



Grandstream Networks, Inc.

Configuring Grandstream Devices with 3CX Phone System



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INTRODUCTION

All Grandstream products are SIP based and respect RFC3261 for SIP and related RFCs, allowing them to interact with any SIP server including 3CX Phone System.

Grandstream endpoints support PnP (Plug and Play) feature to make devices installation and configuration easy from SIP servers supporting this feature such as 3CX Phone System. Using auto-provisioning, Grandstream devices can be configured with zero configuration on the device side.

This guide will help users to configure their Grandstream devices with 3CX Phone System via **manual configuration** or via **auto-provisioning**.

This guide covers different network setups including:

- **Local Devices (LAN):** Grandstream devices and 3CX Phone System are located within same local network.
- **Remote Devices using SBC:** Grandstream devices are located in a different network where a 3CX SBC (Session Border Controller) is installed and connected to the remote 3CX Phone System.
- **Remote Devices using STUN:** Grandstream devices are located in a remote network behind a router with NAT.

NETWORK SETUP

In this tutorial, we will use three network setups including LAN, SBC and STUN.

Local Network (LAN)

Grandstream devices and 3CX Phone System are located in the same local network as shown on the following figure.

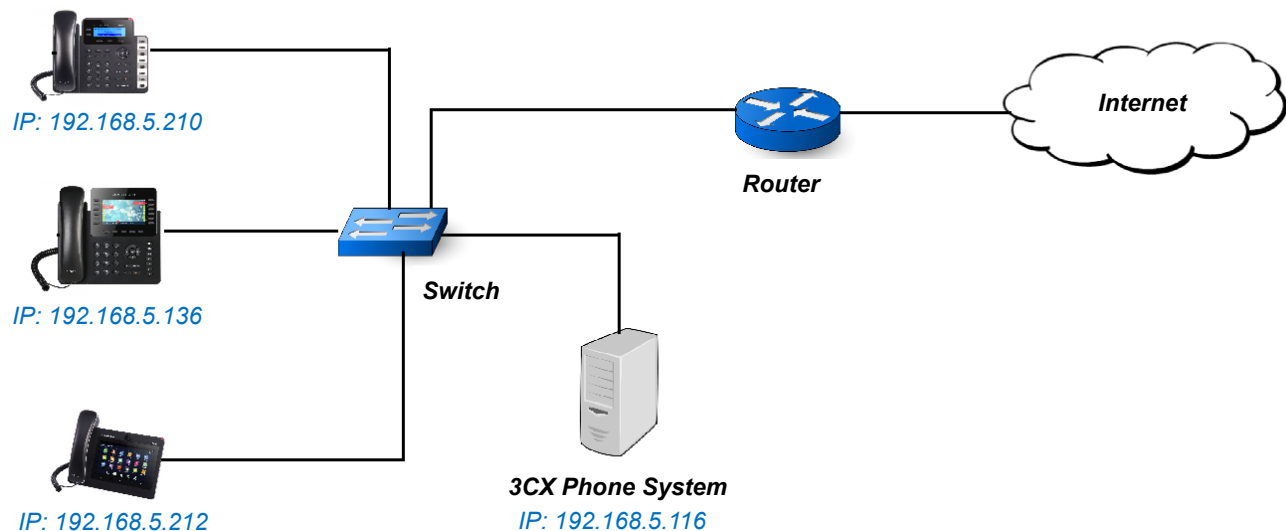


Figure 1: SIP Phones in the same LAN as 3CX Phone System

SBC (Session Border Controller)

In case users have SIP devices outside the local network of 3CX Phone System but behind a 3CX Session Border Controller, it's possible to configure them with 3CX Phone System.

In this network setup, we consider the following:

- 3CX Phone System FQDN is "gstest.3cx.eu".
- 3CX SBC is installed and configured correctly (IP: 192.168.6.31). Tunnel port (5090 by default needs to be opened and forward traffic to SBC machine).
- Grandstream device is GXV3275 (IP: 192.168.6.225) located in same LAN as 3CX SBC.



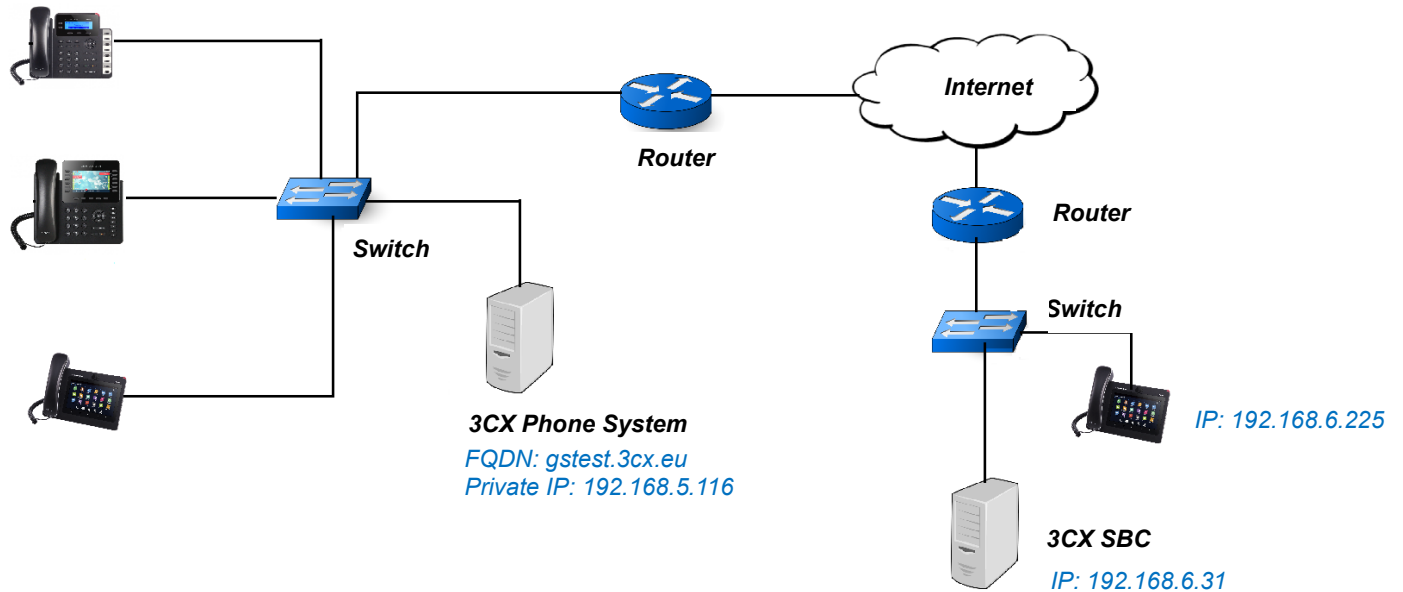


Figure 2: Remote Phone Located Behind SBC

Remote STUN

Grandstream Devices support STUN mode in SIP Network Settings, allowing them to communicate with 3CX Phone System across the WAN.

3CX Phone System must be using a static public IP / FQDN, and the firewall should allow SIP / RTP traffic:

- TCP port configured during installation used for the provisioning of remote extensions (in this guide, 8001 with HTTPS).
- UDP port 5060: used for SIP traffic.
- UDP ports 9000–9500: used for RTP traffic (audio/video).

In this network setup, we consider the following:

- 3CX Phone System FQDN is “gstest.3cx.eu”.
- Grandstream device is behind a router with dynamic IP.



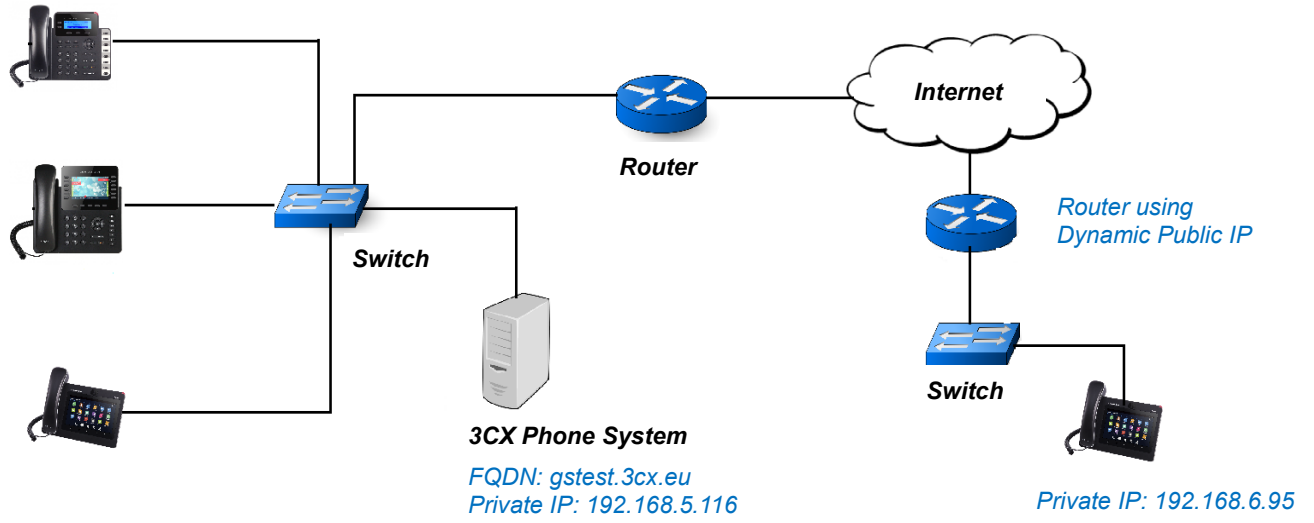


Figure 3: Remote Phone using STUN



MANUAL CONFIGURATION

Before configuring the end device, users will need to ensure that extensions are already created on 3CX Phone System and make sure that the devices are properly powered up, connected to your Network and have IP addresses.

This chapter will introduce how to configure a Grandstream device manually located in the same local Network as 3CX Phone System, behind a 3CX Session Border Controller, or remotely using STUN.

Local Devices (LAN)

The following chapter describes basic configuration instructions to configure a Grandstream device when the device is in the same LAN as 3CX Phone System.

SIP Extension Configuration

To configure SIP extension, follow below steps:

1. Take note of the ID and password fields of the extension from 3CX Phone System which will be configured on the device.
2. Connect the device to the network and power supply. The phone will boot up and obtain an IP address (assuming a DHCP server is available in the network).
3. Use your browser to access the web interface of the device by entering <http://ip-address> where ip-address is the IP address of the device.
4. Enter the admin username and password, and click login to access the configuration pages. Default admin username and password are *admin/admin*.
5. Go to one of the **Accounts** → **General Settings**.
6. Make sure that “**Account Active**” is set to “Yes”, then Enter the SIP credentials retrieved from 3CX Phone system on the appropriate fields as shown in the below example:

Grandstream GXP2170 Admin Logout | Reboot | Provision | Factory Reset | English ▾

GRANDSTREAM STATUS ACCOUNTS SETTINGS NETWORK MAINTENANCE PHONEBOOK

Version 1.0.8.27

Accounts

Account 1 ▾

General Settings

Network Settings

SIP Settings ⇄

Audio Settings

Call Settings

Intercom Settings

Feature Codes

Account 2 ⇄

Account 3 ⇄

Account 4 ⇄

Account 5 ⇄

Account 6 ⇄

General Settings

Account Active No Yes

Account Name	201	
SIP Server	192.168.5.116	
Secondary SIP Server	<input type="text"/>	
Outbound Proxy	<input type="text"/>	
Backup Outbound Proxy	<input type="text"/>	
BLF Server	<input type="text"/>	
SIP User ID	201	
Authenticate ID	201	
Authenticate Password	*****	
Name	John Doe	
Voice Mail Access Number	<input type="text"/>	

Picture




Figure 4: Account Configuration on GXP2170

7. Click on **Save and Apply** for the configuration to take effect and register the account. The phone will send SIP REGISTER request to 3CX Phone System and get the extension registered.



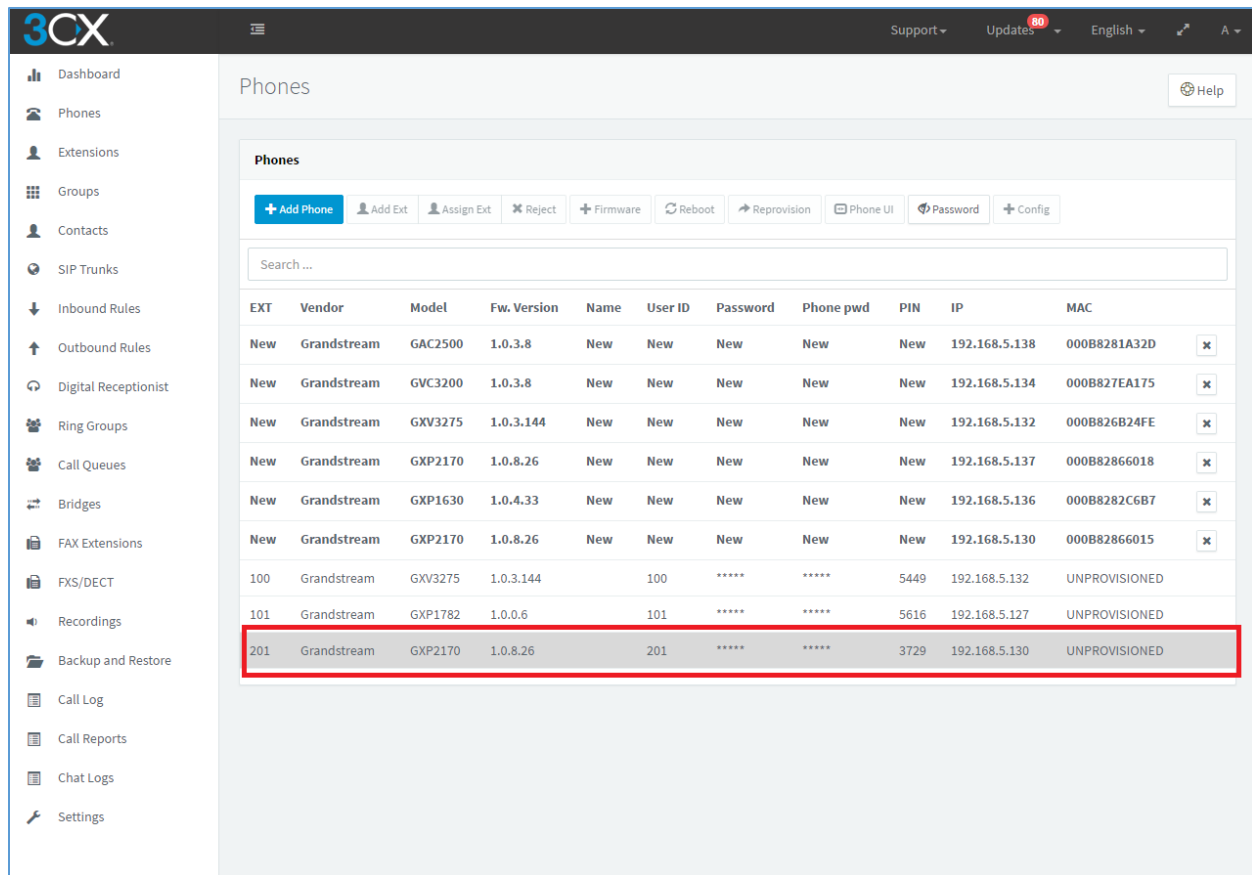


Figure 5: Phones Panel

Note: Since the phone used is already on the same network as the 3CX Phone System, users may either use 3CX Phone System private IP or FQDN on SIP Server Field.

MPK / VPK Configuration

Multi-Purpose Keys (MPK), and Virtual Multi-Purpose Keys (VPK) on supported models can be configured to act as Speed Dial, BLF (Busy Lamp Field) and more other features.

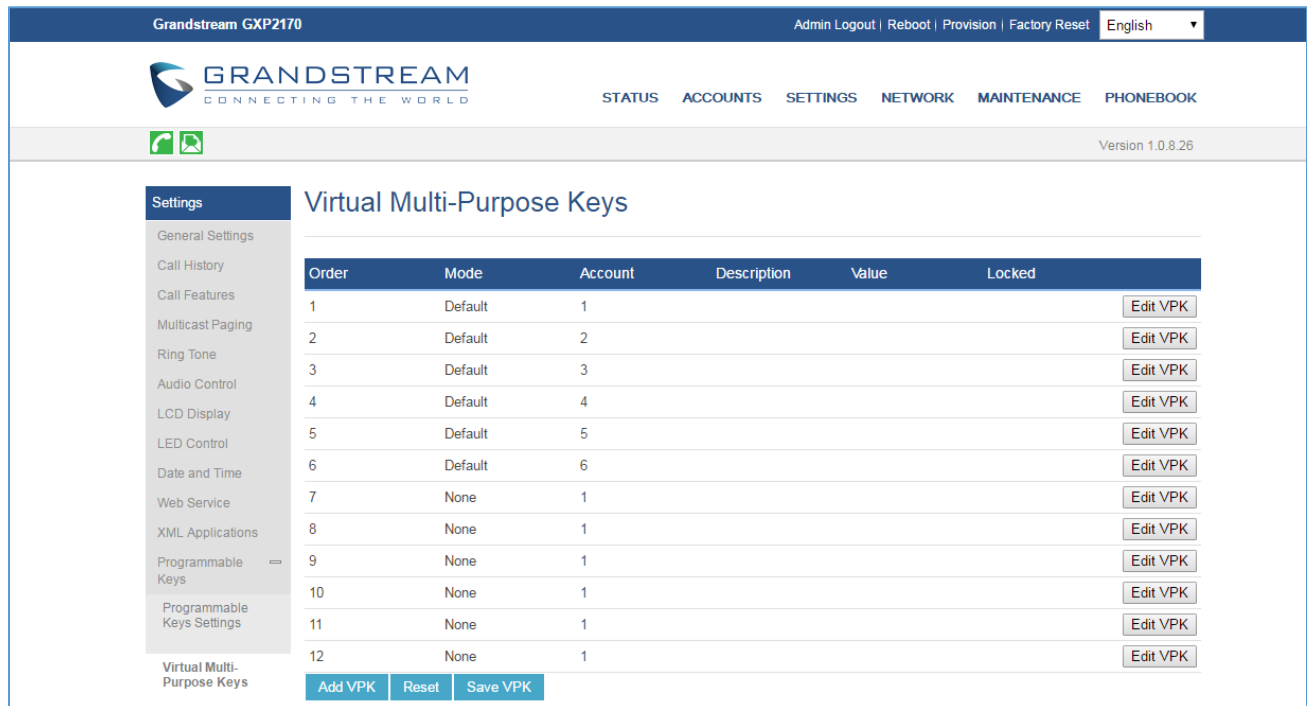
VPKs are available in GXP21XX and GXP17XX series only and can be configured instead of using physical built-in MPK or extension module (GXP2200EXT).

In this chapter, we are using GXP2170 which doesn't support MPK by default (extension module can be attached), thus we will use VPK available by default.

To configure VPKs on the phone, follow below instructions:

1. Log in to the phone's Web GUI.
2. Go to **Settings** → **Programmable Keys** → **Virtual Multi-Purpose Keys**.
3. Click on **Add VPK** to add a new VPK. (Click on **Edit VPK** to edit an existing VPK).





Grandstream GXP2170 Admin Logout | Reboot | Provision | Factory Reset English

GRANDSTREAM CONNECTING THE WORLD STATUS ACCOUNTS SETTINGS NETWORK MAINTENANCE PHONEBOOK

Version 1.0.8.26

Settings

- General Settings
- Call History
- Call Features
- Multicast Paging
- Ring Tone
- Audio Control
- LCD Display
- LED Control
- Date and Time
- Web Service
- XML Applications
- Programmable Keys
- Programmable Keys Settings
- Virtual Multi-Purpose Keys

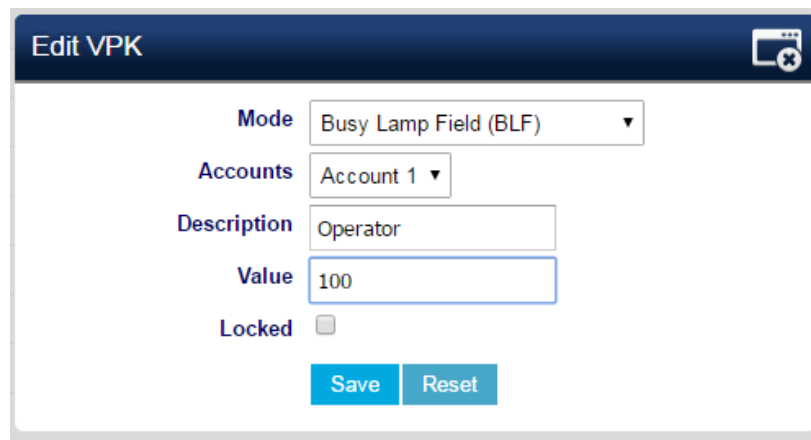
Virtual Multi-Purpose Keys

Order	Mode	Account	Description	Value	Locked
1	Default	1			<input type="checkbox"/>
2	Default	2			<input type="checkbox"/>
3	Default	3			<input type="checkbox"/>
4	Default	4			<input type="checkbox"/>
5	Default	5			<input type="checkbox"/>
6	Default	6			<input type="checkbox"/>
7	None	1			<input type="checkbox"/>
8	None	1			<input type="checkbox"/>
9	None	1			<input type="checkbox"/>
10	None	1			<input type="checkbox"/>
11	None	1			<input type="checkbox"/>
12	None	1			<input type="checkbox"/>

Buttons: Add VPK, Reset, Save VPK

Figure 6: Create a VPK on GXP2170

- To configure a Key as BLF for instance to monitor another extension on 3CX Phone System, set Mode to **Busy Lamp Field (BLF)**.



Edit VPK

Mode: Busy Lamp Field (BLF)

Accounts: Account 1

Description: Operator

Value: 100

Locked:

Buttons: Save, Reset

Figure 7: BLF Key

- In **Accounts** dropdown list, select the account to use with this VPK.
- In **Description** field, enter a name to be displayed for this key.
- In **Value** field, enter the extension SIP user ID to monitor.
- Click on **Save and Apply** to submit changes.

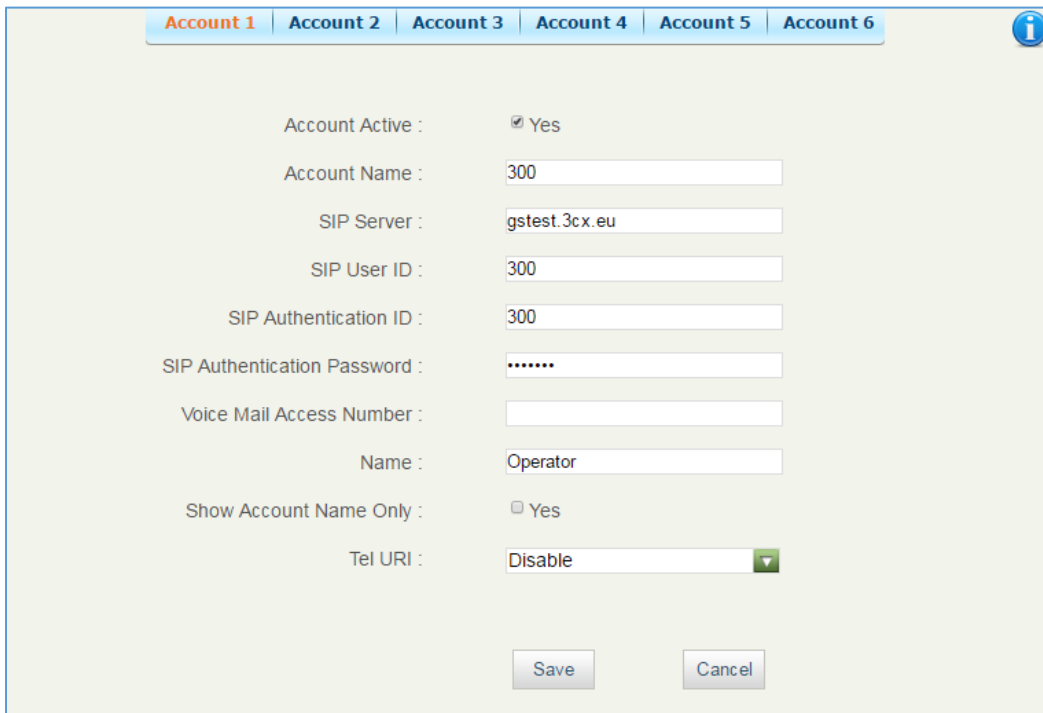


Remote Devices using 3CX SBC

To configure a Grandstream device located behind a 3CX SBC, follow below instructions:

Note: We will use GXV3275 as example. Same configuration applies to other models.

1. Take note of SIP extension credentials from 3CX Phone System to be configured on the device.
2. Log in to the phone and go to **Account** → **General Settings**.
3. Make sure to set **Account Active** to “Yes”.
4. Fill the information related to SIP extension created on the 3CX Phone System.
5. In **SIP Server** field, enter the IP/FQDN of 3CX Phone System (in this example: “gstest.3cx.eu”), and click on **Save**.



Account 1	Account 2	Account 3	Account 4	Account 5	Account 6
Account Active :	<input checked="" type="checkbox"/> Yes				
Account Name :	<input type="text" value="300"/>				
SIP Server :	<input type="text" value="gstest.3cx.eu"/>				
SIP User ID :	<input type="text" value="300"/>				
SIP Authentication ID :	<input type="text" value="300"/>				
SIP Authentication Password :	<input type="password" value="....."/>				
Voice Mail Access Number :	<input type="text"/>				
Name :	<input type="text" value="Operator"/>				
Show Account Name Only :	<input type="checkbox"/> Yes				
Tel URI :	<input type="text" value="Disable"/>				
<input type="button" value="Save"/>		<input type="button" value="Cancel"/>			

Figure 8: GXV3275 Account General Settings

6. Once saved, navigate to **Network Settings** under account and type in the private IP and port of 3CX SBC in **Outbound Proxy** field (192.168.6.31:5060).



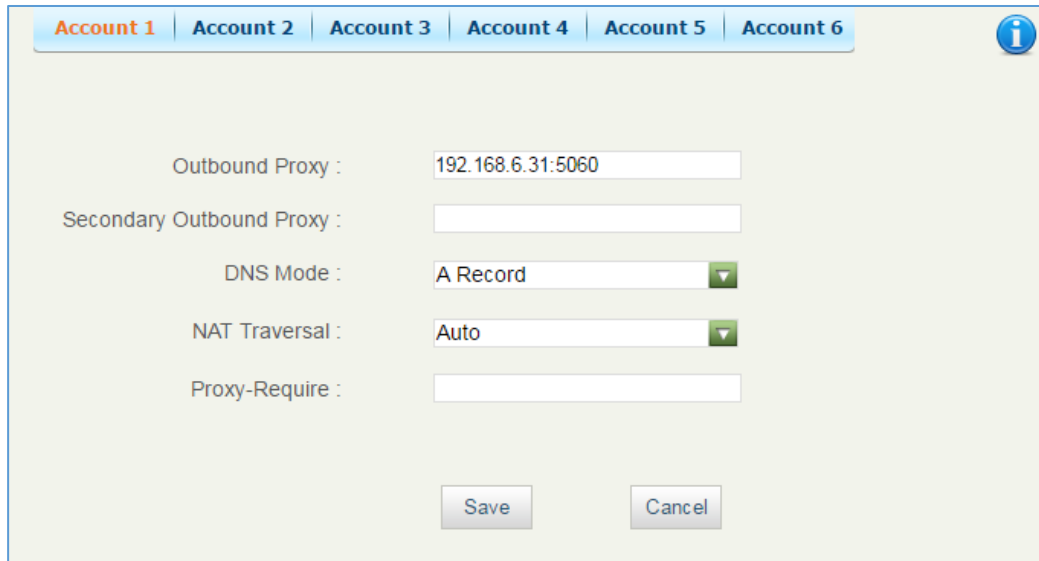


Figure 9: Outbound Proxy setting

7. Click on **Save and Apply** to register the extension with 3CX Phone System as tunneled via 3CX SBC.

Remote Devices using STUN

To configure a remote Grandstream device using STUN, follow below instructions:

Note: We will use GXP2135 as example. Same configuration applies to other models.

1. Take note of the SIP extension credentials from 3CX Phone System to be configured on the device.
2. Log in to the phone and go to **Account** → **General Settings**.
3. Make sure to set **Account Active** to “Yes”.
4. Fill the information related to SIP extension created on the 3CX Phone System.
5. In **SIP Server** field, enter the public IP/FQDN of *3CX Phone System* (“testgs.3cx.eu” in this example), and click on **Save**.



General Settings

Account Active	<input type="radio"/> No <input checked="" type="radio"/> Yes
Account Name	<input type="text" value="101"/>
SIP Server	<input type="text" value="testgs.3cx.eu"/>
Secondary SIP Server	<input type="text"/>
Outbound Proxy	<input type="text"/>
Backup Outbound Proxy	<input type="text"/>
BLF Server	<input type="text"/>
SIP User ID	<input type="text" value="101"/>
Authenticate ID	<input type="text" value="101"/>
Authenticate Password	<input type="password" value="....."/>
Name	<input type="text" value="101"/>
Voice Mail Access Number	<input type="text"/>

Figure 10: Configure Remote extension via STUN

- Once saved, navigate to **Network Settings** and set **NAT Traversal** to “STUN”.

Accounts	Network Settings
Account 1	
General Settings	
Network Settings	
SIP Settings	
Audio Settings	
Call Settings	
Account 2	
Account 3	

DNS Mode	<input type="text" value="A Record"/>
Primary IP	<input type="text"/>
Backup IP 1	<input type="text"/>
Backup IP 2	<input type="text"/>
NAT Traversal	<input type="text" value="STUN"/>
Proxy-Require	<input type="text"/>

Figure 11: NAT Traversal set to STUN

- Press **Save** button and navigate to **Settings** → **General Settings**. In **STUN Server** field, set a valid STUN server (“stun.3cx.com:3478” for example).



General Settings

Local RTP Port	<input type="text" value="5004"/>
Local RTP Port Range	<input type="text" value="200"/>
Use Random Port	<input checked="" type="radio"/> No <input type="radio"/> Yes
Keep-Alive Interval	<input type="text" value="20"/>
Use NAT IP	<input type="text"/>
STUN server	<input type="text" value="stun.3cx.com:3478"/>
Public Mode	<input checked="" type="radio"/> No <input type="radio"/> Yes
Delay Registration	<input type="text" value="0"/>

Figure 12: General Settings – STUN server

8. Press **Save and Apply** to register the device with 3CX Phone System.



AUTO-PROVISIONING

Before configuring the end device, users will need to ensure that extensions are already created on 3CX Phone System and make sure that the devices are properly powered up, connected to your Network and have IP addresses.

This chapter will introduce how to auto-provision a Grandstream device located in the same local Network as 3CX Phone System, behind a 3CX Session Border Controller, or remotely using STUN.

Local Devices (LAN)

When having the devices on the same network as 3CX Phone System, users have the ability to provision end devices automatically either using Plug and Play feature, or by adding the device on the 3CX Phone System.

Plug and Play

Grandstream SIP devices can be provisioned using Plug and Play feature which offers the possibility to be auto-discovered at boot when in the same Local Network as 3CX Phone System, allowing the phone to retrieve the configuration automatically once assigned.

To auto-provision Grandstream devices, follow below steps:

1. Power on the phone and connect it to the same LAN as 3CX Phone System.

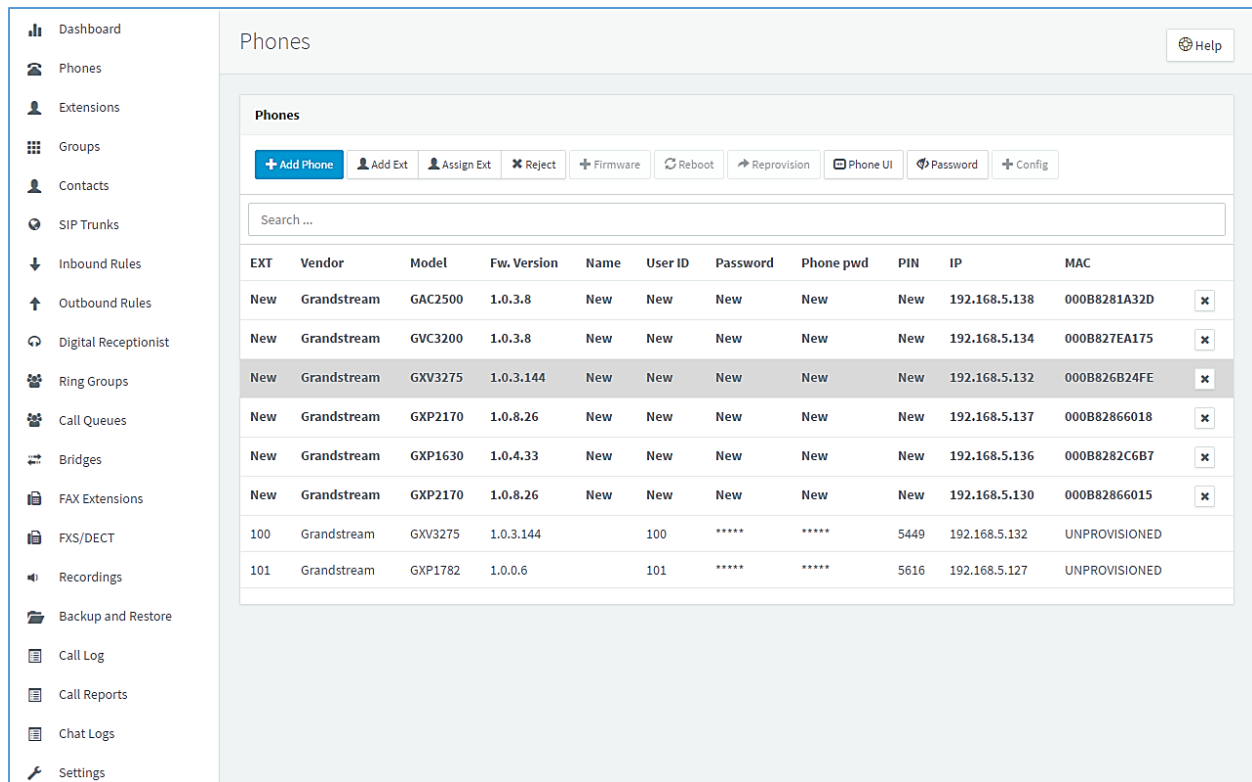
At booting stage, Grandstream devices send a SIP SUBSCRIBE message to multicast IP address to be discoverable by 3CX Phone System in same LAN.

2. Access to 3CX Phone System interface and click on **Phones** in the left panel.

Discovered devices with their related information including Model, MAC address, IP address will be displayed as shown in below figure.

Note: If a device is not discovered, access to its web interface and set **3CX Auto Provision** to "Yes" (by default set to Yes) under **Maintenance → Upgrade and Provisioning** then reboot it.





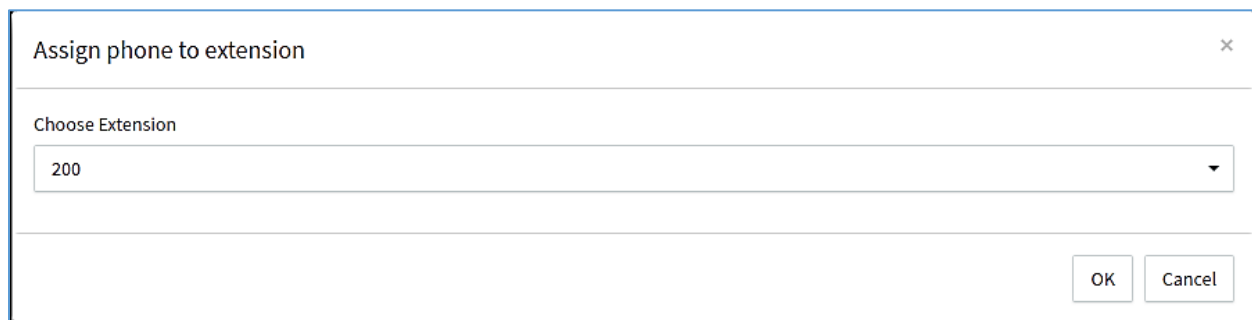
Phones

Search ...

EXT	Vendor	Model	Fw. Version	Name	User ID	Password	Phone pwd	PIN	IP	MAC	
New	Grandstream	GAC2500	1.0.3.8	New	New	New	New	New	192.168.5.138	00B8281A32D	<input type="button" value="x"/>
New	Grandstream	GVC3200	1.0.3.8	New	New	New	New	New	192.168.5.134	00B827EA175	<input type="button" value="x"/>
New	Grandstream	GXV3275	1.0.3.144	New	New	New	New	New	192.168.5.132	00B826B24FE	<input type="button" value="x"/>
New	Grandstream	GXP2170	1.0.8.26	New	New	New	New	New	192.168.5.137	00B82866018	<input type="button" value="x"/>
New	Grandstream	GXP1630	1.0.4.33	New	New	New	New	New	192.168.5.136	00B8282C6B7	<input type="button" value="x"/>
New	Grandstream	GXP2170	1.0.8.26	New	New	New	New	New	192.168.5.130	00B82866015	<input type="button" value="x"/>
100	Grandstream	GXV3275	1.0.3.144		100	*****	*****	5449	192.168.5.132	UNPROVISIONED	
101	Grandstream	GXP1782	1.0.0.6		101	*****	*****	5616	192.168.5.127	UNPROVISIONED	

Figure 13: GXV3275 Discovered via PnP feature

3. Select the device to provision and click on **Add Ext** (to create a new extension for this device) or **Assign Ext** (to assign a previously created extension).



Assign phone to extension

Choose Extension

200

Figure 14: Assign Extension to Phone

4. Users can configure advanced options on the device during provisioning such as voice codecs, Forwarding Rules, BLF... as shown in below figure.



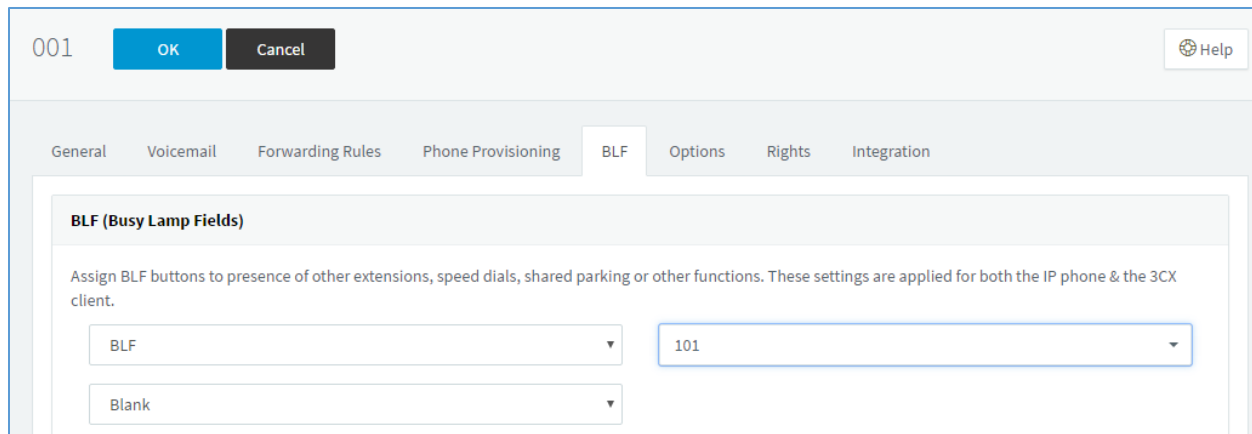


Figure 15: Configuring BLF

5. Press **OK** to save the configuration.
6. Once applied, the phone will be rebooted and get provisioned automatically with provisioning URL on its configuration server path.

Add New Device

Users have also the possibility to prepare 3CX Phone System to provision Grandstream devices that will be deployed with the system before having them connected to the network.

To add a new device to 3CX Phone System, follow below steps:

1. Log in to the 3CX Phone System and go to **Phones** panel.
2. Click on **Add Phone**, and choose an extension to assign.
3. Choose the device's model from available models list, and enter its MAC address as shown in below figure.

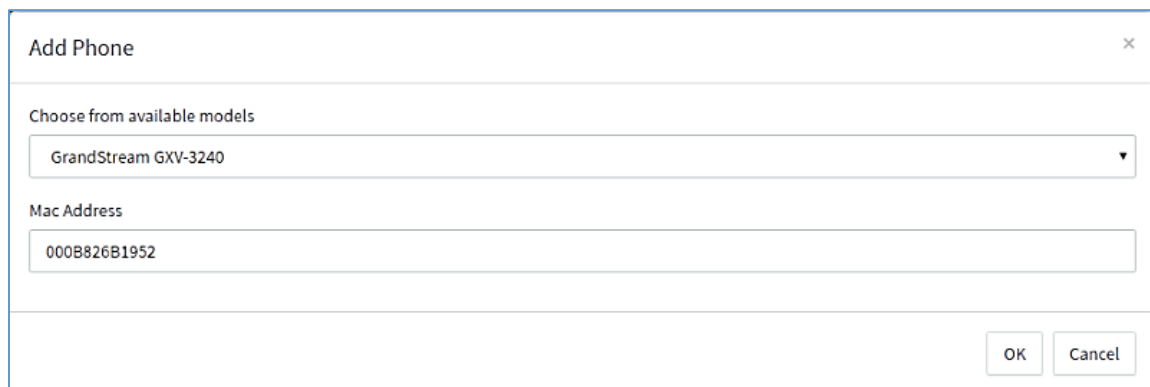


Figure 16: Add Phone via MAC address

4. In "Phone Provisioning" tab, leave **Provisioning Method** set to "Local LAN (in the office)".
5. Press **OK** to save the configuration.
6. Once the device with matching model/MAC address is connected to the network and detected by 3CX Phone System, the phone will reboot and get provisioned automatically with assigned extension and configuration.

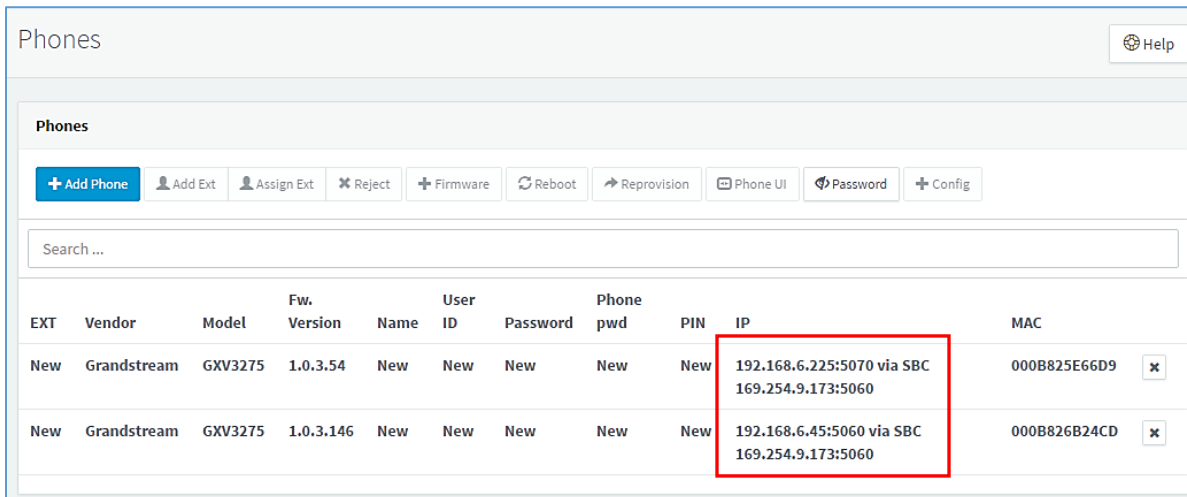


Remote Devices using 3CX SBC

To auto-provision Grandstream devices located behind a 3CX SBC, follow below steps:

1. Log in to the remote 3CX Phone System and go to **Phones** panel.
2. Select the device to provision and click on **Add Ext** (to create a new extension for this device) or **Assign Ext** (to assign a previously created extension).

Devices behind SBC will be marked with “via SBC” in IP column as show in below figure.



EXT	Vendor	Model	Fw. Version	Name	User ID	Password	Phone pwd	PIN	IP	MAC
New	Grandstream	GXV3275	1.0.3.54	New	New	New	New	New	192.168.6.225:5070 via SBC 169.254.9.173:5060	000B825E66D9
New	Grandstream	GXV3275	1.0.3.146	New	New	New	New	New	192.168.6.45:5060 via SBC 169.254.9.173:5060	000B826B24CD

Figure 17: Devices behind SBC

3. 3CX will open “Phone Provisioning” tab with following options preconfigured:
 - **Provisioning Method** set “3CX SBC (remote)”.
 - **MAC Address** set to phone’s MAC address.
 - **Select Interface** set to 3CX FQDN (in this example: “gstest.3cx.eu”).
 - **IP Address of 3CX Session Border Controller** set to 3CX SBC IP.
 - **Port** set to 3CX SBC SIP port (in this example: 5060).
4. Click on **OK** to provision the phone.
5. Once applied, the phone will be rebooted and get provisioned automatically with provisioning URL on its configuration server path.
 (In this example: “https://gstest.3cx.eu:8001/provisioning/l8g27ctxwm1ye0”.)



001 OK Cancel Help

General Voicemail Forwarding Rules **Phone Provisioning** BLF Options Rights Integration

Phone Provisioning

+ Add

Your phones

GrandStream GXV-3275 ✕ Delete

For info on how to provision this phone click [here](#).

IP Phone

Provisioning Method
 3CX SBC (remote) ▼

Provisioning Link: <https://gstest.3cx.eu:8001/provisioning/l8g27ctxwm1ye0>

Mac Address
 000B826B24CD

Select Interface
 gstest.3cx.eu ▼

IP Address of 3CX Session Border Controller
 169.254.9.173

Port
 5060

Figure 18: Provisioning via SBC

Remote Devices using STUN

To configure remote extensions using STUN, follow below steps:

1. Log in to the 3CX Phone System and go to **Phones** panel.
2. Click on **Add Phone**, and choose an extension to assign.
3. Choose the device's model from available models list, and enter its MAC address as shown in below figure.



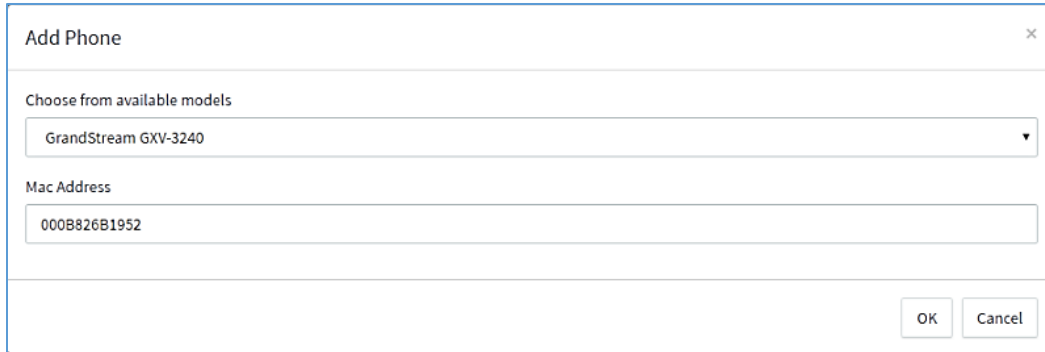
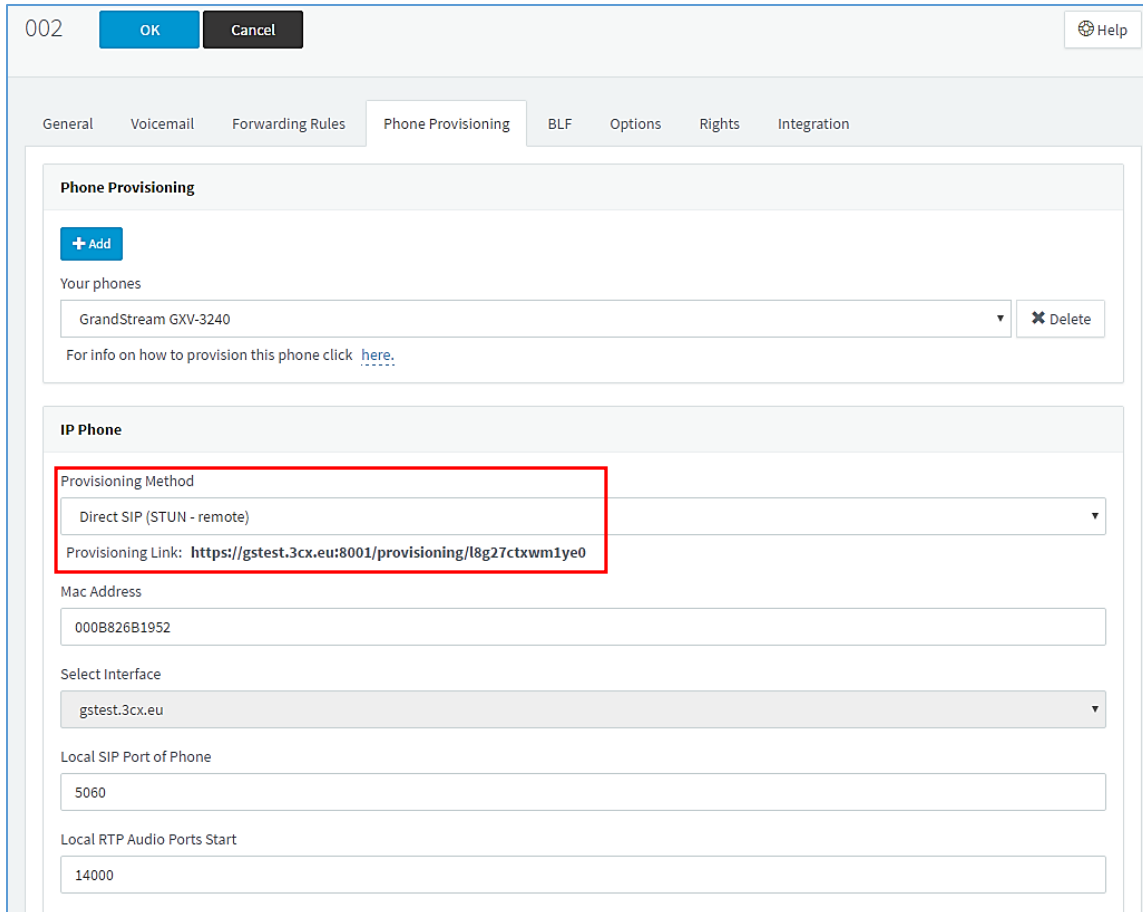


Figure 19: Add Phone via MAC address

4. In “Phone Provisioning” tab, set the following:
 - **Provisioning Method:** Direct SIP (STUN – remote)
 - **MAC Address:** Leave as preconfigured (MAC address of the phone entered).
 - **Select Interface:** 3CX FQDN preconfigured (in this example: “gstest.3cx.eu”).
 - **Local SIP Port of Phone:** set the local SIP port used by the phone.
 - **Local RTP Audio Ports Start:** Leave as preconfigured “14000”.
 - **Local RTP Audio Ports End:** Leave as preconfigured “14009”.
5. Copy or take note of the **Provisioning Link**.
(In this example: <https://gstest.3cx.eu:8001/provisioning/l8g27ctxwm1ye0>).



002 OK Cancel Help

General Voicemail Forwarding Rules **Phone Provisioning** BLF Options Rights Integration

Phone Provisioning

+ Add

Your phones

GrandStream GXV-3240 ✕ Delete

For info on how to provision this phone click [here](#).

IP Phone

Provisioning Method
Direct SIP (STUN - remote)

Provisioning Link: <https://gstest.3cx.eu:8001/provisioning/l8g27ctxwm1ye0>

Mac Address
000B826B1952

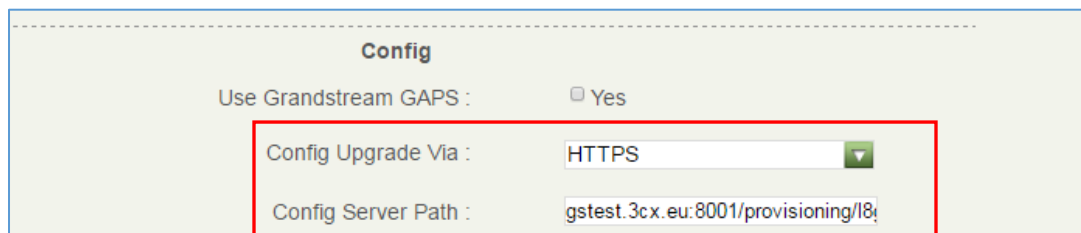
Select Interface
gstest.3cx.eu

Local SIP Port of Phone
5060

Local RTP Audio Ports Start
14000

Figure 20: Provisioning using STUN

6. Click on **OK** to save and apply changes. 3CX will prepare a configuration file for the phone with configured MAC address, model and settings.
7. Access remote phone's web interface, navigate to **Maintenance** → **Upgrade** and set following:
 - **Config Upgrade via:** Set provisioning protocol (in this example: "HTTPS").
 - **Config Server Path:** Set provisioning URL (in this example: "gstest.3cx.eu:8001/provisioning/l8g27ctxwm1ye0").



Config

Use Grandstream GAPS : Yes

Config Upgrade Via : HTTPS

Config Server Path : gstest.3cx.eu:8001/provisioning/l8g27ctxwm1ye0

Figure 21: Phone Configuration using STUN

8. Press **Save and Apply**, and reboot the phone to start provisioning process.
9. Once rebooted, the phone will contact 3CX server to download its configuration file and get provisioned with assigned extension.

