PBX Approval Report

IP-PBX Innovaphone IP6000

Vodafone Office Voice & Corporate Net over IP

Document	Certification document
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1 Introduction

This document describes the PBX certification for IP-PBX Innovaphone IP6000 with Vodafone SIP Trunking services. PBX Certification is performing interoperability test between Vodafone services and IP-PBX Innovaphone IP6000 using SIP Protocol. The certification of IP-PBX Innovaphone IP6000 is a prerequisite which Vodafone request to avoid any interoperability problem between the IP-PBX environment and Vodafone network. These tests are part of the Vodafone PBX Approval process. The interoperability tests are performed at the Vodafone Test Center (VTC) Heerlen. The supplier of the IP-PBX Innovaphone IP6000 and Vodafone NL both cooperated in this interoperability test certification to make sure that the test done correctly and according standard method of SIP protocol which are described in different Ref document and the technical condition of Vodafone NL.

1.1 Product / services description

Vodafone NL SIP Trunking Services are providing SIP Trunks for two different Vodafone Voice Services. Both services are tested during the PBX Approval process. The two service s which have been tested and certified are:

1.1.1 Vodafone Office Voice (VoV)

Vodafone Office Voice (VOV) is a PBX trunking service which provides PSTN access to enterprise PBXs. A trunk line allows PBX extensions to make and receive calls to and from the PSTN network. VOV trunk lines are IP based and they consist of direct SIP connections to the customer IP PBXs..

1.1.2 Corporate Net over IP (CNoIP)

The Vodafone service called Corporate Net is providing a Closed User Group service for mobiles. This is called a Mobile VPN. Within the Mobile VPN the mobile vpn users can call other mobile vpn users with short and long numbers which are connected to their mobile devices. Corporate Net over IP also provides the possibility to call between the mobile VPN and IP-PBX via a separated SIP Trunk. This enables the fixed-mobile integration between the Enterprise PBX environment and the mobile vpn users. The SIP trunk makes it possible to expand further the fixed-mobile integration for example, short number dialing between mobile phones, mobile phone to PBX extension and PBX extension to mobile phone. Also is it possible to offer specials services like Forced on PBX.

2 General Test Approach and Test Results

The general test approach was to configure a simulated enterprise site using an IP-PBX PBX Name. The IP-PBX was configured to use the SIP Trunk Solution provided for Vodafone Office Voice (VoV) and Vodafone Corporate Net over IP (CNoIP). This means two SIP Trunks will be connected to the IP-PBX.

2.1 PBX Certification testing

Within the PBX certification tests different types of tests are executed. A summary of these tests are described here.

Vodafone Office Voice (VoV)

- Basic Features : basic inbound/outbound calls, G711alaw codec, CLI(P/R), Forwarded calls, Call transfer, dtmf.
- Optional G729a codec: Voice call with G729a codec including fallback to G711 codec
- Optional Fax support: Support of fax transfer using G711 pass-thru and optional T.38 including fax fallback

Vodafone Corporate Net over IP (CNoIP)

- Basic CNoIP : basic inbound/outbound calls, G711alaw codec, CLI(P/R), Forwarded calls, Call transfer, dtmf.
- Optional FoPBX: Forced on PBX tests for Mobile Originating (MO) and Mobile terminating (MT) calls

2.2 Test results summary

The PBX Certification tests between Vodafone NL and IP-PBX Innovaphone IP6000 where successfully completed with the following observations

- The system has analogue port for the fax. This port don't support G729 codec for voice, only G711 codec is supported for voice and fax.

Approved features

The IP-PBX Innovaphone IP6000 is approved to use the Vodafone NL SIP Trunk services for the following features:

Vodafone Office Voice

- ☒ Basic Call G711Voice
- ☒ G729a Codec
- ☒ Fax support

Vodafone Corporate Net over IP

- ☒ Basic Call G711Voice
- ☐ Forced on PBX (MO) Mobile Originating
- ☐ Forced on PBX (MT) Mobile Terminating

Vodafone NL SIP Certification Program (VSCP)

The approved features will result in a VSCP level. The test with IP-PBX Innovaphone IP6000 has resulted in the following VSCP level. The corresponding logo can be used by the PBX vendor.

Vodafone SIP Certified level

- ☐ Vodafone SIP Certified
- ☒ Vodafone SIP Certified Silver
- ☐ Vodafone SIP Certified Gold

Vodafone SIP certified Silver

Vodafone NL
Date : 22-04-2013.
Approved by : Zeid H.M..

3 Test setup

The interoperability tests require that the configuration of the test environment should be stable and reliable during the test. The interoperability test is preferred to perform in the environment that is equal to the real environment. All test cases will be executed at the location which Vodafone allocated.

3.1 Lab topology

The following lab topology was used during the tests.

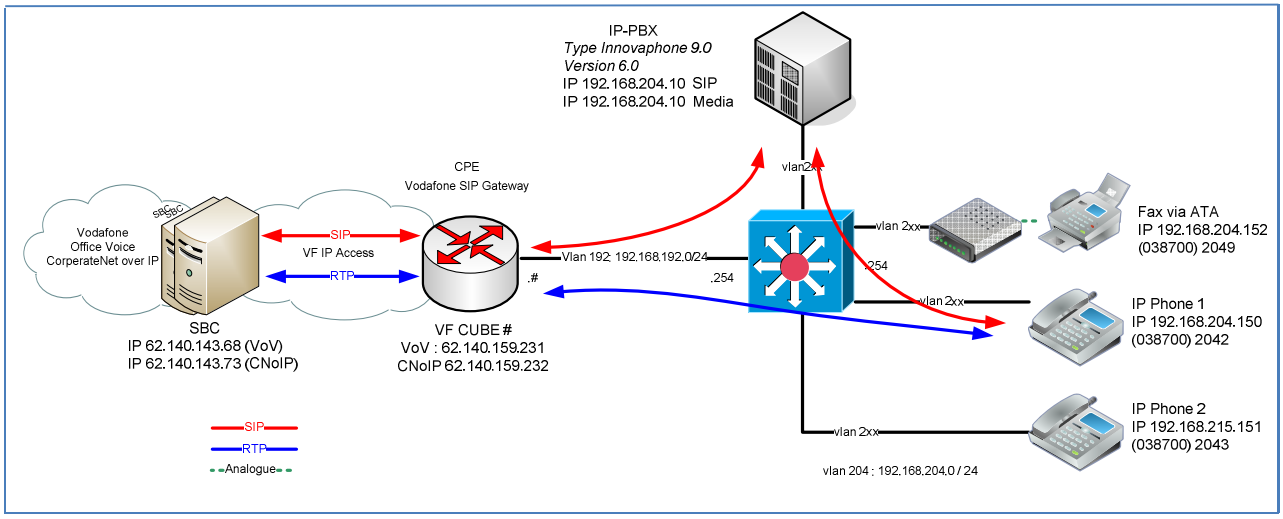


Figure 1 : Lab topology for Innovaphone IP 6000

3.2 Hardware and software

The following hardware and software where used during the tests:

System	HW version	SW version
Vodafone Core SBC	Acme Packet Net-Net 4500	SCX6.2.0 MR-11 Patch 4
Vodafone VF-CUBE	Cisco 2901	15.2.(4)M3
Vodafone Ref-PBX	OneAccess One300	ONEOS5-VOIP_SIP-V4.2R6E5_V34N
IP-PBX innovaphone IP6000	Hardware[302]	9.00 hotfix22 IP6000[9.061240], Bootcode[9061240]
IP-Phones innovaphone IP240	Hardware[303]	9.00 hotfix22 IP240[9.061240], Bootcode[9061240]
Fax ATA IP24 Innovaphone	Hardware[306]	9.00 hotfix22 IP24[9.061240], Bootcode[9061240]

Table 1: Hardware & Software list

3.3 IP objects and list of IP addresses

List of important IP addresses which are used in the test certification

System	IP address
Vodafone SBC VoV	62.140.143.68
Vodafone SBC CNoIP	62.140.143.75
Vodafone VF-CUBE VoV	62.140.159.231
Vodafone VF-CUBE CNoIP	62.140.159.232
IP-PBX SIP	192.168.204.10
IP-PBX Media	192.168..204.10
Fax ATA	192.168.204.159
IP-Phone 1	192.168.204.152
IP-Phone 2	192.168.204.153

Table 2: IP address list

3.4 DDI and telephone numbering plan

List of important telephone number ranges.

Name	Value
VoV DDI Ranges	0387002040 - 0387002049
CNoIP Ranges PBX	2040 – 2049
CNoIP Ranges Mobile VPN	7xxx
IP-PBX IP-Phone 1	038-700 (2042)
IP-PBX IP-Phone 2	038-700 (2043)
IP-PBX Fax	038-700 (2049)

Table 3: DDI and phone numbers

3.5 Number format

The number format which is used on the SIP Trunk between Vodafone and the IP-PBX is described is this chapter. This means the number format which must be used for PBX originating calls and PBX terminating calls.

3.5.1 Number format for PBX originating calls

The IP-PBX should be configured according to use the correct called and calling party numbers. The calling and called party numbers should be formatted as shown in table. Calls presented with the following formats in the INVITE request will be handled correctly by the Vodafone Office Voice service:

Header Field	Type	PBX parameter value
Request-URI	National	sip: 0455443639@62.140.159.xxx
	International	sip: 0031455443639@62.140.159.xxx
	Short	sip: 7xxx@62.140.159.xxx
To:	National	sip: 0455443639@62.140.159.xxx
	International	sip: 0031455443639@62.140.159.xxx
	Short	sip: 7xxx@62.140.159.xxx
From:		sip:03870020xx@192.168.xxx.xxx

Table 4: Number format for PBX originating calls

3.5.2 Number format for PBX terminating calls

Calls will be presented to the PABX by the Vodafone Office Voice service by an incoming INVITE request where the headers have the following format:

Header Field	Type	PBX parameter value
Request-URI		sip: 03870020xx @192.168.xxx.xxx
	short	sip:20xx@192.168.xxx.xxx
To:		sip: 03870020xx @192.168.xxx.xxx
	short	sip:20xx@192.168.xxx.xxx
From:	National	sip:0xxxxxxxxx@62.140.159.xxx
	short	sip:7xxx@62.140.159.xxx
	International	sip: 0031455443639@62.140.159.xxx

Table 5: Number format for PBX terminating calls

4 Configuration Vodafone

4.1 Vodafone SIP Trunk configuration

The SIP Trunks are configured at Vodafone as a standard SIP Trunk for services Vodafone Office Voice version 1.0 and Vodafone Corporate Net over IP version 1.0. The key component and separation point between Vodafone and customer network is the Vodafone CPE called VF-CUBE. The VF-CUBE is configured with configuration version 1.0

Name	Value
VF-CUBE configuration version	1.0
Protocol	UDP
VF-CUBE SIP Port	5060
VF-CUBE SIP & Media IP Address VoV	62.140.159.231 ***
VF-CUBE SIP & Media IP Address CNoIP	62.140.159.232 ***
IP-PBX SIP Port	5060
IP-PBX SIP IP Address VoV	*192.168.204.10*
IP-PBX SIP IP Address CNoIP	*192.168.204.10*

Table 6 Trunk setting VF-CUBE

**** Because of multiple test environments the lab environment, the IP address used during the test can be different then used in real customer's setup.*
Default first SIP Trunk VoV in customers environment : 62.140.159.225
Default first SIP Trunk CNoIP in customers environment: 62.140.159.226

4.2 Special configuration Vodafone

In some cases the Vodafone default configuration settings has to be changed. These special configurations are described here:

- No special configuration needed

5 Configuration IP-PBX Innovaphone IP6000

This chapter describe and provides an overview of the SIP Trunk configuration in the IP-PBX Innovaphone IP6000 which was used during the test. There are two sip trunks defined in the Innovaphone IP6000 IP-PBX:

Vodafone Office Voice (VoV)
Corporate Net over IP (CNoIP)

The PBX is configured to route all mobile destination via the Corporate Net over IP SIP Trunk. This is also applicable for the short and long numbers of the Mobile VPN users.

The PBX is configured to route all other PSTN destination via the Vodafone Office Voice SIP Trunk.

5.1 IP-PBX Innovaphone IP6000 system configuration

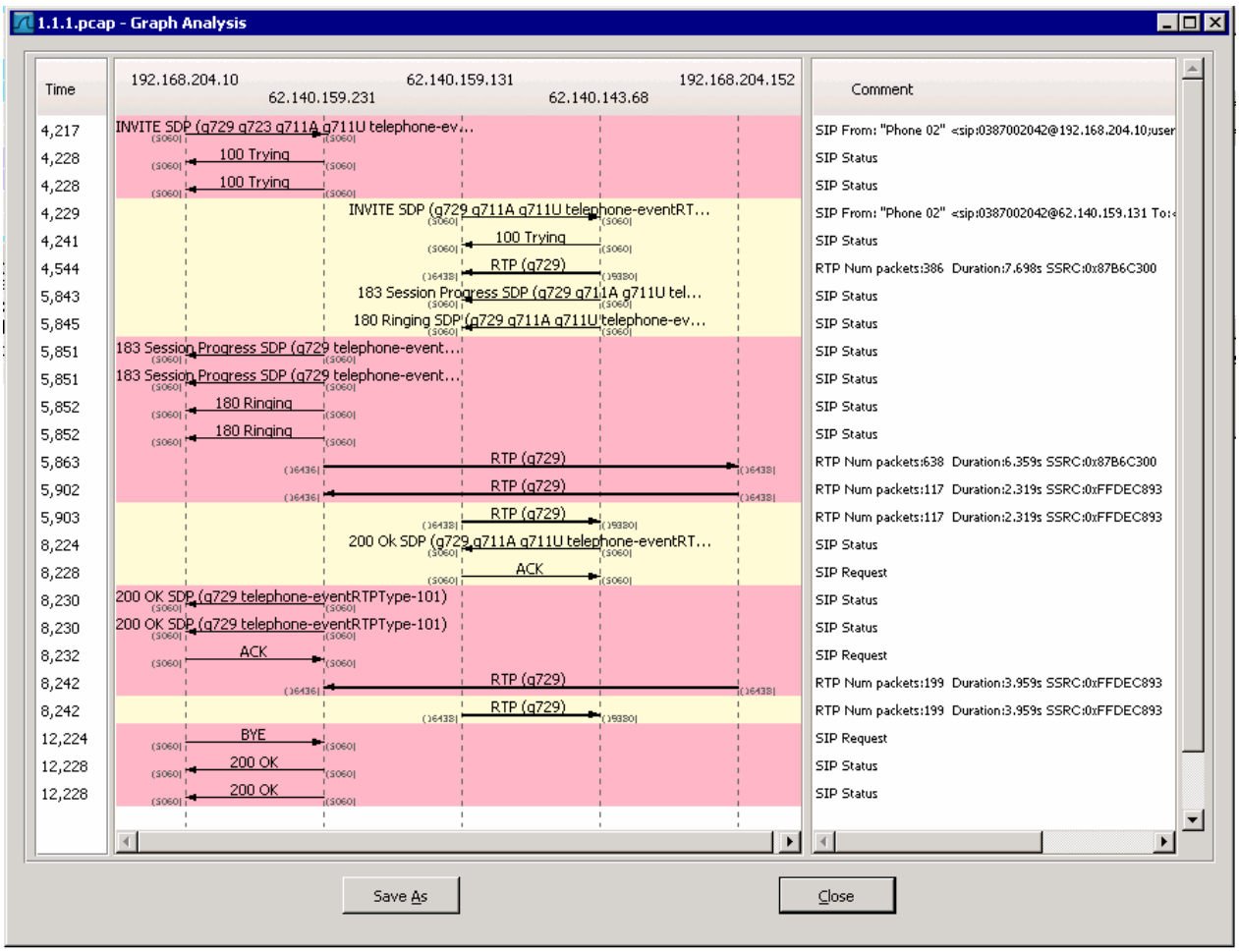
See attached document Innovaphone – Vodafone Configuration as a separate document.

6 SIP Call trace examples

During the compliance tests SIP traces were captured and saved for all the different call scenarios. A few examples of the basic call are shown here.

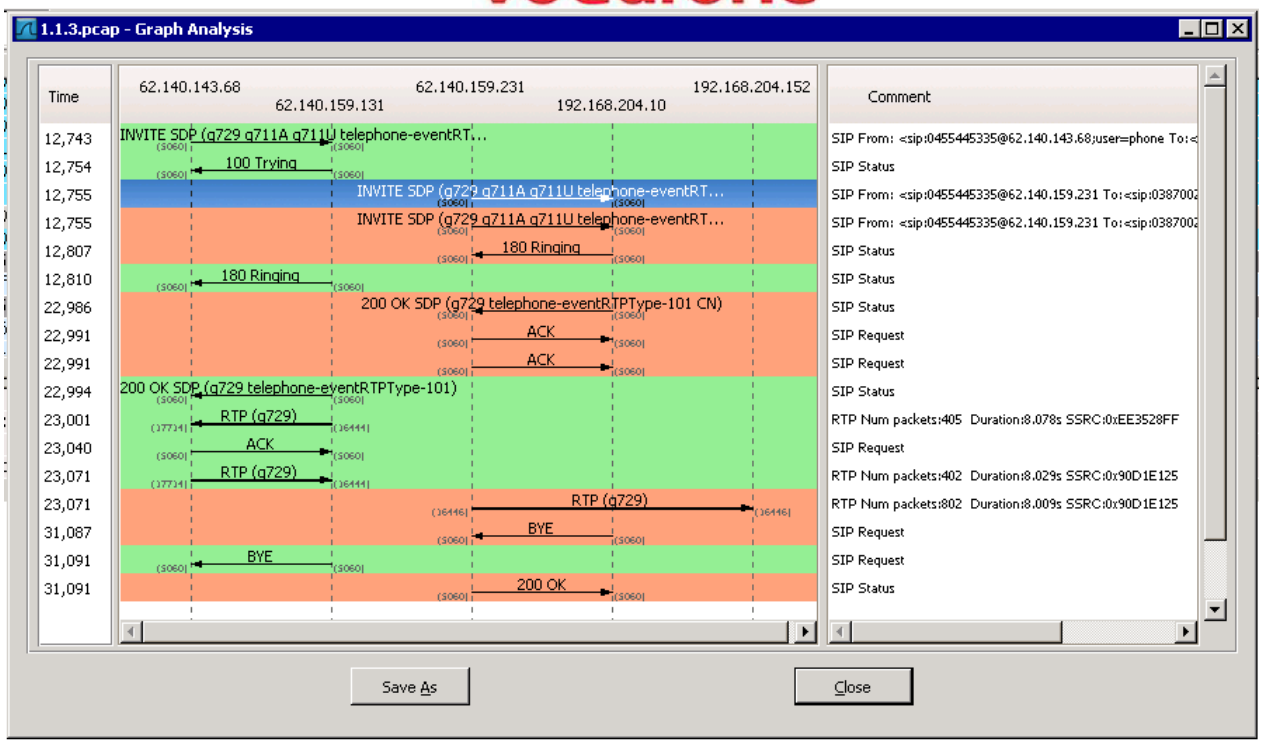
6.1 Office Voice IP-PBX originating

```
INVITE sip:0433551232@62.140.159.231;user=phone SIP/2.0
Via: SIP/2.0/UDP 192.168.204.10:5060;branch=z9hG4bK-C00DE66C;rport
From: "Phone 02" <sip:0387002042@192.168.204.10;user=phone>;tag=641306989
To: <sip:0433551232@62.140.159.231;user=phone>
Call-ID: 4c79485fe909d3118cfb0090330804be@0.0.0.0
CSeq: 301208 INVITE
Contact: <sip:0387002042@192.168.204.10:5060;user=phone;transport=UDP>
Alert-Info: <urn:alert:source:internal>
Allow: REGISTER,SUBSCRIBE,NOTIFY,INVITE,ACK,PRACK,OPTIONS,BYE,CANCEL,REFER,INFO,UPDATE,PUBLISH
Content-Length: 260
Content-Type: application/sdp
Max-Forwards: 59
Supported: 100rel,replaces,privacy,timer,from-change,histinfo,answermode
User-Agent: (innovaphone IP6000/9.00 hotfix22 [9.061240/9061240/302])
P-Preferred-Identity: "Phone 02" <sip:0387002042@192.168.204.10;user=phone>
P-Sig-Options: Overlap-Dialing

v=0
o=- 14 1 IN IP4 192.168.204.10
s=-
t=0 0
m=audio 16438 RTP/AVP 18 4 8 0 101 13
c=IN IP4 192.168.204.152
a=rtpmap:101 telephone-event/8000
a=fmtp:18 annexa=yes
a=fmtp:18 annexb=no
a=fmtp:101 0-15
a=ptime:60
a=silenceSupp:off - - - -
a=sendrecv
```


1.1.1.pcap - Graph Analysis
Time
192.168.204.10
62.140.159.231
62.140.159.131
62.140.143.68
192.168.204.152
Comment
4,217 INVITE SDP (g729 g723 g711A g711U telephone-ev... SIP From: "Phone 02" <sip:0387002042@192.168.204.10;user
4,228 100 Trying SIP Status
4,228 100 Trying SIP Status
4,229 INVITE SDP (g729 g711A g711U telephone-eventRT... SIP From: "Phone 02" <sip:0387002042@62.140.159.131 To:
4,241 100 Trying SIP Status
4,544 RTP (g729) RTP Num packets:386 Duration:7.698s SSRC:0x87B6C300
5,843 183 Session Progress SDP (g729 g711A g711U tel... SIP Status
5,845 180 Ringing SDP (g729 g711A g711U telephone-ev... SIP Status
5,851 183 Session Progress SDP (g729 telephone-event... SIP Status
5,851 183 Session Progress SDP (g729 telephone-event... SIP Status
5,852 180 Ringing SIP Status
5,852 180 Ringing SIP Status
5,863 RTP (g729) RTP Num packets:638 Duration:6.359s SSRC:0x87B6C300
5,902 RTP (g729) RTP Num packets:117 Duration:2.319s SSRC:0xFFDEC893
5,903 RTP (g729) RTP Num packets:117 Duration:2.319s SSRC:0xFFDEC893
8,224 200 Ok SDP (g729 g711A g711U telephone-eventRT... SIP Status
8,228 ACK SIP Request
8,230 200 OK SDP (g729 telephone-eventRTPType-101) SIP Status
8,230 200 OK SDP (g729 telephone-eventRTPType-101) SIP Status
8,232 ACK SIP Request
8,242 RTP (g729) RTP Num packets:199 Duration:3.959s SSRC:0xFFDEC893
8,242 RTP (g729) RTP Num packets:199 Duration:3.959s SSRC:0xFFDEC893
12,224 BYE SIP Request
12,228 200 OK SIP Status
12,228 200 OK SIP Status
Save As
Close

6.2 Office Voice IP-PBX terminating

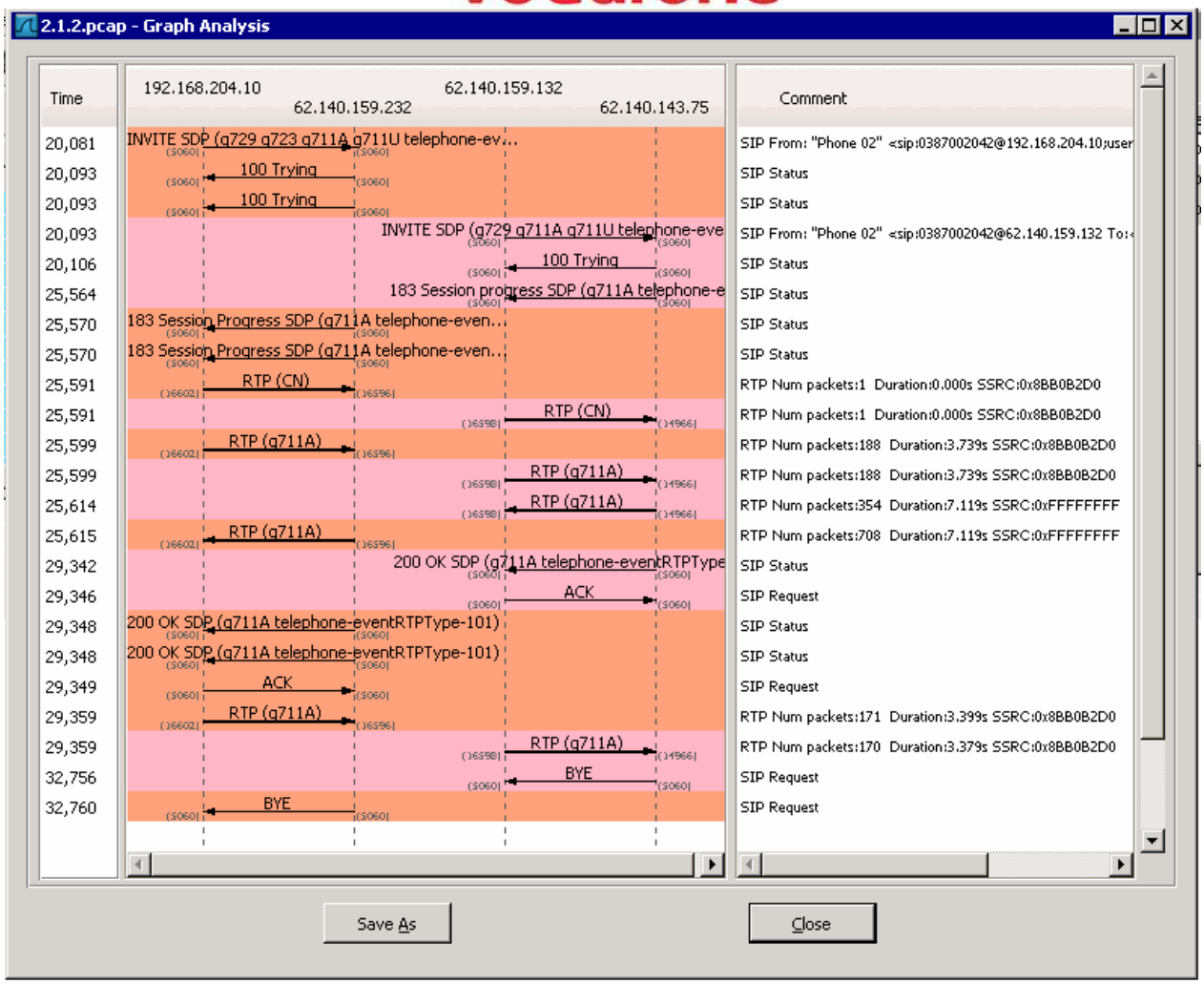
```
INVITE sip:0387002042@192.168.204.10:5060 SIP/2.0
Via: SIP/2.0/UDP 62.140.159.231:5060;branch=z9hG4bK18DFB2483
From: <sip:0455445335@62.140.159.231>;tag=1EC2383C-1654
To: <sip:0387002042@192.168.204.10>
Date: Thu, 04 Apr 2013 09:25:01 GMT
Call-ID: 5C1741A1-9C4011E2-B001BF93-8D1F3DA5@62.140.159.231
Supported: timer,resource-priority,replaces,sdp-anat
Min-SE:  1800
User-Agent: Vodafone-NL-SIP-Gateway-V1.0
Allow: INVITE, OPTIONS, BYE, CANCEL, ACK, PRACK, REGISTER
CSeq: 101 INVITE
Timestamp: 1365067501
Contact: <sip:0455445335@62.140.159.231:5060>
Expires: 180
Allow-Events: telephone-event
Max-Forwards: 67
P-Asserted-Identity: <sip:0455445335@62.140.159.231>
Session-Expires:  1800
Content-Type: application/sdp
Content-Disposition: session;handling=required
Content-Length: 312

v=0
o=CiscoSystemsSIP-GW-UserAgent 8647 8098 IN IP4 62.140.159.231
s=SIP Call
c=IN IP4 62.140.159.231
t=0 0
m=audio 16446 RTP/AVP 18 8 0 101
c=IN IP4 62.140.159.231
a=rtpmap:18 G729/8000
a=fmtp:18 annexb=no
a=rtpmap:8 PCMA/8000
a=rtpmap:0 PCMU/8000
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-15
```


1.1.3.pcap - Graph Analysis
Time
62.140.143.68
62.140.159.131
62.140.159.231
192.168.204.10
192.168.204.152
Comment
12,743 INVITE SDP (g729 g711A g711U telephone-eventRT... SIP From: <sip:0455445335@62.140.143.68;user=phone To:<
12,754 100 Trying SIP Status
12,755 INVITE SDP (g729 g711A g711U telephone-eventRT... SIP From: <sip:0455445335@62.140.159.231 To:<sip:0387002
12,755 INVITE SDP (g729 g711A g711U telephone-eventRT... SIP From: <sip:0455445335@62.140.159.231 To:<sip:0387002
12,807 180 Ringing SIP Status
12,810 180 Ringing SIP Status
22,986 200 OK SDP (g729 telephone-eventRTPType-101 CN) SIP Status
22,991 ACK SIP Request
22,991 ACK SIP Request
22,994 200 OK SDP (g729 telephone-eventRTPType-101) SIP Status
23,001 RTP (g729) RTP Num packets:405 Duration:8.078s SSRC:0xEE3528FF
23,040 ACK SIP Request
23,071 RTP (g729) RTP Num packets:402 Duration:8.029s SSRC:0x90D1E125
23,071 RTP (g729) RTP Num packets:802 Duration:8.009s SSRC:0x90D1E125
31,087 BYE SIP Request
31,091 BYE SIP Request
31,091 200 OK SIP Status
Save As
Close

6.3 Corporate Net over IP IP-PBX originating

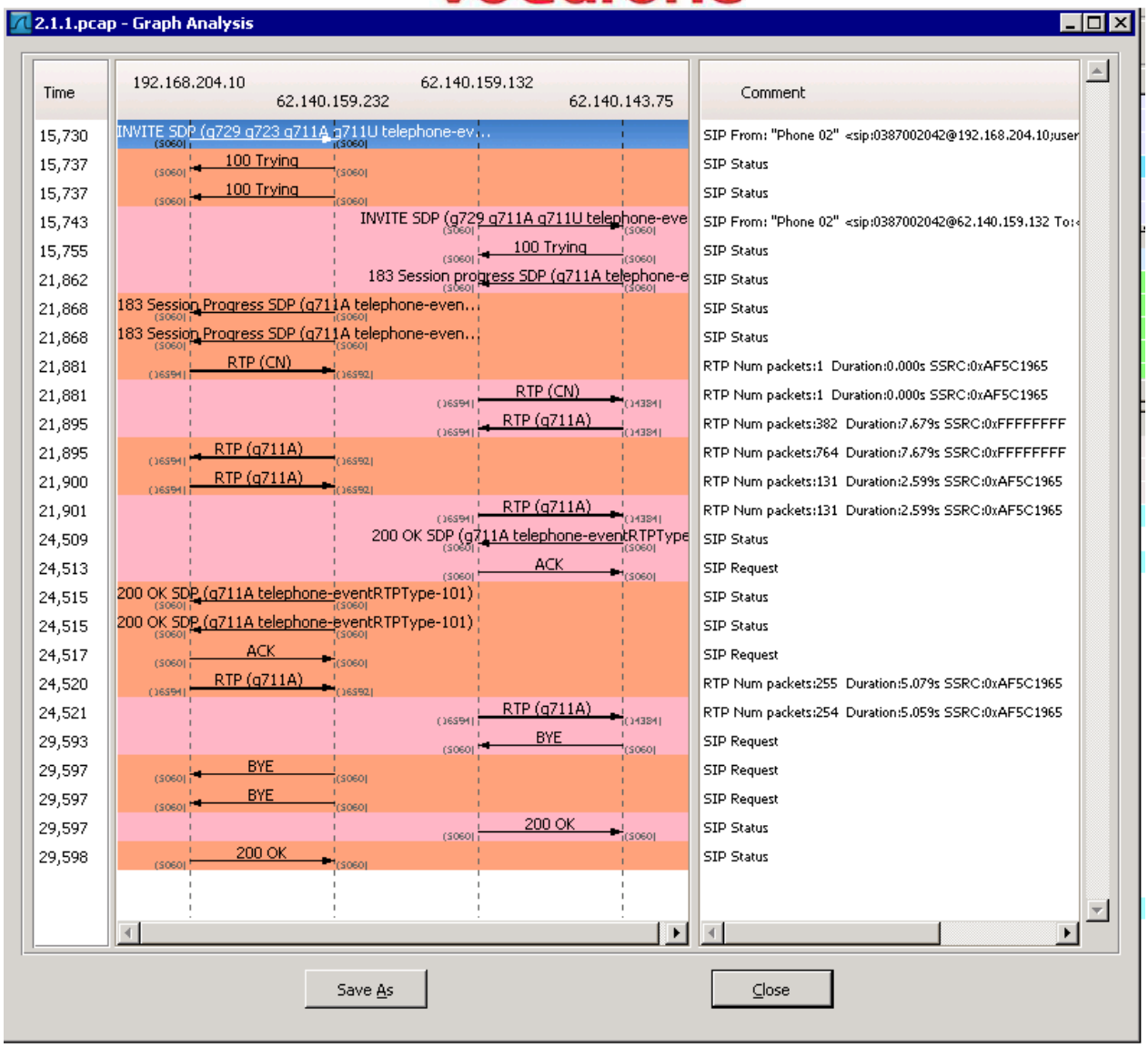
With Long CLI to MSISDN

```
INVITE sip:0611913038@62.140.159.232;user=phone SIP/2.0
Via: SIP/2.0/UDP 192.168.204.10:5060;branch=z9hG4bK-C00DE6D4;rport
From: "Phone 02" <sip:0387002042@192.168.204.10;user=phone>;tag=641307789
To: <sip:0611913038@62.140.159.232;user=phone>
Call-ID: d300ea00e909d3118cfb0090330804be@0.0.0.0
CSeq: 301208 INVITE
Contact: <sip:0387002042@192.168.204.10:5060;user=phone;transport=UDP>
Alert-Info: <urn:alert:source:internal>
Allow: REGISTER,SUBSCRIBE,NOTIFY,INVITE,ACK,PRACK,OPTIONS,BYE,CANCEL,REFER,INFO,UPDATE,PUBLISH
Content-Length: 259
Content-Type: application/sdp
Max-Forwards: 59
Supported: 100rel,replaces,privacy,timer,from-change,histinfo,answermode
User-Agent: (innovaphone IP6000/9.00 hotfix22 [9.061240/9061240/302])
P-Preferred-Identity: "Phone 02" <sip:0387002042@192.168.204.10;user=phone>
P-Sig-Options: Overlap-Dialing

v=0
o=- 54 1 IN IP4 192.168.204.10
s=-
t=0 0
m=audio 16602 RTP/AVP 18 4 8 0 101 13
c=IN IP4 192.168.204.10
a=rtpmap:101 telephone-event/8000
a=fmtp:18 annexa=yes
a=fmtp:18 annexb=no
a=fmtp:101 0-15
a=ptime:60
a=silenceSupp:off - - - -
a=sendrecv
```


2.1.2.pcap - Graph Analysis
Time
192.168.204.10
62.140.159.232
62.140.159.132
62.140.143.75
Comment
20,081 INVITE SDP (g729 g723 g711A g711U telephone-ev... SIP From: "Phone 02" <sip:0387002042@192.168.204.10;user
20,093 100 Trying SIP Status
20,093 100 Trying SIP Status
20,093 INVITE SDP (g729 g711A g711U telephone-eve SIP From: "Phone 02" <sip:0387002042@62.140.159.132 To:<
20,106 100 Trying SIP Status
25,564 183 Session progress SDP (g711A telephone-e SIP Status
25,570 183 Session Progress SDP (g711A telephone-even... SIP Status
25,570 183 Session Progress SDP (g711A telephone-even... SIP Status
25,591 RTP (CN) RTP Num packets:1 Duration:0.000s SSRC:0x8BB0B2D0
25,591 RTP (CN) RTP Num packets:1 Duration:0.000s SSRC:0x8BB0B2D0
25,599 RTP (g711A) RTP Num packets:188 Duration:3.739s SSRC:0x8BB0B2D0
25,599 RTP (g711A) RTP Num packets:188 Duration:3.739s SSRC:0x8BB0B2D0
25,614 RTP (g711A) RTP Num packets:354 Duration:7.119s SSRC:0xFFFFFFFF
25,615 RTP (g711A) RTP Num packets:708 Duration:7.119s SSRC:0xFFFFFFFF
29,342 200 OK SDP (g711A telephone-eventRTPType SIP Status
29,346 ACK SIP Request
29,348 200 OK SDP (g711A telephone-eventRTPType-101) SIP Status
29,348 200 OK SDP (g711A telephone-eventRTPType-101) SIP Status
29,349 ACK SIP Request
29,359 RTP (g711A) RTP Num packets:171 Duration:3.399s SSRC:0x8BB0B2D0
29,359 RTP (g711A) RTP Num packets:170 Duration:3.379s SSRC:0x8BB0B2D0
32,756 BYE SIP Request
32,760 BYE SIP Request
Save As
Close

With Short CLI to MSISDN

```
INVITE sip:7001@62.140.159.232;user=phone SIP/2.0
Via: SIP/2.0/UDP 192.168.204.10:5060;branch=z9hG4bK-C00DE6D2;rport
From: "Phone 02" <sip:0387002042@192.168.204.10;user=phone>;tag=641307776
To: <sip:7001@62.140.159.232;user=phone>
Call-ID: 10d5bef4e909d3118cfb0090330804be@0.0.0.0
CSeq: 301208 INVITE
Contact: <sip:0387002042@192.168.204.10:5060;user=phone;transport=UDP>
Alert-Info: <urn:alert:source:internal>
Allow: REGISTER,SUBSCRIBE,NOTIFY,INVITE,ACK,PRACK,OPTIONS,BYE,CANCEL,REFER,INFO,UPDATE,PUBLISH
Content-Length: 259
Content-Type: application/sdp
Max-Forwards: 59
Supported: 100rel,replaces,privacy,timer,from-change,histinfo,answermode
User-Agent: (innovaphone IP6000/9.00 hotfix22 [9.061240/9061240/302])
P-Preferred-Identity: "Phone 02" <sip:0387002042@192.168.204.10;user=phone>
P-Sig-Options: Overlap-Dialing

v=0
o=- 53 1 IN IP4 192.168.204.10
s=-
t=0 0
m=audio 16594 RTP/AVP 18 4 8 0 101 13
c=IN IP4 192.168.204.10
a=rtpmap:101 telephone-event/8000
a=fmtp:18 annexa=yes
a=fmtp:18 annexb=no
a=fmtp:101 0-15
a=ptime:60
a=silenceSupp:off - - - -
a=sendrecv
```


2.1.1.pcap - Graph Analysis
Time
192.168.204.10
62.140.159.232
62.140.159.132
62.140.143.75
Comment
15,730 INVITE SDP (g729 g723 g711A g711U telephone-ev... SIP From: "Phone 02" <sip:0387002042@192.168.204.10;user
15,737 100 Trying SIP Status
15,737 100 Trying SIP Status
15,743 INVITE SDP (g729 g711A g711U telephone-eve SIP From: "Phone 02" <sip:0387002042@62.140.159.132 To:
15,755 100 Trying SIP Status
21,862 183 Session progress SDP (g711A telephone-e SIP Status
21,868 183 Session Progress SDP (g711A telephone-even... SIP Status
21,868 183 Session Progress SDP (g711A telephone-even... SIP Status
21,881 RTP (CN) RTP Num packets:1 Duration:0.000s SSRC:0xAF5C1965
21,881 RTP (CN) RTP Num packets:1 Duration:0.000s SSRC:0xAF5C1965
21,895 RTP (g711A) RTP Num packets:382 Duration:7.679s SSRC:0xFFFFFFFF
21,895 RTP (g711A) RTP Num packets:764 Duration:7.679s SSRC:0xFFFFFFFF
21,900 RTP (g711A) RTP Num packets:131 Duration:2.599s SSRC:0xAF5C1965
21,901 RTP (g711A) RTP Num packets:131 Duration:2.599s SSRC:0xAF5C1965
24,509 200 OK SDP (g711A telephone-eventRTPType SIP Status
24,513 ACK SIP Request
24,515 200 OK SDP (g711A telephone-eventRTPType-101) SIP Status
24,515 200 OK SDP (g711A telephone-eventRTPType-101) SIP Status
24,517 ACK SIP Request
24,520 RTP (g711A) RTP Num packets:255 Duration:5.079s SSRC:0xAF5C1965
24,521 RTP (g711A) RTP Num packets:254 Duration:5.059s SSRC:0xAF5C1965
29,593 BYE SIP Request
29,597 BYE SIP Request
29,597 BYE SIP Request
29,597 200 OK SIP Status
29,598 200 OK SIP Status
Save As
Close

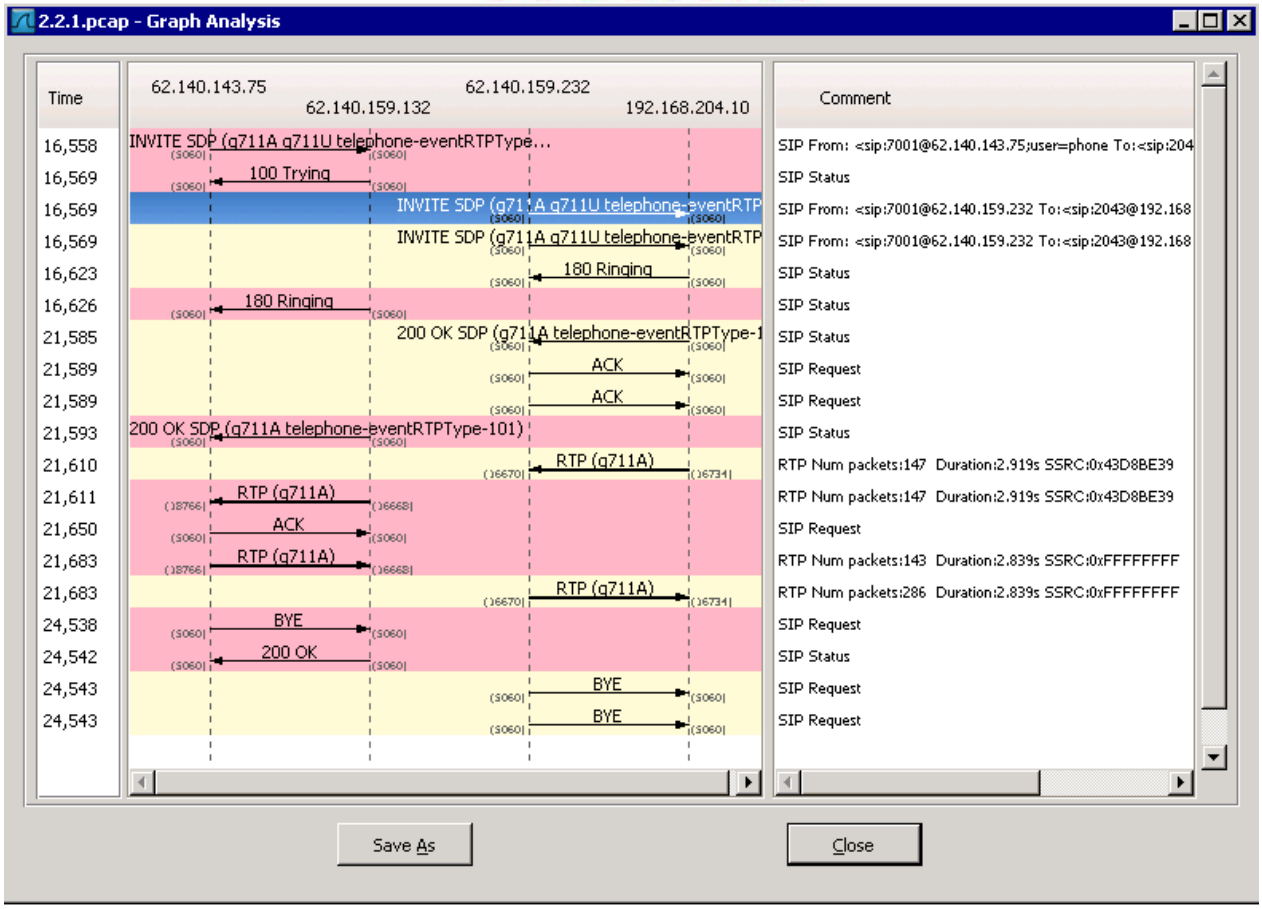
6.4 Corporate Net over IP IP-PBX terminating

With long CLI to DDI

```
INVITE sip:0387002043@192.168.204.10:5060 SIP/2.0
Via: SIP/2.0/UDP 62.140.159.232:5060;branch=z9hG4bK195C529F
From: <sip:0611913038@62.140.159.232>;tag=1F918234-390
To: <sip:0387002043@192.168.204.10>
Date: Thu, 04 Apr 2013 13:11:26 GMT
Call-ID: FD508505-9C5F11E2-B994BF93-8D1F3DA5@62.140.159.232
Supported: timer,resource-priority,replaces,sdp-anat
Min-SE:  1800
User-Agent: Vodafone-NL-SIP-Gateway-V1.0
Allow: INVITE, OPTIONS, BYE, CANCEL, ACK, PRACK, REGISTER
CSeq: 101 INVITE
Timestamp: 1365081086
Contact: <sip:0611913038@62.140.159.232:5060>
Expires: 180
Allow-Events: telephone-event
Max-Forwards: 68
P-Asserted-Identity: <sip:0611913038@62.140.159.232>
Content-Type: application/sdp
Content-Disposition: session;handling=required
Content-Length: 265

v=0
o=CiscoSystemsSIP-GW-UserAgent 2530 6993 IN IP4 62.140.159.232
s=SIP Call
c=IN IP4 62.140.159.232
t=0 0
m=audio 16686 RTP/AVP 8 0 101
c=IN IP4 62.140.159.232
a=rtpmap:8 PCMA/8000
a=rtpmap:0 PCMU/8000
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-15
```

With short CLI to shot number IP-PBX

```
INVITE sip:2043@192.168.204.10:5060 SIP/2.0
Via: SIP/2.0/UDP 62.140.159.232:5060;branch=z9hG4bK195991421
From: <sip:7001@62.140.159.232>;tag=1F8D49C0-1F26
To: <sip:2043@192.168.204.10>
Date: Thu, 04 Apr 2013 13:06:49 GMT
Call-ID: 5872B511-9C5F11E2-B951BF93-8D1F3DA5@62.140.159.232
Supported: timer,resource-priority,replaces,sdp-anat
Min-SE:  1800
User-Agent: Vodafone-NL-SIP-Gateway-V1.0
Allow: INVITE, OPTIONS, BYE, CANCEL, ACK, PRACK, REGISTER
CSeq: 101 INVITE
Timestamp: 1365080809
Contact: <sip:7001@62.140.159.232:5060>
Expires: 180
Allow-Events: telephone-event
Max-Forwards: 68
P-Asserted-Identity: <sip:7001@62.140.159.232>
Content-Type: application/sdp
Content-Disposition: session;handling=required
Content-Length: 265

v=0
o=CiscoSystemsSIP-GW-UserAgent 4056 3866 IN IP4 62.140.159.232
s=SIP Call
c=IN IP4 62.140.159.232
t=0 0
m=audio 16670 RTP/AVP 8 0 101
c=IN IP4 62.140.159.232
a=rtpmap:8 PCMA/8000
a=rtpmap:0 PCMU/8000
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-15
```


2.2.1.pcap - Graph Analysis
Time
62.140.143.75
62.140.159.132
62.140.159.232
192.168.204.10
Comment
16,558 INVITE SDP (g711A g711U telephone-eventRTPType... SIP From: <sip:7001@62.140.143.75;user=phone To:<sip:204
16,569 100 Trying SIP Status
16,569 INVITE SDP (g711A g711U telephone-eventRTP SIP From: <sip:7001@62.140.159.232 To:<sip:2043@192.168
16,569 INVITE SDP (g711A g711U telephone-eventRTP SIP From: <sip:7001@62.140.159.232 To:<sip:2043@192.168
16,623 180 Ringing SIP Status
16,626 180 Ringing SIP Status
21,585 200 OK SDP (g711A telephone-eventRTPType-1 SIP Status
21,589 ACK SIP Request
21,589 ACK SIP Request
21,593 200 OK SDP (g711A telephone-eventRTPType-101) SIP Status
21,610 RTP (g711A) RTP Num packets:147 Duration:2.919s SSRC:0x43D8BE39
21,611 RTP (g711A) RTP Num packets:147 Duration:2.919s SSRC:0x43D8BE39
21,650 ACK SIP Request
21,683 RTP (g711A) RTP Num packets:143 Duration:2.839s SSRC:0xFFFFFFFF
21,683 RTP (g711A) RTP Num packets:286 Duration:2.839s SSRC:0xFFFFFFFF
24,538 BYE SIP Request
24,542 200 OK SIP Status
24,543 BYE SIP Request
24,543 BYE SIP Request
Save As
Close

innovaphone - Vodafone Configuratie

E. Lievens & K. Delporte

In opdracht van

Com8 NV

V1.0 |April 2013

Algemene Informatie

In deze case staat stapsgewijs beschreven hoe we Vodafone SIP kunnen configureren op een innovaphone PBX/Gateway.
Er is gebruik gemaakt van een innovaphone IP6000 (Gateway/PBX), een IP24 (analoge adaptor) en enkele IP240-toestellen (alle firmware V9 Hoftix 22).

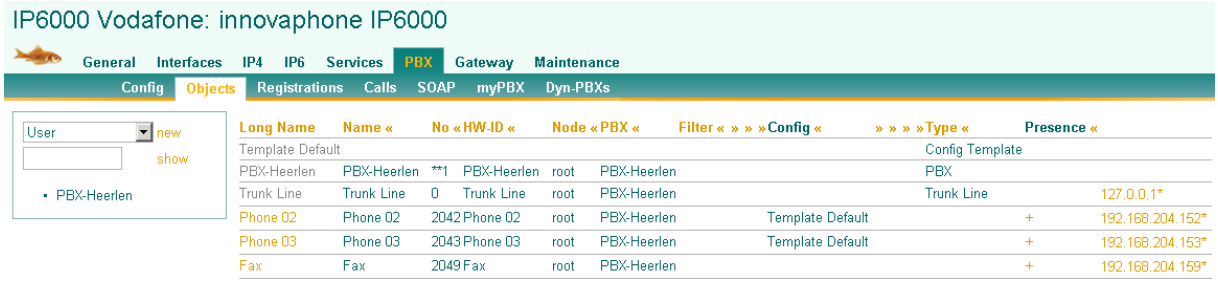
Aanvullende Informatie

http://wiki.innovaphone.com/index.php?title=Reference7:Administration/Relay/Interfaces/SIP

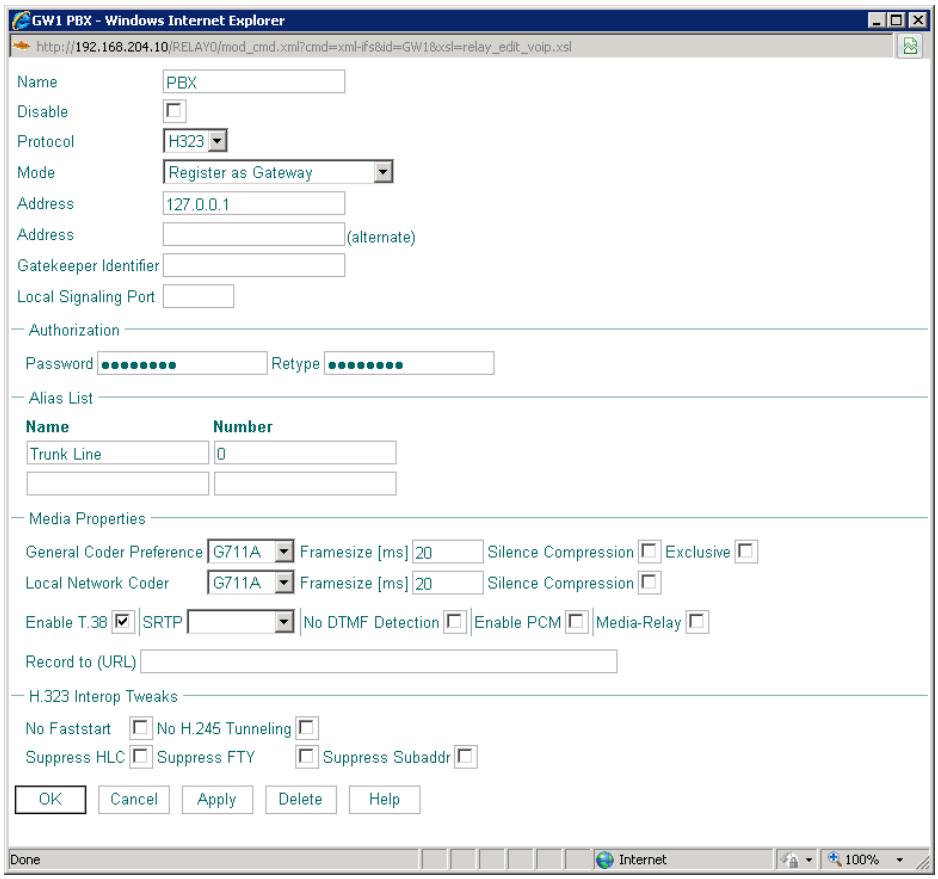
INHOUD

1. Inleiding

Voor dit document vertrekken we van een eenvoudige basisconfiguratie van een innovaphone gateway/PBX, waarbij er twee gebruikers geconfigureerd en aangemeld zijn:



Tevens is er al een koppeling tussen de gateway en de PBX via het 'Trunk Line'-object. Deze koppeling is geconfigureerd onder 'Gateway -> GK -> GW1 'PBX':



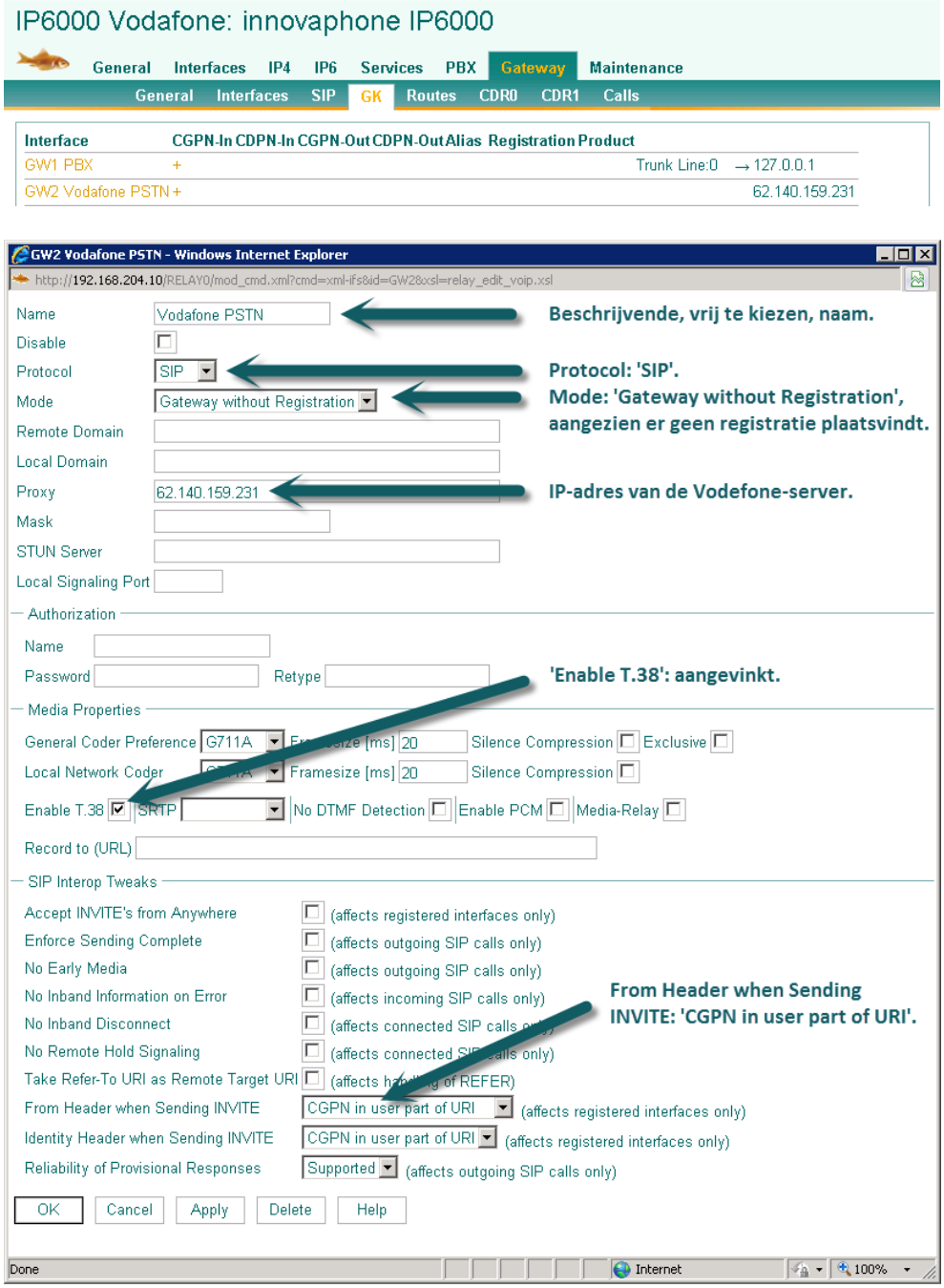
Deze configuratie zal ervoor zorgen dat de uitgaande gesprekken die beginnen met een 0 naar GW1 'PBX' gestuurd worden. Tevens kan deze GW1 'PBX' gebruikt worden om gesprekken vanaf het Vodafone-platform de PBX binnen te leiden.

2. Vodafone-servers

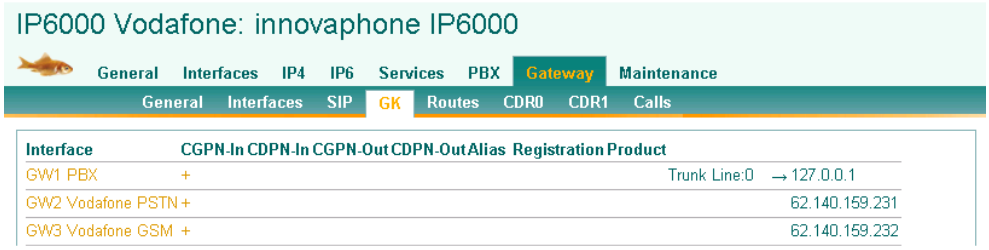
In eerste instantie zullen we de SIP-koppeling instellen op de centrale met behulp van de verkregen instellingen. Na deze paragraaf zal de innovaphone gateway/PBX gekoppeld zijn met het Vodafone-platform.

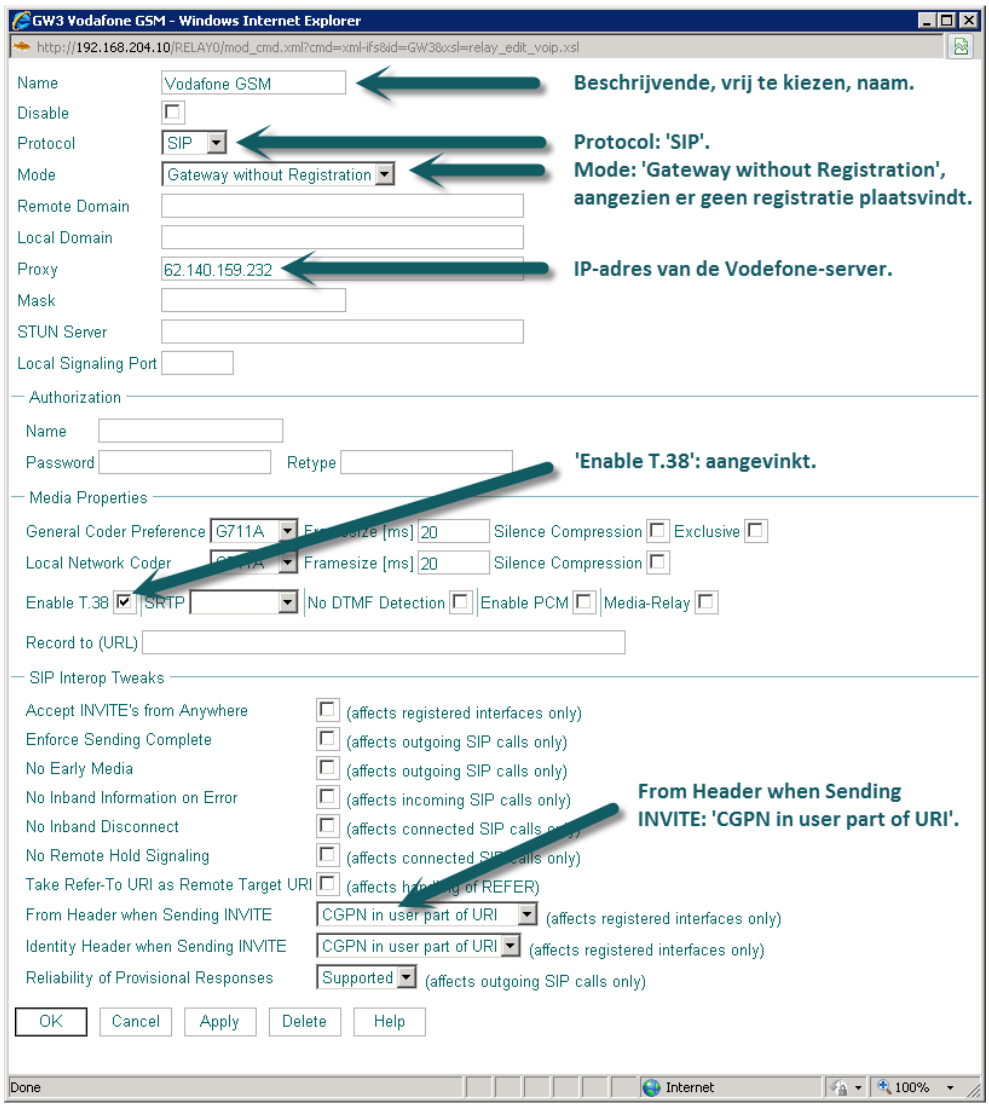
Vodafone heeft twee server waarnaar en waarvan gesprekken kunnen gevoerd worden. Eentje voor gesprekken met het vaste net, terwijl de tweede moet gebruikt worden voor gesprekken met het mobiele net. Om deze twee koppelingen met deze Vodafone-servers te configureren, klikken we in de webinterface van de gateway/PBX door op 'Gateway -> GK'. Daar kunnen we de koppeling naar de eerste Vodafone-server instellen.

2.1. Vodafone-server voor vaste gesprekken



2.1. Vodafone-server voor mobiele gesprekken





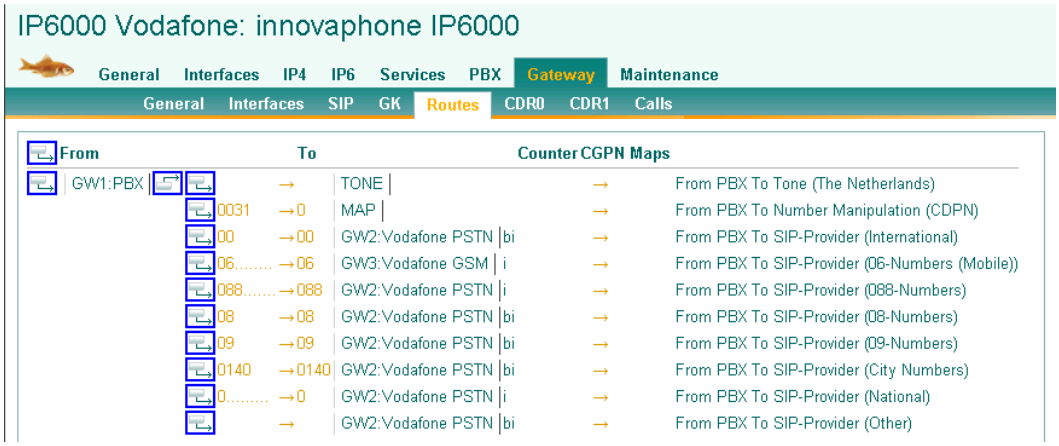
Momenteel heeft onze gateway een koppeling naar de centrale (‘Gateway -> GK -> GW1’: ‘PBX’) en twee koppelingen naar het Vodafone-platform (‘Gateway -> GK -> GW2’: ‘Vodafone PSTN’ en ‘Gateway -> GK -> GW3’: ‘Vodafone GSM’). Indien we beide kunnen koppelen met elkaar, dan kan er gebeld worden.

3. Uitgaande gesprekken

In voorgaande hebben we zowel een koppeling naar de PBX (GW1 'PBX') als naar het platform van Vodafone ingesteld. Indien we beide met elkaar kunnen combineren, dan kan er gebeld worden. Beide combineren kan door het aanmaken van passende routes.

3.1 Uitgaande routes configureren

Een eerste route die we zullen instellen is deze om naar buiten te kunnen bellen. We zullen dus alles wat komt vanaf GW1 'PBX' sturen het platform van Vodafone. Hiervoor klikken we in de webinterface van de innovaphone door op 'Gateway -> Routes' en maken onderstaande routes aan:

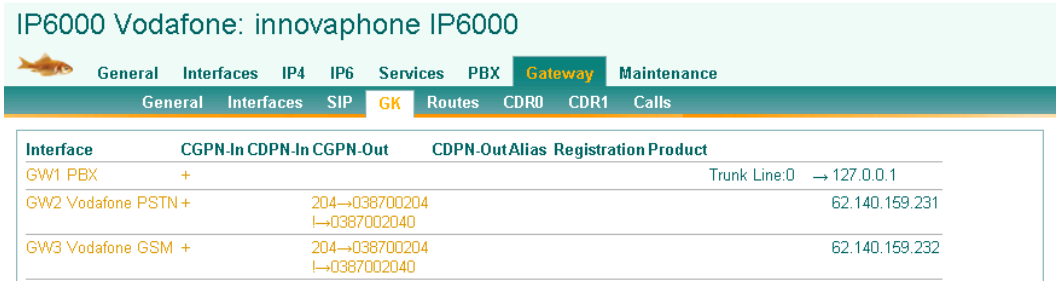


Let wel: de volgorde van deze routes is wel degelijk belangrijk. Indien de lengte van het gevormd nummer niet gekend is (Internationale nummers (00), 08-nummers (behalve 088-nummers), 09-nummers en 0140-nummers), dan moet 'Force Enblock' aangevinkt zijn.

Bemerk ook dat alle gesprekken naar buiten gaan via GW2 'Vodafone PSTN', behalve de mobiele nummers, welke naar buiten gaan via GW3 'Vodafone GSM'.

3.2 Juiste nummer uitsturen

Om ervoor te zorgen dat elke telefoon het juiste nummer naar buiten stuurt, moeten we de nodige nummermanipulaties instellen op de Gateways richting Vodafone. In onderstaande zorgen we ervoor dat elke extensie zijn eigen rechtstreeks nummer naar buiten stuurt (indien deze extensie begint met 204). Anders wordt het hoofdnummer naar buiten gestuurd:



4. Inkomende gesprekken

Momenteel kan er enkel uitgebeld worden via het Vodafone-platform. Inbellen is natuurlijk ook wenselijk en wordt besproken in onderstaande paragrafen.

4.1 Nummertransformatie van de inkomende gesprekken

Aangezien Vodafone de nummers stuurt in het formaat dat in de handleiding aanbevolen wordt:

- 00xxx voor internationale nummers
- 0xxx voor nationale nummers
- xxx voor verkorte nummers

moeten we geen nummertransformaties voorzien op de koppelingen (GW2 en GW3) naar het Vodafone-platform.

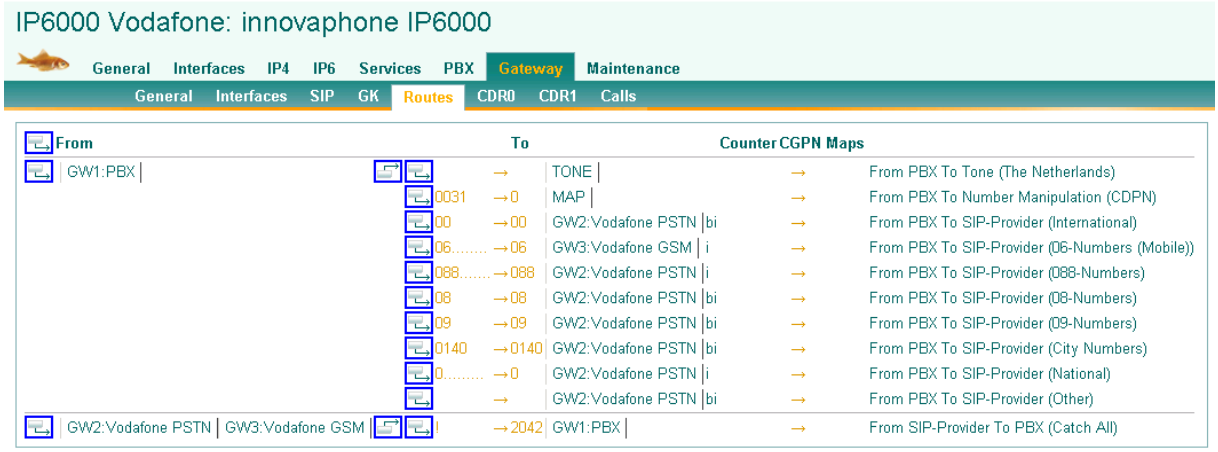
4.2 Inkomende route configureren

Nu dat inkomende nummers correct omgezet zijn, kunnen we deze nummer gebruiken om deze naar de betreffende gebruikers te sturen. We voegen hiervoor een extra route toe.

4.2.1 'Catch All'-Route

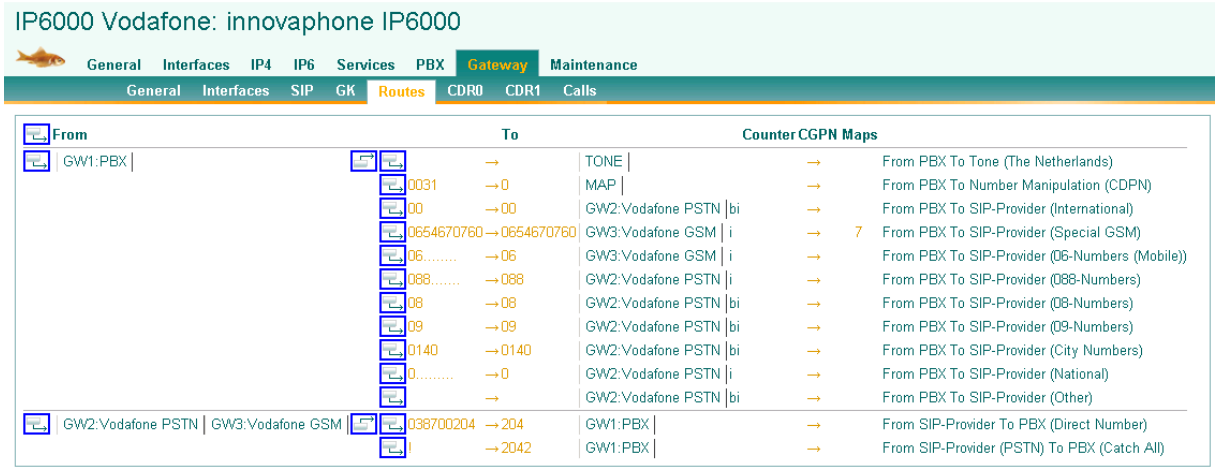
Als eerste route zullen we een 'Catch All'-Route instellen, zodanig dat 'alles' naar een interne extensie gestuurd wordt. Deze interne extensie is normaal een secretaresse, een groep of een groep van secretaressen.

Om alles op te vangen kunnen we het uitroepteken ('!') gebruiken. Dit zal het volledig nummer wegnemen:



4.2.2. Specifieke routes

In voorgaande leiden we 'alles' af naar een interne extensie, maar normaal gezien zullen verschillende nummers naar verschillende extensie gerouteerd dienen te worden. Dit kunnen we configureren door, boven de 'Catch All'-Route specifieke routes toe te voegen. Aangezien de externe nummers en interne nummers overeenkomste bevatten, kunnen we de volledige 10-reeks opvangen in één enkele map:



In bovenstaande worden alle buitennummers die beginnen met 038700204 vervangen door 204, wat resulteert in een map die 10 verschillende nummers opvangt (zo wordt 0387002045 omgezet in 2045). Bemerk dat indien het interne nummer niet zou gekend zijn in de centrale, de route verder doorlopen wordt en uiteindelijk de 'Catch All'-route genomen wordt.

5. Verkorte Nummers

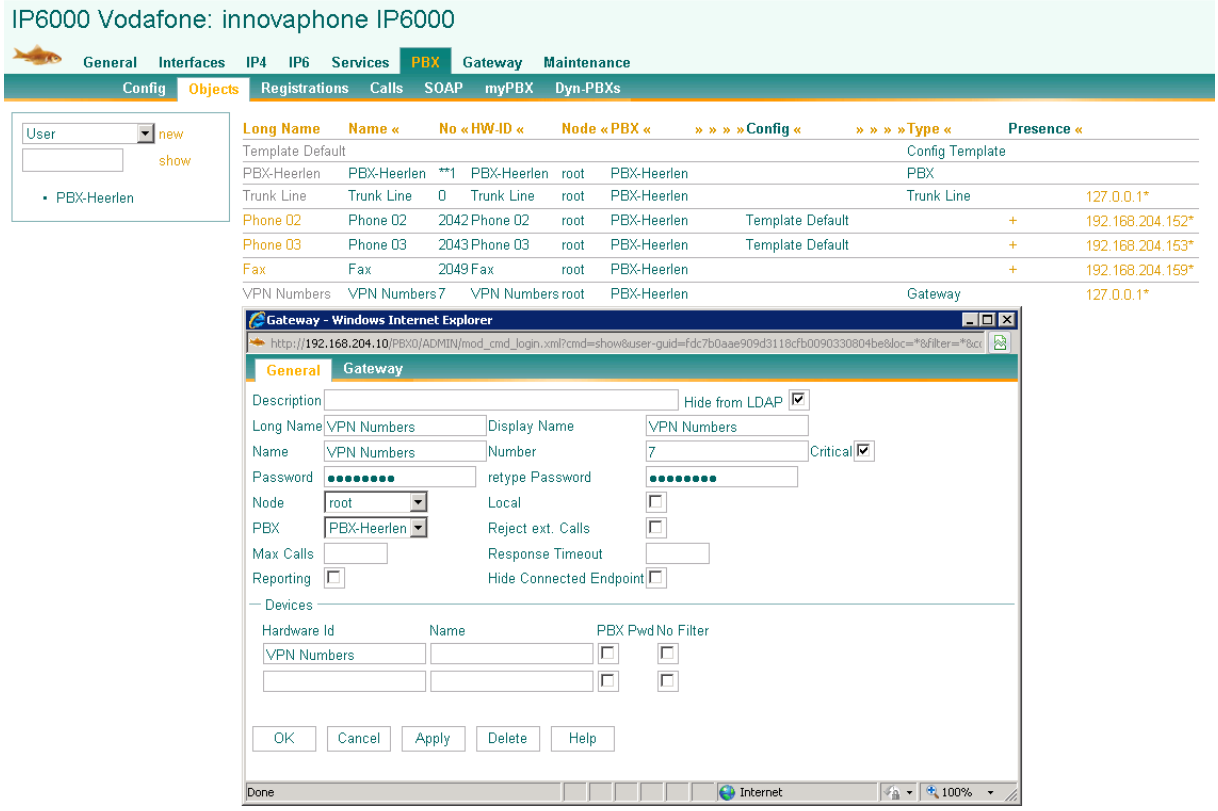
Vodafone voorziet ook in de mogelijkheid om interne nummers te bellen via de geselecteerde mobiele telefoons. Ook vanuit de centrale willen we rechtstreeks mobiele toestellen aanroepen en om duidelijk het onderscheid te kunnen maken zullen we deze oproepen voorzien van een prefix (7 in onderstaande).

5.1. Koppeling voor de verkorte nummers

Omdat we gemakkelijk verkorte nummer zouden kunnen vormen vanuit de centrale en ook om zo'n gesprekken vanaf een mobiele telefoon de centrale binnen te loodsen, zullen we een extra koppeling maken tussen de PBX en de gateway.

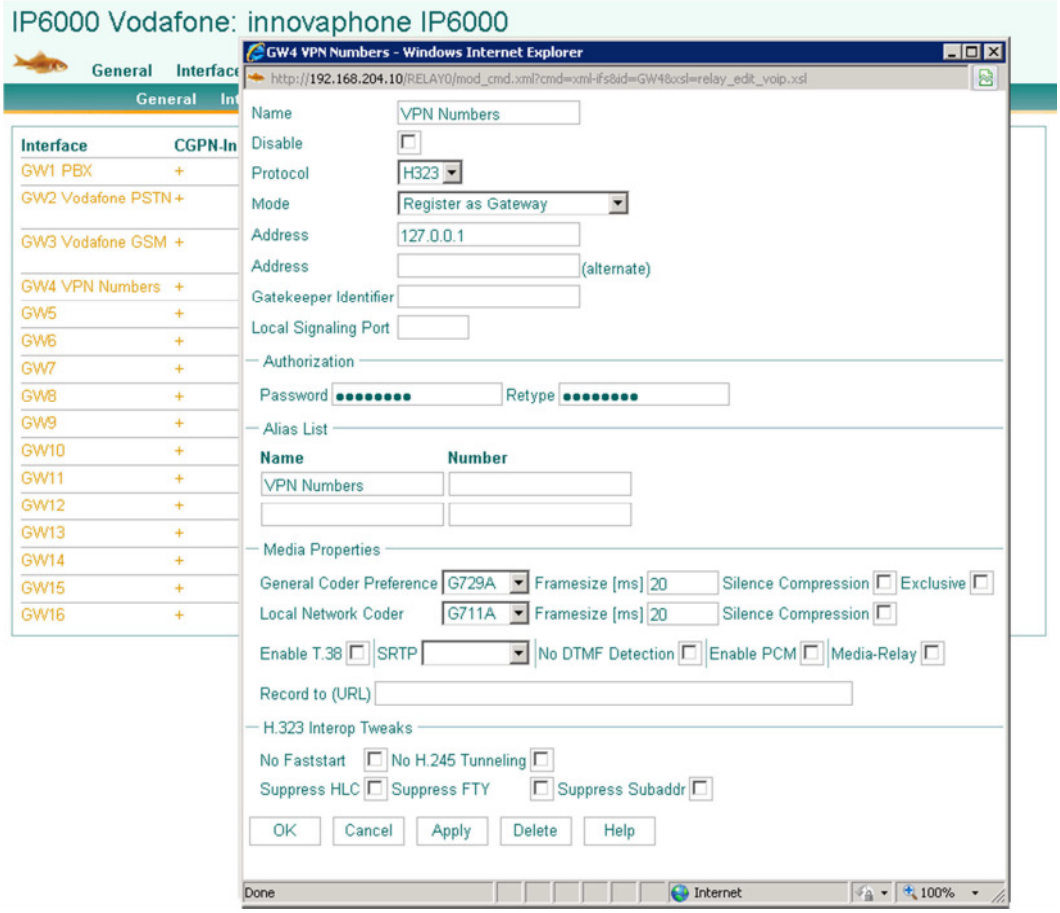
5.1.1. Gateway-object maken in de PBX

Als eerste stap moeten we een Gateway-object aanmaken in de centrale om deze koppeling tot stand te kunnen brengen.


IP6000 Vodafone: innovaphone IP6000
General Interfaces IP4 IP6 Services PBX Gateway Maintenance
Config Objects Registrations Calls SOAP myPBX Dyn-PBXs
User new
show
PBX-Heerlen
Long Name Name « No « HW-ID « Node « PBX « » » » » Config « » » » » Type « Presence «
Template Default Config Template
PBX-Heerlen PBX-Heerlen **1 PBX-Heerlen root PBX-Heerlen PBX
Trunk Line Trunk Line 0 Trunk Line root PBX-Heerlen Trunk Line 127.0.0.1*
Phone 02 Phone 02 2042 Phone 02 root PBX-Heerlen Template Default + 192.168.204.152*
Phone 03 Phone 03 2043 Phone 03 root PBX-Heerlen Template Default + 192.168.204.153*
Fax Fax 2049 Fax root PBX-Heerlen + 192.168.204.159*
VPN Numbers VPN Numbers 7 VPN Numbers root PBX-Heerlen Gateway 127.0.0.1*
Gateway - Windows Internet Explorer
http://192.168.204.10/PBX0/ADMIN/mod_cmd_login.xml?cmd=show&user-guid=fdc7b0aae909d3118cfb0090330804be&loc=*&filter=*&c
General Gateway
Description Hide from LDAP
Long Name VPN Numbers Display Name VPN Numbers
Name VPN Numbers Number 7 Critical
Password retype Password
Node root Local
PBX PBX-Heerlen Reject ext. Calls
Max Calls Response Timeout
Reporting Hide Connected Endpoint
Devices
Hardware Id Name PBX Pwd No Filter
VPN Numbers
OK Cancel Apply Delete Help
Done Internet 100%

5.1.2. Gateway registreren

Om de koppeling te vervolledigen zullen we onder ‘Gateway -> GK’ een vrije GW registreren op dit object.



5.2. Routes en Nummertransformaties

Om vanaf de PBX of vanaf een Mobiele telefoon te kunnen bellen en opdat de nummers mooi zouden weergegeven worden, moeten de nodige routes en nummertransformaties geconfigureerd worden.

5.2.1. Uitbellen vanaf de PBX

Als eerste stap zullen we ervoor zorgen dat we een mobiele telefoon kunnen aanroepen vanaf een geregistreerd toestel in de PBX. We hebben hiervoor een prefix voorzien (7) en van zodra deze prefix gevormd wordt, komen we uit in GW4 ‘VPN Numbers’. Van hieruit voorzien we een nieuwe route naar de Vodafone (meer bepaald de koppeling voor GSM-nummers):

IP6000 Vodafone: innovaphone IP6000

General | Interfaces | IP4 | IP6 | Services | PBX | Gateway | Maintenance

General | Interfaces | SIP | GK | Routes | CDR0 | CDR1 | Calls

From		To			Counter	CGPN Maps
GW1:PBX		→	TONE	→		From PBX To Tone (The Netherlands)
	0031	→0	MAP	→		From PBX To Number Manipulation (CDPN)
	00	→00	GW2:Vodafone PSTN bi	→		From PBX To SIP-Provider (International)
	0654670760	→0654670760	GW3:Vodafone GSM i	→	7	From PBX To SIP-Provider (Special GSM)
	06.....	→06	GW3:Vodafone GSM i	→		From PBX To SIP-Provider (06-Numbers (Mobile))
	088.....	→088	GW2:Vodafone PSTN i	→		From PBX To SIP-Provider (088-Numbers)
	08	→08	GW2:Vodafone PSTN bi	→		From PBX To SIP-Provider (08-Numbers)
	09	→09	GW2:Vodafone PSTN bi	→		From PBX To SIP-Provider (09-Numbers)
	0140	→0140	GW2:Vodafone PSTN bi	→		From PBX To SIP-Provider (City Numbers)
	0.....	→0	GW2:Vodafone PSTN i	→		From PBX To SIP-Provider (National)
		→	GW2:Vodafone PSTN bi	→		From PBX To SIP-Provider (Other)
GW2:Vodafone PSTN | GW3:Vodafone GSM	038700204	→204	GW1:PBX	→		From SIP-Provider To PBX (Direct Number)
	!	→2042	GW1:PBX	→		From SIP-Provider (PSTN) To PBX (Catch All)
GW4:VPN Numbers	7...	→7	GW3:Vodafone GSM i	→	7	From PBX To SIP-Provider (VPN-Numbers)

Bemerk dat we ook de bellende partij aanpassen (zie 'CGPN Maps'): we voegen er een 7 vooraan aan toe. Dit zal ons toelaten om een onderscheid te kunnen maken hoe we ons eigen nummer zullen doorgeven aan Vodafone.

Vervolgens passen we de nummertransformaties op GW3 'Vodafone GSM' lichtelijk aan zodanig dat we ook verkorte nummers kunnen meesturen:

IP6000 Vodafone: innovaphone IP6000

General | Interfaces | IP4 | IP6 | Services | PBX | Gateway | Maintenance

General | Interfaces | SIP | GK | Routes | CDR0 | CDR1 | Calls

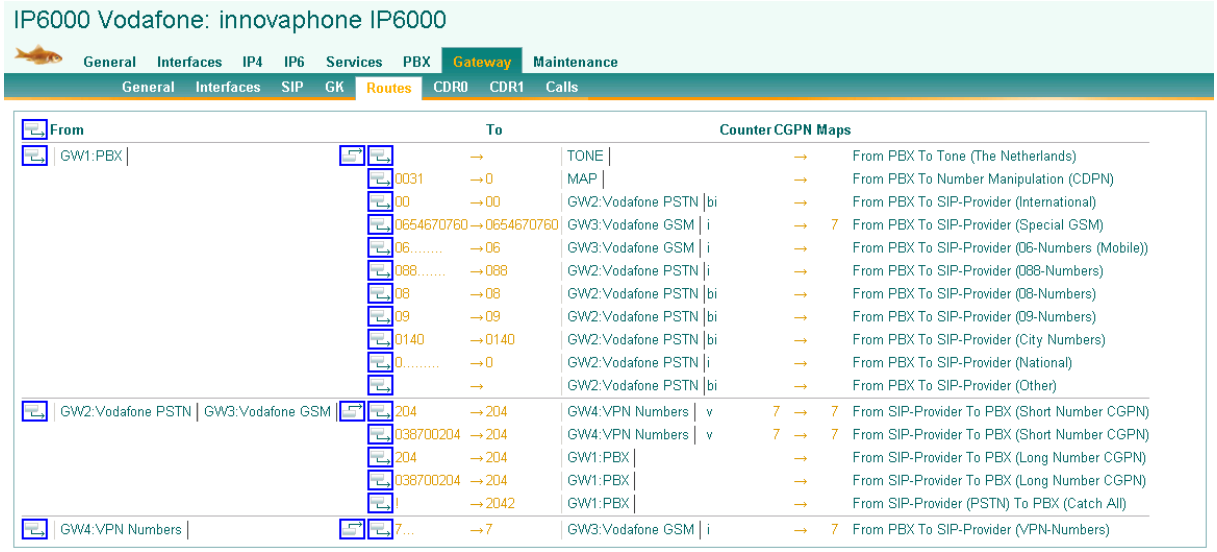
Interface	CGPN-In	CDPN-In	CGPN-Out	CDPN-Out	Alias	Registration	Product
GW1 PBX	+						Trunk Line:0 → 127.0.0.1
GW2 Vodafone PSTN	+		204→038700204 !→0387002040				62.140.159.231
GW3 Vodafone GSM	+		7204→204 204→038700204 !→0387002040				62.140.159.232
GW4 VPN Numbers	+						VPN Numbers → 127.0.0.1

In bovenstaande hebben we een extra nummermanipulatie bijgevoegd onder 'CGPN-Out'. Indien het nummer begint met '7204' (we bellen via het verkorte nummer, want we hebben een 7 voorgevoegd in de routes), dan vervormen we dit terug naar het intern nummer. In de overige nummertransformaties zenden we het volledige buitennummer richting Vodafone.

5.2.2. Inbellen vanaf een mobiele telefoon

Bij het inbellen vanaf een mobiele telefoon zullen we verschillende opties hebben, afhankelijk van hoe Vodafone de bellende partij weergeeft:

- Indien Vodafone het VPN-nummer (beginnende met 7) meestuurt als bellende partij, dan willen we deze informatie behouden (en het gesprek via GW4 'VPN-Numbers' de centrale binnensturen). Dit heeft al voordeel dat de gebelde partij dit verkort nummer ook weergegeven ziet op het display van zijn/haar telefoon
- In de andere gevallen zullen we het volledige buitennummer tonen, voorafgegaan door het 'Trunk Line'-nummer. Het gevolg is dus dat we het gesprek moeten binnen sturen via GW1 'PBX'.



In bovenstaande zijn de eerste twee maps van de tweede route nodig, indien het Vodafone het VPN-nummer meestuurt. De resterende 3 maps worden gebruikt indien Vodafone het volledige nummer meestuurt als bellende partij.

5. Uiteindelijke resultaat.

In dit document hebben we ervoor gezorgd dat er uitgaande en inkomende oproepen mogelijk zijn naar en van Vodafone (ook via de VPN-nummers). Tevens kunnen we het juiste uitgaande nummer meesturen en kunnen we verschillende inkiesnummers omleiden naar de gepaste interne extensies.

Er kan dus gebeld worden ☺