

Configuration Note

AudioCodes Professional Services - Interoperability Lab

AudioCodes Mediant™ SBC for Sunrise SIP Trunk with Microsoft® Skype for Business Server 2015

Version 7.0



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Notice

This document describes how to connect the Microsoft Skype for Business Server 2015 and Sunrise SIP Trunk using AudioCodes Mediant SBC product series.

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Documentation Feedback

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1 Introduction

This Configuration Note describes how to set up AudioCodes Enterprise Session Border Controller (hereafter, referred to as *SBC*) for interworking between Sunrise's SIP Trunk and Microsoft's Skype for Business Server 2015 environment.

You can also use AudioCodes' SBC Wizard tool to automatically configure the SBC based on this interoperability setup. However, it is recommended to read through this document in order to better understand the various configuration options. For more information on AudioCodes' SBC Wizard including download option, visit AudioCodes Web site at <http://www.audiocodes.com/sbc-wizard> (login required).

1.1 Intended Audience

The document is intended for engineers, or AudioCodes and Sunrise Partners who are responsible for installing and configuring Sunrise's SIP Trunk and Microsoft's Skype for Business Server 2015 for enabling VoIP calls using AudioCodes SBC.

1.2 About AudioCodes SBC Product Series

AudioCodes' family of SBC devices enables reliable connectivity and security between the Enterprise's and the service provider's VoIP networks.

The SBC provides perimeter defense as a way of protecting Enterprises from malicious VoIP attacks; mediation for allowing the connection of any PBX and/or IP-PBX to any service provider; and Service Assurance for service quality and manageability.

Designed as a cost-effective appliance, the SBC is based on field-proven VoIP and network services with a native host processor, allowing the creation of purpose-built multiservice appliances, providing smooth connectivity to cloud services, with integrated quality of service, SLA monitoring, security and manageability. The native implementation of SBC provides a host of additional capabilities that are not possible with standalone SBC appliances such as VoIP mediation, PSTN access survivability, and third-party value-added services applications. This enables Enterprises to utilize the advantages of converged networks and eliminate the need for standalone appliances.

AudioCodes SBC is available as an integrated solution running on top of its field-proven Mediant Media Gateway and Multi-Service Business Router platforms, or as a software-only solution for deployment with third-party hardware.

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2 Component Information

2.1 AudioCodes SBC Version

Table 2-1: AudioCodes SBC Version

SBC Vendor	AudioCodes
Models	<ul style="list-style-type: none"> ▪ Mediant 500 E-SBC ▪ Mediant 800 Gateway & E-SBC ▪ Mediant 1000B Gateway & E-SBC ▪ Mediant 3000 Gateway & SBC ▪ Mediant 2600 E-SBC ▪ Mediant 4000 SBC
Software Version	SIP_7.00A.058.002
Protocol	<ul style="list-style-type: none"> ▪ SIP/UDP (to the Sunrise SIP Trunk) ▪ SIP/TCP or TLS (to the S4B FE Server)
Additional Notes	None

2.2 Sunrise SIP Trunking Version

Table 2-2: Sunrise Version

Vendor/Service Provider	Sunrise
SSW Model/Service	IMS SIP Trunk
Software Version	IMS 10.2 CSCF - V100R010C20SPC100, patch CSCF_V100R010C20SPH101 SBC - V300R001C20SPC100, patch SE2900_V300R001C20SPH109
Protocol	SIP
Additional Notes	None

2.3 Microsoft Skype for Business Server 2015 Version

Table 2-3: Microsoft Skype for Business Server 2015 Version

Vendor	Microsoft
Model	Skype for Business
Software Version	Release 2015 6.0.9319.0, CU December 2015 or higher
Protocol	SIP
Additional Notes	None

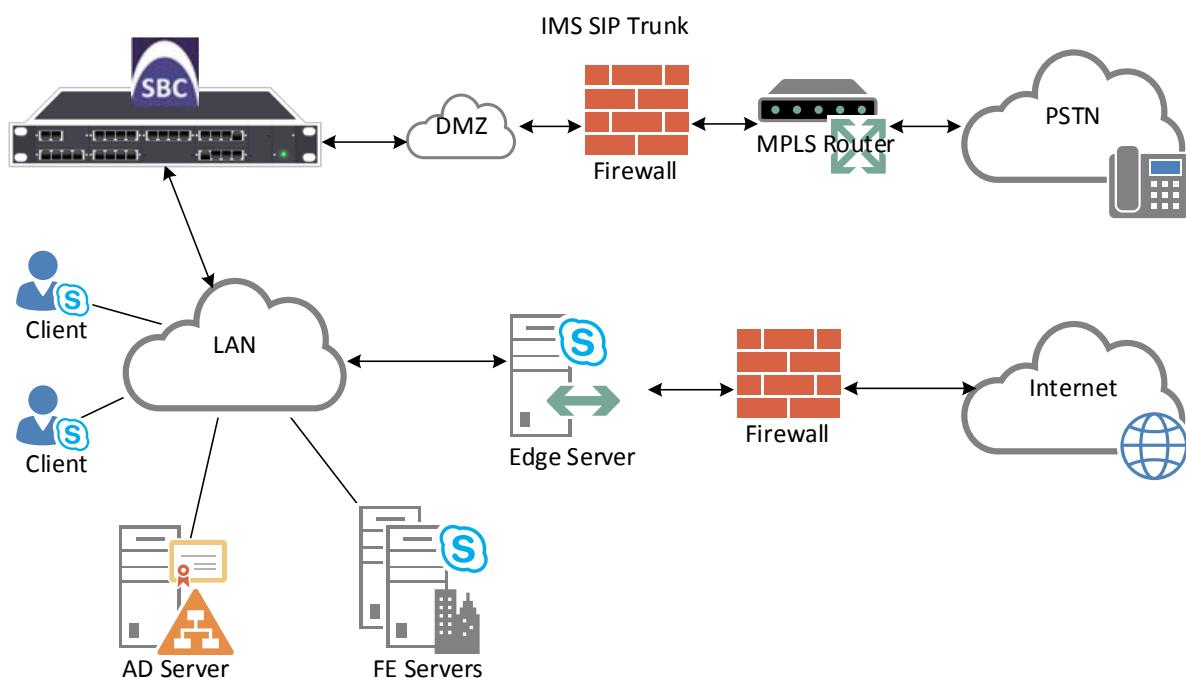
2.4 Interoperability Test Topology

The interoperability testing between AudioCodes SBC and Sunrise SIP Trunk with Skype for Business 2015 was done using the following topology setup:

- Enterprise deployed with Microsoft Skype for Business Server 2015 in its private network for enhanced communication within the Enterprise.
- Enterprise wishes to offer its employees enterprise-voice capabilities and to connect the Enterprise to the PSTN network using Sunrise's SIP Trunking service.
- AudioCodes SBC is implemented to interconnect between the Enterprise LAN and the SIP Trunk.
 - **Session:** Real-time voice session using the IP-based Session Initiation Protocol (SIP).
 - **Border:** IP-to-IP network border between Skype for Business Server 2015 network in the Enterprise LAN and Sunrise's SIP Trunk located in the public network.

The figure below illustrates this interoperability test topology:

Figure 2-1: Interoperability Test Topology between SBC and Microsoft Skype for Business with Sunrise SIP Trunk



2.4.1 Environment Setup

The interoperability test topology includes the following environment setup:

Table 2-4: Environment Setup

Area	Setup
Network	<ul style="list-style-type: none">▪ Microsoft Skype for Business Server 2015 environment is located on the Enterprise's LAN▪ Sunrise SIP Trunk is located on the WAN
Signaling Transcoding	<ul style="list-style-type: none">▪ Microsoft Skype for Business Server 2015 operates with SIP-over-TLS transport type▪ Sunrise SIP Trunk operates with SIP-over-UDP transport type
Codecs Transcoding	<ul style="list-style-type: none">▪ Microsoft Skype for Business Server 2015 supports G.711A-law and G.711U-law coders▪ Microsoft Skype for Business Clients (Media Bypass) supports G.722, G.711A-law and G.711U-law coders▪ Sunrise SIP Trunk supports G.722, G729, G.711A-law and G.711U-law coders
Media Transcoding	<ul style="list-style-type: none">▪ Microsoft Skype for Business Server 2015 operates with SRTP media type▪ Sunrise SIP Trunk operates with RTP media type

2.4.2 Known Limitations

There were no limitations observed in the interoperability tests done for the AudioCodes SBC interworking between Microsoft Skype for Business Server 2015 and Sunrise's SIP Trunk.

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3 Configuring Skype for Business Server 2015

This chapter describes how to configure Microsoft Skype for Business Server 2015 to operate with AudioCodes SBC.



Note: Dial plans, voice policies, and PSTN usages are also necessary for Enterprise voice deployment; however, they are beyond the scope of this document.

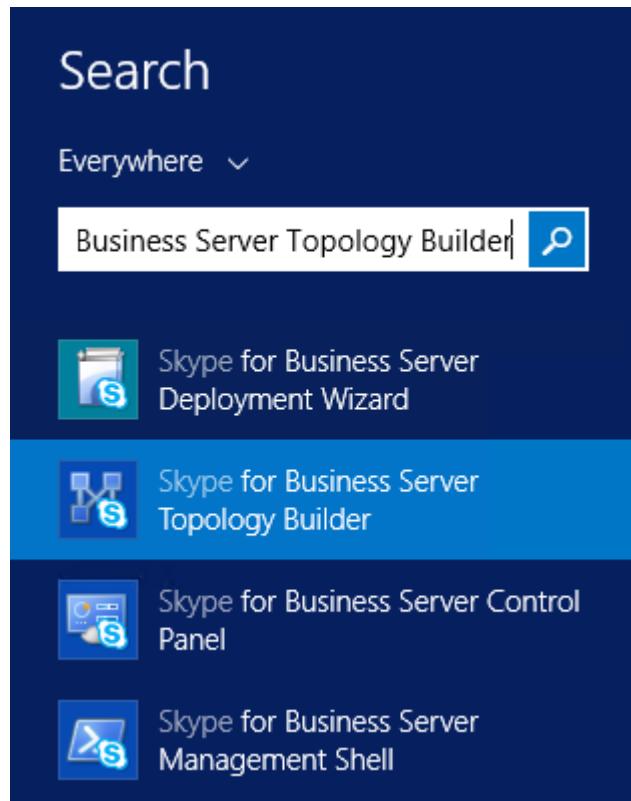
3.1 Configuring the SBC as an IP / PSTN Gateway

The procedure below describes how to configure the SBC as an IP / PSTN Gateway.

➤ **To configure SBC as IP/PSTN Gateway and associate it with Mediation Server:**

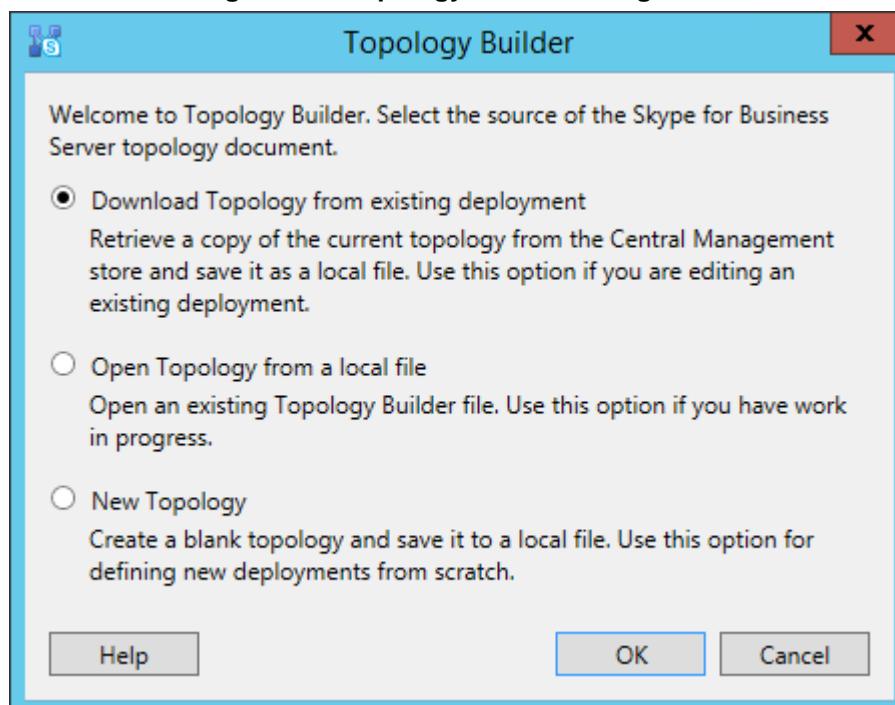
1. On the server where the Topology Builder is installed, start the Skype for Business Server 2015 Topology Builder (Windows Start menu > search for **Skype for Business Server Topology Builder**), as shown below:

Figure 3-1: Starting the Skype for Business Server Topology Builder



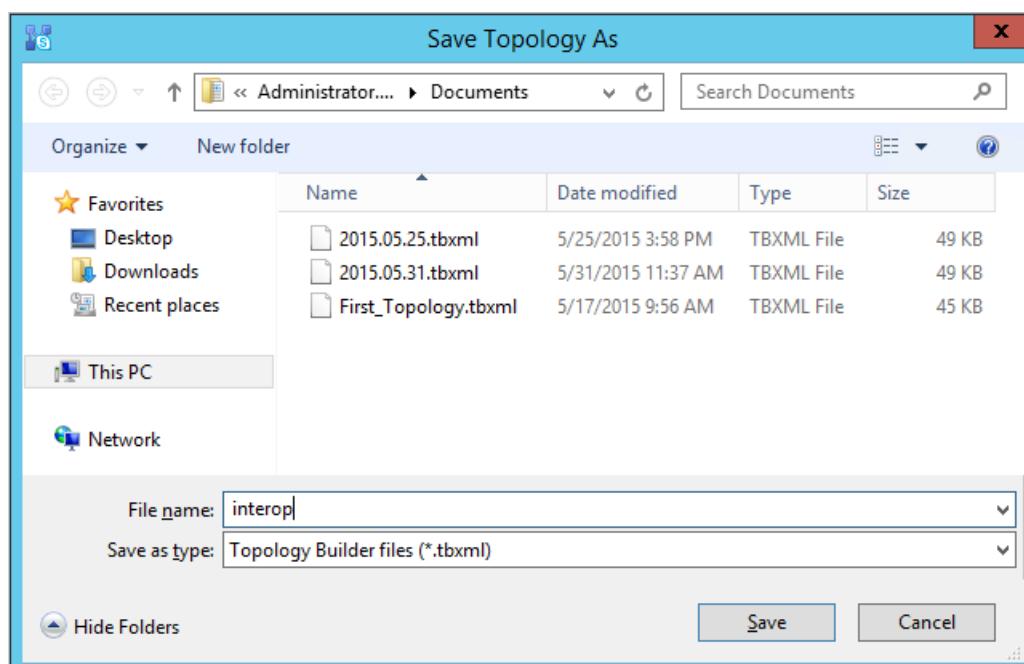
The following is displayed:

Figure 3-2: Topology Builder Dialog Box



2. Select the **Download Topology from existing deployment** option, and then click **OK**; you are prompted to save the downloaded Topology:

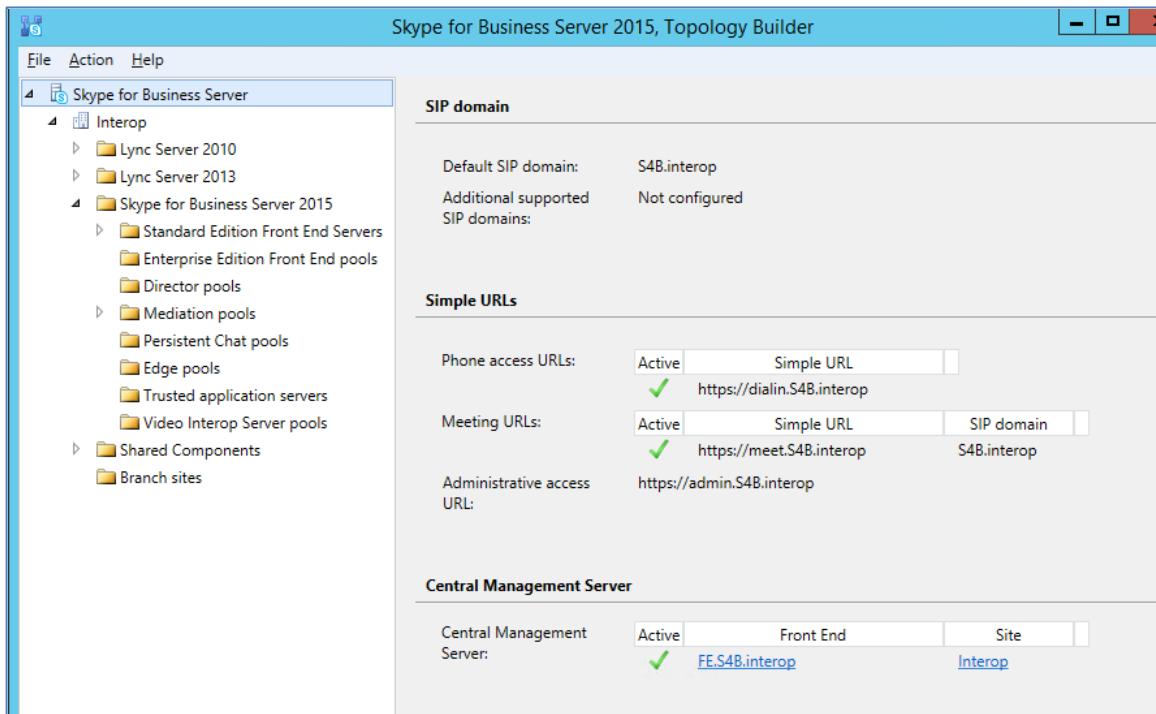
Figure 3-3: Save Topology Dialog Box



3. Enter a name for the Topology file, and then click **Save**. This step enables you to roll back from any changes you make during the installation.

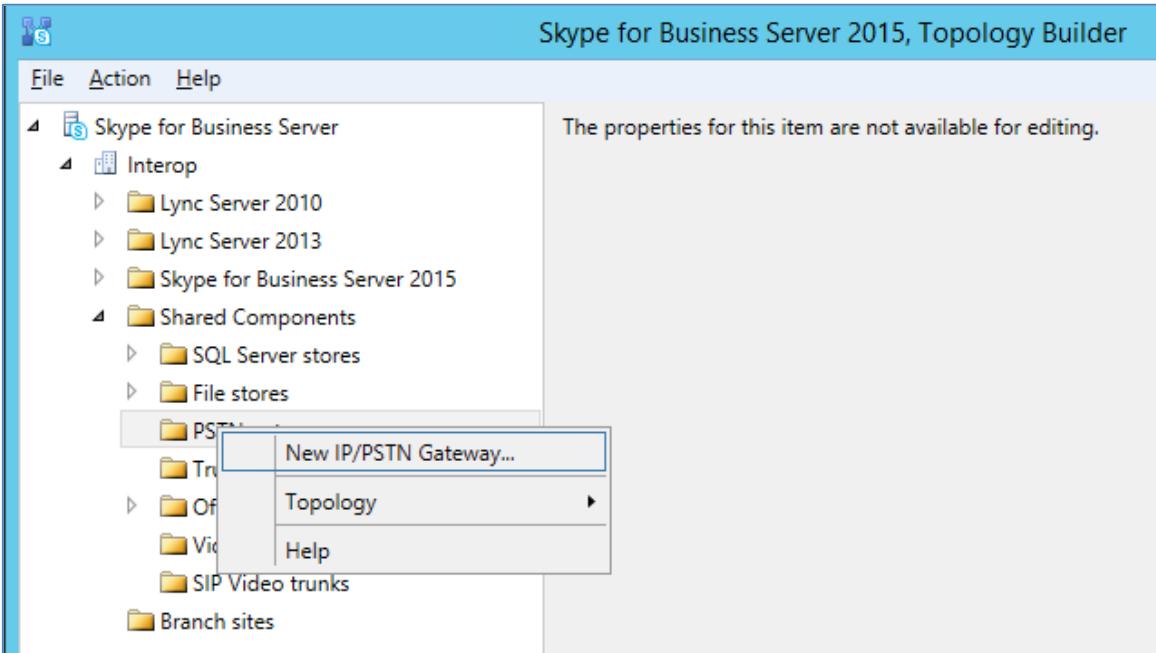
4. The Topology Builder screen with the downloaded Topology is displayed:

Figure 3-4: Downloaded Topology



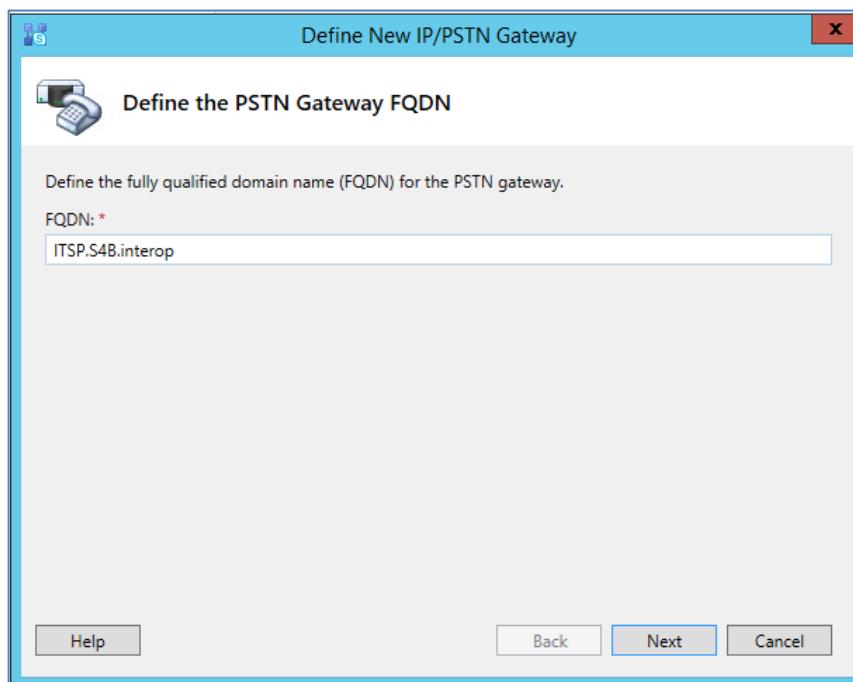
5. Under the **Shared Components** node, right-click the **PSTN gateways** node, and then from the shortcut menu, choose **New IP/PSTN Gateway**, as shown below:

Figure 3-5: Choosing New IP/PSTN Gateway



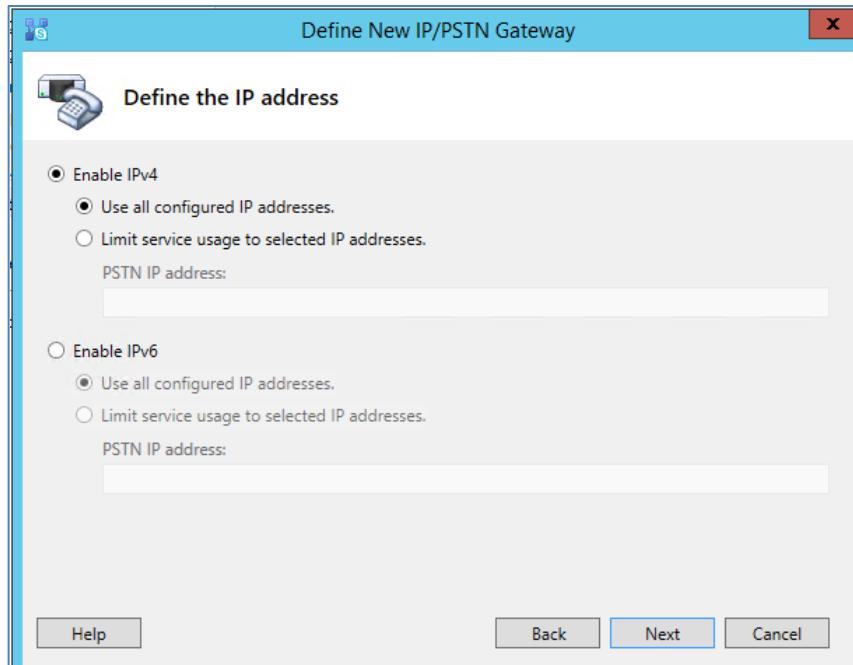
6. The following is displayed:

Figure 3-6: Define the PSTN Gateway FQDN



7. Enter the Fully Qualified Domain Name (FQDN) of the SBC (e.g., **ITSP.S4B.interop**). This FQDN should be equivalent to the configured Subject Name (CN) in the TLS Certificate Context (see Section 4.9.3 on page 61).
8. Click **Next**; the following is displayed:

Figure 3-7: Define the IP Address



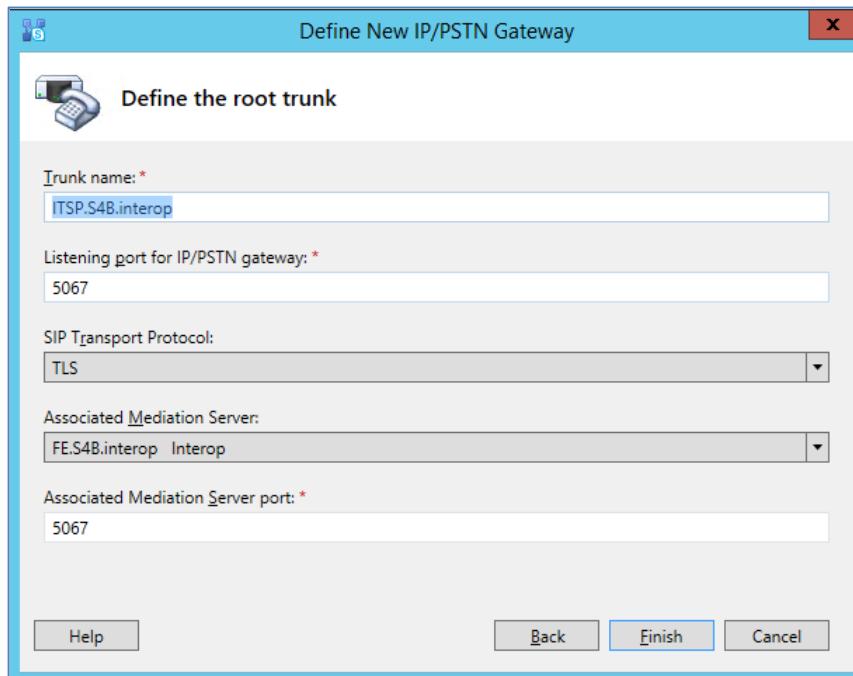
9. Define the listening mode (IPv4 or IPv6) of the IP address of your new PSTN gateway, and then click **Next**.
10. Define a *root trunk* for the PSTN gateway. A trunk is a logical connection between the Mediation Server and a gateway uniquely identified by the following combination: Mediation Server FQDN, Mediation Server listening port (TLS or TCP), gateway IP

and FQDN, and gateway listening port.

**Notes:**

- When defining a PSTN gateway in Topology Builder, you must define a root trunk to successfully add the PSTN gateway to your topology.
- The root trunk cannot be removed until the associated PSTN gateway is removed.

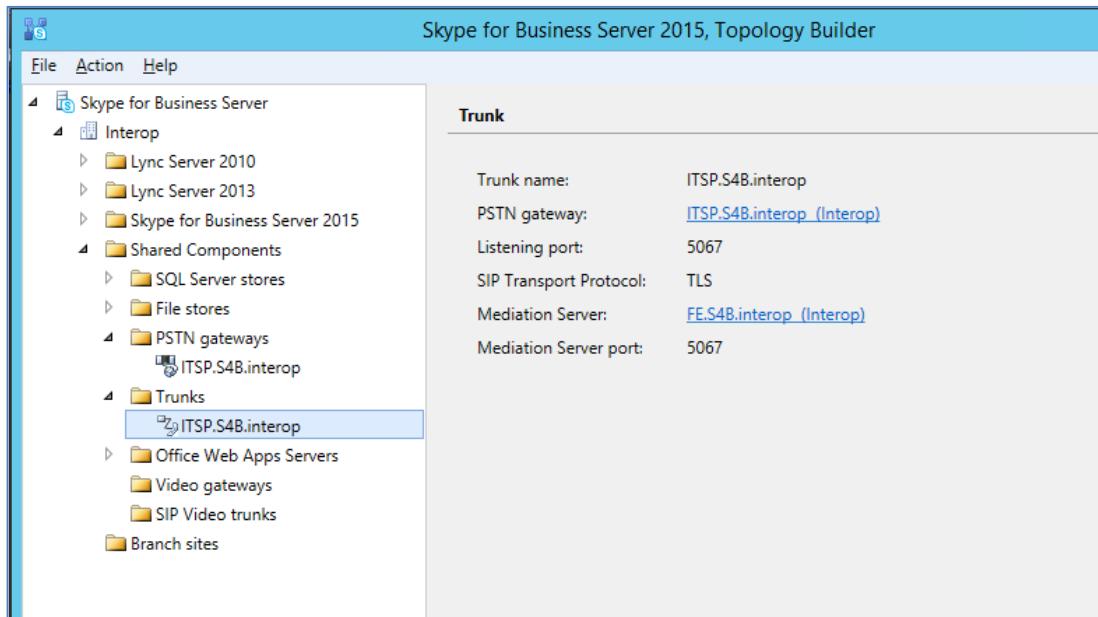
Figure 3-8: Define the Root Trunk



- In the 'Listening Port for IP/PSTN Gateway' field, enter the listening port that the SBC will use for SIP messages from the Mediation Server that will be associated with the root trunk of the PSTN gateway (e.g., **5067**). This parameter is later configured in the SIP Interface table (see Section 0 on page 42).
- In the 'SIP Transport Protocol' field, select the transport type (e.g., **TLS**) that the trunk uses. This parameter is later configured in the SIP Interface table (see Section 0 on page 42).
- In the 'Associated Mediation Server' field, select the Mediation Server pool to associate with the root trunk of this PSTN gateway.
- In the 'Associated Mediation Server Port' field, enter the listening port that the Mediation Server will use for SIP messages from the SBC (e.g., **5067**).
- Click **Finish**.

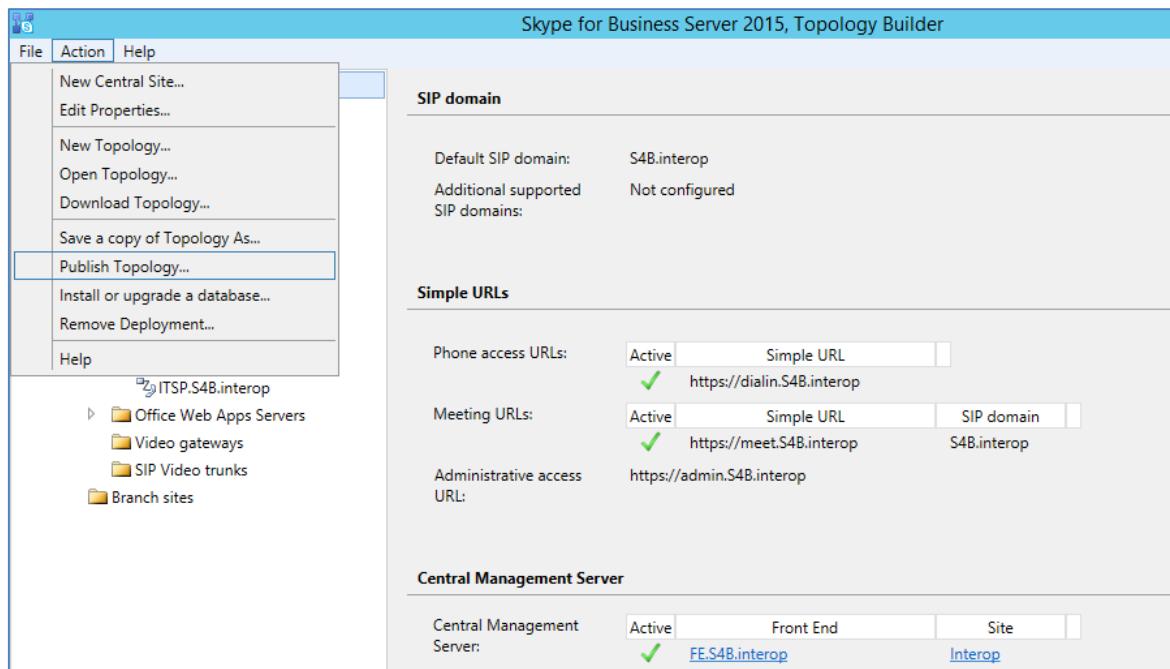
The SBC is added as a PSTN gateway, and a trunk is created as shown below:

Figure 3-9: SBC added as IP/PSTN Gateway and Trunk Created



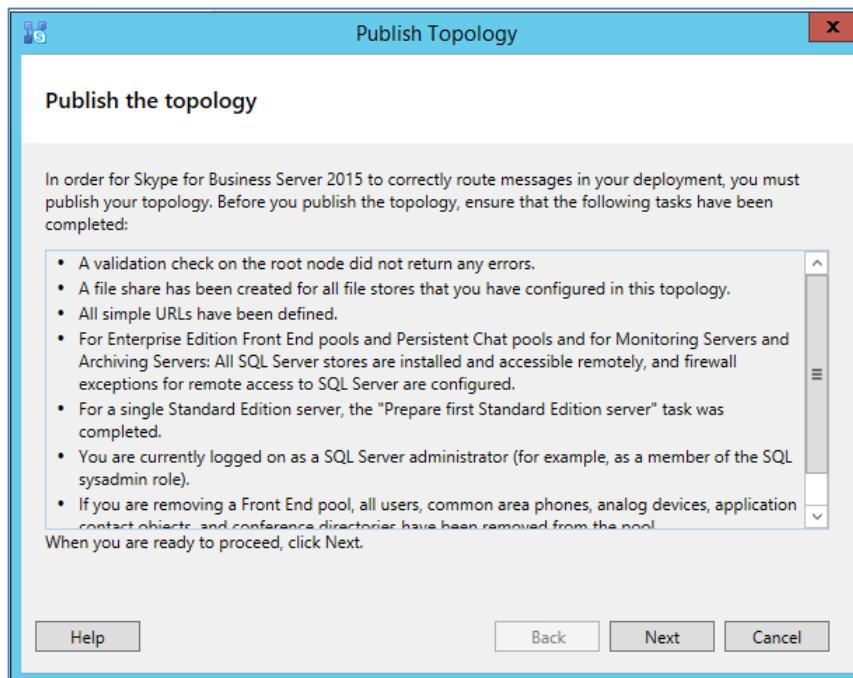
- 11.** Publish the Topology: In the main tree, select the root node **Skype for Business Server**, and then from the **Action** menu, choose **Publish Topology**, as shown below:

Figure 3-10: Choosing Publish Topology



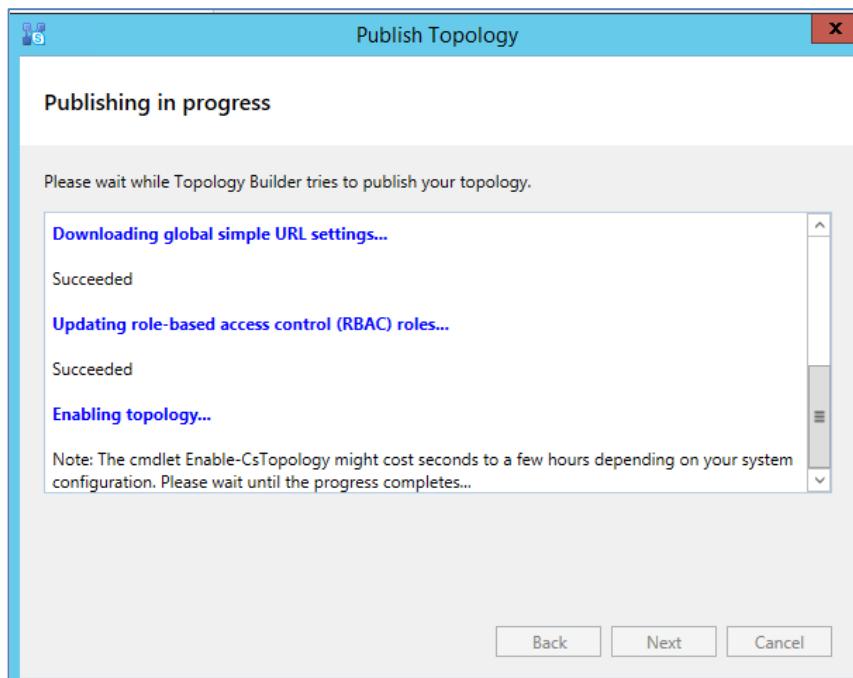
The following is displayed:

Figure 3-11: Publish the Topology



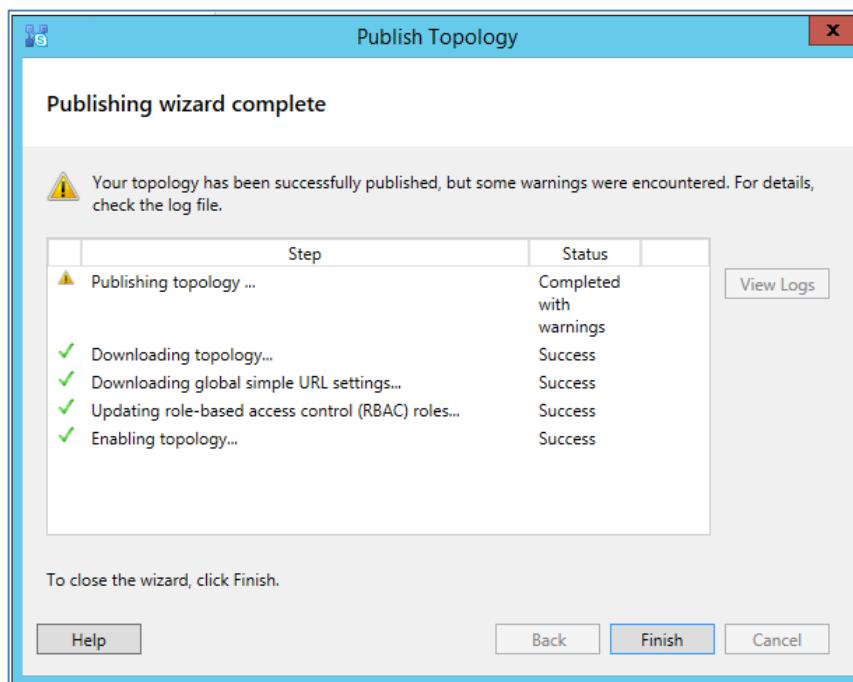
12. Click **Next**; the Topology Builder starts to publish your topology, as shown below:

Figure 3-12: Publishing in Progress



- 13.** Wait until the publishing topology process completes successfully, as shown below:

Figure 3-13: Publishing Wizard Complete



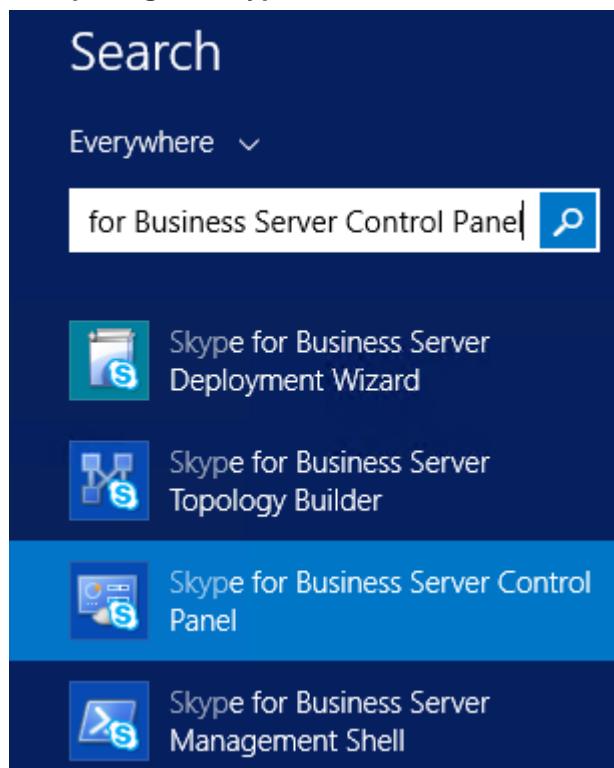
- 14.** Click **Finish**.

3.2 Configuring the "Route" on Skype for Business Server 2015

The procedure below describes how to configure a "Route" on the Skype for Business Server 2015 and to associate it with the SBC PSTN gateway.

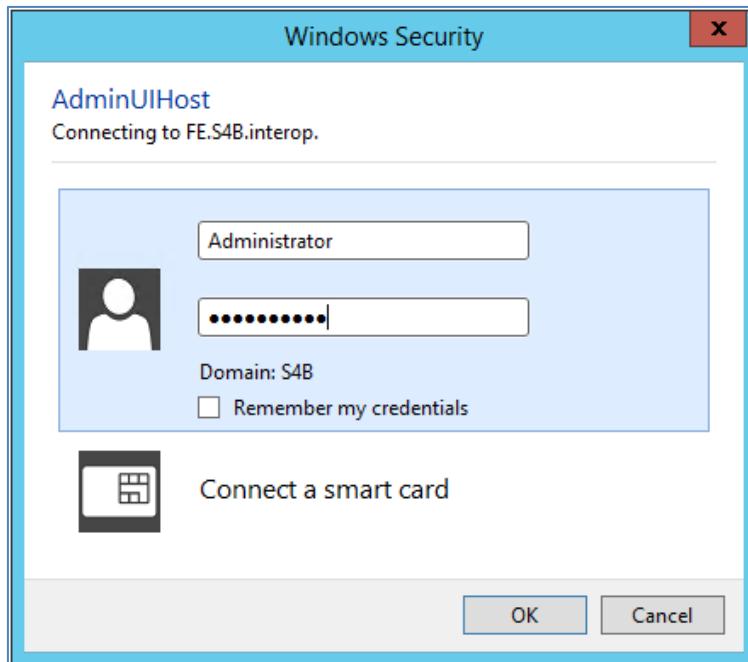
- **To configure the "route" on Skype for Business Server 2015:**
 1. Start the Microsoft Skype for Business Server 2015 Control Panel (**Start** > search for **Microsoft Skype for Business Server Control Panel**), as shown below:

Figure 3-14: Opening the Skype for Business Server Control Panel



- 2. You are prompted to enter your login credentials:

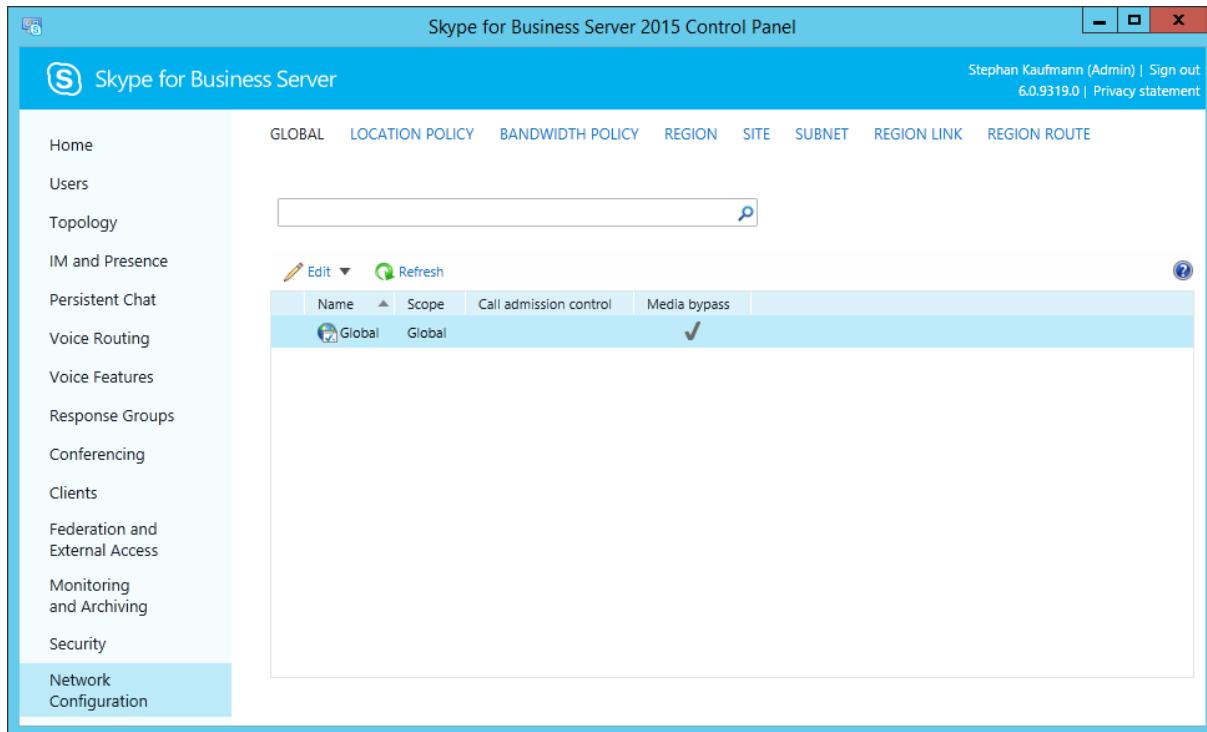
Figure 3-15: Skype for Business Server Credentials



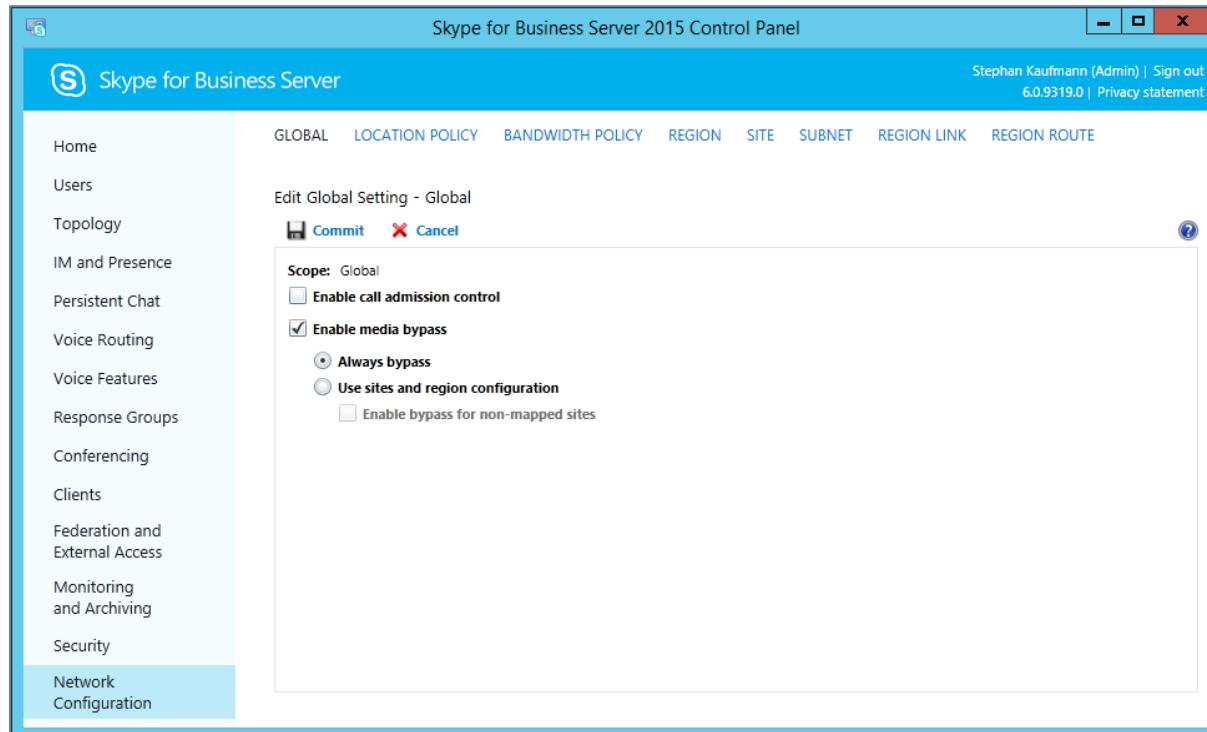
3. Enter your domain username and password, and then click **OK**; the Microsoft Skype for Business Server 2015 Control Panel is displayed:

Figure 3-16: Microsoft Skype for Business Server 2015 Control Panel

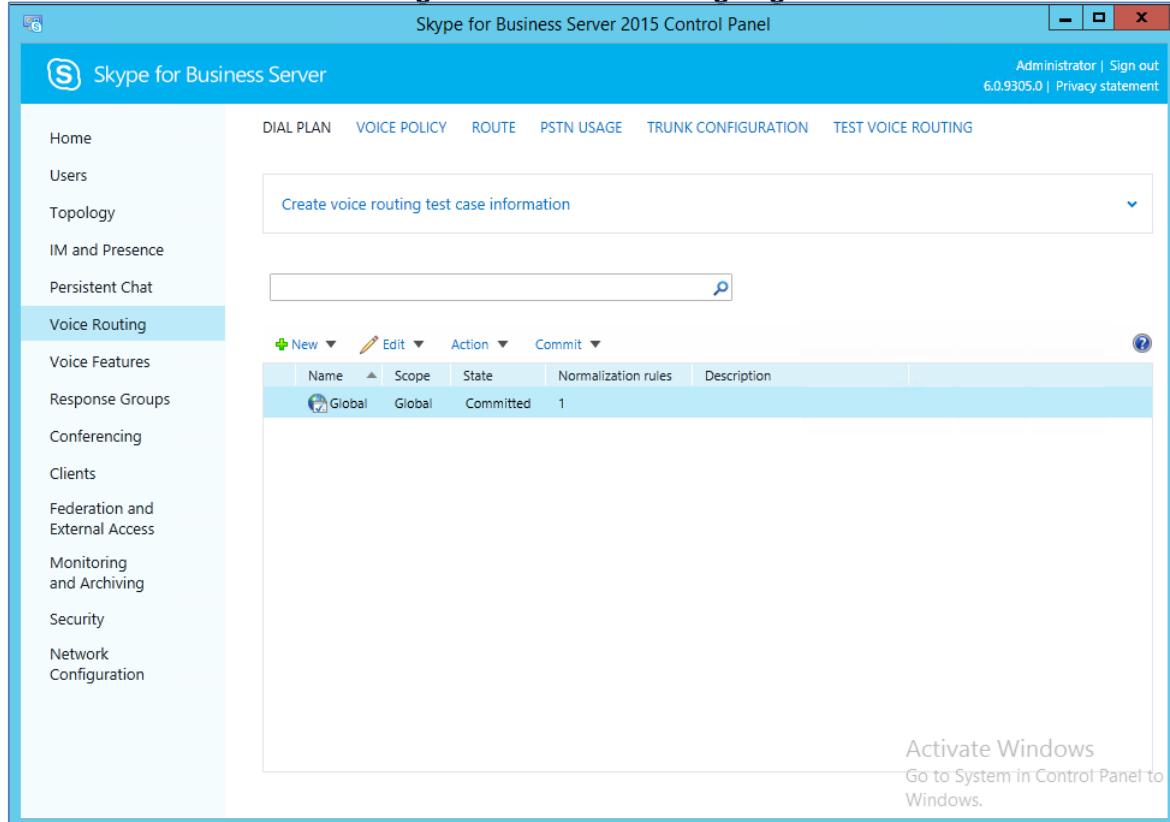
4. To enable Media bypass, select **Network Configuration** in the left navigation pane.

Figure 3-17: Network Configuration Page

- 5.** Select **Global** and click to **Edit**. The **Edit Global Settings** page appears:

Figure 3-18: Global Settings Page

- 6.** Activate **Enable Media bypass** and click to **Commit**.
- 7.** In the left navigation pane, select **Voice Routing**.
- 8.** In the left navigation pane, select **Voice Routing**.

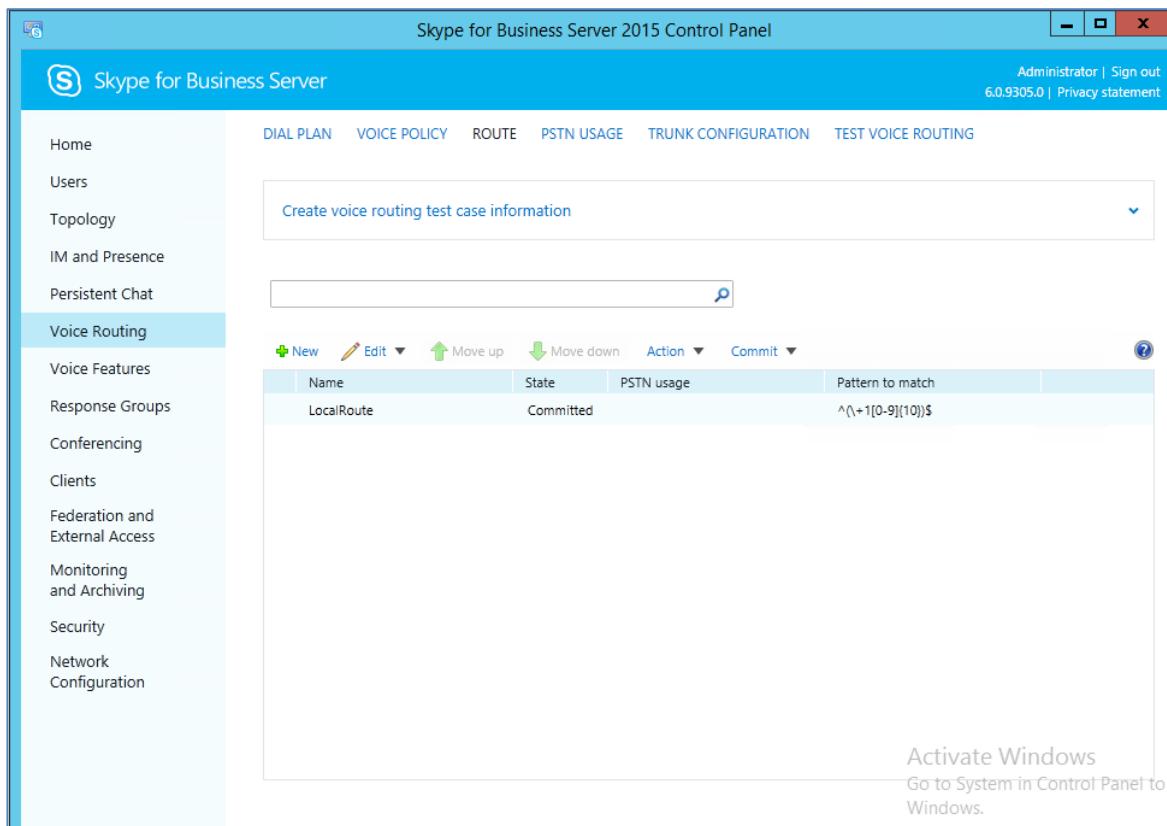
Figure 3-19: Voice Routing Page


Create voice routing test case information

Name	Scope	State	Normalization rules	Description
Global	Global	Committed	1	

Activate Windows
Go to System in Control Panel to activate Windows.

9. In the Voice Routing page, select the **Route** tab.

Figure 3-20: Route Tab


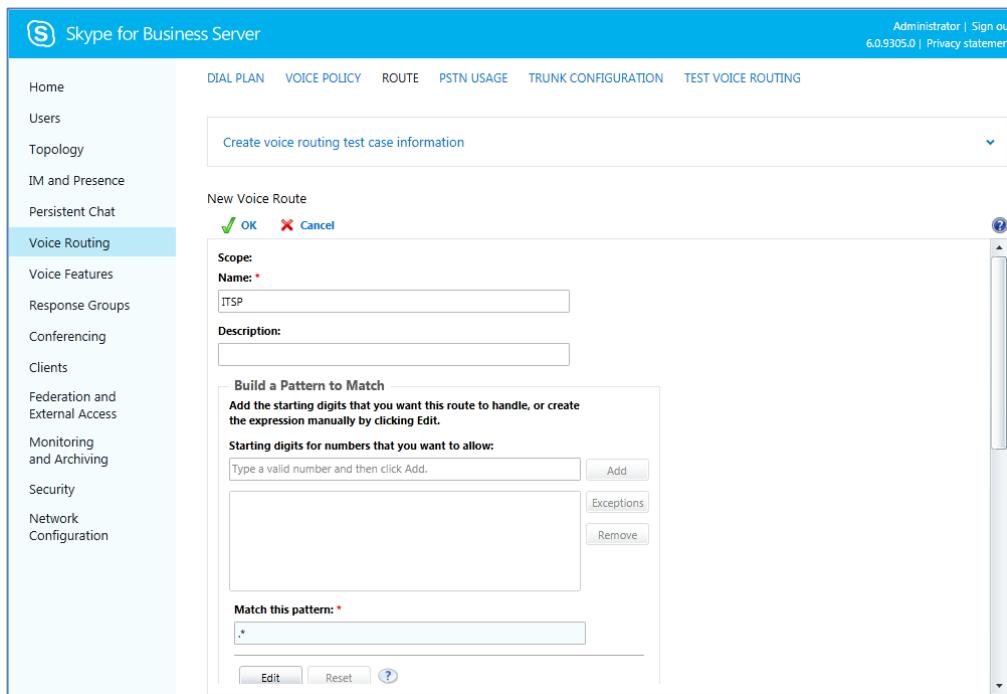
Create voice routing test case information

Name	State	PSTN usage	Pattern to match
LocalRoute	Committed		^(\+1[0-9]{10})\$

Activate Windows
Go to System in Control Panel to activate Windows.

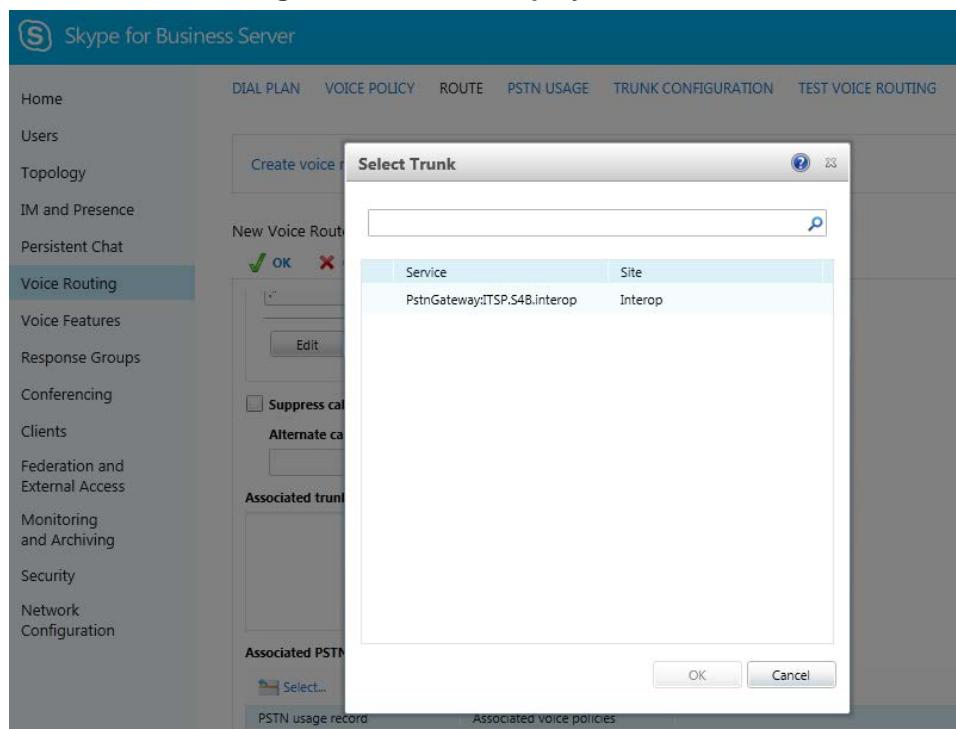
10. Click **New**; the New Voice Route page appears:

Figure 3-21: Adding New Voice Route



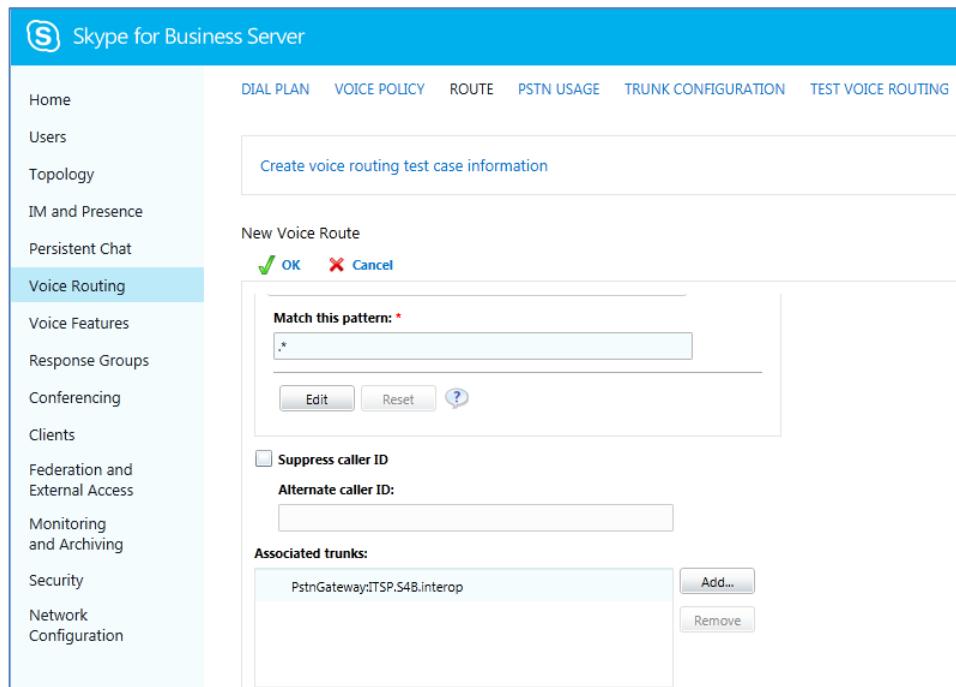
11. In the 'Name' field, enter a name for this route (e.g., **ITSP**).
12. In the 'Starting digits for numbers that you want to allow' field, enter the starting digits you want this route to handle (e.g., * to match all numbers), and then click **Add**.
13. Associate the route with the SBC Trunk that you created:
 - a. Under the 'Associated Trunks' group, click **Add**; a list of all the deployed gateways is displayed:

Figure 3-22: List of Deployed Trunks



- b.** Select the SBC Trunk you created, and then click **OK**; the trunk is added to the 'Associated Trunks' group list:

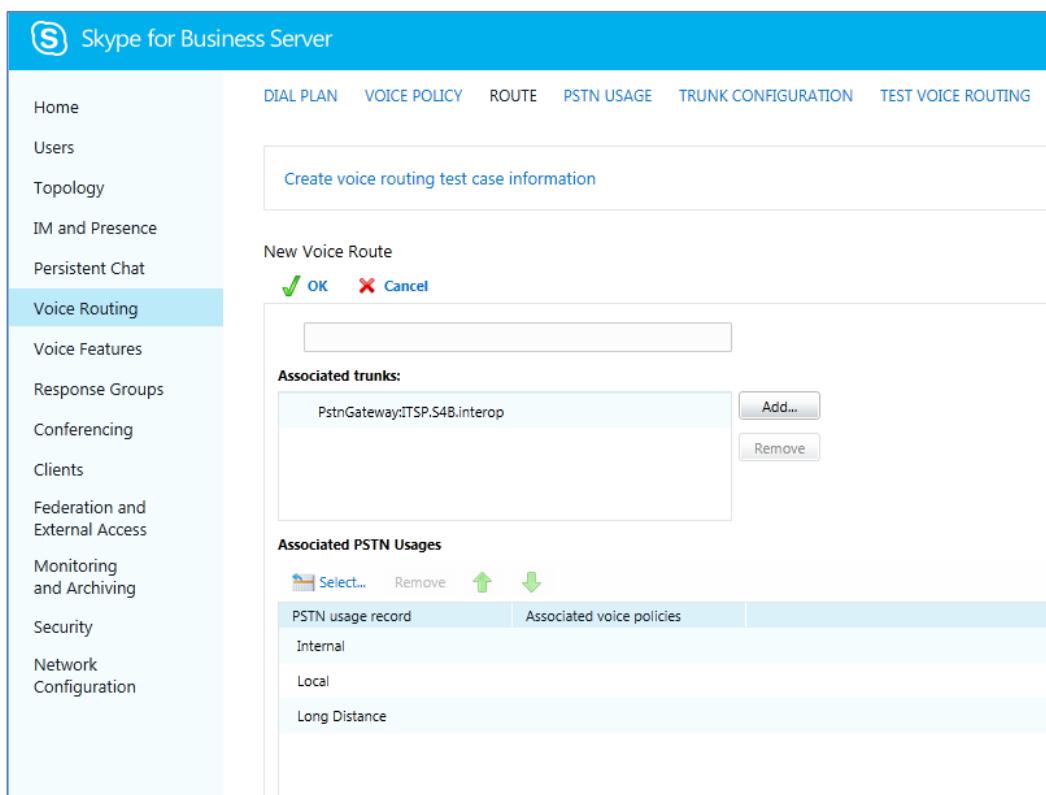
Figure 3-23: Selected SBC Trunk



14. Associate a PSTN Usage to this route:

- a.** Under the 'Associated PSTN Usages' group, click **Select** and then add the associated PSTN Usage.

Figure 3-24: Associating PSTN Usage to Route



15. Click **OK** (located on the top of the New Voice Route page); the New Voice Route (Uncommitted) is displayed:

Figure 3-25: Confirmation of New Voice Route

Name	State	PSTN usage	Pattern to match
Route to Sunrise IMS	Uncommitted	Unlimited	^\\+

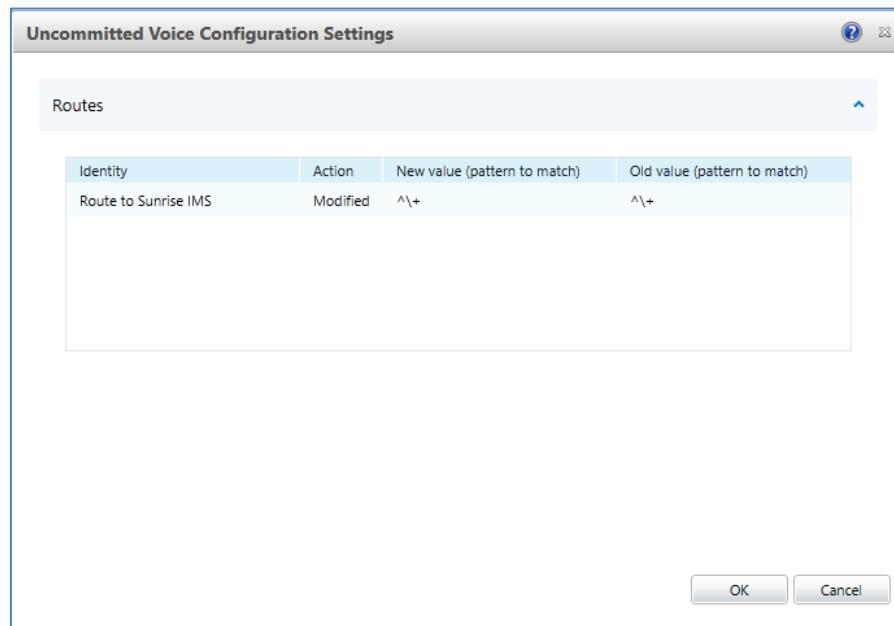
16. From the **Commit** drop-down list, choose **Commit all**, as shown below:

Figure 3-26: Committing Voice Routes

- Review uncommitted changes
- Commit all**
- Cancel selected changes
- Cancel all uncommitted changes

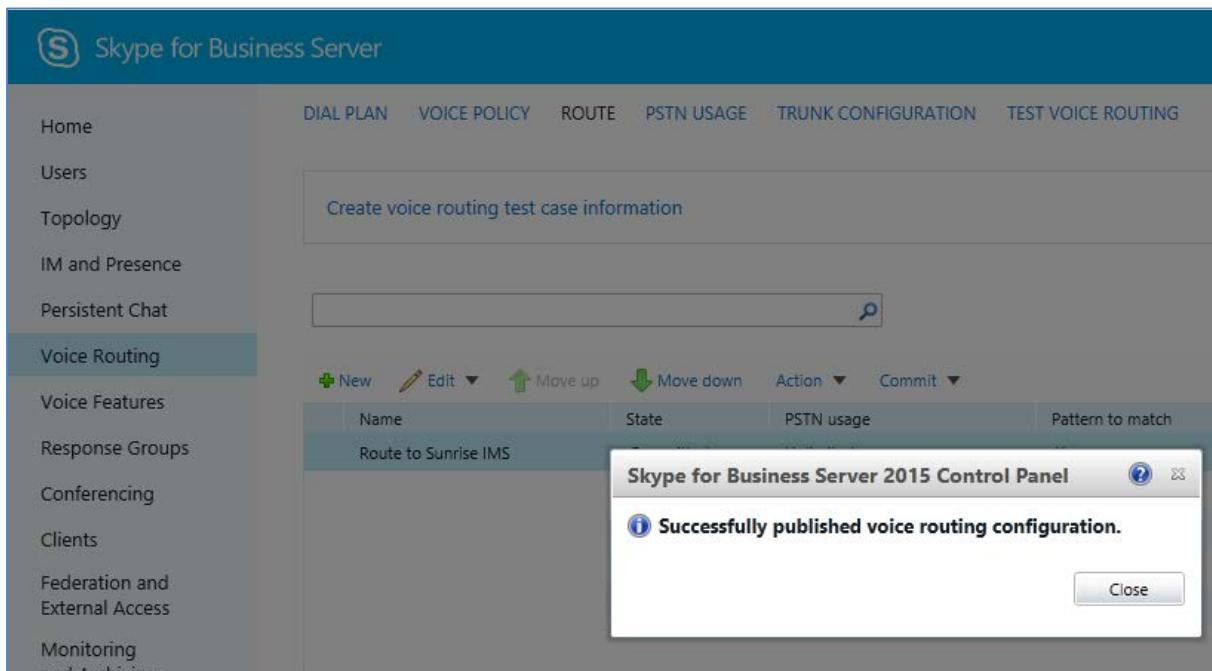
The Uncommitted Voice Configuration Settings page appears:

Figure 3-27: Uncommitted Voice Configuration Settings



- Click **Commit**; a message is displayed confirming a successful voice routing configuration, as shown below:

Figure 3-28: Confirmation of Successful Voice Routing Configuration



Name	State	PSTN usage	Pattern to match
Route to Sunrise IMS	Normal	Normal	

- 18.** Click **Close**; the new committed Route is displayed in the Voice Routing page, as shown below:

Figure 3-29: Voice Routing Screen Displaying Committed Routes

The screenshot shows the Skype for Business Server 2015 interface. The left sidebar has a 'Voice Routing' tab selected. The main area displays a table of committed routes. One row is selected, showing 'Route to Sunrise IMS' with 'Committed' status and 'Unlimited' PSTN usage. A note above the table says 'Create voice routing test case information'. Below the table are buttons for New, Edit, Move up, Move down, Action, Commit, and a search bar.

Name	State	PSTN usage	Pattern to match
Route to Sunrise IMS	Committed	Unlimited	^\\+

- 19.** For ITSPs that implement a call identifier, continue with the following steps:



Note: The SIP History-Info header provides a method to verify the identity (ID) of the call forwarder (i.e., the Skype for Business user number). This ID is required by Sunrise SIP Trunk in the SIP diversion header. The device adds this ID to the diversion header in the sent INVITE message using the IP Profile (see Section 4.6 on page 48).

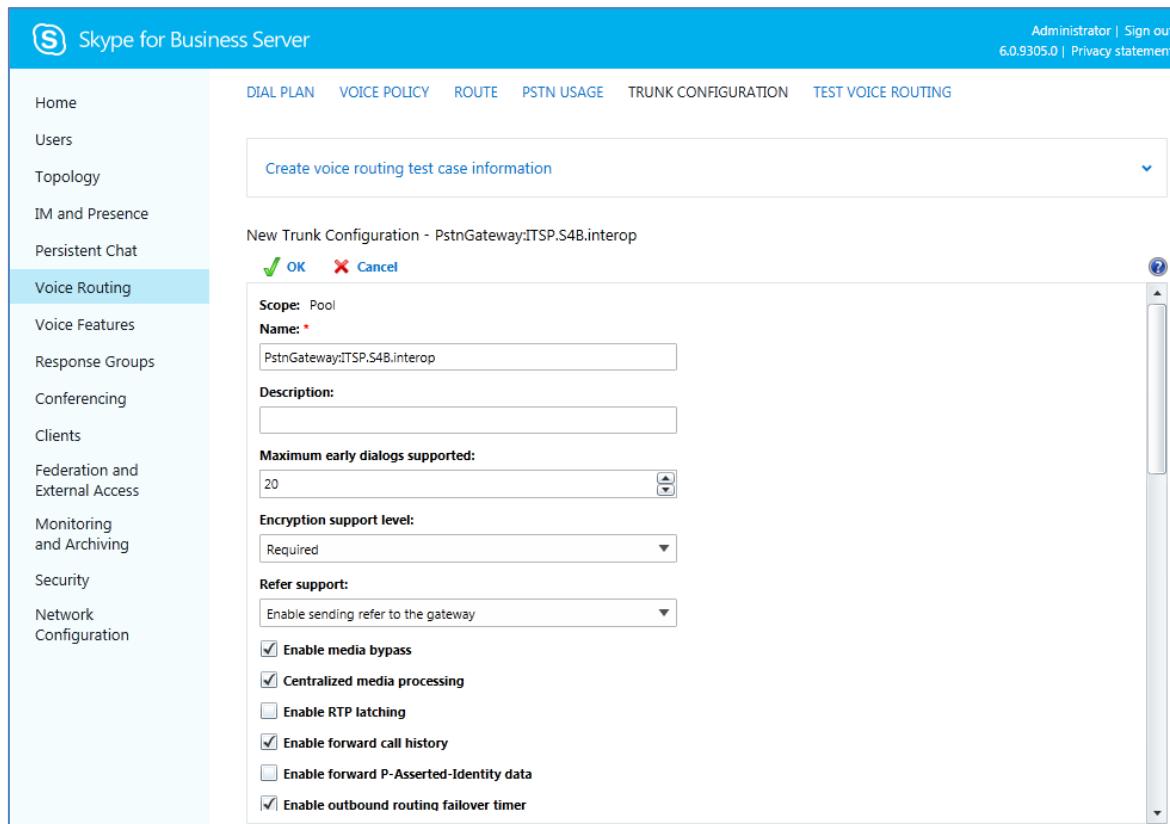
- a.** In the Voice Routing page, select the **Trunk Configuration** tab. Note that you can add and modify trunk configuration by site or by pool.

Figure 3-30: Voice Routing Screen – Trunk Configuration Tab

The screenshot shows the Skype for Business Server 2015 interface with the 'Trunk Configuration' tab selected in the sidebar. The main area displays a table of trunk configurations. One row is selected, showing 'Global' with 'Committed' status. The table includes columns for Name, Scope, State, Media bypass, PSTN usage, Calling number rules, and Called number rules. A note above the table says 'Create voice routing test case information'. Below the table are buttons for New, Edit, Action, Commit, and a search bar.

Name	Scope	State	Media bypass	PSTN usage	Calling number rules	Called number rules
Global	Global	Committed			0	0

- b.** Click **Edit**; the Edit Trunk Configuration page appears:



The screenshot shows the 'Voice Routing' section of the Skype for Business Server Management Shell. A new trunk configuration is being created with the following settings:

- Name:** PstnGateway:ITSP.S4B.interop
- Description:** (empty)
- Maximum early dialogs supported:** 20
- Encryption support level:** Required
- Refer support:** Enable sending refer to the gateway
- Enable media bypass:**
 - Centralized media processing
 - Enable RTP latching
 - Enable forward call history
 - Enable forward P-Asserted-Identity data
 - Enable outbound routing failover timer

- c. Select the **Enable forward call history** check box, and then click **OK**.
- d. Repeat Steps 11 through 13 to commit your settings.
- e. Verify de-activation of RTCP, activation of Session timers and Media Bypass and deactivation of Refer support. Since some of these parameters are not visible on the graphical interface, the Skype for Business server Management Shell must be used. Use the following command on the Skype for Business server Management Shell:

```
Set-CsTrunkConfiguration -Identity Global -EnableBypass $true -EnableReferSupport $false -RTCPActiveCalls $false -RTCPCallsOnHold $false -EnableSessionTimer $true
```

- f. To verify the configuration, use the following cmdlet:

```
Get-CsTrunkConfiguration
```

Identity	:	Global
OutboundTranslationRulesList	:	{}
SipResponseCodeTranslationRulesList	:	{}
OutboundCallingNumberTranslationRulesList	:	{}
PstnUsages	:	{}
Description	:	
ConcentratedTopology	:	True
EnableBypass	:	True
EnableMobileTrunkSupport	:	False
EnableReferSupport	:	False
EnableSessionTimer	:	True
EnableSignalBoost	:	False
MaxEarlyDialogs	:	20

RemovePlusFromUri	: False
RTCPActiveCalls	: False
RTCPCallsOnHold	: False
SRTPMode	: Required
EnablePIDFLOSupport	: False
EnableRTPLatching	: False
EnableOnlineVoice	: False
ForwardCallHistory	: True
Enable3pccRefer	: False
ForwardPAI	: False
EnableFastFailoverTimer	: True
EnableLocationRestriction	: False
NetworkSiteID	:

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4 Configuring AudioCodes SBC

This chapter provides step-by-step procedures on how to configure AudioCodes SBC for interworking between Microsoft Skype for Business Server 2015 and the Sunrise SIP Trunk. These configuration procedures are based on the interoperability test topology described in Section 2.4 on page 10, and includes the following main areas:

- SBC WAN interface - Sunrise SIP Trunking environment
- SBC LAN interface - Skype for Business Server 2015 environment

This configuration is done using the SBC's embedded Web server (hereafter, referred to as *Web interface*).



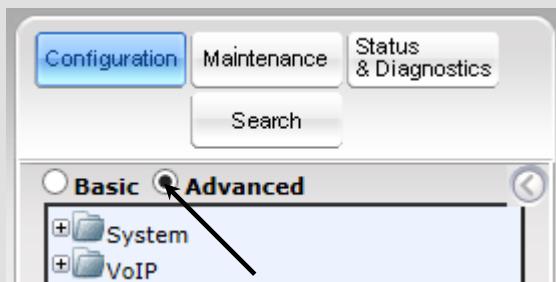
Notes:

- For implementing Microsoft Skype for Business and Sunrise SIP Trunk based on the configuration described in this section, AudioCodes SBC must be installed with a Software License Key that includes the following software features:

- ✓ Microsoft
- ✓ SBC
- ✓ Security
- ✓ DSP
- ✓ RTP
- ✓ SIP

For more information about the Software License Key, contact your AudioCodes sales representative.

- The scope of this interoperability test and document does **not** cover all security aspects for connecting the SIP Trunk to the Microsoft Skype for Business environment. Comprehensive security measures should be implemented per your organization's security policies. For security recommendations on AudioCodes' products, refer to the *Recommended Security Guidelines* document.
- Before you begin configuring the SBC, ensure that the SBC's Web interface Navigation tree is in Advanced-menu display mode. To do this, select the **Advanced** option, as shown below:



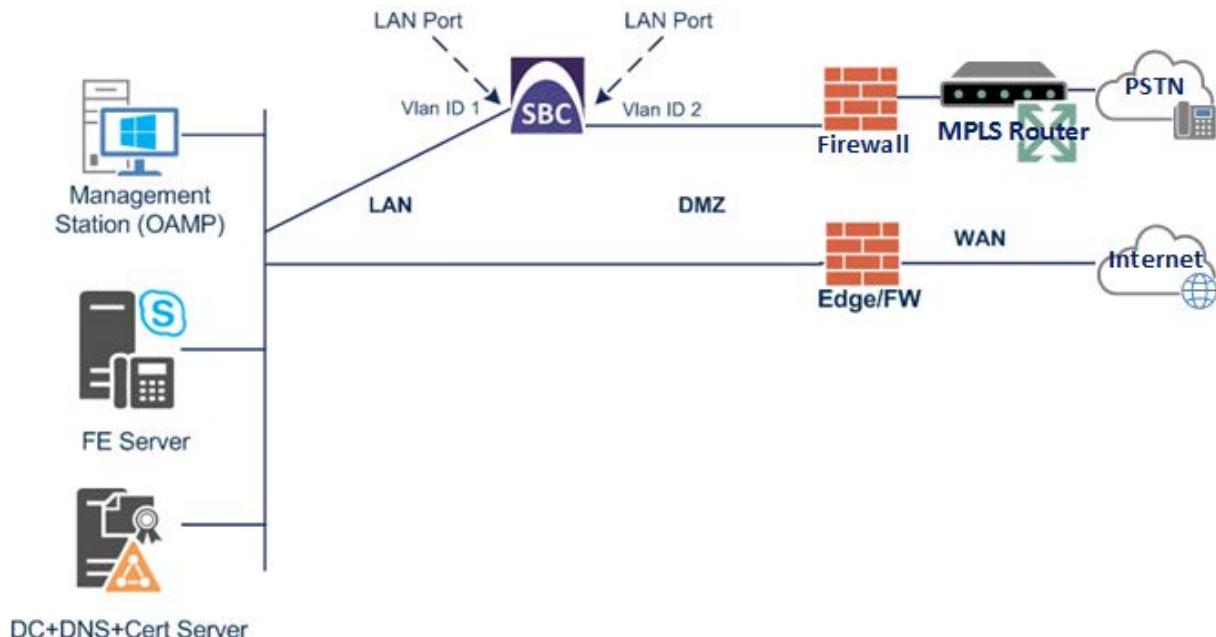
Note that when the SBC is reset, the Navigation tree reverts to Basic-menu display.

4.1 Step 1: IP Network Interfaces Configuration

This step describes how to configure the SBC's IP network interfaces. There are several ways to deploy the SBC; however, this interoperability test topology employs the following deployment method:

- SBC interfaces with the following IP entities:
 - Skype for Business servers, located on the LAN
 - Sunrise SIP Trunk, located on the WAN
- SBC connects to the WAN through a DMZ network
- Physical connection: The type of physical connection to the LAN depends on the method used to connect to the Enterprise's network. In the interoperability test topology, SBC connects to the LAN and WAN using dedicated LAN ports (i.e., two ports and two network cables are used).
- SBC also uses two logical network interfaces:
 - LAN (VLAN ID 1)
 - WAN (VLAN ID 2)

Figure 4-1: Network Interfaces in Interoperability Test Topology



4.1.1 Step 1a: Configure VLANs

➤ To configure the VLANs:

1. Open the Ethernet Device Table page (**Configuration** tab > **VoIP** menu > **Network** > **Ethernet Device Table**).
2. There will be one existing row for VLAN ID 1 and underlying interface GROUP_1.
3. Add another VLAN ID 2 for the WAN side as follows:

Parameter	Value
Index	1
VLAN ID	2
Underlying Interface	GROUP_2 (Ethernet port group)
Name	vlan 2
Tagging	Untagged

Figure 4-2: Configured VLAN IDs in Ethernet Device Table

The screenshot shows a web-based configuration interface for the Ethernet Device Table. At the top, there are buttons for 'Add +', 'Edit', 'Delete', 'Show / Hide', and search functions. Below this is a table with columns: Index, VLAN ID, Underlying Interface, Name, and Tagging. Two rows are present: Row 0 has Index 1, VLAN ID 1, Underlying Interface GROUP_1, Name vlan 1, and Tagging Untagged; Row 1 has Index 2, VLAN ID 2, Underlying Interface GROUP_2, Name vlan 2, and Tagging Untagged. At the bottom of the table, there are navigation buttons for pages and a message indicating 'View 1 - 2 of 2'.

Index	VLAN ID	Underlying Interface	Name	Tagging
0	1	GROUP_1	vlan 1	Untagged
1	2	GROUP_2	vlan 2	Untagged

4.1.2 Step 1b: Configure Network Interfaces

This step describes how to configure the IP network interfaces for each of the following interfaces:

- LAN VoIP (assigned the name "SfB")
- WAN VoIP (assigned the name "Sunrise")

➤ To configure the IP network interfaces:

1. Open the IP Interfaces Table page (**Configuration** tab > **VoIP** menu > **Network** > **IP Interfaces Table**).
2. Modify the existing LAN network interface:
 - a. Select the line with 'Index' 0 of the **OAMP + Media + Control** table row, and then click **Edit**.
 - b. Configure the interface as follows:

Parameter	Value
IP Address	10.145.205.12 (IP address of SBC)

Parameter	Value
Prefix Length	24 (subnet mask in bits for 255.255.0.0)
Default Gateway	10.145.205.1
Interface Name	SfB (arbitrary descriptive name)
Primary DNS Server IP Address	10.145.205.51
Secondary DNS Server IP Address	10.145.205.52
Underlying Device	vlan 1

a. Click **Save**.

3. Add a network interface for the WAN side:

b. Click **Add**.

c. Configure the interface as follows:

Parameter	Value
Application Type	Media + Control
IP Address	192.168.201.30 (WAN IP address)
Prefix Length	24 (for 255.255.255.128)
Default Gateway	0.0.0.0
Interface Name	Sunrise
Primary DNS Server IP Address	0.0.0.0
Secondary DNS Server IP Address	0.0.0.0
Underlying Device	vlan 2

a. Click **Add**.

The configured IP network interfaces are shown below:

Figure 4-3: Configured Network Interfaces in IP Interfaces Table

▼ Interface Table									
<input type="button" value="Add +"/> <input type="button" value="Edit"/> <input type="button" value="Delete"/> <input type="button" value="Show / Hide"/> <input type="button" value="All"/> <input type="text" value="Search in table"/> <input type="button" value="Search"/>									
Index	Interface Name	Application Type	Interface Mode	IP Address	Prefix Length	Default Gateway	Primary DNS	Secondary DNS	Under Device
0	SfB	OAMP + Media + Cor	IPv4 Manual	10.145.205.12	24	10.145.205.1	10.145.205.51	10.145.205.52	vlan 1
1	Sunrise	Media + Control	IPv4 Manual	192.168.201.30	24	0.0.0.0	0.0.0.0	0.0.0.0	vlan 2

Page of 1 | View 1 - 2 of 2

4.1.3 Step 1c: Adding Static Routes to Sunrise SBC

This step describes how to configure the following static IP routes to sunrise SBCs:

- 192.168.200.0/24 IMS Next Hop
- 10.17.220.0/28 IMS Zürich SIP
- 10.17.220.16/28 IMS Zürich Media
- 10.24.220.0/28 IMS Bern SIP
- 10.24.220.16/28 IMS Bern Media

➤ **To configure the IP network interfaces:**

1. Open the Static Route Table page (**Configuration** tab > **VoIP** menu > **Network** > **Static Route Table**).

- a. Click **Add**.

- b. Configure the static route as follows:

Parameter	Value
Index	0
Device Name	vlan 2
Destination	192.168.200.0
Prefix length	24
Gateway	192.168.201.20 (Firewall internal IP address)
Description	IMS Next Hop

- c. Click to **Add**.

2. Add the static route to IMS Zürich for SIP.

- a. Click **Add**.

- b. Configure the static route as follows:

Parameter	Value
Index	1
Device Name	vlan 2
Destination	10.17.220.0
Prefix length	28
Gateway	192.168.201.20 (Firewall internal IP address)
Description	IMS ZUR SIP

- c. Click to **Add**.

3. Add the static route to IMS Zürich for Media.

a. Click **Add**.

b. Configure the static route as follows:

Parameter	Value
Index	2
Device Name	vlan 2
Destination	10.17.220.16
Prefix length	28
Gateway	192.168.201.20 (Firewall internal IP address)
Description	IMS ZUR Media

c. Click to **Add**.

4. Add the static route to IMS Bern for SIP.

a. Click **Add**.

b. Configure the static route as follows:

Parameter	Value
Index	3
Device Name	vlan 2
Destination	10.24.220.0
Prefix length	28
Gateway	192.168.201.20 (Firewall internal IP address)
Description	IMS BER SIP

c. Click to **Add**.

5. Add the static route to IMS Bern for Media.

a. Click **Add**.

b. Configure the static route as follows:

Parameter	Value
Index	4
Device Name	vlan 2
Destination	10.24.220.0
Prefix length	28
Gateway	192.168.201.20 (Firewall internal IP address)
Description	IMS BER Media

c. Click to **Add**.

The configured static IP routes are shown below:

Figure 4-4: Configured Network Interfaces in IP Interfaces Table

The screenshot shows a table titled "Static Route Table" with the following data:

Index	Device Name	Destination	Prefix Length	Gateway	Description
0	vlan 2	192.168.200.0	24	192.168.201.20	IMS Next Hop
1	vlan 2	10.17.220.0	28	192.168.201.20	IMS ZUR SIP
2	vlan 2	10.17.220.16	28	192.168.201.20	IMS ZUR Media
3	vlan 2	10.24.220.0	28	192.168.201.20	IMS BER SIP
4	vlan 2	10.24.220.16	28	192.168.201.20	IMS BER Media

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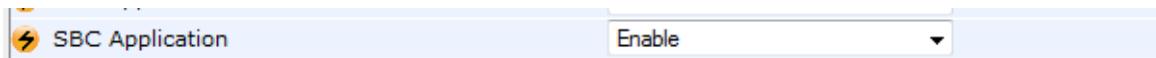
4.2 Step 2: Enable the SBC Application

This step describes how to enable the SBC application.

➤ **To enable the SBC application:**

1. Open the Applications Enabling page (**Configuration** tab > **VoIP** menu > **Applications Enabling** > **Applications Enabling**).

Figure 4-5: Enabling SBC Application



2. From the 'SBC Application' drop-down list, select **Enable**.
3. Click **Submit**.
4. Reset the SBC with a burn to flash for this setting to take effect (see Section 4.15 on page 82).

4.3 Step 3: Configure Media Realms

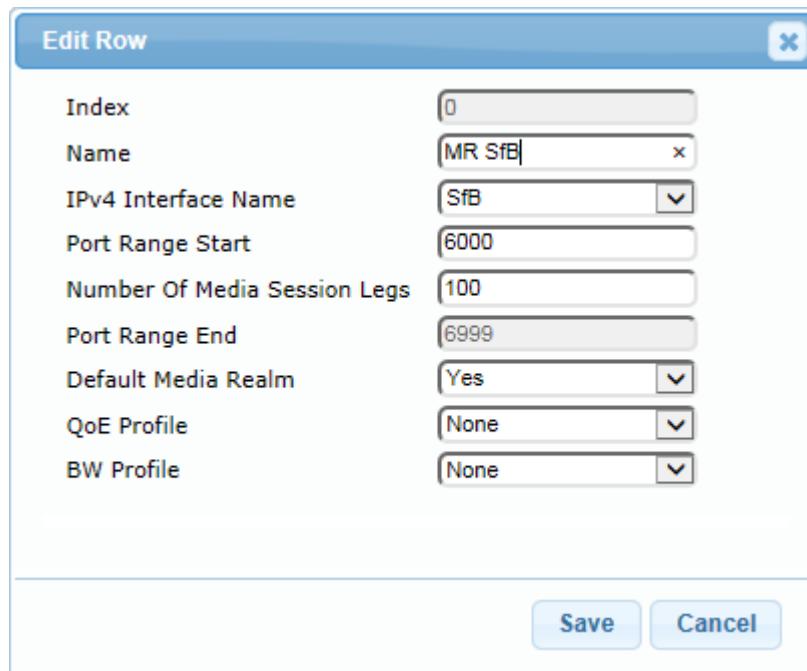
This step describes how to configure Media Realms. The simplest configuration is to create two Media Realms - one for internal (LAN) traffic and one for external (WAN) traffic.

➤ **To configure Media Realms:**

1. Open the Media Realm Table page (**Configuration** tab > **VoIP** menu > **VoIP Network** > **Media Realm Table**).
2. Add a Media Realm for the LAN interface. You can use the default Media Realm (Index 0), but modify it as shown below:

Parameter	Value
Index	0
Media Realm Name	MR SfB (descriptive name)
IPv4 Interface Name	Voice
Port Range Start	6000 (represents lowest UDP port number used for media on LAN)
Number of Media Session Legs	100 (media sessions assigned with port range)

Figure 4-6: Configuring Media Realm for LAN



Edit Row	
Index	0
Name	MR SfB
IPv4 Interface Name	SfB
Port Range Start	6000
Number Of Media Session Legs	100
Port Range End	6999
Default Media Realm	Yes
QoE Profile	None
BW Profile	None

Save Cancel

3. Configure a Media Realm for WAN traffic:

Parameter	Value
Index	1
Media Realm Name	MR Sunrise (arbitrary name)
IPv4 Interface Name	Sunrise
Port Range Start	7000 (represents lowest UDP port number used for media on WAN)
Number of Media Session Legs	100 (media sessions assigned with port range)

Figure 4-7: Configuring Media Realm for WAN

Add Row

Index	1
Name	MR Sunrise
IPv4 Interface Name	Sunrise
Port Range Start	7000
Number Of Media Session Legs	100
Port Range End	
Default Media Realm	No
QoE Profile	None
BW Profile	None

Add **Cancel**

The configured Media Realms are shown in the figure below:

Figure 4-8: Configured Media Realms in Media Realm Table

▼ Media Realm Table

Index	Name	IPv4 Interface Name	Port Range Start	Number Of Media Session Legs	Port Range End	Default Media Realm
0	MR SfB	SfB	6000	100	6999	Yes
1	MR Sunrise	Sunrise	7000	100	7999	No

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4.4 Step 4: Configure SIP Signaling Interfaces

This step describes how to configure SIP Interfaces. For the interoperability test topology, an internal and external SIP Interface must be configured for the SBC.

➤ **To configure SIP Interfaces:**

1. Open the SIP Interface Table page (**Configuration** tab > **VoIP** menu > **VoIP Network** > **SIP Interface Table**).
2. Add a SIP Interface for the LAN interface. You can use the default SIP Interface (Index 0), but modify it as shown below:

Parameter	Value
Index	0
Interface Name	SfB (see note at the end of this section)
Network Interface	SfB
Application Type	SBC
UDP Port (for supporting Fax ATA device)	5068 (if required)
TCP Port	5068 (if required)
TLS Port	5067 (see note below)
Media Realm	MR SfB



Note: The TLS port parameter must be identically configured in the Skype for Business Topology Builder (see Section 3.1 on page 13).

3. Configure a SIP Interface for the WAN:

Parameter	Value
Index	1
Interface Name	Sunrise
Network Interface	Sunrise
Application Type	SBC
UDP Port	5061
TCP Port	0
TLS Port	5061 (only for TLS connection option)
Media Realm	MR Sunrise

The configured SIP Interfaces are shown in the figure below:

Figure 4-9: Configured SIP Interfaces in SIP Interface Table

SIP Interface Table										
	Add +	Edit	Delete	Show / Hide	All	Search in table		Search		
Index	Name	SRD	Network Interface	Application Type	UDP Port	TCP Port	TLS Port	Encapsulation Protocol	Media Realm	
0	SfB	DefaultSF	SfB	SBC	5068	5068	5067	No encapsulation	MR SfB	
1	Sunrise	DefaultSF	Sunrise	SBC	5061	0	5061	No encapsulation	MR Sunrise	

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Note: Unlike in previous software releases where configuration entities (e.g., SIP Interface, Proxy Sets, and IP Groups) were associated with each other using table row indices, Version 7.0 uses the string **names** of the configuration entities. Therefore, it is recommended to configure each configuration entity with meaningful names for easy identification.

4.5 Step 5: Configure Proxy Sets

This step describes how to configure Proxy Sets. The Proxy Set defines the destination address (IP address or FQDN) of the IP entity server. Proxy Sets can also be used to configure load balancing between multiple servers.

For the interoperability test topology, two Proxy Sets need to be configured for the following IP entities:

- Microsoft Skype for Business Server 2015
- Sunrise SIP Trunk
- Fax supporting ATA device (optional)

The Proxy Sets will be later applied to the VoIP network by assigning them to IP Groups.

➤ **To configure Proxy Sets:**

1. Open the Proxy Sets Table page (**Configuration** tab > **VoIP** menu > **VoIP Network** > **Proxy Sets Table**).
2. Add a Proxy Set for the Skype for Business Server 2015. You can use the default Proxy Set (Index 0), but modify it as shown below:

Parameter	Value
Proxy Set ID	0
Proxy Name	SfB
SBC IPv4 SIP Interface	SfB
Proxy Keep Alive	Using Options
Load Balancing Method	Round Robin

Parameter	Value
Proxy Hot Swap	Enable

Figure 4-10: Configuring Proxy Set for Microsoft Skype for Business Server 2015

Edit Row X

Index	0
SRD	DefaultSRD
Name	SfB
Gateway IPv4 SIP Interface	None
SBC IPv4 SIP Interface	SfB
Proxy Keep-Alive	Using OPTIONS
Proxy Keep-Alive Time [sec]	60
Redundancy Mode	Round Robin
Proxy Load Balancing Method	Round Robin
DNS Resolve Method	None
Proxy Hot Swap	Enable
Keep-Alive Failure Responses	None
Classification Input	IP Address only
TLS Context Name	None

Save Cancel

3. Configure a Proxy Address Table for Proxy Set for Skype for Business Server 2015:
 - a. Go to **Configuration** tab > **VoIP** menu > **VoIP Network** > **Proxy Sets Table** > **Proxy Address Table**.

Parameter	Value
Index	0
Proxy Address	FEPool01.sunlab.ch:5067 (Skype for Business Server 2015 FQDN and destination port)
Transport Type	TLS

Figure 4-11: Configuring Proxy Address for Microsoft Skype for Business Server 2015

Add Row

Index	0
Proxy Address	FEPool01.sunlab.ch:5067
Transport Type	TLS

Add **Cancel**

4. Configure a Proxy Set for the Sunrise SIP Trunk:

Parameter	Value
Proxy Set ID	1
Proxy Name	Sunrise
SBC IPv4 SIP Interface	Sunrise
Proxy Keep Alive	Using Options
Proxy Hot Swap	Disable

Figure 4-12: Configuring Proxy Set for Sunrise SIP Trunk

Edit Row

Index	1
SRD	DefaultSRD
Name	Sunrise
Gateway IPv4 SIP Interface	None
SBC IPv4 SIP Interface	Sunrise
Proxy Keep-Alive	Using OPTIONS
Proxy Keep-Alive Time [sec]	60
Redundancy Mode	
Proxy Load Balancing Method	Disable
DNS Resolve Method	
Proxy Hot Swap	Disable
Keep-Alive Failure Responses	
Classification Input	IP Address only
TLS Context Name	None

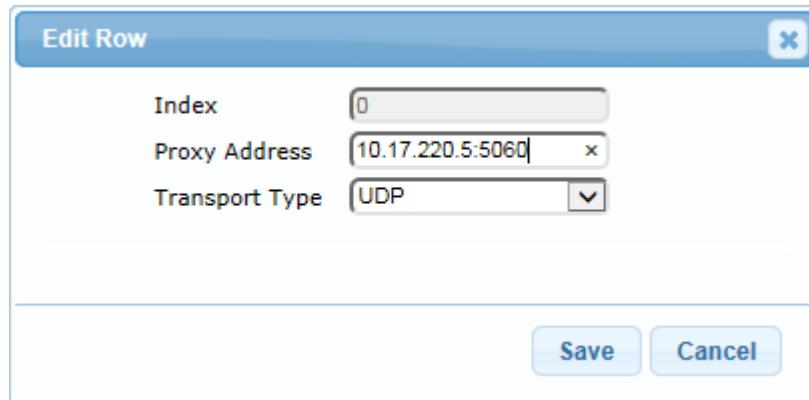
Save **Cancel**

- a. Configure a Proxy Address Table for Proxy Set 1:
- b. Go to Configuration tab > VoIP menu > VoIP Network > **Proxy Sets Table** > **Proxy Address Table**.

Parameter	Value
Index	0
Proxy Address	10.17.220.5:5060 (IP address / FQDN and destination port)
Transport Type	UDP

Parameter	Value
Index	1
Proxy Address	10.24.220.5:5060 (IP address / FQDN and destination port)
Transport Type	UDP

Figure 4-13: Configuring Proxy Address for Sunrise SIP Trunk



5. Configure a Proxy Set for Fax supporting ATA device (if required):

Parameter	Value
Proxy Set ID	2
Proxy Name	Fax
SBC IPv4 SIP Interface	SfB

Figure 4-14: Configuring Proxy Set for Fax ATA device

Index: 2
 SRD: DefaultSRD
 Name: Fax
 Gateway IPv4 SIP Interface: None
 SBC IPv4 SIP Interface: SfB
 Proxy Keep-Alive: Disable
 Proxy Keep-Alive Time [sec]: 60
 Redundancy Mode: (dropdown)
 Proxy Load Balancing Method: Disable
 DNS Resolve Method: (dropdown)
 Proxy Hot Swap: Disable
 Keep-Alive Failure Responses: (dropdown)
 Classification Input: IP Address only
 TLS Context Name: None

Save **Cancel**

- Configure a Proxy Address Table for Proxy Set 2:
- Go to **Configuration** tab > **VoIP** menu > **VoIP Network** > **Proxy Sets Table** > **Proxy Address Table**.

Parameter	Value
Index	0
Proxy Address	10.145.205.99:5060 (IP address / FQDN and destination port)
Transport Type	UDP

Figure 4-15: Configuring Proxy Address for Fax ATA device

Index: 0
 Proxy Address: 10.145.205.99:5060
 Transport Type: UDP

Add **Cancel**

The configured Proxy Sets are shown in the figure below:

Figure 4-16: Configured Proxy Sets in Proxy Sets Table

▼ Proxy Sets Table								
	Add +	Edit	Delete	Show / Hide	All	Search in table	Search	
Index	Name	SRD	Gateway IPv4 SIP Interface	SBC IPv4 SIP Interface	Proxy Keep-Alive Time [sec]	Redundancy Mode	Proxy Hot Swap	
0	SfB		None	SfB	60		Enable	
1	Sunrise		None	Sunrise	60		Disable	
2	Fax		None	SfB	60		Disable	

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4.6 Step 6: Configure IP Profiles

This step describes how to configure IP Profiles. The IP Profile defines a set of call capabilities relating to signaling (e.g., SIP message terminations such as REFER) and media (e.g., coder and transcoding method).

In this interoperability test topology, IP Profiles need to be configured for the following IP entities:

- Microsoft Skype for Business Server 2015 - to operate in secure mode using SRTP and TLS
- Sunrise SIP trunk - to operate in non-secure mode using RTP and UDP (optional SRTP and TLS available)

➤ **To configure IP Profile for the Skype for Business Server 2015:**

1. Open the IP Profile Settings page (**Configuration tab > VoIP > Coders and Profiles > IP Profile Settings**).
2. Click **Add**.
3. Click the **Common** tab, and then configure the parameters as follows:

Parameter	Value
Index	1
Name	SfB
Signaling DiffServ	24
Symmetric MKI	Enable
MKI Size	1
Reset SRTP State Upon Re-key	Enable
Generate SRTP keys mode:	Always

Figure 4-17: Configuring IP Profile for Skype for Business Server 2015 – Common Tab

The screenshot shows the 'Edit Row' dialog for an IP profile. The 'Common' tab is active. The 'Index' is set to 1. The configuration includes the following parameters:

Name	SfB
Dynamic Jitter Buffer Minimum Delay [msec]	10
Dynamic Jitter Buffer Optimization Factor	10
Jitter Buffer Max Delay [msec]	250
RTP IP DiffServ	46
Signaling DiffServ	24
Silence Suppression	Enable
RTP Redundancy Depth	0
Echo Canceler	Line
Broken Connection Mode	Disconnect
Input Gain (-32 to 31 dB)	0
Voice Volume (-32 to 31 dB)	0

At the bottom are 'Save' and 'Cancel' buttons.

4. Click the **SBC Signaling** tab, and then configure the parameters as follows:

Parameter	Value
P-Asserted-Identity Header Mode	Remove
Session Expires Mode	Supported
Remote Update Support	Supported Only After Connect
Remote re-INVITE Support	Supported Only With SDP
Remote Delayed Offer Support	Not Supported
Remote REFER Mode	Handle Locally (required, as Skype for Business Server 2015 does not support receipt of SIP REFER)
Remote 3xx Mode	Handle Locally (required, as Skype for Business Server 2015 does not support receipt of SIP 3xx responses)
Remote Early Media RTP Detection Behavior	By Media (required, as Skype for Business Server 2015 does not send RTP immediately to remote side when it sends a SIP 18x response)
Reliable Held Tone Source	Yes

Parameter	Value
Play Held Tone	Yes
Remote Hold Format	Inactive

Figure 4-18: Configuring IP Profile for Skype for Business Server 2015 – SBC Signaling Tab

Edit Row X

SBC Signaling

PRACK Mode	<input type="button" value="Transparent"/>
P-Asserted-Identity Header Mode	<input type="button" value="Remove"/>
Diversion Header Mode	<input type="button" value="As Is"/>
History-Info Header Mode	<input type="button" value="As Is"/>
Session Expires Mode	<input type="button" value="Supported"/>
Remote Update Support	<input type="button" value="Supported Only After"/>
Remote re-INVITE	<input type="button" value="Supported only with S"/>
Remote Delayed Offer Support	<input type="button" value="Supported"/>
User Registration Time	<input type="button" value="0"/>
NAT UDP Registration Time	<input type="button" value="-1"/>
NAT TCP Registration Time	<input type="button" value="-1"/>
Remote REFER Mode	<input type="button" value="Handle Locally"/>
Remote Replaces Mode	<input type="button" value="Standard"/>
Play RBT To Transferee	<input type="button" value="No"/>

Save **Cancel**

5. Click the **SBC Media** tab, and then configure the parameters as follows:

Parameter	Value
Extension Coders Group ID	Coders Group 1
Allowed Audio Coders Group ID	Coders Group 1
Allowed Coders Mode	Restriction and Preference
SBC Media Security Mode	SRTP
Enforce MKI Size	Enforce
Use Silence Suppression	Add

Figure 4-19: Configuring IP Profile for Skype for Business Server 2015 – SBC Media Tab

The screenshot shows the 'Edit Row' dialog box for configuring an IP Profile. The 'SBC Media' tab is active. The configuration parameters include:

- Transcoding Mode: Only If Required
- Extension Coders: Coders Group 1
- Allowed Audio Coders: Coders Group 1
- Allowed Coders Mode: Restriction and Prefe
- Allowed Video Coders: None
- Allowed Media Types: (empty)
- SBC Media Security Mode: SRTP
- Media Security Method: SDES
- Enforce MKI Size: Enforce
- SDP Remove Crypto Lifetime: No
- RFC 2833 Mode: As Is
- Alternative DTMF Method: As Is
- RFC 2833 DTMF Payload Type: 0

At the bottom are 'Save' and 'Cancel' buttons.

➤ **To configure an IP Profile for the Sunrise SIP Trunk:**

1. Click Add.
2. Click the **Common** tab, and then configure the parameters as follows:

Parameter	Value
Index	2
Profile Name	Sunrise
Signaling DiffServ	24

Figure 4-20: Configuring IP Profile for Sunrise SIP Trunk – Common Tab

Edit Row

Index 2

Common **GW** **SBC Signaling** **SBC Media**

Name	Sunrise
Dynamic Jitter Buffer Minimum Delay [msec]	10
Dynamic Jitter Buffer Optimization Factor	10
Jitter Buffer Max Delay [msec]	250
RTP IP DiffServ	46
Signaling DiffServ	24
Silence Suppression	Disable
RTP Redundancy Depth	0
Echo Canceler	Line
Broken Connection Mode	Disconnect
Input Gain (-32 to 31 dB)	0
Voice Volume (-32 to 31 dB)	0

Save Cancel

3. Click the **SBC Signaling** tab, and then configure the parameters as follows:

Parameter	Value
P-Asserted-Identity Header Mode	As Is
Diversion Header Mode	Add (required for anonymous calls)
Session Expires Mode	Supported
Remote Update Support	Not Supported (to make sure, UPDATE is converted to re-INVITE)
Remote REFER Behavior	Handle Locally (SBC handles / terminates incoming REFER requests instead of forwarding them to SIP Trunk)
Remote Early Media RTP Detection Mode	By Media
Play Held Tone	Yes
Remote Hold Format	Not Supported (To make sure MoH from Skype for Business or SBC is played and not Sunrise default MoH)

Figure 4-21: Configuring IP Profile for Sunrise SIP Trunk – SBC Signaling Tab

The screenshot shows the 'Edit Row' configuration interface for an IP profile. The 'SBC Signaling' tab is active. The configuration parameters listed are:

- PRACK Mode: Transparent
- P-Asserted-Identity Header Mode: As Is
- Diversion Header Mode: Add
- History-Info Header Mode: As Is
- Session Expires Mode: Supported
- Remote Update Support: Not Supported
- Remote re-INVITE: Supported
- Remote Delayed Offer Support: Supported
- User Registration Time: 0
- NAT UDP Registration Time: -1
- NAT TCP Registration Time: -1
- Remote REFER Mode: Handle Locally
- Remote Replaces Mode: Standard
- Play RBT To Transferee: No

At the bottom are 'Save' and 'Cancel' buttons.

- Click the **SBC Media** tab, and then configure the parameters as follows:

Parameter	Value
Extension Coders Group ID	Coders Group 2
Allowed Audio Coders Group ID	Coders Group 2
Allowed Coders Mode	Restriction and Preference
Media Security Behavior	RTP

Figure 4-22: Configuring IP Profile for Sunrise SIP Trunk – SBC Media Tab

Edit Row

	Common	GW	SBC Signaling	SBC Media
Transcoding Mode	Only If Required			
Extension Coders	Coders Group 2			
Allowed Audio Coders	Coders Group 2			
Allowed Coders Mode	Restriction and Prefe			
Allowed Video Coders	None			
Allowed Media Types				
SBC Media Security Mode	RTP			
Media Security Method	SDES			
Enforce MKI Size	Enforce			
SDP Remove Crypto Lifetime	No			
RFC 2833 Mode	Extend			
Alternative DTMF Method	As Is			
RFC 2833 DTMF Payload Type	101			
Fax Coders	Coders Group 2			
Fax Mode	Handle on re-INVITE			
<input type="button" value="Save"/> <input type="button" value="Cancel"/>				

➤ **To configure an IP Profile for the FAX supporting ATA (if required):**

1. Click **Add**.
2. Click the **Common** tab, and then configure the parameters as follows:

Parameter	Value
Index	3
Profile Name	Fax
Signaling DiffServ	24

Figure 4-23: Configuring IP Profile for FAX ATA – Common Tab

The screenshot shows the 'Edit Row' dialog for an IP Profile. The 'Common' tab is active. The 'Index' is set to 3. The configuration includes:

- Name: Fax
- Dynamic Jitter Buffer Minimum Delay [msec]: 10
- Dynamic Jitter Buffer Optimization Factor: 10
- Jitter Buffer Max Delay [msec]: 250
- RTP IP DiffServ: 46
- Signaling DiffServ: 24
- Silence Suppression: Disable
- RTP Redundancy Depth: 0
- Echo Canceler: Line
- Broken Connection Mode: Disconnect
- Input Gain (-32 to 31 dB): 0
- Voice Volume (-32 to 31 dB): 0

At the bottom are 'Save' and 'Cancel' buttons.

3. Click the **SBC Signaling** tab, and then configure the parameters as follows:

Parameter	Value
All Parameters	Leave as Default

4. Click the **SBC Media** tab, and then configure the parameters as follows:

Parameter	Value
All Parameters	Leave as default

4.7 Step 7: Configure IP Groups

This step describes how to configure IP Groups. The IP Group represents an IP entity on the network with which the SBC communicates. This can be a server (e.g., IP PBX or ITSP) or it can be a group of users (e.g., LAN IP phones). For servers, the IP Group is typically used to define the server's IP address by associating it with a Proxy Set. Once IP Groups are configured, they are used to configure IP-to-IP routing rules for denoting source and destination of the call.

In this interoperability test topology, IP Groups must be configured for the following IP entities:

- Skype for Business Server 2015 (Mediation Server) located on LAN
- Sunrise SIP Trunk located on WAN
- Fax supporting ATA device located on LAN (if required)

➤ **To configure IP Groups:**

1. Open the IP Group Table page (**Configuration** tab > **VoIP** menu > **VoIP Network** > **IP Group Table**).
2. Add an IP Group for the Skype for Business Server 2015. You can use the default IP Group (Index 0), but modify it as shown below:

Parameter	Value
Index	0
Name	SfB
Type	Server
Proxy Set	SfB
IP Profile	SfB
Media Realm	MR SfB
Classify By Proxy Set	Enable
Inbound Message Manipulation Set	1
Outbound Message Manipulation Set	1

3. Configure an IP Group for the Sunrise SIP Trunk:

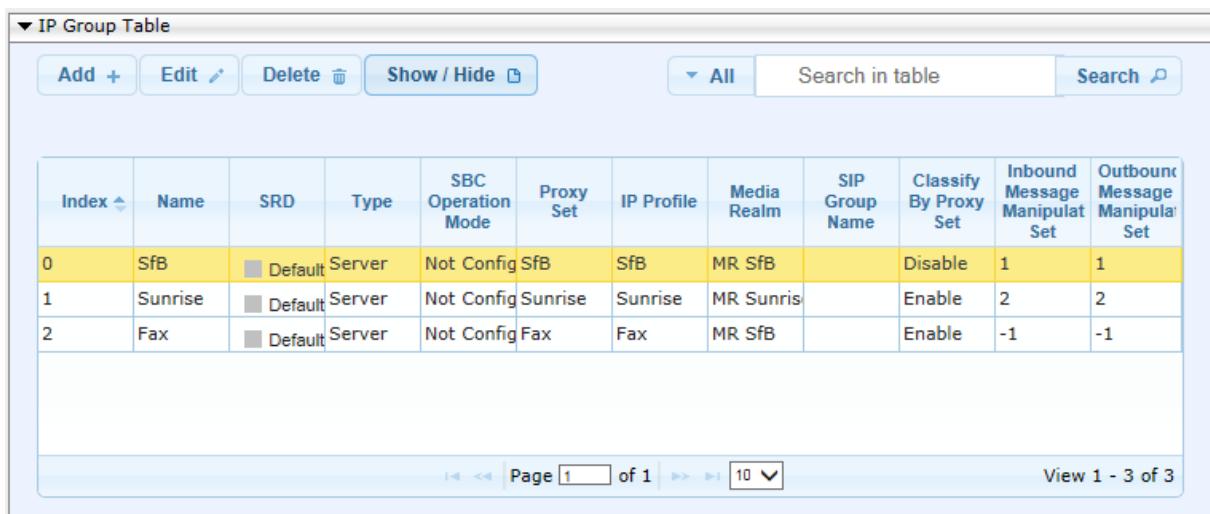
Parameter	Value
Index	1
Name	Sunrise
Type	Server
Proxy Set	Sunrise
IP Profile	Sunrise
Media Realm	MR Sunrise
Inbound Message Manipulation Set	2
Outbound Message Manipulation Set	2

4. Configure an IP Group for the Fax supporting ATA device:

Parameter	Value
Index	2
Name	Fax
Type	Server
Proxy Set	Fax
IP Profile	Fax
Media Realm	MR SfB

The configured IP Groups are shown in the figure below:

Figure 4-24: Configured IP Groups in IP Group Table



The screenshot shows a web-based configuration interface for an IP Group Table. At the top, there are buttons for Add (+), Edit (pencil), Delete (trash), Show / Hide (refresh), and search functions (All, Search). The main table displays three rows of IP group configurations:

Index	Name	SRD	Type	SBC Operation Mode	Proxy Set	IP Profile	Media Realm	SIP Group Name	Classify By Proxy Set	Inbound Message Manipulat Set	Outbound Message Manipulat Set
0	SfB	Default	Server	Not Config	SfB	SfB	MR SfB		Disable	1	1
1	Sunrise	Default	Server	Not Config	Sunrise	Sunrise	MR Sunris		Enable	2	2
2	Fax	Default	Server	Not Config	Fax	Fax	MR SfB		Enable	-1	-1

At the bottom, there are navigation links for Page 1 of 1, a dropdown for items per page (set to 10), and a note indicating View 1 - 3 of 3.

4.8 Step 8: Configure Coders

This step describes how to configure coders (termed *Coder Group*). As Skype for Business Server 2015 supports the G.711 coder and with media bypass a long list of other coders while the network connection to Sunrise SIP Trunk restrict operation to G.722, G.729, and G.711, you need to add a Coder Group with the G.722 and G.729 coder for the Sunrise SIP Trunk.

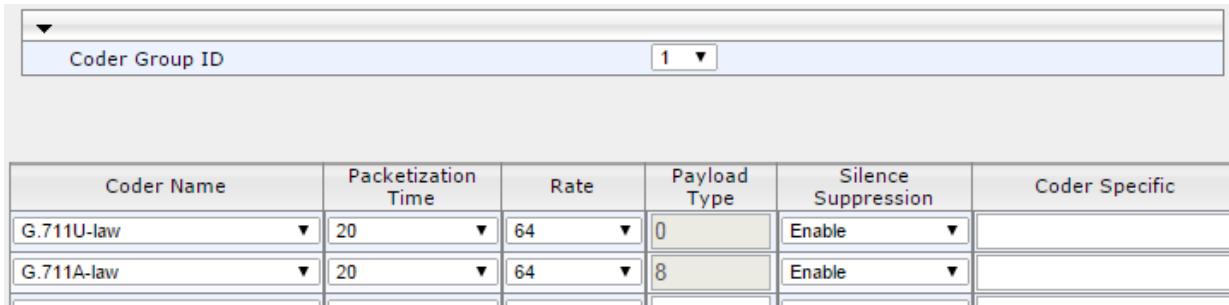
Note that the Coder Group ID for this entity was assigned to its corresponding IP Profile in the previous step (see Section 4.6 on page 48).

➤ **To configure coders:**

1. Open the Coder Group Settings (**Configuration** tab > **VoIP** menu > **Coders and Profiles** > **Coders Group Settings**).
2. Configure a Coder Group for Skype for Business Server 2015:

Parameter	Value
Coder Group ID	1
Coder Name	<ul style="list-style-type: none"> ▪ G.711 U-law ▪ G.711 A-law
Silence Suppression	Enable (for both coders)

Figure 4-25: Configuring Coder Group for Skype for Business Server 2015

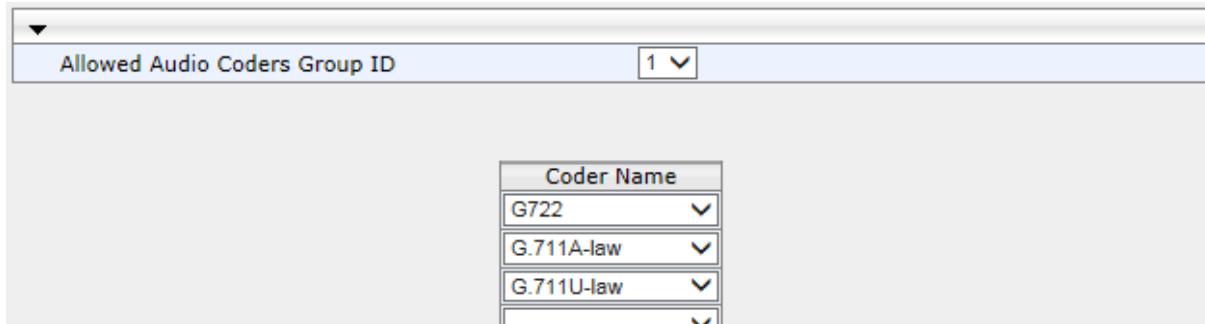


The procedure below describes how to configure an Allowed Coders Group to ensure that voice sent to the Skype for Business Server 2015 the G.722 coder whenever possible (only for media bypass) and remove unsupported coders. Note that this Allowed Coders Group ID was assigned to the IP Profile belonging to the Skype for Business Server Trunk (see Section 4.6 on page 48).

➤ **To set a preferred coder for the Sunrise SIP Trunk:**

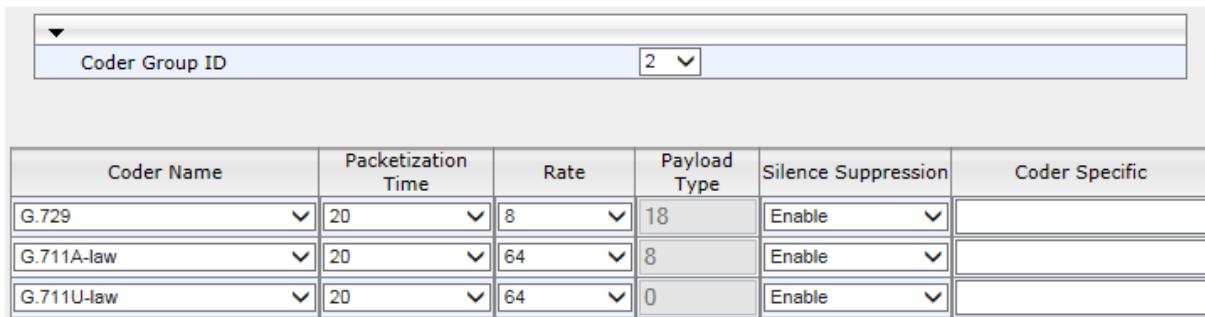
1. Open the Allowed Coders Group page (**Configuration** tab > **VoIP** menu > **SBC** > **Allowed Audio Coders Group**).
2. Configure an Allowed Coder as follows:

Parameter	Value
Allowed Audio Coders Group ID	1
Coder Name	G.722 G.711 A-law G.711 U-law

Figure 4-26: Configuring Allowed Coders Group for Skype For Business Server 2015

- 3.** Configure a Coder Group for Sunrise SIP Trunk:

Parameter	Value
Coder Group ID	2
Coder Name	G.729 G.711 A-Law G.711 U-Law

Figure 4-27: Configuring Coder Group for Sunrise SIP Trunk

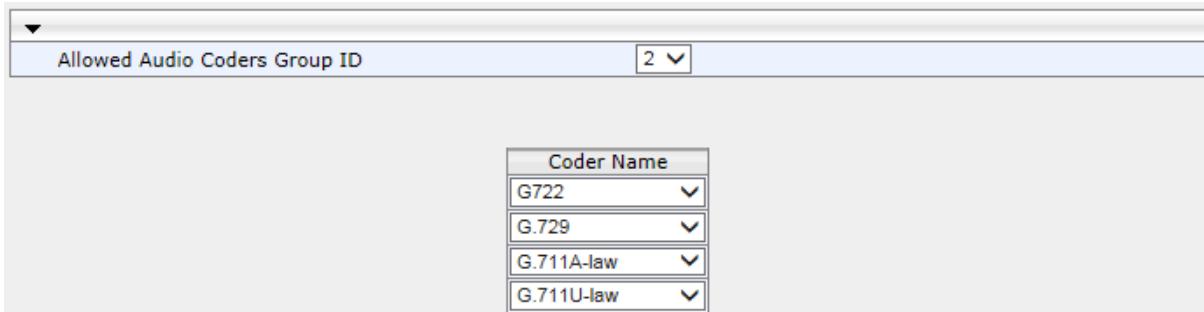
The procedure below describes how to configure an Allowed Coders Group to ensure that voice sent to the Sunrise SIP Trunk uses the G.722 coder whenever possible. Note that this Allowed Coders Group ID was assigned to the IP Profile belonging to the Sunrise SIP Trunk (see Section 4.6 on page 48).

➤ **To set a preferred coder for the Sunrise SIP Trunk:**

1. Open the Allowed Coders Group page (**Configuration** tab > **VoIP** menu > **SBC** > **Allowed Audio Coders Group**).
2. Configure an Allowed Coder as follows:

Parameter	Value
Allowed Audio Coders Group ID	2
Coder Name	G.722 G.729 G.711 A-law G.711 U-law

Figure 4-28: Configuring Allowed Coders Group for Sunrise SIP Trunk



Coder Name
G722
G.729
G.711A-law
G.711U-law

4.9 Step 9: SIP TLS Connection Configuration

This section describes how to configure the SBC for using a TLS connection with the Skype for Business Server 2015 Mediation Server. This is essential for a secure SIP TLS connection.

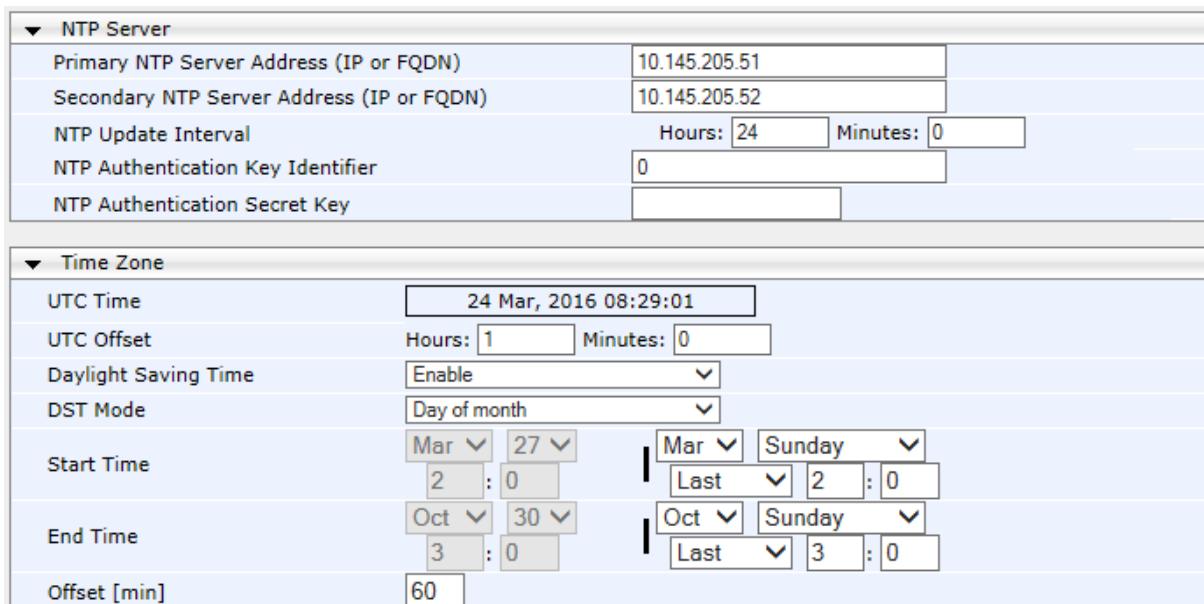
4.9.1 Step 9a: Configure the NTP Server Address

This step describes how to configure the NTP server's IP address. It is recommended to implement an NTP server (Microsoft NTP server or a third-party server) to ensure that the SBC receives the accurate and current date and time. This is necessary for validating certificates of remote parties.

➤ **To configure the NTP server address:**

1. Open the Application Settings page (**Configuration tab > System > Time And Date**).
2. In the 'Primary NTP Server Address' field, enter the IP address of the NTP server (e.g., **10.145.205.51**).
3. Configure Time Zone settings as required.

Figure 4-29: Configuring NTP Server Address



NTP Server	
Primary NTP Server Address (IP or FQDN)	10.145.205.51
Secondary NTP Server Address (IP or FQDN)	10.145.205.52
NTP Update Interval	Hours: 24 Minutes: 0
NTP Authentication Key Identifier	0
NTP Authentication Secret Key	

Time Zone	
UTC Time	24 Mar, 2016 08:29:01
UTC Offset	Hours: 1 Minutes: 0
Daylight Saving Time	Enable
DST Mode	Day of month
Start Time	Mar 27 : 0 Mar Sunday Last 2 : 0
End Time	Oct 30 : 0 Oct Sunday Last 3 : 0
Offset [min]	60

4. Click **Submit**.

4.9.2 Step 9b: Configure the TLS version

This step describes how to configure the SBC to use TLS only. AudioCodes recommends implementing only TLS to avoid flaws in SSL.

➤ **To configure the TLS version:**

1. Open the TLS Contexts page (**Configuration** tab > **System** menu > **TLS Contexts**).
2. In the TLS Contexts table, select the required TLS Context index row (usually default index 0 will be used), and then click 'Edit'.
3. From the 'TLS Version' drop-down list, select '**TLSv1.0 TLSv1.1 and TLSv1.2**'

Figure 4-30: Configuring TLS version

Edit Record #0	
Index	0
Name	default
TLS Version	TLSv1.0 TLSv1.1 and TLSv1.2
Cipher Server	RC4:EXP
Cipher Client	ALL:!ADH
OCSP Server	Disable
Primary OCSP Server	0.0.0.0
Secondary OCSP Server	0.0.0.0
OCSP Port	2560
OCSP Default Response	Reject
<input checked="" type="button"/> Submit <input type="button"/> Cancel	

4. Click **Submit**.

4.9.3 Step 9c: Configure a Certificate

This step describes how to exchange a certificate with Microsoft Certificate Authority (CA). The certificate is used by the SBC to authenticate the connection with Skype for Business Server 2015.

The procedure involves the following main steps:

- a. Generating a Certificate Signing Request (CSR).
- b. Requesting Device Certificate from CA.
- c. Obtaining Trusted Root Certificate from CA.
- d. Deploying Device and Trusted Root Certificates on SBC.



Note: The Subject Name (CN) field parameter should be identically configured in the DNS Active Directory and Topology Builder (see Section 3.1 on page 13).

➤ **T**

- **o configure a certificate:**
1. Open the TLS Contexts page (**Configuration** tab > **System** menu > **TLS Contexts**).
 2. In the TLS Contexts table, select the required TLS Context index row (usually default index 0 will be used), and then click the **TLS Context Certificates**  button, located at the bottom of the TLS Contexts page; the Context Certificates page appears.
 3. Change **Private Key Size** to 2048
 4. Click the **Generate Private-Key** button and accept the warning message box with **Ok**.
 5. Under the **Certificate Signing Request** group, do the following:
 - a. In the 'Subject Name [CN]' field, enter the SBC FQDN name (e.g., **NE0002.intra.sunlab.ch**).
 - b. Fill in the rest of the request fields according to your security provider's instructions.
 6. Click the **Create CSR** button; a textual certificate signing request is displayed in the area below the button:

Figure 4-31: Certificate Signing Request – Creating CSR

Certificate Signing Request	
Subject Name [CN]	<input type="text" value="NE0002.intra.sunlab.ch"/>
Organizational Unit [OU] (optional)	<input type="text" value="IT"/>
Company name [O] (optional)	<input type="text" value="Sunrise"/>
Locality or city name [L] (optional)	<input type="text" value="Zuerich"/>
State [ST] (optional)	<input type="text" value="ZH"/>
Country code [C] (optional)	<input type="text" value="CH"/>
<input type="button" value="Create CSR"/>	

After creating the CSR, copy the text below (including the BEGIN/END lines) and send it to your Certification Authority for signing.

```

-----BEGIN CERTIFICATE REQUEST-----
MIICsTCCAZkCAQAwBDEfMB0GA1UEAwvWTkUwMDAyLmludHJhLnN1bmhxYi5jaDEL
MAkGA1UECwwCSVQxEDAOBgNVBAoMB1N1bnJpc2UxEDAOBgNVBAcMB1p1ZXJpY2gx
CzAJBgNVBAgMAlpIMQswCQYDVQQGEwJDSDCCASIwDQYJKoZIhvcNAQEBBQADggEP
ADCCAQoCggEBALP0CxewSYxdESCXLmc+oigirwPamLa+G9Hs7mu4eky5y80Wpcj1
YNTcsUVKS/auHLIng0yRKPdZ8daNUgpLLnxszWJZSU+QnU4gcw46Uh8jNBKfxfpE
tdSVtqMRKTRqX0EhyB9WzYuYuLnnwH/usG+s+qTUC3HR27h9OY2ckwPrTHtiSaB5S
P0xEI7dymJaPtyKa5T2/i5gaakfpHc2k/+WbAwOvGJ04vaSfj1I5UFFpwOkOzmng
9h++NnDmFixPsXHgKNZQuHIy02DSM1obnaDdCCcRkh7p6+BOF5z959ngSu6FaLXX
F6da/achNVR09+pXADQ6crsNb2iB6QhtN1cCAwEAAAAMAA0GCSqGSIb3DQEBBQUA
A4IBAQQAqi7qR+08aNylA1YFKXYbSg/za1rYJtEQ5LntZKIWAQyMnzKjV/j8AF9Cu
p6WYw4DobP7iqnMcoDqrV6bIp7cMFLJ6X1Ge81AkulU5SyD/8ONpexvCMKgjpR4i
qS/bXb9amRs5wRq6k+UYJEXVcPNEvmpXAV9aF00DIL/KBY3GbSIdbmir2IC7/str
rEj4PsAB6UBzGGh9yw2Vj0ZyngzWVh8HKbiAo8EXvGKhCGKwjK1elQ67SokVSIBM
LJ7HUbwySE330R5Y/IG4KMKpUOzah7uxSp2qHfW0q4e7RJYrPlzzs8DTfBhIRyYe
aa0zFd9x8XrBgxhfHfdDGfzYnyTe
-----END CERTIFICATE REQUEST-----

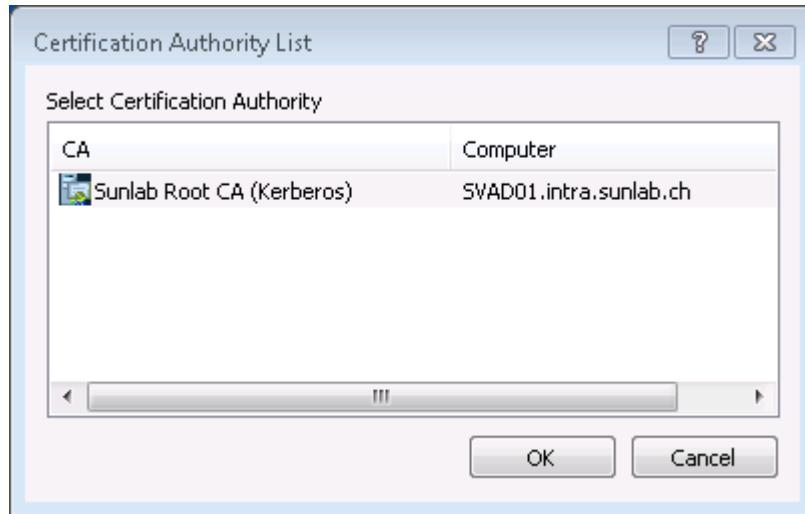
```

7. Copy the CSR from the line "----**BEGIN CERTIFICATE**" to "**END CERTIFICATE REQUEST**----" to a text file (such as Notepad), and then save it to a folder on your computer with the file name, *certreq.txt*.
8. Open a command prompt on your Windows PC or Server: Press Windows-Key + R, enter **cmd.exe** and press Enter key.
9. Enter the following command (one line, you can modify the CertificateTemplate Attribute as requested, make sure, to enter the correct path to certreq.txt):


```
certreq.exe -submit -attrib "CertificateTemplate:WebServer"
certreq.txt newcert.cer
```

10. A window appears. Choose your issuing CA:

Figure 4-32: Microsoft Certificate Services Web Page



11. The certificate will be stored in the defined file. For confirmation, you get the following response in command prompt:

```
Active Directory Enrollment Policy
{XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX}
ldap:
RequestId: 29
RequestId: "29"
Certificate retrieved(Issued) Issued
```

12. Request the public root certificate of your CA as Base64 file from your CA Administrator.

13. In the SBC's Web interface, return to the **TLS Contexts** page and do the following:

- In the TLS Contexts table, select the required TLS Context index row (typically, the default TLS Context at Index 0 is used), and then click the **TLS Context Certificates** button, located at the bottom of the TLS Contexts page; the Context Certificates page appears.
- Scroll down to the **Upload certificates files from your computer** group, click the **Browse** button corresponding to the 'Send Device Certificate...' field, navigate to the *gateway.cer* certificate file that you saved on your computer in Step 11?? **Error! Reference source not found.**, and then click **Send File** to upload the certificate to the SBC.

Figure 4-33: Upload Device Certificate Files from your Computer Group

▼ Upload certificate files from your computer

Private key pass-phrase (optional) audc

Send **Private Key** file from your computer to the device.
The file must be in either PEM or PFX (PKCS#12) format.

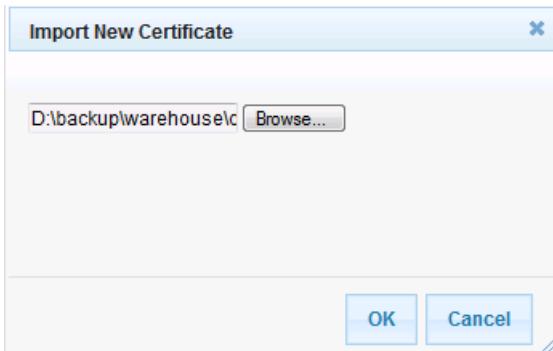
Note: Replacing the private key is not recommended but if it's done, it should be over a physically-secure network link.

Send **Device Certificate** file from your computer to the device.
The file must be in textual PEM format.

- c. In the SBC's Web interface, return to the **TLS Contexts** page.

- d. In the TLS Contexts table, select the required TLS Context index row, and then click the **TLS Context Trusted-Roots Certificates**  button, located at the bottom of the TLS Contexts page; the Trusted Certificates page appears.
- e. Click the **Import** button, and then select the root certificate file to load.

Figure 4-34: Importing Root Certificate into Trusted Certificates Store



14. Click **OK**; the certificate is loaded to the device and listed in the Trusted Certificates store.
15. Reset the SBC with a burn to flash for your settings to take effect (see Section 4.15 on page 82).

4.10 Step 10: Configure SRTP

This step describes how to configure media security. If you configure the Microsoft Mediation Server to use SRTP, you need to configure the SBC to operate in the same manner. Note that SRTP was enabled for Skype for Business Server 2015 when you configured an IP Profile for Skype for Business Server 2015 (see Section 4.6 on page 48).

➤ **To configure media security:**

1. Open the Media Security page (**Configuration** tab > **VoIP** menu > **Media** menu > **Media Security**).
2. Configure the parameters as follows:

Parameter	Value
Media Security	Enable

Figure 4-35: Configuring SRTP

General Media Security Settings	
Media Security	Enable
Aria Protocol Support	Disable
Media Security Behavior	Mandatory
Authentication On Transmitted RTP Packets	Active
Encryption On Transmitted RTP Packets	Active
Encryption On Transmitted RTCP Packets	Active
SRTP Tunneling Authentication for RTP	Disable
SRTP Tunneling Authentication for RTCP	Disable

3. Click **Submit**.
4. Reset the SBC with a burn to flash for your settings to take effect (see Section 4.15 on page 82).

4.11 Step 11: Configure Maximum IP Media Channels

This step describes how to configure the maximum number of required IP media channels. The number of media channels represents the number of DSP channels that the SBC allocates to call sessions.

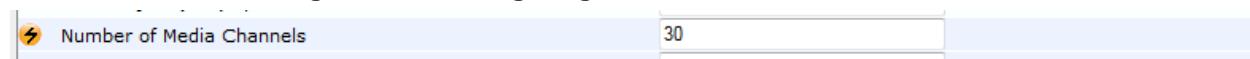


Note: This step is required **only** if transcoding is required.

➤ **To configure the maximum number of IP media channels:**

1. Open the IP Media Settings page (**Configuration** tab > **VoIP** menu > **SIP Definitions** > **Advanced Parameters**).

Figure 4-36: Configuring Number of Media Channels



2. In the 'Number of Media Channels' field, enter the number of media channels according to your environments transcoding calls (e.g., **30**).
3. Click **Submit**.
4. Reset the SBC with a burn to flash for your settings to take effect (see Section 4.15 on page 82).

4.12 Step 12: Configure IP-to-IP Call Routing Rules

This step describes how to configure IP-to-IP call routing rules. These rules define the routes for forwarding SIP messages (e.g., INVITE) received from one IP entity to another. The SBC selects the rule whose configured input characteristics (e.g., IP Group) match those of the incoming SIP message. If the input characteristics do not match the first rule in the table, they are compared to the second rule, and so on, until a matching rule is located. If no rule is matched, the message is rejected. The routing rules use the configured IP Groups to denote the source and destination of the call. As configured in Section 0 on page 55, IP Group 1 represents Skype for Business Server 2015, and IP Group 2 represents Sunrise SIP Trunk.

For the interoperability test topology, the following IP-to-IP routing rules need to be configured to route calls between Skype for Business Server 2015 (LAN) and Sunrise SIP Trunk (WAN):

- Terminate SIP OPTIONS messages on the SBC that are received from the LAN
- Calls from Skype for Business Server 2015 to Sunrise SIP Trunk
- Calls from Sunrise SIP Trunk to Fax supporting ATA device (if required)
- Calls from Sunrise SIP Trunk to Skype for Business Server 2015
- Calls from Fax supporting ATA device to Sunrise SIP Trunk (if required)

➤ **To configure IP-to-IP routing rules:**

1. Open the IP-to-IP Routing Table page (**Configuration** tab > **VoIP** menu > **SBC** > **Routing SBC** > **IP-to-IP Routing Table**).
2. Configure a rule to terminate SIP OPTIONS messages received from the LAN:
 - a. Click **Add**.
 - b. Click the **Rule** tab, and then configure the parameters as follows:

Parameter	Value
-----------	-------

Index	0
Name	OPTIONS termination (arbitrary descriptive name)
Source IP Group	Any
Request Type	OPTIONS

Figure 4-37: Configuring IP-to-IP Routing Rule for Terminating SIP OPTIONS from LAN – Rule Tab

Edit Row

Index	0
Routing Policy	Default_SBCRouting
<input checked="" type="radio"/> Rule <input type="radio"/> Action	
Name	OPTIONS termination
Alternative Route Options	Route Row
Source IP Group	Any
Request Type	OPTIONS
Source Username Prefix	*
Source Host	*
Source Tags	
Destination Username Prefix	*
Destination Host	*
Destination Tags	
Message Condition	None
Call Trigger	Any
RERoute IP Group	Any
<input type="button" value="Save"/> <input type="button" value="Cancel"/>	

- c. Click the **Action** tab, and then configure the parameters as follows:

Parameter	Value
Destination Type	Dest Address
Destination Address	internal

Figure 4-38: Configuring IP-to-IP Routing Rule for Terminating SIP OPTIONS from LAN – Action Tab

The screenshot shows the 'Edit Row' dialog box for configuring a routing rule. The 'Action' tab is selected. The 'Index' is set to 0 and the 'Routing Policy' is set to 'Default_SBCRouting'. The 'Destination Type' is 'Dest Address'. Other fields include 'Destination IP Group' (None), 'Destination SIP Interface' (None), 'Destination Address' (internal), 'Destination Port' (0), 'Destination Transport Type' (None), 'Call Setup Rules Set ID' (-1), 'Group Policy' (None), and 'Cost Group' (None). Buttons at the bottom include 'Save', 'Cancel', and 'Classic View'.

3. To configure rule to route calls from Sunrise SIP Trunk to Fax supporting ATA device:
 - a. Click **Add**.
 - b. Click the **Rule** tab, and then configure the parameters as follows:

Parameter	Value
Index	1
Route Name	ITSP to Fax (arbitrary descriptive name)
Source IP Group	Sunrise

Figure 4-39: Configuring IP-to-IP Routing Rule for ITSP to Fax – Rule tab

Add Row X

Index	1
Routing Policy	Default_SBCRouting
<input checked="" type="radio"/> Rule <input type="radio"/> Action	
Name	ITSP to Fax
Alternative Route Options	Route Row
Source IP Group	Sunrise
Request Type	All
Source Username Prefix	*
Source Host	*
Source Tags	
Destination Username Prefix	+4199 1234567
Destination Host	*
Destination Tags	
Message Condition	None
Call Trigger	Any
ReRoute IP Group	Anv
<input type="button" value="Add"/> <input type="button" value="Cancel"/>	

c. Click the **Action** tab, and then configure the parameters as follows:

Parameter	Value
Destination Type	IP Group
Destination IP Group	Fax
Destination SIP Interface	SfB

Figure 4-40: Configuring IP-to-IP Routing Rule for ITSP to Fax – Action tab

The screenshot shows the 'Add Row' dialog box for configuring an IP-to-IP routing rule. The 'Action' tab is selected. The configuration parameters are as follows:

Index	8
Routing Policy	Default_SBCRouting
Destination Type	IP Group
Destination IP Group	Fax
Destination SIP Interface	SfB
Destination Address	
Destination Port	0
Destination Transport Type	
Call Setup Rules Set ID	-1
Group Policy	None
Cost Group	None

At the bottom of the dialog are buttons for 'Classic View', 'Add', and 'Cancel'.

4. Configure a rule to route calls from Skype for Business Server 2015 to Sunrise SIP Trunk:
 - a. Click **Add**.
 - b. Click the **Rule** tab, and then configure the parameters as follows:

Parameter	Value
Index	2
Route Name	SfB to ITSP (arbitrary descriptive name)
Source IP Group	SfB

Figure 4-41: Configuring IP-to-IP Routing Rule for SfB to ITSP – Rule tab

Edit Row

Index	2
Routing Policy	Default_SBCRouting
<input checked="" type="radio"/> Rule <input type="radio"/> Action	
Name	SfB to ITSP
Alternative Route Options	Route Row
Source IP Group	SfB
Request Type	All
Source Username Prefix	*
Source Host	*
Source Tags	
Destination Username Prefix	*
Destination Host	*
Destination Tags	
Message Condition	None
Call Trigger	Any
ReRoute IP Group	Anv
<input type="button" value="Save"/> <input type="button" value="Cancel"/>	

c. Click the **Action** tab, and then configure the parameters as follows:

Parameter	Value
Destination Type	IP Group
Destination IP Group	Sunrise
Destination SIP Interface	Sunrise

Figure 4-42: Configuring IP-to-IP Routing Rule for SfB to ITSP – Action tab

The screenshot shows the 'Edit Row' dialog box for configuring an IP-to-IP routing rule. The 'Action' tab is selected. The configuration parameters are as follows:

Destination Type	IP Group
Destination IP Group	Sunrise
Destination SIP Interface	Sunrise
Destination Address	
Destination Port	0
Destination Transport Type	
Call Setup Rules Set ID	-1
Group Policy	None
Cost Group	None

Buttons at the bottom: Save, Cancel, [Classic View](#).

5. To configure rule to route calls from Sunrise SIP Trunk to Skype for Business Server 2015:
 - a. Click **Add**.
 - b. Click the **Rule** tab, and then configure the parameters as follows:

Parameter	Value
Index	3
Route Name	ITSP to SfB (arbitrary descriptive name)
Source IP Group	Sunrise

Figure 4-43: Configuring IP-to-IP Routing Rule for ITSP to SfB – Rule tab

Edit Row

Index	3
Routing Policy	Default_SBCRouting
<input checked="" type="button" value="Rule"/> <input type="button" value="Action"/>	
Name	ITSP to SfB
Alternative Route Options	Route Row
Source IP Group	Sunrise
Request Type	All
Source Username Prefix	*
Source Host	*
Source Tags	
Destination Username Prefix	*
Destination Host	*
Destination Tags	
Message Condition	None
Call Trigger	Any
ReRoute IP Group	Anv
<input type="button" value="Save"/> <input type="button" value="Cancel"/>	

c. Click the **Action** tab, and then configure the parameters as follows:

Parameter	Value
Destination Type	IP Group
Destination IP Group	SfB
Destination SIP Interface	SfB

Figure 4-44: Configuring IP-to-IP Routing Rule for ITSP to SfB – Action tab

The screenshot shows the 'Edit Row' dialog box for configuring an IP-to-IP Routing Rule. The 'Action' tab is selected. The configuration parameters are as follows:

Destination Type	IP Group
Destination IP Group	SfB
Destination SIP Interface	SfB
Destination Address	
Destination Port	0
Destination Transport Type	
Call Setup Rules Set ID	-1
Group Policy	None
Cost Group	None

At the bottom right of the dialog, there is a link to [Classic View](#).

6. Configure a rule to route calls from Fax supporting ATA device to Sunrise SIP Trunk:
 - a. Click **Add**.
 - b. Click the **Rule** tab, and then configure the parameters as follows:

Parameter	Value
Index	4
Route Name	Fax to ITSP (arbitrary descriptive name)
Source IP Group	Fax

Figure 4-45: Configuring IP-to-IP Routing Rule for Fax to ITSP – Rule tab

Edit Row

Index	4
Routing Policy	Default_SBCRouting
<input checked="" type="button" value="Rule"/> <input type="button" value="Action"/>	
Name	Fax to ITSP
Alternative Route Options	Route Row
Source IP Group	Fax
Request Type	All
Source Username Prefix	*
Source Host	*
Source Tags	
Destination Username Prefix	*
Destination Host	*
Destination Tags	
Message Condition	None
Call Trigger	Any
ReRoute IP Group	Any
<input type="button" value="Save"/> <input type="button" value="Cancel"/>	

c. Click the **Action** tab, and then configure the parameters as follows:

Parameter	Value
Destination Type	IP Group
Destination IP Group	Sunrise
Destination SIP Interface	Sunrise

Figure 4-46: Configuring IP-to-IP Routing Rule for Fax to ITSP – Action tab

Edit Row

Index	4
Routing Policy	Default_SBCRouting
<input type="button" value="Rule"/> <input type="button" value="Action"/>	
Destination Type	IP Group
Destination IP Group	Sunrise
Destination SIP Interface	Sunrise
Destination Address	
Destination Port	0
Destination Transport Type	
Call Setup Rules Set ID	-1
Group Policy	None
Cost Group	None
Classic View	
<input type="button" value="Save"/> <input type="button" value="Cancel"/>	

The configured routing rules are shown in the figure below:

Figure 4-47: Configured IP-to-IP Routing Rules in IP-to-IP Routing Table

▼ IP-to-IP Routing Table											
Index	Name	Routing Policy	Alternative Route Options	Source IP Group	Request Type	Source Username Prefix	Destination Username Prefix	Destination Type	Destination IP Group	Destination SIP Interface	Destination Address
0	OPTIONS to Default_SBCRoute Row	Default_SBCRoute	Any	OPTIONS	*	*	*	Dest Address	None	None	internal
1	ITSP to Fax	Default_SBCRoute	Row	Sunrise	All	*	+41991234	IP Group	Fax	SfB	
2	SfB to ITSP	Default_SBCRoute	Row	SfB	All	*	*	IP Group	Sunrise	Sunrise	
3	ITSP to SfB	Default_SBCRoute	Row	Sunrise	All	*	*	IP Group	SfB	SfB	
4	Fax to ITSP	Default_SBCRoute	Row	Fax	All	*	*	IP Group	Sunrise	Sunrise	



Note: The routing configuration may change according to your specific deployment topology.

4.13 Step 13: Configure Message Manipulation Rules

This step describes how to configure SIP message manipulation rules. SIP message manipulation rules can include insertion, removal, and/or modification of SIP headers. Manipulation rules are grouped into Manipulation Sets, enabling you to apply multiple rules to the same SIP message (IP entity).

Once you have configured the SIP message manipulation rules, you need to assign them to the relevant IP Group (in the IP Group table) and determine whether they must be applied to inbound or outbound messages.

➤ **To configure SIP message manipulation rule:**

1. Open the Message Manipulations page (**Configuration** tab > **VoIP** menu > **SIP Definitions** > **Msg Policy & Manipulation** > **Message Manipulations**).
2. Configure a new manipulation rule (Manipulation Set 1) for Skype For Business Server. This rule applies to response messages sent to the Skype For Business Server IP Group to make sure Session Timer Updates will be sent.

Parameter	Value
Index	0
Name	Add Allow UPDATE
Manipulation Set ID	1
Message Type	invite.response
Condition	header.allow !contains 'UPDATE'
Action Subject	header.allow
Action Type	Modify
Action Value	'CANCEL,BYE,INVITE,PRACK,UPDATE'

Figure 4-48: Configuring SIP Message Manipulation Rule 0 (for Skype For Business Servers)

Edit Row
×

Index	<input type="text" value="0"/>
Name	<input type="text" value="Add Allow UPDATE"/>
Manipulation Set ID	<input type="text" value="1"/> x
Message Type	<input type="text" value="invite.response"/>
Condition	<input type="text" value="header.allow !contains 'U'"/>
Action Subject	<input type="text" value="header.allow"/>
Action Type	<input style="border: 1px solid #ccc; padding: 2px; width: 100px; height: 20px; border-radius: 5px;" type="text" value="Modify"/>
Action Value	<input style="border: 1px solid #ccc; padding: 2px; width: 100px; height: 20px; border-radius: 5px;" type="text" value="'CANCEL,BYE,INVITE,PRACK,UPDATE'"/>
Row Role	<input style="border: 1px solid #ccc; padding: 2px; width: 100px; height: 20px; border-radius: 5px;" type="text" value="Use Current Condition"/>

Save
Cancel

3. Configure another two manipulation rules (Manipulation Set 2) for Sunrise SIP Trunk. This rule is applied to request messages sent to the Sunrise SIP Trunk IP Group for transferred calls on Skype for Business Server 2015. This rule generates changes the Referred-by header from Skype For Business to a diversion header.

Parameter	Value
Index	1
Name	Change Referred-by
Manipulation Set ID	2
Message Type	invite.request
Condition	header.referred-by exists
Action Subject	header.Diversion
Action Type	Add
Action Value	'<'+header.referred-by.URL+'>'

Figure 4-49: Configuring SIP Message Manipulation Rule 1 (for Sunrise SIP Trunk)

Edit Row

Index	1
Name	Change Referred-by
Manipulation Set ID	2
Message Type	invite.request
Condition	header.referred-by exists
Action Subject	header.Diversion
Action Type	Add
Action Value	'<'+header.referred-by.URL+'>'
Row Role	Use Current Condition

Save Cancel

Parameter	Value
Index	2
Name	Remove Referred-by
Manipulation Set ID	2
Action Subject	header.referred-by
Action Type	Remove
Row Role	Use Previous Condition

Figure 4-50: Configuring SIP Message Manipulation Rule 2 (for Sunrise SIP Trunk)

Edit Row

Index	2
Name	Remove Referred-by
Manipulation Set ID	2
Message Type	
Condition	
Action Subject	header.referred-by
Action Type	Remove
Action Value	
Row Role	Use Previous Condition

Save **Cancel**

Figure 4-51: Example of Configured SIP Message Manipulation Rules

▼ Message Manipulations

Index	Name	Manipulation Set ID	Message Type	Condition	Action Subject	Action Type	Action Value	Row Role
0	Add Allow UPDATE	1	invite.response	header.allow	header.allow	Modify	'CANCEL,BYE,IN'	Use Current Condition
1	Change Referred-by	2	invite.request	header.referred-by	header.Diversion	Add	'<' + header.referer	Use Current Condition
2	Remove Referred-by	2			header.referred-by	Remove		Use Previous Condition

Page 1 of 1 10 View 1 - 3 of 3

4. Assign Manipulation Set IDs 1 to the Skype for Business 2015 IP Group:
 - a. Open the IP Group Table page (**Configuration** tab > **VoIP** menu > **VoIP Network** > **IP Group Table**).
 - b. Select the row of the Skype for Business 2015 IP Group, and then click **Edit**.
 - c. Click the **SBC** tab.
 - d. Set the 'Inbound Message Manipulation Set' field to **1**.

Figure 4-52: Assigning Manipulation Set to the Skype for Business 2015 IP Group

The screenshot shows the 'Edit Row' dialog box for an IP Group. At the top, there are fields for 'Index' (set to 1) and 'SRD' (set to 'DefaultSRD'). Below these are three tabs: 'Common', 'GW', and 'SBC'. The 'SBC' tab is currently selected. In the main area, there are several configuration options:

- SBC Operation Mode: Not Configured
- Classify By Proxy Set: Enable
- SBC Client Forking Mode: Sequential
- Inbound Message Manipulation Set: 1
- Outbound Message Manipulation Set: 1
- Msg Man User Defined String1: (empty)
- Msg Man User Defined String2: (empty)
- Registration Mode: User Initiates Regis
- Max. Number of Registered Users: -1
- Authentication Mode: User Authenticates
- Authentication Method List: (empty)
- Username: (empty)

At the bottom right of the dialog are 'Save' and 'Cancel' buttons.

- e. Click **Submit**.
5. Assign Manipulation Set ID 2 to the Sunrise SIP trunk IP Group:
 - a. Open the IP Group Table page (**Configuration** tab > **VoIP** menu > **VoIP Network** > **IP Group Table**).
 - b. Select the row of the Sunrise SIP trunk IP Group, and then click **Edit**.
 - c. Click the **SBC** tab.
 - d. Set the 'Outbound Message Manipulation Set' field to **2**.

Figure 4-53: Assigning Manipulation Set 2 to the Sunrise SIP Trunk IP Group

Edit Row

Index	2
SRD	DefaultSRD
<input type="button" value="Common"/> <input type="button" value="GW"/> <input style="background-color: #FFCCBC; color: black; border: none; border-bottom: 2px solid #FFCCBC; padding: 0 5px;" type="button" value="SBC"/>	
SBC Operation Mode	Not Configured
Classify By Proxy Set	Enable
SBC Client Forking Mode	Sequential
Inbound Message Manipulation Set	-1
Outbound Message Manipulation Set	2
Msg Man User Defined String1	
Msg Man User Defined String2	
Registration Mode	User Initiates Regis
Max. Number of Registered Users	-1
Authentication Mode	User Authenticates
Authentication Method List	
Username	
<input type="button" value="Save"/> <input type="button" value="Cancel"/>	

e. Click **Submit**.

4.14 Step 14: Miscellaneous Configuration

This section describes miscellaneous SBC configuration.

4.14.1 SBC General Settings

- To configure call forking:

1. Open the General Settings page (**Configuration** tab > **VoIP** menu > **SBC** > **General Settings**).
2. From the 'SBC Forking Handling Mode' drop-down list, select **Sequential**.
For the interoperability test topology, if a SIP 18x response with SDP is received, the SBC opens a voice stream according to the received SDP. The SBC re-opens the stream according to subsequently received 18x responses with SDP or plays a ringback tone if a 180 response without SDP is received. It is mandatory to set this field for the Skype for Business Server 2015 environment.
3. Set the value of 'Session-Expires [sec]' to 1800.
4. Set the value of 'Max Forwards Limit' to 70.

Figure 4-54: Configuring SBC General Settings

General	
Transcoding Mode	Only If Required
No Answer Timeout [sec]	600
GRUU Mode	As Proxy
Minimum Session-Expires [sec]	90
BroadWorks Survivability Feature	Disable
BYE Authentication	Disable
SBC User Registration Time [sec]	0
SBC Proxy Registration Time [sec]	0
SBC Survivability Registration Time [sec]	0
Forking Handling Mode	Sequential
Unclassified Calls	Reject
Session-Expires [sec]	1800
Direct Media	Disable
Preferences Mode	Doesn't Include Extensions
User Registration Grace Time [sec]	0
Fax Detection Timeout [sec]	10
Max Forwards Limit	70
SBC Enable Subscribe Trying	Disable
SBC DB Routing Search Mode	All permutations
SBC Refer Behavior	Regular
SBC 3xx Behavior	Transparent
RTCP Mode	Transparent

5. Click **Submit**.

4.14.2 Configure SBC Alternative Routing Reasons

This step describes how to configure the SBC's handling of SIP 503 responses received for outgoing SIP dialog-initiating methods, e.g., INVITE, OPTIONS, and SUBSCRIBE messages. In this case SBC attempts to locate an alternative route for the call.

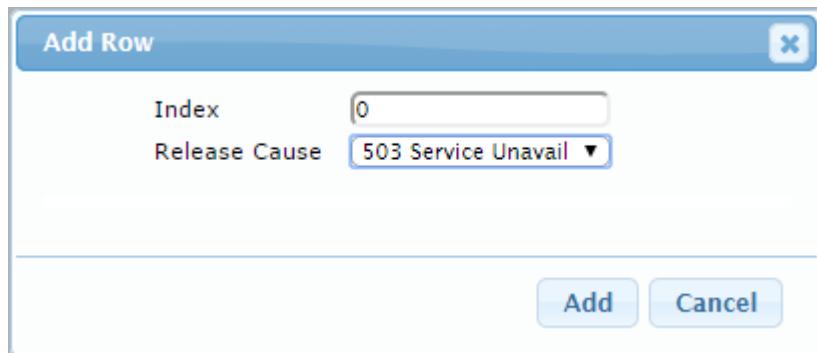
- To configure SIP reason codes for alternative IP routing:

1. Open the SBC Alternative Routing Reasons page (**Configuration** tab > **VoIP** menu >

SBC > Routing SBC > SBC Alternative Routing Reasons).

2. Click **Add**; the following dialog box appears:

Figure 4-55: SBC Alternative Routing Reasons Table - Add Record



Add Row	
Index	0
Release Cause	503 Service Unavail ▾
<input type="button" value="Add"/> <input type="button" value="Cancel"/>	

3. Click **Add**.

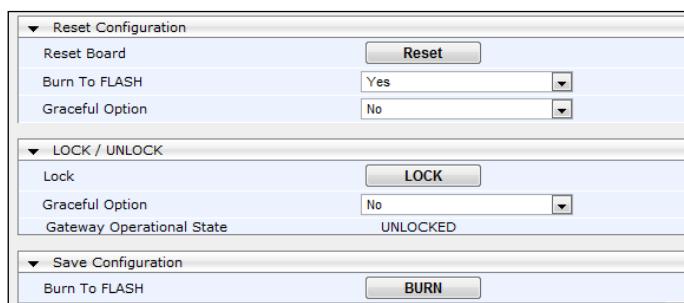
4.15 Step 15: Reset the SBC

After you have completed the configuration of the SBC described in this chapter, save ("burn") the configuration to the SBC's flash memory with a reset for the settings to take effect.

➤ **To save the configuration to flash memory:**

1. Open the Maintenance Actions page (**Maintenance** tab > **Maintenance** menu > **Maintenance Actions**).

Figure 4-56: Resetting the SBC



Reset Configuration	
Reset Board	<input type="button" value="Reset"/>
Burn To FLASH	Yes
Graceful Option	No
LOCK / UNLOCK	
Lock	<input type="button" value="LOCK"/>
Graceful Option	No
Gateway Operational State	UNLOCKED
Save Configuration	
Burn To FLASH	<input type="button" value="BURN"/>

2. Ensure that the 'Burn to FLASH' field is set to **Yes** (default).
3. Click the **Reset** button.

A AudioCodes INI File

The *ini* configuration file of the SBC, corresponding to the Web-based configuration as described in Section 4 on page 33, is shown below:



Note: To load and save an ini file, use the Configuration File page (**Maintenance** tab > **Software Update** menu > **Configuration File**).

```
;*****
;** Ini File **
;*****



;Board: Mediant 1000
;HW Board Type: 47  FK Board Type: 71
;Serial Number: 9032540
;Slot Number: 1
;Software Version: 7.00A.058.002
;DSP Software Version: 624AE3=> 660.14
;Second DSP Software Version: 204IM3=> 660.14
;Board IP Address: 10.145.205.12
;Board Subnet Mask: 255.255.255.0
;Board Default Gateway: 10.145.205.1
;Ram size: 496M  Flash size: 64M
;Num of DSP Cores: 15  Num DSP Channels: 84
;Num of physical LAN ports: 7
;Profile: NONE
;:::Key features:::Board Type: Mediant 1000 ;Security: IPSEC
MediaEncryption StrongEncryption EncryptControlProtocol ;Channel Type:
RTP DspCh=240 IPMediaDspCh=240 ;Coders: G723 G729 NETCODER GSM-FR G727
ILBC G722 ;PSTN Protocols: ISDN IUA=4 CAS ;DSP Voice features:
IpMDetector ;IP Media: Conf VXML VoicePromptAnnounc(H248.9) ;E1Trunks=8
;T1Trunks=8 ;Control Protocols: MGCP MEGACO SIP SBC=10 MSFT ;Default
features:;Coders: G711 G726;

;----- HW components -----
;
; Slot # : Module type : # of ports : # of DSPs
;-----
;      1 : FALC56      :          2 :          3
;      2 : BRI         :          4 :          2
;      3 : FXS         :          4 :          1
;      4 : Empty
;      5 : Empty
;      6 : Empty
;-----


[SYSTEM Params]

SyslogServerIP = 10.145.205.57
EnableSyslog = 0
;NTPServerIP_abs is hidden but has non-default value
NTPServerUTCOffset = 3600
;VpFileLastUpdateTime is hidden but has non-default value
```

```
DayLightSavingTimeStart = '03:SUN/05:02:00'
DayLightSavingTimeEnd = '10:SUN/05:03:00'
DayLightSavingTimeEnable = 1
TLSPkeySize = 2048
TLSPkeyPassphrase = ''
NTPServerIP = '10.145.205.51'
NTPSecondaryServerIP = '10.145.205.52'
;LastConfigChangeTime is hidden but has non-default value
;PM_gwINVITEDialogs is hidden but has non-default value
;PM_gwSBCMediaLegs is hidden but has non-default value

[BSP Params]

PCMLawSelect = 3
UdpPortSpacing = 10
EnterCpuOverloadPercent = 99
ExitCpuOverloadPercent = 95

[Analog Params]

[ControlProtocols Params]

AdminStateLockControl = 0

[MGCP Params]

[MEGACO Params]

EP_Num_0 = 0
EP_Num_1 = 1
EP_Num_2 = 1
EP_Num_3 = 0
EP_Num_4 = 0

[PSTN Params]

[SS7 Params]

[Voice Engine Params]

PrerecordedTonesFileName = 'Sunrise_MoH_SfB_8kHz_8Bit_aLaw.dat'
ENABLEMEDIASECURITY = 1

[WEB Params]

LogoWidth = '145'

[SIP Params]

GWDEBUGLEVEL = 5
;ISPRACKREQUIRED is hidden but has non-default value
MEDIASECURITYBEHAVIOUR = 3
```

```

ENABLESBCAPPLICATION = 1
MSLDAPPRIMARYKEY = 'telephoneNumber'
SBCMAXFORWARDSLIMIT = 70
SBCFORKINGHANDLINGMODE = 1
SBCSESSIONEXPIRES = 1800
ENERGYDETECTORCMD = 587202560
ANSWERDETECTORCMD = 10485760
;GWAPPCONFIGURATIONVERSION is hidden but has non-default value

[ SCTP Params ]

[VXML Params]

[ IPsec Params ]

[ Audio Staging Params ]

[ SNMP Params ]

[ PhysicalPortsTable ]

FORMAT PhysicalPortsTable_Index = PhysicalPortsTable_Port,
PhysicalPortsTable_Mode, PhysicalPortsTable_SpeedDuplex,
PhysicalPortsTable_PortDescription, PhysicalPortsTable_GroupMember,
PhysicalPortsTable_GroupStatus;
PhysicalPortsTable 0 = "GE_0_1", 1, 4, "User Port #0", "GROUP_1",
"Active";
PhysicalPortsTable 1 = "GE_0_2", 1, 4, "User Port #1", "GROUP_1",
"Redundant";
PhysicalPortsTable 2 = "GE_7_1", 1, 4, "User Port #2", "GROUP_2",
"Active";
PhysicalPortsTable 3 = "GE_7_2", 1, 4, "User Port #3", "GROUP_2",
"Redundant";
PhysicalPortsTable 4 = "GE_7_3", 1, 4, "User Port #4", "GROUP_3",
"Active";
PhysicalPortsTable 5 = "GE_7_4", 1, 4, "User Port #5", "GROUP_3",
"Redundant";

[ \PhysicalPortsTable ]

[ EtherGroupTable ]

FORMAT EtherGroupTable_Index = EtherGroupTable_Group,
EtherGroupTable_Mode, EtherGroupTable_Member1, EtherGroupTable_Member2;
EtherGroupTable 0 = "GROUP_1", 2, "GE_0_1", "GE_0_2";
EtherGroupTable 1 = "GROUP_2", 2, "GE_7_1", "GE_7_2";
EtherGroupTable 2 = "GROUP_3", 2, "GE_7_3", "GE_7_4";
EtherGroupTable 3 = "GROUP_4", 0, "", "";
EtherGroupTable 4 = "GROUP_5", 0, "", "";
EtherGroupTable 5 = "GROUP_6", 0, "", "";

[ \EtherGroupTable ]

```

```

[ DeviceTable ]

FORMAT DeviceTable_Index = DeviceTable_VlanID,
DeviceTable_UnderlyingInterface, DeviceTable_DeviceName,
DeviceTable_Tagging;
DeviceTable 0 = 1, "GROUP_1", "vlan 1", 0;
DeviceTable 1 = 2, "GROUP_2", "vlan 2", 0;
DeviceTable 2 = 3, "GROUP_3", "vlan 3", 0;

[ \DeviceTable ]

[ InterfaceTable ]

FORMAT InterfaceTable_Index = InterfaceTable_ApplicationTypes,
InterfaceTable_InterfaceMode, InterfaceTable_IPAddress,
InterfaceTable_PrefixLength, InterfaceTable_Gateway,
InterfaceTable_InterfaceName, InterfaceTable_PrimaryDNSServerIPAddress,
InterfaceTable_SecondaryDNSServerIPAddress,
InterfaceTable_UnderlyingDevice;
InterfaceTable 0 = 6, 10, 10.145.205.12, 24, 10.145.205.1, "SfB",
10.145.205.51, 10.145.205.52, "vlan 1";
InterfaceTable 1 = 5, 10, 192.168.201.30, 24, 0.0.0.0, "Sunrise",
0.0.0.0, 0.0.0.0, "vlan 2";

[ \InterfaceTable ]

[ DspTemplates ]

;
; *** TABLE DspTemplates ***
; This table contains hidden elements and will not be exposed.
; This table exists on board and will be saved during restarts.
;

[ \DspTemplates ]

[ WebUsers ]

FORMAT WebUsers_Index = WebUsers_Username, WebUsers_Password,
WebUsers_Status, WebUsers_PwAgeInterval, WebUsers_SessionLimit,
WebUsers_SessionTimeout, WebUsers_BlockTime, WebUsers_UserLevel,
WebUsers_PwNonce;
WebUsers 0 = "Admin",
"$1$j7qh8qDlra2n8av8+Pj+qqym1MXHwZXDn8ORmpPJnZ6dytODhtCCh4TUjYyDjY/Y34n18
6byoqH3pvrrq2u//s=", 1, 0, 2, 15, 60, 200,
"6a2b760a8f2b9909545740b788f0d4a6";
WebUsers 1 = "User",
"$1$u9/e3tuO8vT2pfbxo/Os+qn//Kv//eiy5uHntOG1ve/qvujt77nWltPX19yE0dndjNjfj
t/cwJOXwJKRwJHOz8s=", 3, 0, 2, 15, 60, 50,
"8f2c00d5bee5308693007feld0e981e4";

[ \WebUsers ]

```

```

[ TLSContexts ]

FORMAT TLSContexts_Index = TLSContexts_Name, TLSContexts_TLSVersion,
TLSContexts_ServerCipherString, TLSContexts_ClientCipherString,
TLSContexts_OcspEnable, TLSContexts_OcspServerPrimary,
TLSContexts_OcspServerSecondary, TLSContexts_OcspServerPort,
TLSContexts_OcspDefaultResponse;
TLSContexts 0 = "default", 7, "RC4:AES128", "ALL:!aNULL", 0, , , 2560, 0;

[ \TLSContexts ]


[ IpProfile ]

FORMAT IpProfile_Index = IpProfile_ProfileName, IpProfile_IpPreference,
IpProfile_CodersGroupID, IpProfile_IsFaxUsed,
IpProfile_JitterBufMinDelay, IpProfile_JitterBufOptFactor,
IpProfile_IPDiffServ, IpProfile_SigIPDiffServ, IpProfile_SCE,
IpProfile_RTPRedundancyDepth, IpProfile_RemoteBaseUDPPort,
IpProfile_CNGmode, IpProfile_VxxTransportType, IpProfile_NSEMode,
IpProfile_IsDTMFUsed, IpProfile_PlayRBTone2IP,
IpProfile_EnableEarlyMedia, IpProfile_ProgressIndicator2IP,
IpProfile_EnableEchoCanceller, IpProfile_CopyDest2RedirectNumber,
IpProfile_MediaSecurityBehaviour, IpProfile_CallLimit,
IpProfile_DisconnectOnBrokenConnection, IpProfile_FirstTxDtmfOption,
IpProfile_SecondTxDtmfOption, IpProfile_RxDTMFOption,
IpProfile_EnableHold, IpProfile_InputGain, IpProfile_VoiceVolume,
IpProfile_AddIEInSetup, IpProfile_SBCExtensionCodersGroupID,
IpProfile_MediaIPVersionPreference, IpProfile_TranscodingMode,
IpProfile_SBCAllowedMediaTypes, IpProfile_SBCAllowedCodersGroupID,
IpProfile_SBCAllowedVideoCodersGroupID, IpProfile_SBCAllowedCodersMode,
IpProfile_SBCMediaSecurityBehaviour, IpProfile_SBCRFC2833Behavior,
IpProfile_SBCAlternativeDTMFMethod, IpProfile_SBCAssertIdentity,
IpProfile_AMDSensitivityParameterSuit, IpProfile_AMDSensitivityLevel,
IpProfile_AMDMaxGreetingTime, IpProfile_AMDMaxPostSilenceGreetingTime,
IpProfile_SBCDiversionMode, IpProfile_SBCHistoryInfoMode,
IpProfile_EnableQSIGTunneling, IpProfile_SBCFaxCodersGroupID,
IpProfile_SBCFaxBehavior, IpProfile_SBCFaxOfferMode,
IpProfile_SBCFaxAnswerMode, IpProfile_SbcPrackMode,
IpProfile_SBCSessionExpiresMode, IpProfile_SBCRemoteUpdateSupport,
IpProfile_SBCRemoteReinviteSupport,
IpProfile_SBCRemoteDelayedOfferSupport, IpProfile_SBCRemoteReferBehavior,
IpProfile_SBCRemote3xxBehavior, IpProfile_SBCRemoteMultiple18xSupport,
IpProfile_SBCRemoteEarlyMediaResponseType,
IpProfile_SBCRemoteEarlyMediaSupport, IpProfile_EnableSymmetricMKI,
IpProfile_MKISize, IpProfile_SBCEnforceMKISize,
IpProfile_SBCRemoteEarlyMediaRTP, IpProfile_SBCRemoteSupportsRFC3960,
IpProfile_SBCRemoteCanPlayRingback, IpProfile_EnableEarly183,
IpProfile_EarlyAnswerTimeout, IpProfile_SBC2833DTMPayloadType,
IpProfile_SBCUserRegistrationTime, IpProfile_ResetSRTPStateUponRekey,
IpProfile_AmdMode, IpProfile_SBCReliableHeldToneSource,
IpProfile_GenerateSRTPKeys, IpProfile_SBCPlayHeldTone,
IpProfile_SBCRemoteHoldFormat, IpProfile_SBCRemoteReplacesBehavior,
IpProfile_SBCSDPPTimeAnswer, IpProfile_SBCPreferredPTime,
IpProfile_SBCUseSilenceSupp, IpProfile_SBCRTPRedundancyBehavior,
IpProfile_SBCPlayRBTTToTransferee, IpProfile_SBCRTCPMode,
IpProfile_SBCJitterCompensation,
IpProfile_SBCRemoteRenegotiateOnFaxDetection,
IpProfile_JitterBufMaxDelay,
IpProfile_SBCUserBehindUdpNATRegistrationTime,
IpProfile_SBCUserBehindTcpNATRegistrationTime,
IpProfile_SBCSDPHandleRTCPAttribute,
IpProfile_SBCRemoveCryptoLifetimeInSDP, IpProfile_SBCIceMode,
IpProfile_SBCRTCPMux, IpProfile_SBCMediaSecurityMethod,
IpProfile_SBCHandleXDetect, IpProfile_SBCRTCPFeedback,

```

```

IpProfile_SBCRemoteRepresentationMode, IpProfile_SBCKeepVIAHeaders,
IpProfile_SBCKeepRoutingHeaders, IpProfile_SBCKeepUserAgentHeader,
IpProfile_SBCRemoteMultipleEarlyDialogs,
IpProfile_SBCRemoteMultipleAnswersMode, IpProfile_SBCDirectMediaTag,
IpProfile_SBCAdaptRFC2833BWToVoiceCoderBW;
IpProfile 1 = "SfB", 1, 0, 0, 10, 10, 46, 24, 1, 0, 0, 0, 2, 0, 0, 0, 0,
-1, 1, 0, 0, -1, 1, 4, -1, 1, 1, 0, 0, "", 1, 0, 0, "", 1, -1, 2, 1, 0,
0, 2, 0, 8, 300, 400, 0, 0, 0, -1, 0, 0, 1, 3, 3, 1, 1, 0, 3, 2, 1, 0, 1,
0, 1, 0, 1, 0, 0, 0, 0, 1, 0, 1, 1, 3, 0, 0, 0, 1, 0, 0, 0, 0,
0, 250, -1, -1, 0, 0, 0, 0, 0, -1, -1, -1, -1, 0, "",
0;IpProfile 2 = "Sunrise", 1, 0, 0, 10, 10, 46, 24, 0, 0, 0, 0, 2, 0, 0,
0, 0, -1, 1, 0, 0, -1, 1, 4, -1, 1, 1, 0, 0, "", 2, 0, 0, "", 2, -1, 2,
2, 0, 0, 0, 0, 8, 300, 400, 1, 0, 0, -1, 0, 0, 1, 3, 3, 0, 2, 1, 3, 0, 1,
0, 1, 0, 0, 1, 0, 0, 0, 0, 0, 1, 0, 1, 5, 0, 0, 0, 0, 0, 0, 0,
0, 0, 250, -1, -1, 0, 0, 0, 0, 0, -1, -1, -1, -1, 0, "", 0;
IpProfile 3 = "Fax", 1, 0, 0, 10, 10, 46, 24, 0, 0, 0, 0, 2, 0, 0, 0, 0,
-1, 1, 0, 0, -1, 1, 4, -1, 1, 1, 0, 0, "", -1, 0, 0, "", -1, -1, 0, 0, 0,
0, 0, 0, 8, 300, 400, 0, 0, 0, -1, 0, 0, 1, 3, 0, 2, 2, 1, 0, 0, 1, 0, 1,
0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 250, -1, -1, 0, 0, 0, 0, 0, -1, -1, -1, -1, 0, "", 0;

[ \IpProfile ]

[ CpMediaRealm ]

FORMAT CpMediaRealm_Index = CpMediaRealm_MediaRealmName,
CpMediaRealm_IPv4IF, CpMediaRealm_IPv6IF, CpMediaRealm_PortRangeStart,
CpMediaRealm_MediaSessionLeg, CpMediaRealm_PortRangeEnd,
CpMediaRealm_IsDefault, CpMediaRealm_QoeProfile, CpMediaRealm_BWProfile;
CpMediaRealm 0 = "MR SfB", "SfB", "", 6000, 100, 6999, 1, "", "";
CpMediaRealm 1 = "MR Sunrise", "Sunrise", "", 7000, 100, 7999, 0, "", "";

[ \CpMediaRealm ]

[ SBCRoutingPolicy ]

FORMAT SBCRoutingPolicy_Index = SBCRoutingPolicy_Name,
SBCRoutingPolicy_LCREnable, SBCRoutingPolicy_LCRAverageCallLength,
SBCRoutingPolicy_LCRDefaultCost, SBCRoutingPolicy_LdapServerGroupName;
SBCRoutingPolicy 0 = "Default_SBCRoutingPolicy", 0, 1, 0, "";

[ \SBCRoutingPolicy ]

[ SRD ]

FORMAT SRD_Index = SRD_Name, SRD_BlockUnRegUsers, SRD_MaxNumOfRegUsers,
SRD_EnableUnAuthenticatedRegistrations, SRD_SharingPolicy,
SRD_UsedByRoutingServer, SRD_SBCOperationMode, SRD_SBCRoutingPolicyName,
SRD_SBCDialPlanName;
SRD 0 = "DefaultSRD", 0, -1, 1, 0, 0, 0, "Default_SBCRoutingPolicy", "";

[ \SRD ]

[ SIPInterface ]

FORMAT SIPInterface_Index = SIPInterface_InterfaceName,
SIPInterface_NetworkInterface, SIPInterface_ApplicationType,

```

```

SIPInterface_UDPPort, SIPInterface_TCPPort, SIPInterface_TLSPort,
SIPInterface_SRDNName, SIPInterface_MessagePolicyName,
SIPInterface_TLSContext, SIPInterface_TLSMutualAuthentication,
SIPInterface_TCPKeepaliveEnable,
SIPInterface_ClassificationFailureResponseType,
SIPInterface_PreClassificationManSet, SIPInterface_EncapsulatingProtocol,
SIPInterface_MediaRealm, SIPInterface_SBCDirectMedia,
SIPInterface_BlockUnRegUsers, SIPInterface_MaxNumOfRegUsers,
SIPInterface_EnableUnAuthenticatedRegistrations,
SIPInterface_UsedByRoutingServer;
SIPInterface 0 = "SfB", "SfB", 2, 0, 5068, 5067, "DefaultSRD", "", "",
"default", -1, 0, 500, -1, 0, "MR SfB", 0, -1, -1, -1, 0;
SIPInterface 1 = "Sunrise", "Sunrise", 2, 5061, 0, 5061, "DefaultSRD",
", "default", -1, 0, 500, -1, 0, "MR Sunrise", 0, -1, -1, -1, 0;

[ \SIPInterface ]

[ ProxySet ]

FORMAT ProxySet_Index = ProxySet_ProxyName,
ProxySet_EnableProxyKeepAlive, ProxySet_ProxyKeepAliveTime,
ProxySet_ProxyLoadBalancingMethod, ProxySet_IsProxyHotSwap,
ProxySet_SRDNName, ProxySet_ClassificationInput, ProxySet_TLSContextName,
ProxySet_ProxyRedundancyMode, ProxySet_DNSResolveMethod,
ProxySet_KeepAliveFailureResp, ProxySet_GWIPv4SIPInterfaceName,
ProxySet_SBCIPv4SIPInterfaceName, ProxySet_SASIPv4SIPInterfaceName,
ProxySet_GWIPv6SIPInterfaceName, ProxySet_SBCIPv6SIPInterfaceName,
ProxySet_SASIPv6SIPInterfaceName;
ProxySet 0 = "SfB", 1, 60, 1, 1, "DefaultSRD", 0, "", -1, -1, "", "", "SfB",
", "", "", "", "";
ProxySet 1 = "Sunrise", 1, 60, 0, 0, "DefaultSRD", 0, "", -1, -1, "", "", "Sunrise",
", "", "", "", "";
ProxySet 2 = "Fax", 0, 60, 0, 0, "DefaultSRD", 0, "", -1, -1, "", "", "SfB",
", "", "", "", "";

[ \ProxySet ]

[ IPGroup ]

FORMAT IPGroup_Index = IPGroup_Type, IPGroup_Name, IPGroup_ProxySetName,
IPGroup_SIPGroupName, IPGroup_ContactUser, IPGroup_SipReRoutingMode,
IPGroup_AlwaysUseRouteTable, IPGroup_SRDNName, IPGroup_MediaRealm,
IPGroup_ClassifyByProxySet, IPGroup_ProfileName,
IPGroup_MaxNumOfRegUsers, IPGroup_InboundManSet, IPGroup_OutboundManSet,
IPGroup_RegistrationMode, IPGroup_AuthenticationMode, IPGroup_MethodList,
IPGroup_EnableSBCClientForking, IPGroup_SourceUriInput,
IPGroup_DestUriInput, IPGroup_ContactName, IPGroup_Username,
IPGroup_Password, IPGroup_UUIFormat, IPGroup_QOEProfile,
IPGroup_BWProfile, IPGroup_MediaEnhancementProfile,
IPGroup_AlwaysUseSourceAddr, IPGroup_MsgManUserDef1,
IPGroup_MsgManUserDef2, IPGroup_SIPConnect, IPGroup_SBCPSAPMode,
IPGroup_DTLSContext, IPGroup_CreatedByRoutingServer,
IPGroup_UsedByRoutingServer, IPGroup_SBCOperationMode,
IPGroup_SBCRouteUsingRequestURIPort, IPGroup_SBCKeepOriginalCallID,
IPGroup_SBCDialPlanName;
IPGroup 0 = 0, "SfB", "SfB", "", "", -1, 0, "DefaultSRD", "MR SfB", 1,
"SfB", -1, 1, 1, 0, 0, "", 0, -1, -1, "", "", "$1$gQ==", 0, "", "", "", 0,
", "", "", 0, 0, "", 0, 0, -1, 0, 0, "";
IPGroup 1 = 0, "Sunrise", "Sunrise", "", "", -1, 0, "DefaultSRD", "MR
Sunrise", 1, "Sunrise", -1, 2, 2, 0, 0, "", 0, -1, -1, "", "", "$1$gQ==",
0, "", "", 0, 0, "", 0, 0, -1, 0, 0, "";

```

```

IPGroup 2 = 0, "Fax", "Fax", "", "", -1, 0, "DefaultSRD", "MR_SfB", 1,
"Fax", -1, -1, -1, 0, 0, "", 0, -1, -1, "", "", "$1$gQ==", 0, "", "", "",
0, "", "", 0, 0, "", 0, 0, -1, 0, 0, "";

[ \IPGroup ]

[ SBCAlternativeRoutingReasons ]

FORMAT SBCAlternativeRoutingReasons_Index =
SBCAlternativeRoutingReasons_ReleaseCause;
SBCAlternativeRoutingReasons 0 = 503;

[ \SBCAlternativeRoutingReasons ]

[ ProxyIp ]

FORMAT ProxyIp_Index = ProxyIp_ProxySetId, ProxyIp_ProxyIpIndex,
ProxyIp_IpAddress, ProxyIp_TransportType;
ProxyIp 0 = "0", 0, "FEPool01.intra.sunlab.ch:5067", 2;
ProxyIp 1 = "0", 1, "FEPool02.intra.sunlab.ch:5067", 2;
ProxyIp 2 = "1", 0, "10.17.220.5:5060", 0;
ProxyIp 3 = "1", 1, "10.24.220.5:5060", 0;
ProxyIp 4 = "2", 0, "10.145.205.99:5060", 0;

[ \ProxyIp ]

[ IP2IPRouting ]

FORMAT IP2IPRouting_Index = IP2IPRouting_RouteName,
IP2IPRouting_RoutingPolicyName, IP2IPRouting_SrcIPGroupName,
IP2IPRouting_SrcUsernamePrefix, IP2IPRouting_SrcHost,
IP2IPRouting_DestUsernamePrefix, IP2IPRouting_DestHost,
IP2IPRouting_RequestType, IP2IPRouting_MessageConditionName,
IP2IPRouting_ReRouteIPGroupName, IP2IPRouting_Trigger,
IP2IPRouting_CallSetupRulesSetId, IP2IPRouting_DestType,
IP2IPRouting_DestIPGroupName, IP2IPRouting_DestSIPInterfaceName,
IP2IPRouting_DestAddress, IP2IPRouting_DestPort,
IP2IPRouting_DestTransportType, IP2IPRouting_AltRouteOptions,
IP2IPRouting_GroupPolicy, IP2IPRouting_CostGroup, IP2IPRouting_DestTags,
IP2IPRouting_SrcTags;
IP2IPRouting 0 = "OPTIONS termination", "Default_SBCRoutingPolicy",
"Any", "*", "*", "**", "**", 6, "", "Any", 0, -1, 1, "", "", "internal", 0,
-1, 0, 0, "", "", "";
IP2IPRouting 1 = "ITSP to Fax", "Default_SBCRoutingPolicy", "Sunrise",
"**", "**", "+41991234567", "**", 0, "", "Any", 0, -1, 0, "Fax", "SfB", "",
0, -1, 0, 0, "", "", "";
IP2IPRouting 2 = "SfB to ITSP", "Default_SBCRoutingPolicy", "SfB", "**",
"**", "**", 0, "", "Any", 0, -1, 0, "Sunrise", "Sunrise", "", 0, -1,
0, 0, "", "", "";
IP2IPRouting 3 = "ITSB to SfB", "Default_SBCRoutingPolicy", "Sunrise",
"**", "**", "**", 0, "", "Any", 0, -1, 0, "Sfb", "SfB", "", 0, -1, 0,
0, "", "", "";
IP2IPRouting 4 = "Fax to ITSP", "Default_SBCRoutingPolicy", "Fax", "**",
"**", "**", 0, "", "Any", 0, -1, 0, "Sunrise", "Sunrise", "", 0, -1,
0, 0, "", "", "";

[ \IP2IPRouting ]

```

```
[ CodersGroup0 ]  
  
FORMAT CodersGroup0_Index = CodersGroup0_Name, CodersGroup0_pTime,  
CodersGroup0_rate, CodersGroup0_PayloadType, CodersGroup0_Sce,  
CodersGroup0_CoderSpecific;  
CodersGroup0 0 = "g711Alaw64k", 20, 255, -1, 0, "";  
  
[ \CodersGroup0 ]  
  
[ CodersGroup1 ]  
  
FORMAT CodersGroup1_Index = CodersGroup1_Name, CodersGroup1_pTime,  
CodersGroup1_rate, CodersGroup1_PayloadType, CodersGroup1_Sce,  
CodersGroup1_CoderSpecific;  
CodersGroup1 0 = "g711Alaw64k", 20, 0, -1, 1, "";  
CodersGroup1 1 = "g711Ulaw64k", 20, 0, -1, 1, "";  
  
[ \CodersGroup1 ]  
  
[ CodersGroup2 ]  
  
FORMAT CodersGroup2_Index = CodersGroup2_Name, CodersGroup2_pTime,  
CodersGroup2_rate, CodersGroup2_PayloadType, CodersGroup2_Sce,  
CodersGroup2_CoderSpecific;  
CodersGroup2 0 = "g729", 20, 0, -1, 1, "";  
CodersGroup2 1 = "g711Alaw64k", 20, 0, -1, 1, "";  
CodersGroup2 2 = "g711Ulaw64k", 20, 0, -1, 1, "";  
  
[ \CodersGroup2 ]  
  
[ AllowedCodersGroup1 ]  
  
FORMAT AllowedCodersGroup1_Index = AllowedCodersGroup1_Name;  
AllowedCodersGroup1 0 = "g722";  
AllowedCodersGroup1 1 = "g711Alaw64k";  
AllowedCodersGroup1 2 = "g711Ulaw64k";  
  
[ \AllowedCodersGroup1 ]  
  
[ AllowedCodersGroup2 ]  
  
FORMAT AllowedCodersGroup2_Index = AllowedCodersGroup2_Name;  
AllowedCodersGroup2 0 = "g722";  
AllowedCodersGroup2 1 = "g729";  
AllowedCodersGroup2 2 = "g711Alaw64k";  
AllowedCodersGroup2 3 = "g711Ulaw64k";  
  
[ \AllowedCodersGroup2 ]  
  
[ MessageManipulations ]  
  
FORMAT MessageManipulations_Index =  
MessageManipulations_ManipulationName, MessageManipulations_ManSetID,
```

```

MessageManipulations_MessageType, MessageManipulations_Condition,
MessageManipulations_ActionSubject, MessageManipulations_ActionType,
MessageManipulations_ActionValue, MessageManipulations_RowRole;
MessageManipulations 0 = "Add Allow UPDATE", 1, "invite.response",
"header.allow !contains 'UPDATE'", "header.allow", 2,
"'CANCEL,BYE,INVITE,PRACK,UPDATE'", 0;
MessageManipulations 1 = "Change Referred-by", 2, "invite.request",
"header.referred-by exists", "header.Diversion", 0, "'<'+'header.referred-
by.URL+'>'", 0;
MessageManipulations 2 = "Remove Referred-by", 2, "", "",
"header.referred-by", 1, "", 1;

[ \MessageManipulations ]

[ GwRoutingPolicy ]

FORMAT GwRoutingPolicy_Index = GwRoutingPolicy_Name,
GwRoutingPolicy_LCREnable, GwRoutingPolicy_LCRAverageCallLength,
GwRoutingPolicy_LCRDefaultCost, GwRoutingPolicy_LdapServerGroupName;
GwRoutingPolicy 0 = "GwRoutingPolicy", 0, 1, 0, "";

[ \GwRoutingPolicy ]

[ ResourcePriorityNetworkDomains ]

FORMAT ResourcePriorityNetworkDomains_Index =
ResourcePriorityNetworkDomains_Name,
ResourcePriorityNetworkDomains_Ip2TelInterworking;
ResourcePriorityNetworkDomains 1 = "dsn", 1;
ResourcePriorityNetworkDomains 2 = "dod", 1;
ResourcePriorityNetworkDomains 3 = "drsn", 1;
ResourcePriorityNetworkDomains 5 = "uc", 1;
ResourcePriorityNetworkDomains 7 = "cuc", 1;

[ \ResourcePriorityNetworkDomains ]

[ StaticRouteTable ]

FORMAT StaticRouteTable_Index = StaticRouteTable_DeviceName,
StaticRouteTable_Destination, StaticRouteTable_PrefixLength,
StaticRouteTable_Gateway, StaticRouteTable_Description;
StaticRouteTable 0 = "vlan 2", 192.168.200.0, 24, 192.168.201.20, "IMS
Next Hop";
StaticRouteTable 1 = "vlan 2", 10.17.220.0, 28, 192.168.201.20, "IMS ZUR
SIP";
StaticRouteTable 2 = "vlan 2", 10.17.220.16, 28, 192.168.201.20, "IMS ZUR
Media";
StaticRouteTable 3 = "vlan 2", 10.24.220.0, 28, 192.168.201.20, "IMS BER
SIP";
StaticRouteTable 4 = "vlan 2", 10.24.220.16, 28, 192.168.201.20, "IMS BER
Media";

[ \StaticRouteTable ]

```

B Configuring Analog Devices (ATAs) for Fax Support

This section describes how to configure the analog device entity to route its calls to the AudioCodes Media Gateway for supporting faxes. The analog device entity must be configured to send all calls to the AudioCodes SBC.



Note: The configuration described in this section is for ATA devices configured for AudioCodes MP-11x series.

B.1 Step 1: Configure the Endpoint Phone Number Table

The 'Endpoint Phone Number Table' page allows you to activate the MP-11x ports (endpoints) by defining telephone numbers. The configuration below uses the example of ATA destination phone number "5872330307" (IP address 10.15.17.12) with all routing directed to the SBC device (10.15.17.55).

➤ **To configure the Endpoint Phone Number table:**

1. Open the Endpoint Phone Number Table page (**Configuration** tab > **VoIP** menu > **GW and IP to IP** submenu > **Hunt Group** sub-menu > **Endpoint Phone Number**).

Figure B-1: Endpoint Phone Number Table Page

Endpoint Phone Number Table				
	Channel(s)	Phone Number	Hunt Group ID	Tel Profile ID
1	1	5872330307		0
2				
3				
4				

B.2 Step 2: Configure Tel to IP Routing Table

This step describes how to configure the Tel-to-IP routing rules to ensure that the MP-11x device sends all calls to the AudioCodes central SBC device.

➤ **To configure the Tel to IP Routing table:**

1. Open the Tel to IP Routing page (**Configuration** tab > **VoIP** menu > **GW and IP to IP** submenu > **Routing** sub-menu > **Tel to IP Routing**).

Figure B-2: Tel to IP Routing Page

Tel to IP Routing											Advanced Parameter List ▾		
<input type="button" value="▼"/> Routing Index <input type="button" value="1-10 ▾"/> <input type="button" value="Tel To IP Routing Mode"/> <input type="button" value="Route calls before manipulation ▾"/>											Advanced Parameter List ▾		
	Src. Hunt Group ID	Dest. Phone Prefix	Source Phone Prefix	>	Dest. IP Address	Port	Transport Type	Dest. IP Group ID	IP Profile ID	Cost Group ID			
1	*	*	*	>	10.15.17.55	5060	UDP	-1	0	None			
2				>			Not Configured	-1		None			

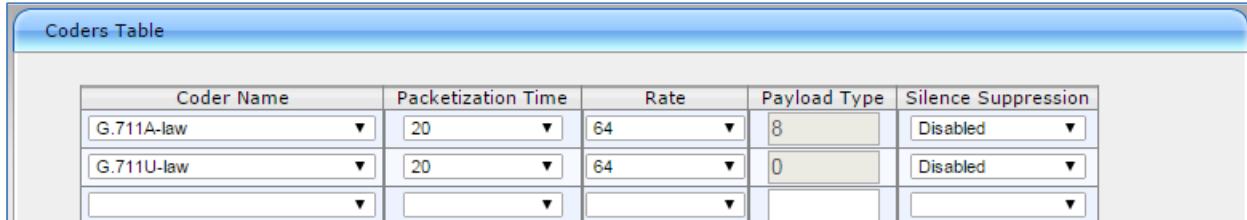
B.3 Step 3: Configure Coders Table

This step describes how to configure the coders for the MP-11x device.

➤ **To configure MP-11x coders:**

1. Open the Coders page (**Configuration** tab > **VoIP** menu > **Coders And Profiles** sub-menu > **Coders**).

Figure B-3: Coders Table Page



Coder Name	Packetization Time	Rate	Payload Type	Silence Suppression
G.711A-law	20	64	8	Disabled
G.711U-law	20	64	0	Disabled

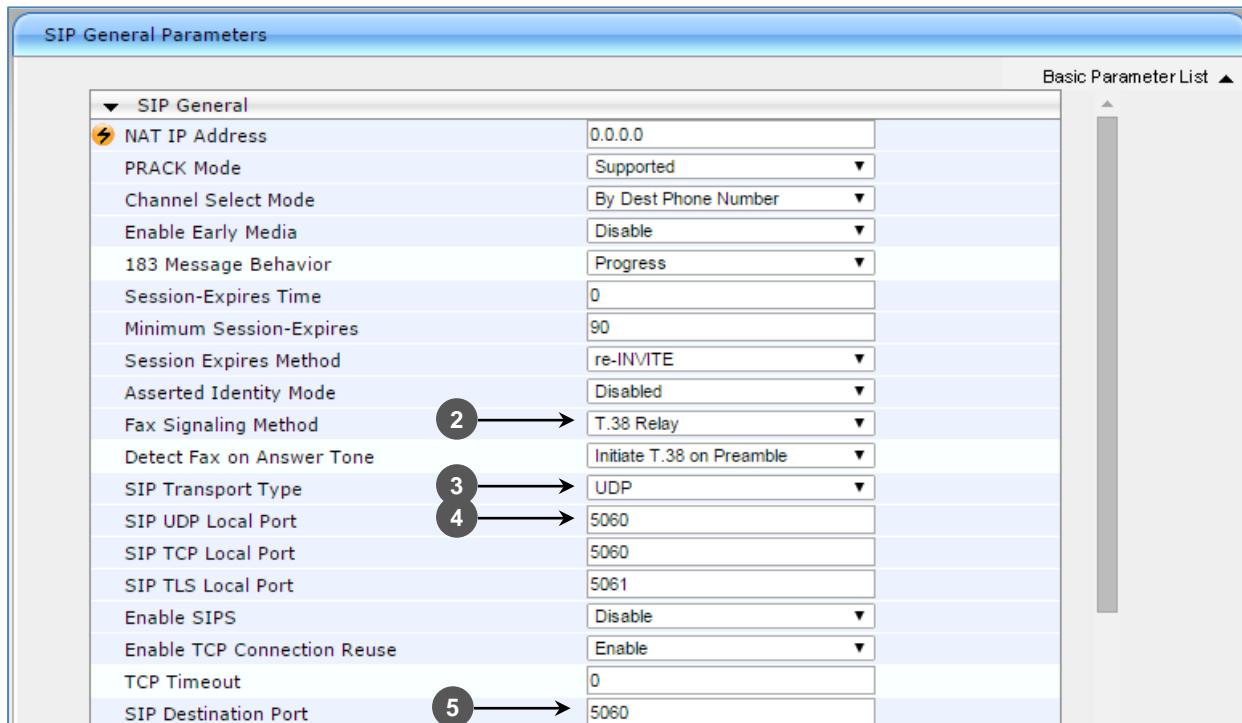
B.4 Step 4: Configure SIP UDP Transport Type and Fax Signaling Method

This step describes how to configure the fax signaling method for the MP-11x device.

➤ **To configure the fax signaling method:**

1. Open the SIP General Parameters page (**Configuration** tab > **VoIP** menu > **SIP Definitions** submenu > **General Parameters**).

Figure B-4: SIP General Parameters Page



2. From the 'FAX Signaling Method' drop-down list, select **G.711 Transport** for G.711 fax support and select **T.38 Relay** for T.38 fax support.
3. From the 'SIP Transport Type' drop-down list, select **UDP**.
4. In the 'SIP UDP Local Port' field, enter **5060** (corresponding to the Central Gateway UDP transmitting port configuration).
5. In the 'SIP Destination Port', enter **5060** (corresponding to the Central Gateway UDP listening port configuration).

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