

Table of Contents

| | |
|---|----|
| <u>Interactive Voice Response System</u> | 2 |
| <u>Introduction to the Auto Attendant</u> | 2 |
| <u>A Two Level XML Form</u> | 2 |
| <u>Two Auto Attendant Messages</u> | 4 |
| <u>Scripts for Recording Greetings</u> | 5 |
| <u>IVR Greetings</u> | 5 |
| <u>Greetings Files</u> | 5 |
| <u>Using Virtual Extensions</u> | 5 |
| <u>Unanswered calls</u> | 5 |
| <u>Greetings from Extensions</u> | 5 |
| <u>Call Routing</u> | 6 |
| <u>Introduction</u> | 6 |
| <u>Sample Call Routing Table for an ISDN Installation</u> | 6 |
| <u>Call Redirection Configuration</u> | 7 |
| <u>Voice Recording Configuration</u> | 7 |
| <u>Forcing an Intercom Call</u> | 7 |
| <u>Remote Extensions</u> | 8 |
| <u>Prerequisites</u> | 8 |
| <u>Connecting via Routers and Firewalls</u> | 8 |
| <u>Network Services</u> | 8 |
| <u>Firewall Rules for Inbound Services</u> | 8 |
| <u>Changing your ISP</u> | 8 |
| <u>DHCP Server Traps</u> | 9 |
| <u>UDP Flood Detection</u> | 9 |
| <u>Call Handling Limitations</u> | 9 |
| <u>Parking a Call</u> | 9 |
| <u>Replacing a Phone on an Existing Extension</u> | 10 |
| <u>Manually Configuring an IP-Phone</u> | 10 |
| <u>Mass Deployment of snom Phones</u> | 11 |
| <u>Setting up a Deployment Server</u> | 11 |
| <u>Using Dial Plans</u> | 11 |
| <u>Installing the Voice-Blue IP Gateway</u> | 12 |
| <u>Notes</u> | 13 |

Interactive Voice Response System

Introduction to the Auto Attendant

The Auto Attendant is the first contact point for the business. Therefore it is important to get the information flow with quick greetings and small pauses. This is to allow the caller to select an option or to bypass the menu layers. There can be many auto attendants but usually there is just two: during and after business hours. The two main elements of an Auto Attendants are the XML script and the wav greeting files.

Therefore the very first thing to do is to decide if there will be an IVR system or not and if there is then the number of menu layers that will be available, keeping in mind option to allow the caller to select the extension number at the first level thus bypassing the IVR.

The sample below has two levels, with a break-out to an extension after the first greeting.

Level1: Department Selection

Level2: Personnel Selection

Note1: The Xml test file can be downloaded into the Auto Attendant from the Quadro's Extension Management menu.

Note2: Highlighted comments cannot be included in the xml script.

Note3: Additional forms for other departments are not shown.

A Two Level XML Form

```
<?xml version="1.0" encoding="UTF-8"?>
<vxml version="2.0">
<form id="mainform">
  <noinput count="1">
    <goto next="#departments"/>
  </noinput>
```

This is where we break out of the welcome message, so there should be a slight pause at the end of welcome.wav equal to the difference between the prompt timeout and the message duration.

```
<field name="extn_number" type="digits?length=3" modal="false">
  <option dtmf="311" value="311"/>
  <option dtmf="312" value="312"/>
  <option dtmf="313" value="313"/>
  <option dtmf="314" value="314"/>
  <option dtmf="315" value="315"/>
  <option dtmf="318" value="318"/>
  <option dtmf="380" value="380"/>
  <option dtmf="399" value="399"/>
  <prompt timeout="3s">
```

This is the first level where the company announcement is made which should be very brief.

```
<audio src="welcome.wav"/>
</prompt>
<filled>
  <goto nextitem="dial_extn"/>
</filled>
</field>
<object name="dial_extn" classid="connect">
  <param name="extension" expr="extn_number"/>
  <nomatch>
    <goto nextitem="extn_number"/>
  </nomatch>
</object>
</form>
```

This is the first level where the departments are announced with default extension of 313. In a single level system this would be the receptionists extension with departments.wav being a more detailed company message.

```
<form id="departments">
  <noinput count="1"> only loop once
    <assign name="dept_extn" expr="313"/>
    <goto nextitem="dial_dept"/>
  </noinput>
  <field name="dept_extn" type="digits?length=1" modal="false">
    <link dtmf="1" next="#salesmenu"/>
    <link dtmf="2" next="#telephonymenu"/>
    <link dtmf="3" next="#supportmenu"/>
    <link dtmf="4" next="#computermenu"/>
    <link dtmf="5" next="#accountsmenu"/>
    <option dtmf="0" value="399"/> connect to receptionist
  <prompt timeout="5s">
    <audio src="departments.wav"/>
  </prompt>
  <filled>
    <goto nextitem="dial_dept"/>
  </filled>
</field>
```

This object is contains the main dialing routine, collecting variables from the form's script above.

```
<object name="dial_dept" classid="connect">
  <param name="extension" expr="dept_extn"/>
  <filled>
    <exit/>
  </filled>
  <nomatch>
    <goto nextitem="dept_extn"/> loop if not found
  </nomatch>
</object>
</form>
```

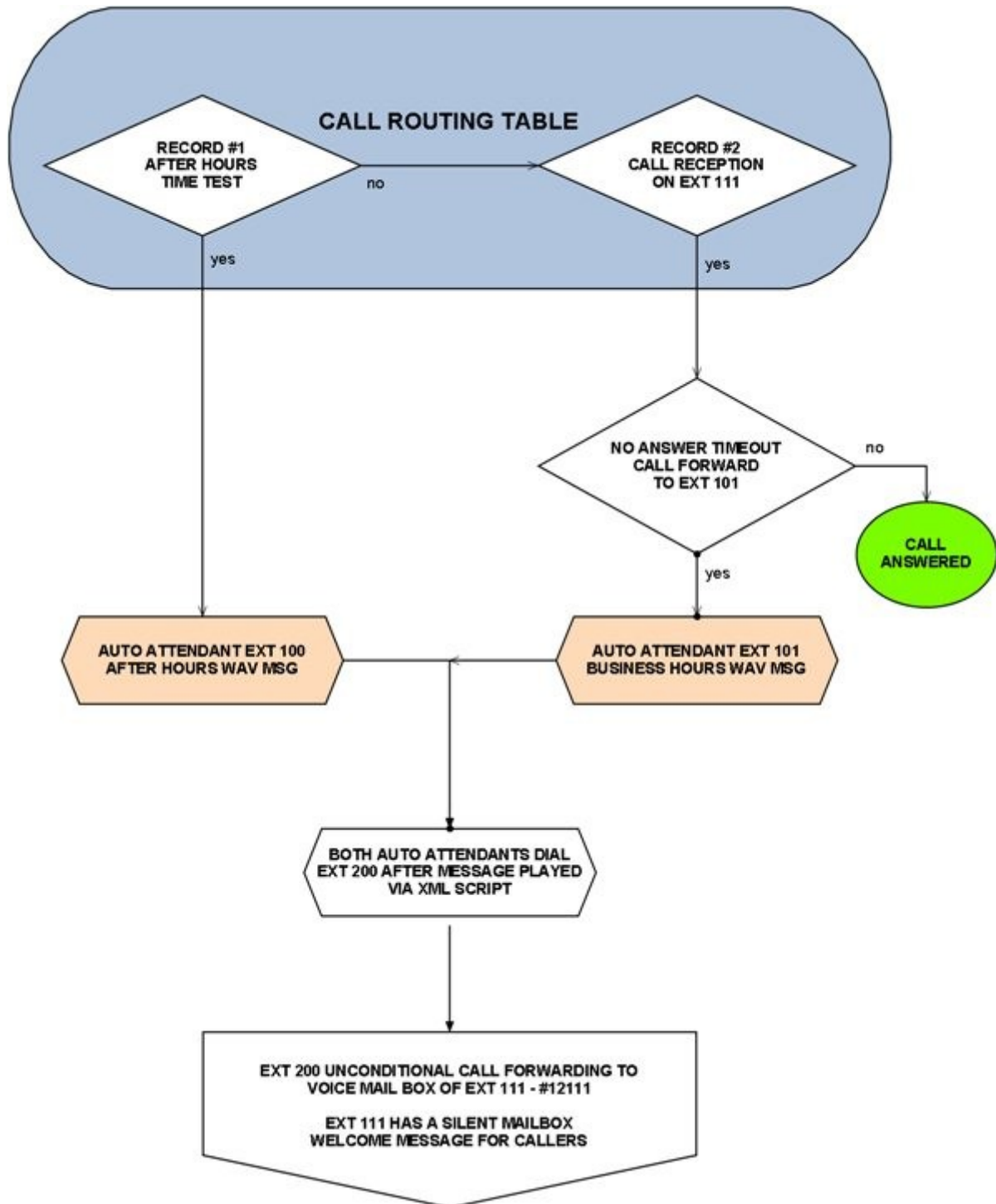
```
<form id="salesmenu">
  <noinput count="2">
    <assign name="sales_extn" expr="399"/>
    <goto nextitem="dial_sales"/>
  </noinput>
  <field name="sales_extn" type="digits?length=1" modal="false">
    <prompt timeout="5s" bargein="true">
```

This is where each employee is announced or there could be just one group extension with group hunt or many extension ringing settings enabled.

```
<audio src="sales.wav"/>
</prompt>
<option dtmf="1" value="313"/>
<option dtmf="2" value="314"/>
<filled>
  <goto nextitem="dial_sales"/>
</filled>
</field>
<object name="dial_sales" classid="connect">
  <param name="extension" expr="sales_extn"/>
  <nomatch>
    <goto nextitem="sales_extn"/>
  </nomatch>
</object>
</form>
</vxml>
```

Two Auto Attendant Messages

This is used where the customer wants to have distinct messages for after hours and busy during business hours:



Scripts for Recording Greetings

IVR Greetings

The above scenario details the Auto Attendant that the calling party will hear when they call the auto attendant. It points to these recorded messages (.wav files):

- ◆ **welcome.wav:** A welcome message with 3 options for the calling party (1= Sales. 2=Planning. 3= Support, 0 =call receptionist on xtn 399).
[4 seconds] Thank you for calling THE COMPANY, If you know the extension number of the person you are calling, please dial it now or hold for the receptionist. [pause]
 - ◆ **welcome_repeat.wav:** Will replay the options to the calling party if no option is selected, or an invalid selection is made noinput count="2" in the script
[4 seconds] If you know the extension number of the person you are calling, please dial it now or hold for the receptionist. [1 second pause]
 - ◆ **Sales.wav:** the greeting when the caller selects 1 from the first menu level.
[5 seconds] press 1 for Fred, 2 for Harry [2 second pause] a small soundbite for making a product announcement could go here
 - ◆ **Support.wav:** the greeting when the caller selects the technical support department
-

Greetings Files

- ◆ Configure the Voice Mail Common Settings from the Telephony menu with the G711u standard to access voice-mails via email or the web interface of the Quadro. This standard must be used.
 - Voice.wav files can be created with windows sound recorder using a CCITT uLaw codec (G.711a) format.
 - The quick way is to find an extension, pick a quiet time and leave yourself a voice message then save and rename that message from the Quadro's Extension Management Menu

Using Virtual Extensions

These extensions have no phones attached and are created by selecting Add in User Management and selecting User Extensions.

- ◆ 371 is the Sales Group
- ◆ 372 is the Engineering Group
- ◆ 373 is the Service/Operations Group
- ◆ 274 is the Accounts Group
- ◆ Note that there could be a link to a mobile phone here if there enough are spare lines

Call Hunt and Many Extension Ringing Groups

- ◆ Select User Management and Extension Settings from the Users menu.
- ◆ Click on 371 Sales group and select Supplementary Services from the Call Handling Menu.
- ◆ Click on Any Addresses and
- ◆ Select Many Extension Ringing.
- ◆ Tick the Enable Service tickbox and save.
- ◆ Enable the extensions that will be in the Sales group e.g. Extensions 311,313.
- ◆ Tick the boxes of these extensions and click Enable, then save.
- ◆ Repeat this configuration for the other groups: extensions 372..374

Unanswered calls

Note: When a call to 370.. 374 goes unanswered it will go to that extensions voice-mail. As these virtual extensions have no phones attached to them, the voicemail for these extensions needs to be monitored by the web interface of the Quadro and/or via email (see below for configuration of this).

Greetings from Extensions

Each extension can have a personalized Voice Mail and Do Not Disturb greeting.

The Voice Mail is configured via the *0 option from the phone and the Do Not Disturb message can be personalized from the Quadro's GUI. This is explained in the quick user guide

Call Routing

Introduction

The call routing table is the heart of any IP-PBX and the following sample could be used as a check list in the planning stage. **Don't forget to save the configuration after each major change!**

Sample Call Routing Table for an ISDN Installation

| Pattern | Pattern Modification | Call Settings Summary | Description |
|--|-----------------------|---------------------------|--|
| 000 | | E1/T1 | Emergency Call |
| 9* | NDS: 1 | E1/T1 | ISDN-10 |
| 7* | NDS: 1 Suffix: 11 | SIP 172.30.0.20:5060 | Call via GSM gateway |
| 12??? | NDS: 2 | PBX-Voicemail | Send to Voicemail |
| 11??? | NDS: 2 | PBX-Intercom | Intercom calls (disabled by default in the Extension Management) |
| 8* | NDS: 1 | SIP sip.epygi.com:5060 | Make a free SIP call via Epygi |
| [2,3,5,6]???????? | NDS: 1 Prefix: 9 | E1/T1 | Redial missed calls from fixed phones via ISDN. For Sydney, missed calls display: 2nnnnnnnn so drop the 2 add the 9 (note:7,8 and 9 have conflicts with 7*, 8* etc above) |
| [4]???????? | Prefix: 0 | E1/T1 | Missed Mobile Calls Redialed via ISDN |
| ??? | | PBX | Calls to to Extensions |
| 04* | | SIP 172.30.0.20:5060 | Calls to mobiles via the GSM gateway |
| replace pattern with isdn main # | NDS: 8 Prefix: 996 | PBX | Revised Auto Attendant with default disabled |
| replace pattern with isdn main # | NDS: 8 Prefix: 998 | PBX | After Hours Auto Attendant via extension 998 settings |
| replace pattern with isdn # assigned to Paul | NDS: 8 Prefix: 101 | PBX | Direct number for Paul on IP ext. 101 bypassing I.V.R. |
| replace pattern with isdn # assigned Sales Fax | NDS: 8 Prefix: 599 | PBX | A FAX connected to a FXS port on extension 599 |

Common Speed Dial Settings

The Call Routing Table is the place to set speed dial, for example where a three digit extension range is used, set the speed dial to a two digit number and discard two digits in the settings.

Call Redirection Configuration

Snom Handsets

To set a function key status LED to display the Call forward Status:

1. Configure the phone using PnP or MAC based Auto-Deployment so you have the Advanced Link in the IP Line setting.
2. Click on the Advanced Link and set one of the unused function keys on the snom as CallFwd.
3. Reboot the snom.
4. Press this key and then 2 to set fwd destination then the Cancel button
5. Use this key to toggle forwarding state. LED is on when FWD is active.
6. Note on a snom300 the best choice is either to reassign the L2 (key2) or Mute (key6) keys to the Redirect function.
7. Note: Where there is no advanced url on the Quadro line settings, you can:
 - a) Set key 6 with an extension key type with the value: <sip:*4@192.168.32.100:5060>

YeaLink Handsets

1. Dont use the Yealink buttons - use the Epygi Call Forward Management:
 1. *41 Toggles call forwarding
 2. *42 new number then # changes destination
 3. TODO: set indicator LED

Voice Recording Configuration

This is almost identical to the conferencing feature but with the third party being a dedicated extension for Voice Recording. The message is directly saved to the voice mailbox after the welcome message.

1. Select the Quadro's **Extension Management** Menu
 - a) Select the extension you want to record calls. In this example we will use **888**
 - b) Select Edit Entry, and General Settings page
 - c) In the Voice Mail Settings page, remove the 5 minutes limit to allow the recording of long messages.
 - d) Note that forwarding voice recordings of over 3 minutes duration will result in a truncated voice attachment in the received email.
2. Add a new rule to the Quadro's **Call Routing Table**
 - a) **pattern = 13888**
 - b) **NDS = 2**
 - c) **Call Type = PBX-Voicemail.**
3. Replace the welcome message with an appropriate message to notify that recording has been started.
4. Assign a function key or the Record key with the voice recorder type and value of **13888**.
5. To collect the message, you will need into log into the web GUI and goto Extensions Management, or perhaps there could be extension 888 setup as identity2 .

Forcing an Intercom Call

You can force an extension to accept an intercom request like this:

6. Add a new rule to the Quadro's **Call Routing Table** (we are using 3 digit extension numbering)
 - a) **pattern = 11???**
 - b) **NDS = 2,**
 - c) **Call Type = PBX-Intercom.**
7. Select the **Extension Management** Menu
 - a) Select the extension you want to receive intercom calls
 - b) Select Caller ID Based Services

- c) To ensure only internal extensions can intercom to the extension:
 - d) Select the Caller ID Based Services and create a Caller ID pattern for internal calls only
 - Select PBX-??? from the drop-down list.
 - e) On this Caller ID pattern enable the intercom service with the 'Activate on Request' setting.
8. Now you can dial:
- a) 11 123 to intercom to extension 123
 - b) 12 123 to connect directly to ext. 123 voice-mail (previously setup in the Call Routing Table)
 - c) 123 to call the extension normally.

Remote Extensions

Prerequisites:

- ◆ Access via the Internet to the Quadro with port forwarding as below:

Connecting via Routers and Firewalls

- ◆ When connecting to an existing dsl router, these additional service types will required to be created and then a rule applied:

Network Services

Service Table

| Service Type | Ports |
|------------------------|--------------------|
| RDP (TCP) | 5801 - 5802 |
| SIP1 (TCP/UDP) | 5060 |
| RTP1 (UDP) | 6000 - 6100 |
| STUN1 (TCP) | 4569 |
| STUN2 (TCP/UDP) | 3478 - 3479 |

- ◆ Firewall rules to forward these services to the Epygi PBX will need to be setup, for example:

Firewall Rules for Inbound Services

| Service Name | LAN Server IP address |
|--------------|-----------------------|
| STUN2 | 192.168.16.100 |
| STUN1 | 192.168.16.100 |
| RTP1 | 192.168.16.100 |
| SIP1 | 192.168.16.100 |
| RDP | Any |

- ◆ This assumes the ip address of the Epygi is set to 192.168.16.100 either statically or preferentially by DHCP. Once the IP has been assigned it will be reserved for the mac address.
- ◆ Note the RDP service is for remote access of the server and is not part of the PBX
- ◆ Check that these services are enabled for outbound traffic.
- ◆ Set the QOS Priority to: Minimize-Delay – if the optiion is available

Changing your ISP

- ◆ Make sure that the SIP TCP address points to the new public IP shown on the router. This setting can be found in the NAT Transversal Settings page.
- ◆ Check that this setting is updated, however generally the system will detect automatically a change in the WAN IP address.

DHCP Server Traps

If the Quadro is setup to be a DHCP Server for the phones then all other DHCP Servers on the network must be disabled for the snom phones to boot, as they will introduce a conflict is not configured with a valid mac address per assigned ip address. That is the DHCP server for the computers must look for a mac address then assign an IP.

To prevent the Epygi from giving out leases to a lan workstation, set the Epygi dhcp server to non authoritative in the advanced settings. Another option would be to map ther lease to the mac address.

If all else fails:

1. setup the Epygi and ip phone network as a stand alone network
2. register the phones with dhcp enabled
3. set the ip address to manual from each phones web interface (we already have the ip address)
4. then disable the dhcp server on the Epygi.



Warning: If the phones connect to another DHCP Server at bootup, then the NR indicator will be displayed on the LCD Display.

UDP Flood Detection

The Quadro will respond with an intermittant “waiting to connect” and then “IP connection cannot be established” messages when the UDP protocol is being blocked by some modern security routers.

A STUN system event will be created regulary every hour showing a few failed/successful ports.



Warning: with the Netgear FVS336G router, we found an option to prevent UDP flooding from the LAN. Uncheck this option in the Security Section, Attach Checks and all is well!

Call Handling Limitations



Warning: The default number of lines for each extension can have active at once (including the receptionist) is two. This must be increased to a minimum of 4 to allow multiple calls to be placed on hold (which uses two active lines) and still be able to dial out or use an extension button on the expansion module.

Parking a Call

To be revised.

SIP Accounts - Checklist

1. In the Call Routing Wizard page 1 ensure that the call type is IP-PSTN and
2. In page 2 ensure that Use Extension Settings: points to the virtual extension for the SIP account.

Replacing a Phone on an Existing Extension

This procedure can be used where the replacement is a different model or unit is to be changed:

1. Log in to the Quadro GUI
 - a) Select the **Extensions Management Menu item**
 - b) Select the extension number eg 505 and set the IP line to None
 - c) This should set the old IP line to inactive.
2. Ensure the phone is RESET off line and the NR indicator is displayed.
 - a) While still logged on to the Quadro:
 - b) Select **Extensions Management - Edit Entry**
 - c) Click on the **General Settings – 505** link
 - d) Enter the desired Display Name and Password
 - e) Set the Attached Line to the next available line.
 - f) Enable the Show on Public Directory option
 - g) Set the Percentage of Total Memory to 3 %
 - h) Save the settings.
3. While still logged on to the Quadro:
 - a) Select the **Telephony Menu item**
 - b) Select the IP Line for extension 505: eg IP Line Settings - IP Line 26
 - c) Select the SIP Phone radio button
 - d) Select Phone Model: eg Snom 300, Snom 320, Snom 360, Snom 370
 - e) Enter the MAC Address: from the phone
 - f) Enter the Line Appearance: default 2
 - g) Enter the Username and Password: **locext505** and 0000
 - h) Save the settings
4. Reboot the new Phone.

Manually Configuring an IP-Phone

Where phones require a manual installation like the snom370 they cannot be loaded with any pre-configured XML script.

This is the procedure to set up a phone manually:

1. Ensure the Quadro's PnP for IP lines setting is Disabled.
2. Go into the Quadro IP Line settings
 - a) Select the IP Line used by receptionist
 - b) Set to Inactive
 - c) Save the settings.
3. Do a factory Reset of the snom.
 - a) Avoid letting it get an IP address from Quadro if you are using Quadro as a DHCP server.
 - b) Suggest have snom off main LAN. **This may be a challenge as the snom will complain when there is no network connection.**
4. Set the IP Line to SIP Phone and phone model to other.
 - a) Leave MAC field empty.
 - b) Set Line Appearance and Uname/Pword
 - c) Save the settings.
 - d) Manually configure the phone.
 - Set a static IP address in the snom with the subnet mask
 - DNS and gateway settings.
 - Set Quadro IP as the Time Server.
 - Set the SIP details in Identity 1 on snom (in GUI).

Mass Deployment of snom Phones

[Mass deployment](#) allows for phone configuration and firmware updates to be applied during bootup.

Setting up a Deployment Server

Using Dial Plans

Dial plans are usually used for routing calls between branch PBX's.

Installing the Voice-Blue IP Gateway

