

This specification describes the situation of the Proximus network and services. It will be subject to modifications for corrections or when the network or the services will be modified. Please take into account that modifications can appear at any moment. Therefore, the reader is requested to check regularly with the most recent list of available specifications that the document in one's possession is the latest version.

Proximus can't be held responsible for any damages due to the use of an outdated version of this specification.

Whilst every care has been taken in the preparation and publication of this document, errors in content, typographical or otherwise, may occur. If you have remarks concerning its accuracy, please send a mail to the following address proximus.uni.spec@proximus.com and your remark will be transmitted to the right Proximus department.

IMS CORPORATE VoIP

SIP signaling

Enterprise Voice / Multiline

TABLE OF CONTENTS

1. Document History	5
2. Scope.....	6
3. References.....	7
3.1. Normative references	7
3.2. Informative references	8
4. Symbols, Definitions and Abbreviations.....	9
4.1. Symbols.....	9
4.2. Definitions	9
4.3. Abbreviations.....	11
5. General.....	12
5.1. Structure of the document	12
5.2. Reference point	12
6. SIP profile	13
6.1. Introduction	13
6.2. 3GPP standards.....	13
6.3. ETSI TISPAN standards	13
6.4. IETF RFCs.....	13
6.4.1. Supported Methods.....	14
6.4.2. Supported Responses.....	15
6.4.3. Supported Headers	16
6.4.4. Unsupported Headers.....	18
6.4.5. Supported Bodies.....	18
6.4.6. Timer values.....	18
6.4.7. Transport protocol.....	18
7. SIP behaviour	18
7.1. Introduction	19

7.2. Registration/Authentication	19
7.3. Basic call.....	24
7.3.1. Public on-net originating call set-up.....	25
7.3.2. Public off-net originating call set-up.....	33
7.3.3. Public on-net terminating call set-up	42
7.3.4. Public off-net terminating call set-up.....	48
7.3.5. Forward call tear down	53
7.3.6. Backward call tear down	54
7.4. Supplementary services	56
7.4.1. Calling Line Identity Presentation (CLIP).....	56
7.4.2. Calling Line Identity presentation Restriction (CLIR).....	60
7.4.3. Call forwarding services.....	61
7.4.4. Outgoing Call Barring	78
7.4.5. Call Hold.....	88
7.4.6. Conference Call.....	111
7.4.7. Call Transfer	111
7.5. Call admission control.....	133
7.5.1. Incoming call to the IP-P(A)BX rejected by call admission control	133
7.5.2. Outgoing call from the IP-P(A)BX rejected by call admission control	134
7.6. CLI screening.....	134
7.7. FAX support	134
7.8. Emergency calls	134
7.9. DTMF.....	135

1. Document History

Every update of this document results in a complete new version with new version number and release date.

Version	Date	Main or important changes since previous version
1.0	November 24, 2016	First version, identical to Bizz IP telephony multi.
1.1	November 25, 2016	Editorial correction
1.2	June 28, 2018	Clarification concerning the initial value of the Max-Forwards Header The use of Diversion header added.
1.3	December 19, 2018	Use of Diversion header removed.
2.0	May 25, 2019	Document name changed from BGC to PXM
2.1	June 06, 2019	Update after comments from IP-PBX team: Enterprise Voice Multi changed into Enterprise Voice / Multiline (aligned with commercial product names)
2.2	September 19, 2019	Update of SW versions in Scope
2.3	December 29, 2020	Correction of the CLIR service and Privacy header

Table 1: document history

2. Scope

This document defines the SIP signalling over the VoIP interface between the Proximus IMS Network and small IP-P(A)BXs, connected via SIP Enterprise Voice / Multiline. The specifications listed in this document are not exhaustive but have to be interpreted as “minimal requirements for compliance to the Proximus Corporate VoIP services”.

The specifications are applicable for the following IMS equipment and software packages:

- Nokia (Alcatel-Lucent) ISC – software package Release 13
- Oracle SBC 4600 – Software Version SCZ8.1.0 MR-1 patch 12
- Broadsoft application server – BroadWorks R22

This document is part of a set of documents describing the UNI interface of the Proximus IMS Network, for IP-P(A)BXs. Other documents in this set are:

- PXM IMS Corporate VoIP – UNI specification – General [1]
- PXM IMS Corporate VoIP – UNI specification – SIP signalling – Business Trunking with IMS services [2]
- PXM IMS Corporate VoIP – UNI specification – SIP signalling – Wireless Office Extended [3]
- PXM IMS Corporate VoIP – UNI specification – Testing
- PXM IMS VoIP – UNI specification – Fax over IP [36]

3. References

Whenever a date of edition is mentioned, the document with this date should be consulted. If no date is present, the latest version of this document should be consulted.

3.1. Normative references

1	Proximus	PXM IMS Corporate VoIP – UNI specification – General
2	Proximus	PXM IMS Corporate VoIP – UNI specification – SIP signalling – Business Trunking with IMS services
3	Proximus	PXM IMS Corporate VoIP – UNI specification – SIP signalling – Wireless Office Extended
4	3GPP TS 24.229	IP Multimedia call control protocol based on SIP and SDP, Stage 3 Release 7
5	3GPP TS 23.167	IP Multimedia Subsystem (IMS) emergency sessions, Release 7
6	SIP forum	The SIP connect 1.1 technical recommendation (draft)
7	ETSI TS 182 025	Business Trunking; architecture and functional description v2.1.1
8	ITU-T E.164	The international telecommunication numbering plan
9	IETF RFC 3261	SIP: Session Initiation Protocol
10	IETF RFC 3262	Reliability of Provisional Responses in the Session Initiation Protocol (SIP)
11	IETF RFC 3264	An Offer /Answer Model with the Session Description Protocol (SDP)
12	IETF RFC 3265	Session Initiation Protocol (SIP)-Specific Event Notification
13	IETF RFC 4566	SDP: Session Description Protocol
14	IETF RFC 2976	The SIP INFO Method
15	IETF RFC 3311	The Session Initiation Protocol (SIP) UPDATE Method
16	IETF RFC 3323	A Privacy Mechanism for the Session Initiation Protocol (SIP)
17	IETF RFC 3325	Private Extensions to SIP for Asserted Identity within Trusted Networks
18	IETF RFC 3326	The Reason Header Field for the Session Initiation Protocol (SIP)
19	IETF RFC 3455	Private header extensions for SIP for 3GPP
20	IETF RFC 3515	The Session Initiation Protocol (SIP) REFER Method
21	IETF RFC 3891	The Session Initiation Protocol (SIP) "Replaces" Header
22	IETF RFC 3892	The Session Initiation Protocol (SIP) Referred-By Mechanism

23	IETF RFC 3960	Early Media and Ringing Tone Generation in SIP
24	IETF RFC 4028	Session Timers in the Session Initiation Protocol (SIP)
25	IETF RFC 2617	HTTP Authentication: Basic and Digest Access Authentication
26	IETF RFC 1321	The MD5 Message-Digest Algorithm
27	IETF RFC 3550	RTP: A Transport Protocol for Real-Time Applications
28	IETF RFC 3551	RTP Profile for Audio and Video Conferences with Minimal Control
29	IETF RFC 4733	RTP Payload for DTMF Digits, Telephony Tones, and Telephony Signals
30	IETF RFC 4734	Definition of Events for Modem, FAX and Text Telephony signals
31	IETF RFC 5806	Diversion indication in SIP
32	IETF RFC 6044	Mapping and Interworking of Diversion Information between Diversion and History-Info Headers in the Session Initiation Protocol (SIP)
33	IETF RFC 4244	An Extension to SIP for Request History Information
34	IETF RFC 3966	The Tel URI for Telephone Numbers
35	IETF draft	Applying Loose Routing to Session Initiation Protocol (SIP) User Agents (UA)” (expired)
36	Proximus	PXM IMS VoIP – UNI specification – Fax over IP
37	IETF RFC 5621	Message body handling in SIP
38	IETF RFC 5876	Updates to Asserted Identity in the Session Initiation Protocol (SIP)

Table 2: normative references

3.2. Informative references

--	--	--

Table 3: informative references

4. Symbols, Definitions and Abbreviations

4.1. Symbols

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

None.

4.2. Definitions

For the purpose of the present document, the following definitions apply:

IP-P(A)BX: The IP P(A)BX constitutes an Enterprise's collection of network elements that provides packetized voice call origination and termination services using the Session Initiation Protocol (SIP) and the Session Description Protocol (SDP) for signalling and the Real-time Transport Protocol (RTP) for media traffic.

pbxPUID: The public user identity referring to the IP P(A)BX as a whole. The pbxPUID will/can be used as host part of the SIP URI used by the IP-P(A)BX.

PBXName: The same as pbxPUID.

Dialled-SubB-dn: destination number as dialled by the originating user. The format can be:

- +32 <MobNSN>
- 0 <MobNSN>
- 0032 <MobNSN>
- <1AB> (emergency numbers)
- <1ABC> (short code services)

Norm-SubB-dn: destination E.164 number in international format (i.e. +<Country Code><Area Code><DN> ex: +32227970231).

Norm-SubA-dn: originating E.164 number in international format (i.e. +<Country Code><Area Code><DN> ex: +32227970231).

Dialed-SubC-dn: forwarded -to number as programmed by the forwarding user. It can be any number (e.g. national, international , ...).

Norm-SubC-dn: forwarded-to E.164 number in international format (i.e. +<Country Code><Area Code><DN> ex: +32227974563).

DisplayName: the name of the user.

IP-addr-PBXName: the IP address of the PBX with name PBXName.

IP-addr-IMS: the IP address of the Proximus IMS network access point (i.e. the SBC).

1AB: called emergency service e.g. 100,112, etc.

1ABC: called short code service

4.3. Abbreviations

See §2.2 of “PXM IMS Corporate VoIP – UNI specification – General” [1]

Additionally for the purpose of the present document, the following abbreviations apply:

CC	Country Code
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Presentation Restriction
CFU	Call Forwarding Unconditional
CFB	Call Forwarding on Busy
CFNR	Call Forwarding on No Reply
DN	Directory Number
DTMF	Dual Tone Multi-Frequency
iDN	Individual directory number i.e. a particular DN within the range of the IP-P(A)BX
OCB	Outgoing Call Barring
NSN	National Significant Number

5. General

5.1. Structure of the document

The general structure of this document mainly covers the following aspects:

- SIP profile: this chapter will contain the list of RFCs and standards to which the Proximus IMS network complies, relevant for IP-P(A)BX interconnection.
- SIP behavior: besides the protocol support also the expected behavior is important. E.g. how does REGISTRATION exactly take place. Main topics to be covered in this chapter:
 - Registration/authentication
 - Basic Call
 - Supplementary services
 - Call admission control
 - CLI screening
 - Fax support
 - Emergency calls
 - DTMF

5.2. Reference point

See § 4.3.2 of [1]: “PXM IMS Corporate VoIP – UNI specification – General”.

6. SIP profile

6.1. Introduction

The following clauses list the SIP related 3GPP and ETSI standards and IETF RFCs to which the IP-P(A)BX shall be compliant.

6.2. 3GPP standards

The Proximus IMS network implements and supports SIP protocol in accordance with:

- TS 24.229 IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP), stage 3 Release 7 [4]
- TS 23.167 IP multimedia subsystem (IMS) emergency sessions, Release 7 [5]
Although this is a registration configuration, emergency registrations are not applicable.

6.3. ETSI TISPA standards

The Proximus IMS network implements and supports SIP protocol in accordance with:

- TS 182 025 Business Trunking; architecture and functional description”, v2.1.1 (2008-09) [7]

6.4. IETF RFCs

The Proximus IMS network implements and supports SIP/SDP protocol in accordance with:

- RFC 3261 SIP: session initiation protocol [9]
- RFC 3262 Reliability of provisional responses in SIP [10]
- RFC 3264 an offer/answer model with SDP [11]
- RFC 3265 SIP-specific event notification [12]
Only the NOTIFY method is supported, the SUBSCRIBE method and the 489 “bad event” response are not supported.

Because the NOTIFY method is a rather generic method usable in many different functions (e.g. message waiting indication) it cannot be guaranteed that the behavior will be correct for every possible functionality using the NOTIFY method.

- RFC 4566 SDP: session description protocol [13]
- RFC 2976 SIP INFO method [14]

Because the INFO method is a rather generic method usable in many different functions it cannot be guaranteed that the behavior will be correct for every possible functionality using the INFO method. For example DTMF transport in the INFO method doesn't work properly. Therefore it is mandatory to support the mechanisms for DTMF transport listed in § 7.9

- RFC 3311 SIP UPDATE Method [15]
- RFC 3323 A Privacy Mechanism for the Session Initiation Protocol (SIP) [16]
- RFC 3325 Private Extensions to SIP for Asserted Identity within Trusted Networks [17]
- RFC 3326 SIP reason header [18]
- RFC 3455 3GPP P-headers [19]
- RFC 3515 SIP REFER Method [20]
- RFC 3891 The Session Initiation Protocol (SIP) "Replaces" Header [21]
- RFC 3892 The Session Initiation Protocol (SIP) Referred-By Mechanism [22]
- RFC 3960 Early Media and Ringing Tone Generation in SIP [23]
- RFC 4028 Session Timers in the SIP [24]
- RFC 2617 HTTP Authentication: Basic and Digest Access Authentication [25]
- RFC 1321 The MD5 Message-Digest Algorithm [26]
- RFC 3550 RTP: A Transport Protocol for Real-Time Applications [27]
- RFC 3551 RTP Profile for Audio and Video Conferences with Minimal Control [28]
- RFC 4733 RTP Payload for DTMF Digits, Telephony Tones, and Telephony Signals [29]
- RFC 4734 Definition of Events for Modem, FAX and Text Telephony signals [30]
- RFC 5806 Diversion indication in SIP [31]
- RFC 6044 Mapping and Interworking of Diversion Information between Diversion and History-Info Headers in the Session Initiation Protocol (SIP) [32]
- RFC 4244 An Extension to SIP for Request History Information [33]
- RFC 3966 The Tel URI for Telephone Numbers [34]
- Draft Applying Loose Routing to Session Initiation Protocol (SIP) User Agents (UA)" (expired) [35]
- RFC 5621 Message Body Handling in SIP [37]
 - Since more and more SIP applications use multipart message bodies, the correct support and handling of multipart message bodies is very important.
- RFC 5876 Updates to Asserted Identity in the Session Initiation Protocol (SIP) [38]

6.4.1. Supported Methods

The Proximus NGN network supports the following methods:

- INVITE according to [4] and [9]
- ACK according to [4] and [9]
- BYE according to [4] and [9]

- CANCEL according to [4] and [9]
- REGISTER according to [4] and [9]
- OPTIONS according to [4] and [9]
- PRACK according to [4] and [10]
- NOTIFY according to [4] and [12]
- REFER according to [4] and [20]
- UPDATE according to [4] and [15]
- INFO according to [4] and [14]

6.4.2. Supported Responses

Provisional responses (1xx)

- 100 Trying according to [4] and [9]
- 180 Ringing according to [4] and [9]
- 181 Call Is Being Forwarded according to [4] and [9]
- 182 Queued according to [4] and [9]
- 183 Session Progress according to [4] and [9]

Successful responses (2xx):

- 200 OK according to [4] and [9]
- 202 Accepted according to [4] and [12]

Redirection responses (3xx):

- 302 Moved Temporarily according to [4] and [9]

Request Failure responses (4xx):

- 400 Bad Request according to [4] and [9]
- 401 Unauthorized according to [4] and [9]
- 402 Payment Required according to [4] and [9]
- 403 Forbidden according to [4] and [9]
- 404 Not Found according to [4] and [9]
- 405 Method Not Allowed according to [4] and [9]
- 406 Not Acceptable according to [4] and [9]
- 407 Proxy Authentication Required according to [4] and [9]
- 408 Request Timeout according to [4] and [9]
- 410 Gone according to [4] and [9]
- 413 Request Entity Too Large according to [4] and [9]

- 414 Request-URI Too Long according to [4] and [9]
- 415 Unsupported Media Type according to [4] and [9]
- 416 Unsupported URI Scheme according to [4] and [9]
- 420 Bad Extension according to [4] and [9]
- 421 Extension Required according to [4] and [9]
- 423 Interval Too Brief according to [4] and [9]
- 480 Temporarily Unavailable according to [4] and [9]
- 481 Call/Transaction Does Not Exist according to [4] and [9]
- 482 Loop Detected according to [4] and [9]
- 483 Too Many Hops according to [4] and [9]
- 484 Address Incomplete according to [4] and [9]
- 485 Ambiguous according to [4] and [9]
- 486 Busy Here according to [4] and [9]
- 487 Request Terminated according to [4] and [9]
- 488 Not Acceptable Here according to [4] and [9]
- 491 Request Pending according to [4] and [9]
- 493 Undecipherable according to [4] and [9]

Server Failure responses (5xx):

- 500 Server Internal Error according to [4] and [9]
- 501 Not Implemented according to [4] and [9]
- 502 Bad Gateway according to [4] and [9]
- 503 Service Unavailable according to [4] and [9]
- 504 Server Time-out according to [4] and [9]
- 505 Version Not Supported according to [4] and [9]
- 513 Message Too Large according to [4] and [9]

Global Failures responses (6xx):

- 600 Busy Everywhere according to [4] and [9]
- 603 Decline according to [4] and [9]
- 604 Does Not Exist Anywhere according to [4] and [9]
- 606 Not Acceptable according to [4] and [9]

6.4.3. Supported Headers

- Via according to [4] and [9]
- To according to [4] and [9]
- From according to [4] and [9]

- CSeq according to [4] and [9]
 - Call-Id according to [4] and [9]
 - Contact according to [4] and [9]
 - Max-Forwards according to [4] and [9]
- As recommended in RFC 3261 [9] clause 20.22 the IP-PBX shall use as initial value of the Max-Forwards header the value 70.
- Route according to [4] and [9]
 - Record-Route according to [4] and [9]
 - Content-Type according to [4] and [9]
 - Content-Disposition according to [4] and [9]
 - Content-Length according to [4] and [9]
 - MIME-Version according to [4] and [9]
 - Supported according to [4] and [9]
 - Require according to [4] and [9]
 - Expires according to [4] and [9]
 - Unsupported according to [4] and [9]
 - Allow according to [4] and [9]
 - Retry-After according to [4] and [9]
 - In-Reply-To according to [4] and [9]
 - Authorization according to [4] and [9]
 - Proxy-Authenticate according to [4] and [9]
 - WWW-Authenticate according to [4] and [9]
 - Min-Expires according to [4] and [9]
 - Proxy-Authorization according to [4] and [9]
 - Alert-Info according to [4] and [9]
 - Warning according to [4] and [9]
 - Accept according to [4] and [9]
 - Call-Info according to [4] and [9]
 - RSeq according to [4] and [10]
 - RAck according to [4] and [10]
 - Allow-Events according to [4] and [12]
 - Event according to [4] and [12]
 - Subscription-State according to [4] and [12]
 - Refer-To according to [4] and [20]
 - Privacy according to [4], [16] and [17]
 - P-Asserted-Identity according to [4] and [17]
 - Reason according to [4] and [18]
 - P-Called-Party-ID according to [4] and [19]
 - P-Access-Network-Info according to [4] and [19]
 - P-Associated-URI according to [4] and [19]

- Replaces according to [4] and [21]
- Referred-By according to [4] and [22]
- Session Expires according to [4] and [24]
- Min-Se according to [4] and [24]

6.4.4. Unsupported Headers

Proprietary SIP headers (i.e. headers starting with “X-“ or “x-“) are never supported and shall not be sent on the interface.

6.4.5. Supported Bodies

Multipart message bodies are supported and used in the Proximus IMS network. Therefore message body handling according to RFC 5321 [38] is mandatory.

In any case correct support and usage of SIP response 415 “Unsupported Media type” as specified in RFC 3261 [9] is mandatory.

6.4.6. Timer values

The Proximus IMS network supports the timers described in [4] and [9] with the following (default) settings:

- T1 = 500 msec
- T2 = 4 seconds
- T4 = 5 seconds
- Timer D = 32 seconds
- Timer H = 32 seconds

All other timers are derived from these, according to [4] and [9].

6.4.7. Transport protocol

The Proximus IMS network supports SIP over UDP only.

Important remark: In case SIP message length approaches the MTU size, [4] and [9] specify that UDP transport should be replaced by TCP transport. This **shall NOT** be applied by the IP-P(A)BX.

7. SIP behaviour

7.1. Introduction

Besides the standards and RFCs describing the protocol supported, also the expected behaviour is important. E.g. how does registration exactly take place, which information is expected in the “From” header, etc.

Enterprise Voice / Multiline is also known as Registration based business trunking and corresponds to the Subscription based business trunking as described in [7].

IMPORTANT:

SIP signalling serves the call set-up/teardown of calls/sessions as well as the description of session parameters (through the use of SDP) and the invocation of features and services. This means that the exchange of SIP signalling between an IP-PBX and the Proximus network shall serve one of the above purposes. In other words, SIP signalling shall be meaningful and the sending of useless SIP messages shall to be avoided !

Example of useless SIP signalling: A re-INVITE in an established session without any SDP included is often useless because typically re-INVITE is used to re-negotiate/change the session parameters. So, if there is no need to re-negotiate/change the session parameters no re-INVITE should be transmitted.

7.2. Registration/Authentication

IP-P(A)BX devices connected to the Proximus IMS network by use of an Enterprise Voice / Multiline **must** use registration and authentication.

Internal in the corporate network SIP end devices e.g. SIP phones, may also register with the IP-P(A)BX itself. These registrations with the IP P(A)BX shall remain invisible to the Proximus IMS network.

IP-P(A)BX registration **shall** use group registration using its PBX public user identifier (pbxPUIID=PBXName). Each IP-P(A)BX will be assigned one pbxPUIID, aka Pilot ID aka PBXName. This is a non-dialable public identity.

An IP-P(A)BX has usually allocated to it one or more contiguous DN ranges. Upon registration with the PBXName, the Proximus IMS network will implicitly register all allocated DN ranges. An IP-P(A)BX **shall NOT** register with a DN from his range.

Internal in the IMS network wildcarded PUIIDs will be used. These will be reflected in the P-associated-URI header sent to the IP-P(A)BX upon successful registration. Wildcarded PUIID will be in the TEL-URI format. For example, the number range (+3227363000 - +3227363999) can be represented by +3227363!...! using a regular expression. Wildcard PUIIDs will not overlap each other.

IP-P(A)BXs **shall** be configured to ask for a registration interval of 1800 seconds minimum. The Proximus IMS network will grant an interval of 1800 seconds or 30 seconds depending on the fact whether the Proximus IMS network (i.e. the Acme SBC) detects the presence of a NAT device. The IP-P(A)BX shall adapt his registration renewal according to the granted expiry time.

The IP-P(A)BX **shall** renew the registration at the earliest after half of the granted interval has expired, and before the expiry of the granted interval.

- In case the granted interval is 1800 seconds, every registration renewal will be authenticated.
- In case the granted interval is 30 seconds, the registration renewal will happen without authentication for about 1770 seconds. The registration renewal approaching the 1800 seconds interval will again be authenticated.

In the (erroneous) case the IP-P(A)BX would request a registration interval smaller than 1800 seconds, the Proximus IMS network will reply with a *423 Interval too brief* response including a *min-expires* header containing the minimum value to be used. The IP-P(A)BX shall adapt to this minimal value.

The registration of an IP-P(A)BX provides a binding between the IP-P(A)BX public user identifiers (e.g. telephone numbers) and the IP address of the IP-P(A)BX. Because IP-P(A)BXs may change IP address from time to time, an automatic de-registration and registration should be performed in such case.

Authentication procedures can be requested for INVITE (session authentication) or for REGISTER (registration authentication).

The authentication mechanism is based on the Digest Access Authentication Scheme described in RFC 2617 (HTTP authentication) [25]. This authentication applies the challenge-response mechanism that requires username, password, realm values and the checksum procedures MD5 based (RFC 1321) [26].

Figure 1 shows the expected message flow for registration of an IP-P(A)BX.

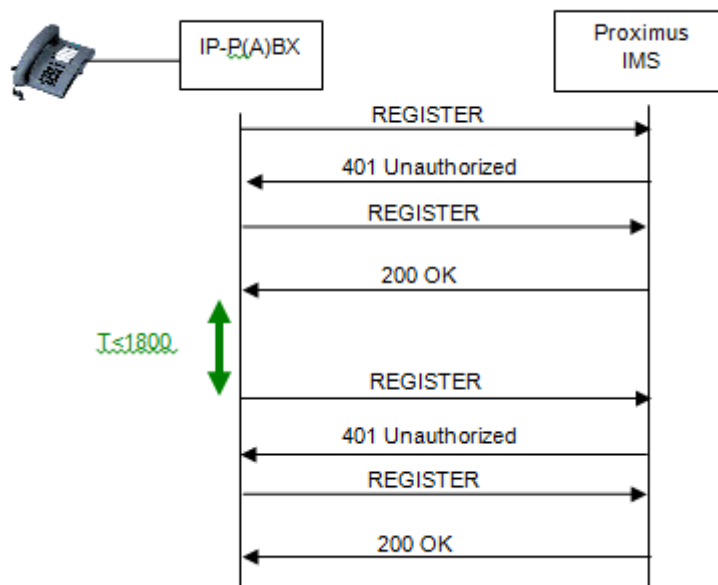


Figure 1: Registration and re-registration

In order to register the IP-P(A)BX sends a *REGISTER* message to the Proximus IMS network with the following headers:

- *Request-URI* = sip:ims.belgacom.be
- *To* = <sip:PBXName@ims.belgacom.be>
- *From* = <sip:PBXName@ims.belgacom.be>
- *Expires* = 3600 (the IP-P(A)BX proposes a registration interval of 3600 seconds).
- *Via* = IP-addr-PBXName
- *Contact* = <sip:PBXName@ IP-addr-PBXName>

Live example

Request-Line: REGISTER sip:ims.belgacom.be:5060 SIP/2.0

Message Header

Call-ID: OA72B051BAilotuid322797014022FA326C@ims.belgacom.be

Contact: <sip:pilotpuid3227970140@10.127.239.219:57463>

CSeq: 1 REGISTER

Expires: 3600

From: <sip:pilotpuid3227970140@ims.belgacom.be:5060>;tag=1477

Max-Forwards: 70

Privacy: none

Supported: path

To: <sip:pilotpuid3227970140@ims.belgacom.be:5060>
Via: SIP/2.0/UDP 10.127.239.219:57463;branch=z9hG4bK-58B4-1
Content-Length: 0

The Proximus IMS network returns a *401 Unauthorized* response containing the following header:

- *www-authenticate* with a *digest realm*, a *nonce* and an *algorithm* parameter

Live example

Status-Line: SIP/2.0 401 Unauthorized
Message Header
Call-ID: OA72Bo51BAIlotuid322797014022FA326C@ims.belgacom.be
From: <sip:pilotpuid3227970140@ims.belgacom.be:5060>;tag=1477
To: <sip:pilotpuid3227970140@ims.belgacom.be:5060>;
tag=4ca2148b-128757461076807
Via: SIP/2.0/UDP 10.127.239.219:57463;branch=z9hG4bK-58B4-1
CSeq: 1 REGISTER
Date: Wed, 20 Oct 2010 11:36:50 GMT
Server: Alcatel-Lucent-HPSS/3.0.3
WWW-Authenticate: Digest realm="ims.belgacom.be",
nonce="b7c904cbcd45236dbf3054aea940e9703dc8f84c0508",
opaque="Lss:scsf-stdn.imsgroup0-000.ilasm.ims.ims.be:5060",
algorithm=MD5,
qop="auth"
Content-Length: 0

The IP-P(A)BX sends a new *REGISTER* with the headers:

- *Request-URI* = sip:ims.belgacom.be
- *To* = <sip:PBXName@ims.belgacom.be>
- *From* = <sip:PBXName@ims.belgacom.be>
- *Expires* = 3600 (the IP-P(A)BX proposes a registration interval of 3600 seconds).
- *Via* = IP-addr-PBXName
- *Contact* = <sip:PBXName@IP-addr-PBXName>
- *Authorization* includes the requested authentication data:
 - *realm* is copied from the *401 Unauthorized* response received earlier
 - *nonce* is copied from the *401 Unauthorized* response received earlier
 - *digest username* contains the private userID of the IP-P(A)PBX
- *Call ID* = same value as the original *REGISTER* message
- *Cseq* is incremented with regard to the original *REGISTER* message

All other headers are the same as in the original *REGISTER*

Live example

Request-Line: REGISTER sip:ims.belgacom.be:5060 SIP/2.0
Message Header
**Authorization: Digest username="pilotprn3227970140@ims.belgacom.be",
realm="ims.belgacom.be",
nonce="b7c904cbcd45236dbf3054aea940e9703dc8f84c0508",
uri="sip:ims.belgacom.be",
response="4b235ba59d0169ae388f114c633dbf81",
algorithm=MD5,
cnonce="ZckOxabLmpTsOi"
Opaque Value: "Lss:scsf-stdn.imsgroup0-000.ilasm.ims.ims.be:5060"
QOP: auth
Nonce Count: 00000001**
Call-ID: OA72B051BAilotuid322797014022FA326C@ims.belgacom.be
Contact: <sip:pilotpuid3227970140@10.127.239.219:57463>
CSeq: 2 REGISTER
Expires: 3600
From: <sip:pilotpuid3227970140@ims.belgacom.be:5060>;tag=5279
Max-Forwards: 70
Privacy: none
Supported: path
To: <sip:pilotpuid3227970140@ims.belgacom.be:5060>
Via: SIP/2.0/UDP 10.127.239.219:57463;branch=z9hG4bK-34D8-2
Content-Length: 0

The Proximus IMS network returns a 200 OK response with following headers:

- *Contact* reflects the registered binding(s) for this IP-P(A)BX, with:
 - *expires* parameter with value 1800, to indicate that a registration interval of 1800 seconds has been granted.

[Live example](#)

Status-Line: SIP/2.0 200 OK
Message Header
Call-ID: OA72B051BAilotuid322797014022FA326C@ims.belgacom.be
From: <sip:pilotpuid3227970140@ims.belgacom.be:5060>;tag=5279
To: <sip:pilotpuid3227970140@ims.belgacom.be:5060>;
tag=4ca2148b-1287574610340304
Via: SIP/2.0/UDP 10.127.239.219:57463;branch=z9hG4bK-34D8-2
CSeq: 2 REGISTER
Allow-Events: reg
Contact: <sip:pilotpuid3227970140@10.127.239.219:57463>;expires=1800

Date: Wed, 20 Oct 2010 11:36:50 GMT
P-Associated-URI: <sip:pilotpuid3227970140@ims.belgacom.be>
P-Associated-URI: <tel:+3227970140;wcard-range=+322797014!.>
Server: Alcatel-Lucent-HPSS/3.0.3
Content-Length: 0

7.3. Basic call

In Corporate VoIP several call types are possible:

- Private on-net calls are completely treated by the IP-P(A)BX and hence out of scope of this document.
- Public on-net calls are treated by the Proximus IMS network. This is a call between an IP-P(A)BX extension and an IMS user not part of the same IP-P(A)BX.
- Public off-net calls are treated by the Proximus IMS network. This is a call between an IP-P(A)BX extension and a non-IMS user (e.g. PSTN/ISDN, Mobile,..).

Basic call set-up and tear down complies with normal SIP behaviour as described in the relevant Standards and RFCs [4][9][10][11][13].

Basic call set-up happens with authentication. Since dynamic IP addresses are used the Proximus IMS network needs to identify and authorize the IP-P(A)BX based on the HTTP digest authentication [25].

Basic call set-up may use the mechanism for reliable transport of 1XX responses according to IETF RFC 3262 “Reliability of Provisional Responses in the Session Initiation Protocol (SIP)” [10], but it is not mandatory. The procedures for announcing the capability and use are described in [10].

Basic call set-up may use the mechanism for session timer according to IETF RFC 4028 “Session Timers in the Session Initiation Protocol (SIP)” [24], but it is not mandatory. The procedures for announcing the capability and use are described in [24].

The IP-P(A)BX shall use the following identity to originate a call:

- *From* header:
 - sip:Norm-SubA-dn@ims.belgacom.be

The *From* header **shall** always contain a valid PUID, even when the CLIR service is to be invoked.

- *Contact* header
 - sip:Norm-SubA-dn@IP-addr-PBXName, or
 - sip:PBXName@IP-addr-PBXName

the IP address of the IP-P(A)BX in the *Contact* header **MUST** be the same as used in the *Contact* header of the *REGISTER* message because the Proximus IMS network uses this for admission control.

- *P-Asserted-ID* header:
 - sip:Norm-SubA-dn@ims.belgacom.be

According to SIP Connect 1.1 [6], it is recommended that the IP-P(A)BX includes a *P-Asserted-ID* header in the *INVITE* request. The Proximus IMS network does not expect to receive this header and if received this header will be overwritten by the Proximus IMS network with the correct *P-Asserted-ID*.

Note: as “Norm-SubA-dn” any DN within the range of the registered wildcarded PUID can be used.

7.3.1. Public on-net originating call set-up

Figure 2 shows the expected message flow for a public on-net originating call set-up.

Note: depending on the call scenario (e.g. whether reliability of provisional responses is used or not) differences may occur.

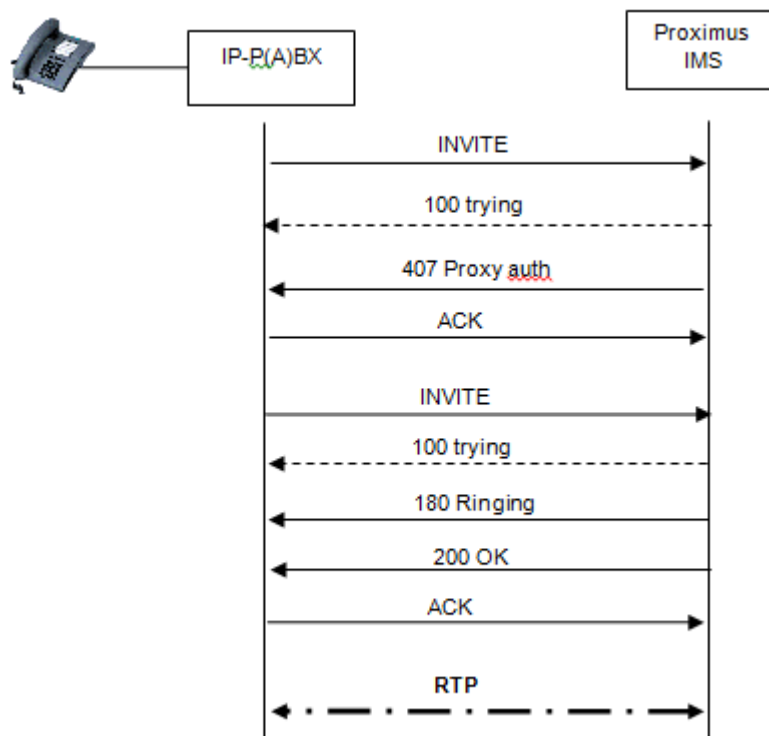


Figure 2: Basic call/session set-up (public on-net, with authentication)

To set-up a public on-net call the IP-P(A)BX sends an *INVITE* message to the Proximus IMS network with the following headers:

- *Request-URI* = sip:Dialed-SubB-dn@ims.belgacom.be;user=phone
- *To* = <sip:Dialed-SubB-dn@ims.belgacom.be;user=phone>

- *From* = DisplayName <sip:Norm-SubA-dn@ims.belgacom.be;user=phone>
- *Via* = IP-addr-PBXName
- *Contact* = <sip:Norm-SubA-dn@IP-addr-PBXName>
- *P-preferred-id* = <sip:Norm-SubA-dn@ims.belgacom.be> or <sip:PBXName@ims.belgacom.be>

Note: The *DisplayName* in the *From* header is optional

[Live example](#)

```
Request-Line: INVITE sip:027970315@ims.belgacom.be;user=phone SIP/2.0
Message Header
Accept: application/sdp,application/dtmf-relay
Allow: PRACK,ACK,CANCEL,BYE,SUBSCRIBE,NOTIFY,INVITE,
REFER,OPTIONS,INFO,UPDATE,REGISTER
Call-ID: OA3EA34832322797014253837534@ims.belgacom.be
Contact: <sip:+3227970142@10.127.239.219:57463;user=phone>
Content-Type: application/sdp
CSeq: 3 INVITE
From: <sip:+3227970142@ims.belgacom.be;user=phone>;tag=26BB
Max-Forwards: 70
P-Preferred-Identity: <sip:pilotpuid3227970140@ims.belgacom.be:5060>
Privacy: none
Supported: replaces
To: <sip:027970315@ims.belgacom.be;user=phone>
Via: SIP/2.0/UDP 10.127.239.219:57463;branch=z9hG4bK-645A-3
Content-Length: 301
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): ims.belgacom.be 3496556295 3496556295 IN IP4
192.168.1.200
Owner Username: ims.belgacom.be
Session ID: 3496556295
Session Version: 3496556295
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 192.168.1.200
Session Name (s): Session SDP
Connection Information (c): IN IP4 10.127.239.219
Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.239.219
Time Description, active time (t): 0 0
Session Start Time: 0
Session Stop Time: 0
```

Media Description, name and address (m): audio 16384 RTP/AVP 18 8 101
Media Type: audio
Media Port: 16384
Media Proto: RTP/AVP
Media Format: ITU-T G.729
Media Format: ITU-T G.711 PCMA
Media Format: 101
Media Attribute (a): rtpmap:18 G729/8000
Media Attribute Fieldname: rtpmap
Media Format: 18
MIME Type: G729
Media Attribute (a): fmp:18 annexb=no
Media Attribute Fieldname: fmp
Media Format: 18 [G729]
Media format specific parameters: annexb=no
Media Attribute (a): rtpmap:8 PCMA/8000
Media Attribute Fieldname: rtpmap
Media Format: 8
MIME Type: PCMA
Media Attribute (a): rtpmap:101 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: telephone-event
Media Attribute (a): fmp:101 0-15
Media Attribute Fieldname: fmp
Media Format: 101 [telephone-event]
Media format specific parameters: 0-15
Media Attribute (a): ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20

The *INVITE* contains SDP information regarding the proposed call parameters (e.g. codec, IP address and port number on which the IP-P(A)BX user wants to receive RTP).

The Proximus IMS network returns first *100 Trying* response and then a *407 proxy authentication required* response. This response contains the following header:

- *proxy-authenticate* with parameters:
 - *digest realm*
 - *nonce*
 - *algorithm*

[Live example](#)

Status-Line: SIP/2.0 100 Trying

Message Header

Call-ID: OA3EA34832322797014253837534@ims.belgacom.be
From: <sip:+3227970142@ims.belgacom.be;user=phone>;tag=26BB
To: <sip:027970315@ims.belgacom.be;user=phone>
Via: SIP/2.0/UDP 10.127.239.219:57463;branch=z9hG4bK-645A-3
CSeq: 3 INVITE
Content-Length: 0

Status-Line: SIP/2.0 407 Proxy Authentication Required

Message Header

Call-ID: OA3EA34832322797014253837534@ims.belgacom.be
From: <sip:+3227970142@ims.belgacom.be;user=phone>;tag=26BB
To: <sip:027970315@ims.belgacom.be;user=phone>;
tag=4ca21474-1287574695387855-gm-po-lucentPCSF-001638
Via: SIP/2.0/UDP 10.127.239.219:57463;branch=z9hG4bK-645A-3
CSeq: 3 INVITE
Date: Wed, 20 Oct 2010 11:38:15 GMT
**Proxy-Authenticate: Digest realm="ims.belgacom.be",
nonce="b7c9036dbf3054aea944cbcd4a70e9703dc8f84c1908",
opaque="Lss:000001.55472",
algorithm=MD5,
qop="auth"**
Server: Alcatel-Lucent-HPSS/3.0.3
Contact: <sip:10.127.244.46:5060;transport=udp>
Content-Length: 0

The IP-P(A)BX sends an ACK message to the Proximus IMS network in order to close properly the transaction started by the INVITE. This is necessary because the 407 proxy authentication required is a final response.

[Live example](#)

Request-Line: ACK sip:027970315@ims.belgacom.be;user=phone SIP/2.0

Message Header

Call-ID: OA3EA34832322797014253837534@ims.belgacom.be
CSeq: 3 ACK
From: <sip:+3227970142@ims.belgacom.be;user=phone>;tag=26BB
Max-Forwards: 70
To: <sip:027970315@ims.belgacom.be;user=phone>;
tag=4ca21474-1287574695387855-gm-po-lucentPCSF-001638
Via: SIP/2.0/UDP 10.127.239.219:57463;branch=z9hG4bK-645A-3
Content-Length: 0

The IP-P(A)BX sends a new *INVITE* to the Proximus IMS network with:

- *Request-URI* = sip:Dialed-SubB-dn@ims.belgacom.be;user=phone
- *To* = <sip:Dialed-SubB-dn@ims.belgacom.be;user=phone>
- *From* = DisplayName <sip:Norm-SubA-dn@ims.belgacom.be;user=phone>
- *Via* = IP-addr-PBXName
- *Contact* = <sip:Norm-SubA-dn@IP-addr-PBXName>
- *P-preferred-id* = <sip:Norm-SubA-dn@ims.belgacom.be> or <sip:PBXName@ims.belgacom.be>
- *proxy-authorization* with the requested authentication data:
 - *realm* copied from the 407 proxy authentication required received earlier
 - *nonce* copied from the 407 proxy authentication required received earlier
 - *Call ID* = same value as in the original *INVITE*
 - *Cseq* = incremented with regard to the original *INVITE*

Note: The *DisplayName* in the *From* header is optional

The *INVITE* again contains SDP information regarding the proposed call parameters (e.g. codec, IP address and port number on which the IP-P(A)BX user wants to receive RTP).

[Live example](#)

```
Request-Line: INVITE sip:027970315@ims.belgacom.be;user=phone SIP/2.0
Message Header
Accept: application/sdp,application/dtmf-relay
Allow: PRACK,ACK,CANCEL,BYE,SUBSCRIBE,NOTIFY,INVITE,
REFER,OPTIONS,INFO,UPDATE,REGISTER
Call-ID: OA3EA34832322797014253837534@ims.belgacom.be
Contact: <sip:+3227970142@10.127.239.219:57463;user=phone>
Content-Type: application/sdp
CSeq: 4 INVITE
From: <sip:+3227970142@ims.belgacom.be;user=phone>;tag=26BB
Max-Forwards: 70
P-Preferred-Identity: <sip:pilotpuid3227970140@ims.belgacom.be:5060>
Privacy: none
Proxy-Authorization: Digest
username="pilotprn3227970140@ims.belgacom.be",
realm="ims.belgacom.be",
nonce="b7c9036dbf3054aea944cbcd4a70e9703dc8f84c1908",
uri="sip:027970315@ims.belgacom.be",
response="dfe6b95dc705bbf076d62a3ff20839b7",
cnonc="ZckOxabLmpTsOi",
Opaque Value: "Lss:000001.55472",
QOP: auth
Nonce Count: 00000001
```

Supported: replaces

To: <sip:027970315@ims.belgacom.be;user=phone>

Via: SIP/2.0/UDP 10.127.239.219:57463;branch=z9hG4bK-1CE-4

Content-Length: 301

Message body

Session Description Protocol

Session Description Protocol Version (v): 0

Owner/Creator, Session Id (o): ims.belgacom.be 3496556295 3496556295 IN IP4 192.168.1.200

Owner Username: ims.belgacom.be

Session ID: 3496556295

Session Version: 3496556295

Owner Network Type: IN

Owner Address Type: IP4

Owner Address: 192.168.1.200

Session Name (s): Session SDP

Connection Information (c): IN IP4 10.127.239.219

Connection Network Type: IN

Connection Address Type: IP4

Connection Address: 10.127.239.219

Time Description, active time (t): 0 0

Session Start Time: 0

Session Stop Time: 0

Media Description, name and address (m): audio 16384 RTP/AVP 18 8 101

Media Type: audio

Media Port: 16384

Media Proto: RTP/AVP

Media Format: ITU-T G.729

Media Format: ITU-T G.711 PCMA

Media Format: 101

Media Attribute (a): rtpmap:18 G729/8000

Media Attribute Fieldname: rtpmap

Media Format: 18

MIME Type: G729

Media Attribute (a): fmp:18 annexb=no

Media Attribute Fieldname: fmp

Media Format: 18 [G729]

Media format specific parameters: annexb=no

Media Attribute (a): rtpmap:8 PCMA/8000

Media Attribute Fieldname: rtpmap

Media Format: 8

MIME Type: PCMA

Media Attribute (a): rtpmap:101 telephone-event/8000

Media Attribute Fieldname: rtpmap

Media Format: 101

MIME Type: telephone-event

Media Attribute (a): fntp:101 0-15
Media Attribute Fieldname: fntp
Media Format: 101 [telephone-event]
Media format specific parameters: 0-15
Media Attribute (a): ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20

The Proximus IMS network first returns a *100 Trying* response and performs normal call routing to the destination. When the destination is reached a *180 Ringing* response is returned to the IP-P(A)BX.

Remark: Before receiving a *180 Ringing* response, depending on the call scenario it is possible that a *183 Progress* response is received.

[Live example](#)

Status-Line: SIP/2.0 100 Trying

Message Header

Call-ID: OA3EA34832322797014253837534@ims.belgacom.be
From: <sip:+3227970142@ims.belgacom.be;user=phone>;tag=26BB
To: <sip:027970315@ims.belgacom.be;user=phone>
Via: SIP/2.0/UDP 10.127.239.219:57463;branch=z9hG4bK-1CE-4
CSeq: 4 INVITE
Content-Length: 0

Status-Line: SIP/2.0 180 Ringing

Message Header

Call-ID: OA3EA34832322797014253837534@ims.belgacom.be
From: <sip:+3227970142@ims.belgacom.be;user=phone>;tag=26BB
To: <sip:027970315@ims.belgacom.be;user=phone>;
tag=4ca21474-1287574695452907-gm-po-lucentPCSF-027509
Via: SIP/2.0/UDP 10.127.239.219:57463;branch=z9hG4bK-1CE-4
CSeq: 4 INVITE
Contact: <sip:10.127.244.46:5060;transport=udp>
Allow: ACK,BYE,CANCEL,INFO,INVITE,OPTIONS,PRACK,REFER,NOTIFY,UPDATE
Content-Length: 0
Server: Alcatel-Lucent-HPSS/3.0.3

When the call is answered the Proximus IMS network returns a *200 OK* response containing SDP information regarding the accepted call parameters (e.g. codec, IP address and port number on which the destination wants to receive RTP).

[Live example](#)

Status-Line: SIP/2.0 200 OK

Message Header

Call-ID: OA3EA34832322797014253837534@ims.belgacom.be
From: <sip:+3227970142@ims.belgacom.be;user=phone>;tag=26BB
To: <sip:027970315@ims.belgacom.be;user=phone>;
tag=4ca21474-1287574695452907-gm-po-lucentPCSF-027509
Via: SIP/2.0/UDP 10.127.239.219:57463;branch=z9hG4bK-1CE-4
CSeq: 4 INVITE
Contact: <sip:10.127.244.46:5060;transport=udp>
Allow: ACK,BYE,CANCEL,INFO,INVITE,OPTIONS,PRACK,REFER,NOTIFY,UPDATE
Content-Length: 0
Server: Alcatel-Lucent-HPSS/3.0.3
Accept: multipart/mixed,application/media_control+xml,application/sdp
Content-Type: application/sdp
Content-Length: 190
Server: Alcatel-Lucent-HPSS/3.0.3

Message body

Session Description Protocol

Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): BroadWorks 159221 1 IN IP4 10.127.244.46
Owner Username: BroadWorks
Session ID: 159221
Session Version: 1
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.127.244.46
Session Name (s): -
Connection Information (c): IN IP4 10.127.244.46
Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.244.46
Time Description, active time (t): 0 0
Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio 10200 RTP/AVP 18 101
Media Type: audio
Media Port: 10200
Media Proto: RTP/AVP
Media Format: ITU-T G.729
Media Format: 101
Media Attribute (a): rtpmap:18 G729/8000
Media Attribute Fieldname: rtpmap
Media Format: 18
MIME Type: G729
Media Attribute (a): rtpmap:101 telephone-event/8000
Media Attribute Fieldname: rtpmap

Media Format: 101
MIME Type: telephone-event
Media Attribute (a): fntp:101 0-15
Media Attribute Fieldname: fntp
Media Format: 101 [telephone-event]
Media format specific parameters: 0-15

The IP-P(A)BX sends an ACK message to the Proximus IMS network in order to properly close the *INVITE* transaction.

[Live example](#)

```
Request-Line: ACK sip:027970315@ims.belgacom.be;user=phone SIP/2.0
Message Header
Call-ID: OA3EA34832322797014253837534@ims.belgacom.be
CSeq: 4 ACK
From: <sip:+3227970142@ims.belgacom.be;user=phone>;tag=26BB
Max-Forwards: 70
To: <sip:027970315@ims.belgacom.be;user=phone>;
    tag=4ca21474-1287574695387855-gm-po-lucentPCSF-001638
Via: SIP/2.0/UDP 10.127.239.219:57463;branch=z9hG4bK-645A-3
Content-Length: 0
```

7.3.2. Public off-net originating call set-up

Figure 3 shows the expected message flow for a public off-net originating call set-up.

Note: depending on the call scenario (e.g. whether reliability of provisional responses is used or not) differences may occur.

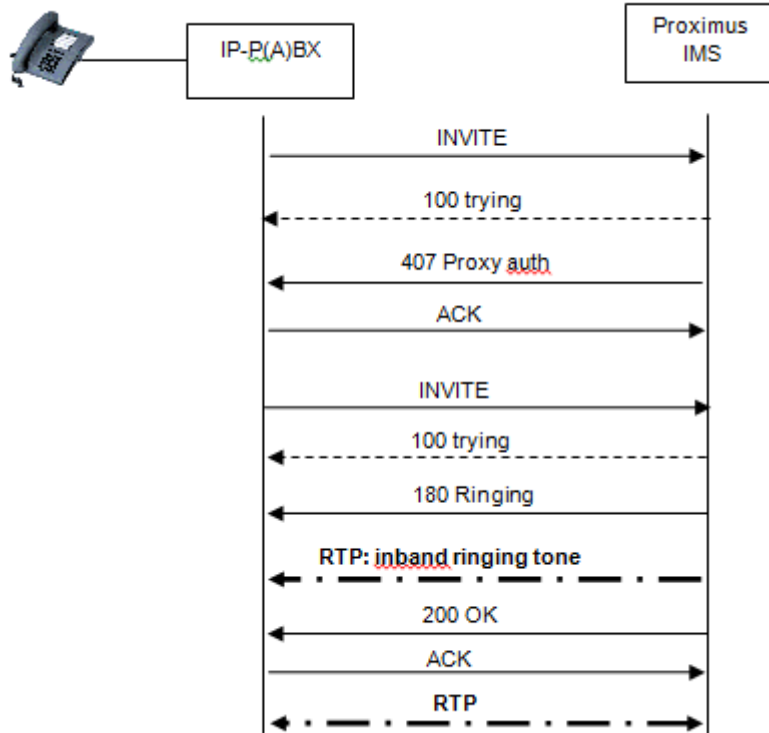


Figure 3: Basic call/session set-up (public off-net, with authentication)

To set-up a public off-net call the IP-P(A)BX sends an *INVITE* message to the Proximus IMS network with the following headers:

- *Request-URI* = sip:Dialed-SubB-dn@ims.belgacom.be;user=phone
- *To* = < sip:Dialed-SubB-dn@ims.belgacom.be;user=phone >
- *From* = DisplayName < sip:Norm-SubA-dn@ims.belgacom.be;user=phone >
- *Via* = IP-addr-PBXName
- *Contact* = < sip:Norm-SubA-dn@IP-addr-PBXName;user=phone >
- *P-preferred-id* = < sip:Norm-SubA-dn@ims.belgacom.be;user=phone > or < sip:PBXName@ims.belgacom.be >

Note: The *DisplayName* in the *From* header is optional

[Live example](#)

Request-Line: INVITE **sip:023379021@ims.belgacom.be;user=phone** SIP/2.0
 Message Header
 Accept: application/sdp,application/dtmf-relay
 Allow: PRACK,ACK,CANCEL,BYE,SUBSCRIBE,NOTIFY,INVITE,REFER,
 OPTIONS,INFO,UPDATE,REGISTER

Call-ID: OA5EC5F2903227970142FB2F31@ims.belgacom.be

Contact: <sip:+3227970142@10.127.239.219:57463;user=phone>

Content-Type: application/sdp

CSeq: 6 INVITE

From: <sip:+3227970142@ims.belgacom.be;user=phone>;tag=4C5D

Max-Forwards: 70

P-Preferred-Identity: <sip:pilotpuid3227970140@ims.belgacom.be:5060>

Privacy: none

Supported: replaces

To: <sip:023379021@ims.belgacom.be;user=phone>

Via: SIP/2.0/UDP 10.127.239.219:57463;branch=z9hG4bK-F66-8

Content-Length: 301

Message body

Session Description Protocol

Session Description Protocol Version (v): 0

Owner/Creator, Session Id (o): ims.belgacom.be 3496556366 3496556366 IN IP4

192.168.1.200

Owner Username: ims.belgacom.be

Session ID: 3496556366

Session Version: 3496556366

Owner Network Type: IN

Owner Address Type: IP4

Owner Address: 192.168.1.200

Session Name (s): Session SDP

Connection Information (c): IN IP4 10.127.239.219

Connection Network Type: IN

Connection Address Type: IP4

Connection Address: 10.127.239.219

Time Description, active time (t): 0 0

Session Start Time: 0

Session Stop Time: 0

Media Description, name and address (m): audio 16388 RTP/AVP 18 8 101

Media Type: audio

Media Port: 16388

Media Proto: RTP/AVP

Media Format: ITU-T G.729

Media Format: ITU-T G.711 PCMA

Media Format: 101

Media Attribute (a): rtpmap:18 G729/8000

Media Attribute Fieldname: rtpmap

Media Format: 18

MIME Type: G729

Media Attribute (a): fmp:18 annexb=no

Media Attribute Fieldname: fmp

Media Format: 18 [G729]

Media format specific parameters: annexb=no

Media Attribute (a): rtpmap:8 PCMA/8000
Media Attribute Fieldname: rtpmap
Media Format: 8
MIME Type: PCMA
Media Attribute (a): rtpmap:101 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: telephone-event
Media Attribute (a): fmp:101 0-15
Media Attribute Fieldname: fmp
Media Format: 101 [telephone-event]
Media format specific parameters: 0-15
Media Attribute (a):ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20

The *INVITE* contains SDP information regarding the proposed call parameters (e.g. codec, IP address and port number on which the IP-P(A)BX user wants to receive RTP).

The Proximus IMS network returns first *100 Trying* response and then a *407 proxy authentication required* response. This response contains the following header:

- *proxy-authenticate* with parameters:
 - *digest realm*
 - *nonce*
 - *algorithm*

Live example

Status-Line: SIP/2.0 100 Trying

Message Header

Call-ID: OA5EC5F2903227970142FB2F31@ims.belgacom.be
From: <sip:+3227970142@ims.belgacom.be;user=phone>;tag=4C5D
To: <sip:023379021@ims.belgacom.be;user=phone>
Via: SIP/2.0/UDP 10.127.239.219:57463;branch=z9hG4bK-F66-8
CSeq: 6 INVITE
Content-Length: 0

Status-Line: SIP/2.0 407 Proxy Authentication Required

Message Header

Call-ID: OA5EC5F2903227970142FB2F31@ims.belgacom.be
From: <sip:+3227970142@ims.belgacom.be;user=phone>;tag=4C5D
To: <sip:023379021@ims.belgacom.be;user=phone>;
tag=4ca21474-1287574766732509-gm-po-lucentPCSF-037572
Via: SIP/2.0/UDP 10.127.239.219:57463;branch=z9hG4bK-F66-8
CSeq: 6 INVITE
Date: Wed, 20 Oct 2010 11:39:26 GMT

**Proxy-Authenticate: Digest realm="ims.belgacom.be",
nonce="b7c9036dbf3054aea940e974cbcd4ee03dc8f84c2308",
opaque="Lss:000008.55518",
algorithm=MD5,
qop="auth",
stale=true**

Server: Alcatel-Lucent-HPSS/3.0.3

Content-Length: 0

Contact: <sip:10.127.244.46:5060;transport=udp>

The IP-P(A)BX sends an *ACK* message to the Proximus IMS network in order to close properly the transaction started by the *INVITE*. This is necessary because the *407 proxy authentication required* is a final response.

[Live example](#)

Request-Line: **ACK sip:023379021@ims.belgacom.be;user=phone SIP/2.0**

Message Header

Call-ID: **OA5EC5F2903227970142FB2F31@ims.belgacom.be**

CSeq: **6 ACK**

From: <sip:+3227970142@ims.belgacom.be;user=phone>;tag=4C5D

Max-Forwards: 70

To: <sip:023379021@ims.belgacom.be;user=phone>;

tag=4ca21474-1287574766732509-gm-po-lucentPCSF-037572

Via: **SIP/2.0/UDP 10.127.239.219:57463;branch=z9hG4bK-F66-8**

Content-Length: 0

The IP-P(A)BX sends a new *INVITE* to the Proximus IMS network with:

- *Request-URI* = sip:Dialed-SubB-dn@ims.belgacom.be;user=phone
- *To* = <sip:Dialed-SubB-dn@ims.belgacom.be;user=phone>
- *From* = *DisplayName* <sip:Norm-SubA-dn@ims.belgacom.be;user=phone>
- *Via* = IP-addr-PBXName
- *Contact* = <sip:Norm-SubA-dn@IP-addr-PBXName;user=phone>
- *P-preferred-id* = <sip:Norm-SubA-dn@ims.belgacom.be;user=phone>
- *proxy-authorization* with the requested authentication data:
 - *realm* copied from the *407 proxy authentication required* received earlier
 - *nonce* copied from the *407 proxy authentication required* received earlier
 - *Call ID* = same value as in the original *INVITE*
 - *Cseq* = incremented with regard to the original *INVITE*

Note: The *DisplayName* in the *From* header is optional

[Live example](#)

Request-Line: **INVITE sip:023379021@ims.belgacom.be;user=phone SIP/2.0**

Message Header

Accept: application/sdp,application/dtmf-relay
Allow: PRACK,ACK,CANCEL,BYE,SUBSCRIBE,NOTIFY,INVITE,REFER,
OPTIONS,INFO,UPDATE,REGISTER
Call-ID: OA5EC5F2903227970142FB2F31@ims.belgacom.be
Contact: <sip:+3227970142@10.127.239.219:57463;user=phone>
Content-Type: application/sdp
CSeq: 7 INVITE
From: <sip:+3227970142@ims.belgacom.be;user=phone>;tag=4C5D
Max-Forwards: 70
P-Preferred-Identity: <sip:pilotpuid3227970140@ims.belgacom.be:5060>
Privacy: none
Proxy-Authorization: Digest
username="pilotprn3227970140@ims.belgacom.be",
realm="ims.belgacom.be",
nonce="b7c9036dbf3054aea940e974cbcd4ee03dc8f84c2308",
uri="sip:023379021@ims.belgacom.be",
response="ee3baeabc99ce63e0a6c091db5b23",
cnonc="ZckOxabLmpTsOi"
Supported: replaces
To: <sip:023379021@ims.belgacom.be;user=phone>
Via: SIP/2.0/UDP 10.127.239.219:57463;branch=z9hG4bK-1F7F-9
Content-Length: 301
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): ims.belgacom.be 3496556366 3496556366 IN IP4
192.168.1.200
Owner Username: ims.belgacom.be
Session ID: 3496556366
Session Version: 3496556366
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 192.168.1.200
Session Name (s): Session SDP
Connection Information (c): IN IP4 10.127.239.219
Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.239.219
Time Description, active time (t): 0 0
Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio 16388 RTP/AVP 18 0 8 101
Media Type: audio
Media Port: 16388
Media Proto: RTP/AVP
Media Format: ITU-T G.729

Media Format: ITU-T G.711 PCMU
Media Format: ITU-T G.711 PCMA
Media Format: 101
Media Attribute (a): rtpmap:18 G729/8000
Media Attribute Fieldname: rtpmap
Media Format: 18
MIME Type: G729
Media Attribute (a): fmp:18 annexb=no
Media Attribute Fieldname: fmp
Media Format: 18 [G729]
Media format specific parameters: annexb=no
Media Attribute (a): rtpmap:0 PCMU/8000
Media Attribute Fieldname: rtpmap
Media Format: 0
MIME Type: PCMU
Media Attribute (a): rtpmap:8 PCMA/8000
Media Attribute Fieldname: rtpmap
Media Format: 8
MIME Type: PCMA
Media Attribute (a): rtpmap:101 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: telephone-event
Media Attribute (a): fmp:101 0-15
Media Attribute Fieldname: fmp
Media Format: 101 [telephone-event]
Media format specific parameters: 0-15
Media Attribute (a): ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20

The *INVITE* again contains SDP information regarding the proposed call parameters (e.g. codec, IP address and port number on which the IP-P(A)BX user wants to receive RTP).

The Proximus IMS network first returns a *100 Trying* response and performs normal call routing to the destination. When the destination is reached a *180 Ringing* response is returned to the IP-P(A)BX.

Live example

Status-Line: SIP/2.0 100 Trying

Message Header

Call-ID: OA5EC5F2903227970142FB2F31@ims.belgacom.be

From: <sip:+3227970142@ims.belgacom.be;user=phone>;tag=4C5D

To: <sip:023379021@ims.belgacom.be;user=phone>

Via: SIP/2.0/UDP 10.127.239.219:57463;branch=z9hG4bK-1F7F-9

CSeq: 7 INVITE

Content-Length: 0

Status-Line: SIP/2.0 180 Ringing

Message Header

Call-ID: OA5EC5F2903227970142FB2F31@ims.belgacom.be

From: <sip:+3227970142@ims.belgacom.be;user=phone>;tag=4C5D

To: <sip:023379021@ims.belgacom.be;user=phone>;

tag=4ca21474-1287574766796652-gm-po-lucentPCSF-032761

Via: SIP/2.0/UDP 10.127.239.219:57463;branch=z9hG4bK-1F7F-9

CSeq: 7 INVITE

Contact: <sip:10.127.244.46:5060;transport=udp>

Allow: ACK,BYE,CANCEL,INFO,INVITE,OPTIONS,PRACK,REFER,NOTIFY,UPDATE

Content-Type: application/sdp

Content-Length: 194

Server: Alcatel-Lucent-HPSS/3.0.3

Message body

Session Description Protocol

Session Description Protocol Version (v): 0

Owner/Creator, Session Id (o): BroadWorks 159227 1 IN IP4 10.127.244.46

Owner Username: BroadWorks

Session ID: 159227

Session Version: 1

Owner Network Type: IN

Owner Address Type: IP4

Owner Address: 10.127.244.46

Session Name (s): -

Connection Information (c): IN IP4 10.127.244.46

Connection Network Type: IN

Connection Address Type: IP4

Connection Address: 10.127.244.46

Time Description, active time (t): 0 0

Session Start Time: 0

Session Stop Time: 0

Media Description, name and address (m): audio 10202 RTP/AVP 18 101

Media Type: audio

Media Port: 10202

Media Proto: RTP/AVP

Media Format: ITU-T G.729

Media Format: 101

Media Attribute (a):ptime:20

Media Attribute Fieldname: ptime

Media Attribute Value: 20

Media Attribute (a):maxptime:60

Media Attribute Fieldname: maxptime

Media Attribute Value: 60

Media Attribute (a):rtpmap:101 telephone-event/8000

Media Attribute Fieldname: rtpmap

Media Format: 101
MIME Type: telephone-event
Media Attribute (a): fmtp:101 0-15
Media Attribute Fieldname: fmtp
Media Format: 101 [telephone-event]
Media format specific parameters: 0-15

When the call is answered the Proximus IMS network returns a 200 OK response containing SDP information regarding the accepted call parameters (e.g. codec, IP address and port number on which the destination wants to receive RTP).

Live example

Status-Line: SIP/2.0 200 OK
Message Header
Call-ID: OA5EC5F2903227970142FB2F31@ims.belgacom.be
From: <sip:+3227970142@ims.belgacom.be;user=phone>;tag=4C5D
To: <sip:023379021@ims.belgacom.be;user=phone>;
tag=4ca21474-1287574766796652-gm-po-lucentPCSF-032761
Via: SIP/2.0/UDP 10.127.239.219:57463;branch=z9hG4bK-1F7F-9
CSeq: 7 INVITE
Contact: <sip:10.127.244.46:5060;transport=udp>
Allow: ACK,BYE,CANCEL,INFO,INVITE,OPTIONS,PRACK,REFER,NOTIFY,UPDATE
Accept: multipart/mixed,application/media_control+xml,application/sdp
Content-Type: application/sdp
Content-Length: 194
Server: Alcatel-Lucent-HPSS/3.0.3
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): BroadWorks 159227 1 IN IP4 10.127.244.46
Owner Username: BroadWorks
Session ID: 159227
Session Version: 1
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.127.244.46
Session Name (s): -
Connection Information (c): IN IP4 10.127.244.46
Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.244.46
Time Description, active time (t): 0 0
Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio 10202 RTP/AVP 18 101

Media Type: audio
Media Port: 10202
Media Proto: RTP/AVP
Media Format: ITU-T G.729
Media Format: 101
Media Attribute (a):ptime:20
Media Attribute Fieldname:ptime
Media Attribute Value: 20
Media Attribute (a):maxptime:60
Media Attribute Fieldname:maxptime
Media Attribute Value: 60
Media Attribute (a):rtpmap:101 telephone-event/8000
Media Attribute Fieldname:rtpmap
Media Format: 101
MIME Type: telephone-event
Media Attribute (a):fmtp:101 0-15
Media Attribute Fieldname:fmtp
Media Format: 101 [telephone-event]
Media format specific parameters: 0-15

The IP-P(A)BX sends an ACK message to the Proximus IMS network in order to properly close the *INVITE* transaction.

Live example

```
Request-Line: ACK sip:10.127.244.46:5060;transport=udp SIP/2.0
Message Header
Call-ID: OA5EC5F2903227970142FB2F31@ims.belgacom.be
CSeq: 7 ACK
From: <sip:+3227970142@ims.belgacom.be;user=phone>;tag=4C5D
Max-Forwards: 70
To: <sip:023379021@ims.belgacom.be;user=phone>;
    tag=4ca21474-1287574766796652-gm-po-lucentPCSF-032761
Via: SIP/2.0/UDP 10.127.239.219:57463;branch=z9hG4bK-61E-A
Content-Length: 0
```

7.3.3. Public on-net terminating call set-up

Figure 4 shows the expected message flow for a public on-net terminating call set-up.

Note: depending on the call scenario (e.g. whether reliability of provisional responses is used or not) differences may occur.

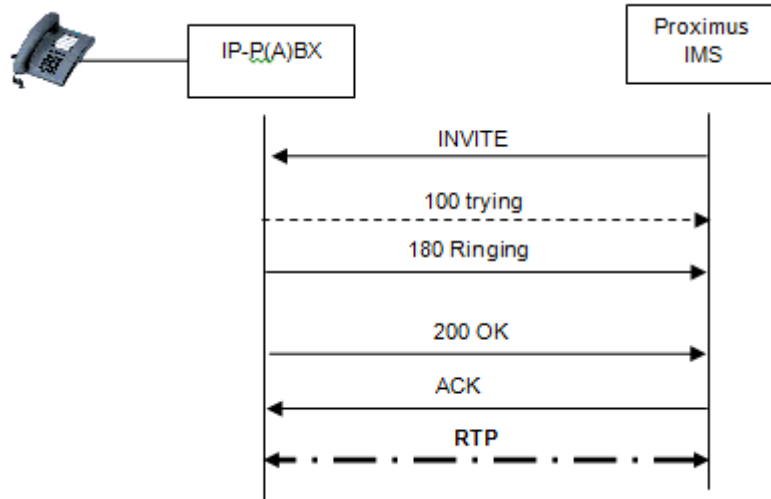


Figure 4: Basic call/session set-up (public off-net, with authentication)

To set-up a call to the IP-P(A)BX, the Proximus IMS network sends an *INVITE* message to the IP-P(A)BX with the following headers:

- *Request-URI* = sip:Norm-SubB-dn@ims.belgacom.be;user=phone
- *To* = <sip:Norm-SubB-dn@ims.belgacom.be;user=phone>
- *From* = DisplayName <sip:Norm-SubA-dn@ims.belgacom.be;user=phone>
- *Via* = IP-addr-IMS
- *Contact* = <sip:IP-addr-IMS>
- *P-asserted-id* = DisplayName <sip:Norm-SubA-dn@ims.belgacom.be;user=phone>
- *P-called-party-id* = <tel:Norm-SubB-dn>

Note 1: The *DisplayName* in the *From* header is optional

Note 2: The *P-asserted-id* header and *P-called-party-id* header are optional

Remark: Any incoming basic call to an IP-P(A)BX may have undergone diversion before it reaches the IP-P(A)BX. Therefore a diverting number can be present in the *INVITE* message in the *Diversion* header (the *Diversion Top* header contains the Redirecting Number, while the *Diversion Bottom* header contains the Original Called Number). The *Diversion* header has been documented in IETF RFC 5806 Diversion indication in SIP [31].

[Live example](#)

Request-Line: INVITE sip:+3227970142@10.127.239.219:57463;user=phone SIP/2.0
Message Header

Via: SIP/2.0/UDP 10.127.244.46:5060;

branch=z9hG4bK4knk7qoch8pu5mvmq05uq9d2c6

Call-ID: LU-1287574786454558@imgroup0-003.ilasm.ims.ims.be

To: "3227970140 3227970140"
<sip:+3227970142@ims.belgacom.be;user=phone>
From: "+3223379021" **<sip:+3223379021@ims.belgacom.be;user=phone>**;
tag=4ca21474-128757481644549-gm-pt-lucentPCSF-038096
CSeq: 1 INVITE
Max-Forwards: 67
Content-Type: application/sdp
Contact: **<sip:10.127.244.46:5060;transport=udp>**
Allow: ACK,BYE,CANCEL,INFO,INVITE,OPTIONS,PRACK,REFER,NOTIFY,UPDATE
Accept: multipart/mixed,application/media_control+xml,application/sdp
Content-Length: 214
P-Called-Party-ID: **<tel:+3227970142>**
User-Agent: XXXX

Message body

Session Description Protocol

Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): BroadWorks 159230 1 IN IP4 10.127.244.46
Owner Username: BroadWorks
Session ID: 159230
Session Version: 1
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.127.244.46
Session Name (s): -
Connection Information (c): IN IP4 10.127.244.46
Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.244.46
Time Description, active time (t): 0 0
Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio 10204 RTP/AVP 8 18 101
Media Type: audio
Media Port: 10204
Media Proto: RTP/AVP
Media Format: ITU-T G.711 PCMA
Media Format: ITU-T G.729
Media Format: 101
Media Attribute (a): rtpmap:8 PCMA/8000
Media Attribute Fieldname: rtpmap
Media Format: 8
MIME Type: PCMA
Media Attribute (a): rtpmap:18 G729/8000
Media Attribute Fieldname: rtpmap
Media Format: 18
MIME Type: G729

Media Attribute (a): rtpmap:101 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: telephone-event
Media Attribute (a): fntp:101 0-15
Media Attribute Fieldname: fntp
Media Format: 101 [telephone-event]
Media format specific parameters: 0-15

The *INVITE* contains SDP information regarding the proposed call parameters (e.g. codec, IP address and port number on which the Proximus IMS network wants to receive RTP).

The IP-P(A)BX returns first a *100 Trying* response, optionally followed by a *183 Progress* response, and then a *180 Ringing* response.

[Live example](#)

Status-Line: SIP/2.0 100 Trying

Message Header

Allow: PRACK,ACK,CANCEL,BYE,SUBSCRIBE,NOTIFY,INVITE,REFER,
OPTIONS,INFO,UPDATE,REGISTER

Call-ID: LU-1287574786454558@imgroup0-003.ilasm.ims.ims.be

CSeq: 1 INVITE

From: "+3223379021" <sip:+3223379021@ims.belgacom.be;user=phone>;
tag=4ca21474-128757481644549-gm-pt-lucentPCSF-038096

To: "3227970140 3227970140" <sip:+3227970142@ims.belgacom.be;user=phone>

Via: SIP/2.0/UDP 10.127.244.46:5060;received=10.127.244.46;
branch=z9hG4bK4knk7qoch8pu5mbq05uq9d2c6

Content-Length: 0

Status-Line: SIP/2.0 183 Session Progress

Message Header

Call-ID: LU-1287574786454558@imgroup0-003.ilasm.ims.ims.be

CSeq: 1 INVITE

From: "+3223379021" <sip:+3223379021@ims.belgacom.be;user=phone>;
tag=4ca21474-128757481644549-gm-pt-lucentPCSF-038096

To: "3227970140 3227970140" <sip:+3227970142@ims.belgacom.be;user=phone>;
tag=53E4

Via: SIP/2.0/UDP 10.127.244.46:5060;received=10.127.244.46;
branch=z9hG4bK4knk7qoch8pu5mbq05uq9d2c6

Content-Length: 0

Status-Line: SIP/2.0 180 Ringing

Message Header

Call-ID: LU-1287574786454558@imgroup0-003.ilasm.ims.ims.be

CSeq: 1 INVITE
From: "+3223379021" <sip:+3223379021@ims.belgacom.be;user=phone>;
tag=4ca21474-128757481644549-gm-pt-lucentPCSF-038096
To: "3227970140 3227970140" <sip:+3227970142@ims.belgacom.be;user=phone>;
tag=53E4
Via: SIP/2.0/UDP 10.127.244.46:5060;received=10.127.244.46;
branch=z9hG4bK4knk7qoch8pu5mnbq05uq9d2c6
Content-Length: 0

When the call is answered the IP-P(A)BX returns a 200 OK response containing SDP information regarding the accepted call parameters (e.g. codec, IP address and port number on which the destination wants to receive RTP).

Live example

Status-Line: SIP/2.0 200 OK
Message Header
Accept: application/sdp,application/dtmf-relay
Allow: PRACK,ACK,CANCEL,BYE,SUBSCRIBE,NOTIFY,INVITE,REFER,
OPTIONS,INFO,UPDATE,REGISTER
Call-ID: LU-1287574786454558@imgroup0-003.ilasm.ims.ims.be
Contact: "3227970140 3227970140" <sip:+3227970142@10.127.239.219:57463;
user=phone>
Content-Type: application/sdp
CSeq: 1 INVITE
From: "+3223379021" <sip:+3223379021@ims.belgacom.be;user=phone>;
tag=4ca21474-128757481644549-gm-pt-lucentPCSF-038096
P-Preferred-Identity: <sip:27970142@ims.belgacom.be:5060;user=phone>
Privacy: none
To: "3227970140 3227970140" <sip:+3227970142@ims.belgacom.be;user=phone>;
tag=53E4
Via: SIP/2.0/UDP 10.127.244.46:5060;received=10.127.244.46;
branch=z9hG4bK4knk7qoch8pu5mnbq05uq9d2c6
Content-Length: 253
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): ims.belgacom.be 3496556394 3496556395 IN IP4
192.168.1.200
Owner Username: ims.belgacom.be
Session ID: 3496556394
Session Version: 3496556395
Owner Network Type: IN
Owner Address Type: IP4

Owner Address: 192.168.1.200
Session Name (s): Session SDP
Connection Information (c): IN IP4 10.127.239.219
Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.239.219
Time Description, active time (t): 0 0
Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio 16391 RTP/AVP 18 101
Media Type: audio
Media Port: 16391
Media Proto: RTP/AVP
Media Format: ITU-T G.729
Media Format: 101
Media Attribute (a): rtpmap:18 G729/8000
Media Attribute Fieldname: rtpmap
Media Format: 18
MIME Type: G729
Media Attribute (a): fmp:18 annexb=no
Media Attribute Fieldname: fmp
Media Format: 18 [G729]
Media format specific parameters: annexb=no
Media Attribute (a): rtpmap:101 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: telephone-event
Media Attribute (a): fmp:101 0-15
Media Attribute Fieldname: fmp
Media Format: 101 [telephone-event]
Media format specific parameters: 0-15
Media Attribute (a): ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20

The Proximus IMS network sends an *ACK* message to the IP-P(A)BX in order to properly close the *INVITE* transaction.

Live example

Request-Line: ACK sip:+3227970142@10.127.239.219:57463;user=phone SIP/2.0
Message Header
Via: SIP/2.0/UDP 10.127.244.46:5060;
branch=z9hG4bK58fmk8p12af1pe6o2msf5in6t4-gog5

```

From: "+3223379021" <sip:+3223379021@ims.belgacom.be;user=phone>;
    tag=4ca21474-128757481644549-gm-pt-lucentPCSF-038096
To: "3227970140 3227970140" <sip:+3227970142@ims.belgacom.be;user=phone>;
    tag=53E4
Call-ID: LU-1287574786454558@imgroup0-003.ilasm.ims.ims.be
CSeq: 1 ACK
Contact: <sip:10.127.244.46:5060>
Max-Forwards: 67
Content-Length: 0
User-Agent: XXXX
  
```

7.3.4. Public off-net terminating call set-up

Figure 5 shows the expected message flow for a public off-net terminating call set-up.

Note: depending on the call scenario (e.g. whether reliability of provisional responses is used or not) differences may occur.

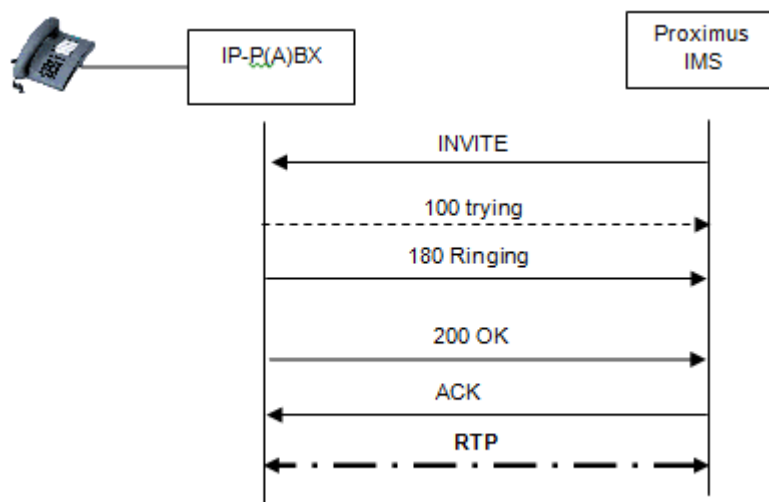


Figure 5: Basic call/session set-up (public off-net, with authentication)

To set-up a call to the IP-P(A)BX, the Proximus IMS network sends an *INVITE* message to the IP-P(A)BX with the following headers:

- *Request-URI* = sip:Norm-SubB-dn@ims.belgacom.be;user=phone
- *To* = <sip:Norm-SubB-dn@ims.belgacom.be;user=phone>
- *From* = DisplayName <sip:Norm-SubA-dn@ims.belgacom.be;user=phone>
- *Via* = IP-addr-IMS
- *Contact* = <sip:IP-addr-IMS>

- *P-asserted-id* = DisplayName < sip:Norm-SubA-dn@ims.belgacom.be;user=phone > or < tel:Norm-SubA-dn >
- *P-called-party-id* = < tel:Norm-SubB-dn >

Note: The DisplayName in the From header is optional

Remark: Any incoming basic call to an IP-P(A)BX may have undergone diversion before it reaches the IP-P(A)BX. Therefore a diverting number can be present in the *INVITE* message in the *Diversion* header (the *Diversion Top* header contains the Redirecting Number, while the *Diversion Bottom* header contains the Original Called Number). The *Diversion* header has been documented in IETF RFC 5806 Diversion indication in SIP [31].

[Live example](#)

```
Request-Line: INVITE sip:+3227970142@10.127.239.219:57463;user=phone SIP/2.0
Message Header
  Via: SIP/2.0/UDP 10.127.244.46:5060;branch=z9hG4bKhhgk4g8cr9hlekl6u73ipb3hb6
  Call-ID: LU-128757481644542@imgroup0-003.ilasm.ims.ims.be
  To: "3227970140 3227970140"
  < sip:+3227970142@ims.belgacom.be;user=phone >
  From: "+3223379021" < sip:+3223379021@ims.belgacom.be;user=phone >;
    tag=4ca21474-128757481644549-gm-pt-lucentPCSF-038096
  CSeq: 1 INVITE
  Max-Forwards: 67
  Content-Type: application/sdp
  Contact: < sip:10.127.244.46:5060;transport=udp >
  P-Asserted-Identity: < tel:+3223379021 >
  Privacy: none
  Supported: 100rel
  Allow: ACK,BYE,CANCEL,INFO,INVITE,OPTIONS,PRACK,REFER,NOTIFY,UPDATE
  Accept: multipart/mixed,application/media_control+xml,application/sdp
  Content-Length: 179
  P-Called-Party-ID: < tel:+3227970142 >
  User-Agent: XXXX
Message body
  Session Description Protocol
    Session Description Protocol Version (v): 0
    Owner/Creator, Session Id (o): BroadWorks 159235 1 IN IP4 10.127.244.46
    Owner Username: BroadWorks
    Session ID: 159235
    Session Version: 1
    Owner Network Type: IN
    Owner Address Type: IP4
    Owner Address: 10.127.244.46
```

Session Name (s): -
Connection Information (c): IN IP4 10.127.244.46
 Connection Network Type: IN
 Connection Address Type: IP4
 Connection Address: 10.127.244.46
Time Description, active time (t): 0 0
 Session Start Time: 0
 Session Stop Time: 0
Media Description, name and address (m): audio 10206 RTP/AVP 8 18 101
 Media Type: audio
 Media Port: 10206
 Media Proto: RTP/AVP
 Media Format: ITU-T G.711 PCMA
 Media Format: ITU-T G.729
 Media Format: 101
Media Attribute (a): rtpmap:101 TELEPHONE-EVENT/8000
 Media Attribute Fieldname: rtpmap
 Media Format: 101
 MIME Type: TELEPHONE-EVENT
Media Attribute (a):ptime:20
 Media Attribute Fieldname: ptime
 Media Attribute Value: 20
Media Attribute (a):maxptime:30
 Media Attribute Fieldname: maxptime
 Media Attribute Value: 30

The *INVITE* contains SDP information regarding the proposed call parameters (e.g. codec, IP address and port number on which the Proximus IMS network wants to receive RTP).

The IP-P(A)BX returns first a *100 Trying* response, optionally followed by a *183 Progress* response, and then a *180 Ringing* response.

[Live example](#)

```
Status-Line: SIP/2.0 100 Trying
Message Header
Allow: PRACK,ACK,CANCEL,BYE,SUBSCRIBE,NOTIFY,INVITE,REFER,
      OPTIONS,INFO,UPDATE,REGISTER
Call-ID: LU-128757481644542@imgroup0-003.ilasm.ims.imt.be
CSeq: 1 INVITE
From: "+3223379021" <sip:+3223379021@ims.belgacom.be;user=phone>;
      tag=4ca21474-128757481644549-gm-pt-lucentPCSF-038096
To: "3227970140 3227970140" <sip:+3227970142@ims.belgacom.be;user=phone>
Via: SIP/2.0/UDP 10.127.244.46:5060;received=10.127.244.46;
     branch=z9hG4bKxbgk4g8cr9hlekl6u73ipb3hb6
```

Content-Length: 0

Status-Line: SIP/2.0 183 Session Progress

Message Header

Call-ID: LU-128757481644542@imgroup0-003.ilasm.ims.ims.be

CSeq: 1 INVITE

From: "+3223379021" <sip:+3223379021@ims.belgacom.be;user=phone>;
tag=4ca21474-128757481644549-gm-pt-lucentPCSF-038096

To: "3227970140 3227970140" <sip:+3227970142@ims.belgacom.be;user=phone>;
tag=4384

Via: SIP/2.0/UDP 10.127.244.46:5060;received=10.127.244.46;
branch=z9hG4bKhhbgk4g8cr9hlekl6u73ipb3hb6

Content-Length: 0

Status-Line: SIP/2.0 180 Ringing

Message Header

Call-ID: LU-128757481644542@imgroup0-003.ilasm.ims.ims.be

CSeq: 1 INVITE

From: "+3223379021" <sip:+3223379021@ims.belgacom.be;user=phone>;
tag=4ca21474-128757481644549-gm-pt-lucentPCSF-038096

To: "3227970140 3227970140" <sip:+3227970142@ims.belgacom.be;user=phone>;
tag=4384

Via: SIP/2.0/UDP 10.127.244.46:5060;received=10.127.244.46;
branch=z9hG4bKhhbgk4g8cr9hlekl6u73ipb3hb6

Content-Length: 0

When the call is answered the IP-P(A)BX returns a 200 OK response containing SDP information regarding the accepted call parameters (e.g. codec, IP address and port number on which the destination wants to receive RTP).

[Live example](#)

Status-Line: SIP/2.0 200 OK

Message Header

Accept: application/sdp,application/dtmf-relay

Allow: PRACK,ACK,CANCEL,BYE,SUBSCRIBE,NOTIFY,INVITE,REFER,
OPTIONS,INFO,UPDATE,REGISTER

Call-ID: LU-128757481644542@imgroup0-003.ilasm.ims.ims.be

Contact: "3227970140

3227970140" <sip:+3227970142@10.127.239.219:57463;user=phone>

Content-Type: application/sdp

CSeq: 1 INVITE

From: "+3223379021" <sip:+3223379021@ims.belgacom.be;user=phone>;
tag=4ca21474-128757481644549-gm-pt-lucentPCSF-038096

P-Preferred-Identity: <sip:27970142@ims.belgacom.be:5060;user=phone>
Privacy: none
To: "3227970140 3227970140" <sip:+3227970142@ims.belgacom.be;user=phone>;
tag=4384
Via: SIP/2.0/UDP 10.127.244.46:5060;received=10.127.244.46;
branch=z9hG4bKKhbgk4g8cr9hlekl6u73ipb3hb6
Content-Length: 253
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): ims.belgacom.be 3496556424 3496556425 IN IP4
192.168.1.200
Owner Username: ims.belgacom.be
Session ID: 3496556424
Session Version: 3496556425
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 192.168.1.200
Session Name (s): Session SDP
Connection Information (c): IN IP4 10.127.239.219
Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.239.219
Time Description, active time (t): 0 0
Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio 16393 RTP/AVP 18 101
Media Type: audio
Media Port: 16393
Media Proto: RTP/AVP
Media Format: ITU-T G.729
Media Format: 101
Media Attribute (a): rtpmap:18 G729/8000
Media Attribute Fieldname: rtpmap
Media Format: 18
MIME Type: G729
Media Attribute (a): fmp:18 annexb=no
Media Attribute Fieldname: fmp
Media Format: 18 [G729]
Media format specific parameters: annexb=no
Media Attribute (a): rtpmap:101 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: telephone-event
Media Attribute (a): fmp:101 0-15
Media Attribute Fieldname: fmp

Media Format: 101 [telephone-event]
 Media format specific parameters: 0-15
 Media Attribute (a): ptime:20
 Media Attribute Fieldname: ptime
 Media Attribute Value: 20

The Proximus IMS network sends an ACK message to the IP-P(A)BX in order to properly close the *INVITE* transaction.

[Live example](#)

```
Request-Line: ACK sip:+3227970142@10.127.239.219:57463;user=phone SIP/2.0
Message Header
Via: SIP/2.0/UDP 10.127.244.46:5060;
    branch=z9hG4bKniveq6kpk7vvh3mk53rhrr7-gog5
From: "+3223379021" <sip:+3223379021@ims.belgacom.be;user=phone>;
    tag=4ca21474-128757481644549-gm-pt-lucentPCSF-038096
To: "3227970140 3227970140" <sip:+3227970142@ims.belgacom.be;user=phone>;
    tag=4384
Call-ID: LU-128757481644542@imgroup0-003.ilasm.ims.ims.be
CSeq: 1 ACK
Contact: <sip:10.127.244.46:5060>
Max-Forwards: 67
Content-Length: 0
User-Agent: XXXX
```

7.3.5. Forward call tear down

Figure 6 shows the expected message flow for call tear down initiated by the IP-P(A)BX.

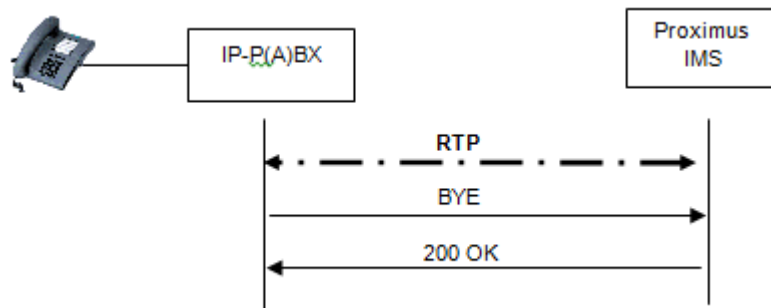


Figure 6: Basic call/session teardown

To end an established public on-net or a public off-net call the IP-P(A)BX sends a *BYE* message to the Proximus IMS network.

- *CallID* = matches the *CallID* of the concerned call
- *Cseq* = is incremented with regard to the previous transaction related to this call

Live example

```
Request-Line: BYE sip:10.127.244.46:5060;transport=udp SIP/2.0
Message Header
Call-ID: OA584BE5B53227970142BCE2A48@ims.belgacom.be
CSeq: 6 BYE
From: <sip:+3227970142@ims.belgacom.be;user=phone>;tag=54A2
Reason: Q.850;cause=16;text="Normal call clearing"
To: <sip:027970317@ims.belgacom.be;user=phone>;
    tag=4ca21474-1287574731612668-gm-po-lucentPCSF-008274
Via: SIP/2.0/UDP 10.127.239.219:57463;branch=z9hG4bK-1333-7
Content-Length: 0
```

The Proximus IMS network returns a *200 OK* response.

Live example

```
Status-Line: SIP/2.0 200 OK
Message Header
Call-ID: OA584BE5B53227970142BCE2A48@ims.belgacom.be
From: <sip:+3227970142@ims.belgacom.be;user=phone>;tag=54A2
To: <sip:027970317@ims.belgacom.be;user=phone>;
    tag=4ca21474-1287574731612668-gm-po-lucentPCSF-008274
Via: SIP/2.0/UDP 10.127.239.219:57463;branch=z9hG4bK-1333-7
CSeq: 6 BYE
Contact: <sip:10.127.244.46:5060>
Date: Wed, 20 Oct 2010 11:39:11 GMT
Server: Alcatel-Lucent-HPSS/3.0.3
Content-Length: 0
```

7.3.6. Backward call tear down

Figure 7 shows the expected message flow for call tear down initiated by the Proximus IMS network.

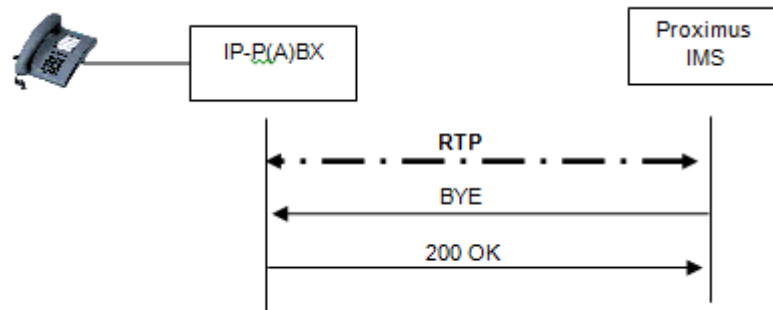


Figure 7: Basic call/session teardown

To end an established public on-net or a public off-net call the Proximus IMS network sends a *BYE* message to the IP-P(A)BX.

- *CallID* = matches the *CallID* of the concerned call
- *Cseq* = is incremented with regard to the previous transaction related to this call

Live example

```

Request-Line: BYE sip:+3227970142@10.127.239.219:57463;user=phone SIP/2.0
Message Header
Via: SIP/2.0/UDP 10.127.244.46:5060;
    branch=z9hG4bKniveq6kpk7vvh3mk53rhrr7-1k5
Call-ID: LU-128757481644542@imgroup0-003.ilasm.ims.ims.be
To: "3227970140 3227970140" <sip:+3227970142@ims.belgacom.be;user=phone>;
    tag=4384
From: "+3223379021" <sip:+3223379021@ims.belgacom.be;user=phone>;
    tag=4ca21474-128757481644549-gm-pt-lucentPCSF-038096
CSeq: 2 BYE
Contact: <sip:10.127.244.46:5060>
Max-Forwards: 69
User-Agent: XXXX
Content-Length: 0
    
```

The IP-P(A)BX returns a *200 OK* response.

Live example

```

Status-Line: SIP/2.0 200 OK
Message Header
    Call-ID: LU-128757481644542@imgroup0-003.ilasm.ims.ims.be
    
```

```
CSeq: 2 BYE
From: "+3223379021" <sip:+3223379021@ims.belgacom.be;user=phone>;
    tag=4ca21474-128757481644549-gm-pt-lucentPCSF-038096
To: "3227970140 3227970140" <sip:+3227970142@ims.belgacom.be;user=phone>;
    tag=4384
Via: SIP/2.0/UDP 10.127.244.46:5060;received=10.127.244.46;
    branch=z9hG4bKniveq6kpk7vvbvh3mk53rhrr7-1k5
Content-Length: 0
```

7.4. Supplementary services

All supplementary services shall be executed at -and managed by- the IP-P(A)BX. There is no individual user profile in the Proximus IMS network for the extensions behind the IP-P(A)BX.

Services executed by the IP-P(A)BX and involving internal users only shall not be visible for the Proximus IMS network.

Services executed by the IP-P(A)BX involving external users need particular interaction with the Proximus IMS network. The expected behaviour is discussed in the following clauses.

7.4.1. Calling Line Identity Presentation (CLIP)

The Calling Line Identification Presentation service is enabled by default and applies to all PBX iDN and to the pbxPUIID.

Note: the pbxPUIID is in fact a non-dialable public identity and hence in practice it will not be used as CLI

7.4.1.1. Incoming call to the IP-P(A)PBX

The CLIP service sends the identity of the calling line to the IP-P(A)BX. The calling line identity can be provided by the network or it can include identity information supplied by the caller and validated by the network.

The calling line identity can be contained in the *From* and *P-Asserted-Id* headers in the *INVITE* message sent to the IP-P(A)BX. The presentation information of the calling line identity, which establishes the identity type (Presentation Allowed or Presentation Restricted) is contained in the *Privacy* header in the *INVITE* message.

The format of the calling line identity information in the *From* and *P-Asserted-Id* headers in the *INVITE* message is:

- *From* = DisplayName <sip:Norm-SubA-dn@ims.belgacom.be;user=phone>
- *P-Asserted-ID* = DisplayName <sip:Norm-SubA-dn@ims.belgacom.be;user=phone> or <tel:Norm-SubA-dn>

Note 1: The *DisplayName* in the *From* header and *P-Asserted-ID* header is optional

Note 2: The *Norm-SubA-dn* in the *From* header and *P-Asserted-ID* header is not necessarily the same. For example in case of interworking with legacy ISDN two calling line identities may be delivered.

The *Privacy* header in the *INVITE* message has the value "none". The absence of the *Privacy* header equally means "no privacy".

Live example

```
Request-Line: INVITE sip:+3227970251@ims.belgacom.be;user=phone SIP/2.0
Message Header
Via: SIP/2.0/UDP 10.127.249.182:5060;
    branch=z9hG4bKa059e4b6gkop22974ocg3ga540
Call-ID: BW081233763301110-584809374@10.127.70.20
To: "3227970251 3227970250" <sip:+3227970251@ims.belgacom.be;user=phone>
From: "RV-027970315" <sip:+3227970315@ims.belgacom.be;user=phone>;
    tag=1125622886-1291104753763-
CSeq: 233540658 INVITE
Max-Forwards: 68
Content-Type: application/sdp
Contact: <sip:10.127.249.182:5060;
    ue-addr=impbasilab1-sig-fo.ims.ims.be;transport=udp>
Privacy: none
P-Charging-Vector: icid-value="PCSF:10.127.68.10-4cf4b1f1-0004f523";
    orig-ioi="bgc_ims"
P-Access-Network-Info: ADSL2+
Supported: 100rel
Allow: ACK,BYE,CANCEL,INFO,INVITE,OPTIONS,PRACK,REFER,NOTIFY,UPDATE
Accept: multipart/mixed,application/media_control+xml,application/sdp
Content-Length: 227
User-Agent: XXXX
Route: <sip:+3227970251;tgrp=tg_af75of_0101uri;
    trunk-context=sbc1.ims.ims.be@10.127.249.4:5060;user=phone;lr>
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): BroadWorks 88815 1 IN IP4 10.127.249.182
Owner Username: BroadWorks
Session ID: 88815
Session Version: 1
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.127.249.182
```

Session Name (s): -
Connection Information (c): IN IP4 10.127.249.182
 Connection Network Type: IN
 Connection Address Type: IP4
 Connection Address: 10.127.249.182
Time Description, active time (t): 0 0
 Session Start Time: 0
 Session Stop Time: 0
Media Description, name and address (m): audio 15190 RTP/AVP 8 18 101
 Media Type: audio
 Media Port: 15190
 Media Proto: RTP/AVP
 Media Format: ITU-T G.711 PCMA
 Media Format: ITU-T G.729
 Media Format: 101
Media Attribute (a): rtpmap:8 PCMA/8000
 Media Attribute Fieldname: rtpmap
 Media Format: 8
 MIME Type: PCMA
Media Attribute (a): rtpmap:18 G729/8000
 Media Attribute Fieldname: rtpmap
 Media Format: 18
 MIME Type: G729
Media Attribute (a): rtpmap:101 telephone-event/8000
 Media Attribute Fieldname: rtpmap
 Media Format: 101
 MIME Type: telephone-event
Media Attribute (a): sendrecv
Media Attribute (a): fmp:101 0-11
 Media Attribute Fieldname: fmp
 Media Format: 101 [telephone-event]
 Media format specific parameters: 0-11

7.4.1.2. Outgoing call from the IP-P(A)PBX

The calling line identity shall be contained in the *From* and *P-Asserted-Id* headers in the *INVITE* message sent by the IP-P(A)BX.

- *From* = DisplayName <sip:Norm-SubA-dn@ims.belgacom.be;user=phone>
- *P-Asserted-ID* = <sip:Norm-SubA-dn@ims.belgacom.be;user=phone>

Note: The *DisplayName* in the *From* header an *P-Asserted-ID* header is optional

[Live example](#)

Request-Line: INVITE sip:023379020@ims.belgacom.be;user=phone SIP/2.0

Message Header

Route: <sip:10.127.249.182;lr>

Allow: INVITE, ACK, CANCEL, BYE, PRACK, NOTIFY, SUBSCRIBE,
OPTIONS, UPDATE

Supported: replaces,timer,100rel

User-Agent: XXXX

Session-Expires: 1800;refresher=uac

Min-SE: 900

P-Asserted-Identity: "testteam"

<sip:+3227970251@ims.belgacom.be;user=phone>

Content-Type: application/sdp

To: <sip:023379020@ims.belgacom.be;user=phone>

From: "testteam" <sip:+3227970251@ims.belgacom.be;user=phone>;

tag=426662155353bf59d2bccf32155e1e45

Contact: <sip:+3227970251@10.127.249.4;transport=UDP>

Call-ID: 686e67c13e0cc50ad6e5foba9ebb7c55@10.127.249.4

CSeq: 1383567065 INVITE

Via: SIP/2.0/UDP 10.127.249.4;branch=z9hG4bKd851c2507af7ec54d5c39dab3f8e9f91

Max-Forwards: 70

Content-Length: 291

Message body

Session Description Protocol

Session Description Protocol Version (v): 0

Owner/Creator, Session Id (o): OXE 1291112196 1291112196 IN IP4 10.127.249.4

Owner Username: OXE

Session ID: 1291112196

Session Version: 1291112196

Owner Network Type: IN

Owner Address Type: IP4

Owner Address: 10.127.249.4

Session Name (s): abs

Connection Information (c): IN IP4 10.127.249.16

Connection Network Type: IN

Connection Address Type: IP4

Connection Address: 10.127.249.16

Time Description, active time (t): 0 0

Session Start Time: 0

Session Stop Time: 0

Media Description, name and address (m): audio 32514 RTP/AVP 8 18 101

Media Type: audio

Media Port: 32514

Media Proto: RTP/AVP

Media Format: ITU-T G.711 PCMA

Media Format: ITU-T G.729

Media Format: 101

Media Attribute (a): sendrecv
Media Attribute (a): rtpmap:8 PCMA/8000
Media Attribute Fieldname: rtpmap
Media Format: 8
MIME Type: PCMA
Media Attribute (a):ptime:20
Media Attribute Fieldname:ptime
Media Attribute Value: 20
Media Attribute (a):maxptime:30
Media Attribute Fieldname:maxptime
Media Attribute Value: 30
Media Attribute (a): rtpmap:18 G729/8000
Media Attribute Fieldname: rtpmap
Media Format: 18
MIME Type: G729
Media Attribute (a): fmp:18 annexb=no
Media Attribute Fieldname: fmp
Media Format: 18 [G729]
Media format specific parameters: annexb=no
Media Attribute (a):ptime:20
Media Attribute Fieldname:ptime
Media Attribute Value: 20
Media Attribute (a):maxptime:40
Media Attribute Fieldname:maxptime
Media Attribute Value: 40
Media Attribute (a): rtpmap:101 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: telephone-event

Note: According to SIP Connect 1.1 [6], it is recommended that the IP-P(A)BX includes a *P-Asserted-ID* header in the *INVITE* request. The Proximus IMS network does not expect to receive this header and if received this header will be overwritten by the Proximus IMS network with the correct *P-Asserted-ID*.

7.4.2. Calling Line Identity presentation Restriction (CLIR)

The Calling Line Identity presentation Restriction (CLIR) service can be invoked on a call by call basis per individual number, using the dialed feature codes.

7.4.2.1. Incoming call to the IP-P(A)BX

In case the CLIR service has been invoked by the calling user of an incoming call to the IP-P(A)BX, the *From* header in the *INVITE* will not contain the identity information of the calling user and the *P-Asserted-Id* header will not be present in the *INVITE*. The presentation information of the calling line

identity, which establishes the identity type (Presentation Allowed or Presentation Restricted) may be contained in the *Privacy* header in the *INVITE* message.

- *From* = DisplayName <sip:Anonymous@anonymous.invalid>
- *Privacy* = id and/or header and/or User

Note: if present *DisplayName* will have the value “Anonymous”.

7.4.2.2. Outgoing call from the IP-P(A)BX

In order to prevent the presentation of the calling user’s identity (invoke CLIR) the IP-P(A)BX user can use the dialed feature code for the CLIR service and/or the IP-P(A)BX may include a *Privacy* header in the *INVITE*. The value of the *Privacy* header in the *INVITE* shall be *id* and/or *header* and/or *user*

In any case the *From* header **shall** always contain a PUID, even when the CLIR service is to be invoked.

- *From* = DisplayName <sip:Norm-SubA-dn@ims.belgacom.be;user=phone>
- *Privacy* = id and/or header and/or User

7.4.3. Call forwarding services

The call forwarding feature(s) shall be managed and handled by the IP-P(A)BX.

The following behaviour is valid for all flavours (e.g. unconditional (CFU), on busy (CFB), on no reply (CFNR), ...) of call forwarding executed by the IP-P(A)BX.

In case an incoming call to the IP-P(A)BX is forwarded to a destination **external** to the IP-P(A)BX, the IP-P(A)BX shall:

- Either return a 302 Moved Temporarily response containing the forwarded-to-number in the *Contact* header. The Proximus IMS network will then redirect the call to the forwarded-to-number. The calling line identity possibly shown to the forwarded-to destination will be the identity of the original calling user. This is the preferred method.
- Or create the forwarding by setting-up a new (forwarded) call. The incoming call and the outgoing (forwarded) call are considered being 2 separate calls. A *Diversion* header should NOT be included in the outgoing (forwarded) call. The calling line identity possibly shown to the forwarded-to destination will be the diverting calling line identity because the (forwarded) call is not related to the incoming call. The *History-info* header MUST NOT be included in the outgoing (forwarded) call.

7.4.3.1. Call forward via new (outgoing) call

Figure 8 shows the expected message flow for a call forward via a new call.

Note: depending on the call scenario (e.g. whether reliability of provisional responses is used or not) differences may occur.

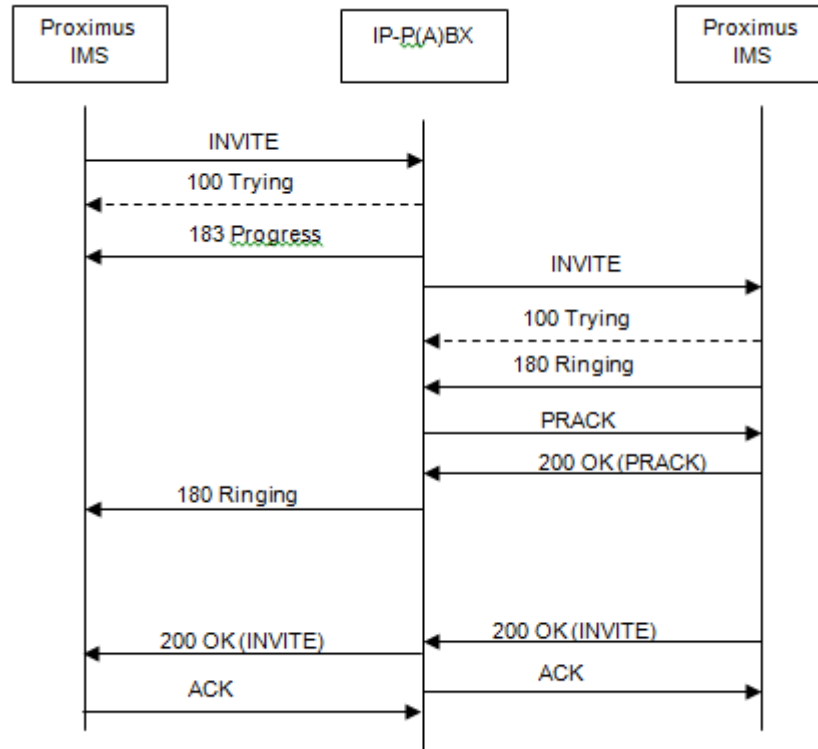


Figure 8: Call forward via new outgoing call

In order to set-up a call to an IP-P(A)BX the Proximus IMS network sends an *INVITE* message to the IP-P(A)BX with:

- *From* = DisplayName < sip:Norm-SubA-dn@ims.belgacom.be;user=phone >
- *To* = DisplayName < sip:Norm-SubB-dn@ims.belgacom.be;user=phone >

The IP-P(A)BX returns a *100 Trying* response.

[Live example](#)

Request-Line: INVITE sip:+3227970251@ims.belgacom.be;user=phone SIP/2.0
 Message Header
 Via: SIP/2.0/UDP 10.127.249.182:5060;branch=z9hG4bKe1ejg691mr8aor09c9baj4u5l7
 Call-ID: BW08543096612011151946121@10.127.70.20
**To: "3227970251
 3227970250"< sip:+3227970251@ims.belgacom.be;user=phone >**
From: "+3223379031"< sip:+3223379031@ims.belgacom.be;user=phone >;
tag=1827139038-1294822470966-
 CSeq: 1018657436 INVITE
 Max-Forwards: 68

Content-Type: application/sdp
Contact: <sip:10.127.249.182:5060;ue-addr=impbasilab1-sig-fo.ims.ims.be;transport=udp>
Privacy: none
Supported: 100rel
Allow: ACK,BYE,CANCEL,INFO,INVITE,OPTIONS,PRACK,REFER,NOTIFY,UPDATE
Accept: multipart/mixed,application/media_control+xml,application/sdp
Content-Length: 182
User-Agent: XXXX
Route: <sip:+3227970251;tgrp=tg_af75of_0101uri;trunk-context=sbc1.ims.ims.be@10.127.249.4:5060;user=phone;lr>
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): BroadWorks 3194421 1 IN IP4 10.127.249.182
Owner Username: BroadWorks
Session ID: 3194421
Session Version: 1
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.127.249.182
Session Name (s): -
Connection Information (c): IN IP4 10.127.249.182
Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.249.182
Time Description, active time (t): 0 0
Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio 15694 RTP/AVP 8 18 101
Media Type: audio
Media Port: 15694
Media Proto: RTP/AVP
Media Format: ITU-T G.711 PCMA
Media Format: ITU-T G.729
Media Format: 101
Media Attribute (a): rtpmap:101 TELEPHONE-EVENT/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: TELEPHONE-EVENT
Media Attribute (a): ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20
Media Attribute (a): maxptime:30
Media Attribute Fieldname: maxptime
Media Attribute Value: 30

Status-Line: SIP/2.0 100 Trying

Message Header

To: "3227970251 3227970250" <sip:+3227970251@ims.belgacom.be;user=phone>

From: "+3223379031" <sip:+3223379031@ims.belgacom.be;user=phone>;

tag=1827139038-1294822470966-

Call-ID: BW08543096612011151946121@10.127.70.20

CSeq: 1018657436 INVITE

Via: SIP/2.0/UDP 10.127.249.182:5060;branch=z9hG4bKe1ejg691mr8aor09c9baj4u5l7

Content-Length: 0

When the IP-P(A)BX invokes the call forward feature, a *183 Progress* response is sent to the Proximus IMS network.

[Live example](#)

Status-Line: SIP/2.0 183 Session Progress

Message Header

Allow: INVITE, ACK, CANCEL, BYE, PRACK, NOTIFY, SUBSCRIBE, OPTIONS, UPDATE

Contact: sip:10.127.249.4

User-Agent: XXXX

To: "3227970251 3227970250" <sip:+3227970251@ims.belgacom.be;user=phone>;

tag=35e6f75a8c3510817253a92aa13b7c55

From: "+3223379031" <sip:+3223379031@ims.belgacom.be;user=phone>;

tag=1827139038-1294822470966-

Call-ID: BW08543096612011151946121@10.127.70.20

CSeq: 1018657436 INVITE

Via: SIP/2.0/UDP 10.127.249.182:5060;branch=z9hG4bKe1ejg691mr8aor09c9baj4u5l7

Content-Length: 0

The IP-P(A)BX starts a new call to the "forwarded-to-destination" by sending an *INVITE* message to the Proximus IMS network with:

- *From* = DisplayName <sip:Norm-SubB-dn@ims.belgacom.be;user=phone>
- *P-Asserted-ID* = DisplayName <sip:Norm-SubB-dn@ims.belgacom.be;user=phone>
- *To* = <sip:Dialled-SubC-dn@ims.belgacom.be;user=phone>

[Live example](#)

Request-Line: INVITE sip:023379021@ims.belgacom.be;user=phone SIP/2.0

Message Header

Route: <sip:10.127.249.182;lr>

Allow: INVITE, ACK, CANCEL, BYE, PRACK, NOTIFY, SUBSCRIBE, OPTIONS, UPDATE
Supported: replaces,timer,100rel
User-Agent: XXXX
Session-Expires: 1800;refresher=uac
Min-SE: 900
**P-Asserted-Identity: "testteam P&P" <sip:+3227970251@ims.belgacom.be;
user=phone>**
Content-Type: application/sdp
To: <sip:023379021@ims.belgacom.be;user=phone>
**From: "testteam P&P" <sip:+3227970251@ims.belgacom.be;user=phone>;
tag=bd17b50474bf2c5caaab3b3107494be4**
Contact: <sip:+3227970251@10.127.249.4;transport=UDP>
Call-ID: 3f1979b5d1e4fde70afa60fa65a35fd3@10.127.249.4
CSeq: 869438703 INVITE
Via: SIP/2.0/UDP 10.127.249.4;branch=z9hG4bK9d56c1b14509e02867eacf8f3d9ec870
Max-Forwards: 70
Content-Length: 292
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): OXE 1294830037 1294830037 IN IP4 10.127.249.4
Owner Username: OXE
Session ID: 1294830037
Session Version: 1294830037
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.127.249.4
Session Name (s): abs
Connection Information (c): IN IP4 10.127.249.182
Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.249.182
Time Description, active time (t): 0 0
Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio 15694 RTP/AVP 8 18 101
Media Type: audio
Media Port: 15694
Media Proto: RTP/AVP
Media Format: ITU-T G.711 PCMA
Media Format: ITU-T G.729
Media Format: 101
Media Attribute (a): sendrecv
Media Attribute (a): rtpmap:8 PCMA/8000
Media Attribute Fieldname: rtpmap
Media Format: 8

MIME Type: PCMA
Media Attribute (a): ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20
Media Attribute (a): maxptime:30
Media Attribute Fieldname: maxptime
Media Attribute Value: 30
Media Attribute (a): rtpmap:18 G729/8000
Media Attribute Fieldname: rtpmap
Media Format: 18
MIME Type: G729
Media Attribute (a): fmp:18 annexb=no
Media Attribute Fieldname: fmp
Media Format: 18 [G729]
Media format specific parameters: annexb=no
Media Attribute (a): ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20
Media Attribute (a): maxptime:40
Media Attribute Fieldname: maxptime
Media Attribute Value: 40
Media Attribute (a): rtpmap:101 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: telephone-event

The Proximus IMS network returns a *100 Trying* response to the IP-P(A)BX.

[Live example](#)

Status-Line: SIP/2.0 100 Trying
Message Header
To: <sip:023379021@ims.belgacom.be;user=phone>
From: "testteam P&P" <sip:+3227970251@ims.belgacom.be;user=phone>;
tag=bd17b50474bf2c5caaab3b3107494be4
Call-ID: 3f1979b5d1e4fde70afa60fa65a35fd3@10.127.249.4
Via: SIP/2.0/UDP 10.127.249.4;branch=z9hG4bK9d56c1b14509e02867eacf8f3d9ec870
CSeq: 869438703 INVITE
Content-Length: 0

When the “forwarded-to-destination” is reached the Proximus IMS network returns a *180 Ringing* response to the IP-P(A)BX.

In this case the *180 Ringing* response contains a *Require* header with value *100rel*, which means that reliable transport of *1XX* responses is required. Consequently the IP-P(A)BX must send a *PRACK* message to the Proximus IMS network in order to confirm the receipt of the *180 Ringing* response.

Live example

Status-Line: SIP/2.0 180 Ringing

Message Header

To: <sip:023379021@ims.belgacom.be;user=phone>;tag=1787430291-1294822473854

From: "testteam P&P" <sip:+3227970251@ims.belgacom.be;user=phone>;

tag=bd17b50474bf2c5caaab3b3107494be4

Call-ID: 3f1979b5d1e4fde70afa60fa65a35fd3@10.127.249.4

Via: SIP/2.0/UDP 10.127.249.4;branch=z9hG4bK9d56c1b14509e02867eacf8f3d9ec870

CSeq: 869438703 INVITE

Contact: <sip:10.127.249.182:5060;ue-addr=impbasilab1-sig-fo.ims.ims.be;transport=udp>

RSeq: 1018658879

Require: 100rel

Allow: ACK,BYE,CANCEL,INFO,INVITE,OPTIONS,PRACK,REFER,NOTIFY,UPDATE

Content-Type: application/sdp

Content-Length: 179

Server: Alcatel-Lucent-HPSS/3.0.3

Message body

Session Description Protocol

Session Description Protocol Version (v): 0

Owner/Creator, Session Id (o): BroadWorks 3194424 1 IN IP4 10.127.249.182

Owner Username: BroadWorks

Session ID: 3194424

Session Version: 1

Owner Network Type: IN

Owner Address Type: IP4

Owner Address: 10.127.249.182

Session Name (s): -

Connection Information (c): IN IP4 10.127.249.182

Connection Network Type: IN

Connection Address Type: IP4

Connection Address: 10.127.249.182

Time Description, active time (t): 0 0

Session Start Time: 0

Session Stop Time: 0

Media Description, name and address (m): audio 15696 RTP/AVP 8 101

Media Type: audio

Media Port: 15696

Media Proto: RTP/AVP

Media Format: ITU-T G.711 PCMA

Media Format: 101
Media Attribute (a): ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20
Media Attribute (a): maxptime:30
Media Attribute Fieldname: maxptime
Media Attribute Value: 30
Media Attribute (a): rtpmap:101 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: telephone-event

Request-Line: PRACK sip:10.127.249.182:5060;
ue-addr=impbasilab1-sig-fo.ims.ims.be;transport=udp SIP/2.0

Message Header

Supported: replaces,timer
User-Agent: XXXX
RACK: 1018658879 869438703 INVITE
To: <sip:023379021@ims.belgacom.be;user=phone>;tag=1787430291-1294822473854
From: <sip:+3227970251@ims.belgacom.be;user=phone>;
tag=bd17b50474bf2c5caaab3b3107494be4
Call-ID: 3f1979b5d1e4fde70afa60fa65a35fd3@10.127.249.4
CSeq: 869438704 PRACK
Via: SIP/2.0/UDP 10.127.249.4;branch=z9hG4bKca9fe2795912907ebbf0f5b3e0883325
Max-Forwards: 70
Content-Length: 0

The Proximus IMS network returns a 200 OK response to the IP-P(A)BX in order to properly close the PRACK transaction.

[Live example](#)

Status-Line: SIP/2.0 200 OK

Message Header

To: <sip:023379021@ims.belgacom.be;user=phone>;tag=1787430291-1294822473854
From: <sip:+3227970251@ims.belgacom.be;user=phone>;
tag=bd17b50474bf2c5caaab3b3107494be4
Call-ID: 3f1979b5d1e4fde70afa60fa65a35fd3@10.127.249.4
Via: SIP/2.0/UDP 10.127.249.4;branch=z9hG4bKca9fe2795912907ebbf0f5b3e0883325
CSeq: 869438704 PRACK
Server: Alcatel-Lucent-HPSS/3.0.3
Content-Length: 0

After the successful *PRACK* transaction the IP-P(A)BX returns a *180 Ringing* response to the Proximus IMS network for the original incoming *INVITE* message.

Live example

```
Status-Line: SIP/2.0 180 Ringing
Message Header
Allow: INVITE, ACK, CANCEL, BYE, PRACK, NOTIFY, SUBSCRIBE, OPTIONS, UPDATE
Contact: sip:10.127.249.4
User-Agent: XXXX
To: "3227970251 3227970250" <sip:+3227970251@ims.belgacom.be;user=phone>;
    tag=35e6f75a8c3510817253a92aa13b7c55
From: "+3223379031" <sip:+3223379031@ims.belgacom.be;user=phone>;
    tag=1827139038-1294822470966-
Call-ID: BW08543096612011151946121@10.127.70.20
CSeq: 1018657436 INVITE
Via: SIP/2.0/UDP 10.127.249.182:5060;branch=z9hG4bKe1ejg691mr8aor09c9baj4u5l7
Content-Length: 0
```

When the “forwarded-to-destination” answers the call, the Proximus IMS network sends a *200 OK* response to the IP-P(A)BX.

Live example

```
Status-Line: SIP/2.0 200 OK
Message Header
To: <sip:023379021@ims.belgacom.be;user=phone>;tag=1787430291-1294822473854
From: "testteam P&P" <sip:+3227970251@ims.belgacom.be;user=phone>;
    tag=bd17b50474bf2c5caaab3b3107494be4
Call-ID: 3f1979b5d1e4fde70afa60fa65a35fd3@10.127.249.4
Via: SIP/2.0/UDP 10.127.249.4;branch=z9hG4bK9d56c1b14509e02867eacf8f3d9ec870
CSeq: 869438703 INVITE
Contact: <sip:10.127.249.182:5060;ue-addr=impbasilab1-sig-fo.ims.ims.be;transport=udp>
Allow: ACK,BYE,CANCEL,INFO,INVITE,OPTIONS,PRACK,REFER,NOTIFY,UPDATE
Accept: multipart/mixed,application/media_control+xml,application/sdp
Content-Type: application/sdp
Content-Length: 179
Server: Alcatel-Lucent-HPSS/3.0.3
Message body
Session Description Protocol
    Session Description Protocol Version (v): 0
    Owner/Creator, Session Id (o): BroadWorks 3194424 2 IN IP4 10.127.249.182
```

Owner Username: BroadWorks
Session ID: 3194424
Session Version: 2
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.127.249.182
Session Name (s): -
Connection Information (c): IN IP4 10.127.249.182
Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.249.182
Time Description, active time (t): 0 0
Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio 15696 RTP/AVP 8 101
Media Type: audio
Media Port: 15696
Media Proto: RTP/AVP
Media Format: ITU-T G.711 PCMA
Media Format: 101
Media Attribute (a):ptime:20
Media Attribute Fieldname:ptime
Media Attribute Value: 20
Media Attribute (a):maxptime:30
Media Attribute Fieldname:maxptime
Media Attribute Value: 30
Media Attribute (a):rtpmap:101 telephone-event/8000
Media Attribute Fieldname:rtpmap
Media Format: 101
MIME Type: telephone-event

The IP-P(A)BX returns an *ACK* message in order to properly close the *INVITE* transaction of the call to the "forwarded-to-destination".

[Live example](#)

Request-Line: [ACK sip:10.127.249.182:5060;ue-addr=impbasilab1-sig-fo.ims.ims.be;transport=udp SIP/2.0](#)

Message Header

Contact: sip:10.127.249.4

User-Agent: XXXX

To: <sip:023379021@ims.belgacom.be;user=phone>;tag=1787430291-1294822473854

From: "testteam P&P" <sip:+3227970251@ims.belgacom.be;user=phone>;

tag=bd17b50474bf2c5caaab3b3107494be4

Call-ID: 3f1979b5d1e4fde70afa60fa65a35fd3@10.127.249.4
CSeq: 869438703 ACK
Via: SIP/2.0/UDP 10.127.249.4;branch=z9hG4bK8dacfe7784855923bdaac44a1b94d878
Max-Forwards: 70
Content-Length: 0

The IP-P(A)BX sends a 200 OK response to the Proximus IMS network for the original *INVITE* transaction.

Live example

Status-Line: SIP/2.0 200 OK
Message Header
Allow: INVITE, ACK, CANCEL, BYE, PRACK, NOTIFY, SUBSCRIBE, OPTIONS, UPDATE
Contact: sip:10.127.249.4
Supported: replaces,timer,100rel
User-Agent: XXXX
Session-Expires: 1800;refresher=uas
P-Asserted-Identity: "SIP IMS" <sip:SIP%20IMS@10.127.249.4>
Content-Type: application/sdp
To: "3227970251 3227970250" <sip:+3227970251@ims.belgacom.be;user=phone>;
tag=35e6f75a8c3510817253a92aa13b7c55
From: "+3223379031" <sip:+3223379031@ims.belgacom.be;user=phone>;
tag=1827139038-1294822470966-
Call-ID: BW08543096612011151946121@10.127.70.20
CSeq: 1018657436 INVITE
Via: SIP/2.0/UDP 10.127.249.182:5060;branch=z9hG4bKe1ejg691mr8aor09c9baj4u5l7
Content-Length: 218
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): OXE 1294830036 1294830036 IN IP4 10.127.249.4
Owner Username: OXE
Session ID: 1294830036
Session Version: 1294830036
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.127.249.4
Session Name (s): abs
Connection Information (c): IN IP4 10.127.249.182
Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.249.182
Time Description, active time (t): 0 0

Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio 15696 RTP/AVP 8 101
Media Type: audio
Media Port: 15696
Media Proto: RTP/AVP
Media Format: ITU-T G.711 PCMA
Media Format: 101
Media Attribute (a): rtpmap:8 PCMA/8000
Media Attribute Fieldname: rtpmap
Media Format: 8
MIME Type: PCMA
Media Attribute (a):ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20
Media Attribute (a):maxptime:30
Media Attribute Fieldname: maxptime
Media Attribute Value: 30
Media Attribute (a): rtpmap:101 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: telephone-event
Media Attribute (a): sendrecv

The Proximus IMS network returns an *ACK* message in order to properly close the *INVITE* transaction of the original call.

[Live example](#)

```
Request-Line: ACK sip:10.127.249.4;user=phone SIP/2.0
Message Header
Via: SIP/2.0/UDP 10.127.249.182:5060;branch=z9hG4bKlauopcs6osac3t4blvo2gbnor2-
spdl7ei5
From: "+3223379031" <sip:+3223379031@ims.belgacom.be;user=phone>;
tag=1827139038-1294822470966-
To: "3227970251 3227970250" <sip:+3227970251@ims.belgacom.be;user=phone>;
tag=35e6f75a8c3510817253a92aa13b7c55
Call-ID: BW08543096612011151946121@10.127.70.20
CSeq: 1018657436 ACK
Contact: <sip:10.127.249.182>
Max-Forwards: 68
Content-Length: 0
User-Agent: XXXXX
```


7.4.3.2. Call forward via 302 Moved Temporary response

Figure 9 shows the expected message flow for a call forward via a 302 Moved temporarily response.

Note: depending on the call scenario (e.g. whether reliability of provisional responses is used or not) differences may occur.

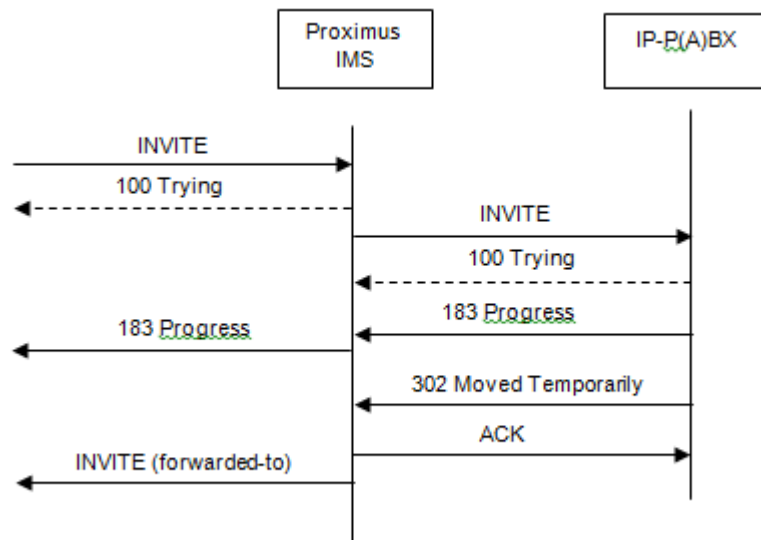


Figure 9: Call forward via 302 moved temporarily

In order to set-up a call to an IP-P(A)BX the Proximus IMS network sends an *INVITE* message to the IP-P(A)BX with:

- *From* = DisplayName <sip:Norm-SubA-dn@ims.belgacom.be;user=phone>
- *To* = DisplayName <sip:Norm-SubB-dn@ims.belgacom.be;user=phone>

The IP-P(A)BX returns a *100 Trying* response.

Live example

```

Request-Line: INVITE sip:+3227970142@10.127.239.214:42470;user=phone SIP/2.0
Message Header
Via: SIP/2.0/UDP 10.127.244.46:5060;branch=z9hG4bKcomoapgj9qqk2v6cdn7gaios07
Call-ID: LU-1294828919149874@imgroup0-003.ilasm.ims.ims.be
To: "3227970142 3227970142"
<sip:+3227970142@ims.belgacom.be;user=phone>
From: "+3223379031" <sip:+3223379031@ims.belgacom.be;user=phone>;
tag=4d22c245-1294828919149881-gm-pt-lucentPCSF-024135
  
```

CSeq: 1 INVITE
Max-Forwards: 67
Content-Type: application/sdp
Contact: <sip:10.127.244.46:5060;transport=udp>
P-Asserted-Identity: <tel:+3223379031>
Privacy: none
Supported: 100rel
Allow: ACK,BYE,CANCEL,INFO,INVITE,OPTIONS,PRACK,REFER,NOTIFY,UPDATE
Accept: multipart/mixed,application/media_control+xml,application/sdp
Content-Length: 180
P-Called-Party-ID: <tel:+3227970142>
User-Agent: XXXX
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): BroadWorks 3195280 1 IN IP4 10.127.244.46
Owner Username: BroadWorks
Session ID: 3195280
Session Version: 1
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.127.244.46
Session Name (s): -
Connection Information (c): IN IP4 10.127.244.46
Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.244.46
Time Description, active time (t): 0 0
Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio 11926 RTP/AVP 8 18 101
Media Type: audio
Media Port: 11926
Media Proto: RTP/AVP
Media Format: ITU-T G.711 PCMA
Media Format: ITU-T G.729
Media Format: 101
Media Attribute (a): rtpmap:101 TELEPHONE-EVENT/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: TELEPHONE-EVENT
Media Attribute (a):ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20
Media Attribute (a):maxptime:30
Media Attribute Fieldname: maxptime

Media Attribute Value: 30

Status-Line: SIP/2.0 100 Trying

Message Header

Allow: PRACK,ACK,CANCEL,BYE,SUBSCRIBE,NOTIFY,INVITE,REFER,
OPTIONS,INFO,UPDATE,REGISTER

Call-ID: LU-1294828919149874@imgroupo-003.ilasm.ims.ims.be

CSeq: 1 INVITE

From: "+3223379031" <sip:+3223379031@ims.belgacom.be;user=phone>;
tag=4d22c245-1294828919149881-gm-pt-lucentPCSF-024135

To: "3227970142 3227970142" <sip:+3227970142@ims.belgacom.be;user=phone>

Via: SIP/2.0/UDP 10.127.244.46:5060;received=10.127.244.46;
branch=z9hG4bKcomoapgj9qqk2v6cdn7gaioso7

Content-Length: 0

When the IP-P(A)BX invokes the call forward feature, a *183 Progress* response is sent to the Proximus IMS network, followed by a *302 Moved temporarily* response containing:

- Contact = <sip:Dialed-SubC-dn@ims.belgacom.be;user=phone>

Live example

Status-Line: SIP/2.0 183 Session Progress

Message Header

Call-ID: LU-1294828919149874@imgroupo-003.ilasm.ims.ims.be

CSeq: 1 INVITE

From: "+3223379031" <sip:+3223379031@ims.belgacom.be;user=phone>;
tag=4d22c245-1294828919149881-gm-pt-lucentPCSF-024135

To: "3227970142 3227970142"

<sip:+3227970142@ims.belgacom.be;user=phone>;tag=6C15

Via: SIP/2.0/UDP 10.127.244.46:5060;received=10.127.244.46;
branch=z9hG4bKcomoapgj9qqk2v6cdn7gaioso7

Content-Length: 0

Status-Line: SIP/2.0 302 Moved Temporarily

Message Header

Call-ID: LU-1294828919149874@imgroupo-003.ilasm.ims.ims.be

Contact: <sip:023379021@ims.belgacom.be:5060;user=phone>

CSeq: 1 INVITE

From: "+3223379031" <sip:+3223379031@ims.belgacom.be;user=phone>;
tag=4d22c245-1294828919149881-gm-pt-lucentPCSF-024135

To: "3227970142 3227970142"

<sip:+3227970142@ims.belgacom.be;user=phone>;tag=6C15

Via: SIP/2.0/UDP 10.127.244.46:5060;received=10.127.244.46;

branch=z9hG4bKcomoapgj9qqk2v6cdn7gaioso7
Content-Length: 0

The Proximus IMS network returns an ACK message in order to properly close the *INVITE* transaction.

[Live example](#)

```
Request-Line: ACK sip:+3227970142@10.127.239.214:42470;user=phone SIP/2.0
Message Header
Call-ID: LU-1294828919149874@imgroup0-003.ilasm.ims.ims.be
From: "+3223379031" <sip:+3223379031@ims.belgacom.be;user=phone>;
    tag=4d22c245-1294828919149881-gm-pt-lucentPCSF-024135
To: "3227970142 3227970142"
<sip:+3227970142@ims.belgacom.be;user=phone>;tag=6C15
Via: SIP/2.0/UDP 10.127.244.46:5060;received=10.127.244.46;
    branch=z9hG4bKcomoapgj9qqk2v6cdn7gaioso7
CSeq: 1 ACK
Max-Forwards: 67
Content-Length: 0
```

The Proximus IMS network starts a new call towards the forwarded-to-destination received in the *Contact* header of the *302 Moved temporarily* response:

- *Request-URI* = <sip:Norm-SubC-dn@ims.belgacom.be;user=phone>
- *From* = DisplayName <sip:Norm-SubA-dn@ims.belgacom.be;user=phone>
- *To* = DisplayName <sip:Norm-SubC-dn@ims.belgacom.be;user=phone>
- *Diversion* = DisplayName <sip:Norm-SubB-dn@ims.belgacom.be;user=phone>

[Live example](#)

```
Request-Line: INVITE sip:+3223379021@ims.belgacom.be;user=phone SIP/2.0
Message Header
Via:SIP/2.0/UDP 10.127.70.20;
    branch=z9hG4bKBroadWorks.-1plbjr-10.127.68.25V5060-0-1021881667-
584009114-1294828919429-
From:"+3223379031" <sip:+3223379031@ims.belgacom.be;user=phone>;
    tag=584009114-1294828919429-
To:<sip:+3223379021@ims.belgacom.be;user=phone>
Call-ID:BW104159429120111-702712322@10.127.70.20
CSeq:1021881667 INVITE
Contact:<sip:impbasilab1-sig-fo.ims.ims.be>
P-Asserted-Identity:<tel:+3223379031>
```

Privacy:none
**Diversion:"3227970142 3227970142"<sip:+3227970142@ims.belgacom.be;
user=phone>;user-id="btu3227970142@ims.belgacom.be";
privacy=off;reason=unknown;counter=1**
Route:<sip:scsf-stdn.imsgroup0-004.ilasm.ims.ims.be:5060;lr;orig>
P-Charging-Vector:icid-value=S9C40-20110112114158-00015308;icid-generated-
at=149.204.0.1
P-Charging-Function-
Addresses:ecf="charge.ilasm.ims.ims.be";ecf="charge.ilasm.ims.ims.be"
Supported:100rel
Allow:ACK,BYE,CANCEL,INFO,INVITE,OPTIONS,PRACK,REFER,NOTIFY,UPDATE
P-Served-User-Identity:<sip:pilotpuid27970140@ims.belgacom.be>
Accept:multipart/mixed,application/media_control+xml,application/sdp
Max-Forwards: 70
Content-Type:application/sdp
Content-Length: 180
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): BroadWorks 3195280 1 IN IP4 10.127.72.114
Owner Username: BroadWorks
Session ID: 3195280
Session Version: 1
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.127.72.114
Session Name (s): -
Connection Information (c): IN IP4 10.127.72.114
Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.72.114
Time Description, active time (t): 0 0
Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio 40864 RTP/AVP 8 18 101
Media Type: audio
Media Port: 40864
Media Proto: RTP/AVP
Media Format: ITU-T G.711 PCMA
Media Format: ITU-T G.729
Media Format: 101
Media Attribute (a): rtpmap:101 TELEPHONE-EVENT/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: TELEPHONE-EVENT
Media Attribute (a):ptime:20

Media Attribute Fieldname: ptime
Media Attribute Value: 20
Media Attribute (a): maxptime:30
Media Attribute Fieldname: maxptime
Media Attribute Value: 30

The remainder of the message sequence is like any other normal basic call.

7.4.4. Outgoing Call Barring

In case the IP-P(A)BX applies Outgoing Call Barring to one of his users, the call shall **not** be sent to the Proximus IMS network.

Additionally a network Outgoing Call Barring can be programmed for the complete IP-P(A)BX and/or for each iDN. This OCB is offered on a permanent basis only and cannot be activated or de-activated via a dialled command.

In case a IP-P(A)BX user tries to make a call to a barred destination, an announcement will be played in the Proximus IMS network. To end the call 2 scenarios are possible:

- During the announcement the calling user ends the call by sending a *Cancel* message.
- At the end of the announcement the Proximus IMS network tears down the call by sending a *404 Not found* response.

Remark: According to ETSI TS 183 011 [37] the response in case of OCB should be *603 Decline*. In future evolution of the Proximus network the usage of *603 Decline* instead of *404 Not found* is considered.

7.4.4.1. OCB with call teardown during announcement

Figure 10 shows the expected message flow for an OCB with call teardown during announcement.

Note: depending on the call scenario (e.g. whether reliability of provisional responses is used or not) differences may occur.

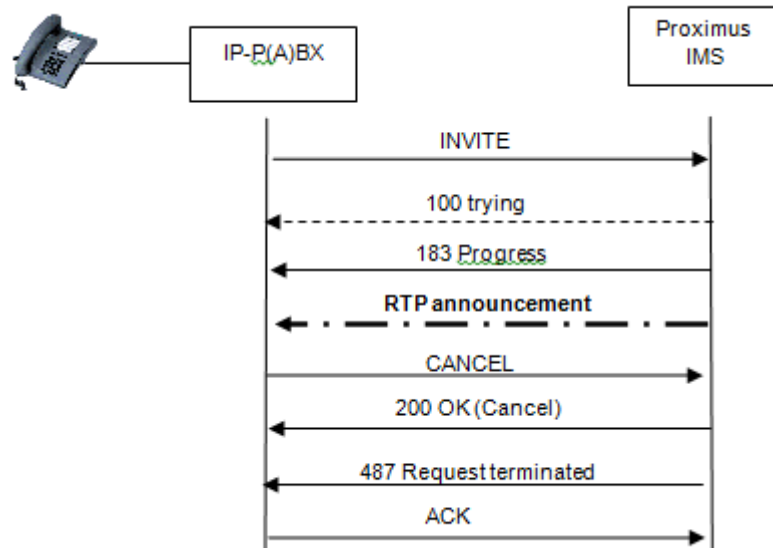


Figure 10: Basic call/session set-up to barred destination

In order to set-up a call the IP-P(A)BX sends an *INVITE* message to the Proximus IMS network. The Proximus IMS network returns a *100 Trying* response.

Live example

```

Request-Line: INVITE sip:0035316791650@ims.belgacom.be SIP/2.0
Message Header
Via: SIP/2.0/UDP 10.127.249.20:5060;branch=z9hG4bKocd3_INVITE;rport
From: <sip:+3227979451@ims.belgacom.be>;tag=9fxced76sl
To: <sip:0035316791650@ims.belgacom.be>
Call-ID: 1122-0-3293-5041460@csip
CSeq: 3871 INVITE
Contact: <sip:+3227979450@10.127.249.20>
P-preferred-identity: <sip:+3227979450@ims.belgacom.be>
Max-Forwards: 70
User-Agent: XXXX
Allow: INVITE, ACK, CANCEL, OPTIONS, BYE, INFO, REFER, NOTIFY
Content-Type: application/sdp
Accept: application/sdp, multipart/mixed, application/dtmf-relay
Content-Length: 239
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): root 3112 3112 IN IP4 10.127.249.21
Owner Username: root
    
```

Session ID: 3112
Session Version: 3112
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.127.249.21
Session Name (s): session
Connection Information (c): IN IP4 10.127.249.21
Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.249.21
Time Description, active time (t): 0 0
Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio 1024 RTP/AVP 18 8 101
Media Type: audio
Media Port: 1024
Media Proto: RTP/AVP
Media Format: ITU-T G.729
Media Format: ITU-T G.711 PCMA
Media Format: 101
Media Attribute (a): rtcp:1025
Media Attribute Fieldname: rtcp
Media Attribute Value: 1025
Media Attribute (a): rtpmap:18 G729/8000
Media Attribute Fieldname: rtpmap
Media Format: 18
MIME Type: G729
Media Attribute (a): rtpmap:8 PCMA/8000
Media Attribute Fieldname: rtpmap
Media Format: 8
MIME Type: PCMA
Media Attribute (a): rtpmap:101 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: telephone-event
Media Attribute (a): fntp:101 0-15
Media Attribute Fieldname: fntp
Media Format: 101 [telephone-event]
Media format specific parameters: 0-15
Media Attribute (a): ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20

Status-Line: SIP/2.0 100 Trying

Message Header

Via: SIP/2.0/UDP 10.127.249.20:5060;received=10.127.249.20;

branch=z9hG4bKocd3_INVITE;rport=5060
From: <sip:+3227979451@ims.belgacom.be>;tag=9fxced76sl
To: <sip:0035316791650@ims.belgacom.be>
Call-ID: 1122-0-3293-5041460@csip
CSeq: 3871 INVITE
Content-Length: 0

When the Proximus IMS network invokes the OCB feature it returns a *183 Progress* response to the IP-P(A)BX and an announcement is played.

Live example

Status-Line: SIP/2.0 183 Session Progress
Message Header
Via: SIP/2.0/UDP 10.127.249.20:5060;received=10.127.249.20;
branch=z9hG4bKocd3_INVITE;rport=5060
From: <sip:+3227979451@ims.belgacom.be>;tag=9fxced76sl
To: <sip:0035316791650@ims.belgacom.be>;tag=1073695206-1294838189960
Call-ID: 1122-0-3293-5041460@csip
CSeq: 3871 INVITE
Contact: <sip:10.127.249.182:5060;ue-addr=impbasilab1-sig-fo.ims.ims.be;transport=udp>
Allow: ACK,BYE,CANCEL,INFO,INVITE,OPTIONS,PRACK,REFER,NOTIFY,UPDATE
Content-Type: application/sdp
Content-Length: 189
Server: Alcatel-Lucent-HPSS/3.0.3
Session: Media
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): BroadWorks 882 1 IN IP4 10.127.249.182
Owner Username: BroadWorks
Session ID: 882
Session Version: 1
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.127.249.182
Session Name (s): -
Time Description, active time (t): 0 0
Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio 15798 RTP/AVP 18 101
Media Type: audio
Media Port: 15798

Media Proto: RTP/AVP
Media Format: ITU-T G.729
Media Format: 101
Connection Information (c): IN IP4 10.127.249.182
Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.249.182
Media Attribute (a): rtpmap:18 G729/8000
Media Attribute Fieldname: rtpmap
Media Format: 18
MIME Type: G729
Media Attribute (a): rtpmap:101 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: telephone-event
Media Attribute (a): fmp:101 0-15
Media Attribute Fieldname: fmp
Media Format: 101 [telephone-event]
Media format specific parameters: 0-15

During the announcement the calling user ends the call and the IP-P(A)BX sends a *CANCEL* message to the Proximus IMS network.

The Proximus IMS network returns a *200 OK* response in order to properly close the *CANCEL* transaction.

Live example

Request-Line: CANCEL sip:0035316791650@ims.belgacom.be SIP/2.0
Message Header
Via: SIP/2.0/UDP 10.127.249.20:5060;branch=z9hG4bKocd3_INVITE;rport
From: <sip:+3227979451@ims.belgacom.be>;tag=9fxced76sl
To: <sip:0035316791650@ims.belgacom.be>
Call-ID: 1122-0-3293-5041460@csip
CSeq: 3871 CANCEL
Contact: <sip:+3227979450@10.127.249.20>
Max-Forwards: 70
User-Agent: XXXX
Allow: INVITE, ACK, CANCEL, OPTIONS, BYE, INFO, REFER, NOTIFY
Content-Length: 0

Status-Line: SIP/2.0 200 OK
Message Header
Via: SIP/2.0/UDP 10.127.249.20:5060;received=10.127.249.20;
branch=z9hG4bKocd3_INVITE;rport=5060

```
From: <sip:+3227979451@ims.belgacom.be>;tag=9fxced76sl  
To: <sip:0035316791650@ims.belgacom.be>;tag=aprqjmtc-a5dain20003u1  
Call-ID: 1122-0-3293-5041460@csip  
CSeq: 3871 CANCEL  
Content-Length: 0
```

The Proximus IMS network sends a *487 Request terminated* response to the IP-P(A)BX in order to indicate that the *INVITE* transaction is terminated.

[Live example](#)

```
Status-Line: SIP/2.0 487 Request terminated  
Message Header  
Via: SIP/2.0/UDP 10.127.249.20:5060;received=10.127.249.20;  
branch=z9hG4bKocd3_INVITE;rport=5060  
From: <sip:+3227979451@ims.belgacom.be>;tag=9fxced76sl  
To: <sip:0035316791650@ims.belgacom.be>;tag=1073695206-1294838189960  
Call-ID: 1122-0-3293-5041460@csip  
CSeq: 3871 INVITE  
Server: Alcatel-Lucent-HPSS/3.0.3  
Content-Length: 0
```

The IP-P(A)BX sends an *ACK* message to the Proximus IMS network in order to properly close the *INVITE* transaction.

[Live example](#)

```
Request-Line: ACK sip:0035316791650@ims.belgacom.be SIP/2.0  
Message Header  
Via: SIP/2.0/UDP 10.127.249.20:5060;branch=z9hG4bKocd3_INVITE;rport  
From: <sip:+3227979451@ims.belgacom.be>;tag=9fxced76sl  
To: <sip:0035316791650@ims.belgacom.be>;tag=1073695206-1294838189960  
Call-ID: 1122-0-3293-5041460@csip  
CSeq: 3871 ACK  
Content-Length: 0
```

7.4.4.2. OCB with call teardown at end of announcement

Figure 11 shows the expected message flow for an OCB with call teardown at end of announcement.

Note: depending on the call scenario (e.g. whether reliability of provisional responses is used or not) differences may occur.

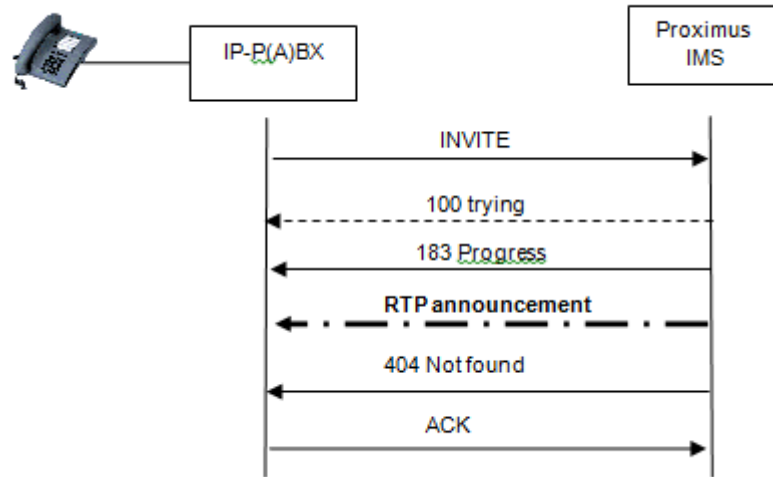


Figure 11: Basic call/session set-up to barred destination

In order to set-up a call the IP-P(A)BX sends an *INVITE* message to the Proximus IMS network. The Proximus IMS network returns a *100 Trying* response.

Live example

```

Request-Line: INVITE sip:0035316791650@ims.belgacom.be SIP/2.0
Message Header
Via: SIP/2.0/UDP 10.127.249.20:5060;branch=z9hG4bKocd3_INVITE;rport
From: <sip:+3227979451@ims.belgacom.be>;tag=9fxced76sl
To: <sip:0035316791650@ims.belgacom.be>
Call-ID: 1122-0-3293-5041460@csip
CSeq: 3871 INVITE
Contact: <sip:+3227979450@10.127.249.20>
P-preferred-identity: <sip:+3227979450@ims.belgacom.be>
Max-Forwards: 70
User-Agent: XXXX
Allow: INVITE, ACK, CANCEL, OPTIONS, BYE, INFO, REFER, NOTIFY
Content-Type: application/sdp
Accept: application/sdp, multipart/mixed, application/dtmf-relay
Content-Length: 239
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): root 3112 3112 IN IP4 10.127.249.21
Owner Username: root
Session ID: 3112
Session Version: 3112
    
```

Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.127.249.21
Session Name (s): session
Connection Information (c): IN IP4 10.127.249.21
Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.249.21
Time Description, active time (t): 0 0
Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio 1024 RTP/AVP 18 8 101
Media Type: audio
Media Port: 1024
Media Proto: RTP/AVP
Media Format: ITU-T G.729
Media Format: ITU-T G.711 PCMA
Media Format: 101
Media Attribute (a): rtcp:1025
Media Attribute Fieldname: rtcp
Media Attribute Value: 1025
Media Attribute (a): rtpmap:18 G729/8000
Media Attribute Fieldname: rtpmap
Media Format: 18
MIME Type: G729
Media Attribute (a): rtpmap:8 PCMA/8000
Media Attribute Fieldname: rtpmap
Media Format: 8
MIME Type: PCMA
Media Attribute (a): rtpmap:101 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: telephone-event
Media Attribute (a): fmp:101 0-15
Media Attribute Fieldname: fmp
Media Format: 101 [telephone-event]
Media format specific parameters: 0-15
Media Attribute (a): ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20

Status-Line: SIP/2.0 100 Trying

Message Header

Via: SIP/2.0/UDP 10.127.249.20:5060;received=10.127.249.20;

branch=z9hG4bKocd3_INVITE;rport=5060

From: <sip:+3227979451@ims.belgacom.be>;tag=9fxced76sl

To: <sip:0035316791650@ims.belgacom.be>
Call-ID: 1122-0-3293-5041460@csip
CSeq: 3871 INVITE
Content-Length: 0

When the Proximus IMS network invokes the OCB feature it returns a *183 Progress* response to the IP-P(A)BX and an announcement is played.

[Live example](#)

Status-Line: SIP/2.0 183 Session Progress
Message Header
Via: SIP/2.0/UDP 10.127.249.20:5060;received=10.127.249.20;
branch=z9hG4bKocd3_INVITE;rport=5060
From: <sip:+3227979451@ims.belgacom.be>;tag=9fxced76sl
To: <sip:0035316791650@ims.belgacom.be>;tag=1073695206-1294838189960
Call-ID: 1122-0-3293-5041460@csip
CSeq: 3871 INVITE
Contact: <sip:10.127.249.182:5060;ue-addr=impbasilab1-sig-fo.ims.ims.be;transport=udp>
Allow: ACK,BYE,CANCEL,INFO,INVITE,OPTIONS,PRACK,REFER,NOTIFY,UPDATE
Content-Type: application/sdp
Content-Length: 189
Server: Alcatel-Lucent-HPSS/3.0.3
Session: Media
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): BroadWorks 882 1 IN IP4 10.127.249.182
Owner Username: BroadWorks
Session ID: 882
Session Version: 1
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.127.249.182
Session Name (s): -
Time Description, active time (t): 0 0
Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio 15798 RTP/AVP 18 101
Media Type: audio
Media Port: 15798
Media Proto: RTP/AVP
Media Format: ITU-T G.729

Media Format: 101
Connection Information (c): IN IP4 10.127.249.182
Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.249.182
Media Attribute (a): rtpmap:18 G729/8000
Media Attribute Fieldname: rtpmap
Media Format: 18
MIME Type: G729
Media Attribute (a): rtpmap:101 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: telephone-event
Media Attribute (a): fmp:101 0-15
Media Attribute Fieldname: fmp
Media Format: 101 [telephone-event]
Media format specific parameters: 0-15

After the announcement the Proximus IMS network ends the call and sends a *404 Not found* response to the IP-P(A)BX.

[Live example](#)

Status-Line: SIP/2.0 404 Not found
Message Header
Via: SIP/2.0/UDP 10.127.249.20:5060;received=10.127.249.20;
branch=z9hG4bKocd3_INVITE;rport=5060
From: <sip:+3227979451@ims.belgacom.be>;tag=9fxced76sl
To: <sip:0035316791650@ims.belgacom.be>;tag=1073695206-1294838189960
Call-ID: 1122-0-3293-5041460@csip
CSeq: 3871 INVITE
Server: Alcatel-Lucent-HPSS/3.0.3
Content-Length: 0

The IP-P(A)BX sends an *ACK* message to the Proximus IMS network in order to properly close the *INVITE* transaction.

[Live example](#)

Request-Line: ACK sip:0035316791650@ims.belgacom.be SIP/2.0
Message Header
Via: SIP/2.0/UDP 10.127.249.20:5060;branch=z9hG4bKocd3_INVITE;rport
From: <sip:+3227979451@ims.belgacom.be>;tag=9fxced76sl

To: <sip:0035316791650@ims.belgacom.be>;tag=1073695206-1294838189960
Call-ID: 1122-0-3293-5041460@csip
CSeq: 3871 ACK
Content-Length: 0

7.4.5. Call Hold

The call hold feature shall be managed and handled by the IP-P(A)BX.

An IP-P(A)BX user may place an active call on hold and may retrieve a held call. The IP-P(A)BX shall provide “music on hold” or play an announcement for the held user. For these purposes, the Proximus IMS supports the use of re-INVITE transactions to modify the media description parameters for a call according to the held/retrieved state.

An IP-P(A)BX user involved in an active call may be placed on hold and may be retrieved. Depending on the holding user (external to the IP-P(A)BX) either the Proximus IMS or the holding user’s equipment is responsible to provide “music on hold” or to play an announcement for the held IP-P(A)BX user. For these purposes, the Proximus IMS supports the use of re-INVITE transactions to modify the media description parameters for a call according to the held/retrieved state.

7.4.5.1. Call Hold initiated by the IP-P(A)BX user

An established public on-net or public off-net call can be put on Hold by the IP-P(A)BX user. The user which is put on hold will receive music or an announcement, provided by the IP-P(A)BX. There are two methods of providing music/announcements on hold:

- the IP-P(A)BX may connect the user on hold to its media resource (the music/announcement generator) using the re-INVITE mechanism to change the media description parameters:
 - announce a different IP address (used for sourcing the RTP stream containing the music/announcement)
 - add an *a=sendonly* attribute to the media description in order to stop receiving RTP from the external user.

In this case resuming the call is accomplished using the re-INVITE mechanism again in order to restore the original media description parameters:

- use the original IP address for the RTP stream
- add an *a=sendrecv* attribute to the media description in order to resume both way RTP traffic.
- the IP-P(A)BX may connect the user on hold to its media resource (the music/announcement generator) without further signalling between the IP-P(A)BX and the Proximus IMS network. Resuming the call is accomplished also without further signalling.

In case the media stream (RTP) for music/announcement is sourced by the IP-P(A)BX from a different IP address then the media stream for voice the usage of the re-INVITE mechanism is **mandatory** in order to avoid problems with the security features (e.g. pinholing) performed at the edge of the Proximus IMS network.

In all other cases the usage of the re-INVITE mechanism is **strongly recommended** in order to avoid useless RTP streams.

Note: In the context of the Call Hold service putting a line on hold can also be accomplished by sending a re-INVITE containing in the SDP information 0.0.0.0 as IP address. The 200 OK response should contain in the SDP information an *a=inactive* attribute as a result. As this is an old mechanism it is **strongly discouraged** and continued support of this mechanism is not guaranteed.

Figure 12 shows the expected message flow for a hold/retrieve performed by an IP-P(A)BX user.

Note: depending on the call scenario (e.g. whether reliability of provisional responses is used or not) differences may occur.

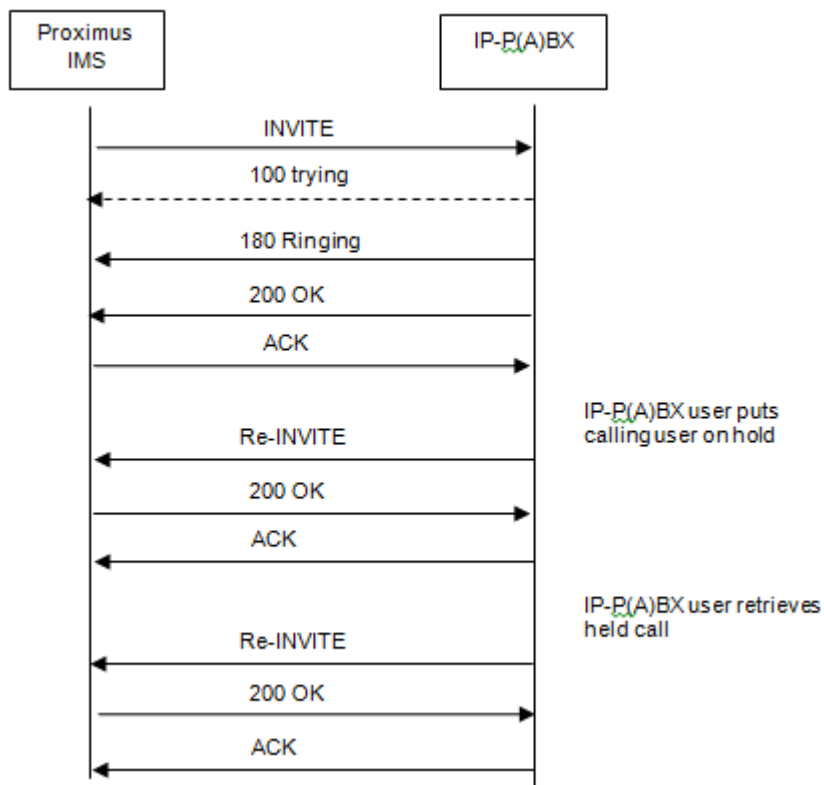


Figure 12: Hold/retrieve by IP-P(A)BX user example

An incoming call to an IP-P(A)BX user is set-up. When answering the call the 200 OK response contains in the SDP part the IP address of the called IP-P(A)BX user used for the media stream:

- *Connection Information* = IN IP4 <IP address of called user>

[Live example](#)

Request-Line: INVITE sip:+3227970251@ims.belgacom.be;user=phone SIP/2.0
Message Header
Via: SIP/2.0/UDP 10.127.249.182:5060;branch=z9hG4bKnp4puui5chjojd23vv4fjvp600
Call-ID: BW132411381120111-1617987323@10.127.70.20
To: "3227970251 3227970250" <sip:+3227970251@ims.belgacom.be;user=phone>
From: "RV-027970315" <sip:+3227970315@ims.belgacom.be;user=phone>;
tag=330868717-1294838651382-
CSeq: 1026747643 INVITE
Max-Forwards: 68
Content-Type: application/sdp
Contact: <sip:10.127.249.182:5060;ue-addr=impbasilab1-sig-fo.ims.ims.be;transport=udp>
Privacy: none
P-Access-Network-Info: ADSL2+
Supported: 100rel
Allow: ACK,BYE,CANCEL,INFO,INVITE,OPTIONS,PRACK,REFER,NOTIFY,UPDATE
Accept: multipart/mixed,application/media_control+xml,application/sdp
Content-Length: 225
User-Agent: XXXX
Route: <sip:+3227970251;tgrp=tg_af75of_0101uri;
trunk-context=sbc1.ims.ims.be@10.127.249.4:5060;user=phone;lr>
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): BroadWorks 946 1 IN IP4 10.127.249.182
Owner Username: BroadWorks
Session ID: 946
Session Version: 1
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.127.249.182
Session Name (s): -
Connection Information (c): IN IP4 10.127.249.182
Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.249.182
Time Description, active time (t): 0 0
Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio 15724 RTP/AVP 8 18 101
Media Type: audio
Media Port: 15724
Media Proto: RTP/AVP
Media Format: ITU-T G.711 PCMA
Media Format: ITU-T G.729
Media Format: 101

Media Attribute (a): rtpmap:8 PCMA/8000
Media Attribute Fieldname: rtpmap
Media Format: 8
MIME Type: PCMA
Media Attribute (a): rtpmap:18 G729/8000
Media Attribute Fieldname: rtpmap
Media Format: 18
MIME Type: G729
Media Attribute (a): rtpmap:101 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: telephone-event
Media Attribute (a): sendrecv
Media Attribute (a): fmp:101 0-11
Media Attribute Fieldname: fmp
Media Format: 101 [telephone-event]
Media format specific parameters: 0-11

Status-Line: SIP/2.0 100 Trying

Message Header

To: "3227970251 3227970250" <sip:+3227970251@ims.belgacom.be;user=phone>
From: "RV-027970315" <sip:+3227970315@ims.belgacom.be;user=phone>;
tag=330868717-1294838651382-
Call-ID: BW132411381120111-1617987323@10.127.70.20
CSeq: 1026747643 INVITE
Via: SIP/2.0/UDP 10.127.249.182:5060;branch=z9hG4bKnp4puui5chjojd23vv4fjvp600
Content-Length: 0

Status-Line: SIP/2.0 180 Ringing

Message Header

Allow: INVITE, ACK, CANCEL, BYE, PRACK, NOTIFY, SUBSCRIBE, OPTIONS, UPDATE
Contact: sip:10.127.249.4
User-Agent: XXXX
To: "3227970251 3227970250" <sip:+3227970251@ims.belgacom.be;user=phone>;
tag=556801c19doea6c82d8462336e5fed10
From: "RV-027970315" <sip:+3227970315@ims.belgacom.be;user=phone>;
tag=330868717-1294838651382-
Call-ID: BW132411381120111-1617987323@10.127.70.20
CSeq: 1026747643 INVITE
Via: SIP/2.0/UDP 10.127.249.182:5060;branch=z9hG4bKnp4puui5chjojd23vv4fjvp600
Content-Length: 0

Status-Line: SIP/2.0 200 OK

Message Header

Allow: INVITE, ACK, CANCEL, BYE, PRACK, NOTIFY, SUBSCRIBE, OPTIONS, UPDATE
Contact: sip:10.127.249.4

Supported: replaces,timer,100rel
User-Agent: XXXX
Session-Expires: 1800;refresher=uas
P-Asserted-Identity: "SIP IMS" <sip:SIP%20IMS@10.127.249.4>
Privacy: user
Content-Type: application/sdp
To: "3227970251 3227970250" <sip:+3227970251@ims.belgacom.be;user=phone>;
tag=556801c19doea6c82d8462336e5fed10
From: "RV-027970315" <sip:+3227970315@ims.belgacom.be;user=phone>;
tag=330868717-1294838651382-
Call-ID: BW132411381120111-1617987323@10.127.70.20
CSeq: 1026747643 INVITE
Via: SIP/2.0/UDP 10.127.249.182:5060;branch=z9hG4bKnp4puui5chjojd23vv4fv600
Content-Length: 240

Message body

Session Description Protocol

Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): OXE 1294846217 1294846217 IN IP4 10.127.249.4
Owner Username: OXE
Session ID: 1294846217
Session Version: 1294846217
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.127.249.4

Session Name (s): abs

Connection Information (c): IN IP4 10.127.249.16

Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.249.16

Time Description, active time (t): 0 0

Session Start Time: 0

Session Stop Time: 0

Media Description, name and address (m): audio 32514 RTP/AVP 18 101

Media Type: audio
Media Port: 32514
Media Proto: RTP/AVP
Media Format: ITU-T G.729
Media Format: 101

Media Attribute (a): rtpmap:18 G729/8000

Media Attribute Fieldname: rtpmap
Media Format: 18
MIME Type: G729

Media Attribute (a): fmp:18 annexb=no

Media Attribute Fieldname: fmp
Media Format: 18 [G729]
Media format specific parameters: annexb=no

Media Attribute (a): ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20
Media Attribute (a): maxptime:40
Media Attribute Fieldname: maxptime
Media Attribute Value: 40
Media Attribute (a): rtpmap:101 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: telephone-event
Media Attribute (a): sendrecv

Request-Line: ACK sip:10.127.249.4;user=phone SIP/2.0

Message Header

Via: SIP/2.0/UDP 10.127.249.182:5060;
branch=z9hG4bK29b28at9mmuhs31fi2lg6mpl7-thcoutj5
From: "RV-027970315" <sip:+3227970315@ims.belgacom.be;user=phone>;
tag=330868717-1294838651382-
To: "3227970251 3227970250" <sip:+3227970251@ims.belgacom.be;user=phone>;
tag=556801c19doea6c82d8462336e5fed10
Call-ID: BW132411381120111-1617987323@10.127.70.20
CSeq: 1026747643 ACK
Contact: <sip:10.127.249.182>
Max-Forwards: 68
Content-Length: 0
User-Agent: XXXX

When putting the call on hold the IP-P(A)BX sends a (re)INVITE message to the Proximus IMS network in order to change the session description parameters. The connection information is changed to contain the IP address of the media resource of the IP-P(A)BX that will be sourcing the “music on hold” and the media attribute is set to *sndonly*.

- Connection Information = IN IP4 <IP address of the media resource of the IP-P(A)BX>
- Media Attribute = *sndonly*

Note: changing the media attribute from *sendrecv* to *sndonly* is not mandatory but recommended in order to stop an unnecessary media stream.

[Live example](#)

Request-Line: INVITE sip:10.127.249.182:5060;
ue-addr=impbasilab1-sig-fo.ims.ims.be;transport=udp SIP/2.0
Message Header
Allow: INVITE, ACK, CANCEL, BYE, PRACK, NOTIFY, SUBSCRIBE, OPTIONS, UPDATE

Contact: sip:10.127.249.4
Supported: replaces,timer,100rel
User-Agent: XXXX
Session-Expires: 1800;refresher=uac
Min-SE: 900
Content-Type: application/sdp
To: <sip:+3227970315@ims.belgacom.be;user=phone>;tag=330868717-1294838651382-
From: <sip:+3227970251@ims.belgacom.be;user=phone>;
tag=556801c19doea6c82d8462336e5fed10
Call-ID: BW132411381120111-1617987323@10.127.70.20
CSeq: 1910404660 INVITE
Via: SIP/2.0/UDP 10.127.249.4;branch=z9hG4bK2575fe925680e5498560cd71c24ec450
Max-Forwards: 70
Content-Length: 240

Message body

Session Description Protocol

Session Description Protocol Version (v): 0

Owner/Creator, Session Id (o): OXE 1294846217 1294846218 IN IP4 10.127.249.4

Owner Username: OXE

Session ID: 1294846217

Session Version: 1294846218

Owner Network Type: IN

Owner Address Type: IP4

Owner Address: 10.127.249.4

Session Name (s): abs

Connection Information (c): IN IP4 10.127.249.22

Connection Network Type: IN

Connection Address Type: IP4

Connection Address: 10.127.249.22

Time Description, active time (t): 0 0

Session Start Time: 0

Session Stop Time: 0

Media Description, name and address (m): audio 32696 RTP/AVP 18 101

Media Type: audio

Media Port: 32696

Media Proto: RTP/AVP

Media Format: ITU-T G.729

Media Format: 101

Media Attribute (a): sndonly

Media Attribute (a): rtpmap:18 G729/8000

Media Attribute Fieldname: rtpmap

Media Format: 18

MIME Type: G729

Media Attribute (a): fmp:18 annexb=no

Media Attribute Fieldname: fmp

Media Format: 18 [G729]

Media format specific parameters: annexb=no
Media Attribute (a): ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20
Media Attribute (a): maxptime:40
Media Attribute Fieldname: maxptime
Media Attribute Value: 40
Media Attribute (a): rtpmap:101 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: telephone-event

The Proximus IMS network returns a 200 OK response acknowledging the changed media description parameters: The media attribute is set to *rcvonly*.

- *Media Attribute* = *rcvonly*

Live example

Status-Line: SIP/2.0 200 OK
Message Header
To: <sip:+3227970315@ims.belgacom.be;user=phone>;tag=330868717-1294838651382-
From: <sip:+3227970251@ims.belgacom.be;user=phone>;
tag=556801c19d0ea6c82d8462336e5fed10
Call-ID: BW132411381120111-1617987323@10.127.70.20
Via: SIP/2.0/UDP 10.127.249.4;branch=z9hG4bK2575fe925680e5498560cd71c24ec450
CSeq: 1910404660 INVITE
Allow: ACK,BYE,CANCEL,INFO,INVITE,OPTIONS,PRACK,REFER,NOTIFY,UPDATE
Accept: multipart/mixed,application/media_control+xml,application/sdp
Contact: <sip:10.127.249.182:5060;ue-addr=impbasilab1-sig-
fo.ims.ims.be;transport=udp>
Content-Type: application/sdp
Content-Length: 184
Server: Alcatel-Lucent-HPSS/3.0.3
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): BroadWorks 946 2 IN IP4 10.127.249.182
Owner Username: BroadWorks
Session ID: 946
Session Version: 2
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.127.249.182

Session Name (s): -
Connection Information (c): IN IP4 10.127.249.182
 Connection Network Type: IN
 Connection Address Type: IP4
 Connection Address: 10.127.249.182
Time Description, active time (t): 0 0
 Session Start Time: 0
 Session Stop Time: 0
Media Description, name and address (m): audio 15724 RTP/AVP 18 101
 Media Type: audio
 Media Port: 15724
 Media Proto: RTP/AVP
 Media Format: ITU-T G.729
 Media Format: 101
Media Attribute (a): rtpmap:18 G729/8000
 Media Attribute Fieldname: rtpmap
 Media Format: 18
 MIME Type: G729
Media Attribute (a): rcvonly
Media Attribute (a): rtpmap:101 telephone-event/8000
 Media Attribute Fieldname: rtpmap
 Media Format: 101
 MIME Type: telephone-event

The IP-P(A)BX sends an ACK message to the Proximus IMS network in order to properly close the *INVITE* transaction.

Live example

Request-Line: ACK sip:10.127.249.182:5060;
 ue-addr=impbasilab1-sig-fo.ims.ims.be;transport=udp SIP/2.0
Message Header
 Contact: sip:10.127.249.4
 User-Agent: XXXX
 To: <sip:+3227970315@ims.belgacom.be;user=phone>;tag=330868717-1294838651382-
 From: <sip:+3227970251@ims.belgacom.be;user=phone>;
 tag=556801c19d0ea6c82d8462336e5fed10
 Call-ID: BW132411381120111-1617987323@10.127.70.20
 CSeq: 1910404660 ACK
 Via: SIP/2.0/UDP 10.127.249.4;branch=z9hG4bKf8b9b658c838e1e13801099b69b81194
 Max-Forwards: 70
 Content-Length: 0

When retrieving the held call the IP-P(A)BX sends a (re)INVITE message to the Proximus IMS network in order to change the session description parameters. The connection information is changed back to contain the IP address of the called user and the media attribute is set to *sendrecv*.

- *Connection Information* = IN IP4 <IP address of called user>
- *Media Attribute* = sendrecv

Live example

```
Request-Line: INVITE sip:10.127.249.182:5060;
              ue-addr=impbasilab1-sig-fo.ims.ims.be;transport=udp SIP/2.0
Message Header
Allow: INVITE, ACK, CANCEL, BYE, PRACK, NOTIFY, SUBSCRIBE, OPTIONS, UPDATE
Contact: sip:10.127.249.4
Supported: replaces,timer,100rel
User-Agent: XXXX
Session-Expires: 1800;refresher=uac
Min-SE: 900
Content-Type: application/sdp
To: <sip:+3227970315@ims.belgacom.be;user=phone>;tag=330868717-1294838651382-
From: <sip:+3227970251@ims.belgacom.be;user=phone>;
      tag=556801c19d0ea6c82d8462336e5fed10
Call-ID: BW132411381120111-1617987323@10.127.70.20
CSeq: 1910404661 INVITE
Via: SIP/2.0/UDP 10.127.249.4;branch=z9hG4bKd264cabb885780ea32045b42a9a8c298
Max-Forwards: 70
Content-Length: 240
Message body
Session Description Protocol
  Session Description Protocol Version (v): 0
  Owner/Creator, Session Id (o): OXE 1294846217 1294846219 IN IP4 10.127.249.4
  Owner Username: OXE
  Session ID: 1294846217
  Session Version: 1294846219
  Owner Network Type: IN
  Owner Address Type: IP4
  Owner Address: 10.127.249.4
  Session Name (s): abs
Connection Information (c): IN IP4 10.127.249.16
  Connection Network Type: IN
  Connection Address Type: IP4
  Connection Address: 10.127.249.16
  Time Description, active time (t): 0 0
  Session Start Time: 0
```

Session Stop Time: 0
Media Description, name and address (m): audio 32514 RTP/AVP 18 101
Media Type: audio
Media Port: 32514
Media Proto: RTP/AVP
Media Format: ITU-T G.729
Media Format: 101
Media Attribute (a): sendrecv
Media Attribute (a): rtpmap:18 G729/8000
Media Attribute Fieldname: rtpmap
Media Format: 18
MIME Type: G729
Media Attribute (a): fmp:18 annexb=no
Media Attribute Fieldname: fmp
Media Format: 18 [G729]
Media format specific parameters: annexb=no
Media Attribute (a):ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20
Media Attribute (a):maxptime:40
Media Attribute Fieldname: maxptime
Media Attribute Value: 40
Media Attribute (a): rtpmap:101 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: telephone-event

The Proximus IMS network returns a 200 OK response acknowledging the changed media description parameters: The media attribute is set to *sendrecv*.

- *Media Attribute* = *sendrecv*

Live example

Status-Line: SIP/2.0 200 OK

Message Header

To: <sip:+3227970315@ims.belgacom.be;user=phone>;tag=330868717-1294838651382-
From: <sip:+3227970251@ims.belgacom.be;user=phone>;
tag=556801c19d0ea6c82d8462336e5fed10
Call-ID: BW132411381120111-1617987323@10.127.70.20
Via: SIP/2.0/UDP 10.127.249.4;branch=z9hG4bKd264cabb885780ea32045b42a9a8c298
CSeq: 1910404661 INVITE
Allow: ACK,BYE,CANCEL,INFO,INVITE,OPTIONS,PRACK,REFER,NOTIFY,UPDATE
Accept: multipart/mixed,application/media_control+xml,application/sdp

Contact: <sip:10.127.249.182:5060;ue-addr=impbasilab1-sig-fo.ims.ims.be;transport=udp>
Content-Type: application/sdp
Content-Length: 184
Server: Alcatel-Lucent-HPSS/3.0.3
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): BroadWorks 946 3 IN IP4 10.127.249.182
Owner Username: BroadWorks
Session ID: 946
Session Version: 3
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.127.249.182
Session Name (s): -
Connection Information (c): IN IP4 10.127.249.182
Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.249.182
Time Description, active time (t): 0 0
Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio 15724 RTP/AVP 18 101
Media Type: audio
Media Port: 15724
Media Proto: RTP/AVP
Media Format: ITU-T G.729
Media Format: 101
Media Attribute (a): rtpmap:18 G729/8000
Media Attribute Fieldname: rtpmap
Media Format: 18
MIME Type: G729
Media Attribute (a): sendrecv
Media Attribute (a): rtpmap:101 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: telephone-event

The IP-P(A)BX sends an ACK message to the Proximus IMS network in order to properly close the *INVITE* transaction.

[Live example](#)

Request-Line: ACK sip:10.127.249.182:5060;
 ue-addr=impbasilab1-sig-fo.ims.ims.be;transport=udp SIP/2.0
 Message Header
 Contact: sip:10.127.249.4
 User-Agent: XXXX
 To: <sip:+3227970315@ims.belgacom.be;user=phone>;tag=330868717-1294838651382-
 From: <sip:+3227970251@ims.belgacom.be;user=phone>;
 tag=556801c19doea6c82d8462336e5fed10
 Call-ID: BW132411381120111-1617987323@10.127.70.20
 CSeq: 1910404661 ACK
 Via: SIP/2.0/UDP 10.127.249.4;branch=z9hG4bK9e84b5f5925a65cebbc2a86ade920b76
 Max-Forwards: 70
 Content-Length: 0

7.4.5.2. Call Hold initiated by a user external to the IP-P(A)BX

Figure 13 shows the expected message flow for a hold/retrieve performed by an external user.

Note: depending on the call scenario (e.g. whether reliability of provisional responses is used or not) differences may occur.

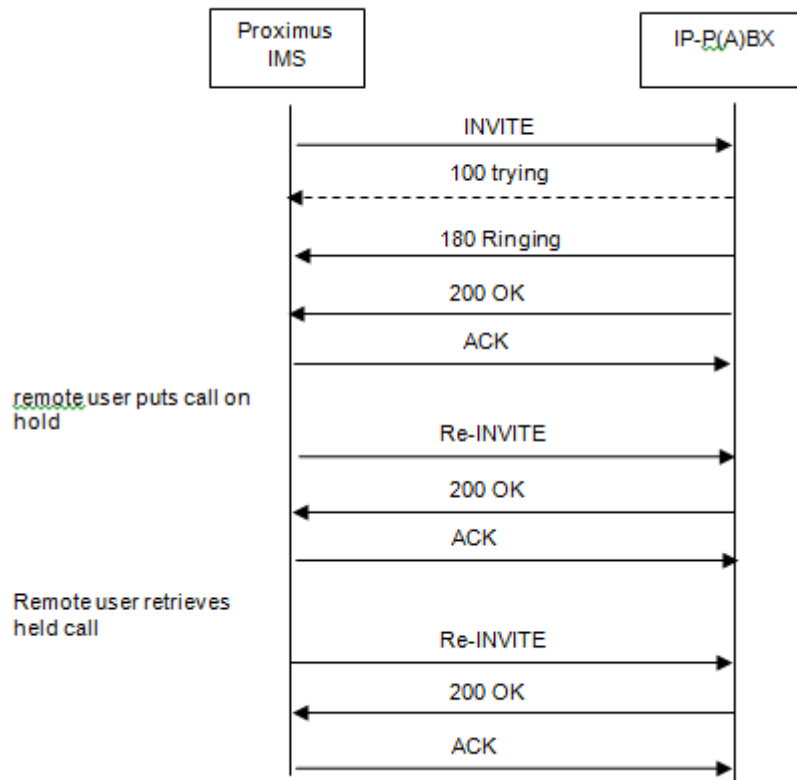


Figure 13: Hold/retrieve by remote user

An incoming call to an IP-P(A)BX user is set-up. When answering the call the 200 OK response contains in the SDP part the IP address of the called IP-P(A)BX user used for the media stream:

- *Connection Information* = IN IP4 <IP address of called user>

Live example

```
Request-Line: INVITE sip:+3227970251@ims.belgacom.be;user=phone SIP/2.0
Message Header
Via: SIP/2.0/UDP 10.127.249.182:5060;branch=z9hG4bKpho3uo2vj95ofopobh2p3cl611
Call-ID: BW13330111012011102747137@10.127.70.20
To: "3227970251 3227970250" <sip:+3227970251@ims.belgacom.be;user=phone>
From: "+3227972030" <sip:+3227972030@ims.belgacom.be;user=phone>;
    tag=1961511564-1294839181110-
CSeq: 1027012508 INVITE
Max-Forwards: 68
Content-Type: application/sdp
Contact: <sip:10.127.249.182:5060;ue-addr=impbasilab1-sig-fo.ims.ims.be;transport=udp>
Privacy: none
Supported: 100rel
Allow: ACK,BYE,CANCEL,INFO,INVITE,OPTIONS,PRACK,REFER,NOTIFY,UPDATE
Accept: multipart/mixed,application/media_control+xml,application/sdp
Content-Length: 179
User-Agent: XXXX
Route: <sip:+3227970251;tgrp=tg_af75of_0101uri;
    trunk-context=sbc1.ims.ims.be@10.127.249.4:5060;user=phone;lr>
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): BroadWorks 1019 1 IN IP4 10.127.249.182
  Owner Username: BroadWorks
  Session ID: 1019
  Session Version: 1
  Owner Network Type: IN
  Owner Address Type: IP4
  Owner Address: 10.127.249.182
Session Name (s): -
Connection Information (c): IN IP4 10.127.249.182
  Connection Network Type: IN
  Connection Address Type: IP4
  Connection Address: 10.127.249.182
Time Description, active time (t): 0 0
```

Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio 15736 RTP/AVP 8 18 101
Media Type: audio
Media Port: 15736
Media Proto: RTP/AVP
Media Format: ITU-T G.711 PCMA
Media Format: ITU-T G.729
Media Format: 101
Media Attribute (a): rtpmap:101 TELEPHONE-EVENT/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: TELEPHONE-EVENT
Media Attribute (a):ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20
Media Attribute (a):maxptime:30
Media Attribute Fieldname: maxptime
Media Attribute Value: 30

Status-Line: SIP/2.0 100 Trying

Message Header

To: "3227970251 3227970250" <sip:+3227970251@ims.belgacom.be;user=phone>
From: "+3227972030" <sip:+3227972030@ims.belgacom.be;user=phone>;
tag=1961511564-1294839181110-
Call-ID: BW133301110120111102747137@10.127.70.20
CSeq: 1027012508 INVITE
Via: SIP/2.0/UDP 10.127.249.182:5060;branch=z9hG4bKpho3uo2vj95ofopobh2p3cl611
Content-Length: 0

Status-Line: SIP/2.0 180 Ringing

Message Header

Allow: INVITE, ACK, CANCEL, BYE, PRACK, NOTIFY, SUBSCRIBE, OPTIONS, UPDATE
Contact: sip:10.127.249.4
User-Agent: XXXX
To: "3227970251 3227970250" <sip:+3227970251@ims.belgacom.be;user=phone>;
tag=50df8b3c8093c30f5a8086f69dd1275c
From: "+3227972030" <sip:+3227972030@ims.belgacom.be;user=phone>;
tag=1961511564-1294839181110-
Call-ID: BW133301110120111102747137@10.127.70.20
CSeq: 1027012508 INVITE
Via: SIP/2.0/UDP 10.127.249.182:5060;branch=z9hG4bKpho3uo2vj95ofopobh2p3cl611
Content-Length: 0

Status-Line: SIP/2.0 200 OK

Message Header

Allow: INVITE, ACK, CANCEL, BYE, PRACK, NOTIFY, SUBSCRIBE, OPTIONS, UPDATE
Contact: sip:10.127.249.4
Supported: replaces,timer,100rel
User-Agent: XXXX
Session-Expires: 1800;refresher=uas
P-Asserted-Identity: "SIP IMS" <sip:SIP%20IMS@10.127.249.4>
Privacy: user
Content-Type: application/sdp
To: "3227970251 3227970250" <sip:+3227970251@ims.belgacom.be;user=phone>;
tag=50df8b3c8093c30f5a8086f69dd1275c
From: "+3227972030" <sip:+3227972030@ims.belgacom.be;user=phone>;
tag=1961511564-1294839181110-
Call-ID: BW133301110120111102747137@10.127.70.20
CSeq: 1027012508 INVITE
Via: SIP/2.0/UDP 10.127.249.182:5060;branch=z9hG4bKpho3uo2vj95ofopobh2p3cl611
Content-Length: 240

Message body

Session Description Protocol

Session Description Protocol Version (v): 0

Owner/Creator, Session Id (o): OXE 1294846747 1294846747 IN IP4 10.127.249.4

Owner Username: OXE

Session ID: 1294846747

Session Version: 1294846747

Owner Network Type: IN

Owner Address Type: IP4

Owner Address: 10.127.249.4

Session Name (s): abs

Connection Information (c): IN IP4 10.127.249.16

Connection Network Type: IN

Connection Address Type: IP4

Connection Address: 10.127.249.16

Time Description, active time (t): 0 0

Session Start Time: 0

Session Stop Time: 0

Media Description, name and address (m): audio 32514 RTP/AVP 18 101

Media Type: audio

Media Port: 32514

Media Proto: RTP/AVP

Media Format: ITU-T G.729

Media Format: 101

Media Attribute (a): rtpmap:18 G729/8000

Media Attribute Fieldname: rtpmap

Media Format: 18

MIME Type: G729

Media Attribute (a): fmp:18 annexb=no

Media Attribute Fieldname: fmp

Media Format: 18 [G729]
Media format specific parameters: annexb=no
Media Attribute (a): ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20
Media Attribute (a): maxptime:40
Media Attribute Fieldname: maxptime
Media Attribute Value: 40
Media Attribute (a): rtpmap:101 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: telephone-event
Media Attribute (a): sendrecv

Request-Line: ACK sip:10.127.249.4;user=phone SIP/2.0
Message Header
Via: SIP/2.0/UDP 10.127.249.182:5060;branch=z9hG4bKuolamu17lmqd3iup75lfcqf1a2-thdefei5
From: "+3227972030" <sip:+3227972030@ims.belgacom.be;user=phone>;
tag=1961511564-1294839181110-
To: "3227970251 3227970250" <sip:+3227970251@ims.belgacom.be;user=phone>;
tag=50df8b3c8093c30f5a8086f69dd1275c
Call-ID: BW133301110120111102747137@10.127.70.20
CSeq: 1027012508 ACK
Contact: <sip:10.127.249.182>
Max-Forwards: 68
Content-Length: 0
User-Agent: XXXX

When the call is put on hold by the remote user the IP-P(A)BX receives a (re)INVITE message from the Proximus IMS network in order to change the session description parameters. The media attribute is set to *sndonly*.

- *Media Attribute = sndonly*

Note: The IP-P(A)BX user will receive “music on hold” provided by the media resource function of the Proximus IMS network. Connection to this media resource is invisible for the IP-P(A)BX and the media stream IP address used on the UNI interface remains the same. Therefore the *Connection Information* is not changed.

[Live example](#)

Request-Line: INVITE sip:10.127.249.4;user=phone SIP/2.0
Message Header

Via: SIP/2.0/UDP 10.127.249.182:5060;branch=z9hG4bKuolamu17lmqd3iup75lfcqf1a2-thdevee5

Call-ID: BW133301110120111102747137@10.127.70.20

To: "3227970251 3227970250" <sip:+3227970251@ims.belgacom.be;user=phone>;
tag=50df8b3c8093c30f5a8086f69dd1275c

From: "+3227972030" <sip:+3227972030@ims.belgacom.be;user=phone>;
tag=1961511564-1294839181110-

CSeq: 1027012509 INVITE

Max-Forwards: 68

Content-Type: application/sdp

Contact: <sip:10.127.249.182;transport=udp>

Allow: ACK,BYE,CANCEL,INFO,INVITE,OPTIONS,PRACK,REFER,NOTIFY,UPDATE

Accept: multipart/mixed,application/media_control+xml,application/sdp

Content-Length: 191

User-Agent: XXXX

Message body

Session Description Protocol

Session Description Protocol Version (v): 0

Owner/Creator, Session Id (o): BroadWorks 1019 2 IN IP4 10.127.249.182

Owner Username: BroadWorks

Session ID: 1019

Session Version: 2

Owner Network Type: IN

Owner Address Type: IP4

Owner Address: 10.127.249.182

Session Name (s): -

Connection Information (c): IN IP4 10.127.249.182

Connection Network Type: IN

Connection Address Type: IP4

Connection Address: 10.127.249.182

Time Description, active time (t): 0 0

Session Start Time: 0

Session Stop Time: 0

Media Description, name and address (m): audio 15736 RTP/AVP 8 18 101

Media Type: audio

Media Port: 15736

Media Proto: RTP/AVP

Media Format: ITU-T G.711 PCMA

Media Format: ITU-T G.729

Media Format: 101

Media Attribute (a): rtpmap:101 TELEPHONE-EVENT/8000

Media Attribute Fieldname: rtpmap

Media Format: 101

MIME Type: TELEPHONE-EVENT

Media Attribute (a):ptime:20

Media Attribute Fieldname:ptime

Media Attribute Value: 20
Media Attribute (a): maxptime:30
Media Attribute Fieldname: maxptime
Media Attribute Value: 30
Media Attribute (a): sndonly

The IP-P(A)BX shall return a 200 OK response to the Proximus IMS network in order to acknowledge the changed media description parameter and shall suspend sending RTP packets.

- *Media Attribute = rcvonly*

Live example

Status-Line: SIP/2.0 200 OK
Message Header
Allow: INVITE, ACK, CANCEL, BYE, PRACK, NOTIFY, SUBSCRIBE, OPTIONS, UPDATE
Contact: sip:10.127.249.4
Supported: replaces,timer,100rel
User-Agent: XXXX
Session-Expires: 1800;refresher=uas
Content-Type: application/sdp
To: "3227970251 3227970250" <sip:+3227970251@ims.belgacom.be;user=phone>;
tag=50df8b3c8093c30f5a8086f69dd1275c
From: "+3227972030" <sip:+3227972030@ims.belgacom.be;user=phone>;
tag=1961511564-1294839181110-
Call-ID: BW133301110120111102747137@10.127.70.20
CSeq: 1027012509 INVITE
Via: SIP/2.0/UDP 10.127.249.182:5060;branch=z9hG4bKuolamu17lmqd3iup75lfcqf1a2-
thdevee5
Content-Length: 240
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): OXE 1294846747 1294846748 IN IP4 10.127.249.4
Owner Username: OXE
Session ID: 1294846747
Session Version: 1294846748
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.127.249.4
Session Name (s): abs
Connection Information (c): IN IP4 10.127.249.16
Connection Network Type: IN
Connection Address Type: IP4

Connection Address: 10.127.249.16
Time Description, active time (t): 0 0
Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio 32514 RTP/AVP 18 101
Media Type: audio
Media Port: 32514
Media Proto: RTP/AVP
Media Format: ITU-T G.729
Media Format: 101
Media Attribute (a): rtpmap:18 G729/8000
Media Attribute Fieldname: rtpmap
Media Format: 18
MIME Type: G729
Media Attribute (a): fmp:18 annexb=no
Media Attribute Fieldname: fmp
Media Format: 18 [G729]
Media format specific parameters: annexb=no
Media Attribute (a): ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20
Media Attribute (a): maxptime:40
Media Attribute Fieldname: maxptime
Media Attribute Value: 40
Media Attribute (a): rtpmap:101 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: telephone-event
Media Attribute (a): rconvonly

The Proximus IMS network sends an ACK message to the IP-P(A)BX in order to properly close the *INVITE* transaction.

[Live example](#)

Request-Line: ACK sip:10.127.249.4;user=phone SIP/2.0
Message Header
Via: SIP/2.0/UDP 10.127.249.182:5060;branch=z9hG4bKuolamu17lmqd3iup75lfcqf1a2-thdevei5
From: "+3227972030" <sip:+3227972030@ims.belgacom.be;user=phone>;
tag=1961511564-1294839181110-
To: "3227970251 3227970250" <sip:+3227970251@ims.belgacom.be;user=phone>;
tag=50df8b3c8093c30f5a8086f69dd1275c
Call-ID: BW13330111012011102747137@10.127.70.20

CSeq: 1027012509 ACK
Contact: <sip:10.127.249.182>
Max-Forwards: 68
Content-Length: 0
User-Agent: XXXX

When the call is retrieved by the remote user the IP-P(A)BX receives a (re)INVITE message from the Proximus IMS network in order to change the session description parameters. The media attribute is set to *sendrecv*.

- *Media Attribute* = sendrecv

Note: The IP-P(A)BX user will be reconnected to the remote user by the Proximus IMS network. This is invisible for the IP-P(A)BX and the media stream IP address used on the UNI interface remains the same. Therefore the *Connection Information* is not changed.

Live example

Request-Line: INVITE sip:10.127.249.4;user=phone SIP/2.0

Message Header

Via: SIP/2.0/UDP 10.127.249.182:5060;branch=z9hG4bKuolamu17lmqd3iup75lfcqf1a2-thdeffe5

Call-ID: BW133301110120111102747137@10.127.70.20

To: "3227970251 3227970250" <sip:+3227970251@ims.belgacom.be;user=phone>;
tag=50df8b3c8093c30f5a8086f69dd1275c

From: "+3227972030" <sip:+3227972030@ims.belgacom.be;user=phone>;
tag=1961511564-1294839181110-

CSeq: 1027012510 INVITE

Max-Forwards: 68

Content-Type: application/sdp

Contact: <sip:10.127.249.182;transport=udp>

Allow: ACK,BYE,CANCEL,INFO,INVITE,OPTIONS,PRACK,REFER,NOTIFY,UPDATE

Accept: multipart/mixed,application/media_control+xml,application/sdp

Content-Length: 191

User-Agent: XXXX

Message body

Session Description Protocol

Session Description Protocol Version (v): 0

Owner/Creator, Session Id (o): BroadWorks 1019 3 IN IP4 10.127.249.182

Owner Username: BroadWorks

Session ID: 1019

Session Version: 3

Owner Network Type: IN

Owner Address Type: IP4

Owner Address: 10.127.249.182
Session Name (s): -
Connection Information (c): IN IP4 10.127.249.182
Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.249.182
Time Description, active time (t): 0 0
Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio 15736 RTP/AVP 8 18 101
Media Type: audio
Media Port: 15736
Media Proto: RTP/AVP
Media Format: ITU-T G.711 PCMA
Media Format: ITU-T G.729
Media Format: 101
Media Attribute (a): rtpmap:101 TELEPHONE-EVENT/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: TELEPHONE-EVENT
Media Attribute (a):ptime:20
Media Attribute Fieldname:ptime
Media Attribute Value: 20
Media Attribute (a):maxptime:30
Media Attribute Fieldname:maxptime
Media Attribute Value: 30
Media Attribute (a): sendrecv

The IP-P(A)BX shall return a 200 OK response to the Proximus IMS network in order to acknowledge the changed media description parameter and shall resume sending RTP packets.

- *Media Attribute = sendrecv*

Live example

Status-Line: SIP/2.0 200 OK

Message Header

Allow: INVITE, ACK, CANCEL, BYE, PRACK, NOTIFY, SUBSCRIBE, OPTIONS, UPDATE

Contact: sip:10.127.249.4

Supported: replaces,timer,100rel

User-Agent: XXXX

Session-Expires: 1800;refresher=uas

Content-Type: application/sdp

To: "3227970251 3227970250" <sip:+3227970251@ims.belgacom.be;user=phone>;

tag=50df8b3c8093c30f5a8086f69dd1275c
From: "+3227972030" <sip:+3227972030@ims.belgacom.be;user=phone>;
tag=1961511564-1294839181110-
Call-ID: BW133301110120111102747137@10.127.70.20
CSeq: 1027012510 INVITE
Via: SIP/2.0/UDP 10.127.249.182:5060;
branch=z9hG4bKuolamu17lmqd3iup75lfcqf1a2-thdeffe5
Content-Length: 240
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): OXE 1294846747 1294846749 IN IP4 10.127.249.4
Owner Username: OXE
Session ID: 1294846747
Session Version: 1294846749
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.127.249.4
Session Name (s): abs
Connection Information (c): IN IP4 10.127.249.16
Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.249.16
Time Description, active time (t): 0 0
Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio 32514 RTP/AVP 18 101
Media Type: audio
Media Port: 32514
Media Proto: RTP/AVP
Media Format: ITU-T G.729
Media Format: 101
Media Attribute (a): rtpmap:18 G729/8000
Media Attribute Fieldname: rtpmap
Media Format: 18
MIME Type: G729
Media Attribute (a): fmp:18 annexb=no
Media Attribute Fieldname: fmp
Media Format: 18 [G729]
Media format specific parameters: annexb=no
Media Attribute (a): ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20
Media Attribute (a): maxptime:40
Media Attribute Fieldname: maxptime
Media Attribute Value: 40

Media Attribute (a): rtpmap:101 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: telephone-event
Media Attribute (a): sendrecv

The Proximus IMS network sends an ACK message to the IP-P(A)BX in order to properly close the *INVITE* transaction.

[Live example](#)

```
Request-Line: ACK sip:10.127.249.4;user=phone SIP/2.0
Message Header
Via: SIP/2.0/UDP 10.127.249.182:5060;branch=z9hG4bKuolamu17lmqd3iup75lfcqf1a2-
thdeff5
From: "+3227972030" <sip:+3227972030@ims.belgacom.be;user=phone>;
tag=1961511564-1294839181110-
To: "3227970251 3227970250" <sip:+3227970251@ims.belgacom.be;user=phone>;
tag=50df8b3c8093c30f5a8086f69dd1275c
Call-ID: BW13330111012011102747137@10.127.70.20
CSeq: 1027012510 ACK
Contact: <sip:10.127.249.182>
Max-Forwards: 68
Content-Length: 0
User-Agent: XXXX
```

7.4.6. Conference Call

The conference feature shall be managed and handled by the IP-P(A)BX. In case external users are involved in a conference call, the incoming and/or outgoing calls to/from the IP-P(A)BX will be treated like normal basic calls by the Proximus IMS.

7.4.7. Call Transfer

The call transfer feature shall be managed and handled by the IP-P(A)BX.

The following behaviour is valid for all flavours (e.g. with or without consultation) of call transfer executed by the IP-P(A)BX.

In case a call involving an IP-P(A)BX user is transferred (by that IP-P(A)BX user) to a destination **external** to the IP-P(A)BX, the IP-P(A)BX shall:

- Either set-up a new call to the transferred-to destination, and:

- o either use a re-INVITE to transfer the RTP stream of the original call to the new destination. No *Diversion* header nor *History-info* header shall be included in the outgoing call. The calling line identity possibly shown to the transferred-to destination will be the identity of the forwarding IP-P(A)BX user (or the IP-P(A)BX general number).
- o or not use a re-INVITE and handle the transfer of the RTP streams autonomously.
- or use a REFER message containing the Referred-by header and Referred-to header in order to allow the Proximus IMS network to redirect the call to the transferred-to-number. The calling line identity possibly shown to the transferred-to destination will be the identity of the original calling user.

7.4.7.1. Call transfer without using re-INVITE

Figure 14 shows the expected message flow for a call transfer without using re-INVITE.

Note: depending on the call scenario (e.g. whether reliability of provisional responses is used or not) differences may occur.

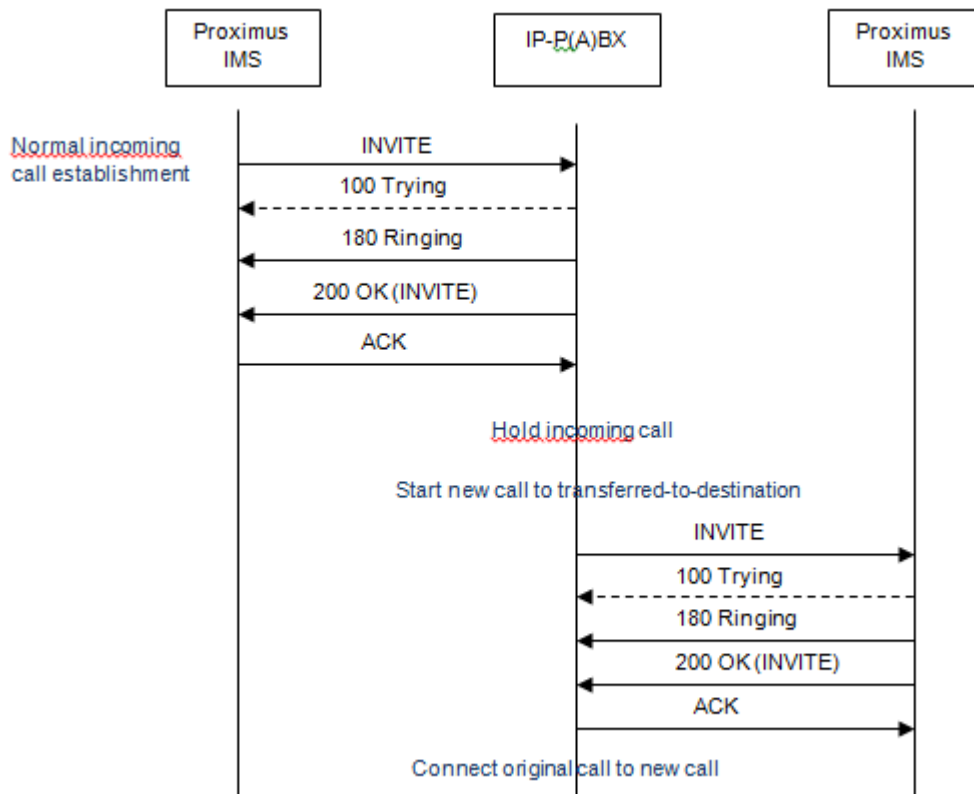


Figure 14: Call transfer without using re-INVITE

In this call transfer scenario, the transfer is in fact completely invisible for the Proximus IMS network. The IP-P(A)BX acts on 2 independent calls and remains in the call path, for signaling as well as for the RTP

streams even after the call transfer has been completed. Consequently this scenario is not optimal from a bandwidth usage point of view.

7.4.7.2. Call transfer using re-INVITE

Figure 15 shows the expected message flow for a call transfer using re-INVITE.

Note: depending on the call scenario (e.g. whether reliability of provisional responses is used or not) differences may occur.

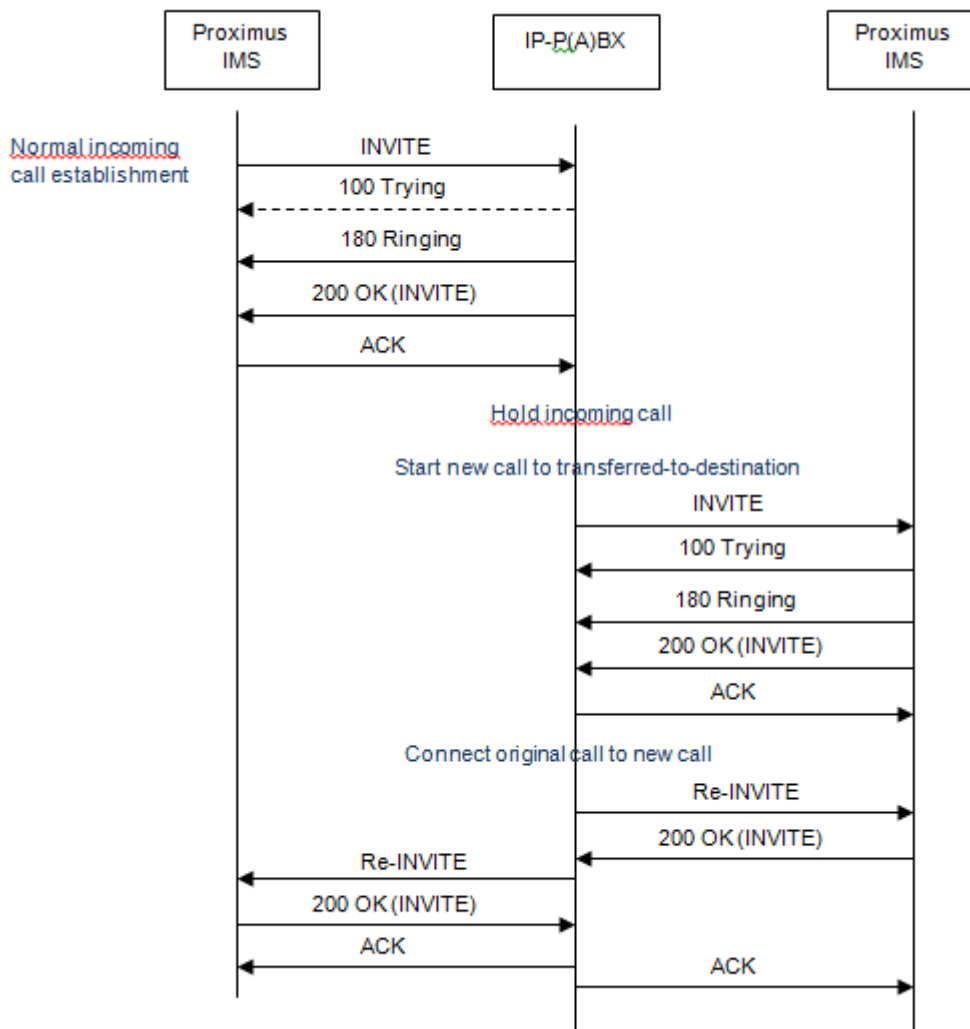


Figure 15: Call transfer using re-INVITE

To transfer an incoming established call the IP-P(A)BX first puts the established call on hold and then sends an *INVITE* message to the Proximus IMS network in order to start a new call to the transferred-to destination.

The initial call is set-up according to § 6.3.3 or § 6.3.4 above. The SDP information in the *INVITE* message contains the IP address and port number on which the Proximus IMS network (i.e. the SBC) wants to receive the RTP stream. The SDP information in the *200 OK* response contains the IP address and port number on which the IP-P(A)BX user wants to receive the RTP stream

Live example

```
Request-Line: INVITE sip:+3227979383@ims.belgacom.be;user=phone SIP/2.0
Message Header
Via: SIP/2.0/UDP 10.127.249.182:5060;branch=z9hG4bKvqg5bgihsqggl51rhra354g40
Call-ID: BW082907082240111-1255895887@10.127.70.20
To: "First83 Last83" <sip:+3227979383@ims.belgacom.be;user=phone>
From: "+3223379031" <sip:+3223379031@ims.belgacom.be;user=phone>;
    tag=2029194627-1295857747082-
CSeq: 462553670 INVITE
Max-Forwards: 68
Content-Type: application/sdp
Contact: <sip:10.127.249.182:5060;ue-addr=impbasilab1-sig-
fo.ims.ims.be;transport=udp>
Privacy: none
Supported: 100rel
Allow: ACK,BYE,CANCEL,INFO,INVITE,OPTIONS,PRACK,REFER,NOTIFY,UPDATE
Accept: multipart/mixed,application/media_control+xml,application/sdp
Content-Length: 178
User-Agent: XXXX
Route: <sip:+3227979383;tgrp=tg_af700f_000;
    trunk-context=sbc1.ims.ims.be@10.127.249.4:5060;user=phone;lr>
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): BroadWorks 160 1 IN IP4 10.127.249.182
  Owner Username: BroadWorks
  Session ID: 160
  Session Version: 1
  Owner Network Type: IN
  Owner Address Type: IP4
  Owner Address: 10.127.249.182
Session Name (s): -
Connection Information (c): IN IP4 10.127.249.182
  Connection Network Type: IN
  Connection Address Type: IP4
  Connection Address: 10.127.249.182
Time Description, active time (t): 0 0
  Session Start Time: 0
  Session Stop Time: 0
```

Media Description, name and address (m): audio **10658** RTP/AVP 8 18 101
Media Type: audio
Media Port: 10658
Media Proto: RTP/AVP
Media Format: ITU-T G.711 PCMA
Media Format: ITU-T G.729
Media Format: 101
Media Attribute (a): rtpmap:101 TELEPHONE-EVENT/8000
Media Attribute Fieldname: rtpmap
Media Format: 101
MIME Type: TELEPHONE-EVENT
Media Attribute (a):ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20
Media Attribute (a):maxptime:30
Media Attribute Fieldname: maxptime
Media Attribute Value: 30

Status-Line: SIP/2.0 100 Trying

Message Header

To: "First83 Last83" <sip:+3227979383@ims.belgacom.be;user=phone>
From: "+3223379031" <sip:+3223379031@ims.belgacom.be;user=phone>;
tag=2029194627-1295857747082-
Call-ID: BW082907082240111-1255895887@10.127.70.20
CSeq: 462553670 INVITE
Via: SIP/2.0/UDP 10.127.249.182:5060;branch=z9hG4bKvqg5bgihsqggl51rhra354g40
Content-Length: 0

Status-Line: SIP/2.0 180 Ringing

Message Header

Allow: INVITE, ACK, CANCEL, BYE, OPTIONS, PRACK, REFER, NOTIFY, UPDATE
Contact: "TEL 027979383" <sip:+3227979383@10.127.249.4;user=phone>
Supported: from-change
User-Agent: XXXX
P-Asserted-Identity: "TEL 027979383" <sip:+3227979383@10.127.249.4;user=phone>
To: "First83 Last83" <sip:+3227979383@ims.belgacom.be;user=phone>;
tag=0a23e829ef0703f4559ace5458222b38
From: "+3223379031" <sip:+3223379031@ims.belgacom.be;user=phone>;
tag=2029194627-1295857747082-
Call-ID: BW082907082240111-1255895887@10.127.70.20
CSeq: 462553670 INVITE
Via: SIP/2.0/UDP 10.127.249.182:5060;branch=z9hG4bKvqg5bgihsqggl51rhra354g40
Content-Length: 0

Status-Line: SIP/2.0 200 OK

Message Header

Content-Type: application/sdp
Allow: INVITE, ACK, CANCEL, BYE, OPTIONS, PRACK, REFER, NOTIFY, UPDATE
Contact: "TEL 027979383" <sip:+3227979383@10.127.249.4;user=phone>
Supported: 100rel,timer,from-change
User-Agent: XXXX
Session-Expires: 43200;refresher=uas
P-Asserted-Identity: "TEL 027979383" <sip:+3227979383@10.127.249.4;user=phone>
To: "First83 Last83" <sip:+3227979383@ims.belgacom.be;user=phone>;
tag=0a23e829ef0703f4559ace5458222b38
From: "+3223379031" <sip:+3223379031@ims.belgacom.be;user=phone>;
tag=2029194627-1295857747082-
Call-ID: BW082907082240111-1255895887@10.127.70.20
CSeq: 462553670 INVITE
Via: SIP/2.0/UDP 10.127.249.182:5060;branch=z9hG4bKvqg5bgihsqgqgl51rhra354g40
Content-Length: 240

Message body

Session Description Protocol

Session Description Protocol Version (v): 0

Owner/Creator, Session Id (o): default 1295857800 1295857800 IN IP4 10.127.249.4

Owner Username: default

Session ID: 1295857800

Session Version: 1295857800

Owner Network Type: IN

Owner Address Type: IP4

Owner Address: 10.127.249.4

Session Name (s): -

Connection Information (c): IN IP4 10.127.249.7

Connection Network Type: IN

Connection Address Type: IP4

Connection Address: 10.127.249.7

Time Description, active time (t): 0 0

Session Start Time: 0

Session Stop Time: 0

Media Description, name and address (m): audio **32000** RTP/AVP 8 101

Media Type: audio

Media Port: 32000

Media Proto: RTP/AVP

Media Format: ITU-T G.711 PCMA

Media Format: 101

Media Attribute (a): sendrecv

Media Attribute (a): rtpmap:101 telephone-event/8000

Media Attribute Fieldname: rtpmap

Media Format: 101

MIME Type: telephone-event

Media Attribute (a): fmp:101 0-15

Media Attribute Fieldname: fmp

Media Format: 101 [telephone-event]
Media format specific parameters: 0-15
Media Attribute (a): silenceSupp:off - - - -
Media Attribute Fieldname: silenceSupp
Media Attribute Value: off - - - -
Media Attribute (a): ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20
Media Attribute (a): maxptime:30
Media Attribute Fieldname: maxptime
Media Attribute Value: 30

Request-Line: ACK sip:+3227979383@10.127.249.4;user=phone SIP/2.0
Message Header
Via: SIP/2.0/UDP 10.127.249.182:5060;branch=z9hG4bKk21b5l08pbdikoi8i2csnfpbgo-rg4503h5
From: "+3223379031" <sip:+3223379031@ims.belgacom.be;user=phone>;
tag=2029194627-1295857747082-
To: "First83 Last83" <sip:+3227979383@ims.belgacom.be;user=phone>;
tag=0a23e829ef0703f4559ace5458222b38
Call-ID: BW082907082240111-1255895887@10.127.70.20
CSeq: 462553670 ACK
Contact: <sip:10.127.249.182>
Max-Forwards: 68
Content-Length: 0
User-Agent: XXXX

When putting the initial call on hold, the IP-P(A)BX uses a *re-INVITE* message in order to connect the calling user to its media resource responsible for providing “music on hold”. The *re-INVITE* message contains:

- *Connection information* = the IP address of the media resource of the IP-P(A)BX
- *Media port* = the port number of the media resource of the IP-P(A)BX
- *Media Attribute* = sendonly

Live example

Request-Line: INVITE sip:10.127.249.182:5060;
ue-addr=impbasilab1-sig-fo.ims.ims.be;transport=udp SIP/2.0
Message Header
Route: <sip:10.127.249.182;lr>
Allow: INVITE, ACK, CANCEL, BYE, OPTIONS, PRACK, REFER, NOTIFY, UPDATE
Supported: 100rel,from-change,timer
User-Agent: XXXX

Session-Expires: 43200;refresher=uac
P-Asserted-Identity: "TEL 027979383" <sip:+3227979383@10.127.249.4;user=phone>
Contact: "TEL 027979383"
<sip:+3227979383@10.127.249.4;transport=UDP;user=phone>
Content-Type: application/sdp
To: <sip:+3223379031@ims.belgacom.be;user=phone>;tag=2029194627-1295857747082-
From: <sip:+3227979383@ims.belgacom.be;user=phone>;
tag=0a23e829ef0703f4559ace5458222b38
Call-ID: BW082907082240111-1255895887@10.127.70.20
CSeq: 1057090886 INVITE
Via: SIP/2.0/UDP
10.127.249.4;rport;branch=z9hG4bKca2449647e3584c68b5ada9a751486a5
Max-Forwards: 70
Content-Length: 276
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): default 1295857800 1295857801 IN IP4 10.127.249.4
Owner Username: default
Session ID: 1295857800
Session Version: 1295857801
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.127.249.4
Session Name (s): -
Connection Information (c): IN IP4 10.127.249.4
Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.249.4
Time Description, active time (t): 0 0
Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio **32000** RTP/AVP 18 106 4 8 0
Media Type: audio
Media Port: 32000
Media Proto: RTP/AVP
Media Format: ITU-T G.729
Media Format: 106
Media Format: ITU-T G.723
Media Format: ITU-T G.711 PCMA
Media Format: ITU-T G.711 PCMU
Media Attribute (a): sndonly
Media Attribute (a): fmp:18 annexb=no
Media Attribute Fieldname: fmp
Media Format: 18
Media format specific parameters: annexb=no

Media Attribute (a): rtpmap:106 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 106
MIME Type: telephone-event
Media Attribute (a): fmp:106 0-15
Media Attribute Fieldname: fmp
Media Format: 106 [telephone-event]
Media format specific parameters: 0-15
Media Attribute (a): fmp:4 annexa=no
Media Attribute Fieldname: fmp
Media Format: 4 [telephone-event]
Media format specific parameters: annexa=no
Media Attribute (a): maxptime:90
Media Attribute Fieldname: maxptime
Media Attribute Value: 90
Media Attribute (a): silenceSupp:off - - - -
Media Attribute Fieldname: silenceSupp
Media Attribute Value: off - - - -

Status-Line: SIP/2.0 200 OK

Message Header

To: <sip:+3223379031@ims.belgacom.be;user=phone>;tag=2029194627-1295857747082-
From: <sip:+3227979383@ims.belgacom.be;user=phone>;
tag=0a23e829ef0703f4559ace5458222b38
Call-ID: BW082907082240111-1255895887@10.127.70.20
Via: SIP/2.0/UDP 10.127.249.4;received=10.127.249.4;rport=5060;
branch=z9hG4bKca2449647e3584c68b5ada9a751486a5
CSeq: 1057090886 INVITE
Allow: ACK,BYE,CANCEL,INFO,INVITE,OPTIONS,PRACK,REFER,NOTIFY,UPDATE
Accept: multipart/mixed,application/media_control+xml,application/sdp
Contact: <sip:10.127.249.182:5060;ue-addr=impbasilab1-sig-
fo.ims.ims.be;transport=udp>
Content-Type: application/sdp
Content-Length: 205
Server: Alcatel-Lucent-HPSS/3.0.3

Message body

Session Description Protocol

Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): BroadWorks 160 2 IN IP4 10.127.249.182
Owner Username: BroadWorks
Session ID: 160
Session Version: 2
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.127.249.182
Session Name (s): -

Connection Information (c): IN IP4 10.127.249.182

Connection Network Type: IN

Connection Address Type: IP4

Connection Address: 10.127.249.182

Time Description, active time (t): 0 0

Session Start Time: 0

Session Stop Time: 0

Media Description, name and address (m): audio **10658** RTP/AVP 18 106

Media Type: audio

Media Port: 10658

Media Proto: RTP/AVP

Media Format: ITU-T G.729

Media Format: 106

Media Attribute (a): ptime:20

Media Attribute Fieldname: ptime

Media Attribute Value: 20

Media Attribute (a): maxptime:60

Media Attribute Fieldname: maxptime

Media Attribute Value: 60

Media Attribute (a): rcvonly

Media Attribute (a): rtpmap:106 telephone-event/8000

Media Attribute Fieldname: rtpmap

Media Format: 106

MIME Type: telephone-event

Media Attribute (a): fmp:106 0-15

Media Attribute Fieldname: fmp

Media Format: 106 [telephone-event]

Media format specific parameters: 0-15

Request-Line: ACK sip:10.127.249.182:5060;ue-addr=impbasilab1-sig-fo.ims.ims.be;
transport=udp SIP/2.0

Message Header

Route: <sip:10.127.249.182;lr>

Contact: "TEL 027979383" <sip:3227979383@10.127.249.4;user=phone>

User-Agent: XXXX

To: <sip:+3223379031@ims.belgacom.be;user=phone>;tag=2029194627-1295857747082-

From: <sip:+3227979383@ims.belgacom.be;user=phone>;

tag=0a23e829ef0703f4559ace5458222b38

Call-ID: BW082907082240111-1255895887@10.127.70.20

CSeq: 1057090886 ACK

Via: SIP/2.0/UDP

10.127.249.4;rport;branch=z9hG4bK3f39b3bfd2a071438f9147e61ffc3e73

Max-Forwards: 70

Content-Length: 0

The new call to the transferred-to destination is set-up according to § 6.3.3 or § 6.3.4 above. The SDP information in the *INVITE* message contains the IP address and port number on which the IP-P(A)BX user wants to receive the RTP stream. The SDP information in the *200 OK* response contains the IP address and port number on which the Proximus IMS network (i.e. the SBC) wants to receive the RTP stream.

Live example

```
Request-Line: INVITE sip:023379042@ims.belgacom.be;user=phone SIP/2.0
Message Header
Route: <sip:10.127.249.182;lr>
Allow: INVITE, ACK, CANCEL, BYE, OPTIONS, PRACK, REFER, NOTIFY, UPDATE
Supported: 100rel,from-change,timer
User-Agent: XXXX
Session-Expires: 43200
P-Asserted-Identity: "TEL 027979383" <sip:+3227979383@10.127.249.4;user=phone>
To: <sip:023379042@ims.belgacom.be;user=phone>
From: "TEL 027979383" <sip:+3227979383@10.127.249.4;user=phone>;
    tag=97d04fb7109bb1124e29336b8a12ed81
Contact: "TEL 027979383"
<sip:+3227979383@10.127.249.4;transport=UDP;user=phone>
Content-Type: application/sdp
Call-ID: a067107e28ce27edccd711170c09372a@10.127.249.4
CSeq: 2038789414 INVITE
Via: SIP/2.0/UDP
10.127.249.4;rport;branch=z9hG4bK3ea4fbc8f0937f6ac950807703b5e467
Max-Forwards: 70
Content-Length: 276
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): default 1295857819 1295857819 IN IP4 10.127.249.4
  Owner Username: default
  Session ID: 1295857819
  Session Version: 1295857819
  Owner Network Type: IN
  Owner Address Type: IP4
  Owner Address: 10.127.249.4
Session Name (s): -
Connection Information (c): IN IP4 10.127.249.7
  Connection Network Type: IN
  Connection Address Type: IP4
  Connection Address: 10.127.249.7
Time Description, active time (t): 0 0
  Session Start Time: 0
  Session Stop Time: 0
```

Media Description, name and address (m): audio **32000** RTP/AVP 18 106 4 8 0
Media Type: audio
Media Port: 32000
Media Proto: RTP/AVP
Media Format: ITU-T G.729
Media Format: 106
Media Format: ITU-T G.723
Media Format: ITU-T G.711 PCMA
Media Format: ITU-T G.711 PCMU
Media Attribute (a): sendrecv
Media Attribute (a): fmp:18 annexb=no
Media Attribute Fieldname: fmp
Media Format: 18
Media format specific parameters: annexb=no
Media Attribute (a): rtpmap:106 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 106
MIME Type: telephone-event
Media Attribute (a): fmp:106 0-15
Media Attribute Fieldname: fmp
Media Format: 106 [telephone-event]
Media format specific parameters: 0-15
Media Attribute (a): fmp:4 annexa=no
Media Attribute Fieldname: fmp
Media Format: 4 [telephone-event]
Media format specific parameters: annexa=no
Media Attribute (a): maxptime:90
Media Attribute Fieldname: maxptime
Media Attribute Value: 90
Media Attribute (a): silenceSupp:off - - - -
Media Attribute Fieldname: silenceSupp
Media Attribute Value: off - - - -

Status-Line: SIP/2.0 100 Trying

Message Header

To: <sip:023379042@ims.belgacom.be;user=phone>
From: "TEL 027979383" <sip:+3227979383@10.127.249.4;user=phone>;
tag=97d04fb7109bb1124e29336b8a12ed81
Call-ID: a067107e28ce27edccd711170c09372a@10.127.249.4
Via: SIP/2.0/UDP 10.127.249.4;received=10.127.249.4;rport=5060;
branch=z9hG4bK3ea4fbc8f0937f6ac950807703b5e467
CSeq: 2038789414 INVITE
Content-Length: 0

Status-Line: SIP/2.0 180 Ringing

Message Header

To: <sip:023379042@ims.belgacom.be;user=phone>;tag=964148310-1295857779178
From: "TEL 027979383" <sip:+3227979383@10.127.249.4;user=phone>;
tag=97d04fb7109bb1124e29336b8a12ed81
Call-ID: a067107e28ce27edccd711170c09372a@10.127.249.4
Via: SIP/2.0/UDP 10.127.249.4;received=10.127.249.4;rport=5060;
branch=z9hG4bK3ea4fbc8f0937f6ac950807703b5e467
CSeq: 2038789414 INVITE
Contact: <sip:10.127.249.182:5060;ue-addr=impbasilab1-sig-fo.ims.ims.be;transport=udp>
RSeq: 462569717
Require: 100rel
Allow: ACK,BYE,CANCEL,INFO,INVITE,OPTIONS,PRACK,REFER,NOTIFY,UPDATE
Content-Type: application/sdp
Content-Length: 193
Server: Alcatel-Lucent-HPSS/3.0.3
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): BroadWorks 167 1 IN IP4 10.127.249.182
Owner Username: BroadWorks
Session ID: 167
Session Version: 1
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.127.249.182
Session Name (s): -
Connection Information (c): IN IP4 10.127.249.182
Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.249.182
Time Description, active time (t): 0 0
Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio **10660** RTP/AVP 18 106
Media Type: audio
Media Port: 10660
Media Proto: RTP/AVP
Media Format: ITU-T G.729
Media Format: 106
Media Attribute (a):ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20
Media Attribute (a):maxptime:60
Media Attribute Fieldname: maxptime
Media Attribute Value: 60
Media Attribute (a):rtpmap:106 telephone-event/8000

Media Attribute Fieldname: rtpmap
Media Format: 106
MIME Type: telephone-event
Media Attribute (a): fntp:106 0-15
Media Attribute Fieldname: fntp
Media Format: 106 [telephone-event]
Media format specific parameters: 0-15

Request-Line: PRACK sip:023379042@ims.belgacom.be;user=phone SIP/2.0

Message Header

Route: <sip:10.127.249.182;lr>
RAck: 462569717 2038789414 INVITE
User-Agent: XXXX
To: <sip:023379042@ims.belgacom.be;user=phone>;tag=964148310-1295857779178
From:
<sip:+3227979383@10.127.249.4;user=phone>;tag=97d04fb7109bb1124e29336b8a12ed81
Call-ID: a067107e28ce27edccd711170c09372a@10.127.249.4
CSeq: 2038789415 PRACK
Via: SIP/2.0/UDP
10.127.249.4;rport;branch=z9hG4bKc25a2aab6891478c0957b7824c7fa1bc
Max-Forwards: 70
Content-Length: 0

Status-Line: SIP/2.0 200 OK

Message Header

To: <sip:023379042@ims.belgacom.be;user=phone>;tag=964148310-1295857779178
From:
<sip:+3227979383@10.127.249.4;user=phone>;tag=97d04fb7109bb1124e29336b8a12ed81
Call-ID: a067107e28ce27edccd711170c09372a@10.127.249.4
Via: SIP/2.0/UDP 10.127.249.4;received=10.127.249.4;rport=5060;
branch=z9hG4bKc25a2aab6891478c0957b7824c7fa1bc
CSeq: 2038789415 PRACK
Server: Alcatel-Lucent-HPSS/3.0.3
Content-Length: 0

Status-Line: SIP/2.0 200 OK

Message Header

To: <sip:023379042@ims.belgacom.be;user=phone>;tag=964148310-1295857779178
From: "TEL 027979383" <sip:+3227979383@10.127.249.4;user=phone>;
tag=97d04fb7109bb1124e29336b8a12ed81
Call-ID: a067107e28ce27edccd711170c09372a@10.127.249.4
Via: SIP/2.0/UDP 10.127.249.4;received=10.127.249.4;rport=5060;
branch=z9hG4bK3ea4fbc8f0937f6ac950807703b5e467
CSeq: 2038789414 INVITE
Contact: <sip:10.127.249.182:5060;ue-addr=impbasilab1-sig-
fo.ims.ims.be;transport=udp>

Allow: ACK,BYE,CANCEL,INFO,INVITE,OPTIONS,PRACK,REFER,NOTIFY,UPDATE
Accept: multipart/mixed,application/media_control+xml,application/sdp
Content-Type: application/sdp
Content-Length: 193
Server: Alcatel-Lucent-HPSS/3.0.3

Message body

Session Description Protocol

Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): BroadWorks 167 2 IN IP4 10.127.249.182
Owner Username: BroadWorks
Session ID: 167
Session Version: 2
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.127.249.182

Session Name (s): -

Connection Information (c): IN IP4 10.127.249.182

Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.249.182

Time Description, active time (t): 0 0

Session Start Time: 0
Session Stop Time: 0

Media Description, name and address (m): audio **10660** RTP/AVP 18 106

Media Type: audio
Media Port: 10660
Media Proto: RTP/AVP
Media Format: ITU-T G.729
Media Format: 106

Media Attribute (a):ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20

Media Attribute (a):maxptime:60
Media Attribute Fieldname: maxptime
Media Attribute Value: 60

Media Attribute (a):rtpmap:106 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 106

MIME Type: telephone-event

Media Attribute (a):fmp:106 0-15
Media Attribute Fieldname: fmp
Media Format: 106 [telephone-event]
Media format specific parameters: 0-15

Request-Line: ACK sip:10.127.249.182:5060;ue-addr=impbasilab1-sig-fo.ims.ims.be;
transport=udp SIP/2.0

Message Header

Route: <sip:10.127.249.182;lr>
Contact: "TEL 027979383" <sip:+3227979383@10.127.249.4;user=phone>
User-Agent: XXXX
To: <sip:023379042@ims.belgacom.be;user=phone>;tag=964148310-1295857779178
From: "TEL 027979383" <sip:+3227979383@10.127.249.4;user=phone>;
tag=97d04fb7109bb1124e29336b8a12ed81
Call-ID: a067107e28ce27edccd711170c09372a@10.127.249.4
CSeq: 2038789414 ACK
Via: SIP/2.0/UDP
10.127.249.4;rport;branch=z9hG4bK36c90df88f23affbf46dc237e5e14017
Max-Forwards: 70
Content-Length: 0

To perform the call transfer, the IP-P(A)BX sends an *INVITE* message without SDP information to the transferred-to destination, in order to collect the SDP information.

Live example

Request-Line: INVITE sip:10.127.249.182:5060;ue-addr=impbasilab1-sig-fo.ims.ims.be;
transport=udp SIP/2.0

Message Header

Route: <sip:10.127.249.182;lr>
Allow: INVITE, ACK, CANCEL, BYE, OPTIONS, PRACK, REFER, NOTIFY, UPDATE
Supported: 100rel,from-change,timer
User-Agent: XXXX
Session-Expires: 43200;refresher=uac
P-Asserted-Identity: "+3223379031" <sip:+3223379031@10.127.249.4;user=phone>
Contact: "+3223379031" <sip:+3223379031@10.127.249.4;transport=UDP;user=phone>
To: <sip:023379042@ims.belgacom.be;user=phone>;tag=964148310-1295857779178
From:
<sip:+3227979383@10.127.249.4;user=phone>;tag=97d04fb7109bb1124e29336b8a12ed81
Call-ID: a067107e28ce27edccd711170c09372a@10.127.249.4
CSeq: 2038789416 INVITE
Via: SIP/2.0/UDP
10.127.249.4;rport;branch=z9hG4bK30fcoce70580565820a26527983d672d
Max-Forwards: 70
Content-Length: 0

Status-Line: SIP/2.0 200 OK

Message Header

To: <sip:023379042@ims.belgacom.be;user=phone>;tag=964148310-1295857779178
From:
<sip:+3227979383@10.127.249.4;user=phone>;tag=97d04fb7109bb1124e29336b8a12ed81

Call-ID: a067107e28ce27edccd711170c09372a@10.127.249.4
Via: SIP/2.0/UDP 10.127.249.4;received=10.127.249.4;rport=5060;
branch=z9hG4bK3ofcoce70580565820a26527983d672d
CSeq: 2038789416 INVITE
Allow: ACK,BYE,CANCEL,INFO,INVITE,OPTIONS,PRACK,REFER,NOTIFY,UPDATE
Accept: multipart/mixed,application/media_control+xml,application/sdp
Contact: <sip:10.127.249.182:5060;ue-addr=impbasilab1-sig-fo.ims.ims.be;transport=udp>
Content-Type: application/sdp
Content-Length: 176
Server: Alcatel-Lucent-HPSS/3.0.3
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): BroadWorks 167 3 IN IP4 10.127.249.182
Owner Username: BroadWorks
Session ID: 167
Session Version: 3
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.127.249.182
Session Name (s): -
Connection Information (c): IN IP4 10.127.249.182
Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.249.182
Time Description, active time (t): 0 0
Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio **10660** RTP/AVP 18 106
Media Type: audio
Media Port: 10660
Media Proto: RTP/AVP
Media Format: ITU-T G.729
Media Format: 106
Media Attribute (a): rtpmap:106 TELEPHONE-EVENT/8000
Media Attribute Fieldname: rtpmap
Media Format: 106
MIME Type: TELEPHONE-EVENT
Media Attribute (a): ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20
Media Attribute (a): maxptime:60
Media Attribute Fieldname: maxptime
Media Attribute Value: 60

The IP-P(A)BX sends an *INVITE* message to the original calling user, including the collected SDP information.

- *Connection information* = the IP address of the media resource of the Proximus IMS network
- *Media port* = the port number of the media resource of the Proximus IMS network
- *Media Attribute* = sendrecv

Live example

```
Request-Line: INVITE sip:10.127.249.182:5060;ue-addr=impbasilab1-sig-fo.ims.ims.be;
              transport=udp SIP/2.0
Message Header
Route: <sip:10.127.249.182;lr>
Allow: INVITE, ACK, CANCEL, BYE, OPTIONS, PRACK, REFER, NOTIFY, UPDATE
Supported: 100rel,from-change,timer
User-Agent: XXXX
Session-Expires: 43200;refresher=uac
P-Asserted-Identity: <sip:+3227979383@10.127.249.4;user=phone>
Contact: <sip:+3227979383@10.127.249.4;transport=UDP;user=phone>
Content-Type: application/sdp
To: <sip:+3223379031@ims.belgacom.be;user=phone>;tag=2029194627-1295857747082-
From: <sip:+3227979383@ims.belgacom.be;user=phone>;
      tag=0a23e829ef0703f4559ace5458222b38
Call-ID: BW082907082240111-1255895887@10.127.70.20
CSeq: 1057090887 INVITE
Via: SIP/2.0/UDP
10.127.249.4;rport;branch=z9hG4bK5aa09ceb34af866139b05d4b575fb9a8
Max-Forwards: 70
Content-Length: 237
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): default 1295857800 1295857802 IN IP4 10.127.249.4
  Owner Username: default
  Session ID: 1295857800
  Session Version: 1295857802
  Owner Network Type: IN
  Owner Address Type: IP4
  Owner Address: 10.127.249.4
Session Name (s): -
Connection Information (c): IN IP4 10.127.249.182
  Connection Network Type: IN
  Connection Address Type: IP4
Connection Address: 10.127.249.182
```


Time Description, active time (t): 0 0
Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio **10660** RTP/AVP 18 106
Media Type: audio
Media Port: 10660
Media Proto: RTP/AVP
Media Format: ITU-T G.729
Media Format: 106
Media Attribute (a): sendrecv
Media Attribute (a): fmp:18 annexb=no
Media Attribute Fieldname: fmp
Media Format: 18
Media format specific parameters: annexb=no
Media Attribute (a): rtpmap:106 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 106
MIME Type: telephone-event
Media Attribute (a): fmp:106 0-15
Media Attribute Fieldname: fmp
Media Format: 106 [telephone-event]
Media format specific parameters: 0-15
Media Attribute (a): ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20
Media Attribute (a): maxptime:60
Media Attribute Fieldname: maxptime
Media Attribute Value: 60

The Proximus IMS network returns a 200 OK response including SDP information.

[Live example](#)

Status-Line: SIP/2.0 200 OK
Message Header
To: <sip:+3223379031@ims.belgacom.be;user=phone>;tag=2029194627-1295857747082-
From: <sip:+3227979383@ims.belgacom.be;user=phone>;
tag=0a23e829ef0703f4559ace5458222b38
Call-ID: BW082907082240111-1255895887@10.127.70.20
Via: SIP/2.0/UDP 10.127.249.4;received=10.127.249.4;rport=5060;
branch=z9hG4bK5aa09ceb34af866139b05d4b575fb9a8
CSeq: 1057090887 INVITE
Allow: ACK,BYE,CANCEL,INFO,INVITE,OPTIONS,PRACK,REFER,NOTIFY,UPDATE
Accept: multipart/mixed,application/media_control+xml,application/sdp

Contact: <sip:10.127.249.182:5060;ue-addr=impbasilab1-sig-fo.ims.ims.be;transport=udp>

Content-Type: application/sdp

Content-Length: 205

Server: Alcatel-Lucent-HPSS/3.0.3

Message body

Session Description Protocol

Session Description Protocol Version (v): 0

Owner/Creator, Session Id (o): BroadWorks 160 3 IN IP4 10.127.249.182

Owner Username: BroadWorks

Session ID: 160

Session Version: 3

Owner Network Type: IN

Owner Address Type: IP4

Owner Address: 10.127.249.182

Session Name (s): -

Connection Information (c): IN IP4 10.127.249.182

Connection Network Type: IN

Connection Address Type: IP4

Connection Address: 10.127.249.182

Time Description, active time (t): 0 0

Session Start Time: 0

Session Stop Time: 0

Media Description, name and address (m): audio **10658** RTP/AVP 18 106

Media Type: audio

Media Port: 10658

Media Proto: RTP/AVP

Media Format: ITU-T G.729

Media Format: 106

Media Attribute (a):ptime:20

Media Attribute Fieldname: ptime

Media Attribute Value: 20

Media Attribute (a):maxptime:60

Media Attribute Fieldname: maxptime

Media Attribute Value: 60

Media Attribute (a):sendrecv

Media Attribute (a):rtpmap:106 telephone-event/8000

Media Attribute Fieldname: rtpmap

Media Format: 106

MIME Type: telephone-event

Media Attribute (a):fntp:106 0-15

Media Attribute Fieldname: fntp

Media Format: 106 [telephone-event]

Media format specific parameters: 0-15

Request-Line: ACK sip:10.127.249.182:5060;ue-addr=impbasilab1-sig-fo.ims.ims.be;

```
transport=udp SIP/2.0
Message Header
Route: <sip:10.127.249.182;lr>
Contact: <sip:3227979383@10.127.249.4;user=phone>
User-Agent: XXXX
To: <sip:+3223379031@ims.belgacom.be;user=phone>;tag=2029194627-1295857747082-
From: <sip:+3227979383@ims.belgacom.be;user=phone>;
tag=0a23e829ef0703f4559ace5458222b38
Call-ID: BW082907082240111-1255895887@10.127.70.20
CSeq: 1057090887 ACK
Via: SIP/2.0/UDP
10.127.249.4;rport;branch=z9hG4bK829544acdc45c29434646bebc4ca706
Max-Forwards: 70
Content-Length: 0
```

The IP-P(A)BX uses the SDP information received from the Proximus IMS network in order to shortcut the 2 RTP streams.

- *Connection information* = the IP address of the media resource of the Proximus IMS network
- *Media port* = the port number of the media resource of the Proximus IMS network
- *Media Attribute* = sendrecv

Live example

```
Request-Line: ACK sip:10.127.249.182:5060;ue-addr=impbasilab1-sig-fo.ims.ims.be;
transport=udp SIP/2.0
Message Header
Route: <sip:10.127.249.182;lr>
Contact: "+3223379031" <sip:+3223379031@10.127.249.4;user=phone>
User-Agent: XXXX
Content-Type: application/sdp
To: <sip:023379042@ims.belgacom.be;user=phone>;tag=964148310-1295857779178
From:
<sip:+3227979383@10.127.249.4;user=phone>;tag=97d04fb7109bb1124e29336b8a12ed81
Call-ID: a067107e28ce27edccd711170c09372a@10.127.249.4
CSeq: 2038789416 ACK
Via: SIP/2.0/UDP
10.127.249.4;rport;branch=z9hG4bK6b8a3d2088b4fob5de9d9760ab470717
Max-Forwards: 70
Content-Length: 237
Message body
Session Description Protocol
Session Description Protocol Version (v): 0
Owner/Creator, Session Id (o): default 1295857819 1295857820 IN IP4 10.127.249.4
```

Owner Username: default
Session ID: 1295857819
Session Version: 1295857820
Owner Network Type: IN
Owner Address Type: IP4
Owner Address: 10.127.249.4
Session Name (s): -
Connection Information (c): IN IP4 10.127.249.182
Connection Network Type: IN
Connection Address Type: IP4
Connection Address: 10.127.249.182
Time Description, active time (t): 0 0
Session Start Time: 0
Session Stop Time: 0
Media Description, name and address (m): audio **10658** RTP/AVP 18 106
Media Type: audio
Media Port: 10658
Media Proto: RTP/AVP
Media Format: ITU-T G.729
Media Format: 106
Media Attribute (a): sendrecv
Media Attribute (a): fmtp:18 annexb=no
Media Attribute Fieldname: fmtp
Media Format: 18
Media format specific parameters: annexb=no
Media Attribute (a): rtpmap:106 telephone-event/8000
Media Attribute Fieldname: rtpmap
Media Format: 106
MIME Type: telephone-event
Media Attribute (a): fmtp:106 0-15
Media Attribute Fieldname: fmtp
Media Format: 106 [telephone-event]
Media format specific parameters: 0-15
Media Attribute (a):ptime:20
Media Attribute Fieldname: ptime
Media Attribute Value: 20
Media Attribute (a):maxptime:60
Media Attribute Fieldname: maxptime
Media Attribute Value: 60

7.4.7.3. Call transfer using REFER

Figure 16 shows the expected message flow for a call transfer using REFER.

Note: depending on the call scenario (e.g. whether reliability of provisional responses is used or not) differences may occur.

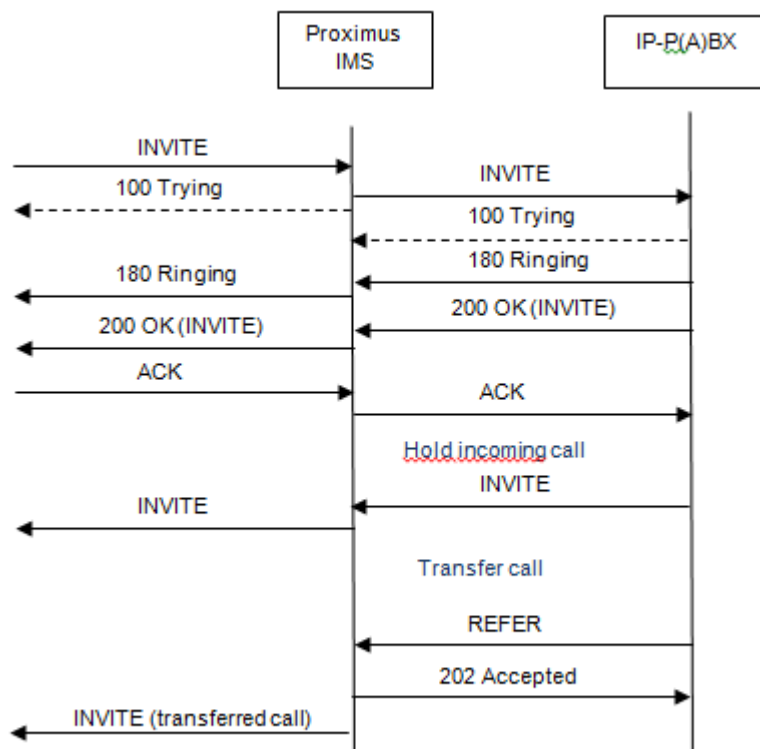


Figure 16: Call transfer using *REFER*

7.5. Call admission control

Call Admission Control concerns controlling the number of simultaneous calls that can be issued or received by an IP-P(A)BX. The maximum number of simultaneous calls can be set per IP-P(A)BX and per Trunk Group.

7.5.1. Incoming call to the IP-P(A)BX rejected by call admission control

In case an incoming call to an IP-P(A)BX exceeds the maximum number of simultaneous calls:

- either the call is rejected in the Proximus IMS network. The call will **not** be offered to the IP-P(A)BX. The calling party will receive a busy indication.
- or the “forced” rerouting feature forwards the call to a new destination, without offering the call to the IP-P(A)BX.

7.5.2. Outgoing call from the IP-P(A)BX rejected by call admission control

In case an outgoing call from an IP-P(A)BX is rejected in the Proximus IMS network by call admission control, the Proximus IMS network will return a *403 Forbidden* response to the IP-P(A)BX.

7.6. CLI screening

The identity of the calling user received from the IP-P(A)BX in the *From* header and *P-asserted-ID*, is verified by the Proximus IMS network by means of a screening function. This function consists of checking if the calling number belongs to the number range(s) defined for the IP-P(A)BX.

If the screening check gives a negative result, the network overwrites the calling identity in the *From* header and *P-asserted-ID* header with a default value for the IP-P(A)BX.

Note: it is in fact the Proximus NanoSBC function which performs the screening.

As some services at the destination side may depend on the calling identity it is important that the IP-P(A)BX sends the correct information in the *From* header and the *P-Asserted-ID* header.

7.7.FAX support

See “PXM IMS VoIP – UNI specification – Fax over IP” [36]

7.8. Emergency calls

Emergency calls need to be routed by the Proximus IMS network to the correct emergency center based on the geographical location of the IP-P(A)BX.

Emergency calls offered by the IP-P(A)BX to the Proximus IMS network

are routed based on **static localization** through the definition of a local area parameter in the Proximus IMS network. The parameter defines the ZIP code related to the SIP DDI. The calls are routed based on the ZIP code. This solution is a static way to route the calls to the emergency center. Nomadism of SIP lines is not taken into account.

7.9. DTMF

For transport of DTMF the following capabilities exist:

- Usage of RFC 2833 (inband signalling in RTP by use of events)
- Usage of G.711 A-law codec (inband signalling in RTP)

Both methods of transporting DTMF shall be supported.

Evolution: Usage of the SIP INFO message (outband signalling: the info follows the path of signalling) is currently under study and may be announced in a later version of this document