



# **Amazon Chime SDK Voice Connector**

## **SIP Trunking Configuration Guide:**

### **3CX with AudioCodes Mediant 1000B SBC**

**March 2023**

## Document History

Rev. No.	Date	Description
0.1	Mar-23-2021	Draft SIP Trunk Configuration Guide
1.0	Apr-19-2021	Initial release
2.0	Mar-28-2023	Updated for 3CX v18

## Table of Contents

1	Audience .....	6
1.1	Amazon Chime SDK Voice Connector.....	6
2	SIP Trunking Network Components.....	7
2.1	Hardware Components .....	8
2.2	Software Requirements .....	8
3	Features .....	8
3.1	Features Supported.....	8
3.2	Features Not Supported .....	9
3.3	Features Not Tested .....	9
3.4	Caveats and Limitations.....	9
4	Configuration .....	10
4.1	Configuration Checklist .....	10
4.2	3CX Configuration.....	11
4.2.1	3CX Management Console .....	11
4.2.2	Add SIP Trunk .....	12
4.2.3	Add Users .....	18
4.2.4	Outbound Rules .....	20
4.2.5	Inbound Rules .....	22
4.3	AudioCodes SBC configuration.....	23
4.3.1	Network IP Interface configuration.....	23
4.3.2	Media Realm configuration .....	23
4.3.3	SRD Configuration .....	25
4.3.4	SIP Interface configuration .....	26
4.3.5	Proxy Sets configuration.....	28
4.3.6	IP Group Table Configuration .....	31
4.3.7	Coder Groups configuration.....	35
4.3.8	IP Profile Configuration .....	36
4.3.9	IP-to-IP Routing .....	42
4.3.10	TLS Configuration.....	44
4.3.11	Message Manipulation configuration .....	46

## Table of Figures

Figure 1 Network Topology .....	7
Figure 2: 3CX Management Console.....	11
Figure 3: 3CX Management Console (cont.) .....	12
Figure 4: Add SIP Trunk .....	12
Figure 5: Add SIP Trunk/VoIP Provider .....	13
Figure 6: Add SIP Trunk (cont.) .....	14
Figure 7: Add SIP Trunk (cont.) .....	14
Figure 8: Add SIP Trunk (cont.) .....	15
Figure 9: Add SIP Trunk (Outbound Parameters).....	16
Figure 10: Add SIP Trunk (Outbound Parameters-cont.).....	17
Figure 11: Add SIP Trunk (Outbound Parameters- cont.) .....	17
Figure 12: Add Users .....	18
Figure 13: Add Users (cont.) .....	18
Figure 14: Add Users (cont.) .....	19
Figure 15: Add Extensions (cont.) .....	19
Figure 16: Add Users (cont.) .....	20
Figure 17: Outbound Rules .....	20
Figure 18: Outbound Rules (cont.) .....	21
Figure 19: Outbound Rules (cont.) .....	21
Figure 20: Inbound Rules.....	22
Figure 21: Inbound Rules (cont.).....	22
Figure 22: IP Interfaces.....	23
Figure 23: Media Realms Table.....	23
Figure 24: Media Realm for 3CX.....	24
Figure 25: Media Realm for Amazon Chime SDK Voice Connector.....	24
Figure 26: Default SRD .....	25
Figure 27: Default SRD table details.....	25
Figure 28: SIP Interfaces.....	26
Figure 29: SIP Interface for 3CX .....	26
Figure 30: SIP Interface for 3CX Continuation .....	27
Figure 31: SIP Interface for Amazon Chime SDK Voice Connector.....	27
Figure 32: SIP Interface for Amazon Chime SDK Voice Connector Continuation .....	28
Figure 33: Proxy Sets table .....	28
Figure 34: Proxy Set table for 3CX.....	29
Figure 35: Proxy Address for 3CX.....	29
Figure 36: Proxy Set Table for Amazon Chime SDK Voice Connector.....	30
Figure 37: Proxy Address for Amazon Chime SDK Voice Connector.....	30

Figure 38: IP Group Table .....	31
Figure 39: IP Group Table for 3CX .....	31
Figure 40: IP Group table for 3CX Continuation .....	32
Figure 41: IP Group Table for 3CX Continuation .....	32
Figure 42: IP Group Table for 3CX Continuation .....	33
Figure 43: IP Group Table for Amazon Chime SDK Voice Connector .....	33
Figure 44: IP Group Table for Amazon Chime SDK Voice Connector Continuation .....	34
Figure 45: IP Group Table for Amazon Chime SDK Voice Connector Continuation .....	34
Figure 46: IP Group Table for Amazon Chime SDK Voice Connector Continuation .....	35
Figure 47: Coder Groups .....	35
Figure 48: IP Profiles .....	36
Figure 49: IP Profile for 3CX .....	36
Figure 50: IP Profile for 3CX Continuation .....	37
Figure 51: IP Profile for 3CX Continuation .....	37
Figure 52: IP Profile for 3CX Continuation .....	38
Figure 53: IP Profile for 3CX Continuation .....	38
Figure 54: IP Profile for 3CX Continuation .....	39
Figure 55: IP Profiles for Amazon Chime SDK Voice Connector .....	39
Figure 56: IP Profiles for Amazon Chime SDK Voice Connector Continuation .....	40
Figure 57: IP Profile for Amazon Chime SDK Voice Connector Continuation .....	40
Figure 58: IP Profile for Amazon Chime SDK Voice Connector Continuation .....	41
Figure 59: IP Profiles for Amazon Chime SDK Voice Connector Continuation .....	41
Figure 60: IP Profiles for Amazon Chime SDK Voice Connector Continuation .....	42
Figure 61: IP-to-IP Routing .....	42
Figure 62: IP-to-IP Routing from 3CX to Amazon Chime SDK Voice Connector .....	43
Figure 63: IP-to-IP Routing from Amazon Chime SDK Voice Connector to 3CX .....	43
Figure 64: TLS Contexts .....	44
Figure 65: TLS Context for Amazon Chime SDK Voice Connector .....	44
Figure 66: Trusted Root Certificate Import option .....	45
Figure 67: Media Security .....	45
Figure 68: SBC Media Security Mode configuration in IP Profile .....	46
Figure 69: OPTIONS TO header 3CX .....	47
Figure 70: OPTIONS TO header Amazon Chime SDK Voice Connector .....	47
Figure 71: FROM header host modification towards 3CX .....	48
Figure 72: FROM header host modification towards Amazon Chime SDK Voice Connector .....	48
Figure 73: PAI header host modification towards Amazon Chime SDK Voice Connector .....	49
Figure 74: BYE response host modification towards Amazon Chime SDK Voice Connector .....	49
Figure 75: Session Refresher modification towards 3CX .....	50

# 1 Audience

This document is intended for technical staff and Value Added Resellers (VAR) with installation and operational responsibilities. This configuration guide provides steps for configuring SIP trunks using **3CX** with **AudioCodes Mediant 1000B SBC** to connect to **Amazon Chime SDK Voice Connector** for inbound and/or outbound telephony capabilities.

The information in this document is for informational purposes only. AWS does not guarantee the accuracy of this document and AWS has no responsibility or liability for errors or omissions related to this document. The document is subject to change without notice, and should not be construed as a commitment by AWS.

## 1.1 Amazon Chime SDK Voice Connector

Amazon Chime SDK Voice Connector is a pay-as-you-go service that enables companies to make or receive secure phone calls over the internet or AWS Direct Connect using their existing telephone system or session border controller (SBC). The service has no upfront fees, elastically scales based on demand, supports calling both landline and mobile phone numbers in over 100 countries, and gives customers the option to enable inbound calling, outbound calling, or both.

Amazon Chime SDK Voice Connector uses the industry-standard Session Initiation Protocol (SIP). Amazon Chime SDK Voice Connector does not require dedicated data circuits. A company can use their existing Internet connection or AWS Direct Connect public virtual interface for SIP connectivity to AWS. Voice connectors can be configured in minutes using the AWS Management Console or Amazon Chime API. Amazon Chime SDK Voice Connector offers cost-effective rates for inbound and outbound calls. Calls into Amazon Chime meetings, as well as calls to other Amazon Chime SDK Voice Connector customers are at no additional cost. With Amazon Chime SDK Voice Connector, companies can reduce their voice calling costs without having to replace their on-premises phone system.

## 2 SIP Trunking Network Components

The network for the SIP trunk reference configuration is illustrated below and is representative of **3CX** with **AudioCodes Mediant 1000B SBC** with **Amazon Chime SDK Voice Connector**.

IP PBX-2 is used as a secondary PBX in the topology to perform call failover and call distribution.

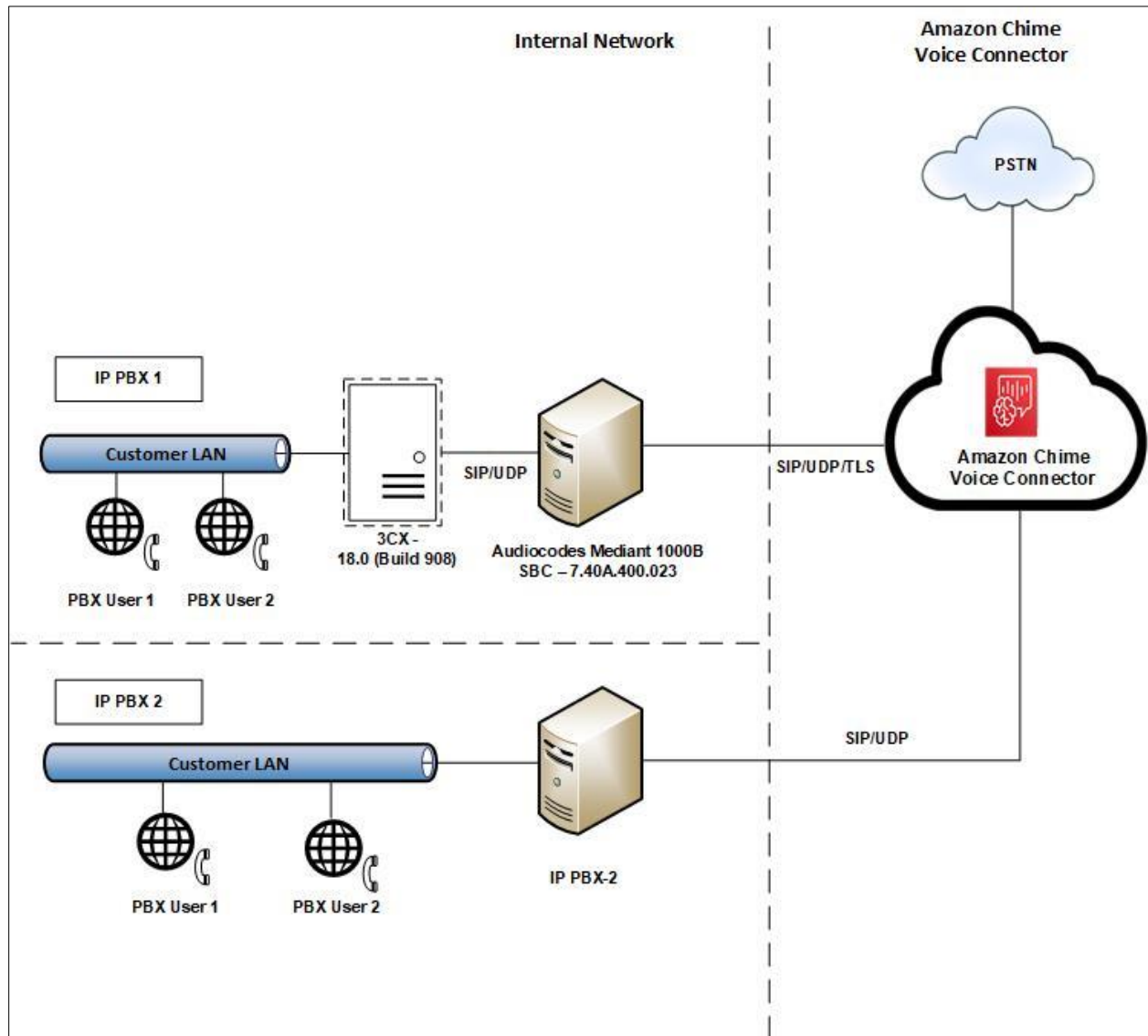


Figure 1 Network Topology

## 2.1 Hardware Components

- 3CX running on Hyper-V Manager Version: 6.3.9600.16384
- AudioCodes Mediant 1000B SBC

## 2.2 Software Requirements

- 3CX version 18.0 (Build 908)
- AudioCodes Mediant 1000B SBC version 7.40A.400.023

# 3 Features

## 3.1 Features Supported

- Calls to and from non-Toll-Free number
- Calls to Toll Free number
- Calls to Premium Telephone number
- Calling Party Number Presentation
- Calling Party Number Restriction
- Inbound Calls to an IVR
- International Calls
- Call Authentication
- Anonymous call
- DTMF-RFC 2833
- Long duration calls
- Calls to conference scheduled by Amazon Chime user
- Call Distribution
- Call Failover



## 3.2 Features Not Supported

- Amazon Chime SDK Voice Connector responds to OPTIONS and TCP Keep Alive messages received from customer equipment, but does not send OPTIONS or TCP Keep Alive messages to customer equipment.

## 3.3 Features Not Tested

- None

## 3.4 Caveats and Limitations

- Amazon Chime SDK Voice Connector,
  - does not support SIP NOTIFY or SIP INFO for DTMF
  - does not send SIP session refresher for long duration calls
- When the WAN link is down and a call is in progress, the PSTN call leg is not disconnected automatically after a period of inactivity. The call must be cleared manually.
- Inbound call INVITE from Amazon Chime SDK Voice Connector with Unsupported cipher is not directly rejected by AudioCodes SBC. Instead, it is sending 180 Ringing first as the call reached the PBX user. When the call is answered, SBC is sending rejection with SIP: 488 Not acceptable to Amazon Chime SDK Voice Connector.

## 4 Configuration

The specific values listed in this guide are used in the lab configuration described in this document and are for illustrative purposes only. Customer must obtain and use the appropriate values for their deployment. Encryption is always recommended if supported.

### 4.1 Configuration Checklist

This section presents an overview of the steps that are required to configure **3CX** and **AudioCodes Mediant 1000B SBC** for SIP Trunking with **Amazon Chime SDK Voice Connector**.

*Table 1 – PBX Configuration Steps*

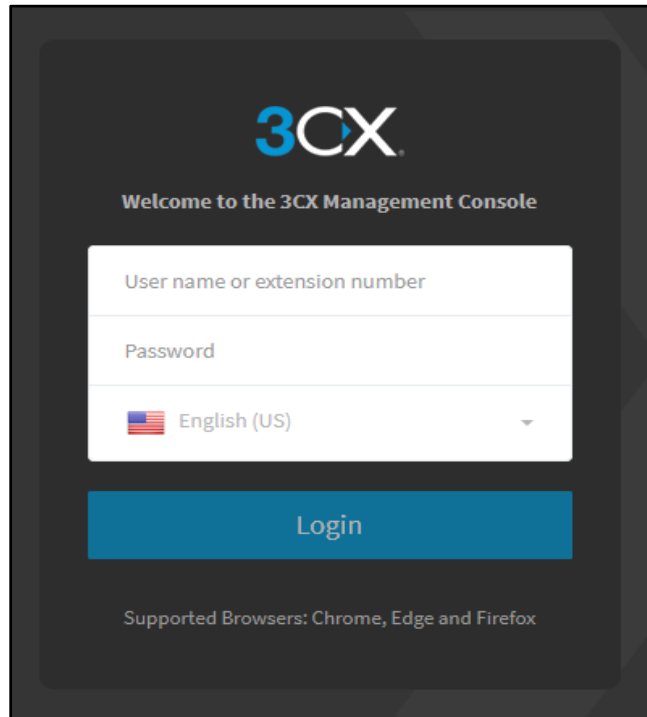
Steps	Description	Reference
Step 1	3CX Configuration	<a href="#">Section 4.2</a>
Step 2	AudioCodes SBC configuration	<a href="#">Section 4.3</a>

## 4.2 3CX Configuration

This section with screen shots taken from 3CX used for the interoperability testing gives a general overview of the 3CX configuration.

### 4.2.1 3CX Management Console

- To access the 3CX PBX, login to 3CX management console by providing the credentials.



*Figure 2: 3CX Management Console*

Dashboard will be displayed after successful login. To verify the system version, navigate to **Information** section and find the version against **License**.

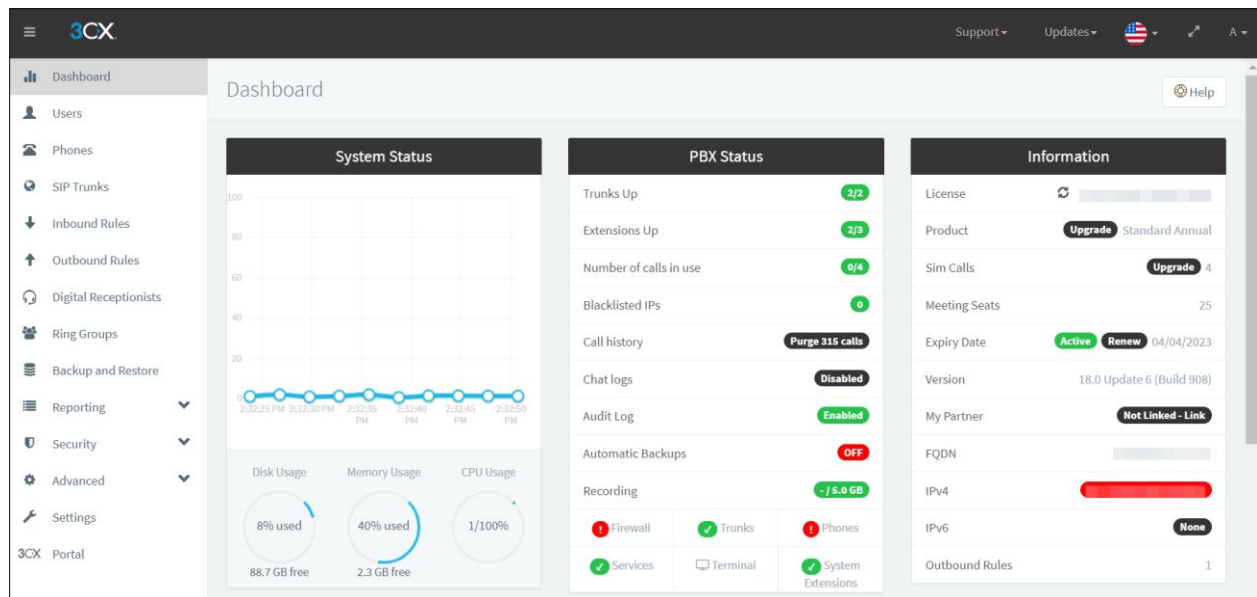


Figure 3: 3CX Management Console (cont.)

## 4.2.2 Add SIP Trunk

1. Navigate to **SIP Trunks** and click on **Add SIP Trunk**.

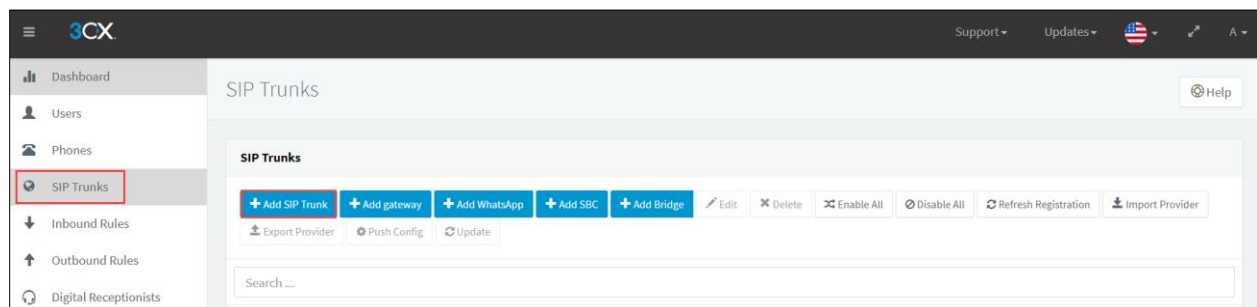



Figure 4: Add SIP Trunk

2. **Select Country** is set to **United States**.
3. **Select Provider in your Country** is set to Amazon Chime SDK Voice Connector.
4. **Main Trunk No** is set to +1919XXXXXXX.
5. Click **OK**.


Add SIP Trunk/VoIP Provider

Select Country

 US

Select Provider in your Country

Amazon Chime Voice Connector

 We strongly recommend using a preferred, or at least a supported vendor. 3rd Party supported means they must test and SUPPORT the integration.

Main Trunk No

+1919

OK

Cancel

Figure 5: Add SIP Trunk/VoIP Provider

Under **General** tab:

6. **Enter name for Trunk** is displayed as Amazon Chime SDK Voice Connector.
7. **Registrar/Server/Gateway Hostname or IP** is set to xx.xx.xx.xx the LAN IP address of AudioCodes Mediant 1000B SBC.
8. **Number of SIM Calls** set to 10.
9. All other fields are left with default settings.

The screenshot shows the 'Amazon Chime Voice Connector' configuration window with the 'General' tab selected. The 'Trunk Details' section is highlighted with a red box. It contains the following fields:

- Enter name for Trunk:** Amazon Chime Voice Connector
- Registrar/Server/Gateway Hostname or IP:** A text input field with a placeholder, followed by an **Auto Discovery** checkbox (checked).
- Outbound Proxy:** A text input field, followed by a port number field set to 5060, and an **Auto Discovery** checkbox (unchecked).
- Number of SIM Calls:** 10

The left sidebar shows the navigation menu with options like Dashboard, Users, Phones, SIP Trunks, Inbound Rules, Outbound Rules, Digital Receptionists, Ring Groups, Backup and Restore, Reporting, Security, Advanced, and Settings.

Figure 6: Add SIP Trunk (cont.)

Under **DIDs** tab:

10. Click **Add Single DID** and add all DIDs required.

The screenshot shows the 'Amazon Chime Voice Connector' configuration window with the 'DIDs' tab selected. The 'DIDs' section is highlighted with a red box. It contains the following elements:

- + Add Single DID** button (highlighted with a red box) and a **Delete** button.
- A table with columns for **DID/DDI Number** and a delete icon (X).
- Three rows of DIDs, each starting with '+1919' followed by a masked number.

The left sidebar shows the navigation menu with options like Dashboard, Users, Phones, SIP Trunks, Inbound Rules, Outbound Rules, Digital Receptionists, Ring Groups, Backup and Restore, Reporting, Security, Advanced, and Settings.

Figure 7: Add SIP Trunk (cont.)

Under **Options** tab:

11. Set the **Transport Protocol** as UDP.
12. Set the **Codec Priority** as G711 U-law.

Transport Protocol

UDP

IP Mode

IPv4

**Codec Priority**

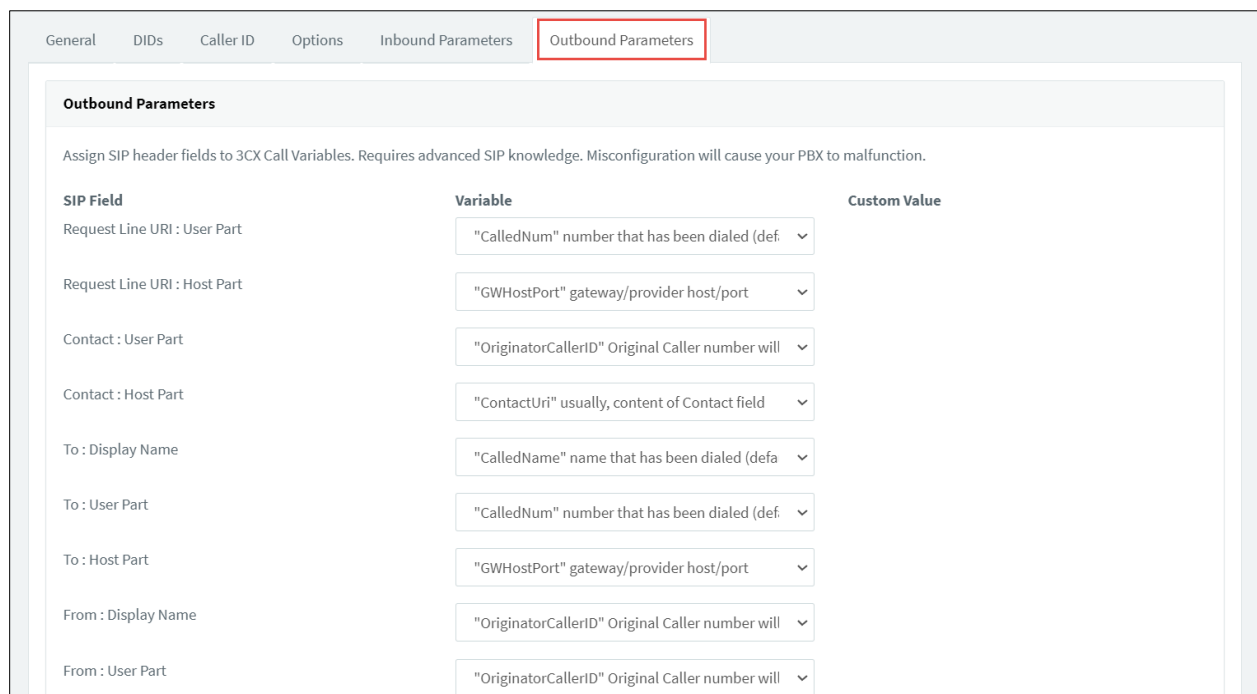
+ Add codecs   ↑ Move Up   ↓ Move Down

G.711 U-law

*Figure 8: Add SIP Trunk (cont.)*

Under **Outbound Parameters** tab:

13. **P-Asserted Identity: Display name** is set to "OutboundCallerId" Original Caller number will be sent.
14. **P-Asserted Identity: User Part** is set to "OutboundCallerId" Original Caller number will be sent.
15. **P-Asserted Identity: Host Part** is set to "GWHostPort" usually, content of Contact field
16. **Remote Party ID- Calling Party for Display Name, User Part and Host Part** is set to "Leave default value".
17. All other fields were left with default settings.



General DIDs Caller ID Options Inbound Parameters **Outbound Parameters**

**Outbound Parameters**

Assign SIP header fields to 3CX Call Variables. Requires advanced SIP knowledge. Misconfiguration will cause your PBX to malfunction.

SIP Field	Variable	Custom Value
Request Line URI : User Part	"CalledNum" number that has been dialed (def	▼
Request Line URI : Host Part	"GWHostPort" gateway/provider host/port	▼
Contact : User Part	"OriginatorCallerID" Original Caller number will	▼
Contact : Host Part	"ContactUri" usually, content of Contact field	▼
To : Display Name	"CalledName" name that has been dialed (defa	▼
To : User Part	"CalledNum" number that has been dialed (def	▼
To : Host Part	"GWHostPort" gateway/provider host/port	▼
From : Display Name	"OriginatorCallerID" Original Caller number will	▼
From : User Part	"OriginatorCallerID" Original Caller number will	▼

Figure 9: Add SIP Trunk (Outbound Parameters)



From : Host Part	"ContactUri" usually, content of Contact field	▼
User Agent : Text String	Leave default value	▼
Remote Party ID - Called Party : Display Name	Leave default value	▼
Remote Party ID - Called Party : User Part	Leave default value	▼
Remote Party ID - Called Party : Host Part	Leave default value	▼
Remote Party ID - Calling Party : Display Name	Leave default value	▼
Remote Party ID - Calling Party : User Part	Leave default value	▼
Remote Party ID - Calling Party : Host Part	Leave default value	▼
P-Asserted Identity : Display Name	"OutboundCallerid" Outbound caller Id taken fr	▼
P-Asserted Identity : User Part	"OutboundCallerid" Outbound caller Id taken fr	▼
P-Asserted Identity : Host Part	"GWHostPort" gateway/provider host/port	▼
P-Preferred Identity : Display Name	Leave default value	▼

Figure 10: Add SIP Trunk (Outbound Parameters-cont.)

P-Preferred Identity : User Part	Leave default value	▼
P-Preferred Identity : Host Part	Leave default value	▼
P-Called-Party-ID : Display Name	Leave default value	▼
P-Called-Party-ID : User Part	Leave default value	▼
P-Called-Party-ID : Host Part	Leave default value	▼

Figure 11: Add SIP Trunk (Outbound Parameters- cont.)

## 4.2.3 Add Users

1. Navigate to **Users** and click **Add**.

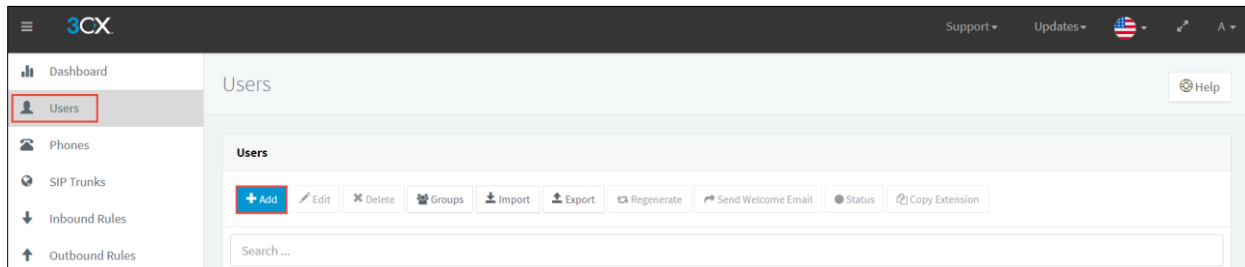


Figure 12: Add Users

2. **User** is set as 4000 for example.
3. **First Name** is set as Amazon and **Last Name** is set as User1.
4. **Outbound Caller ID** is set to +1919XXXXXXX.

A screenshot of the 'User Information' form in the 3CX interface. The 'General' tab is selected and highlighted with a red box. The form contains several input fields: 'Extension' (4000), 'First Name' (Amazon), 'Last Name' (User1), 'Email Address', 'Mobile Number', and 'Outbound Caller ID' (+1919XXXXXXX). The 'Extension' and 'Outbound Caller ID' fields are highlighted with red boxes. To the right of the form is a QR code with the text 'Scan this QR code from the 3CX Android or IOS app to provision it for this extension'.

Figure 13: Add Users (cont.)

5. Under **Direct Inbound Dialing (DID)**, click **Add a DID/DDI**.
6. At the new pop-up window, select the desired DID and Click OK.

The screenshot shows a web interface with two main sections. The top section, titled "Web Authentication", contains a URL "https://[redacted]:5001/webclient" with a small icon to its right. Below the URL is a checkbox labeled "Enable Web Client/Desktop App" which is checked. Underneath is a password field with the placeholder text "Password - Username is extension number" and a masked password "\*\*\*\*\*". The bottom section, titled "Direct Inbound Dialing (DID)", contains the text "Optionally assign a DID to receive calls directly to this extension". Below this text is a blue button labeled "Add a DID/DDI". At the bottom of this section is a text input field containing "+1919" followed by "(4000,4000)" in parentheses, with a small "x" icon to its right.

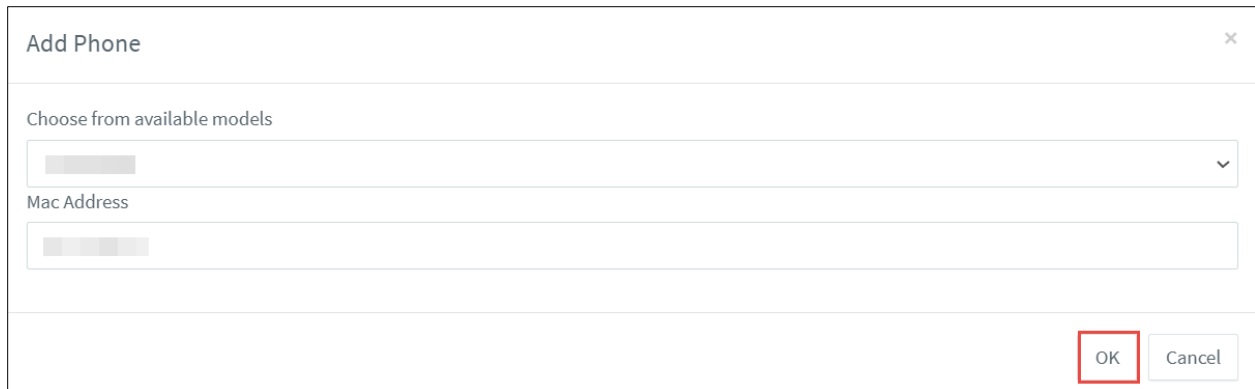
Figure 14: Add Users (cont.)

7. Under **Phone Provisioning** click **Add**.

The screenshot shows a web interface with a horizontal tab bar at the top. The tabs are "General", "Voicemail", "Forwarding Rules", "Phone Provisioning", "BLF", "Options", and "Rights". The "Phone Provisioning" tab is selected and highlighted with a red border. Below the tab bar is a section titled "Phone Provisioning". Inside this section is a blue button with a white plus sign and the word "Add" next to it.

Figure 15: Add Extensions (cont.)

- On the **Add Phone** pop-up window, select the phone model and enter the MAC address.
- Click **OK** in the pop-up window and **OK** in the main window to complete Add Extensions procedure.



The image shows a pop-up window titled "Add Phone" with a close button (X) in the top right corner. Inside the window, there is a section labeled "Choose from available models" with a dropdown menu. Below this is a "Mac Address" field with a text input area. At the bottom right of the window, there are two buttons: "OK" and "Cancel". The "OK" button is highlighted with a red rectangular border.

Figure 16: Add Users (cont.)

#### 4.2.4 Outbound Rules

- Navigate to **Outbound Rules** and click **Add**.

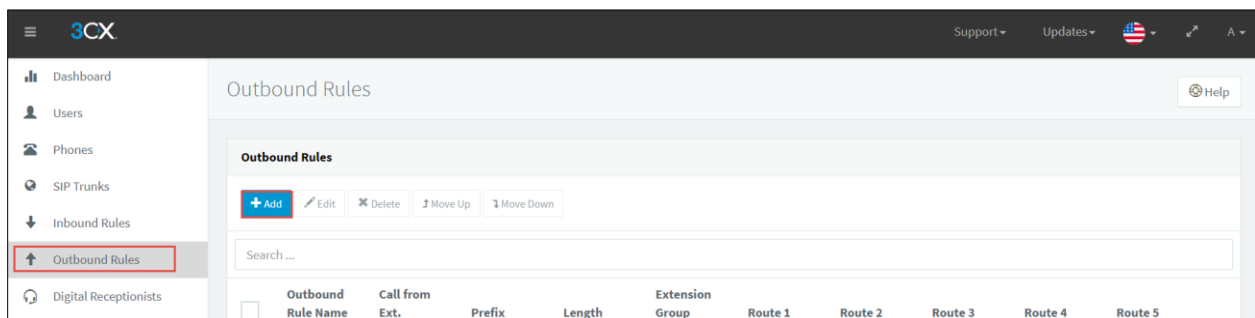


Figure 17: Outbound Rules

2. **Rule Name** is set as AmazonChimeVoiceConnector.
3. **Calls to numbers starting with prefix** is set as 9.

AmazonChimeVoiceConnector [OK] [Cancel] [Help]

**General**

Rule Name  
AmazonChimeVoiceConnector

**Apply this rule to these calls**

Calls to numbers starting with prefix  
9

Calls from extension(s)  
Calls from extension(s)

Calls to Numbers with a length of  
Calls to Numbers with a length of

Calls from extension group(s)  
+ Add

Figure 18: Outbound Rules (cont.)

4. Route 1 is set to Amazon Chime SDK Voice Connector from the drop down.
5. **Strip Digits** is set to 1 and **Prepend** is set to +. This strips 9 and adds + before sending to Amazon Chime SDK Voice Connector.
6. All other fields are left with default settings.

**Make outbound calls on**

Configure up to 5 backup routes for outgoing calls. Each route can be configured differently

			Strip Digits	Prepend	Outbound Caller ID
Route	1	Amazon Chime Voice Connector	1	+	
Route	2	BLOCK CALLS	0		
Route	3	BLOCK CALLS	0		
Route	4	BLOCK CALLS	0		
Route	5	BLOCK CALLS	0		

Figure 19: Outbound Rules (cont.)

## 4.2.5 Inbound Rules

1. Navigate to **Inbound Rules**, click **Add DID Rule**.

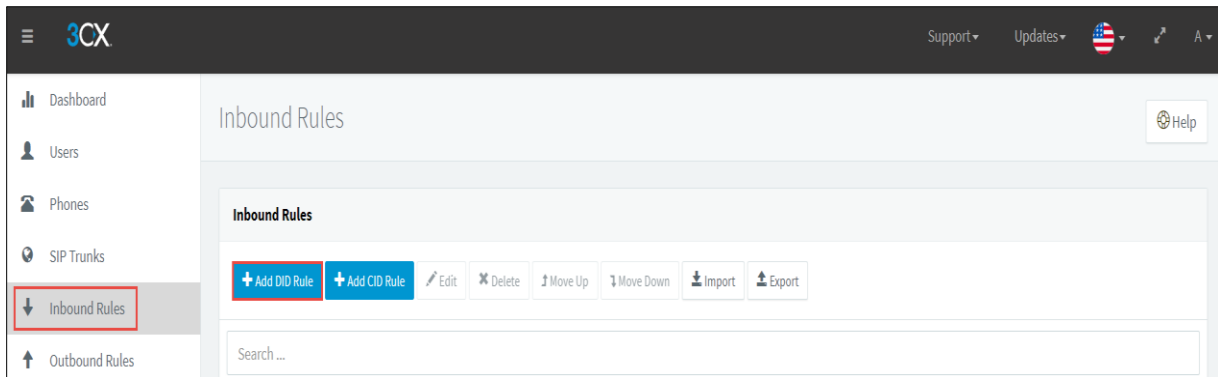


Figure 20: Inbound Rules

2. **Name** is set as Rule for Amazon User1 for example.
3. **DID/DDI** is set to 919XXXXXXX.
4. **Destination for calls during office hours** and **Destination for calls outside office hours** is set as Extension.
5. Click **OK** to complete the configuration.

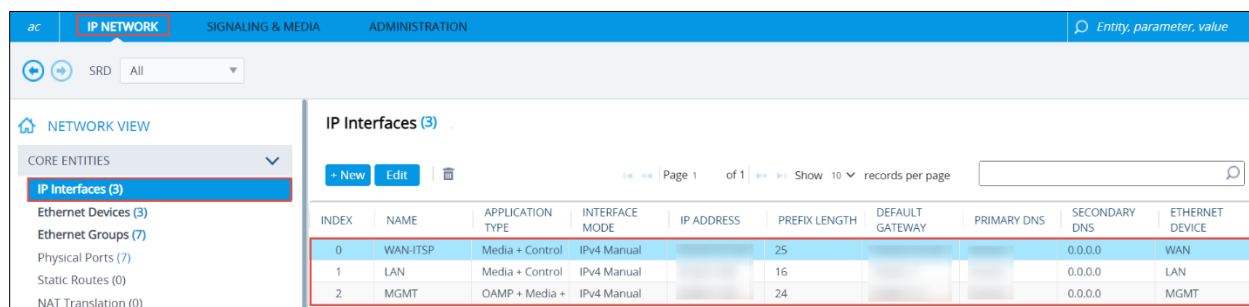
The screenshot shows a configuration dialog titled 'Rule for Amazon User 1' with 'OK' and 'Cancel' buttons. The dialog has two main sections: 'General' and 'Route calls to'. In the 'General' section, the 'Name' field contains 'Rule for Amazon User 1' and the 'DID/DDI' field contains '+1919'. In the 'Route calls to' section, there are two dropdown menus. The first, 'Destination for calls during office hours', has 'Extension' selected. The second, 'Destination for calls outside office hours', also has 'Extension' selected. Both dropdowns show a list of options: '4000 Amazon User1'. At the bottom, there is a checkbox labeled 'Set up Specific Office Hours for this rule' which is currently unchecked.

Figure 21: Inbound Rules (cont.)

## 4.3 AudioCodes SBC configuration

### 4.3.1 Network IP Interface configuration

Navigate to **SETUP**, **IP NETWORK** and expand **CORE ENTITIES**. Click **IP Interfaces** and the below figure shows the interfaces that are been used.

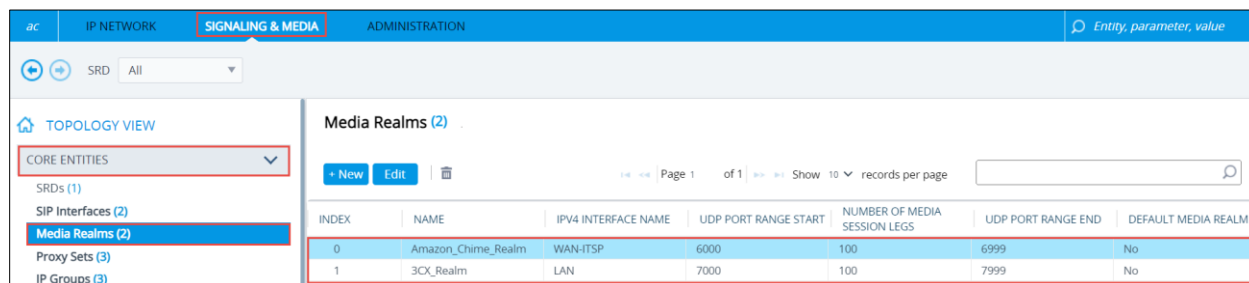


INDEX	NAME	APPLICATION TYPE	INTERFACE MODE	IP ADDRESS	PREFIX LENGTH	DEFAULT GATEWAY	PRIMARY DNS	SECONDARY DNS	ETHERNET DEVICE
0	WAN-ITSP	Media + Control	IPv4 Manual		25			0.0.0.0	WAN
1	LAN	Media + Control	IPv4 Manual		16			0.0.0.0	LAN
2	MGMT	OAMP + Media +	IPv4 Manual		24			0.0.0.0	MGMT

Figure 22: IP Interfaces

### 4.3.2 Media Realm configuration

Two media realms are created, one is associated to 3CX and another is associated with Amazon Chime SDK Voice Connector. To configure media realm, navigate to **SETUP** and select **SIGNALING & MEDIA**. Expand **CORE ENTITIES** and select **Media Realms**.



INDEX	NAME	IPv4 INTERFACE NAME	UDP PORT RANGE START	NUMBER OF MEDIA SESSION LEGS	UDP PORT RANGE END	DEFAULT MEDIA REALM
0	Amazon_Chime_Realm	WAN-ITSP	6000	100	6999	No
1	3CX_Realm	LAN	7000	100	7999	No

Figure 23: Media Realms Table

Click **+New** button to add new media realms. Enter the **name** of the Media Realm, UDP **Port Range Start** and **Number of Media Session Legs**. Select the appropriate **IPv4 Interface Name** for 3CX.

Media Realms [3CX\_Rrealm]

GENERAL	QUALITY OF EXPERIENCE
Index: 1	QoE Profile: -- <a href="#">View</a>
Name: 3CX_Rrealm	Bandwidth Profile: -- <a href="#">View</a>
Topology Location: Up	
IPv4 Interface Name: #1 [LAN] <a href="#">View</a>	
UDP Port Range Start: 7000	
Number Of Media Session Legs: 100	
UDP Port Range End: 7999	
Default Media Realm: No	
Used By Routing Server: Not Used	

Cancel APPLY

Figure 24: Media Realm for 3CX

Enter the **name** of the Media Realm, **Port Range Start value** and **Number of Media Session Legs**. Select the appropriate **IPv4 Interface Name** for Amazon Chime SDK Voice Connector.

Media Realms [Amazon\_Chime\_Rrealm]

GENERAL	QUALITY OF EXPERIENCE
Index: 0	QoE Profile: -- <a href="#">View</a>
Name: Amazon_Chime_Rrealm	Bandwidth Profile: -- <a href="#">View</a>
Topology Location: Up	
IPv4 Interface Name: #0 [WAN-ITSP] <a href="#">View</a>	
UDP Port Range Start: 6000	
Number Of Media Session Legs: 100	
UDP Port Range End: 6999	
Default Media Realm: No	
Used By Routing Server: Not Used	

Cancel APPLY

Figure 25: Media Realm for Amazon Chime SDK Voice Connector



### 4.3.3 SRD Configuration

To configure SRD, navigate to **SETUP** and select **SIGNALING & MEDIA**. Expand **CORE ENTITIES** and select **SRDs**.

INDEX	NAME	SHARING POLICY	SBC OPERATION MODE	SBC ROUTING POLICY	MAX. NUMBER OF REGISTERED USERS	USER SECURITY MODE
0	DefaultSRD (#0)	Shared	B2BUA	Default_SBCRoutingPolicy	-1	Accept All

Figure 26: Default SRD

The default SRD configuration is used.

GENERAL

Index

0

Name

DefaultSRD

Sharing Policy

Shared

SBC Operation Mode

B2BUA

SBC Routing Policy

#0 [Default\_SBCRoutingPolicy]

View

Used By Routing Server

Not Used

Dial Plan

--

View

CAC Profile

--

View

REGISTRATION

Max. Number of Registered Users

-1

User Security Mode

Accept All

Enable Un-Authenticated Registrations

Enable

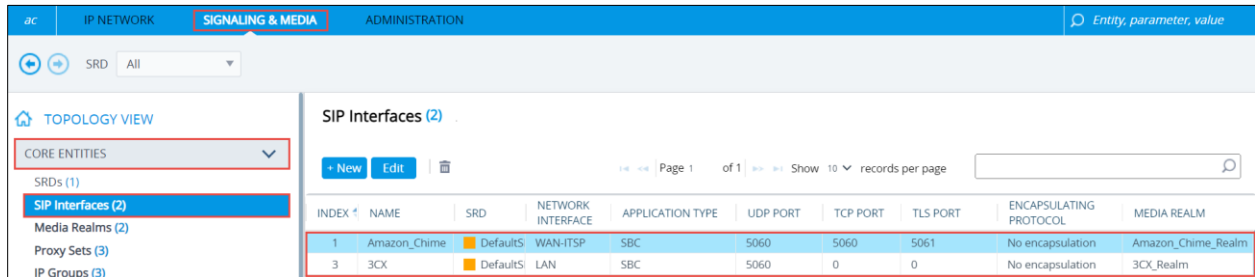
Cancel

APPLY

Figure 27: Default SRD table details

### 4.3.4 SIP Interface configuration

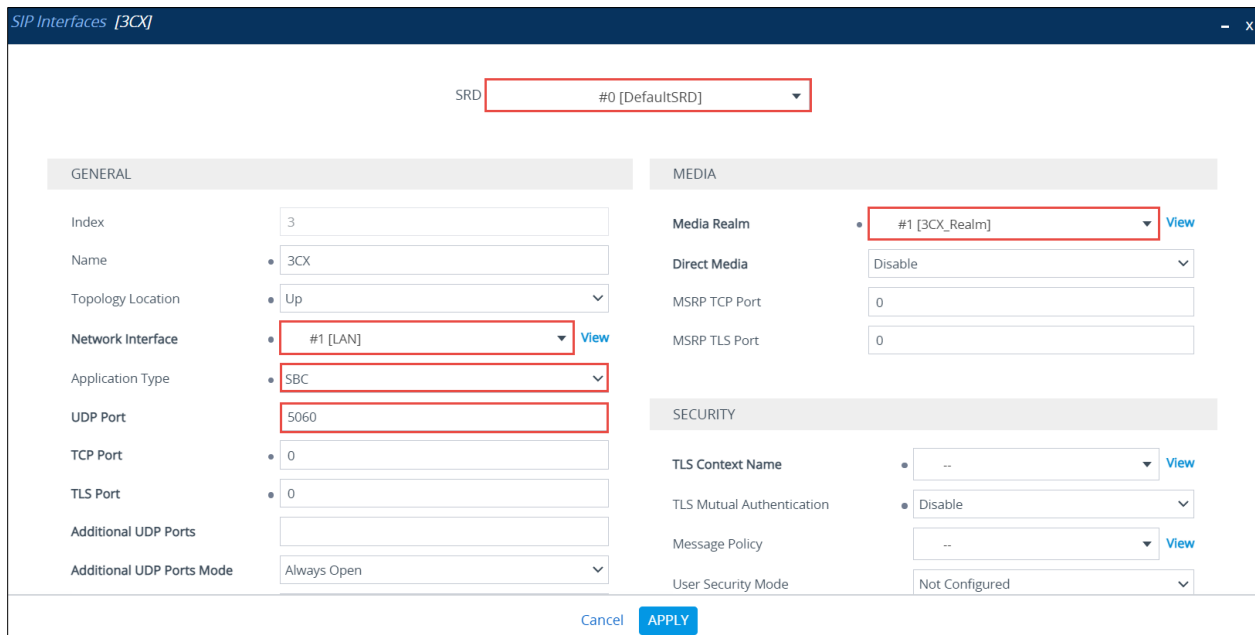
Navigate to **SETUP** and select **SIGNALING & MEDIA**. Expand **CORE ENTITIES** and select **SIP Interfaces**. Two SIP Interfaces are created, one is for 3CX and the other is for Amazon Chime SDK Voice Connector.



INDEX	NAME	SRD	NETWORK INTERFACE	APPLICATION TYPE	UDP PORT	TCP PORT	TLS PORT	ENCAPSULATING PROTOCOL	MEDIA REALM
1	Amazon_Chime	DefaultS	WAN-ITSP	SBC	5060	5060	5061	No encapsulation	Amazon_Chime_Realm
3	3CX	DefaultS	LAN	SBC	5060	0	0	No encapsulation	3CX_Realm

Figure 28: SIP Interfaces

**Network Interface**, **Media Realm**, **Application Type**, **SRD** and **UDP Port** are associated to 3CX Interface and the remaining parameters are set to default.



SRD: #0 [DefaultSRD]

**GENERAL**

Index: 3

Name: 3CX

Topology Location: Up

Network Interface: #1 [LAN] [View](#)

Application Type: SBC

UDP Port: 5060

TCP Port: 0

TLS Port: 0

Additional UDP Ports:

Additional UDP Ports Mode: Always Open

**MEDIA**

Media Realm: #1 [3CX\_Realm] [View](#)

Direct Media: Disable

MSRP TCP Port: 0

MSRP TLS Port: 0

**SECURITY**

TLS Context Name: -- [View](#)

TLS Mutual Authentication: Disable

Message Policy: -- [View](#)

User Security Mode: Not Configured

[Cancel](#) [APPLY](#)

Figure 29: SIP Interface for 3CX

**SIP Interfaces [3CX]**

TCP Port	0	TLS Context Name	--	<a href="#">View</a>
TLS Port	0	TLS Mutual Authentication	Disable	
Additional UDP Ports		Message Policy	--	<a href="#">View</a>
Additional UDP Ports Mode	Always Open	User Security Mode	Not Configured	
Encapsulating Protocol	No encapsulation	Enable Un-Authenticated Registrations	Not configured	
Enable TCP Keepalive	Disable	Max. Number of Registered Users	-1	
Used By Routing Server	Not Used			
Pre-Parsing Manipulation Set	--			
CAC Profile	--			

**CLASSIFICATION**

Classification Failure Response Type	500
Pre-classification Manipulation Set ID	-1
Call Setup Rules Set ID	-1

[Cancel](#) [APPLY](#)

Figure 30: SIP Interface for 3CX Continuation

**Network Interface, Media Realm, Application Type, SRD** and **Port numbers** are associated to Amazon Chime SDK Voice Connector SIP Interface and the remaining parameters are set to default.

**SIP Interfaces [Amazon\_Chime]**

SRD: #0 [DefaultSRD]

GENERAL		MEDIA	
Index	1	Media Realm	#0 [Amazon_Chime_Realm]
Name	Amazon_Chime	Direct Media	Disable
Topology Location	Up	MSRP TCP Port	0
Network Interface	#0 [WAN-ITSP]	MSRP TLS Port	0
Application Type	SBC		
UDP Port	5060		
TCP Port	5060		
TLS Port	5061		
Additional UDP Ports			
Additional UDP Ports Mode	Always Open		

**SECURITY**

TLS Context Name	--	<a href="#">View</a>
TLS Mutual Authentication		
Message Policy	--	<a href="#">View</a>
User Security Mode	Not Configured	

[Cancel](#) [APPLY](#)

Figure 31: SIP Interface for Amazon Chime SDK Voice Connector

**SIP Interfaces [Amazon\_Chime]**

TCP Port: 5060  
 TLS Port: 5061  
 Additional UDP Ports:   
 Additional UDP Ports Mode: Always Open  
 Encapsulating Protocol: No encapsulation  
 Enable TCP Keepalive: Disable  
 Used By Routing Server: Not Used  
 Pre-Parsing Manipulation Set: --  
 CAC Profile: --

TLS Context Name: --  
 TLS Mutual Authentication:   
 Message Policy: --  
 User Security Mode: Not Configured  
 Enable Un-Authenticated Registrations: Not configured  
 Max. Number of Registered Users: -1

**CLASSIFICATION**

Classification Failure Response Type: 500  
 Pre-classification Manipulation Set ID: -1  
 Call Setup Rules Set ID: -1

Cancel APPLY

Figure 32: SIP Interface for Amazon Chime SDK Voice Connector Continuation

### 4.3.5 Proxy Sets configuration

Navigate to **SETUP** and select **SIGNALING & MEDIA**. Expand **CORE ENTITIES** and select **Proxy Sets**. Destination address or FQDN is configured in Proxy Sets. Two Proxy Sets are created, one for 3CX and the other for Amazon Chime SDK Voice Connector.

**Proxy Sets (2)**

INDEX	NAME	SRD	GATEWAY IPV4 SIP INTERFACE	SBC IPV4 SIP INTERFACE	PROXY KEEP-ALIVE TIME [SEC]	REDUNDANCY MODE	PROXY HOT SWAP MODE
0	3CX	DefaultSRD (#0)	--	3CX	60		Disable
1	Amazon_Chime	DefaultSRD (#0)	--	Amazon_Chime	60		Disable

Figure 33: Proxy Sets table

Select **SRD**, **SBC IPv4 SIP Interface** and enable **Proxy Keep-Alive** for 3CX Proxy Set.

The screenshot shows the 'Proxy Sets [3CX]' configuration window. At the top, the 'SRD' dropdown is set to '#0 [DefaultSRD]'. Below this, the 'GENERAL' tab is active, showing fields for 'Index' (0), 'Name' (3CX), 'Gateway IPv4 SIP Interface' (--), 'SBC IPv4 SIP Interface' (#3 [3CX]), and 'TLS Context Name' (--). The 'REDUNDANCY' tab shows 'Redundancy Mode' (dropdown), 'Proxy Hot Swap Mode' (Disable), 'Proxy Load Balancing Method' (Disable), and 'Min. Active Servers for Load Balancing' (1). The 'KEEP ALIVE' tab shows 'Proxy Keep-Alive' (Using OPTIONS), 'Proxy Keep-Alive Time [sec]' (60), and 'Keep-Alive Failure Responses' (empty). The 'ADVANCED' tab shows 'Classification Input' (IP Address only), 'DNS Resolve Method' (dropdown), and 'Accept DHCP Proxy List' (Disable). At the bottom, there are 'Cancel' and 'APPLY' buttons.

Figure 34: Proxy Set table for 3CX

Click on **Proxy Address 0 items** link in bottom to add **Proxy Address** and **Transport Type**.

The screenshot shows the 'Proxy Address' configuration window. The 'GENERAL' tab is active, showing fields for 'Index' (0), 'Proxy Address' (172.16.), 'Transport Type' (UDP), 'Proxy Priority' (0), and 'Proxy Random Weight' (0). At the bottom, there are 'Cancel' and 'APPLY' buttons.

Figure 35: Proxy Address for 3CX

Select **SRD**, **SBC IPv4 SIP Interface** and enable **Proxy Keep-Alive** for Amazon Chime SDK Voice Connector Proxy Set.

Proxy Sets [Amazon\_Chime]

SRD

#0 [DefaultSRD]

GENERAL

Index

1

Name

Amazon\_Chime

Gateway IPv4 SIP Interface

--

View

SBC IPv4 SIP Interface

#1 [Amazon\_Chime]

View

TLS Context Name

--

View

REDUNDANCY

Redundancy Mode

Proxy Hot Swap Mode

Disable

Proxy Load Balancing Method

Disable

Min. Active Servers for Load Balancing

1

KEEP ALIVE

Proxy Keep-Alive

Using OPTIONS

Proxy Keep-Alive Time [sec]

60

Keep-Alive Failure Responses

ADVANCED

Classification Input

IP Address only

DNS Resolve Method

Accept DHCP Proxy List

Disable

Cancel

APPLY

Figure 36: Proxy Set Table for Amazon Chime SDK Voice Connector

Click on **Proxy Address 0 items** link in bottom to add **Proxy Address** and **Transport Type**.

Proxy Address

GENERAL

Index

0

Proxy Address

dtm

Transport Type

UDP

Proxy Priority

0

Proxy Random Weight

0

Cancel

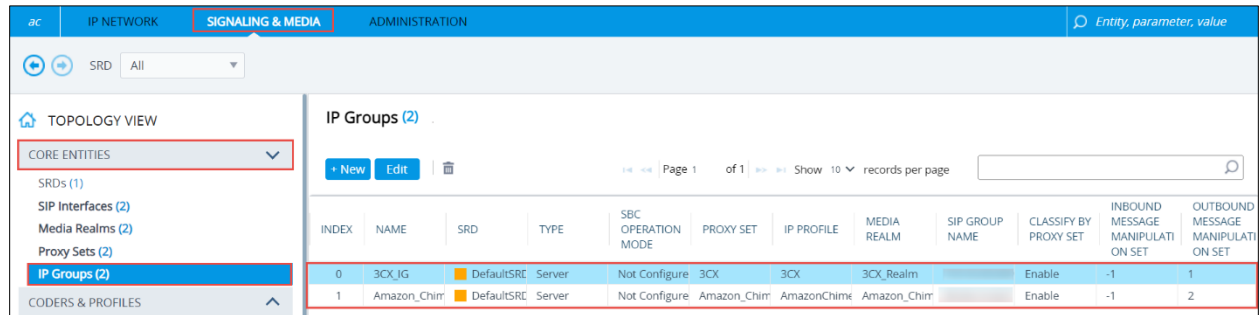
APPLY

Figure 37: Proxy Address for Amazon Chime SDK Voice Connector

Amazon Web Services

### 4.3.6 IP Group Table Configuration

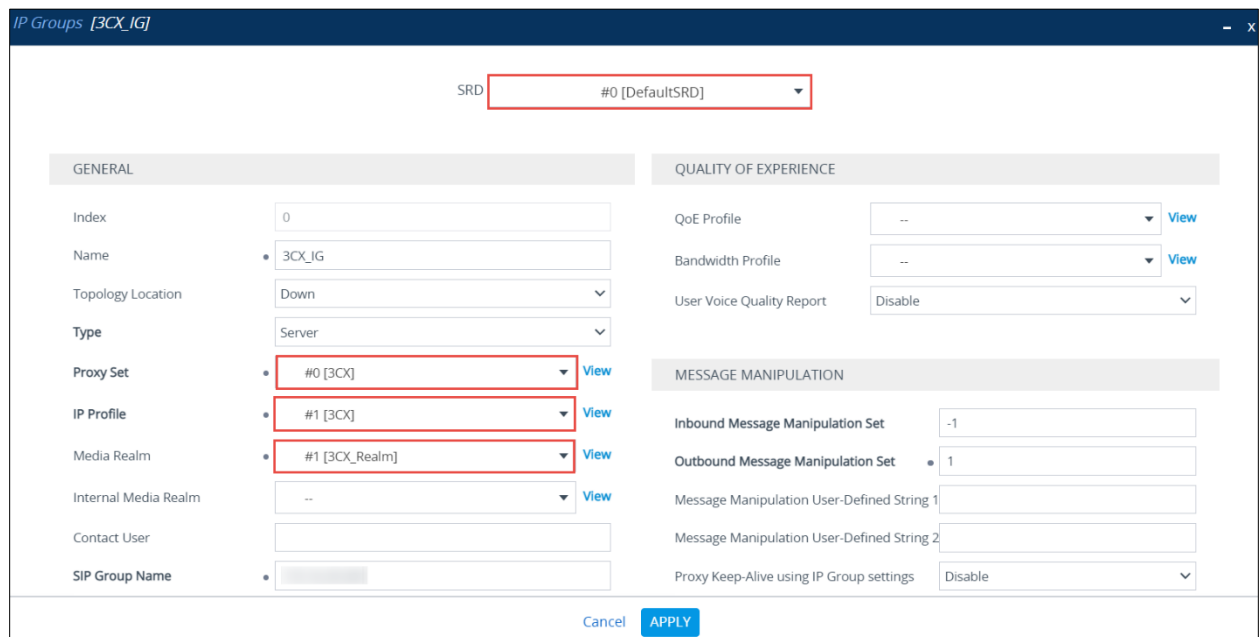
Navigate to **SETUP** and select **SIGNALING & MEDIA**. Expand **CORE ENTITIES** and select **IP Groups**. IP Groups are configured for denoting source and destination in IP-to-IP routing rules. IP Groups created for 3CX and Amazon Chime SDK Voice Connector.



INDEX	NAME	SRD	TYPE	SBC OPERATION MODE	PROXY SET	IP PROFILE	MEDIA REALM	SIP GROUP NAME	CLASSIFY BY PROXY SET	INBOUND MESSAGE MANIPULATION SET	OUTBOUND MESSAGE MANIPULATION SET
0	3CX_IG	DefaultSRD	Server	Not Configure	3CX	3CX	3CX_Realm		Enable	-1	1
1	Amazon_Chime	DefaultSRD	Server	Not Configure	Amazon_Chime	AmazonChime	Amazon_Chime		Enable	-1	2

Figure 38: IP Group Table

Enter the name of the IP Groups for 3CX and associate **Proxy Set**, **IP Profile**, **Media Realm**, **SRD** and the remaining parameters are set to default.



IP Groups [3CX\_IG]

SRD: #0 [DefaultSRD]

**GENERAL**

Index: 0

Name: 3CX\_IG

Topology Location: Down

Type: Server

Proxy Set: #0 [3CX] [View](#)

IP Profile: #1 [3CX] [View](#)

Media Realm: #1 [3CX\_Realm] [View](#)

Internal Media Realm: -- [View](#)

Contact User:

SIP Group Name:

**QUALITY OF EXPERIENCE**

QoE Profile: -- [View](#)

Bandwidth Profile: -- [View](#)

User Voice Quality Report: Disable

**MESSAGE MANIPULATION**

Inbound Message Manipulation Set: -1

Outbound Message Manipulation Set: 1

Message Manipulation User-Defined String 1:

Message Manipulation User-Defined String 2:

Proxy Keep-Alive using IP Group settings: Disable

[Cancel](#) [APPLY](#)

Figure 39: IP Group Table for 3CX

IP Groups [3CX\_IG]

Created By Routing Server

No

Used By Routing Server

Not Used

Proxy Set Connectivity

Connected

SBC GENERAL

Classify By Proxy Set

Enable

Validate Source IP

Disable

SBC Operation Mode

Not Configured

SBC Client Forking Mode

Sequential

CAC Profile

--

View

SIP Source Host Name

ADVANCED

SBC REGISTRATION AND AUTHENTICATION

Max. Number of Registered Users

-1

Registration Mode

User Initiates Registration

Dedicated Connection Mode

Disable

User Stickiness

Disable

User UDP Port Assignment

Disable

Authentication Mode

User Authenticates

Authentication Method List

SBC Server Authentication Type

According to Global Parameter

OAuth HTTP Service

--

View

Username As Client

Password As Client

Username As Server

Cancel

APPLY

Figure 40: IP Group table for 3CX Continuation

IP Groups [3CX\_IG]

UII Format

Disable

Always Use Src Address

No

SBC ADVANCED

Source URI Input

Destination URI Input

SIP Connect

No

SBC PSAP Mode

Disable

Route Using Request URI Port

Disable

Media TLS Context

#0 [default]

View

Keep Original Call-ID

No

Dial Plan

--

View

Call Setup Rules Set ID

-1

Tags

GATEWAY

SIP Re-Routing Mode

Always Use Route Table

No

GW GROUP STATUS

GW Group Registered IP Address

GW Group Registered Status

NA

Cancel

APPLY

Figure 41: IP Group Table for 3CX Continuation



IP Groups [3CX\_IG]

SBC PSAP Mode	Disable	GW Group Registered Status	NA
Route Using Request URI Port	Disable		
Media TLS Context	#0 [default]		<a href="#">View</a>
Keep Original Call-ID	No		
Dial Plan	--		<a href="#">View</a>
Call Setup Rules Set ID	-1		
Tags			
SBC Alternative Routing Reasons Set	--		<a href="#">View</a>
Teams Local Media Optimization Handling	None		
Teams Local Media Optimization Initial Behavior	DirectMedia		
Teams Local Media Optimization Site			
Teams Direct Routing Mode	Disable		
Metering Remote Type	Regular		
Report Metering	Enable		

Cancel APPLY

Figure 42: IP Group Table for 3CX Continuation

Enter the name of the IP Groups for Amazon Chime SDK Voice Connector and associate **SRD**, **Proxy Set**, **IP Profile**, **Media Realm** and the remaining parameters are set to default.

IP Groups [Amazon\_Chime\_IG]

SRD: #0 [DefaultSRD]

GENERAL		QUALITY OF EXPERIENCE	
Index	1	QoE Profile	-- <a href="#">View</a>
Name	Amazon_Chime_IG	Bandwidth Profile	-- <a href="#">View</a>
Topology Location	Up	User Voice Quality Report	Disable
Type	Server		
Proxy Set	#1 [Amazon_Chime] <a href="#">View</a>	MESSAGE MANIPULATION	
IP Profile	#2 [AmazonChimeVoiceConnector] <a href="#">View</a>	Inbound Message Manipulation Set	-1
Media Realm	#0 [Amazon_Chime_Realm] <a href="#">View</a>	Outbound Message Manipulation Set	2
Internal Media Realm	-- <a href="#">View</a>	Message Manipulation User-Defined String 1	
Contact User		Message Manipulation User-Defined String 2	
SIP Group Name	dti	Proxy Keep-Alive using IP Group settings	Enable

Cancel APPLY

Figure 43: IP Group Table for Amazon Chime SDK Voice Connector

IP Groups [Amazon\_Chime\_IG]

Created By Routing Server: No

Used By Routing Server: Not Used

Proxy Set Connectivity: Connected

**SBC GENERAL**

Classify By Proxy Set: Enable

Validate Source IP: Disable

SBC Operation Mode: Not Configured

SBC Client Forking Mode: Sequential

CAC Profile: -- [View](#)

SIP Source Host Name:

**ADVANCED**

**SBC REGISTRATION AND AUTHENTICATION**

Max. Number of Registered Users: -1

Registration Mode: User Initiates Registration

Dedicated Connection Mode: Disable

User Stickiness: Disable

User UDP Port Assignment: Disable

Authentication Mode: User Authenticates

Authentication Method List:

SBC Server Authentication Type: According to Global Parameter

OAuth HTTP Service: -- [View](#)

Username As Client:

Password As Client:

Username As Server:

[Cancel](#) [APPLY](#)

Figure 44: IP Group Table for Amazon Chime SDK Voice Connector Continuation

IP Groups [Amazon\_Chime\_IG]

Local Host Name:

UUI Format: Disable

Always Use Src Address: No

**SBC ADVANCED**

Source URI Input:

Destination URI Input:

SIP Connect: No

SBC PSAP Mode: Disable

Route Using Request URI Port: Disable

Media TLS Context: #0 [default] [View](#)

Keep Original Call-ID: No

Dial Plan: -- [View](#)

Username As Server:

Password As Server:

**GATEWAY**

SIP Re-Routing Mode:

Always Use Route Table: No

**GW GROUP STATUS**

GW Group Registered IP Address:

GW Group Registered Status: NA

[Cancel](#) [APPLY](#)

Figure 45: IP Group Table for Amazon Chime SDK Voice Connector Continuation

IP Groups [Amazon\_Chime\_IG]

SBC PSAP Mode

Disable

Route Using Request URI Port

Disable

Media TLS Context

#0 [default]

View

Keep Original Call-ID

No

Dial Plan

--

View

Call Setup Rules Set ID

-1

Tags

SBC Alternative Routing Reasons Set

--

View

Teams Local Media Optimization Handling

None

Teams Local Media Optimization Initial Behavior

DirectMedia

Teams Local Media Optimization Site

Teams Direct Routing Mode

Disable

Metering Remote Type

Regular

Report Metering

Enable

GW Group Registered Status

NA

Cancel

APPLY

Figure 46: IP Group Table for Amazon Chime SDK Voice Connector Continuation

### 4.3.7 Coder Groups configuration

Navigate to **SETUP** and select **SIGNALING & MEDIA**. Expand **CODERS & PROFILES** and select **Coder Groups**. G711 U-law is configured in Coder Groups.

ac

IP NETWORK

SIGNALING & MEDIA

ADMINISTRATION

Entity, parameter, value

SRD

All

TOPOLOGY VIEW

CORE ENTITIES

CODERS & PROFILES

IP Profiles (3)

Tel Profiles (0)

Coder Settings

Coders Groups (1)

Allowed Audio Coders Groups (1)

Allowed Video Coders Groups (0)

SBC

GATEWAY

SIP DEFINITIONS

MESSAGE MANIPULATION

MEDIA

INTRUSION DETECTION

Coders Group [#0] > Coders Table

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

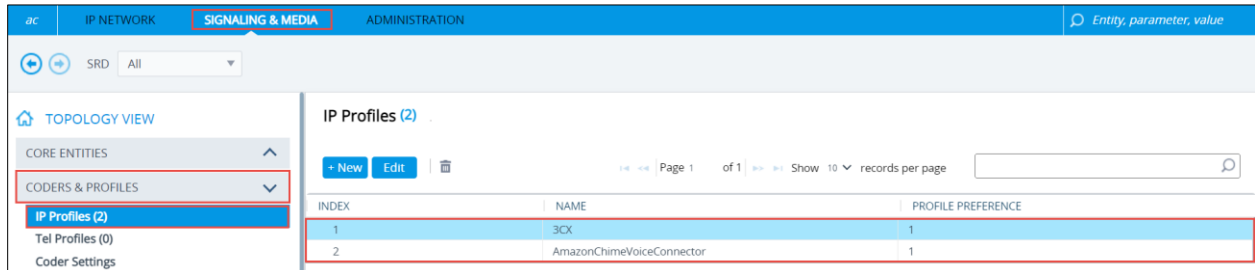
Cancel

APPLY

Figure 47: Coder Groups

### 4.3.8 IP Profile Configuration

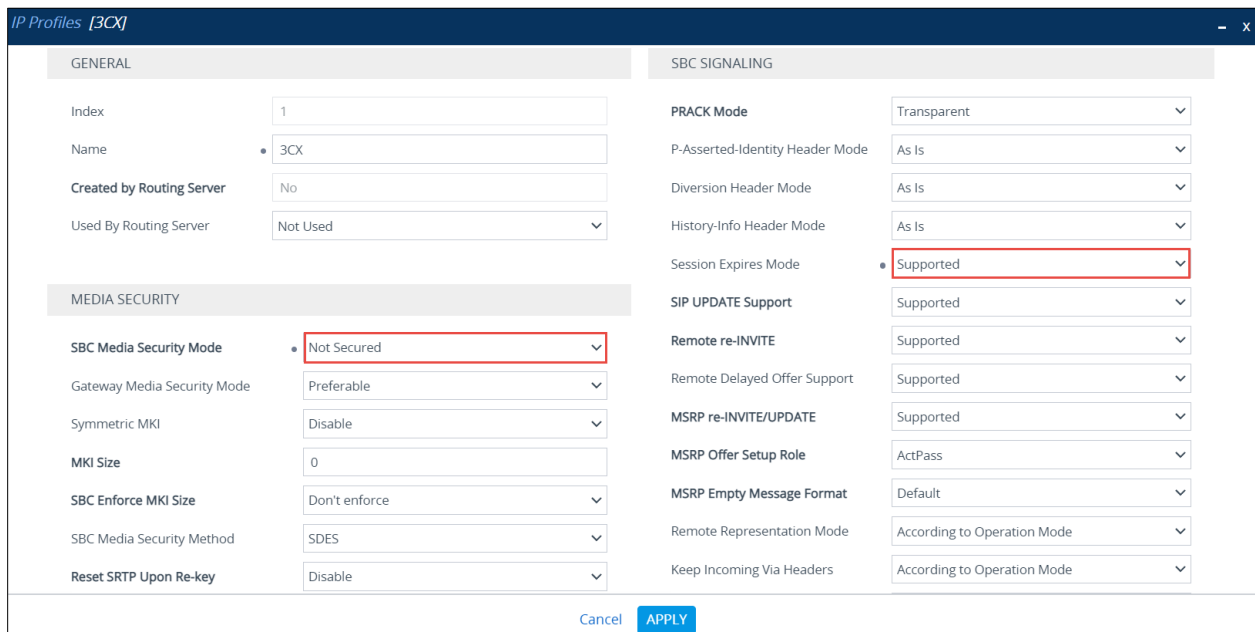
Navigate to **SETUP** and select **SIGNALING & MEDIA**. Expand **CODERS & PROFILES** and select **IP Profiles**. Two IP Profiles are created, one for 3CX and other for Amazon Chime SDK Voice Connector.



INDEX	NAME	PROFILE PREFERENCE
1	3CX	1
2	AmazonChimeVoiceConnector	1

Figure 48: IP Profiles

In the IP Profile for 3CX, select **Session Expire Mode** as *Supported*, **SBC Media Security Mode** as *Not Secured* and **Extension Coder Group** is associated appropriately.



GENERAL	SBC SIGNALING
Index: 1	PRACK Mode: Transparent
Name: 3CX	P-Asserted-Identity Header Mode: As Is
Created by Routing Server: No	Diversion Header Mode: As Is
Used By Routing Server: Not Used	History-Info Header Mode: As Is
	Session Expires Mode: Supported
	SIP UPDATE Support: Supported
	Remote re-INVITE: Supported
	Remote Delayed Offer Support: Supported
	MSRP re-INVITE/UPDATE: Supported
	MSRP Offer Setup Role: ActPass
	MSRP Empty Message Format: Default
	Remote Representation Mode: According to Operation Mode
	Keep Incoming Via Headers: According to Operation Mode

Figure 49: IP Profile for 3CX

**IP Profiles [3CX]**

Generate SRTP Keys Mode	Only If Required	Keep Incoming Routing Headers	According to Operation Mode
SBC Remove Crypto Lifetime in SDP	No	Keep User-Agent Header	According to Operation Mode
SBC Remove Unknown Crypto	No	Handle X-Detect	No
Crypto Suites Group	--	ISUP Body Handling	Transparent
Encryption on RTCP Packets	As Is	ISUP Variant	Itu92
		Max Call Duration [min]	0

**SBC EARLY MEDIA**

Remote Early Media	Supported
Remote Multiple 18x	Supported
Remote Early Media Response Type	Transparent
Remote Multiple Early Dialogs	According to Operation Mode
Remote Multiple Answers Mode	Disable
Remote Early Media RTP Detection Mode	By Signaling
Remote RFC 3960 Support	Not Supported

**SBC REGISTRATION**

User Registration Time	0
NAT UDP Registration Time	-1
NAT TCP Registration Time	-1

**SBC FORWARD AND TRANSFER**

Remote REFER Mode	Regular
-------------------	---------

Cancel APPLY

Figure 50: IP Profile for 3CX Continuation

**IP Profiles [3CX]**

Remote Can Play Ringback	Yes	Remote Replaces Mode	Standard
Generate RTP	None	Play RBT To Transferee	No
		Remote 3xx Mode	Transparent

**SBC MEDIA**

Mediation Mode	RTP Mediation
Extension Coders Group	#0 [AudioCodersGroups_0]
Allowed Audio Coders	--
Allowed Coders Mode	Restriction
Allowed Video Coders	--
Allowed Media Types	
Direct Media Tag	
RFC 2833 Mode	As Is
RFC 2833 DTMF Payload Type	0
Alternative DTMF Method	As Is

**SBC HOLD**

Remote Hold Format	Transparent
Reliable Held Tone Source	Yes
Play Held Tone	No

**SBC FAX**

Fax Coders Group	--
Fax Mode	As Is
Fax Offer Mode	All coders
Fax Answer Mode	Single coder

Cancel APPLY

Figure 51: IP Profile for 3CX Continuation

IP Profiles [3CX]

Send Multiple DTMF Methods

Disable

Receive Multiple DTMF Methods

Disable

Adapt RFC2833 BW to Voice coder BW

Disabled

SDP Ptime Answer

Remote Answer

Preferred PTime

0

Use Silence Suppression

Transparent

RTP Redundancy Mode

As Is

RTCP Mode

Generate Always

Jitter Compensation

Disable

ICE Mode

Disable

SDP Handle RTCP

Don't Care

RTCP Mux

Not Supported

RTCP Feedback

Feedback Off

Re-number MID

Disable

Remote Renegotiate on Fax Detection

Transparent

Fax Rerouting Mode

Disable

MEDIA

Broken Connection Mode

Disconnect

Media IP Version Preference

Only IPv4

RTP Redundancy Depth

Disable

GATEWAY

Early Media

Disable

Early 183

Disable

Early Answer Timeout [sec]

0

Profile Preference

1

Coders Group

#0 [AudioCodersGroups\_0] [View](#)

Cancel

APPLY

Figure 52: IP Profile for 3CX Continuation

IP Profiles [3CX]

Voice Quality Enhancement

Disable

Max Opus Bandwidth

0

Generate No-Op Packets

Disable

SBC Multiple Coders

Not Supported

SBC Allow Only Negotiated PT

Disable

Remove CSRC

Disable

QUALITY OF SERVICE

RTP IP DiffServ

46

Signaling DiffServ

24

Data DiffServ

0

JITTER BUFFER

Dynamic Jitter Buffer Minimum Delay [msec]

10

Play RB Tone to IP

Enable

Progress Indicator to IP

PI= 8

Hold

Enable

Add IE In Setup

QSIG Tunneling

Disable

Copy Destination Number to Redirect Number

Disable

Number of Calls Limit

-1

GATEWAY DTMF

Is DTMF Used

Disable

First Tx DTMF Option

RFC 2833

Second Tx DTMF Option

Rx DTMF Option

Supported

Cancel

APPLY

Figure 53: IP Profile for 3CX Continuation

IP Profiles [3CX]

VOICE		CNG Detector Mode	Disable
Echo Canceler	Line	Vxx Modem Transport Type	Enable Bypass
Input Gain (-32 to 31 dB)	0	NSE Mode	Disable
Voice Volume (-32 to 31 dB)	0		
		ANSWER MACHINE DETECTION	
		AMD Mode	Don't Disconnect
		AMD Sensitivity Parameter Suite	0
		AMD Sensitivity Level	8
		AMD Max Greeting Time	300
		AMD Max Post Silence Greeting Time	400
		LOCAL TONES	
		Local Ringback Tone Index	-1
		Local Held Tone Index	-1

Cancel APPLY

Figure 54: IP Profile for 3CX Continuation

In the IP profile for Amazon Chime SDK Voice Connector **Extension Coder Group** is associated appropriately.

IP Profiles [AmazonChimeVoiceConnector]

GENERAL		SBC SIGNALING	
Index	2	PRACK Mode	Transparent
Name	AmazonChimeVoiceConnector	P-Asserted-Identity Header Mode	As Is
Created by Routing Server	No	Diversion Header Mode	As Is
Used By Routing Server	Not Used	History-Info Header Mode	As Is
		Session Expires Mode	Transparent
MEDIA SECURITY		SIP UPDATE Support	Supported
SBC Media Security Mode	Not Secured	Remote re-INVITE	Supported
Gateway Media Security Mode	Preferable	Remote Delayed Offer Support	Supported
Symmetric MKI	Disable	MSRP re-INVITE/UPDATE	Supported
MKI Size	0	MSRP Offer Setup Role	ActPass
SBC Enforce MKI Size	Don't enforce	MSRP Empty Message Format	Default
SBC Media Security Method	SDES	Remote Representation Mode	According to Operation Mode
Reset SRTP Upon Re-key	Disable	Keep Incoming Via Headers	According to Operation Mode

Cancel APPLY

Figure 55: IP Profiles for Amazon Chime SDK Voice Connector

IP Profiles [AmazonChimeVoiceConnector]

Generate SRTP Keys Mode	Only If Required	Keep Incoming Routing Headers	According to Operation Mode
SBC Remove Crypto Lifetime in SDP	No	Keep User-Agent Header	According to Operation Mode
SBC Remove Unknown Crypto	No	Handle X-Detect	No
Crypto Suites Group	--	ISUP Body Handling	Transparent
Encryption on RTCP Packets	As Is	ISUP Variant	Itu92
		Max Call Duration [min]	0

**SBC EARLY MEDIA**

Remote Early Media	Supported
Remote Multiple 18x	Supported
Remote Early Media Response Type	Transparent
Remote Multiple Early Dialogs	According to Operation Mode
Remote Multiple Answers Mode	Disable
Remote Early Media RTP Detection Mode	By Signaling
Remote RFC 3960 Support	Not Supported

**SBC REGISTRATION**

User Registration Time	0
NAT UDP Registration Time	-1
NAT TCP Registration Time	-1

**SBC FORWARD AND TRANSFER**

Remote REFER Mode	Regular
-------------------	---------

Cancel APPLY

Figure 56: IP Profiles for Amazon Chime SDK Voice Connector Continuation

IP Profiles [AmazonChimeVoiceConnector]

Remote Can Play Ringback	Yes	Remote Replaces Mode	Standard
Generate RTP	None	Play RBT To Transferee	No
		Remote 3xx Mode	Transparent

**SBC MEDIA**

Mediation Mode	RTP Mediation
Extension Coders Group	#0 [AudioCodersGroups_0]
Allowed Audio Coders	--
Allowed Coders Mode	Restriction
Allowed Video Coders	--
Allowed Media Types	
Direct Media Tag	
RFC 2833 Mode	As Is
RFC 2833 DTMF Payload Type	0
Alternative DTMF Method	As Is

**SBC HOLD**

Remote Hold Format	Transparent
Reliable Held Tone Source	Yes
Play Held Tone	No

**SBC FAX**

Fax Coders Group	--
Fax Mode	As Is
Fax Offer Mode	All coders
Fax Answer Mode	Single coder

Cancel APPLY

Figure 57: IP Profile for Amazon Chime SDK Voice Connector Continuation



IP Profiles [AmazonChimeVoiceConnector]

Send Multiple DTMF Methods

Disable

Receive Multiple DTMF Methods

Disable

Adapt RFC2833 BW to Voice coder BW

Disabled

SDP Ptime Answer

Remote Answer

Preferred PTime

0

Use Silence Suppression

Transparent

RTP Redundancy Mode

As Is

RTCP Mode

Generate Always

Jitter Compensation

Disable

ICE Mode

Disable

SDP Handle RTCP

Don't Care

RTCP Mux

Not Supported

RTCP Feedback

Feedback Off

Re-number MID

Disable

Remote Renegotiate on Fax Detection

Transparent

Fax Rerouting Mode

Disable

MEDIA

Broken Connection Mode

Disconnect

Media IP Version Preference

Only IPv4

RTP Redundancy Depth

Disable

GATEWAY

Early Media

Disable

Early 183

Disable

Early Answer Timeout [sec]

0

Profile Preference

1

Coders Group

#0 [AudioCodersGroups\_0]

View

Cancel

APPLY

Figure 58: IP Profile for Amazon Chime SDK Voice Connector Continuation

IP Profiles [AmazonChimeVoiceConnector]

Voice Quality Enhancement

Disable

Max Opus Bandwidth

0

Generate No-Op Packets

Disable

SBC Multiple Coders

Not Supported

SBC Allow Only Negotiated PT

Disable

Remove CSRC

Disable

QUALITY OF SERVICE

RTP IP DiffServ

46

Signaling DiffServ

24

Data DiffServ

0

JITTER BUFFER

Dynamic Jitter Buffer Minimum Delay [msec]

10

Play RB Tone to IP

Enable

Progress Indicator to IP

PI= 8

Hold

Enable

Add IE In Setup

QSIG Tunneling

Disable

Copy Destination Number to Redirect Number

Disable

Number of Calls Limit

-1

GATEWAY DTMF

Is DTMF Used

Disable

First Tx DTMF Option

RFC 2833

Second Tx DTMF Option

Rx DTMF Option

Supported

Cancel

APPLY

Figure 59: IP Profiles for Amazon Chime SDK Voice Connector Continuation

**IP Profiles [AmazonChimeVoiceConnector]**

**VOICE**

Echo Canceler: Line

Input Gain (-32 to 31 dB): 0

Voice Volume (-32 to 31 dB): 0

CNG Detector Mode: Disable

Vxx Modem Transport Type: Enable Bypass

NSE Mode: Disable

**ANSWER MACHINE DETECTION**

AMD Mode: Don't Disconnect

AMD Sensitivity Parameter Suite: 0

AMD Sensitivity Level: 8

AMD Max Greeting Time: 300

AMD Max Post Silence Greeting Time: 400

**LOCAL TONES**

Local Ringback Tone Index: -1

Local Held Tone Index: -1

Cancel APPLY

Figure 60: IP Profiles for Amazon Chime SDK Voice Connector Continuation

### 4.3.9 IP-to-IP Routing

Navigate to **SETUP** and select **SIGNALING & MEDIA**. Expand **SBC** and select **IP-to-IP Routing** under **Routing**. Routing rules are defined for forwarding SIP messages based on IP Groups from source to destination.

**IP-to-IP Routing (2)**

+ New Edit Insert

Page 1 of 1 Show 10 records per page

INDEX	NAME	ROUTING POLICY	ALTERNATIVE ROUTE OPTIONS	SOURCE IP GROUP	REQUEST TYPE	SOURCE USERNAME PATTERN	DESTINATION USERNAME PATTERN	DESTINATION TYPE	DESTINATION IP GROUP	DESTINATION SIP INTERFACE	DESTINATION ADDRESS
3	3CX to Amazon	Default_SBCR	Route Row	3CX_IG	All	*	*	IP Group	Amazon_Chim	Amazon_Chim	
4	AmazonChime	Default_SBCR	Route Row	Amazon_Chim	All	*	*	IP Group	3CX_IG	3CX	

Figure 61: IP-to-IP Routing

## IP to IP routing from 3CX to Amazon Chime SDK Voice Connector.

The screenshot shows the 'IP-to-IP Routing [3CX to AmazonChime]' configuration window. It is divided into two main sections: GENERAL and ACTION.

**GENERAL Section:**

- Index:** 3
- Name:** 3CX to AmazonChime
- Alternative Route Options:** Route Row
- MATCH Section:**
  - Source IP Group:** #0 [3CX\_IG] (highlighted with a red box)
  - Request Type:** All
  - Source Username Pattern:** \*
  - Source Host:** \*
  - Source Tag:** (empty)
  - Destination Username Pattern:** \*
  - Destination Host:** \*
  - Destination Tag:** (empty)

**ACTION Section:**

- Destination Type:** IP Group
- Destination IP Group:** #1 [Amazon\_Chime\_IG] (highlighted with a red box)
- Destination SIP Interface:** #1 [Amazon\_Chime] (highlighted with a red box)
- Destination Address:** (empty)
- Destination Port:** 0
- Destination Transport Type:** (empty)
- IP Group Set:** --
- Call Setup Rules Set ID:** -1
- Group Policy:** Sequential
- Cost Group:** --
- Routing Tag Name:** default
- Internal Action:** (empty)
- Modified Destination User Name:** (empty)

At the bottom, there are 'Cancel' and 'APPLY' buttons.

Figure 62: IP-to-IP Routing from 3CX to Amazon Chime SDK Voice Connector

## IP to IP routing from Amazon Chime SDK Voice Connector to 3CX.

The screenshot shows the 'IP-to-IP Routing [AmazonChime to 3CX]' configuration window. It is divided into two main sections: GENERAL and ACTION.

**GENERAL Section:**

- Index:** 4
- Name:** AmazonChime to 3CX
- Alternative Route Options:** Route Row
- MATCH Section:**
  - Source IP Group:** #1 [Amazon\_Chime\_IG] (highlighted with a red box)
  - Request Type:** All
  - Source Username Pattern:** \*
  - Source Host:** \*
  - Source Tag:** (empty)
  - Destination Username Pattern:** \*
  - Destination Host:** \*
  - Destination Tag:** (empty)

**ACTION Section:**

- Destination Type:** IP Group
- Destination IP Group:** #0 [3CX\_IG] (highlighted with a red box)
- Destination SIP Interface:** #3 [3CX] (highlighted with a red box)
- Destination Address:** (empty)
- Destination Port:** 0
- Destination Transport Type:** (empty)
- IP Group Set:** --
- Call Setup Rules Set ID:** -1
- Group Policy:** Sequential
- Cost Group:** --
- Routing Tag Name:** default
- Internal Action:** (empty)
- Modified Destination User Name:** (empty)

At the bottom, there are 'Cancel' and 'APPLY' buttons.

Figure 63: IP-to-IP Routing from Amazon Chime SDK Voice Connector to 3CX

### 4.3.10 TLS Configuration

TLS is configured between AudioCodes SBC and Amazon Chime SDK Voice Connector. Navigate to **SETUP** and select **IP NETWORK**. Expand **SECURITY** and click on **TLS Contexts**.

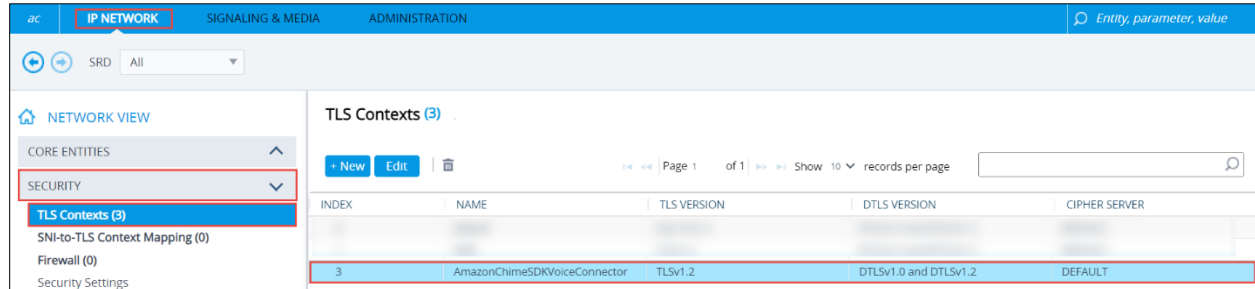


Figure 64: TLS Contexts

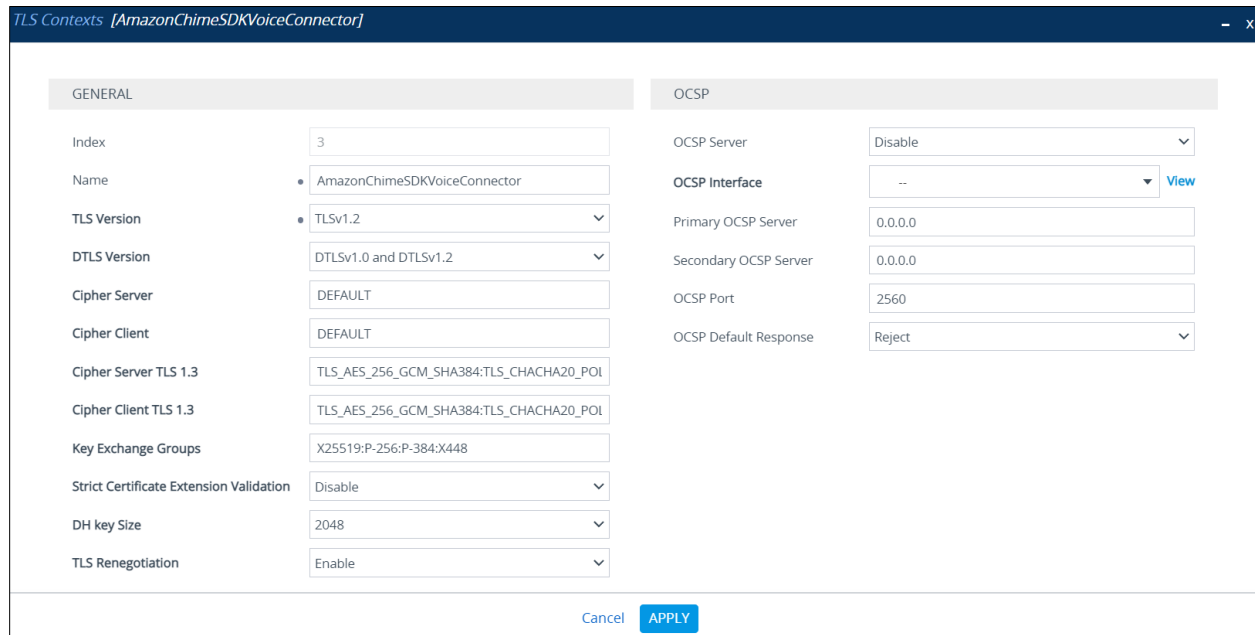


Figure 65: TLS Context for Amazon Chime SDK Voice Connector

Amazon Trust Root Certificate is to be installed in the Trusted Root Certificates list under TLS Context. In the TLS Context page, select the **TLS Context** for Amazon Chime SDK Voice Connector and click **Trusted Root Certificates** link located in the bottom. Click on **Import** button and select the certificate file.

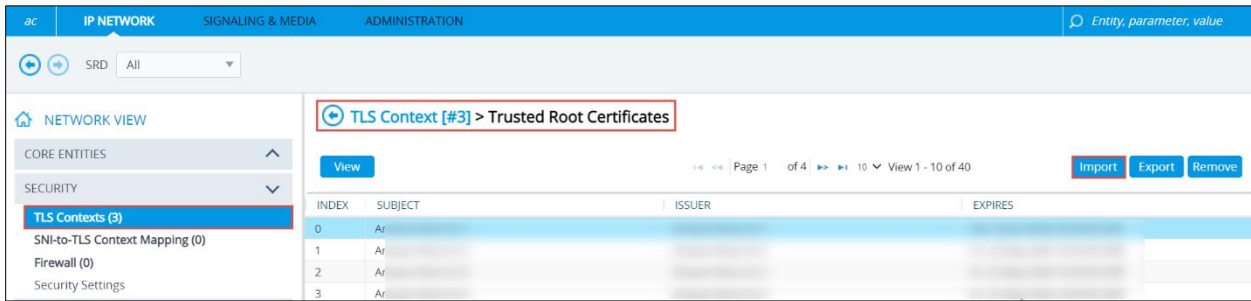


Figure 66: Trusted Root Certificate Import option

Amazon Chime SDK Voice Connector Root Certificate can be downloaded from Amazon Chime SDK Voice Connector account. Generate Self-signed certificate for the created TLS context. To configure media security, navigate to **SETUP** and select **SIGNALING & MEDIA**. Expand **MEDIA** and click on **Media Security**. Under General section, set **Media Security** as Enable.

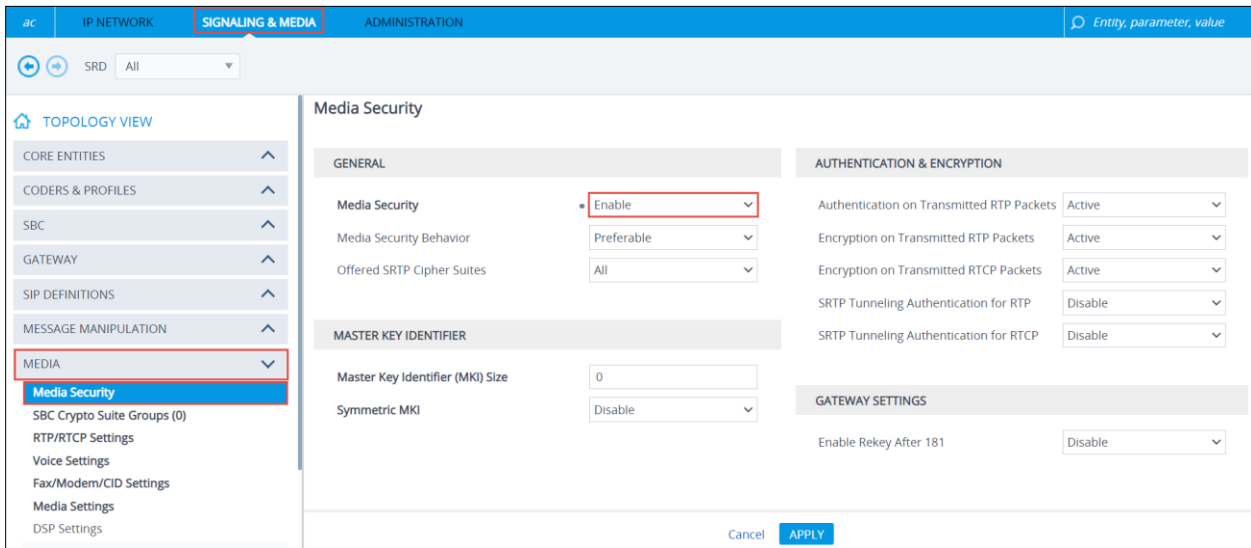


Figure 67: Media Security

In the IP Profile for Amazon Chime SDK Voice Connector **SBC Media Security Mode** must be set to Secured.

The screenshot shows the 'IP Profiles' configuration window for 'AmazonChimeVoiceConnector'. It is divided into two main sections: 'GENERAL' and 'SBC SIGNALING'. The 'GENERAL' section includes fields for 'Index' (2), 'Name' (AmazonChimeVoiceConnector), 'Created by Routing Server' (No), and 'Used By Routing Server' (Not Used). The 'MEDIA SECURITY' section is expanded, showing 'SBC Media Security Mode' set to 'Secured' (highlighted with a red box), 'Gateway Media Security Mode' (Preferable), 'Symmetric MKI' (Disable), 'MKI Size' (0), 'SBC Enforce MKI Size' (Don't enforce), 'SBC Media Security Method' (SDES), and 'Reset SRTP Upon Re-key' (Disable). The 'SBC SIGNALING' section includes various modes like 'PRACK Mode' (Transparent), 'P-Asserted-Identity Header Mode' (As Is), 'Diversion Header Mode' (As Is), 'History-Info Header Mode' (As Is), 'Session Expires Mode' (Transparent), 'SIP UPDATE Support' (Supported), 'Remote re-INVITE' (Supported), 'Remote Delayed Offer Support' (Supported), 'MSRP re-INVITE/UPDATE' (Supported), 'MSRP Offer Setup Role' (ActPass), 'MSRP Empty Message Format' (Default), 'Remote Representation Mode' (According to Operation Mode), and 'Keep Incoming Via Headers' (According to Operation Mode). At the bottom, there are 'Cancel' and 'APPLY' buttons.

GENERAL		SBC SIGNALING	
Index	2	PRACK Mode	Transparent
Name	AmazonChimeVoiceConnector	P-Asserted-Identity Header Mode	As Is
Created by Routing Server	No	Diversion Header Mode	As Is
Used By Routing Server	Not Used	History-Info Header Mode	As Is
MEDIA SECURITY		Session Expires Mode	Transparent
SBC Media Security Mode	Secured	SIP UPDATE Support	Supported
Gateway Media Security Mode	Preferable	Remote re-INVITE	Supported
Symmetric MKI	Disable	Remote Delayed Offer Support	Supported
MKI Size	0	MSRP re-INVITE/UPDATE	Supported
SBC Enforce MKI Size	Don't enforce	MSRP Offer Setup Role	ActPass
SBC Media Security Method	SDES	MSRP Empty Message Format	Default
Reset SRTP Upon Re-key	Disable	Remote Representation Mode	According to Operation Mode
		Keep Incoming Via Headers	According to Operation Mode

Figure 68: SBC Media Security Mode configuration in IP Profile

### 4.3.11 Message Manipulation configuration

SIP message manipulation rules are created to modify SIP headers for each IP entity based on manipulation sets enabled in IP Groups. The following are the message manipulation created for interoperability between 3CX and Amazon Chime SDK Voice Connector.

Below manipulation is created to modify Host value of "To" header with the Destination IP address in the OPTIONS request that is sent towards 3CX.

Message Manipulations [Option\_to\_3CX]

GENERAL

Index

11

Name

• Option\_to\_3CX

Manipulation Set ID

• 1

Row Role

Use Current Condition

MATCH

Message Type

• Options

Condition

ACTION

Action Subject

• Header.to.URL.Host

Action Type

• Modify

Action Value

• Param.Message.Address.Dst.IP

Figure 69: OPTIONS TO header 3CX

Below manipulation is created to modify Host value of "From" header with the LAN IP address, when AudioCodes sends a request towards 3CX.

Message Manipulations [FROM header to 3CX]

GENERAL

Index

1

Name

FROM header to 3CX

Manipulation Set ID

1

Row Role

Use Current Condition

MATCH

Message Type

Any.Request

Condition

ACTION

Action Subject

Header.From.URL.Host

Action Type

Modify

Action Value

'10.64.3'

Cancel

APPLY

Figure 71: FROM header host modification towards 3CX

Below manipulation is created to modify Host value of "From" header with the WAN IP address, when AudioCodes sends a request towards the Amazon Chime SDK Voice Connector.

Message Manipulations [FROM header to AmazonChimeVC]

GENERAL

Index

0

Name

FROM header to AmazonChimeVC

Manipulation Set ID

2

Row Role

Use Current Condition

MATCH

Message Type

Any.Request

Condition

ACTION

Action Subject

Header.From.URL.Host

Action Type

Modify

Action Value

'192.65.'

Cancel

APPLY

Figure 72: FROM header host modification towards Amazon Chime SDK Voice Connector



Below manipulation is created to modify Host value of "PAI" header with the WAN IP address, when AudioCodes sends INVITE request towards the Amazon Chime SDK Voice Connector.

Message Manipulations [PAI header to AmazonChimeVC]

GENERAL

Index

2

Name

PAI header to AmazonChimeVC

Manipulation Set ID

2

Row Role

Use Current Condition

MATCH

Message Type

Invite.Request

Condition

ACTION

Action Subject

Header.P-Asserted-Identity.URL.Host

Action Type

Modify

Action Value

'192.65.'

Cancel

APPLY

Figure 73: PAI header host modification towards Amazon Chime SDK Voice Connector

Below manipulation is created to modify Host value of "To" header in response to BYE that is sent towards the Amazon Chime SDK Voice Connector.

Message Manipulations [Bye response to AmazonChimeVC]

GENERAL

Index

3

Name

Bye response to AmazonChimeVC

Manipulation Set ID

2

Row Role

Use Current Condition

MATCH

Message Type

bye.Response

Condition

ACTION

Action Subject

Header.to.URL.Host

Action Type

Modify

Action Value

'192.65.'

Cancel

APPLY

Figure 74: BYE response host modification towards Amazon Chime SDK Voice Connector

Below manipulation is created to modify Session refresher value from UAC to UAS in the INVITE requests that is sent towards 3CX.

The screenshot displays the 'Message Manipulations' configuration window, titled '[Session Refresher set to UAS]'. The interface is divided into three main sections: GENERAL, ACTION, and MATCH.

**GENERAL Section:**

- Index:** 4
- Name:** Session Refresher set to UAS
- Manipulation Set ID:** 1
- Row Role:** Use Current Condition

**MATCH Section:**

- Message Type:** Invite.Request
- Condition:** (Empty field)

**ACTION Section:**

- Action Subject:** Header.Session-Expires.Refresher
- Action Type:** Modify
- Action Value:** '2'

Each input field has an 'Editor' link next to it for editing the value.

Figure 75: Session Refresher modification towards 3CX