate signalling flows are not shown in the present document;

b) 3GPP TS 24.228 [2] breaks down the functionality of the various CSCFs. The functionality of the S-CSCF and I-CSCF is not relevant for the session setup procedure. Therefore S-CSCFs and I-CSCFs are collapsed into a single entity labelled "Intermediate IM CN subsystem entities".

4.2 Key required to interpret signalling flows

The key to interpret signalling flows specified in 3GPP TS 24.228 [2] subclauses 4.1 and 4.2 applies.

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 [2].

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 [2], 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 [2] in addition to the material shown in the present document.

In order to differentiate between messages for SIP and media, the notation in figure 4.1-1 is used.

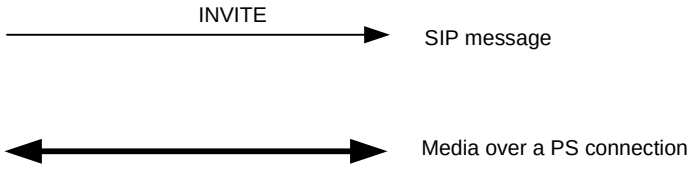

Figure 4.1-1: Signalling flow notation

5 Signalling flows for session initiation

5.1 Establishing a session when UE#1 and UE#2 need to reserve resources

5.1.1 Introduction

The following flows show the establishment of a session where UE#1 and UE#2 need to reserve local resources. In subclause 5.1.2 both UEs will initiate the IP-CAN bearer setup. In subclause 5.1.3 the network will initiate the IP-CAN bearer setup for UE#1.

It is assumed that both the originating UE and terminating UE are using a dedicated IP-CAN bearer for SIP signalling and a dedicated IP-CAN bearer for media.

The box "Intermediate IM CN subsystem entities" stands for the combination of I-CSCF/S-CSCF on the originating and on the terminating side. Routing of messages between those nodes is not described in the flow below.

5.1.2 UE initiated IP-CAN bearer setup

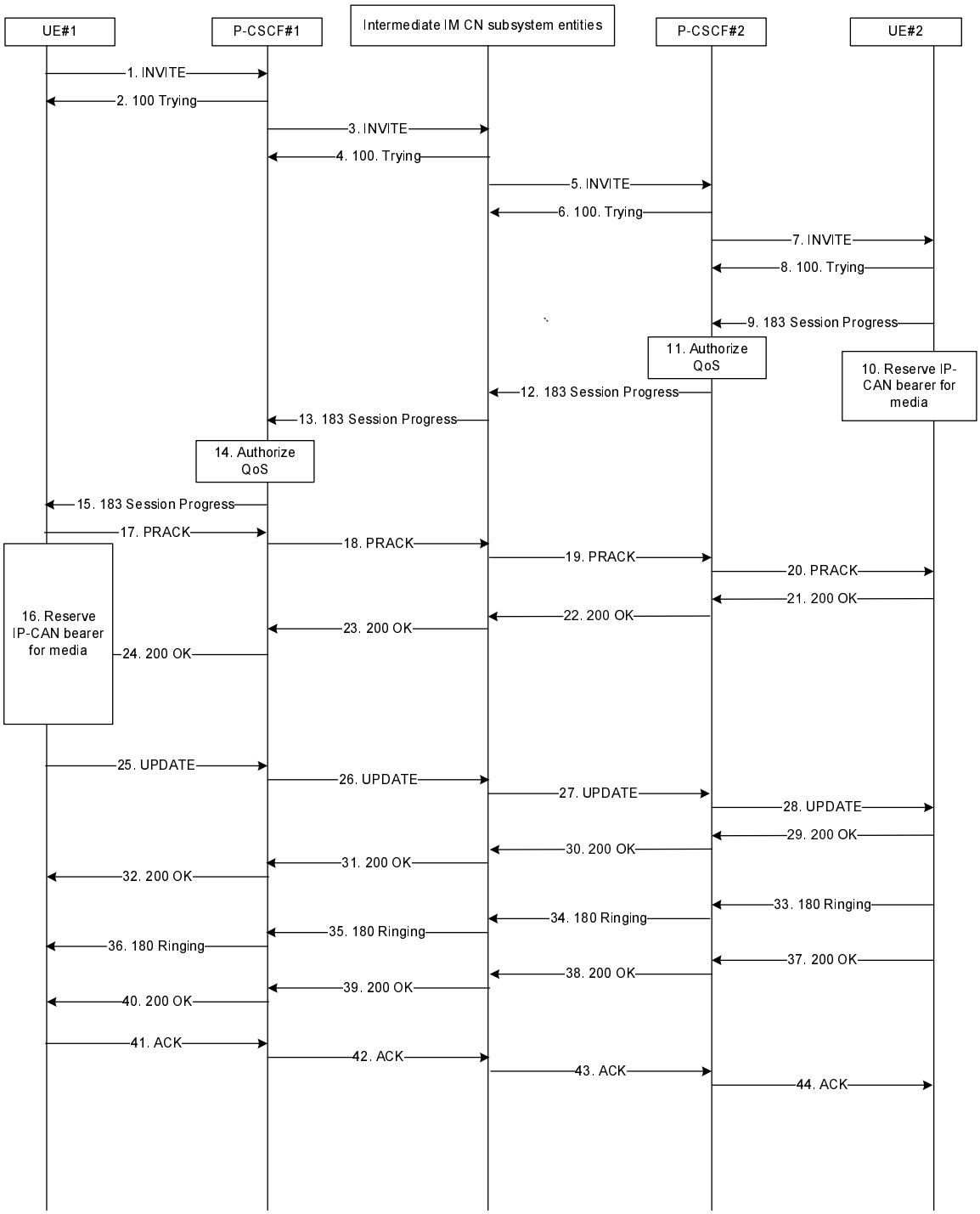

Figure 5.1.2-1: IMS session setup, resource reservation on both sides

The details of the signalling flows are as follows:

1. **INVITE request (UE#1 to P-CSCF#1) see example in table 5.1.2-1**

   For this example, it is assumed that UE#1 is willing to establish a multimedia session comprising a video stream and an audio stream. The video stream supports two codecs, either H.263 or MPEG-4 Visual. The audio stream supports the AMR codec.

   UE#1indicates that it supports precondition and it indicates that it supports reliable provisional responses. However, it does not use the "Require' header for these capabilities.

   UE#1 does not have available the resources that are necessary to transport the media.

For this example it is assumed, that signalling encryption was negotiated between UE and P-CSCF in the security mode set-up procedure during the last successful authentication. This option will only be shown in this example.

Table 5.1.2-1: INVITE request (UE#1 to P-CSCF)

```
INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
P-Preferred-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: sec-agree
Supported: precondition, 100rel
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
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Type: application/sdp
Content-Length: (…)

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

Supported: The UE indicates support for the 'precondition' mechanism and the support for reliable provisional responses

SDP The SDP contains a set of codecs supported by UE#1 and desired by the user at UE#1 for this session. As the local preconditions are not fulfilled, both media are set to "inactive".

Security-Verify: The Security-Verify contains the content of the Security-Server header as received during last successful authentication. It indicates that integrity protection and encryption are in use for this session.

2. **100 (Trying) response (P-CSCF#1 to UE#1)**

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

3. **INVITE request (P-CSCF#1 to S-CSCF#1) - see example in table 5.1.2-2**

Table 5.1.2-2: INVITE request (P-CSCF#1 to S-CSCF#1)

```
INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>
Record-Route: <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy:
From:
To:
Call-ID:
Cseq:
Supported:
Contact:
Allow:
Content-Type:
Content-Length: (…)

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

4. **100 (Trying) response (S-CSCF#1 to P-CSCF#1)**

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

5. **INVITE request (S-CSCF#2 to P-CSCF#2) see example in table 5.1.2-3**

Table 5.1.2-3: INVITE request (S-CSCF#2 to P-CSCF#2)

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

v=
o=
s=
```

```
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
```

6. **100 (Trying) response (P-CSCF#2 to S-CSCF#2)**

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

7. **INVITE request (P-CSCF#2 to UE #2) - see example in table 5.1.2-4**

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

Table 5.1.2-4: INVITE request (P-CSCF#2 to UE#2)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf2.home2.net;lr>
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>,
   <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity:
Privacy:
P-Media-Authorization: 00200001001001017064663l2e686f6d65312e6e6574000c02013331533134363231
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Allow:
Content-Type:
Content-Length: (…)

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

8. **100 (Trying) response (UE#2 to P-CSCF)**

   The UE responds to the INVITE request with a 100 (Trying) provisional response.

9. **183 (Session Progress) response (UE#2 to P-CSCF) - - see example in table 5.1.2-5**

UE#2 determines the complete set of codecs that it is capable of supporting for this session. It determines the intersection with those appearing in the SDP in the INVITE request. UE#2 makes the final codec selection and chooses H.263 and AMR.

UE#2 responds with a 183 (Session Progress) response containing SDP back to the originator. This response is sent to P-CSCF. UE#2 uses a conf line in the SDP to request a confirmation from UE#1 when the local resources are available at UE#1.

Table 5.1.2-5: 183 (Session Progress) response (UE#2 to P-CSCF#2)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>,
   <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From:
To: <tel:+1-212-555-2222>;tag=314159
Call-ID:
CSeq:
Require: 100rel, precondition
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
RSeq: 9021
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933623 2987933623 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=inactive
a=conf:qos remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=inactive
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event
```

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

    The terminating UA sets up the bearer in accordance with the media description received SDP.

11. **Authorize QoS**

    P-CSCF authorizes the resources necessary for this session.

12 **183 (session progress) response (P-CSCF#' to S-CSCF#2) – see example in table 5.1.2-6**

Table 5.1.2-6: 183 (Session Progress) response (P-CSCF#2 to S-CSCF#2)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7)
Record-Route:
P-Asserted-Identity: "John Smith" <sip:user2_public1@home2.net>
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy:
```

```
From:
To:
Call-ID:
CSeq:
Require:
Contact:
Allow:
RSeq:
Content-Type:
Content-Length:

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

13. **183 (session progress) response (S-CSCF#1 to P-CSCF#1) – see example in table 5.1.2-7**

Table 5.1.2-7: 183 (Session Progress) response (P-CSCF#2 to S-CSCF#2)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7)
Record-Route:
P-Asserted-Identity:
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
Allow:
RSeq:
Content-Type:
Content-Length:

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

14. **Authorize QoS**

P-CSCF authorizes the resources necessary for this session.

15. **183 (Session Progress) response (P-CSCF to UE) – see example in table 5.1.2-8**

Table 5.1.2-8: 183 (Session Progress) response (P-CSCF#1 to UE#1)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity:
Privacy:
P-Media-Authorization:
   00200001001001017064663322e76697369746564322e6e6574000c020139425633303732
From:
To:
Call-ID:
CSeq:
Require:
Contact:
Allow:
RSeq:
Content-Type:
Content-Length:

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

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

The originating UE sets up the bearer in accordance with the media description received SDP.

17 -24.**PRACK request / 200(OK) response exchange**

The PRACK request does not carry SDP as the final codec decision is already made as part of the initial offer/answer exchange.

25. **UPDATE request (UE#1 to P-CSCF#1) - see example in table 5.1.2-9**

UE#1 indicates that it can send and receive media as the necessary resources are available.

Table 5.1.2-9: UPDATE request (UE#1 to P-CSCF#1)

```
UPDATE <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:orig@scscf1.home1.net;lr>
From: <sip:user1_public1@home1.net>; tag=171828
To: <tel:+12125552222> tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 129 UPDATE
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; ealg=aes-cbc; spi-c=98765432; spi-
   s=87654321; port-c=8642; port-s=7531
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcompContent-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98
```

```
b=AS:75
a=curr:qos local sendrececv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes
```

26. **UPDATE request (P-CSCF#1 to S-CSCF#1) - see example in table 5.1.2-10**

Table 5.1.2-10: UPDATE request (P-CSCF#1 to S-CSCF#1)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024";
   ggsn=[5555::4b4:3c3:2d2:1e1]; pdp-sig=no; gcid=723084371; auth-token=43876559; flow-id=3
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

27. **UPDATE request (S-CSCF#2 to P-CSCF#2) - see example in table 5.1.2-11**

Table 5.1.2-11: UPDATE request (S-CSCF#2 to P-CSCF#2)

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

v=
o=
s=
```

```
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
```

28. **UPDATE request (P-CSCF#2 to UE#2) - see example in table 5.1.2-12**

Table 5.1.2-12: UPDATE request (S-CSCF#2 to P-CSCF#2)

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

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

29. **200 (OK) response (UE#2 to P-CSCF#1) - see example in table 5.1.2-13**

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

UE indicates that the local resources are available

Table 5.1.2-13: 200(OK) response (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+12125552222>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 129 UPDATE
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=curr:qos local sendrececv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes
```

30. **200 (OK) response (P-CSCF#2 to S-CSCF#2) - see example in table 5.1.2-14**

Table 5.1.2-14: 200(OK) response (P-CSCF#2 to S-CSCF#2)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

```
a=
a=
a=
a=
a=
```

31. **200 (OK) response (S-CSCF#1 to P-CSCF#21) - see example in table 5.1.2-15**

Table 5.1.2-15: 200(OK) response (S-CSCF#1 to P-CSCF#1)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

32. **200 (OK) response (P-CSCF#1 to UE#1) - see example in table 5.1.2-16**

Table 5.1.2-16: 200(OK) response (P-CSCF#1 to UE#1)

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

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

```
a=
a=
a=
a=
a=
```

33 -36 . **180 (Ringing) response**

UE#2 indicates that it is ringing. The UE#2 does not use Require '100rel' as the 180 (Ringing) does not have a SDP and therefore need not to be sent reliable.

37 –40 .**200 (OK) response**

When the called party answers the UE sends a 200 (OK) response final response to the INVITE request (6) to P-CSCF, and starts the media flow(s) for this session.

40-44 **ACK request**

The calling party responds to the 200 (OK) response with an ACK request.

5.1.3 Network initiated IP-CAN bearer setup

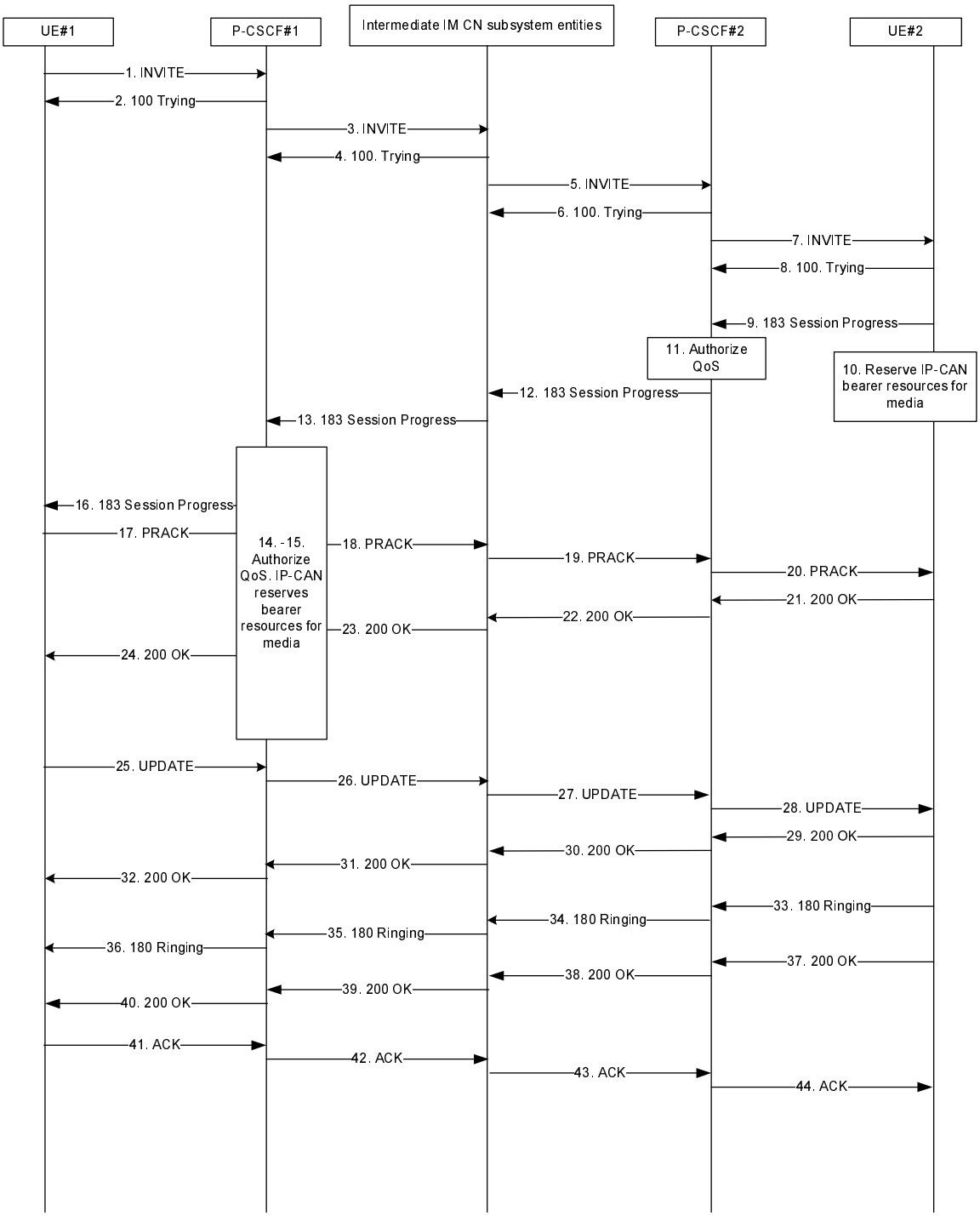

Figure 5.1.3-1: IMS session setup, resource reservation on both sides

The details of the signalling flows are as follows:

1. **INVITE request (UE#1 to P-CSCF#1) see example in table 5.1.3-1**

   For this example, it is assumed that UE#1 is willing to establish a multimedia session comprising a video stream and an audio stream. The video stream supports two codecs, either H.263 or MPEG-4 Visual. The audio stream supports the AMR codec.

   UE#1indicates that it supports precondition and it indicates that it supports reliable provisional responses. However, it does not use the "Require' header for these capabilities.

UE#1 does not have available the resources that are necessary to transport the media.

For this example it is assumed, that signalling encryption was negotiated between UE and P-CSCF in the security mode set-up procedure during the last successful authentication. This option will only be shown in this example.

Table 5.1.3-1: INVITE request (UE#1 to P-CSCF)

```
INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
P-Preferred-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: sec-agree
Supported: precondition, 100rel
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
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Type: application/sdp
Content-Length: (…)

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

Supported: The UE indicates support for the 'precondition' mechanism and the support for reliable provisional responses

SDP The SDP contains a set of codecs supported by UE#1 and desired by the user at UE#1 for this session. As the local preconditions are not fulfilled, both media are set to "inactive".

Security-Verify: The Security-Verify contains the content of the Security-Server header as received during last successful authentication. It indicates that integrity protection and encryption are in use for this session.

2. **100 (Trying) response (P-CSCF#1 to UE#1)**

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

4. **INVITE request (P-CSCF#1 to S-CSCF#1) - see example in table 5.1.3-2**

Table 5.1.3-2: INVITE request (P-CSCF#1 to S-CSCF#1)

```
INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>
Record-Route: <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy:
From:
To:
Call-ID:
Cseq:
Supported:
Contact:
Allow:
Content-Type:
Content-Length: (…)

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

4. **100 (Trying) response (S-CSCF#1 to P-CSCF#1)**

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

5. **INVITE request (S-CSCF#2 to P-CSCF#2) see example in table 5.1.3-3**

Table 5.1.3-3: INVITE request (S-CSCF#2 to P-CSCF#2)

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

v=
o=
s=
```

```
c=
t=
m=
b=
a=
a=
a=
a=
a=
a=
a=
```

6. **100 (Trying) response (P-CSCF#2 to S-CSCF#2)**

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

7. **INVITE request (P-CSCF#2 to UE #2) - see example in table 5.1.3-4**

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

Table 5.1.3-4: INVITE request (P-CSCF#2 to UE#2)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf2.home2.net;lr>
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>,
   <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity:
Privacy:
P-Media-Authorization: 00200001001001017064663l2e686f6d65312e6e6574000c02013331533134363231
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Allow:
Content-Type:
Content-Length: (…)

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

8. **100 (Trying) response (UE#2 to P-CSCF)**

   The UE responds to the INVITE request with a 100 (Trying) provisional response.

9. **183 (Session Progress) response (UE#2 to P-CSCF) - - see example in table 5.1.3-5**

UE#2 determines the complete set of codecs that it is capable of supporting for this session. It determines the intersection with those appearing in the SDP in the INVITE request. UE#2 makes the final codec selection and chooses H.263 and AMR.

UE#2 responds with a 183 (Session Progress) response containing SDP back to the originator. This response is sent to P-CSCF. UE#2 uses a conf line in the SDP to request a confirmation from UE#1 when the local resources are available at UE#1.

Table 5.1.3-5: 183 (Session Progress) response (UE#2 to P-CSCF#2)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>,
   <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From:
To: <tel:+1-212-555-2222>;tag=314159
Call-ID:
CSeq:
Require: 100rel, precondition
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
RSeq: 9021
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933623 2987933623 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98
b=AS:75
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=inactive
a=conf:qos remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local none
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=inactive
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event
```

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

    The terminating UA sets up the bearer in accordance with the media description received SDP.

11. **Authorize QoS**

    P-CSCF authorizes the resources necessary for this session.

13 **183 (session progress) response (P-CSCF#' to S-CSCF#2) – see example in table 5.1.3-6**

Table 5.1.3-6: 183 (Session Progress) response (P-CSCF#2 to S-CSCF#2)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7)
Record-Route:
P-Asserted-Identity: "John Smith" <sip:user2_public1@home2.net>
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy:
```

```
From:
To:
Call-ID:
CSeq:
Require:
Contact:
Allow:
RSeq:
Content-Type:
Content-Length:

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

13. **183 (session progress) response (S-CSCF#1 to P-CSCF#1) – see example in table 5.1.3-7**

Table 5.1.3-7: 183 (Session Progress) response (P-CSCF#2 to S-CSCF#2)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7)
Record-Route:
P-Asserted-Identity:
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
Allow:
RSeq:
Content-Type:
Content-Length:

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

14-15. **Authorize QoS and initiate IP-CAN bearer**

P-CSCF authorises the respective IP flows and provides the QoS requirements for the resources necessary for this session.

In this case, this triggers the IP-CAN to initiate the reservation of required resources, including the initiation of an IP-CAN bearer setup or the modification of an existing one.

16. **183 (Session Progress) response (P-CSCF to UE) – see example in table 5.1.3-8**

Table 5.1.3-8: 183 (Session Progress) response (P-CSCF#1 to UE#1)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity:
Privacy:
P-Media-Authorization:
   00200001001001017064663 22e7669736974656432 2e6e6574000c020139425633303732
From:
To:
Call-ID:
CSeq:
Require:
Contact:
Allow:
RSeq:
Content-Type:
Content-Length:

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

17 -24.**PRACK request / 200(OK) response exchange**

The PRACK request does not carry SDP as the final codec decision is already made as part of the initial offer/answer exchange.

25. **UPDATE request (UE#1 to P-CSCF#1) - see example in table 5.1.3-9**

UE#1 indicates, when it has received from the network an indication that an IP-CAN with necessary quality of service has been established, that it can send and receive media as the necessary resources are available.

Table 5.1.3-9: UPDATE request (UE#1 to P-CSCF#1)

```
UPDATE <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:orig@scscf1.home1.net;lr>
From: <sip:user1_public1@home1.net>; tag=171828
To: <tel:+12125552222> tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 129 UPDATE
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; ealg=aes-cbc; spi-c=98765432; spi-
   s=87654321; port-c=8642; port-s=7531
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcompContent-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=curr:qos local sendrececv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
```

```
a=des:qos mandatory remote sendrecv
a=sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes
```

27. **UPDATE request (P-CSCF#1 to S-CSCF#1) - see example in table 5.1.3-10**

Table 5.1.3-10: UPDATE request (P-CSCF#1 to S-CSCF#1)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024";
   ggsn=[5555::4b4:3c3:2d2:1e1]; pdp-sig=no; gcid=723084371; auth-token=43876559; flow-id=3
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

27. **UPDATE request (S-CSCF#2 to P-CSCF#2) - see example in table 5.1.3-11**

Table 5.1.3-11: UPDATE request (S-CSCF#2 to P-CSCF#2)

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

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

```
a=
a=
a=
a=
a=
a=
```

28. **UPDATE request (P-CSCF#2 to UE#2) - see example in table 5.1.3-12**

Table 5.1.3-12: UPDATE request (S-CSCF#2 to P-CSCF#2)

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

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

29. **200 (OK) response (UE#2 to P-CSCF#1) - see example in table 5.1.3-13**

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

UE indicates that the local resources are available

Table 5.1.3-13: 200(OK) response (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+12125552222>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 129 UPDATE
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=curr:qos local sendrececv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes
```

30. **200 (OK) response (P-CSCF#2 to S-CSCF#2) - see example in table 5.1.3-14**

Table 5.1.3-14: 200(OK) response (P-CSCF#2 to S-CSCF#2)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

```
a=
a=
a=
a=
a=
```

31. **200 (OK) response (S-CSCF#1 to P-CSCF#21) - see example in table 5.1.3-15**

Table 5.1.3-15: 200(OK) response (S-CSCF#1 to P-CSCF#1)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

32. **200 (OK) response (P-CSCF#1 to UE#1) - see example in table 5.1.3-16**

Table 5.1.3-16: 200(OK) response (P-CSCF#1 to UE#1)

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

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

```
a=
a=
a=
a=
a=
```

33 -36. **180 (Ringing) response**

UE#2 indicates that it is ringing. The UE#2 does not use Require '100rel' as the 180 (Ringing) response does not have a SDP and therefore need not to be sent reliable.

37 –40. **200 (OK) response**

When the called party answers the UE sends a 200 (OK) response final response to the INVITE request (6) to P-CSCF, and starts the media flow(s) for this session.

40-44. **ACK request**

The calling party responds to the 200 (OK) response with an ACK request.

5.2 Establishing a session when UE#1 needs to reserve resources while UE#2 has resources already available

5.2.1 Introduction

The following flow shows the establishment of a session where UE#1 needs to reserve local resources (e.g. using a GRPS IP-CAN) while UE#2 does not need to perform resource reservation (e.g. connected via IWLAN IP-CAN).

The box "Intermediate IM CN subsystem entities" stands for the combination of I-CSCF/S-CSCF on the originating and on the terminating side. Routing of messages between those nodes is not described in the flow below.

5.2.2 Signalling Flow

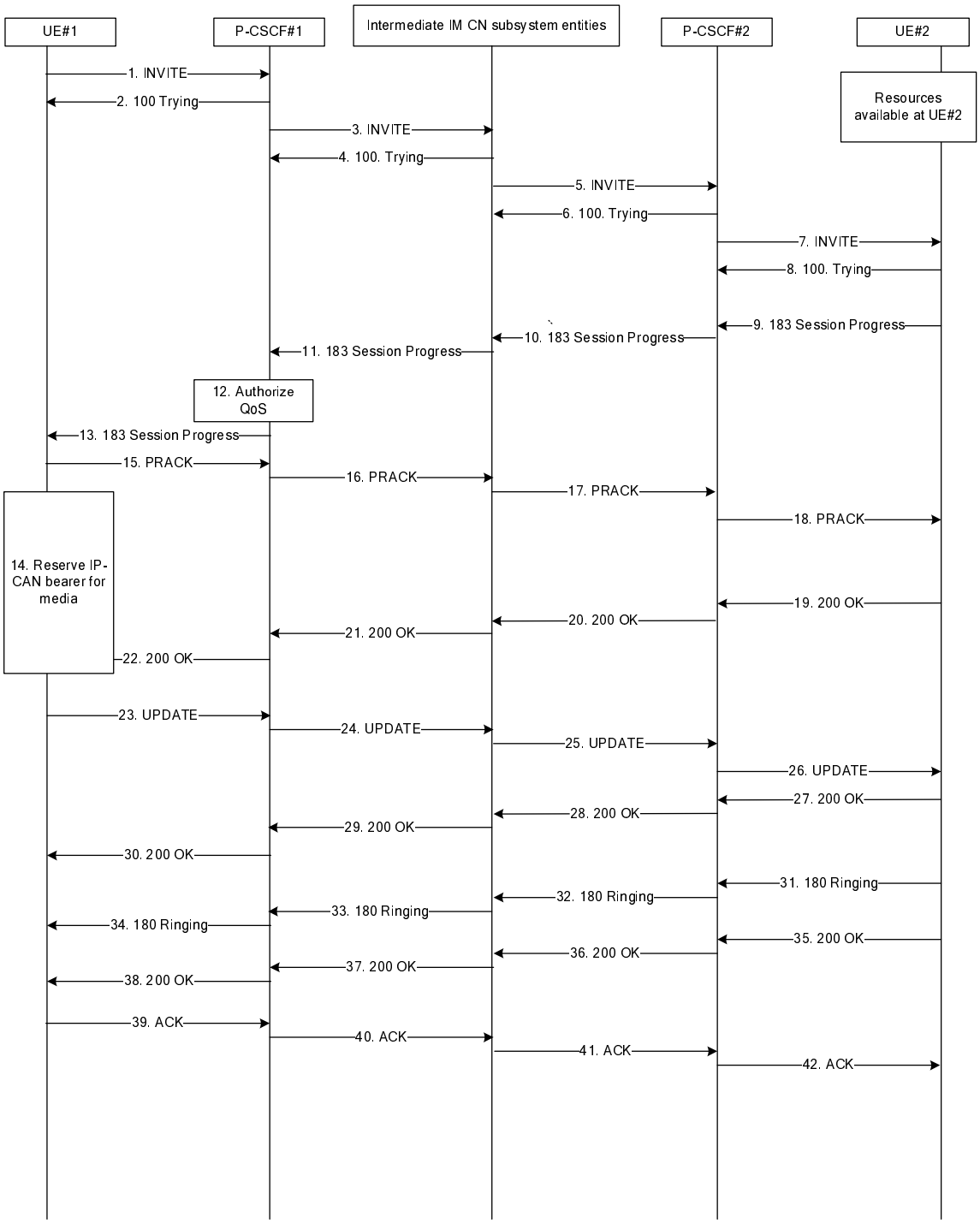

Figure 5.1-1: IMS session setup, resource reservation on originating side only

The details of the signalling flows are as follows:

1. **INVITE request (UE#1 to P-CSCF#1) see example in table 5.2-1**

   For this example, it is assumed that UE#1 is willing to establish a multimedia session comprising a video stream and an audio stream. The video stream supports H.263 codec. The audio stream supports the AMR codec.

   UE#1indicates that it supports precondition and it indicates that it supports reliable provisional responses. However, it does not use the "Require' header for these capabilities.

   UE#1 does not have available the resources that are necessary to transport the media.

Table 5.2-1: INVITE request (UE#1 to P-CSCF)

```
INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
P-Preferred-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: sec-agree
Supported: precondition, 100rel
Proxy-Require: sec-agree
Supported: 100rel
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321;
   port-c=8642; port-s=7531
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Type: application/sdp
Content-Length: (…)

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

Supported: The UE indicates support for the 'precondition' mechanism and the support for reliable provisional responses

SDP The SDP contains a set of codecs supported by UE#1 and desired by the user at UE#1 for this session. As the local preconditions are not fulfilled, both media are set to "inactive".

2. **100 (Trying) response (P-CSCF#1 to UE#1)**

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

3. **INVITE request (P-CSCF#1 to S-CSCF#1) - see example in table 5.2-2**

Table 5.2-2: INVITE request (P-CSCF#1 to S-CSCF#1)

```
INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>
Record-Route: <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy:
From:
```

```
To:
Call-ID:
Cseq:
Require: precondition
Supported:
Contact:
Allow:
Content-Type:
Content-Length: (…)

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

4. **100 (Trying) response (S-CSCF#1 to P-CSCF#1)**

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

5. **INVITE request (S-CSCF#2 to P-CSCF#2) see example in table 5.2-3**

Table 5.2-3: INVITE request (S-CSCF#2 to P-CSCF#2)

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

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

6. **100 (Trying) response (P-CSCF#2 to S-CSCF#2)**

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

7. **INVITE request (P-CSCF#2 to UE #2) - see example in table 5.2-4**

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

Table 5.2-4: INVITE request (P-CSCF#2 to UE#2

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf2.home2.net;lr>
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>,
   <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity:
Privacy:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Allow:
Content-Type:
Content-Length: (…)

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

8. **100 (Trying) response (UE#2 to P-CSCF)**

   The UE responds to the INVITE request with a 100 (Trying) provisional response.

9. **183 (Session Progress) response (UE#2 to P-CSCF) - - see example in table 5.2-5**

   UE#2 determines the complete set of codecs that it is capable of supporting for this session. It determines the intersection with those appearing in the SDP in the INVITE request. UE#2 supports both offered media streams

   UE#2 responds with a 183 (Session Progress) response containing SDP back to the originator. This response is sent to P-CSCF. UE#2 uses a conf line in the SDP to request a confirmation from UE#1 when the local resources are available at UE#1.

   UE#2 has all necessary resources available and indicates that in the SDP

Table 5.2-5: 183 (Session Progress) response (UE#2 to P-CSCF#2)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>,
   <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Access-Network-Info: IEEE-802.11a
Privacy: none
From:
To: <tel:+1-212-555-2222>;tag=314159
Call-ID:
CSeq:
Require: 100rel, precondition
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
RSeq: 9021
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933623 2987933623 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=video 10001 RTP/AVP 98
b=AS:75
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=inactive
a=conf:qos remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 6544 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=inactive
a=conf:qos remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event
```

10. **183 (session progress) response (P-CSCF#2 to S-CSCF#2) – see example in table 5.2-6**

Table 5.2-6: 183 (Session Progress) response (P-CSCF#2 to S-CSCF#2)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7)
Record-Route:
P-Asserted-Identity: "John Smith" <sip:user2_public1@home2.net>
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
Allow:
RSeq:
Content-Type:
Content-Length:

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

11. **183 (session progress) response (S-CSCF#1 to P-CSCF#1) – see example in table 5.2-7**

Table 5.2-7: 183 (Session Progress) response (P-CSCF#2 to S-CSCF#2)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7)
Record-Route:
P-Asserted-Identity:
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy:
From:
To:
Call-ID:
CSeq:
Require:
Contact:
Allow:
RSeq:
Content-Type:
Content-Length:

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

12. **Authorize QoS**

P-CSCF authorizes the resources necessary for this session.

13. **183 (Session Progress) response (P-CSCF to UE) – see example in table 5.2-8**

Table 5.2-8: 183 (Session Progress) response (P-CSCF#1 to UE#1)

```
SIP/2.0 183 Session Progress
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Asserted-Identity:
Privacy:
P-Media-Authorization:
   00200001001001017064663 22e7669736974656432 2e6e6574000c020139425633303732
From:
To:
Call-ID:
CSeq:
Require:
Contact:
Allow:
RSeq:
Content-Type:
Content-Length:

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

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

The originating UE sets up the bearer in accordance with the media description received SDP.

15 -22.**PRACK request / 200(OK) response exchange**

The PRACK request does not carry SDP as the final codec decision is already made as part of the initial offer/answer exchange.

23. **UPDATE request (UE#1 to P-CSCF#1) - see example in table 5.2-9**

UE#1 indicates that it can send and receive media as the necessary resources are available.

Table 5.2-9: UPDATE request (UE#1 to P-CSCF#1)

```
UPDATE <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:orig@scscf1.home1.net;lr>
From: <sip:user1_public1@home1.net>; tag=171828
To: <tel:+12125552222> tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 129 UPDATE
Require: sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi=87654321; port1=7531
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcompContent-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
```

```
a=curr:qos local sendrececv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote none
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes
```

24. **UPDATE request (P-CSCF#1 to S-CSCF#1) - see example in table 5.2-10**

Table 5.2-10: UPDATE request (P-CSCF#1 to S-CSCF#1)

```
UPDATE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024";
   ggsn=[5555::4b4:3c3:2d2:1e1]; pdp-sig=no; gcid=723084371; auth-token=43876559; flow-id=3
Route: <sip:scscf1.home1.net;lr>, <sip:scscf2.home2.net;lr>, <sip:pcscf2.visited2.net;lr>
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:

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

25. **UPDATE request (S-CSCF#2 to P-CSCF#2) - see example in table 5.2-11**

Table 5.2-11: UPDATE request (S-CSCF#2 to P-CSCF#2)

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

v=
o=
s=
c=
```

```
t=
m=
b=
a=
a=
a=
a=
a=
a=
```

26. **UPDATE request (P-CSCF#2 to UE#2) - see example in table 5.2-12**

Table 5.2-12: UPDATE request (S-CSCF#2 to P-CSCF#2)

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

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

27. **200 (OK) response (UE#1 to P-CSCF#1) - see example in table 5.2-13**

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

UE indicates that the local resources are available

Table 5.2-13: 200(OK) response (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From: <sip:user1_public1@home1.net>; tag=171828
To: <tel:+12125552222>;tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 129 UPDATE
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555:: eee:fff:aaa:bbb
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=curr:qos local sendrececv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes
```

28. **200 (OK) response (P-CSCF#2 to S-CSCF#2) - see example in table 5.2-14**

Table 5.2-14: 200(OK) response (P-CSCF#2 to S-CSCF#2)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info:
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

29. **200 (OK) response (S-CSCF#1 to P-CSCF#21) - see example in table 5.2-15**

Table 5.2-15: 200(OK) response (S-CSCF#1 to P-CSCF#1)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
From:
To:
Call-ID:
CSeq:
Content-Type:
Content-Length:

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

30. **200 (OK) response (P-CSCF#1 to UE#1) - see example in table 5.2-16**

Table 5.2-16: 200(OK) response (P-CSCF#1 to UE#1)

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

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

31 -34 . **180 (Ringing) response**

UE#2 indicates that it is ringing. The UE#2 does not use Require '100rel' as the 180 (Ringing) response does not have a SDP and therefore need not to be sent reliable.

35 –38 .**200 (OK) response**

When the called party answers the UE sends a 200 (OK) response final response to the INVITE request (6) to P-CSCF, and starts the media flow(s) for this session.

39-42 **ACK request**

The calling party responds to the 200 (OK) response with an ACK request.

5.3 Establishing a session when UE#1 has resources available while UE#2 needs to perform resource reservation

5.3.1 Introduction

The following flows show the establishment of a session where UE# has all necessary local resources available (e.g. having an appropriate PDP context for the desired media available) while UE#2 has to perform resource reservation.

The box "Intermediate IM CN subsystem entities" stands for the combination of I-CSCF/S-CSCF on the originating and on the terminating side. Routing of messages between those nodes is not described in the flow below.

5.3.2 Signalling Flow (with SDP answer in 200 (OK) response for INVITE request)

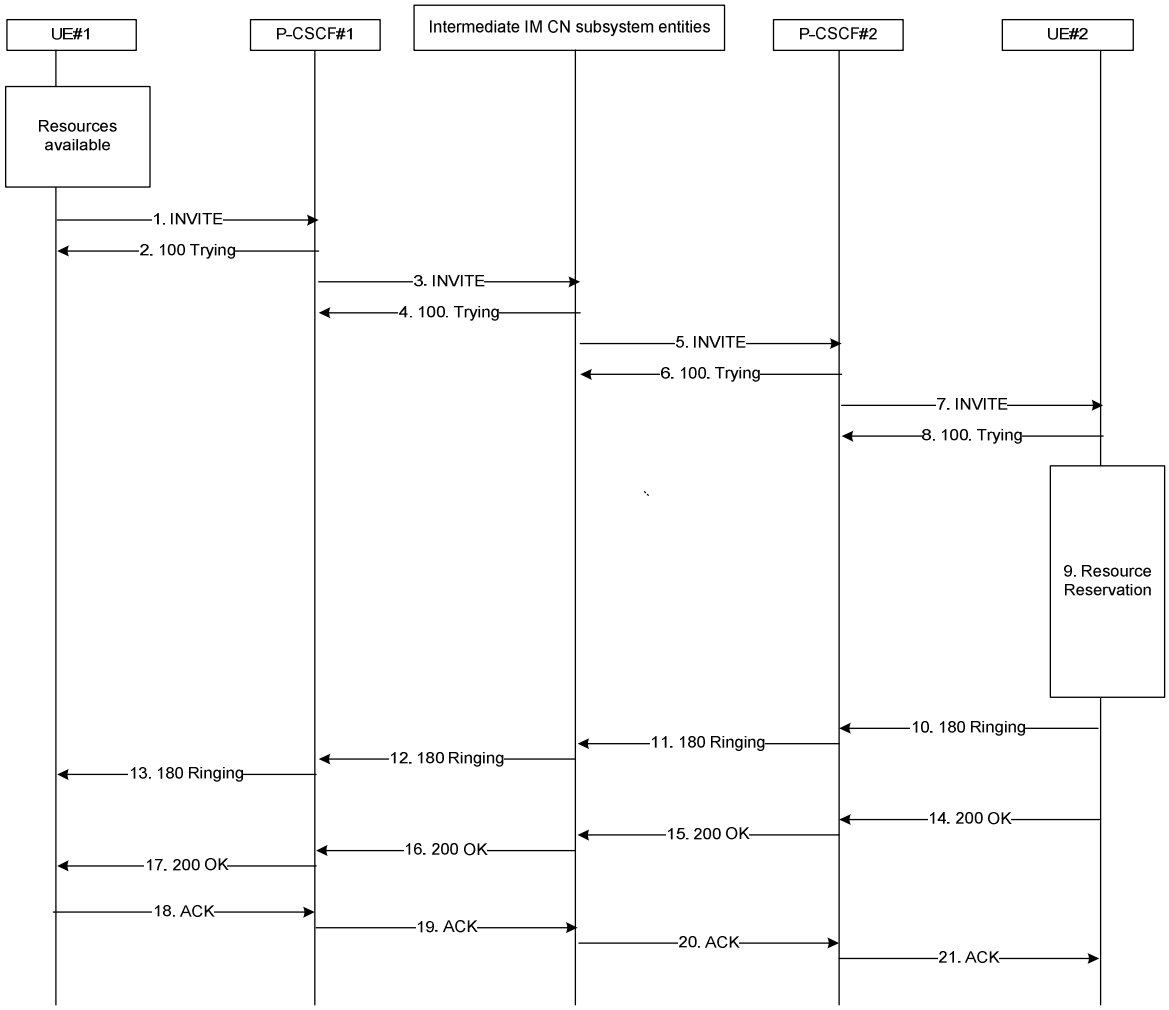

Figure 5.3-1: IMS session setup, resource reservation only on terminating side

The details of the signalling flows are as follows:

1. **INVITE request (UE#1 to P-CSCF#1) see example in table 5.3-1**

For this example, it is assumed that UE#1 is willing to establish a multimedia session comprising a video stream and an audio stream. The video stream supports H.263 codec. The audio stream supports the AMR codec.

UE#1indicates that it supports precondition and it indicates that it supports reliable provisional responses. However, it does not use the "Require' header for these capabilities.

UE#1 does have available the resources that are necessary to transport the media.

Table 5.3-1: INVITE request (UE#1 to P-CSCF)

```
INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
P-Preferred-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: sec-agree
Supported: precondition, 100rel
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321;
   port-c=8642; port-s=7531
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Type: application/sdp
Content-Length: (…)

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

Supported: The UE indicates support for the 'precondition' mechanism and the support for reliable provisional responses

SDP The SDP contains a set of codecs supported by UE#1 and desired by the user at UE#1 for this session.

2. **100 (Trying) response (P-CSCF#1 to UE#1)**

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

3. **INVITE request (P-CSCF#1 to S-CSCF#1) - see example in table 5.3-2**

Table 5.3-2: INVITE request (P-CSCF#1 to S-CSCF#1)

```
INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>
Record-Route: <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy:
From:
To:
Call-ID:
Cseq:
Supported:
Contact:
Allow:
Content-Type:
Content-Length: (…)

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

4. **100 (Trying) response (S-CSCF#1 to P-CSCF#1)**

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

5. **INVITE request (S-CSCF#2 to P-CSCF#2) see example in table 5.3-3**

Table 5.3-3: INVITE request (S-CSCF#2 to P-CSCF#2)

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

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

6. **100 (Trying) response (P-CSCF#2 to S-CSCF#2)**

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

7. **INVITE request (P-CSCF#2 to UE #2) - see example in table 5.3-4**

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

Table 5.3-4: INVITE request (P-CSCF#2 to UE#2)

```
INVITE sip:user2_public1@home2.net SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 67
Route: <sip:scscf2.home2.net;lr>
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>,
   <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity:
Privacy:
From:
To:
Call-ID:
Cseq:
Require:
Supported:
Contact:
Allow:
Content-Type:
Content-Length: (…)

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

8. **100 (Trying) response (UE#2 to P-CSCF)**

The UE responds to the INVITE request with a 100 (Trying) provisional response.

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

The terminating UE sets up the bearer in accordance with the media description.

10. – 13. **180 (Ringing) response**

UE#2 indicates that it is ringing. The UE#2 does not use Require '100rel' as the 180 (Ringing) response does not have a SDP and therefore need not to be sent reliable.

14 **200 (OK) response (UE#2 to P-CSCF#2) - see example in table 5.3-5**

UE indicates that the local resources are available

Table 5.3-5: 200(OK) response (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
Cseq:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555:: eee:fff:aaa:bbb
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=curr:qos local sendrececv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes
```

15. **200 (OK) response (P-CSCF#2 to S-CSCF#2) - see example in table 5.3-6**

Table 5.3-6: 200(OK) response (P-CSCF#2 to S-CSCF#2)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
Cseq:
Content-Type: application/sdp
Content-Length: (…)

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

16. **200 (OK) response (S-CSCF#1 to P-CSCF#1) - see example in table 5.3-7**

Table 5.3-7: 200(OK) response (S-CSCF#1 to P-CSCF#1)

```
SIP/2.0 200 OK
Via: pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
Cseq:
Content-Type: application/sdp
Content-Length: (…)

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

17. **200 (OK) response (P-CSCF#1 to UE#1) - see example in table 5.3-8**

Table 5.3-8: 200(OK) response (P-CSCF#1 to UE#1)

```
SIP/2.0 200 OK
Via: [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
Cseq:
Content-Type: application/sdp
Content-Length: (…)

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

18. –21. . **ACK request**

The calling party responds to the 200 (OK) response with an ACK request.

5.3.3 Signalling Flow (with SDP answer in reliable 180 Ringing) response

In the call flow shown in subclause 5.3.2, the SDP answer is returned to UE#1 in the final 200 (OK) response. An alternative call flow is shown in this section where SDP answer is returned to UE#1 in a reliable 180 (Ringing) response message.

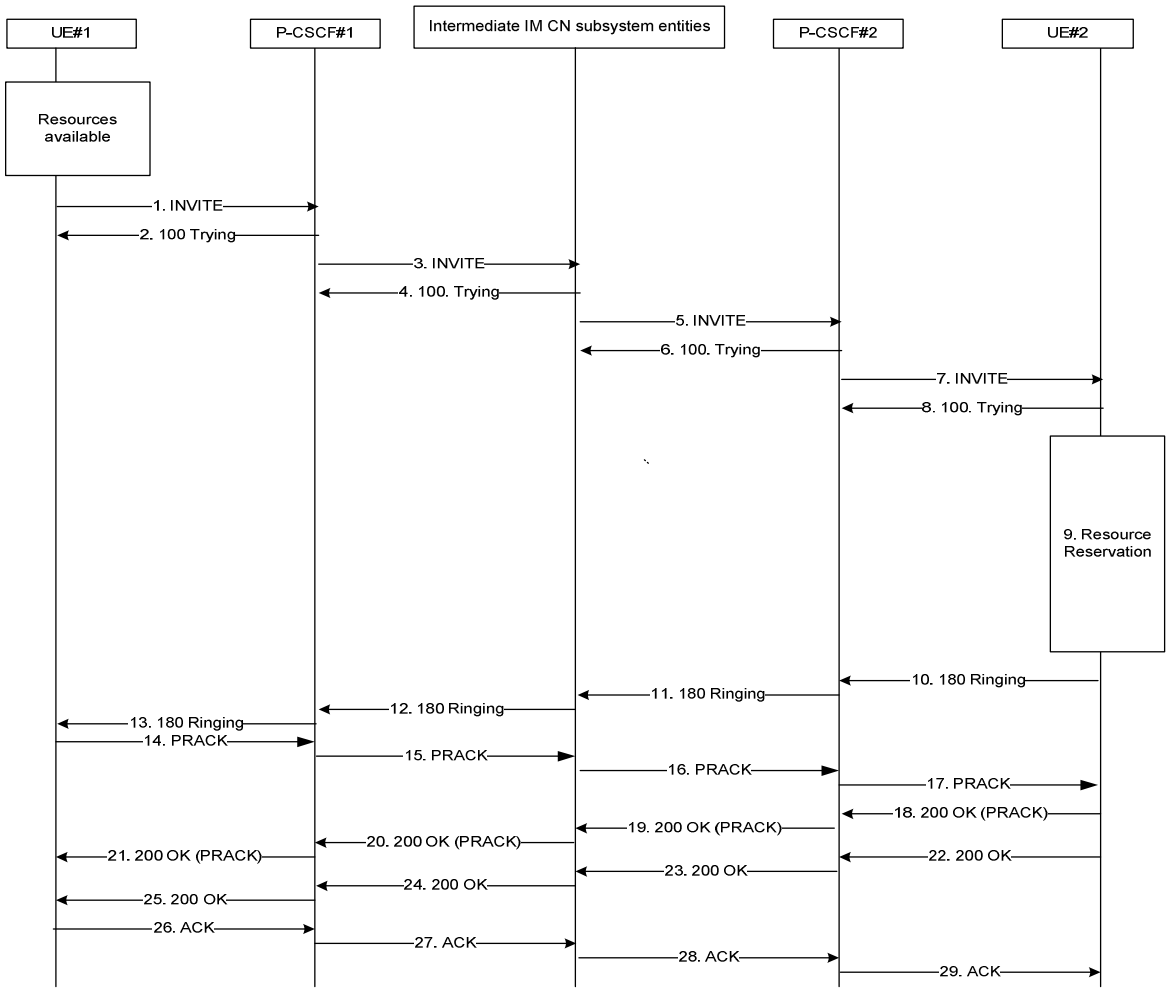

Figure 5.3-2: IMS session setup, resource reservation only on terminating side

The details of the signalling flows are as follows:

1. **INVITE request (UE#1 to P-CSCF#1) see example in table 5.3-9**

   For this example, it is assumed that UE#1 is willing to establish a multimedia session comprising a video stream and an audio stream. The video stream supports H.263 codec. The audio stream supports the AMR codec.

   UE#1indicates that it supports precondition and it indicates that it supports reliable provisional responses. However, it does not use the "Require' header for these capabilities.

   UE#1 does have available the resources that are necessary to transport the media.

Table 5.3-9: INVITE request (UE#1 to P-CSCF)

```
INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
P-Preferred-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: sec-agree
Supported: precondition, 100rel
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321;
   port-c=8642; port-s=7531
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Type: application/sdp
Content-Length: (…)

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

Supported: The UE indicates support for the 'precondition' mechanism and the support for reliable provisional responses

SDP The SDP contains a set of codecs supported by UE#1 and desired by the user at UE#1 for this session.

2. **100 (Trying) response (P-CSCF#1 to UE#1)**

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

3. **INVITE request (P-CSCF#1 to S-CSCF#1) - see example in table 5.3-10**

Table 5.3-10: INVITE request (P-CSCF#1 to S-CSCF#1)

```
INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>
Record-Route: <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy:
From:
To:
Call-ID:
Cseq:
Supported:
Contact:
Allow:
Content-Type:
Content-Length: (…)

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

4. **100 (Trying) response (S-CSCF#1 to P-CSCF#1)**

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

5. **INVITE request (S-CSCF#2 to P-CSCF#2) see example in table 5.3-11**

Table 5.3-11: INVITE request (S-CSCF#2 to P-CSCF#2)

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

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

6. **100 (Trying) response (P-CSCF#2 to S-CSCF#2)**

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

7. **INVITE request (P-CSCF#2 to UE #2) - see example in table 5.3-12**

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

Table 5.3-12: INVITE request (P-CSCF#2 to UE#2)

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

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

8. **100 (Trying) response (UE#2 to P-CSCF)**

   The UE responds to the INVITE request with a 100 (Trying) provisional response.

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

   The terminating UE sets up the bearer in accordance with the media description.

10. – 13. **180 (Ringing) response - see example in table 5.3-13**

    After the resources have been reserved, UE#2 indicates that it is ringing. Since the message includes the SDP answer, this message is sent reliably.

Table 5.3-13: 180 (Ringing) response (UE2 to P-CSCF2)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>,
   <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From:
To: <tel:+1-212-555-2222>;tag=2236
Call-ID:
Cseq:
Require: 100rel
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
RSeq: 9022
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555:: eee:fff:aaa:bbb
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes
```

14. - 17. **PRACK request - see example in table 5.3-14**

UE#1 acknowledges the receipt of the 180 (Ringing). It does not contain SDP as the final codec decision is already made as part of the initial offer/answer exchange

Table 5.3-14: PRACK request (UE1 to P-CSCF1)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>,
   <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=2236
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 128 PRACK
Require: precondition, sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321;
   port-c=8642; port-s=7531
RAck: 9021 127 INVITE
Content-Length: 0
```

18 - 21. **200 (OK) response to (PRACK request)**

UE#2 acknowledges the receipt of the PRACK request with the 200 (OK) response

22. **200 (OK) response (UE#2 to P-CSCF#2) - see example in table 5.3-15**

User #2 answers the phone and this triggers UE #2 to send the 200 (OK) response.

Table 5.3-15: 200(OK) response (UE to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
Cseq: 127 INVITE
Content-Length: 0
```

23. **200 (OK) response (P-CSCF#2 to S-CSCF#2) - see example in table 5.3-16**

Table 5.3-16: 200(OK) response (P-CSCF#2 to S-CSCF#2)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
Cseq:
Content-Length: 0
```

24. **200 (OK) response (S-CSCF#1 to P-CSCF#1) - see example in table 5.3-17**

Table 5.3-17: 200(OK) response (S-CSCF#1 to P-CSCF#1)

```
SIP/2.0 200 OK
Via: pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
Cseq:
Content-Length: 0
```

25. **200 (OK) response (P-CSCF#1 to UE#1) - see example in table 5.3-18**

Table 5.3-18: 200(OK) response (P-CSCF#1 to UE#1)

```
SIP/2.0 200 OK
Via: [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
Cseq:
Content-Length: 0
```

26 - 29. **ACK request**

The calling party responds to the 200 (OK) response with an ACK request.

5.4 Establishing a session when UE#1 need to reserve resources and UE#2 is non-IMS

5.4.1 Introduction

The following flow shows the establishment of a session where UE#1 is connected to the IM CN subsystem and needs to reserve local resources while UE#2 is plain SIP, i.e. does not support the preconditions framework

It is assumed that the originating UE uses a dedicated IP-CAN bearer for SIP signalling and dedicated IP-CAN bearer for media.

The box "Intermediate IM CN subsystem entities" stands for the combination of I-CSCF/S-CSCF on the originating Routing of messages between those nodes is not described in the flow below.

As the topology on the non-IMS, terminating side is not known, only a UE is shown on the terminating side. However, this does not rule out the possibility that there are proxies in the terminating signalling path.

5.4.2 Signalling Flow

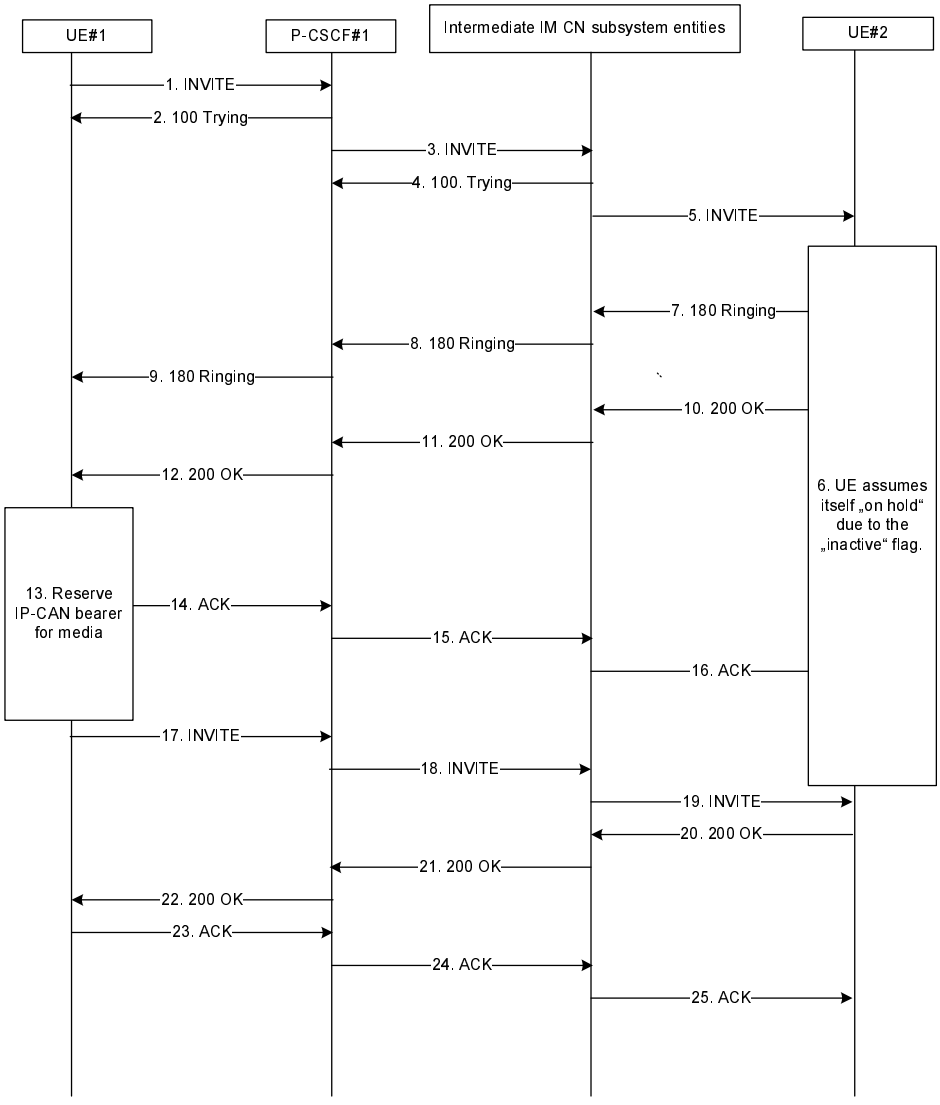

Figure 5.4-1: IMS session setup, resource reservation on both sides

The details of the signalling flows are as follows:

1. **INVITE request (UE#1 to P-CSCF#1) see example in table 5.4-1**

   For this example, it is assumed that UE#1 is willing to establish a multimedia session comprising a video stream and an audio stream. The video stream supports the H.263 coded. The audio stream supports the AMR codec.

   UE#1indicates that it supports precondition and it indicates that it supports reliable provisional responses. However, it does not use the "Require' header for these capabilities.

   UE#1 does not have available the resources that are necessary to transport the media.

Table 5.4-1: INVITE request (UE#1 to P-CSCF)

```
INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
P-Preferred-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: sec-agree
Supported: precondition, 100rel
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321;
   port-c=8642; port-s=7531
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Type: application/sdp
Content-Length: (…)

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

Supported: The UE indicates support for the "precondition" mechanism and the support for reliable provisional responses

SDP The SDP contains a set of codecs supported by UE#1 and desired by the user at UE#1 for this session. As the local preconditions are not fulfilled, both media are set to "inactive".

2. **100 (Trying) response (P-CSCF#1 to UE#1)**

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

3. **INVITE request (P-CSCF#1 to S-CSCF#1) - see example in table 5.4-2**

Table 5.4-2: INVITE request (P-CSCF#1 to S-CSCF#1)

```
INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>
Record-Route: <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy:
From:
To:
Call-ID:
Cseq:
Supported:
Contact:
Allow:
Content-Type:
Content-Length: (…)

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

4. **100 (Trying) response (S-CSCF#1 to P-CSCF#1)**

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

5. **INVITE request (S-CSCF#1 to UE#2) see example in table 5.4-3**

Table 5.4-3: INVITE request(S-CSCF#1 to UE#2)

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

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

```
a=
a=
a=
a=
```

6. UE#2 assumes itself on hold

UE#2 assumes itself on hold as media are set to inactive, i.e. UE#2 does not await or send media.

Resources are available.

7 -9 . 180 (Ringing) response

UE#2 indicates that it is ringing. It is assumed that UE#2 does not support the '100rel' extension and therefore the 180 (Ringing) response is not sent reliable, i.e. no SDP is sent in the 180 (Ringing) response.

10. 200 (OK) response (UE#2 to S-CSCF) - see example in table 5.4-5

User on the terminating side goes off hook. It is assumed that UE#2 plays some announcement to indicate to the user that the call is on hold.

UE#2 ignores the precondition that it received in the INVITE request as it does not support them. No preconditions are included in the SDP answer. Both media streams are set to "inactive".

Table 5.4-5: 200(OK) response (UE#2 to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To: <tel:+1-212-555-2222>;tag=314159
Call-ID:
Cseq:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP6 5555::eee:fff:ggg:hhh
s=-
c=IN IP6 5555::eee:fff:ggg:hhh
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=inactive
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=inactive
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes
```

11. 200 (OK) response (S-CSCF#1 to P-CSCF#1) - see example in table 5.4-6

Table 5.4-6: 200(OK) response (S-CSCF#1 to P-CSCF#1)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
Cseq:
Content-Type: application/sdp
Content-Length: (…)

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

12. 200 (OK) response (P-CSCF#1 to UE#1) - see example in table 5.4-7

Table 5.4-7: 200(OK) response (P-CSCF to UE#1)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
Cseq:
Content-Type: application/sdp
Content-Length: (…)

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

13 . Reserve IPCAN bearer for media

The originating UE sets up the bearer in accordance with the media description received SDP.

14.-16. .ACK request

The calling party responds to the 200 (OK) response with an ACK request.

17. INVITE request (UE#1 to P-CSCF#1) see example in table 5.4-8

UE#1 sets the media streams to active using a re-INVITE request

As UE#2 does not support preconditions, UE#1 does not include preconditions in the SDP.

Table 5.4-8: INVITE request (UE#1 to P-CSCF)

```
INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>; tag=314159
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 128 INVITE
Require: sec-agree
Supported: precondition, 100rel
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321;
   port-c=8642; port-s=7531
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=rtpmap:98 H263
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event
```

18. INVITE request (P-CSCF#1 to S-CSCF#1) see example in table 5.4-9

Table 5.4-9: INVITE request (P-CSCF#1 to S-CSCF)

```
INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>
Record-Route: <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
Cseq:
Supported:
Contact:
Allow:
Content-Type:
Content-Length:

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

19. INVITE request (S-CSCF#1 to UE#2) see example in table 5.4-10

Table 5.4-10: INVITE request (S-CSCF#1 to UE#2)

```
INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp
```

```
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards:
Record-Route: < sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From:
To:
Call-ID:
Cseq:
Supported:
Contact:
Allow:
Content-Type:
Content-Length:

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

20. 200 (OK) response (UE#2 to S-CSCF) - see example in table 5.4-11

UE#2 confirms the new SDP offer. Media is set to active

Table 5.4-11: 200(OK) response (UE#2 to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To: <
Call-ID:
Cseq:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP6 5555::eee:fff:ggg:hhh
s=-
c=IN IP6 5555::eee:fff:ggg:hhh
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes
```

21. 200 (OK) response (S-CSCF#1 to P-CSCF#1) - see example in table 5.4-12

Table 5.4-12: 200(OK) response (S-CSCF#1 to P-CSCF#1)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
Cseq:
Content-Type:
Content-Length:(…)

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

22. 200 (OK) response (P-CSCF#1 to UE#1) - see example in table 5.4-12

Table 5.4-7: 200(OK) response (P-CSCF to UE#1)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
From:
To:
Call-ID:
Cseq:
Content-Type: application/sdp
Content-Length: (…)

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

23.-25. .ACK request

The calling party responds to the 200 (OK) response with an ACK request.

5.5 Establishing a session when UE#1 is non-IMS and UE#2 needs to reserve resources

5.5.1 Introduction

The following flow shows the establishment of a session where UE#1 is a non-IMS UE. i.e. is plain SIP and UE#2 is an IMS and needs to perform resource reservation.

It is assumed that the terminating UE uses a dedicated IP-CAN bearer for SIP signalling and dedicated IP-CAN bearer for media.

The box "Intermediate IM CN subsystem entities" stands for the combination of I-CSCF/S-CSCF on the terminating side Routing of messages between those nodes is not described in the flow below.

As the topology on the non-IMS, originating side is not known, only a UE is shown on the terminating side. However, this does not rule out the possibility that there are proxies in the originating signalling path.

5.5.2 Signalling Flow

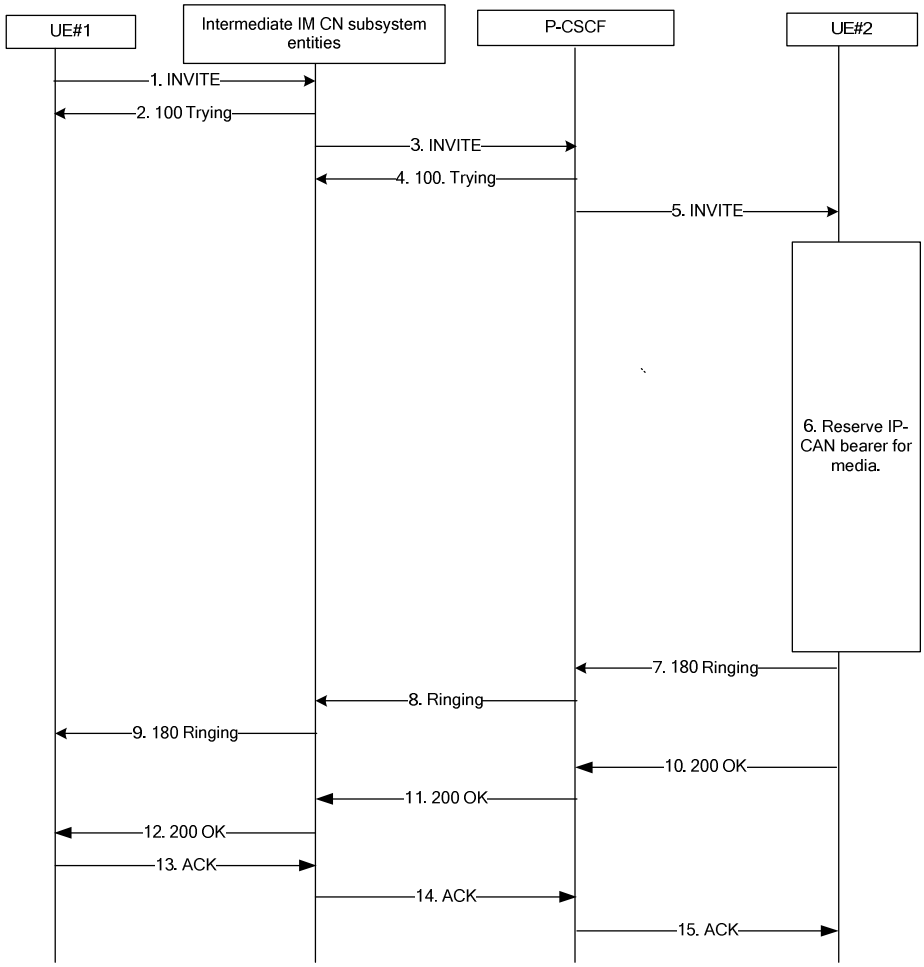

Figure 5.5-1: IMS session setup, resource reservation on terminating side

The details of the signalling flows are as follows:

1. **INVITE request (UE#1 to P-CSCF#1) see example in table 5.5-1**

For this example, it is assumed that UE#1 is willing to establish a multimedia session comprising a video stream and an audio stream. The video stream supports the H.263 coded. The audio stream supports the AMR codec.

UE# does not indicate that it supports precondition and does not indicate support for the 100rel extension.

Table 5.5-1: INVITE request (UE#1 to IM CN Subsystem entities)

```
INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
P-Preferred-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, REFER, MESSAGE
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=rtpmap:98 H263
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
a=rtpmap:96 telephone-event
```

SDP The SDP contains a set of codecs supported by UE#1 and desired by the user at UE#1 for this session.

2. 100 (Trying) response

The IM CN subsystem respond to the INVITE request with a 100 (Trying) provisional response.

3. INVITE request (S-CSCF to P-CSCF) - see example in table 5.5-2

Table 5.5-2: INVITE request (S-CSCF to P-CSCF)

```
INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Route: <sip:pcscf2.visited2.net;lr>
Record-Route: <sip:scscf2.home2.net;lr>
From:
To:
Call-ID:
Cseq:
Contact:
Allow:
Content-Type:
Content-Length: (…)

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

```
a=
a=
a=
a=
```

4. 100 (Trying) response (S-CSCF#1 to P-CSCF#1)

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

5. INVITE request (P-CSCF to UE) see example in table 5.5-3

Table 5.5-3: INVITE request (P-CSCF to UE)

```
INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 66
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>,
   <sip:scscf1.home1.net;lr>
From:
To:
Call-ID:
Cseq:
Require:
Contact:
Allow:
P-Called-Party-ID: <sip:user2_public1@home2.net>
Content-Type:
Content-Length: (…)

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

6. . Reserve IPCAN bearer for media

The IMS UE sets up the bearer in accordance with the media description received SDP and if necessary its codec decision.

7 -9 . 180 (Ringing) response

UE#2 indicates that it is ringing..

10. 200 (OK) response (UE#2 to P-CSCF) - see example in table 5.5-4

UE#2 does not use preconditions as they are not supported by the originating side.

Table 5.5-4: 200(OK) response (UE#2 to P-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From:
To: <tel:+1-212-555-2222>;tag=314159
Call-ID:
```

```
Cseq:
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
RSeq: 9021

Content-Type: application/sdp
Content-Length: (…)
v=0
o=- 2987933615 2987933615 IN IP6 5555::eee:fff:ggg:hhh
s=-
c=IN IP6 5555::eee:fff:ggg:hhh
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes
```

11. 200 (OK) response (P-CSCF to S-CSCF) - see example in table 5.5-5

Table 5.5-5: 200(OK) response (P-CSCF to S-CSCF)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
P-Access-Network-Info:
Privacy:
From:
To: <tel:+1-212-555-2222>;tag=314159
Call-ID:
Cseq:
Contact:
Allow:
RSeq:
Content-Type: application/sdp
Content-Length: (…)

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

12. 200 (OK) response (P-CSCF#1 to UE#1) - see example in table 5.5-6

Table 5.5-6: 200(OK) response (S-CSCF to UE#1)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route:
Privacy:
From:
To: <tel:+1-212-555-2222>;tag=314159
Call-ID:
Cseq:
Contact:
Allow:
RSeq:
Content-Type: application/sdp
```

```
Content-Length: (…)

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

13.-15. ACK request

The calling party responds to the 200 (OK) response with an ACK request.

5.6 Establishing a session when UE#1 and UE#2 do not need to reserve resources

5.6.1 Introduction

The following flows show the establishment of a session where both UE#1 and UE#2 is an IMS and do not need to perform resource reservation. The example that does not use preconditions is based on the Push to Talk over Cellular (PoC) on demand session establishment automatic answer scenario from OMA PoC 1.0 enabler but with a confirmed indication (no media buffering performed by the PoC Server). The example in subclause 5.6.3 shows the scenario where UE#1 has resources already reserved but supports the precondition mechanism and initiates session establishment following the procedures defined in 3GPP TS 24.229 [1] for when the originating UE supports preconditions. During session establishment the originating UE is unaware if the other endpoint requires the use of the preconditions mechanism or whether the other endpoint is required to reserve resources. In this example, the other endpoint, UE#2, also has its resources ready before answering the INVITE request with the first provisional response.

It is assumed that the both UEs uses a dedicated IP-CAN bearer for SIP signalling and dedicated IP-CAN bearer for media.

The box "Intermediate IM CN subsystem entities" stands for the combination of P-CSCF/I-CSCF/S-CSCF nodes in the network. Routing of messages between those nodes is not described in the flow below.

5.6.2 Signalling Flow (preconditions are not used)

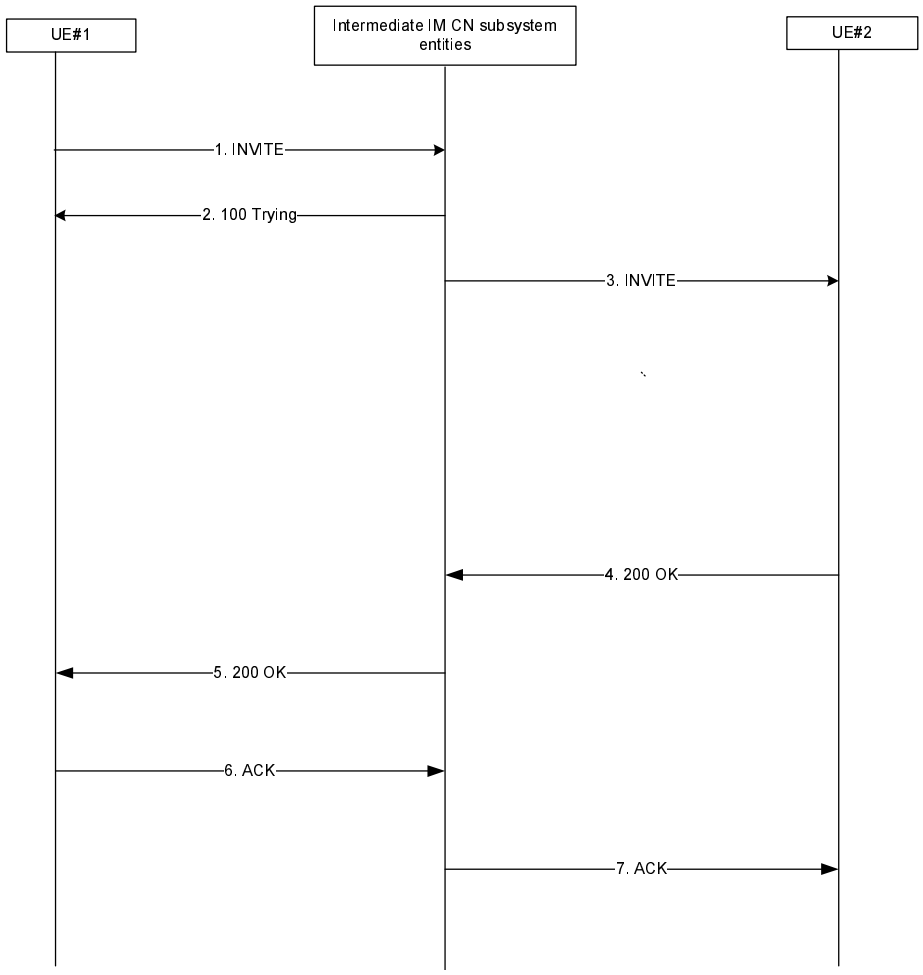

Figure 5.6-1: IMS session setup, no resource reservation, no preconditions

The details of the signalling flows are as follows:

1. **INVITE request (UE#1 to P-CSCF#1) see example in table 5.6-1**

   For this example, it is assumed that UE#1 is willing to establish a multimedia session comprising an audio stream. The audio stream supports the AMR codec.

   UE# does not indicate that it supports precondition and does not indicate support for the 100rel extension.

Within the Intermediate IM CN subsystem entities are two PoC Servers that acts as B2BUAs

Table 5.6-1: INVITE request (UE#1 to IM CN Subsytem entities)

```
INVITE sip:PoCConferenceFactoryURI.home1.net SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
P-Preferred-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: sec-agree,recipient-list-invite
Supported: timer
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321;
   port-c=8642; port-s=7531
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>;+g.poc.talkburst
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE, SUBSCRIBE, NOTIFY, PUBLISH
Accept-Contact: *;+g.poc.talkburst;require;explicit
User-Agent: PoC-client/OMA1.0 Acme-Talk5000/v1.01
Session-Expires: 1800;refresher=uac
Content-Type: multipart/mixed
Content-Length: (…)

--boundary1
Content-Type: application/sdp

v=0
o=- 2987933615 2987933615 IN IP6 5555::aaa:bbb:ccc:ddd
s=-
c=IN IP6 5555::aaa:bbb:ccc:ddd
t=0 0
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=rtpmap:97 AMR
a=rtcp:5560
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=application 2000 udp TBCP
a=fmtp:TBCP queuing=1; tb_priority=2; timestamp=1

--boundary1
Content-Type: application/resource-lists+xml
Content-Disposition: recipient-list

<?xml version="1.0" encoding="UTF-8"?>
<resource-lists xmlns="urn:ietf:params:xml:ns:resource-lists">
<list>
<entry uri="tel:+1-212-555-2222"/>
</list>
</resource-lists>
--boundary1--
```

SDP The SDP contains a set of codecs supported by UE#1 and desired by the user at UE#1 for this session.

Resource List The Resource List contains the URI of UE#2 being invited by the user at UE#1 for this session.

2. 100 (Trying) response

The IM CN subsystem respond to the INVITE request with a 100 (Trying) provisional response.

3. INVITE request (P-CSCF to UE) see example in table 5.6-2

Table 5.6-2: INVITE request (IM CN Subsytem entities to UE)

```
INVITE sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP PoC-
   SessionABCDEF@pocserver2.home2.net;session=1-1
Max-Forwards: 68
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>
From: <sip:user1_public1@home1.net>;tag=487651
To:
Call-ID: 03a0sdcglkj433s09a290bf3
Cseq: 10227 INVITE
Supported: norefersub,timer
Contact: <PoC-SessionABCDEF@pocserver2.home2.net;session=1-1>;+g.poc.talkburst
Allow:
P-Called-Party-ID: <sip:user2_public1@home2.net>
Accept-Contact: *;+g.poc.talkburst; require;explicit
User-Agent: PoC-serv/OMA1.0
Session-Expires: 1800;refresher=uas
Answer-Mode: Auto
Content-Type: application/sdp
Content-Length: (…)

v=
o=- 3361529879 3361529879 IN IP6 60333::ddd:ccc:aaa:bbb
s=
c=IN IP6 5555::ddd:ccc:aaa:bbb
t=
m=audio audio 63776 RTP/AVP 97
b=AS:25.4
a=rtpmap:97 AMR
a=rtcp:6390
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=application 60000 udp TBCP
a=fmtp:TBCP queuing=1; tb_priority=2; timestamp=1
```

4. 200 (OK) response (UE#2 to IM CN Subsytem entities) - see example in table 5.6-3

UE#2 does not use preconditions as they are not supported by the originating side.

Table 5.6-3: 200(OK) response (UE#2 to IM CN Subsytem entities)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   SessionABCDEF@pocserver2.home2.net;session=1-1
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From:
To: <tel:+1-212-555-2222>;tag=314159
Call-ID:
Cseq:
Require:timer
Contact: <sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp>;+g.poc.talkburst
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Server: PoC-client/OMA1.0 Acme-Talk5000/v1.01
Session-Expires: 1800;refresher=uas
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555::eee:fff:aaa:bbb
t=0 0
m=audio 3456 RTP/AVP 97
b=AS:25.4
a=rtpmap:97 AMR
a=rtcp:75000
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=application 75590 udp TBCP
a=fmtp:TBCP queuing=1; tb_priority=2; timestamp=1
```

5. 200 (OK) response (IM CN Subsytem entities to UE#1) - see example in table 5.6-4

Table 5.6-4: 200(OK) response (IM CN Subsytem entities to UE#1)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Record-Route: <sip:scscf1.home1.net;lr>,<sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>
Privacy:
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=257645
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Contact: <sip:PoC-SessionABCDEF@PoC-ServerA.home1.net;session=1-1>;+g.poc.talkburst
Allow:
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 3362987915 3362987915 IN IP6 57777::eee:fff:aaa:bbb
s=-
c=IN IP6 57777::eee:fff:aaa:bbb
t=0 0
m=audio 57787 RTP/AVP 97
b=AS:25.4
a=rtpmap:97 AMR
a=rtcp:57000
a=fmtp:97 mode-set=0,2,5,7; maxframes=2
m=application 57790 udp TBCP
a=fmtp:TBCP queuing=1; tb_priority=2; timestamp=1
```

6.-7. .ACK request

The calling party responds to the 200 (OK) response with an ACK request.

5.6.3 Signalling Flow (preconditions are used)

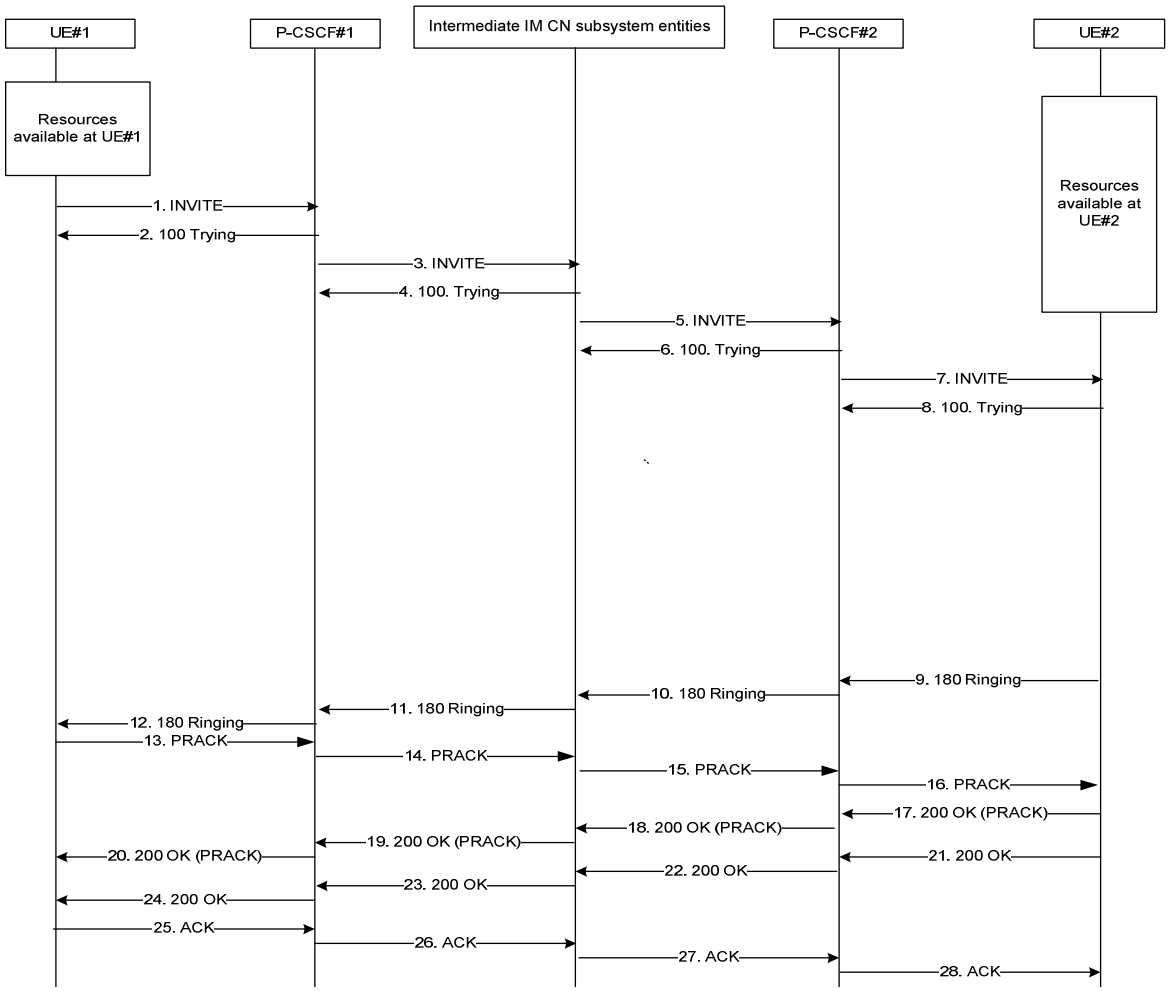

Figure 5.6-2: IMS session setup, no resource reservation, preconditions are used

The details of the signalling flows are as follows:

1. **INVITE request (UE#1 to P-CSCF#1) see example in table 5.6-5**

   For this example, it is assumed that UE#1 is willing to establish a multimedia session comprising a video stream and an audio stream. The video stream supports H.263 codec. The audio stream supports the AMR codec.

   UE#1indicates that it supports precondition and it indicates that it supports reliable provisional responses. However, it does not use the "Require' header for these capabilities.

   UE#1 does have available the resources that are necessary to transport the media.

Table 5.6-5: INVITE request (UE#1 to P-CSCF)

```
INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
Route: <sip:pcscf1.visited1.net:7531;lr;comp=sigcomp>, <sip:scscf1.home1.net;lr>
P-Preferred-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Privacy: none
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 127 INVITE
Require: sec-agree
Supported: precondition, 100rel
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321;
   port-c=8642; port-s=7531
Contact: <sip:[5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp>
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
Content-Type: application/sdp
Content-Length: (…)

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

Supported: The UE indicates support for the 'precondition' mechanism and the support for reliable provisional responses

SDP The SDP contains a set of codecs supported by UE#1 and desired by the user at UE#1 for this session.

2. **100 (Trying) response (P-CSCF#1 to UE#1)**

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

3. **INVITE request (P-CSCF#1 to S-CSCF#1) - see example in table 5.6-7**

Table 5.6-7: INVITE request (P-CSCF#1 to S-CSCF#1)

```
INVITE tel:+1-212-555-2222 SIP/2.0
Via: SIP/2.0/UDP pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 69
Route: <sip:scscf1.home1.net;lr>
Record-Route: <sip:pcscf1.visited1.net;lr>
P-Asserted-Identity: "John Doe" <sip:user1_public1@home1.net>
P-Access-Network-Info:
P-Charging-Vector: icid-value="AyretyU0dm+6O2IrT5tAFrbHLso=023551024"
Privacy:
From:
To:
Call-ID:
Cseq:
Supported:
Contact:
Allow:
Content-Type:
Content-Length: (…)

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

4. **100 (Trying) response (S-CSCF#1 to P-CSCF#1)**

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

5. **INVITE request (S-CSCF#2 to P-CSCF#2) see example in table 5.6-8**

Table 5.6-8: INVITE request (S-CSCF#2 to P-CSCF#2)

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

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

6. **100 (Trying) response (P-CSCF#2 to S-CSCF#2)**

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

7. **INVITE request (P-CSCF#2 to UE #2) - see example in table 5.6-9**

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

Table 5.6-9: INVITE request (P-CSCF#2 to UE#2)

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

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

8. **100 (Trying) response (UE#2 to P-CSCF)**

The UE responds to the INVITE request with a 100 (Trying) provisional response.

9. – 12. **180 (Ringing) response - see example in table 5.6-10**

UE#2 determines the complete set of codecs that it is capable of supporting for this session. It determines the intersection with those appearing in the SDP in the INVITE request. UE#2 makes the final codec selection and chooses H.263 and AMR.

UE#2 responds with a 180 (Ringing) response containing SDP sent reliably back to the originator. This response is sent to P-CSCF. The SDP answer indicates that resources are reserved at both endpoints.

Table 5.6-10: 180 (Ringing) response (UE#2 to P-CSCF#2)

```
SIP/2.0 180 Ringing
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
Record-Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>,
   <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From:
To: <tel:+1-212-555-2222>;tag=2236
Call-ID:
Cseq:
Require: 100rel
Allow: INVITE, ACK, CANCEL, BYE, PRACK, UPDATE, REFER, MESSAGE
RSeq: 9022
Content-Type: application/sdp
Content-Length: (…)

v=0
o=- 2987933615 2987933615 IN IP6 5555::eee:fff:aaa:bbb
s=-
c=IN IP6 5555:: eee:fff:aaa:bbb
t=0 0
m=video 3400 RTP/AVP 98
b=AS:75
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:98 H263
a=fmtp:98 profile-level-id=0
m=audio 3456 RTP/AVP 97 96
b=AS:25.4
a=curr:qos local sendrecv
a=curr:qos remote sendrecv
a=des:qos mandatory local sendrecv
a=des:qos mandatory remote sendrecv
a=rtpmap:97 AMR
a=fmtp:97 mode-set=0,2,5,7; maxframes
```

13. - 16. **PRACK request - see example in table 5.6-11**

UE#1 acknowledges the receipt of the 180 (Ringing) response with a PRACK request sent to UE#2. If UE#1 determines to make any further change in the media flows, it may include a new SDP answer in the PRACK request. In this example, the PRACK request does not contain SDP as the final codec decision is already made as part of the initial offer/answer exchange.

Table 5.6-11: PRACK request (UE#1 to P-CSCF#1)

```
PRACK sip:[5555::eee:fff:aaa:bbb]:8805;comp=sigcomp SIP/2.0
Via: SIP/2.0/UDP [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
Max-Forwards: 70
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
Route: <sip:pcscf2.visited2.net:5088;lr;comp=sigcomp>, <sip:scscf2.home2.net;lr>,
   <sip:scscf1.home1.net;lr>, <sip:pcscf1.visited1.net;lr>
From: <sip:user1_public1@home1.net>;tag=171828
To: <tel:+1-212-555-2222>;tag=2236
Call-ID: cb03a0s09a2sdfglkj490333
Cseq: 128 PRACK
Require: precondition, sec-agree
Proxy-Require: sec-agree
Security-Verify: ipsec-3gpp; q=0.1; alg=hmac-sha-1-96; spi-c=98765432; spi-s=87654321;
   port-c=8642; port-s=7531
RAck: 9021 127 INVITE
Content-Length: 0
```

17 - 20. **200 (OK) response (PRACK request)**

UE#2 acknowledges the receipt of the PRACK request with the 200 (OK) response

21. **200 (OK) response (UE#2 to P-CSCF#2) - see example in table 5.6-12**

User #2 answers the phone and this triggers UE #2 to send the 200 (OK) response to answer the INVITE request.

Table 5.6-12: 200(OK) response (UE#2 to P-CSCF#2)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP pcscf2.visited2.net:5088;comp=sigcomp;branch=z9hG4bK361k21.1, SIP/2.0/UDP
   scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
Cseq: 127 INVITE
Content-Length: 0
```

22. **200 (OK) response (P-CSCF#2 to S-CSCF#2) - see example in table 5.6-13**

Table 5.6-13: 200 (OK) response (P-CSCF#2 to S-CSCF#2)

```
SIP/2.0 200 OK
Via: SIP/2.0/UDP scscf2.home2.net;branch=z9hG4bK764z87.1, SIP/2.0/UDP
   icscf2_s.home2.net;branch=z9hG4bK871y12.1, SIP/2.0/UDP
   scscf1.home1.net;branch=z9hG4bK332b23.1, SIP/2.0/UDP
   pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
Cseq:
Content-Length: 0
```

23. **200 (OK) response (S-CSCF#1 to P-CSCF#1) - see example in table 5.6-14**

Table 5.6-14: 200 (OK) response (S-CSCF#1 to P-CSCF#1)

```
SIP/2.0 200 OK
Via: pcscf1.visited1.net;branch=z9hG4bK240f34.1, SIP/2.0/UDP
   [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
Cseq:
Content-Length: 0
```

24. **200 (OK) response (P-CSCF#1 to UE#1) - see example in table 5.6-15**

Table 5.6-15: 200 (OK) response (P-CSCF#1 to UE#1)

```
SIP/2.0 200 OK
Via: [5555::aaa:bbb:ccc:ddd]:1357;comp=sigcomp;branch=z9hG4bKnashds7
P-Access-Network-Info: 3GPP-UTRAN-TDD; utran-cell-id-3gpp=234151D0FCE11
From:
To:
Call-ID:
Cseq:
Content-Length: 0
```

25 - 28. **ACK request**

The calling party responds to the 200 (OK) response with an ACK request.

Annex A (informative): Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
2006-02					skeleton of the TR	0.0.0	0.0.0
2006-02					Version 0.1.0 created as a result of CT1#41 The following CR's were incorporated and the editor adopted their content / structure to the revised TR structure: C1-060227 - only UE#1 needs to perform resource reservation C1-060537 - UE#1 and UE#2 need to perform resource reservation C1-060538 - only UE#2 needs to perform resource reservation	0.0.0	0.1.0
2006-05					The following CR's were incorporated and the editor adopted their content / structure to the revised TR structure: C1-060701 - Establishing a session when UE#1 need to reserve resources and UE#2 is non-IMS C1-060703 - Miscellaneous Corrections against 24.930 C1-061066 - Establishing a session when UE#1 is non-IMS and UE#2 needs to reserve resources	0.1.0	0.2.0
2006-09					The following CR's were incorporated and the editor adopted their content / structure to the revised TR structure: C1-061640 - PoC Session Establishment Flow C1-061757 - show encryption in Security-Verify C1-061878 - Call flow when originator has resources reserved and the called party needs to reserve resources	0.2.0	0.3.0
2006-09	CT-33	CP-060451			Version 1.0.0 created for presentation to CT#33	0.3.0	1.0.0
2006-11					Version 1.1.0 created as a result of CT1#44 The following CR"s were incorporated and the editor adopted their content / structure to the TR. C1-062323 - Editorial Tidy up of TR 24.930 C1-062330 - Editorial Changes	1.0.0	1.1.0
2006-11	CT-34				V2.0.0 created by MCC to present TR for approval	1.1.0	2.0.0
2006-12					V7.0.0 created by MCC as V2.0.0 was approved in CP-060651	2.0.0	7.0.0
2007-03	CT-35	CP-070140	0001		REmoval of SDP in 200 (OK) INVITE	7.0.0	7.1.0
2007-06	CT-36	CP-070374	0003	2	Network initiated IP-CAN bearer setup	7.1.0	7.2.0
2007-06	CT-36	CP-070374	0002	3	Additional call flow for establishing a session when both endpoints do not need to reserve resources	7.1.0	7.2.0
2007-06	CT-36	CP-070469	0004	2	Editorial Updates to Session Establishment Flows	7.1.0	7.2.0
2007-12	CT-38	CP-070799	0006	3	Clarification on Network initiated IP-CAN bearer setup	7.2.0	7.3.0

History

Document history		
V7.2.0	July 2007	Publication
V7.3.0	January 2008	Publication