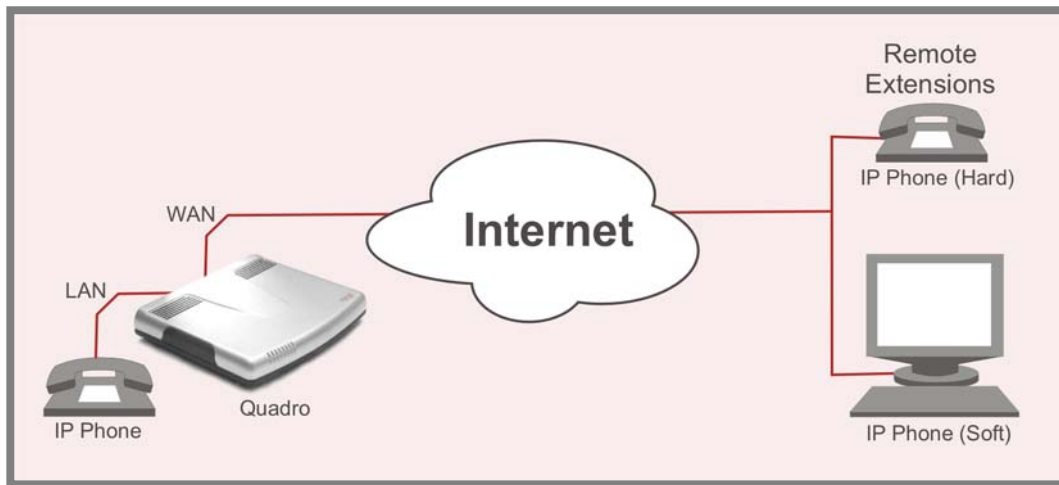


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## Quadro Remote Extension Configuration

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**Abstract:** This document explains what a remote extension is, how to activate remote extension functionality on Quadro and how to configure a remote SIP phone to work as a Quadro remote extension

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## 1 Introduction

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This document explains what a remote extension is, describes how to activate remote extension functionality on the Quadro and how to configure a remote SIP phone to work as a Quadro remote extension. There may be many different configurations where the remote SIP phone can be placed in WAN, but only three typical configurations are explained in this document.

## 2 What is a Remote Extension

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**SIP Remote Extension (RE)** functionality is an advanced telephony feature that allows Quadro users to remotely operate on the Quadro when away from the office. The user registers a hardware or software SIP phone on the Quadro and uses this remote SIP phone in the same way as a locally connected phone. The user can utilize the Quadro's PBX features to place and receive calls, access voice mails, etc.

A RE allows a user to be reachable by the same phone number wherever they are. For local calls this is the user's extension number. For IP calls this is the SIP registration username of the user's extension. For example a user can receive incoming calls on the phone connected locally to the Quadro when they are at the office, and continue receiving calls on a remote SIP phone at their home. By activating the SIP remote extension functionality, the user tells the Quadro where to forward incoming calls - to the phone locally attached to the Quadro or to the specified remote SIP phone. In any case, whether the calls are forwarded to the remote extension or the local extension, the voicemails are stored on the Quadro.

## 3 Remote Extension Configuration

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RE Configuration requires binding a remote SIP phones to a Quadro extension.

RE Configuration consists of the following procedures performed on the Quadro and remote SIP phone separately:

- Activating remote extension functionality on Quadro (see section 3.1)
- Configuring a SIP phone as a Quadro RE (see section 3.2)

### 3.1 Activating Remote Extension Functionality on the Quadro

The configuration steps follow:

1. Login to the Quadro as an administrator and access the User Management page (Users→User Management and Extension Settings).
2. Select the extension you want to configure as a RE and press Edit to start editing the extension settings.

**Please Note:** Only extensions having an attached line (FXS or IP Line<sup>\*</sup>) can be configured as remote.

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<sup>\*</sup> A RE can be configured only on an extension that is attached to an active IP line. For how to activate an IP line, see **IP Phones and IP Lines Configuration Guide**, section **3.1 Configuring IP Lines**.

3. Check the **Enable** option found under the **SIP Remote Extension Settings** subtitle to allow binding a remote SIP phone to the extension and specify the identification parameters for the remote SIP phone: **Username** and **Password** (In Figure 1 **xlite** and **xlite11** respectively). These parameters will be used by a remote SIP phone for registration on the Quadro (see section 3.2).

4. Define how RTP traffic should be routed after call establishment between a remote SIP phone and other party - through Quadro or directly between remote SIP phone and a caller/called party.

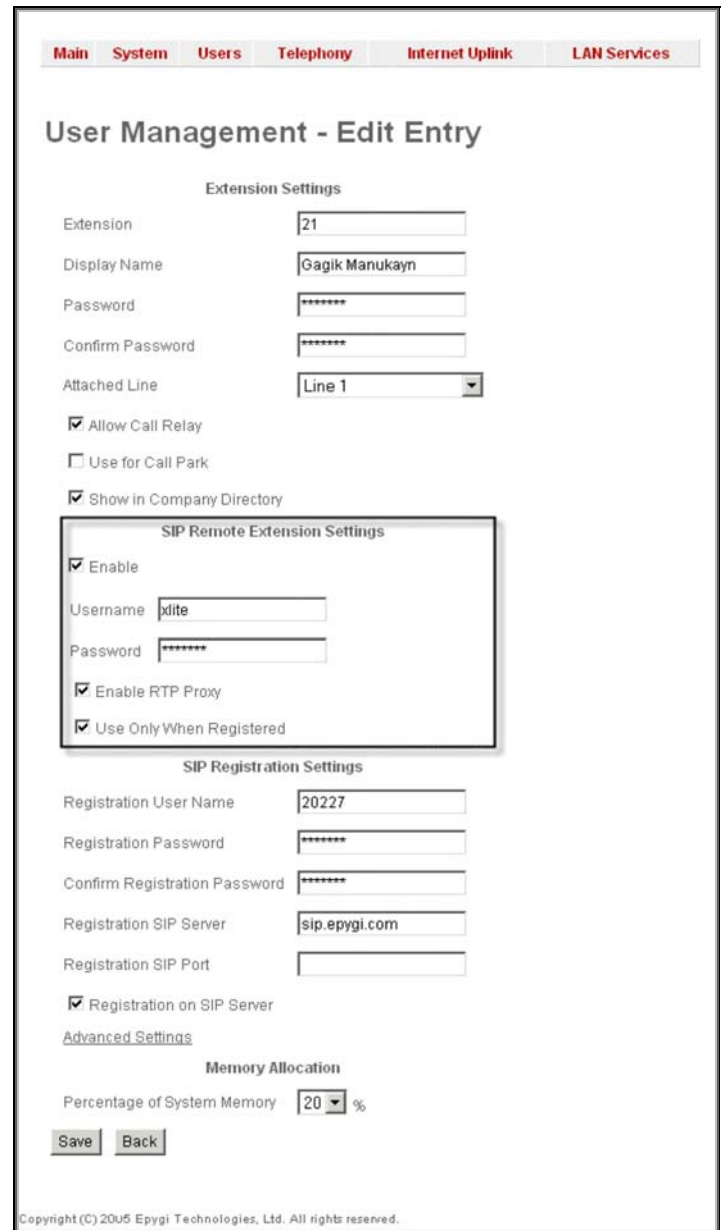
- If the **Enable RTP Proxy** option is enabled, the RTP traffic between the Remote SIP Phone and the caller/called party will go through Quadro, i.e. Quadro becomes RTP proxy for Remote SIP Phone and caller/called party. This option is often required for calls that originate from an ITSP (Internet Telephony Service Provider).
- If this option is disabled, RTP will flow directly between the remote SIP phone and the caller/called party.

5. Specify where the Quadro should route the calls (to the remote SIP phone or to the phone locally connected to Quadro) depending on a remote SIP phone registration status.

- If the **Use Only When Registered** checkbox is enabled, incoming calls will be routed to the remote SIP phone ONLY if it is registered on Quadro (see section 3.1). If this option is enabled but the SIP phone is not registered on Quadro, the incoming call will ring the phone locally connected to the Quadro.
- If the **Use Only When Registered** checkbox is disabled, incoming calls will be routed to the remote SIP phone regardless of whether it is registered or not. If the checkbox is disabled and the SIP phone is not registered on the Quadro, incoming calls will be routed to the voice mailbox of the extension.

**Please Note:** If the **Use Only When Registered** checkbox is disabled, the phone locally connected to Quadro will stop functioning as soon as you apply the changes.

6. Click **Save** to apply the changes.



The screenshot shows the 'User Management - Edit Entry' configuration page. At the top, there are navigation tabs: Main, System, Users, Telephony, Internet Uplink, and LAN Services. The main heading is 'User Management - Edit Entry'. Below this, there are several sections of settings:

- Extension Settings:** Includes fields for Extension (21), Display Name (Gagik Manukayn), Password (masked), Confirm Password (masked), and Attached Line (Line 1). There are also checkboxes for 'Allow Call Relay' (checked), 'Use for Call Park' (unchecked), and 'Show in Company Directory' (checked).
- SIP Remote Extension Settings:** This section is highlighted with a red box. It contains:
  - 'Enable' checkbox: checked
  - Username: xlite
  - Password: xlite11
  - 'Enable RTP Proxy' checkbox: checked
  - 'Use Only When Registered' checkbox: checked
- SIP Registration Settings:** Includes fields for Registration User Name (20227), Registration Password (masked), Confirm Registration Password (masked), Registration SIP Server (sip.epygi.com), and Registration SIP Port. There is a checked checkbox for 'Registration on SIP Server'.
- Advanced Settings:** A section header.
- Memory Allocation:** Includes a field for 'Percentage of System Memory' set to 20%.

At the bottom of the form, there are 'Save' and 'Back' buttons. A copyright notice at the very bottom reads: 'Copyright (C) 2005 Epygi Technologies, Ltd. All rights reserved.'

Figure 1

7. Define how RTP traffic should be routed after call establishment between a remote SIP phone and other party - through Quadro or directly between remote SIP phone and a caller/called party.
  - If the **Enable RTP Proxy** option is enabled, the RTP traffic between the Remote SIP Phone and the caller/called phone will go through Quadro, i.e. Quadro becomes RTP proxy for Remote SIP Phone and caller/called party. This option is often required for calls that originate from an ITSP (Internet Telephony Service Provider).
  - If this option is disabled, RTP will flow directly between the remote SIP phone and the caller/called party.
8. Specify where the Quadro should route the calls (to the remote SIP phone or to the phone locally connected to Quadro) depending on a remote SIP phone registration status.
  - If the **Use Only When Registered** checkbox is enabled, incoming calls will be routed to the remote SIP phone ONLY if it is registered on Quadro (see section 3.1). If this option is enabled but the SIP phone is not registered on Quadro, the incoming call will ring the phone locally connected to the Quadro.
  - If the **Use Only When Registered** checkbox is disabled, incoming calls will be routed to the remote SIP phone regardless of whether it is registered or not. If the checkbox is disabled and the SIP phone is not registered on the Quadro, incoming calls will be routed to the voice mailbox of the extension.
  - **Please Note:** If the **Use Only When Registered** checkbox is disabled, the phone locally connected to Quadro will stop functioning as soon as you apply the changes.
9. Click **Save** to apply the changes.

### 3.2 SIP Phone Configuration as a Quadro RE

In order for a SIP phone (hardware or software) to act as a Quadro RE, the phone should be configured to register on the Quadro. For this purpose, you need to know both the Quadro and SIP phone network configuration: whether the Quadro and a SIP phone are in the same network, whether either of these devices is behind a router, etc.

SIP phone setup for some common network configuration cases is described in sections 3.2.1-3.2.4.

For any network configuration the following parameters **MUST** be configured on a SIP phone.

- IP Address and Subnet mask
- IP Gateway and DNS Server

Ask your network administrator to assign proper values for this group of basic network settings

- **Username** and **Password** – set these identification parameters matching the **Username** and **Password** specified in the **Remote Extension Settings** of the corresponding extension (see 3.1 Activating Remote Extension Functionality on Quadro);
- **Registrar IP** and **Registrar Port** – set to the WAN IP address and SIP listen port (5060) of the Quadro.

**Please Note:** The names of equivalent parameters may differ slightly from phone to phone. As an example Table 1 displays terms used by different SIP phone manufacturers for the “**Username**” parameter.

SIP Phone	“Username”
Snom190	Account
Sipura	UserID
X-Lite	UserName

Table 1

**Please Note:** If the Quadro is placed behind a NAT router, enter the IP address of the NAT as **Registrar IP**, and the port mapped for the Quadro SIP listen port as a **Registrar Port** (it is assumed that dynamic or static IP/Port routing for Quadro is enabled on NAT router, particularly for SIP and RTP traffic).

Depending on network configuration, the advanced network settings like **STUN** or **Manual NAT Configuration** may also be needed on the SIP phone.

**Please Note:** Each specific phone has its own method of configuration. Almost all IP phones support configuration over an embedded WEB GUI. Almost all SIP phones indicate the status of successful configuration and registration with the SIP registrar server. To check registration status, you need to check if there is dial tone on the phone and also dial the Quadro Line information feature code (\*74) to ensure it is functional. After dialing \*74, you should hear a recorded message from the Quadro identifying the extension.

### 3.2.1 Both the Quadro and the SIP Phone are Placed in the Same Network

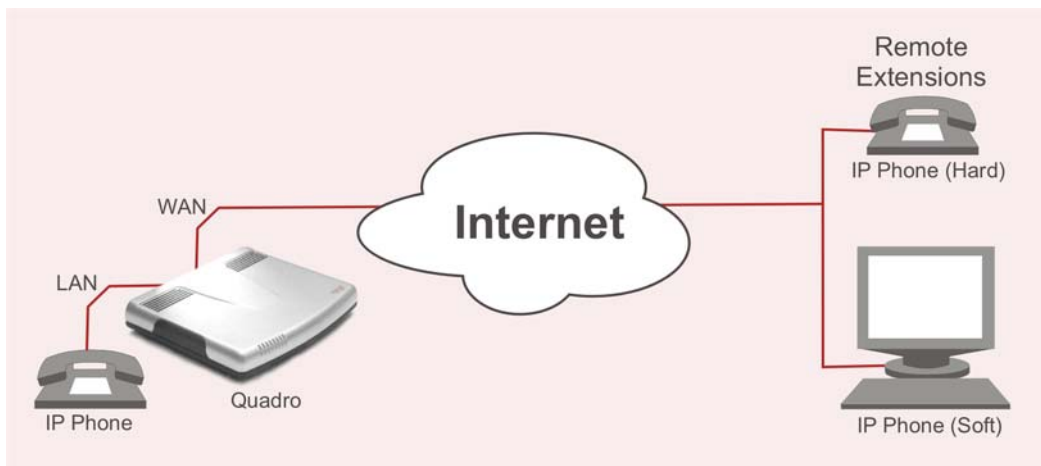


Figure 1

The following parameters should be configured on a SIP phone in this case

- IP Address
- Subnet mask
- IP Gateway
- DNS Server
- Display Name (optional)
- Username and Password – set these identification parameters matching the Username and Password specified in the Remote Extension Settings block of the corresponding extension (see 3.1 Activating Remote Extension Functionality on Quadro);
- Registrar IP and Registrar Port – set the WAN IP and SIP listen port of the Quadro.

**Please Note:** This is the recommended configuration since a static IP address can be purchased from the ISP resulting in a simple and robust configuration.

### 3.2.2 Quadro is placed on the Internet and the SIP Phone is placed behind a NAT

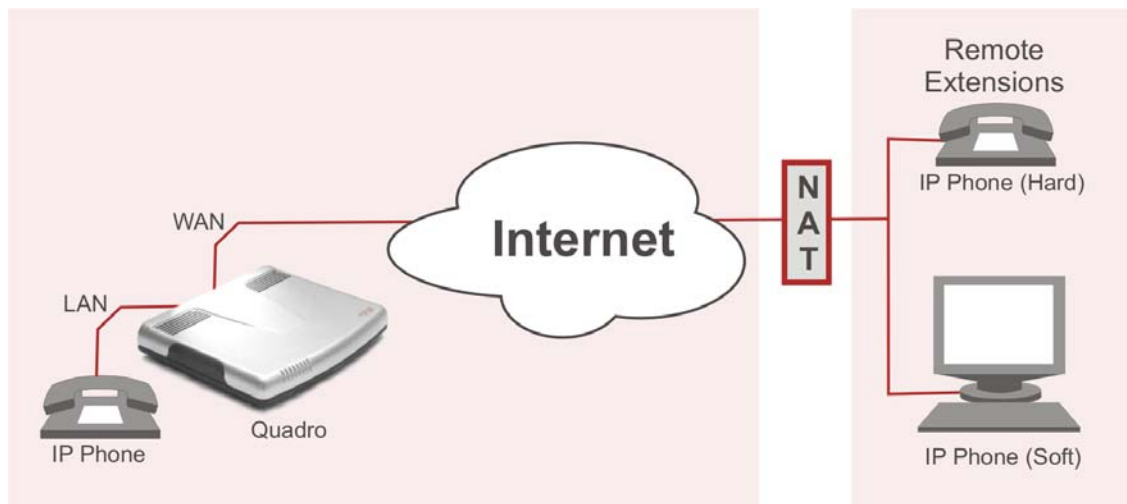


Figure 2

The following parameters should be configured on a SIP phone in this case

- IP Address
- Subnet mask
- IP Gateway
- DNS Server
- Display Name (optional)
- Username and Password – set these identification parameters matching the Username and Password specified in the Remote Extension Settings block of the corresponding extension (see 3.1 Activating Remote Extension Functionality on Quadro);
- Registrar IP and Registrar Port – set the WAN IP and SIP listen port of the Quadro.
- STUN or Manual NAT configuration (refer to your system administrator for these parameters).

**Please Note:** It is essential that the IP phone selected for this application supports STUN or Manual NAT Traversal features.

### 3.2.3 Both Quadro and the SIP Phone are placed behind NATs

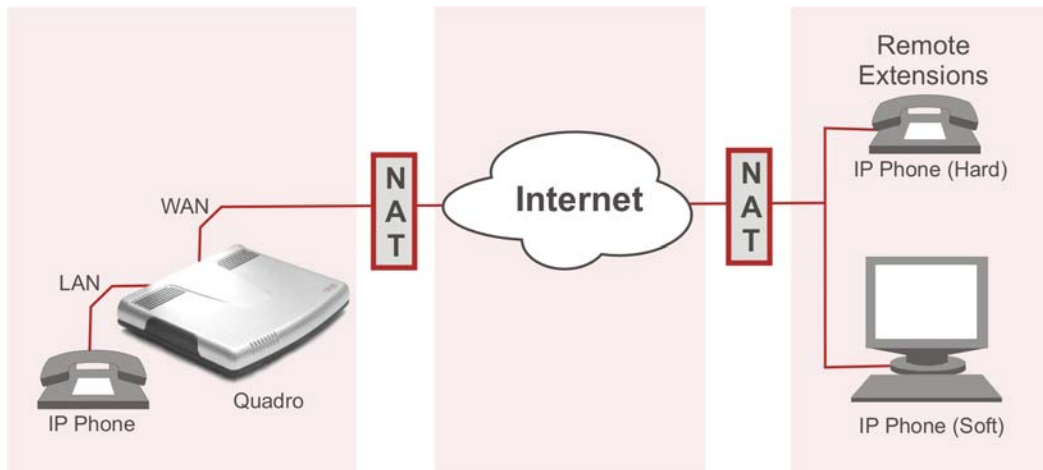


Figure 3

The following parameters should be configured on a SIP phone

- IP Address
- Subnet mask
- IP Gateway
- DNS Server
- Display Name (optional)
- Username and Password – set these identification parameters matching the Username and Password specified in the Remote Extension Settings block of the corresponding extension (see 3.1 Activating Remote Extension Functionality on Quadro);
- Registrar IP and Registrar Port – set the NAT IP address behind which the Quadro is placed, and mapped SIP port for the Quadro on that NAT (Telephony -> NAT Traversal Settings -> SIP Parameters -> Mapped Port when using manual NAT, and System-> Status-> SIP Registration status when using Stun).
- STUN or Manual NAT configuration (refer to your system administrator for these parameters).

**Please Note:** It is essential that the IP phone selected for this application supports STUN or Manual NAT Traversal features.

## 4 Additional Configuration Suggestions

This section gives additional information on advanced network settings of the SIP phones the Quadro has support for. Specifically here the user can find information on whether a SIP phone supports STUN or NAT traversal features, and some tips on how to configure a SIP phone when it is placed behind a NAT.

### 4.1 Snom190

The **Snom190** has four methods to traverse a NAT:

1. Automatic
2. UPNP
3. STUN
4. Static.

In testlab conditions the phone could correctly detect the full cone NAT against it with its **Automatic** and **STUN** methods.

**Please Note:** The NAT traversal methods of the Snom190 work only if the mapped RTP port range starts at 10000 (see the figure below, the **Dynamic RTP port start** setting).

The Snom200, Snom220 and Snom360 function similarly.

<b>Advanced Network:</b>	
NAT detection:	STUN
STUN server (IP-addr:port):	stun.epygi.com
STUN binding interval (seconds):	180
Use Mapped Address:	<input type="radio"/> on <input checked="" type="radio"/> off
Dynamic RTP port start:	10000
Dynamic RTP port stop:	10047
Type of Service (TOS):	160
DTMF Payload Type:	101
Network identity (hostname):	212.126.211.245
Network identity (port):	5663
Local SIP port	<input checked="" type="radio"/> Network port <input type="radio"/> Default SIP port
SIP T1 (ms):	500
SIP Session Timer (s):	3600
SIP Dirty Host TTL (s):	
SIP Max Forwards:	70
ENUM Suffix:	e164.arpa

## 4.2 Polycom SoundPoint IP300SIP

The **Polycom SoundPoint** supports manual NAT traversal feature.

In testlab conditions the phone could correctly detect the full cone NAT against it. There are no any restrictions on the mapped port range. Set any port range given by your network administrator.

Network Address Translation	
IP Address	<input type="text" value="212.126.211.245"/>
Signalling Port	<input type="text" value="5663"/>
Media Port Start	<input type="text" value="10000"/>
top	<input type="button" value="Submit"/>

Registration 1	
Identification	
Display Name	<input type="text" value="polycom"/>
Address	<input type="text" value="polycom@67.110.74.162"/>
Auth User ID	<input type="text" value="polycom"/>
Auth Password	<input type="text" value="*****"/>
Label	<input type="text" value="polycom"/>
Type	<input checked="" type="radio"/> Private <input type="radio"/> Shared
Third Party Name	<input type="text"/>
Server 1	
Address	<input type="text" value="67.110.74.162"/>
Port	<input type="text" value="5060"/>

### 4.3 SIPURA SPA 841

The **SIPURA SPA 841** supports both STUN and manual NAT traversal features.

In testlab conditions the phone could correctly detect the full cone NAT against it. There are no any restrictions on the mapped port range. Set any port range given by your network administrator.

NAT Support Parameters			
Handle VIA received:	<input type="text" value="no"/>	Handle VIA rport:	<input type="text" value="no"/>
Insert VIA received:	<input type="text" value="no"/>	Insert VIA rport:	<input type="text" value="no"/>
Substitute VIA Addr:	<input type="text" value="no"/>	Send Resp To Src Port:	<input type="text" value="no"/>
STUN Enable:	<input type="text" value="yes"/>	STUN Test Enable:	<input type="text" value="yes"/>
STUN Server:	<input type="text" value="stun.epygi.com"/>	EXT IP:	<input type="text"/>
EXT RTP Port Min:	<input type="text" value="10000"/>	NAT Keep Alive Intvl:	<input type="text" value="15"/>

RTP Parameters			
RTP Port Min:	<input type="text" value="10000"/>	RTP Port Max:	<input type="text" value="10049"/>
RTP Packet Size:	<input type="text" value="0.030"/>	Max RTP ICMP Err:	<input type="text" value="0"/>
RTCP Tx Interval:	<input type="text" value="0"/>		

### 4.4 Cisco 7960.

The **Cisco 7960** supports manual NAT traversal feature.

The phone works with Quadro if static IP is set and port forwarding is done on the router.

### 4.5 Other Phones

The **Aastra480i** and **IP Dialog SIP ToneII** have no method to traverse a NAT.

## 5 References

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Quadro Manual-II: Administrator's Guide

IP Phones and IP Lines Configuration Guide

X-lite soft phone configuration