SIP Trunking Configuration Guide: Configuring a SIP Trunk from TATA COMMUNICATIONS to Amazon Chime SDK Voice Connector and a SIP Media Application

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Document History

Rev. No.	Date	Description
1.0	February-07-2023	Initial release
1.1	March-08-2023	Minor edits based on feedback

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1 Audience

This document is intended for technical staff and Value-Added Resellers (VARs) with installation and operational responsibilities. This configuration guide provides steps for configuring **SIP Trunks** between operator **TATA COMMUNICATIONS** and an **Amazon Chime SDK Voice Connector**. An example is provided of the trunk then connecting to a **SIP Media Application (SMA)** that is used to bridge an inbound call to a meeting.

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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.

SIP media applications make it easier and faster for you to create custom signaling and media instructions that you would normally build on your private branch telephone exchange (PBX).

SIP rules specify how a SIP media application can connect to an Amazon Chime SDK meeting. Calls can go to and from private phone numbers that you own or to and from a Request URI hostname, the name assigned to an Amazon Chime SDK Voice Connector. The Amazon Chime SDK runs the SIP rules when a user places or receives a call.

You must be an AWS Lambda user before you can create SIP media applications.

2 SIP Trunking Network Components

The network for SIP Trunk reference configuration is illustrated below and is representative of call routing through **TATA COMMUNICATIONS** with **Amazon Chime SDK Voice Connector** and **SMA.**

Figure 1 : Network Topology

2.1 Hardware Components

- None

2.2 Software Requirements

- None

3 Features

3.1 Features Supported

The below call scenarios are tested with UDP and TLS.

- Inbound calls to SMA using following numbers.
  * US Toll free numbers
  * US Toll numbers
  * International Numbers (UK)
- Calling Party Number Presentation
- DTMF-RFC 2833
- Long duration calls

3.2 Features Not Supported

- None

3.3 Features Not Tested

- None

3.4 Caveats and Limitations

- Amazon Chime SDK Voice Connector does not accept calls from source regions other than US.

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. You must obtain and use the appropriate values for your deployment. Encryption is always recommended if supported.

4.1 Configuration Checklist

In this section we present an overview of the steps that are required for establishing a **TATA COMMUNICATIONS** SIP Trunk to **Amazon Chime SDK Voice Connector** and then creating a **SIP media application** action to bridge an inbound SIP call to a meeting.

Table 1 – PBX Configuration Steps

Steps	Description	Reference
Step 1	Amazon Chime SDK Voice Connector and SIP Media Application Configuration	Section 4.2
Step 2	TATA COMMUNICATION SIP Trunk Configuration	Section 4.3

4.2 Amazon Chime SDK Voice Connector and SIP Media Application Configuration

4.2.1 Create SIP Trunk in Amazon Chime SDK Voice Connector

To create an Amazon Chime SDK Voice Connector

1. Open the Amazon Chime console at https://console.aws.amazon.com/chime-sdk/home
2. For **SIP Trunking**, choose **Voice connectors**.

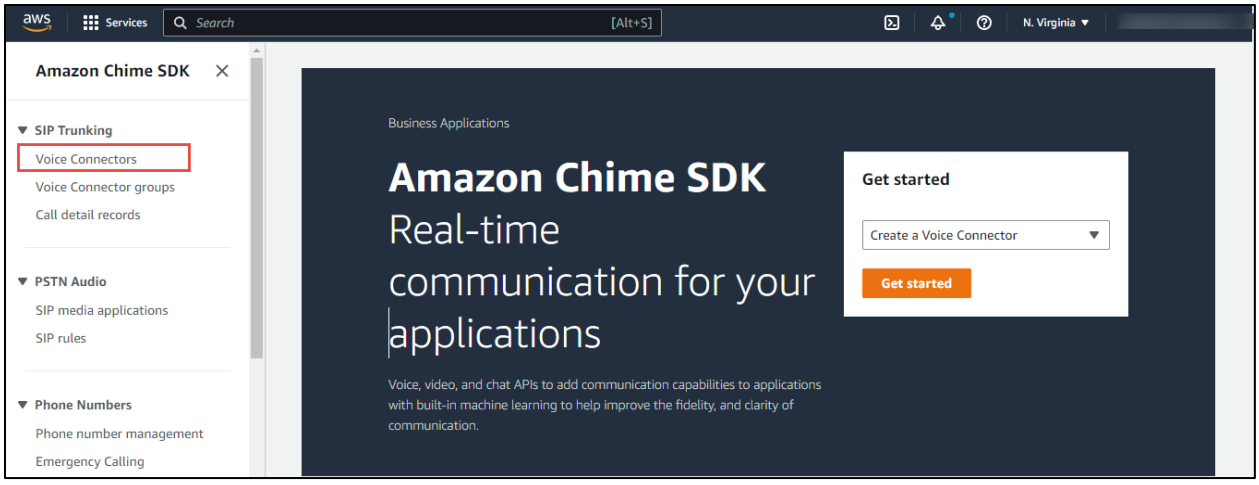

Figure 2 : Create Amazon Chime SDK Voice Connector

3. Choose **Create new Voice Connector**.

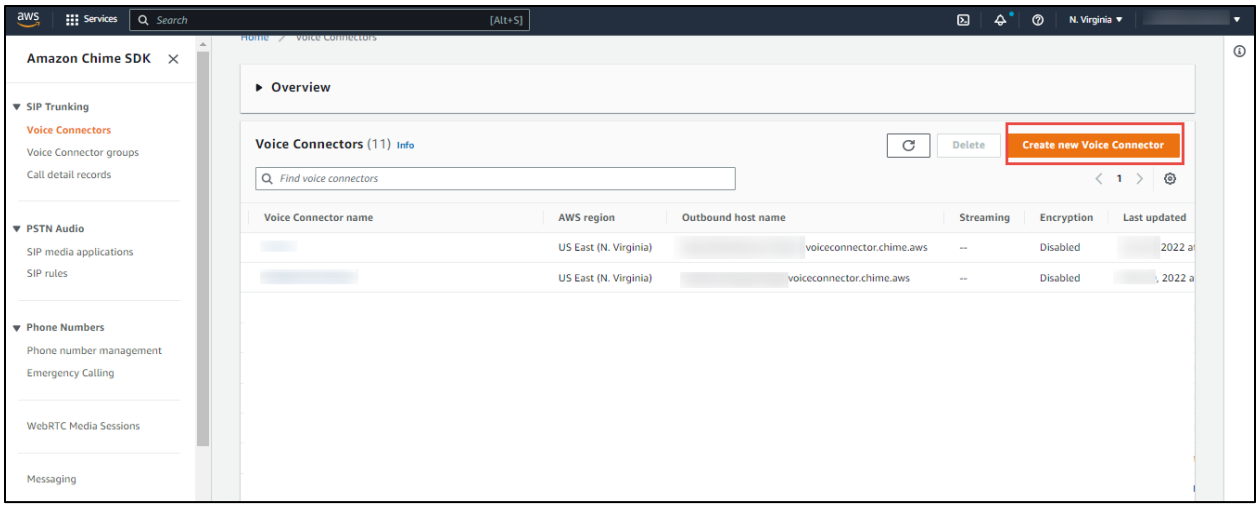

Figure 3 : Create Amazon Chime SDK Voice Connector (cont.)

4. For **Voice Connector name**, enter a name for the Amazon Chime SDK Voice Connector.
5. (Optional) For **AWS Region**, choose an AWS Region for your Amazon Chime SDK Voice Connector. The default Region is US East (N. Virginia) (**us-east-1**). Regions cannot be changed after your Amazon Chime SDK Voice Connector is created.
6. For **Encryption (TLS)** select **Enabled** or **Disabled** for **UDP**
7. Choose Create.

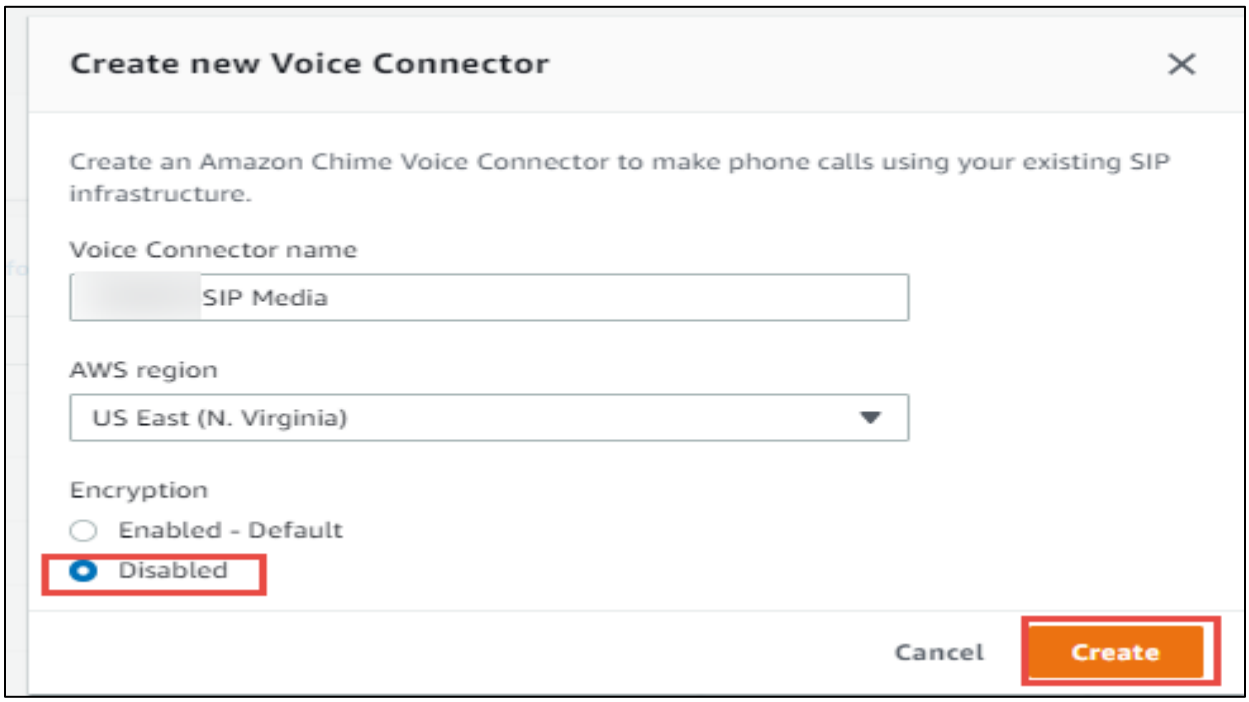

Figure 4 : Create Amazon Chime SDK Voice Connector (cont.)

Note
Enabling encryption configures your Amazon Chime SDK Voice Connector to use TLS transport for SIP signaling and Secure RTP (SRTP) for media. Inbound calls use TLS transport, and unencrypted outbound calls are blocked.

4.2.2 Access List in Amazon Chime SDK Voice Connector

1. Open the Amazon Chime console at https://console.aws.amazon.com/chime-sdk/home
2. For **Calling**, choose **Voice Connectors**.
3. Choose the name of the Amazon Chime SDK Voice Connector to edit.
4. Choose **Origination**, and select **Enabled**.
5. For **Inbound routes**, choose **New**.
6. Enter the values for **Host**, **Port**, **Protocol**, **Priority**, and **Weight**.
7. Choose **Add**.
8. Choose **Save**.

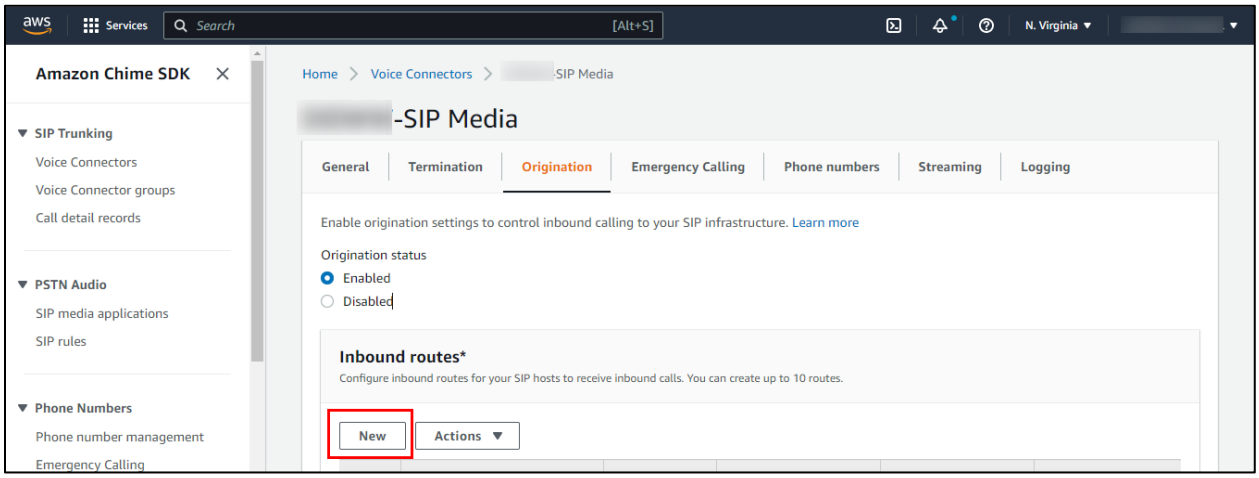

Figure 5 : Create Amazon Chime SDK Voice Connector (cont.)

9. Choose **Termination**, and select **Enabled**.
10. For **Allowed hosts list**, choose **New**, enter the CIDR notations and values to allow list, and choose **Add**.

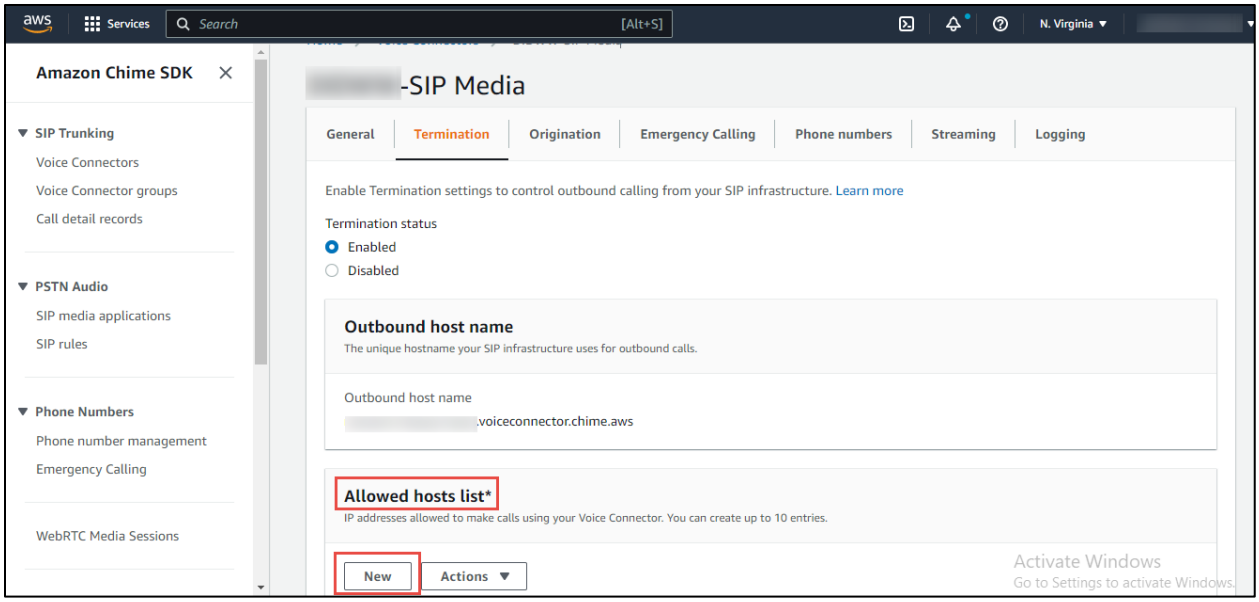

Figure 6 : Create Amazon Chime SDK Voice Connector (cont.)

Note
Adding host addresses is not limited to inbound and outbound configuration. Multiple host addresses will be required due to SIP infrastructure dependency.

4.2.3 Create Lambda

To create a Lambda

1. Open the Amazon console at https://console.aws.amazon.com/console/
2. In the menu select services choose **Lambda.**

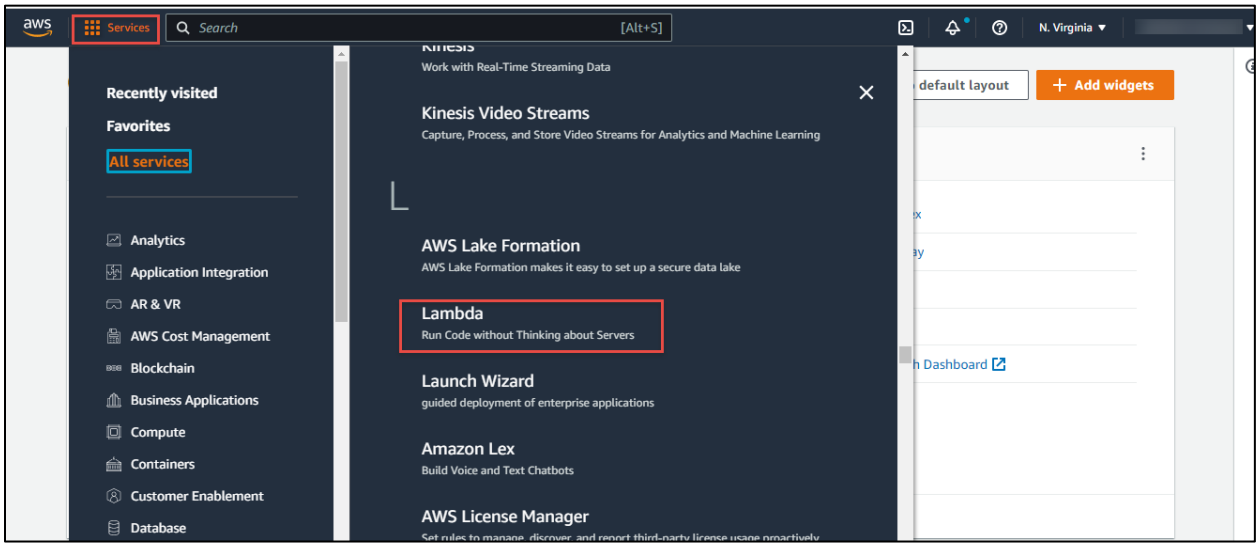

Figure 7 : Create Lambda

3. In the AWS Lambda menu, select the **Functions** and click **Create Function** button to create a new lambda function.

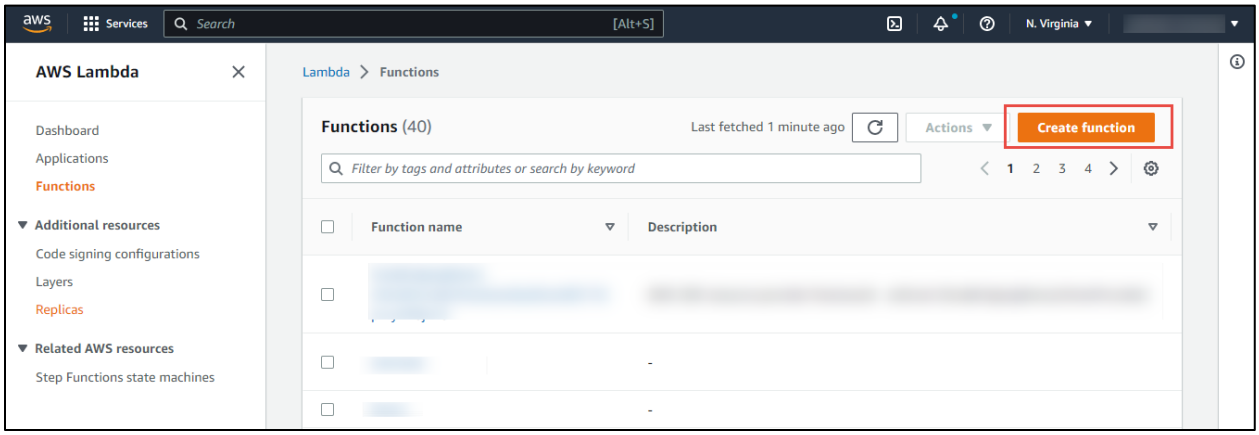

Figure 8 : Create Lambda (cont.)

4. Open the lambda **Function** and click Copy ARN button. This ARN will be used while creating SIP Media Applications.

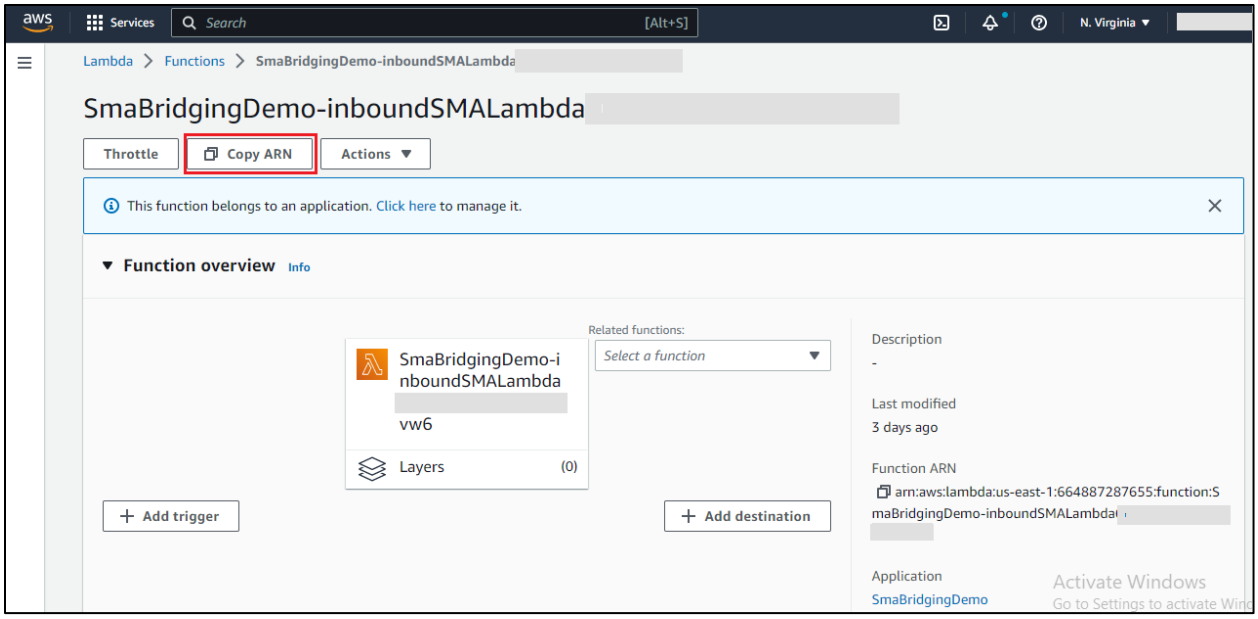

Figure 9 : Create Lambda (cont.)

4.2.4 Create SIP Media Application

To create a SIP media application

1. Open the Amazon Chime console at https://console.aws.amazon.com/chime-sdk/home.
2. In the Amazon Chime SDK console, in the navigation pane, choose **SIP media applications**.
3. Choose **Create**. The **Create a SIP media application** page appears.

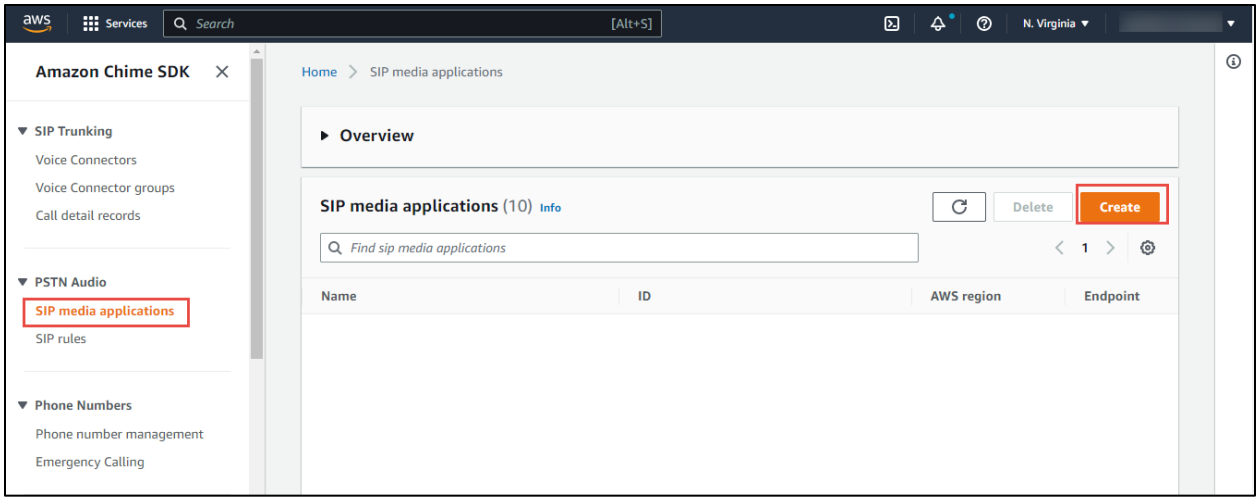

Figure 10 : Create SIP Media Application

4. For **Name**, enter a name for your application.
5. For **AWS Regions**, select a Region. Make sure your selection matches the Region in your Lambda function's Amazon Resource Name (ARN). For example, if your function's ARN contains **us-east-1**, choose the list item with that same Region.
6. Copy your Lambda function's ARN and paste it into the **ARN** box.
7. Choose **Create**.

   A success message appears at the top of the **Create a SIP media application** page, and your media application appears in the list of applications.

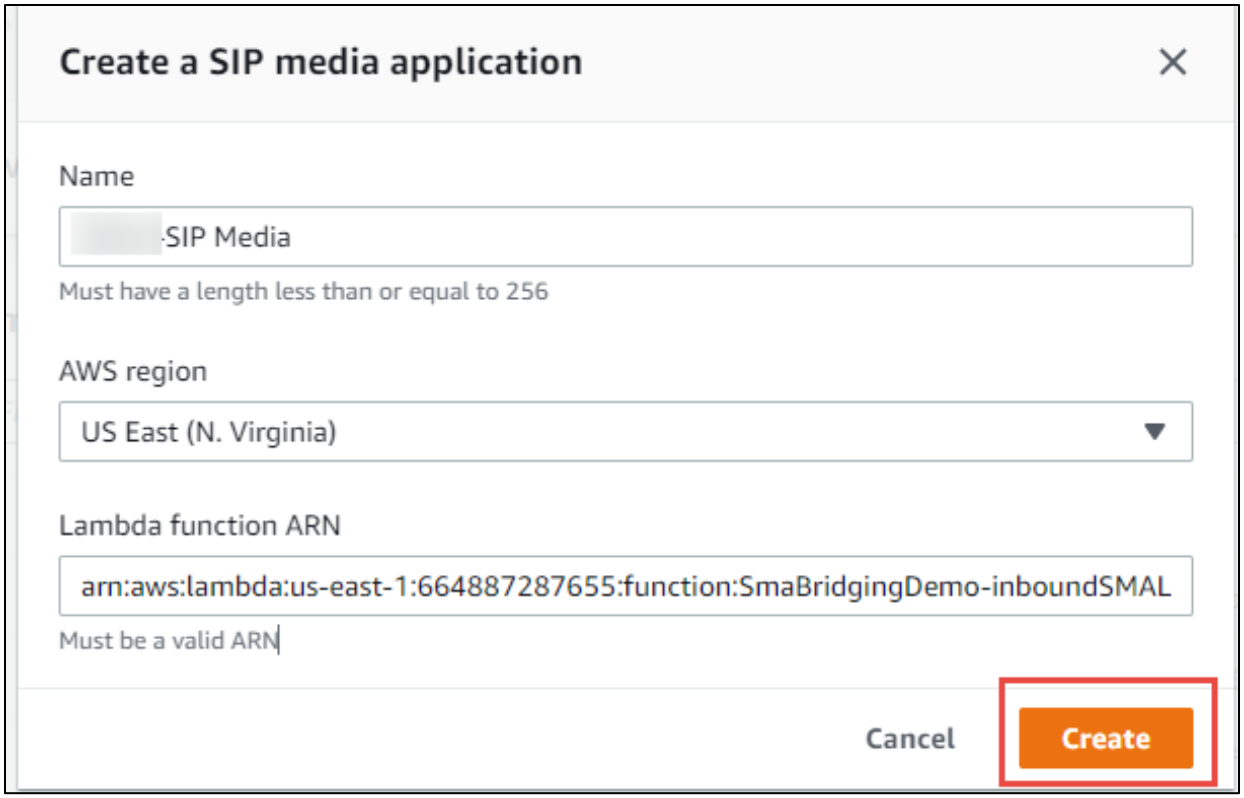

Figure 11 : Create SIP Media Application (cont.)

4.2.5 Create SIP Rules

To create a SIP rule

1. Open the Amazon Chime console at https://console.aws.amazon.com/chime-sdk/home.
2. In the navigation pane, choose **SIP rules**. The **SIP rules** page appears.
3. Choose **Create**. The **Create a SIP rule** dialog box appears.

Figure 12 : Create SIP Rule

4. Enter a name for the rule.
5. Set the Trigger type to **"Request URI hostname".**
6. From the drop down, select the request URI hostname as the voice connector host created.

Figure 13 : Create SIP Rule *(cont.)*

7. Choose **Next**, and on the **Step 2** page, open the **SIP media application** list and select the SIP application that you want to use.
8. As needed, choose **Add a SIP media application** to use the rule with multiple applications.
9. Choose **Create.**

Figure 14 : Create SIP Rule (cont.)

4.2.6 Enable SIP Logs in Amazon Chime SDK Voice Connector

To enable SIP logs for inbound calls

1. Open the Amazon Chime console at https://console.aws.amazon.com/chime-sdk/home.
2. For **Collecting SIP logs**, Choose the name of the Amazon Chime SDK Voice Connector to edit.
3. Choose **Logging** and select SIP message and Media metric logs **Enabled.**
4. Choose **Save.**

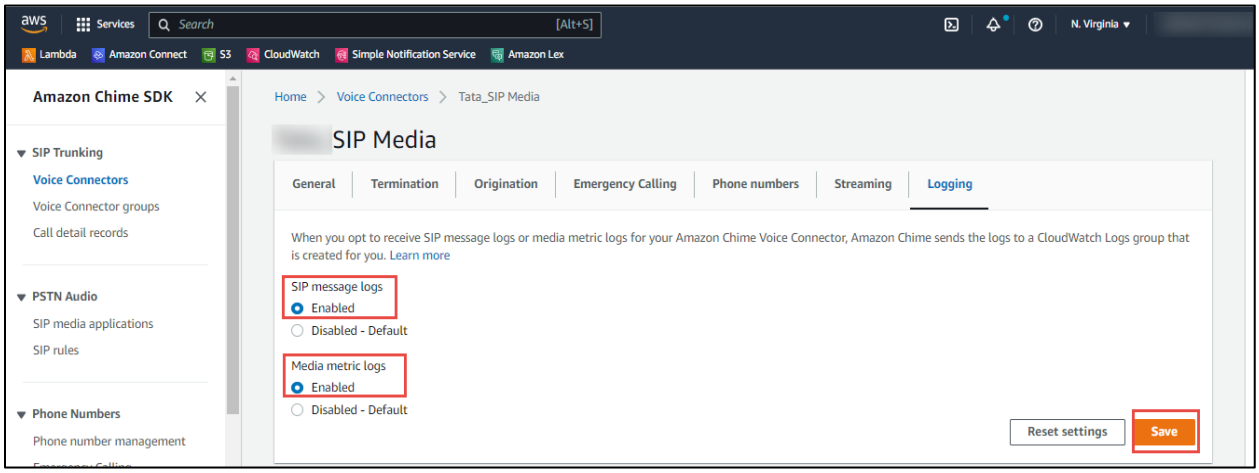

Figure 15 : Enable SIP logs in Cloud Watch

4.2.7 Collect CloudWatch SIP Logs

To collect a SIP Logs

1. Open the Amazon console at https://console.aws.amazon.com/console/.
2. In the menu select services choose **CloudWatch.**
3. Select the **log groups** in AWS CloudWatch and filter the SIP log using the Voice Connector Outbound host name.
4. Select the **SIP messages** from Log group.

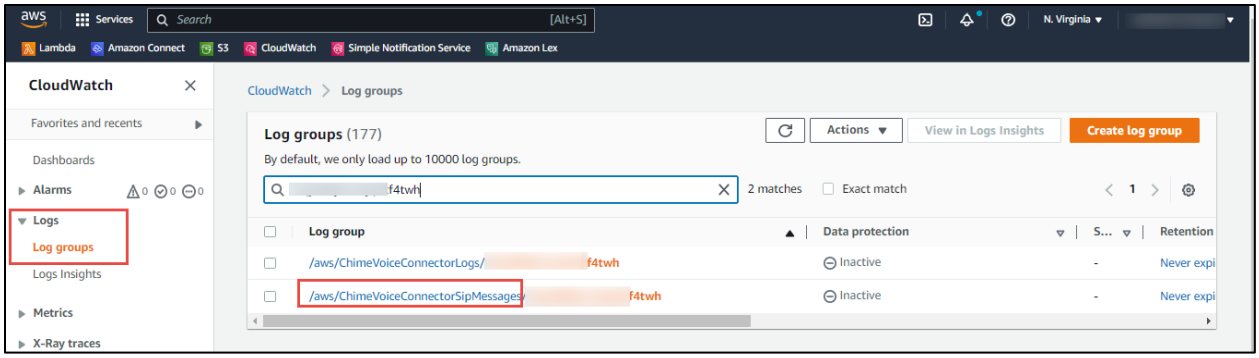

Figure 16 : Collect CloudWatch SIP Logs

4.3 TATA COMMUNICATIONS SIP Trunk Configuration

Customer should work with TATA to setup the SIP trunk and DIDs.

Please refer below table to create the SIP trunk with TATA Montreal and Toronto SBC for UDP protocol.

Amazon Chime [Transport UDP]

Order Number:1353339	Tata Communications SBC (MTTE, Montreal)	Tata Communications SBC (TTTF, Torronto)	Amazon Chime UDP
SIP Signaling	xx.xx.xx.152	xx.xx.xx.22	xx.xx.xx.0/23, xx.xx.xx.0/24
Media 1	xx.xx.xx.150	xx.xx.xx.18	
Media 2	xx.xx.xx.151	xx.xx.xx.19	FQDN - xxxxxx.voiceconnector.chime.aws
Concurrent Channels	Customer to Tata Communications: 20, 5 CPS		
	TATA Communication to Customer: 20, 5 CPS		
Protocol	SIP		
Signaling Transport	UDP		
Numbering Format	+ E.164		
Codec configured	Customer to TATA :- G.711u-law, G.711a-law, G.729, G.722, G722.2		
DTMF Type	RFC 2833		

- Please refer below table to create the SIP trunk with TATA Los Angeles and New York SBC for TLS protocol.

Amazon Chime- [Transport-TLS]

Order Number:1353442	Tata Communications SBC (LAAH, Los Angeles)	Tata Communications SBC (NW8C, New York)	Amazon Chime IP
SIP Signalling	xx.xx.xx.29	xx.xx.xx.161	xx.xx.xx.0/23, xx.xx.xx.0/24
Media 1	xx.xx.xx.25	xx.xx.xx.146	
Media 2	xx.xx.xx.26	xx.xx.xx.147	
Concurrent Channels	Customer to Tata Communications: 20, 5 CPS		
	TATA Communication to Customer: 20, 5 CPS		
Protocol	SIP		
Signalling Transport	TLS		
Numbering Format	+E.164		
Codec configured	Customer to TATA: - G.711u-law, G.711a-law, G.729, G.722, G722.2		
DTMF Type	RFC 2833		