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SERIES Q: SWITCHING AND SIGNALLING

Specifications of signalling related to Bearer Independent Call Control (BICC)

BICC IP bearer control protocol

ITU-T Recommendation Q.1970

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ITU-T Recommendation Q.1970

BICC IP bearer control protocol

Summary

This Recommendation defines BICC IP bearer control protocol. BICC IP bearer control protocol (IPBCP) is used for the exchange of media stream characteristics, port numbers and IP addresses of the source and sink of a media stream to establish and allow the modification of IP bearers. The information exchanged with IPBCP is done during BICC call establishment. In addition it may be exchanged after a call has been established. IPBCP uses the Session Description Protocol (SDP) defined in RFC 4566 to encode this information.

Source

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BICC IP bearer control protocol

1 Scope

This Recommendation defines IP bearer control protocol (IPBCP), which is suitable for use in IP network environments where the Bearer Independent Call Control (BICC) protocol is deployed. IPBCP can be used also in other environments. BICC IPBCP is used for the exchange of media stream characteristics, port numbers and IP addresses of the source and sink of a media stream to establish and allow the modification of IP bearers. The exchange of information with IPBCP is done during BICC call establishment and after a call has been established. IPBCP uses the Session Description Protocol (SDP) defined in RFC 4566 [10] to encode this information.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[1] ITU-T Recommendation Q.1901 (2000), *Bearer Independent Call Control protocol*.

[2] ITU-T Recommendation Q.1902.1 (2001), *Bearer Independent Call Control protocol (Capability Set 2): Functional description*.

[3] ITU-T Recommendation Q.1902.2 (2001), *Bearer Independent Call Control protocol (Capability Set 2) and Signalling System No. 7 ISDN User Part: General functions of messages and parameters*.

[4] ITU-T Recommendation Q.1902.3 (2001), *Bearer Independent Call Control protocol (Capability Set 2) and Signalling System No. 7 ISDN User Part: Formats and codes*.

[5] ITU-T Recommendation Q.1902.4 (2001), *Bearer Independent Call Control protocol (Capability Set 2): Basic call procedures*.

[6] ITU-T Recommendation Q.1902.5 (2001), *Bearer Independent Call Control protocol (Capability Set 2): Exceptions to the Application transport mechanism in the context of BICC*.

[7] ITU-T Recommendation Q.1902.6 (2001), *Bearer Independent Call Control protocol (Capability Set 2): Generic signalling procedures for the support of the ISDN User Part supplementary services and for bearer redirection.*

[8] IETF RFC 791 (1981), *Internet Protocol*.

[9] IETF RFC 3550 (2003), *RTP: A Transport Protocol for Real-Time Applications*.

[10] IETF RFC 4566 (2006), *SDP: Session Description Protocol*.

[11] IETF RFC 2460 (1998), *Internet Protocol, Version 6 (IPv6) Specification*.

[12] IETF RFC 2833 (2000), *RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals*.

[13] IETF RFC 3388 (2002), *Grouping of Media Lines in the Session Description Protocol (SDP).*

[14] IETF RFC 4091 (2005), *The Alternative Network Address Types (ANAT) Semantics for the Session Description Protocol (SDP) Grouping Framework.*

[15] ITU-T Recommendation Q.1970 (2001), *BICC IP Bearer Control Protocol.*

3 Terms and definitions

For the purpose of this Recommendation, the definitions of ITU-T Rec. Q.1902.1 [2] apply. In addition, this Recommendation defines the following terms:

3.1 IP bearer: A bidirectional user plane association between two BIWFs for carrying media stream information across IP networks. An IP bearer is an instance of a Backbone network connection (BNC) type defined in clause 3/Q.1902.1 [2].

3.2 initiating bearer interworking function (I-BIWF): A BIWF initiating the establishment of an IP bearer.

3.3 receiving bearer interworking function (R-BIWF): A BIWF receiving an IP bearer establishment request.

3.4 network default address type: An address type (either IPv4 or IPv6) which is deployed in a network operating with signalling defined in IPBCP version 1 (Q.1970 (07/01) [15]).

4 Abbreviations

This Recommendation uses the following abbreviations:

BCF Bearer Control Function

BICC Bearer Independent Call Control

BIWF Bearer InterWorking Function

BNC Backbone Network Connection

CSF Call Service Function

DTMF Dual Tone Multi-Frequency

I-BIWF Initiating BIWF

IP Internet Protocol

IPBCP IP Bearer Control Protocol

R-BIWF Receiving BIWF

RTP Real time Transport Protocol

SDP Session Description Protocol

UDP User Datagram Protocol

5 Overview

The purpose of IP bearer control protocol (IPBCP) is to exchange information between two BIWFs necessary to establish or modify IP bearers. IPBCP makes use of the Session Description Protocol (SDP) defined in RFC 4566 [10] to encode the information that is exchanged. SDP descriptors used for IPBCP also contain IPBCP-specific SDP attributes.

6 IPBCP messages

IPBCP uses messages to convey information between peer BIWFs. IPBCP defines four messages:

- The Request message is sent by a BIWF to initiate an IP bearer establishment or modification request. The BIWF that initiates an IP bearer establishment request is denoted as the I-BIWF.
- The Accepted message is sent by the BIWF that receives an IP bearer establishment or modification message if it accepts the request. The BIWF that receives an IP bearer establishment request is denoted as the R-BIWF.
- The Confused message is sent by a BIWF in response to an IP bearer establishment or modification request if it cannot process the received Request message.
- The Rejected message is sent by a BIWF in response to an IP bearer establishment or modification request if it rejects the request.

Either an I-BIWF or an R-BIWF may initiate an IP bearer modification request.

6.1 IPBCP message contents

Each IPBCP message consists of the following SDP fields:

Session and time description fields:

1) Protocol version (v);
2) Origin (o);
3) Session name (s);
4) Connection data (c);
5) Session attribute (a) – The session attribute identifies IPBCP version and message type;
6) Time (t).

Media description fields:

1) Media Announcement (m);
2) Media connection data (c) – Additional connection data for the support of the Alternative Network Address Type;
3) Media attributes (a) – Additional attributes for the support of RTP dynamic payload types, DTMF, other tones and signals and packetization time.

NOTE 1 – Some of the fields and subfields are included because they are mandatory and required by SDP but not relevant to IPBCP environment.

NOTE 2 – The above fields must be present in the order as specified in RFC 4566 [10].

NOTE 3 – Other SDP fields may be included in an IPBCP message; however, they are not required by this Recommendation and may be discarded by the receiver if they are not understood.

NOTE 4 – The Connection data field is not present if Media connection data fields are present.

6.2 IPBCP message fields

The following list describes SDP fields as used by IPBCP:

1) Protocol version

   v=0 SDP version 0 is used.

2) Origin

   o=<username> <session id> <version> <network type> <address type> <address>

   <username> is set to "-"; not used by IPBCP.

   <session id> is set to "0"; not used by IPBCP.

<version> see RFC 4566 [10].

<network> type is "IN", for Internet.

<address type> is "IP4" or "IP6".

<address> is the IP address assigned to the BIWF sending an IPBCP message.

The receiver shall ignore the content of the address subfield. IPBCP has no requirements on the content of the origin field.

NOTE 1 – The above subfields are required to respect SDP rules.

3) Session name

s=<session name> is an arbitrary string identifying the session. IPBCP has no requirements on the contents of the session name field.

4) Connection data

c=<network type> <address type> <connection address>

<network type> is "IN".

<address type> is "IP4" or "IP6".

<connection address> is a unicast address. Only unicast streams are supported (e.g., point-to-point) in this version of IPBCP. For the details, see RFC 4566 [10].

NOTE 2 – The Connection data field is not present if Media connection data fields are present.

5) Time

t=<start time> <stop time>

The sender shall set <start time> and <stop time> according to SDP rules. The receiver shall ignore the contents of this field. Values (0,0) are allowed. IPBCP has no requirements on the contents of the Time field.

6) Session attribute

SDP session attribute "ipbcp" provides the means to identify the IPBCP version and to distinguish between Request, Accepted, Confused and Rejected messages.

a=ipbcp: <version> <type>

<version> = 2; this Recommendation defines IPBCP version 2. See ITU-T Rec. Q.1970 (07/01) BICC IP Bearer Control Protocol [15] for the definition of IPBCP version 1.

<type> = ("Request"/"Accepted"/"Confused"/"Rejected")

NOTE 3 – Since IPBCP only supports the establishment of bidirectional bearers, these bearers are by default of type send and receive. Therefore, the SDP attribute a=sendrecv does not need to be signalled.

SDP session attribute "group:ANAT" provides the means to support the Alternative Network Address Type. For the details, see RFC 3388 [13] and RFC 4091 [14].

a=group:ANAT <media stream identifier1> <media stream identifier2>

<media stream identifier1> = 1.

<media stream identifier2> = 2.

7) Media Announcement

m=<media> <port> <transport> <fmt list>

The "fmt list" is limited to only one payload type. For further details, see RFC 4566 [10].

8) Media connection data

To specify Alternative Network Address Types, the format of the media connection data is as follows:

c=<network type> <address type> <connection address>

<network type> is "IN".

<address type> is "IP4" or "IP6".

<connection address> is a unicast address. Only unicast streams are supported (e.g., point-to-point) in this version of IPBCP. For the details, see RFC 4566 [10].

9) Media attributes

To specify capabilities for DTMF digits and other tones and signals, the format of the media attribute is as follows:

a=fmtp:<format> <format specific parameters>

For further details, see RFC 2833 [12].

To specify RTP dynamic payload types, the formats of the media attribute are:

a=rtpmap:<payload> <encoding name>/<clock rate>

For further details, see RFC 4566 [10].

To specify the packetization time, the format of the media attribute is:

a=ptime:<packet time>

where <packet time> is the media packetization time in milliseconds. For further details, about the use of the ptime attribute with RTP see RFC 4566 [10].

To group the above Media connection data and the Media attributes, the format of the media attribute is:

a=mid:<media stream identifier>

where <media stream identifier> labels the Media connection data/Media attribute group as either 1 or 2, with 1 being the higher preference grouping. For the details, see RFC 3388 [13].

7 Transport of IPBCP messages

IPBCP assumes a reliable, sequenced, point-to-point signalling transport service between peer BIWFs.

8 Procedures

8.1 Successful IP bearer establishment

8.1.1 Initiating BIWF

8.1.1.1 BIWF supporting only one network address type

When an I-BIWF receives a request from a control entity to establish an IP bearer, it shall send a Request message to the R-BIWF and start timer T1. The Request message must include one Media Announcement ("m" field). The "c" field shall include an interface address within the I-BIWF, which specifies the intended source and sink of the media stream at the I-BIWF. The request message may also contain optional media attribute fields such as tone and signal capabilities and packetization time.

Upon reception of an Accepted message from the R-BIWF, the I-BIWF shall stop timer T1 and shall check the Accepted message. Successful IP bearer establishment requires that:

- the received Media Announcement is the same as the one included in the Request message, except for the port subfield which can be different;
- except for the ptime and tone and signal capabilities, the media attribute fields must be the same as the ones included in the Request message;
- the optional ptime, tone and signal capabilities, if included in the Accepted message, are acceptable values.

If the I-BIWF accepts the contents of the Accepted message, the IP bearer is successfully established at both BIWFs, and the control entity that initiated the establishment request shall be notified.

8.1.1.2 BIWF supporting alternative network address types

When an I-BIWF receives a request from a control entity to establish an IP bearer, it shall send a Request message to the R-BIWF and start timer T1. The Request message shall include two Media Announcements ("m" fields), corresponding to the two Alternative Network Addresses. The two Media Announcements must be identical, except for the port number which can be different.

The two Media Announcements and their associated Media connection data and Media attributes are grouped using the Media stream identifier attribute ("a=mid"), corresponding to the Group session attribute ("a=group"). The Media stream identifier attribute is mandatory for both Media Announcements.

The 1st Media connection data ("c" field) shall include the interface address corresponding to the preferred address type (i.e., IP4 or IP6) within the I-BIWF, which specifies the intended source and sink of the preferred media stream at the I-BIWF. The 2nd Media connection data ("c" field) shall include the interface address corresponding to the second preference address type within the I-BIWF, which specifies the intended source and sink of the second preference media stream at the I-BIWF. If the preferred address type was IPv4, then the second preference address type shall be IPv6. If the preferred address type was IPv6, then the second preference address type shall be IPv4.

NOTE 1 – Due to the presence of the Media connection data fields associated with each Media Announcement, the Session connection data is not included in the Request message.

The request message may also contain optional Media attribute fields such as tone and signal capabilities and packetization time. These optional Media attribute fields must be identical in both groups of Media Announcements.

Upon reception of an Accepted message from the R-BIWF, the I-BIWF shall stop timer T1 and shall check the Accepted message. Successful IP bearer establishment requires that:

- the received Media Announcements are the same as both Media Announcements included in the Request message, except for the port subfield which can be different. One of these port subfields must be zero, indicating that this Media Announcement has not been selected by the R-BIWF;
- the order and grouping of the two Media Announcements are in the same order and grouping as the Request message. The Media stream identifier attribute ("a=mid") is mandatory for both Media Announcements;
- except for the ptime and tone and signal capabilities, the media attribute fields must be the same as the ones included in the Request message;
- the optional ptime, tone and signal capabilities, if included in the Accepted message, are acceptable values.

NOTE 2 – The Media connection data and optional Media attributes grouped with the Media Announcement which has not been selected (i.e., port subfield is zero, Media connection data indicates "null" IP address) are ignored.

If the I-BIWF accepts the contents of the Accepted message, the IP bearer is successfully established at both BIWFs, and the control entity that initiated the establishment request shall be notified.

8.1.2 Receiving BIWF

8.1.2.1 If Session Attribute "group=ANAT" not present

Upon reception of a Request message from the I-BIWF, the R-BIWF examines the information in the Request message, and if it is acceptable, shall reply to the I-BIWF with an Accepted message. The Accepted message must include one SDP "m" field. The "c" field shall include an interface address within the R-BIWF, which will be the source and sink of the media stream at the R-BIWF. Except for the port subfield, the "m" field must be identical to the one received in the Request message. The Accepted message may also contain optional media attribute fields such as tone and signal capabilities and packetization time. Returning an Accepted message to the I-BIWF implies that the IP bearer has been established at the R-BIWF.

8.1.2.2 If Session Attribute "group=ANAT" present

Upon reception of a Request message from the I-BIWF, the R-BIWF examines the information in the Request message, and selects an interface address corresponding to one of the address types (i.e., IP4 or IP6) received from the I-BIWF.

If the received Request message is acceptable, the R-BIWF shall reply to the I-BIWF with an Accepted message. The Accepted message must include two SDP "m" fields, one of which shall have the port number set to zero, indicating that this Media Announcement has not been selected. The order and grouping of the two Media Announcements are in the same order and grouping as the Request message. Except for the port subfield, the "m" field must be identical to the corresponding Media Announcement received in the Request message.

The Media stream identifier attribute ("a=mid") is mandatory for both Media Announcements. The "c" field associated with the selected Media Announcement shall include an interface address within the R-BIWF, which will be the source and sink of the media stream at the R-BIWF. The "c" field associated with the Media Announcement which has not been selected shall contain a "null" IP address ("0.0.0.0" for IPv4; "0:0:0:0:0:0:0:0" or "::" for IPv6). The Accepted message may also contain optional media attribute fields associated with the selected Media Announcement such as tone and signal capabilities and packetization time.

NOTE – Due to the presence of the Media connection data fields associated with each Media Announcement, the Session connection data is not included in the Accepted message.

Returning an Accepted message to the I-BIWF implies that the IP bearer has been established at the R-BIWF.

8.2 Successful IP bearer modification

Once an IP bearer is established, it can be modified at the request of a control entity at the I-BIWF or the R-BIWF. Only the "fmt list" of the media announcement field and the media attributes being used for an IP bearer can be modified.

8.2.1 BIWF initiating IP bearer modification

8.2.1.1 If Session Attribute "group=ANAT" was not present in bearer establishment

The BIWF initiating the modification request sends a Request message to its peer BIWF and starts timer T2. The Request message must include a single Media Announcement ("m" field) and the media attributes to be changed.

Upon reception of an Accepted message from the peer BIWF, the BIWF that initiated the IP bearer modification request stops timer T2 and checks the Accepted message. Successful IP bearer modification requires that:

- The received Media Announcement is the same as the one included in the Request message, except for the port subfield which can be different.
- Except for the ptime and tone and signal capabilities, the media attribute fields must be the same as the ones included in the Request message.
- The optional ptime, tone and signal capabilities, if included in the Accepted message, are acceptable values.

If the BIWF accepts the contents of the Accepted message, the IP bearer is successfully modified at both BIWFs and the control entity that initiated the modification request shall be notified.

8.2.1.2 If Session Attribute "group=ANAT" was present in bearer establishment

The BIWF initiating the modification request sends a Request message to its peer BIWF and starts timer T2. The Request message shall include two Media Announcements ("m" fields), the Media steam attribute ("a=mid") for both Media Announcements and the media attributes to be changed. The order and grouping of the two Media Announcements shall be in the same order and grouping as in the bearer establishment. The port subfield for the Media Announcement that is not being used shall be set to zero.

The "c" fields associated with the Media Announcements shall not be modified from those already determined during Bearer Establishment. The "c" field associated with the used Media Announcement contains the used connection address, the "c" field associated with the unused Media Announcement contains a "null" address ("0.0.0.0" for IPv4; "0:0:0:0:0:0:0:0" or "::" for IPv6).

NOTE – Due to the presence of the Media connection data fields associated with each Media Announcement, the Session connection data is not included in the Request message.

Upon reception of an Accepted message from the peer BIWF, the BIWF that initiated the IP bearer modification request stops timer T2 and checks the Accepted message. Successful IP bearer modification requires that:

- The received Media Announcements are the same as both Media Announcements included in the Request message, except for the port subfield which can be different. The port subfield for the Media Announcement that is not being used must be zero.
- The order and grouping of the two Media Announcements are in the same order and grouping as the Request message. The Media stream identifier attribute ("a=mid") and Media connection data ("c=") are mandatory for both Media Announcements.
- Except for the ptime and tone and signal capabilities, the media attribute fields must be the same as the ones included in the Request message.
- The optional ptime, tone and signal capabilities, if included in the Accepted message, are acceptable values.

If the BIWF accepts the contents of the Accepted message, the IP bearer is successfully modified at both BIWFs and the control entity that initiated the modification request shall be notified.

8.2.2 BIWF receiving IP bearer modification

8.2.2.1 If Session Attribute "group=ANAT" was not present in bearer establishment

Upon reception of a Request message that applies to an existing IP bearer, the BIWF checks the Request message and, if acceptable, replies with an Accepted message. The Accepted message must contain a single Media Announcement ("m" field). Except for the "port" subfield, this Media Announcement must be identical to the one received in the Request message. The ptime, tone and signal capabilities may be different from the values received in the Request message. Returning an Accepted message implies that the IP bearer has been successfully modified at the BIWF.

8.2.2.2 If Session Attribute "group=ANAT" was present in bearer establishment

Upon reception of a Request message that applies to an existing IP bearer, the BIWF checks the Request message and, if acceptable, replies with an Accepted message. The Accepted message must contain two Media Announcements ("m" fields), the order and grouping of the two Media Announcements shall be in the same order and grouping as in the bearer establishment. The port subfield for the Media Announcement that is not being used shall be set to zero. Except for the "port" subfield, this Media Announcement must be identical to the one received in the Request message. The Media stream identifier attribute ("a=mid") and Media connection data ("c=") are mandatory for both Media Announcements.

NOTE – Due to the presence of the Media connection data fields associated with each Media Announcement, the Session connection data is not included in the Request message.

The ptime, tone and signal capabilities may be different from the values received in the Request message. Returning an Accepted message implies that the IP bearer has been successfully modified at the BIWF.

8.3 IP bearer release

There are no IPBCP messages exchanged between the two BIWFs to release an IP bearer.

NOTE – When IPBCP is used in BICC environment, IP bearer release is triggered by CSF.

8.4 Compatibility procedures

IPBCP uses a basic compatibility mechanism based on version numbers, included in each IPBCP message. Each future revision of this Recommendation shall support the version subfield. Peer BIWFs must use the same version of IPBCP in all messages related to the same IP bearer, except for the Confused message, when the R-BIWF does not support IPBCP version of the I-BIWF.

An R-BIWF receiving an IPBCP message with an unsupported version shall return a Confused message with the version it supports.

An I-BIWF receiving a Confused message shall examine the IPBCP version number indicated in the message. If the version number indicated in the Confused message is supported by the I-BIWF, it may re-initiate an IP bearer establishment request using this version number. Otherwise, the I-BIWF notifies the control entity that initiated IP bearer establishment request.

8.4.1 Re-initiation of bearer establishment request for I-BIWF supporting alternative network address types

For the specific case where a Confused message is received, indicating that the R-BIWF only supports IPBCP version 1, in response to a Request message where the "group:ANAT" session attribute was specified, the I-BIWF shall re-initiate an IP bearer establishment request (see 8.4 above) by sending a Request message according to 8.1.1.1 with:

– the "ipbcp" session attribute indicating IPBCP version 1;

– the Session connection data ("c" field), which shall include an interface address within the I-BIWF, which specifies the intended source and sink of the media stream at the I-BIWF. The network address type of this interface address shall correspond to the Network Default Address Type.

NOTE – This implies that where there are networks with a mix of BIWFs which support either IPBCP version 1 or 2, a Network Default Address Type shall be specified for that network, and all BIWFs in that network must support that Network Default Address Type.

8.5 Procedures for exceptional conditions

8.5.1 IP bearer establishment

8.5.1.1 Initiating BIWF

Upon reception of a Rejected message or an incorrect or erroneous Accepted message from the R-BIWF, the I-BIWF shall stop timer T1, release the resources allocated to the IP bearer and notify the control entity that the IP bearer establishment has failed.

8.5.1.2 Receiving BIWF

8.5.1.2.1 If Session Attribute "group=ANAT" not present

Upon reception of a Request message from the I-BIWF, the R-BIWF shall check the contents of the message. If they are incorrect or the Media Announcement that is offered in the Request message is not supported, the R-BIWF shall reply to the I-BIWF with a Rejected message.

8.5.1.2.2 If Session Attribute "group=ANAT" present

Upon reception of a Request message from the I-BIWF, the R-BIWF shall check the contents of the message. If they are incorrect or both of the Media Announcements that are offered in the Request message are not supported, the R-BIWF shall reply to the I-BIWF with a Rejected message.

8.5.2 IP bearer modification

8.5.2.1 BIWF initiating IP bearer modification

When the BIWF that initiated a bearer modification receives a Rejected message or an incorrect Accepted message from the peer BIWF, the BIWF initiating the IP bearer modification request shall stop timer T2 and notify the control entity that the modification request attempt has failed.

8.5.2.2 BIWF receiving the IP bearer modification

When a BIWF receives a Request message that applies to an existing IP bearer, the request is considered a bearer modification request. The receiving BIWF checks the contents of the message. If the contents are incorrect or the Media Announcement that is offered in the Request message is not supported, the BIWF shall reply to the peer BIWF with a Rejected message and the BIWF that received the modification request shall continue to use the existing IP bearer.

8.5.2.3 Simultaneous IP bearer modification requests

When both BIWFs attempt to modify an IP bearer simultaneously, the request from the I-BIWF shall take precedence over the one from the R-BIWF. The I-BIWF shall discard the R-BIWF request and continue to process the I-BIWF IP bearer modification request by following the procedures of IP bearer modification of 8.2. The R-BIWF shall abandon its request and respond to the control entity of the failure of the modification attempt; it shall continue to process the modification request from the I-BIWF.

8.5.3 Reception of an unexpected message

If a BIWF receives an unexpected message from its peer, it shall discard the message.

9 Timers

Table 1 lists IPBCP timers.

Table 1/Q.1970 – IPBCP timers

Timer	Range	Default value	Cause for start	Cause for stop	Action at expiry
T1	1 to 30 s (in increments of 1 s)	5 s	Request message sent for IP bearer establishment	Accepted, Rejected or Confused message received or call cleared	Notify the control entity that initiated IP bearer establishment
T2	1 to 30 s (in increments of 1 s)	5 s	Request message sent for IP bearer modification	Accepted, Rejected or Confused message received or call cleared	Notify the control entity that initiated IP bearer modification

Appendix I

Examples of bearer establishment and modification using alternative network address types

The following IPBCP coding messages provide examples of bearer establishment and bearer modification to further illustrate the use of the alternative address types.

I.1 Bearer establishment and modification – IPv6 address selected by R-BIWF

I.1.1 Bearer establishment request

v=0

o=- 0 0 IN IP4 140.124.3.1

s=

t=0 0

a=ipbcp 2 Request

a=group:ANAT 1 2

m=audio 25000 RTP/AVP 96

c=IN IP4 140.25.2.0

a=rtpmap:96 AMR/8000

a=mid 1

m=audio 25000 RTP/AVP 96

c=IN IP6 2001:DB8::1

a=rtpmap:96 AMR/8000

a=mid 2

I.1.2 Bearer establishment accepted

v=0

o=- 0 0 IN IP6 3300:DB8::1

s=

t=0 0

a=ipbcp 2 Accepted

a=group:ANAT 1 2

m=audio 0 RTP/AVP 96

c= IN IP4 0.0.0.0

a=mid 1

m=audio 35000 RTP/AVP 96

c=IN IP6 3001:DB8::1

a=rtpmap:96 AMR/8000

a=mid 2

I.1.3 Bearer modification request (Codec modification initiated by R-BIWF)

v=0

o=- 0 0 IN IP6 3300:DB8::1

s=

t=0 0

a=ipbcp 2 Request

a=group:ANAT 1 2

m=audio 0 RTP/AVP 97

c= IN IP4 0.0.0.0

a=mid 1

m=audio 35000 RTP/AVP 97

c=IN IP6 3001:DB8::1

a=rtpmap:97 GSM-EFR/8000

a=mid 2

I.1.4 Bearer modification accepted

v=0

o=- 0 0 IN IP6 2300:DB8::1

s=

t=0 0

a=ipbcp 2 Accepted

a=group:ANAT 1 2

m=audio 0 RTP/AVP 97

c= IN IP4 0.0.0.0

a=mid 1

m=audio 25000 RTP/AVP 97

c=IN IP6 2001:DB8::1

a=rtpmap:97 GSM-EFR/8000

a=mid 2

I.2 Bearer establishment – IPv4 address selected by R-BIWF

I.2.1 Bearer establishment request

v=0
o=- 0 0 IN IP4 140.124.3.1
s=
t=0 0
a=ipbcp 2 Request
a=group:ANAT 1 2
m=audio 25000 RTP/AVP 96
c=IN IP4 140.25.2.0
a=rtpmap:96 AMR/8000
a=mid 1
m=audio 25000 RTP/AVP 96
c=IN IP6 2001:DB8::1
a=rtpmap:96 AMR/8000
a=mid 2

I.2.2 Bearer establishment accepted

v=0
o=- 0 0 IN IP4 140.25.0.0
s=
t=0 0
a=ipbcp 2 Accepted
a=group:ANAT 1 2
m=audio 35000 RTP/AVP 96
c= IN IP4 140.25.4.1
a=mid 1
m=audio 0 RTP/AVP 96
c=IN IP6 ::
a=mid 2

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