

Oracle SBC integration with Avaya and Twilio Elastic Sip Trunking

**Technical Application Note** 





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# **Revision History**

Version	Description of Changes	Date Revision Completed
1.0	Oracle SBC integration with Avaya and Twilio Elastic SIP Trunking	07 <sup>th</sup> May 2021
1.1	Added new section for SBC config/Deployment Using Configuration Assistant	14 <sup>th</sup> December 2021
1.2	Refreshed the app note with testing of Twilio Trunk and Avaya with Oracle SBC 9.0 version	08 <sup>th</sup> April 2022

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### 1. Intended Audience

This document is intended for use by Oracle Systems Engineers, third party Systems Integrators, Oracle Enterprise customers and partners and end users of the Oracle Enterprise Session Border Controller (SBC). It is assumed that the reader is familiar with basic operations of the Oracle Enterprise Session Border Controller platform along with Avaya Aura System Manager GUI and Avaya Aura Session Manager.

### 2. Document Overview

This Oracle technical application note outlines how to configure the Oracle SBC to interwork between Twilio Elastic Sip Trunk with Avaya Session Manager. The solution contained within this document has been tested using Oracle Communication SBC with **OS840p4A** and **OS900p2** 

In addition, it should be noted that the SBC configuration provided in this guide focuses strictly on the Avaya Server and Twilio Elastic Sip Trunk related parameters. Many SBC applications may have additional configuration requirements that are specific to individual customer requirements. These configuration items are not covered in this guide. Please contact your Oracle representative with any questions pertaining to this topic.

Please find the related documentation links below:

#### 2.1. Twilio Elastic SIP Trunking

<u>Twilio Elastic SIP Trunking</u> is a cloud-based solution that provides connectivity for IP-based communications infrastructure to connect to the PSTN for making and receiving telephone calls to the rest of the world via any broadband internet connection. Twilio's Elastic SIP Trunking service automatically scales, up or down, to meet your traffic needs with unlimited capacity. In just minutes you can deploy globally with Twilio's easy-to-use self-service tools without having to rely on slow providers.

Sign up for a free Twilio trial and learn more about configuring your Twilio Elastic SIP Trunk.

Please note that the IP Addresses, FQDN and configuration names and details given in this document are used for reference purposes only. These same details cannot be used in customer configurations. End users of this document can use the configuration details according to their network requirements. There are some public facing IPs (externally routable IPs) that we use for our testing are masked in this document for security reasons. The customers can configure any publicly routable IPs for these sections as per their network architecture needs.

### 3. Introduction

#### 3.1. Audience

This is a technical document intended for telecommunications engineers with the purpose of configuring Avaya Session Manager using Oracle Enterprise SBC. There will be steps that require navigating the Avaya server configuration and Oracle SBC GUI interface. Understanding the basic concepts of TCP/UDP, IP/Routing, DNS server and SIP/RTP, TLS/SRTP are also necessary to complete the configuration and for troubleshooting, if necessary.

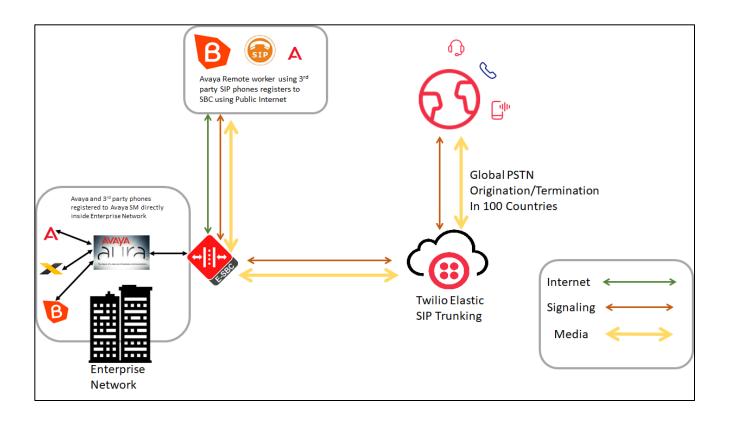
#### 3.2. Requirements

- Fully functioning Avaya Aura Session Manager 8.1 version
- Oracle Enterprise Session Border Controller (hereafter Oracle SBC) running 8.4.0 / 9.0.0 version

The below revision table explains the versions of the software used for each component: This table is Revision 1 as of now:

Software Used	SBC Version	Avaya Aura Session Manager using Avaya Aura System Manager GUI
Revision 1	8.4.0	8.1
Revision 2	9.0.0	8.1

#### 3.3. Architecture



The configuration, validation and troubleshooting are the focuses of this document and will be described in three phases:

- Phase 1 Configuring the Avaya Aura Session Manager
- Phase 2 Configuring the Oracle SBC.
- Phase 3 Configuring the Twilio Elastic SIP Trunk

# 4. Configuring the Avaya Aura Session Manager 8.1

Please login to Avaya Aura System Manager Web GUI with proper login credentials (Username and password). After that, perform the steps below in the given order.

Recommended access to System Manager is via FQDN.	
So to central login for Single Sign-On	User ID: admin
if IP address access is your only option, then note that authentication will fail n the following cases:	Password:
First time login with "admin" account     Expired/Reset passwords	Log On Cancel
Use the "Change Password" hyperlink on this page to change the password manually, and then login.	Change Password
Also note that single sign-on between servers in the same security domain is	
not supported when accessing via IP address.	<b>O</b> Supported Browsers: Internet Explorer 11.x or Firefox 65.0, 66.0 and 67.0.
This system is restricted solely to authorized users for legitimate business purposes only. The actual or attempted unauthorized access, use, or modification of this system is strictly prohibited.	
Unauthorized users are subject to company disciplinary procedures and or criminal and civil penalties under state, federal, or other applicable domestic	

### 4.1. Adding SIP Domain

Click on Routing under the Elements section On the Routing tab, select Domains and Click New

- Set domain name as aura.com (Example in this config)
- Set Type as SIP
- click "Commit" to save the configuration

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Home	Session Manager	Routing								
Routing	^ ^	Domain	Manage	ment			Commit Cancel			Help
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Conc	ditions	Name				Туре	Notes			
Adap	otations ~	* aura.com				sip				
SIP E	ntities									
Entit	y Links						Commit Cancel			
Time	Ranges									
Rout	ing Policies									
Dial	Patterns 🗸									
Regu	ılar Expressions									

### 4.2. Adding Location

Click on Routing under the Elements section On the Routing tab, select Locations and Click New

- Set Name as Phonerlite
- Leave all other fields as default values and click "Commit" to save the configuration.

Avra® System	m Manager 8.1	Users 🗸 🥕 Elements 🗸 💠 Services 🗸 🕴 Widge	ts 🗸 Shortcuts 🗸		Search	🔳   admi
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Locati	ions	* Name:	Phonerlite			
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Adapt	tations 🗸	Dial Plan Transparency in Survivable Mode				
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Time	Ranges					
Routi	ng Policies	Overall Managed Bandwidth				
Dial P		Managed Bandwidth Units: Total Bandwidth:	Kbit/sec \vee			
Regul	ar Expressions	Multimedia Bandwidth:				
		Audio Calls Can Take Multimedia Bandwidth:				

### 4.3. Adding the Oracle SBC as a SIP Entity and Configuring an Entity Link

Click on Routing under the Elements section On the Routing tab, select SIP Entities from the menu on the left side of the screen. Click New to add the SBC as a SIP entity as shown below.

- Set Name: SBC4600Twilio (example in this configuration)
- Set FQDN or IP Address: This is the "inside" IP address of Oracle E-SBC, 10.232.50.78 in this example.
- Set Type: Other
- Set Location: Select Phonerlite from drop down (example in this configuration)
- Set Time Zone: America/New\_York (example in this configuration)
- Under Entity Links, Click Add
- Set SIP Entity 1: Select acme-sm which we will add below after this config
- Set SIP Entity 2: leave the default value SBC4600Twilio
- Set Protocol: UDP/TCP/TLS based on our testing
- Set Ports: Set both Ports to 5060/5061 for testing
- Set Connection Policy: trusted

Leave all other fields as default values and click "Commit" to save the configuration.

AVAYA Aura® System Manager 8.1	Users 🗸 🎤 Elements 🗸 🌣 Services 🗸 ╞ Widge	ets v Shortcuts v	Search 💄 🗮
Home Routing			
Routing ^	SIP Entity Details	Commit Cancel	
Domains	General		
Locations	* Name:	SBC4600Twilio	
	* FQDN or IP Address:	10.232.50.78	
Conditions	Туре:	Other 🗸	
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SIP Entities	Adaptation:	v	
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Routing Policies	Minimum TLS Version:	Use Global Setting 🗸	
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SIP Entities	acme-sm_SBC4600T	Racme-sm	UDP Y	* 5060	SBC4600Twilio	* 5060	trusted	×				
Entity Links	acme-sm_SBC4600T	Racme-sm	TLS Y	* 5061	SBC4600Twilio	* 5061	trusted	×				
Lindy Links	Select : All, None											
Time Ranges	SIP Responses to an O	PTIONS Request										
Routing Policies	Add Remove											
	0 Items 🥲							Filter: Enable				
Dial Patterns × Regular Expressions	Response Code & Reason	Mark Entity Up/Down	Notes									
<					Commit Can	cel						

Please configure Avaya Session Manager as another SIP entity in the same way as we added SBC:

- Set Name: acme-sm (example in this configuration)
- Set FQDN or IP Address: This is the SIP IP address of Avaya SM, 10.50.232.127 in this example.
- Set Type: Session Manager
- Leave all other fields as default values and click "Commit" to save the configuration.

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Home Routing		
Routing ^	SIP Entity Details	Commit Cancel
Domains	General	
Locations	* Name:	acme-sm
	* IP Address:	10.232.50.127
Conditions	SIP FQDN:	
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SIP Entities	Notes:	
	Location:	Phonerlite v
Entity Links	Outbound Proxy:	Y
Time Ranges	Time Zone:	America/New_York <
Routing Policies	Minimum TLS Version:	Use Global Setting V
-	Credential name:	
Dial Patterns 🛛 🗸	Monitoring	
Regular Expressions	-	Use Session Manager Configuration V
<	CRLF Keep Alive Monitoring:	Use Session Manager Configuration \vee

### 4.4. Allowing Unsecured PPM Traffic (only if TLS is not used) and PPM Rate Limiting

Navigate to: Elements->Session Manager->Global Settings

#### Set Allow Unsecured PPM Traffic: checked.

Note that this is only required if you're using HTTP for the PPM downloads. If you're using HTTPS as shown in the E-SBC configuration, leave this unchecked.

Aura® Syst	em Manage	er 8.1	<u></u>	lsers 🗸 🎤 Elements 🗸 🌣 Services 🗸	Widgets	<ul> <li>Shortcuts</li> </ul>	v	Search		Ξ	admi
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	Manager	^	^	Global Settings			Commit Cancel View Defaults				Help ?
Das	hboard		L	Administer settings that apply to all Session Managers	Auto	~	Enable IPv6				
Ses	sion Manag	er Ad	L	Failback Policy	Auto		Allow Unsecured PPM Traffic				
Glol	bal Settings		I	Allow Unauthenticated Emergency Calls ELIN SIP Entity	None	~	Minimum SIP Entity TLS Version	1.2	~		
Con	nmunicatior	n Prof		Ignore SDP for Call Admission Control			Minimum Endpoint TLS Version	1.2	~		
			L	Disable Call Admission Control Threshold Ala	arms		TLS Endpoint Certificate Validation	Non	e	1	
Net	work Config		L	Disable Loop Detection Alarms			Enable End to End Secure Call Indication				
Dev			L	*Loop Detection Alarms Threshold (hours)	24		Enable Military Support				
A.55	olication Cor	.e v	L	Enable Dial Plan Ranges			Enable Application Sequence for Emerge	ncy Calls 🗌			
Ahh			L	Enable Regular Expression Adaptations			Emergency Call Resource-Priority Heade	rs			
Syst	tem Status		L	Enable Flexible Routing			Enable Implicit Users Applications for SI	P users			
Syst				Better Matching Dial Pattern or Range in Location ALL Overrides Match in Originator's Location	5		Enable SIP Resiliency				
Perf			v	Enable Load Balancer							

Navigate to: Elements->Session Manager->Global Settings Session Manager Administration. Select the proper Session Manager instance and click Edit

- Scroll down to PPM Connection Settings
- Set Limited PPM Client Connection: unchecked
- Set PPM Packet Rate Limiting: unchecked
- Leave all other fields as default and Click Commit to save Session Manager Administration page.

Aura® Syste	em Manager :		🔒 Users 🕚	v 🎤 Elei	ments 🗸 🔅 S	Services ~   1	Widgets ~ S	nortcuts v		Search	🖡 🗮   admi
Home	Routing	Se	ession Mar	nager							
Session N		^	^ Se:	ssion M	lanager A	dministrati	on				Help
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Globa	al Settings			-	PM Client Connection	_						
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Netwo	ork Configur 🗡				Packet Rate Limiting e Limiting Threshold							
Device			Event S	erver 👻								
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System	m Status 🛛 🗸		Syslog S	Servers 💩								
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Perfor				En	able Syslog Server 2							
	<	*	Required					Commit	Cancel			

### 4.5. Adding Routing Policies

Navigate to: Routing tab, select Routing Policies and Click New

- Set Name: SMSBCroute (example in this configuration)
- Set Retries : Default value is 0, can be used as same value
- Select SIP Entity as Destination: Select SBC4600Twilio which was previously configured.
- Click Commit to save the configuration

Aura® System Manager 8.1	Users 🗸 🎤 Elements 🗸 🌣 Services 🗸	Widgets v Shortcuts v	Search	n 📕 📮   admi
Home Routing				
Routing ^	Routing Policy Details		Commit Cancel	Help ?
Domains	General			
Locations	* N	Name: SMSBCroute	]	
Conditions		abled:		
Adaptations Y		lotes:	]	
SIP Entities	SIP Entity as Destination			
Entity Links	Select			
Time Ranges	Name	FQDN or IP Address	Туре	Notes
Time Ranges —	SBC4600Twilio	10.232.50.78	Other	
Routing Policies	Time of Day			
Dial Patterns	Add Remove View Gaps/Overlaps			
	1 Item 🛛 🤯			Filter: Enable
Dial Patterns	□ Ranking ▲ Name Mon Tue	Wed Thu Fri Sat S	Sun Start Time End Time	Notes
<	0 24/7 🗸		00:00 23:59	Time Range 24/7
	Select : All. None			

#### 4.6. Adding Dial Patterns:

Navigate to: Routing tab, select Dial Patterns, again Dial Patterns and Click New

- Set Pattern: 1xxxxxxxx (example in this configuration)
- Set Min : 11 (example in this configuration)
- Set Max: 11 (example in this configuration)
- Select SIP Domain: aura.com which was previously configured.
- Click Commit to save the configuration.

The user can create other dial patterns as per their requirement using the config given above

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Home Routing							
Locations							Help ?
Conditions	Dial Pattern Details			Com	mit Cancel		
Adaptations 🗸 🖌	General						
Addptations		* Pattern: 1x	XXXXXXXXX				
SIP Entities		* Min: 11					
Entity Links		* Max: 11					
Time Ranges	E	mergency Call:					
Time Nanges		SIP Domain: au	ıra.com ≚				
Routing Policies		Notes:					
Dial Patterns 🔨	Originating Locations and Rou	ting Policies					
Dial Patterns	Add Remove						
Dial Patterns	1 Item						Filter: Enable
Origination Dial	Originating Location Name A Orig	inating Location es	Routing Policy Name	Rank	Routing Policy Disabled	Routing Policy Destination	Routing Policy Notes
Regular Expressions	Phonerlite		SMSBCroute	0		SBC4600	
v	Select : All, None						

11111112

2///0

After configuring the dial patterns, Please add the dial patterns to the routing policies created above.

AVAYA &	Users 🗸 🍾 Elements 🗸 🔅	Services v	Widgets v Shor	tcuts ~			Search	💄 🗮   adm
Home Routing								
Locations A	Auu Keniove View Gaps/O	venaps						
	1 Item 🛛 ಿ							Filter: Enable
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Adaptations 🗸 🖌	0 24/7					00:00	23:59	Time Range 24/7
r dup curron b	Select : All, None							
SIP Entities	Dial Patterns							
Entity Links	Add Remove							
Time Ranges	2 Items  😍							Filter: Enable
	Pattern 🔺	Min Max	Emergency Call		SIP Domain	Origina	ting Location	Notes
Routing Policies		11 11			aura.com	Phoner	lite	
	91xxxxxxxxxxxxxxx	12 12			aura.com	Phoner	lite	
Dial Patterns ^	Select : All, None							
Dial Patterns	Regular Expressions							
Origination Dial	Add Remove							
	0 Items 🛛 ಿ							Filter: Enable
Regular Expressions	Pattern	Rank	Order			Deny	N	otes
<					Com	mit Cancel		

### 4.7. Adding Users to Avaya Session Manager.

Navigate to: Users tab, select User Management, select Manage Users and Click New

Under Identity Tab, please enter the following

- Set Last Name: User4(example in this configuration)
- Set First Name: Avaya (example in this configuration)
- Set Login Name: 18507904044@aura.com (example in this configuration)

Under Communication Profile tab, click Communication Profile Password

- Set Comm-Profile Password: any password (Numbers or alphabets or alphanumeric)
- Re-enter Comm-Profile Password: Type the password again for confirmation.

#### Navigate to Communication address tab, click New

- Set Type: Avaya SIP
- Set Fully Qualified Address: Type the Directory number @domain.com

18507904044@aura.com

Under Profile tab, enable Session Manager Profile and click it to open it.

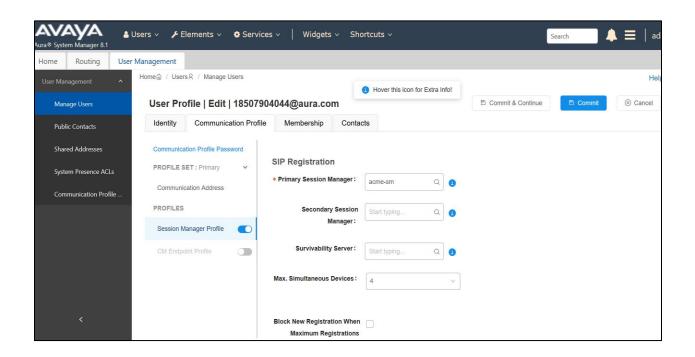
- Set Primary Session Manager under SIP Registration: acme-sm (example in this configuration)
- Set Home Location Manager under Call Routing: Phonerlite (example in this configuration)
- Click Commit to save the configuration.

Aura® System Manager 8.1	Users 🗸 🎤 Elements 🗸 🌣 Se	ervices ~   Widgets ~ Sł	nortcuts v	Sear	ad <mark>⊨ =</mark>   ad
Home Routing User	Management				
User Management ^	Home⊜ / Users 8 / Manage Users				Hel
Manage Users	User Profile   Edit   185	07904044@aura.com		🗈 Commit & Continue	Commit S Cancel
Public Contacts	Identity Communication F	Profile Membership Cont	acts		
Shared Addresses	Basic Info	User Provisioning Rule :	~ ·		
System Presence ACLs	Address	-			
Communication Profile	LocalizedName	* Last Name :	User4	Last Name (Latin Translation) :	User4
		* First Name :	Avaya	First Name (Latin Translation) :	Avaya
		* Login Name :	18507904044@aura.com	Middle Name :	Middle Name Of User
		Description :	Description Of User	Email Address :	Email Address Of User
<		Password :		User Type :	Basic v

0				
AVAYA Aura® System Manager 8.1	Users 🗸 🌶 Elements 🗸 🌣 Services	<ul> <li>Widgets </li> <li>Shortcuts </li> </ul>		Search
Home Routing User	r Management			
User Management ^	Home  ( Users  / Manage Users			Help
Manage Users	User Profile   Edit   18507904	044@aura.com	🗈 Commit & Continue	e 🖻 Commit 🛞 Cancel
Public Contacts	Identity Communication Profile	Comm-Profile Password	×	
Shared Addresses	Communication Profile Password	Comm-Profile Password :		
System Presence ACLs	PROFILE SET : Primary V		•••••	Domain 🛊 🛛
Communication Profile	Communication Address			aura.com
	PROFILES	Re-enter Comm-Profile Password :	••••••	
	Session Manager Profile		Generate Comm-Profile Password	1 10 / page v Goto
	CM Endpoint Profile		Cancel	
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Home Routing User	Management			
User Management ^	Home / Users / Manage Users			Help
Manage Users	User Profile   Edit   18507904	044@aura.com	D Commit & Continue	Commit S Cancel
Public Contacts	Identity Communication Profile	Membership Contacts		
Shared Addresses	Communication Profile Password	Communication Address Add/Edit	×	Options ∨
System Presence ACLs	PROFILE SET : Primary V	* Type: Avaya SIP	v	Domain 🛊 🕅
Communication Profile	Communication Address	*Fully Qualified Address: 18507904044	@ aura.com v	aura.com
	PROFILES	1850/304044		
	Session Manager Profile		1	1 10 / page v Goto
	CM Endpoint Profile		Cancel	
<				



Aura® System Manager 8.1	Users 🗸 🎤 Elements	✓ ♦ Services ✓   Widgets ✓ Sho	ortcuts v	Search	▲ ≡
Home Routing Use	er Management				
User Management 🔷 🔨		Emergency Calling Origination Sequence :	Select ~		
Manage Users Public Contacts		Emergency Calling Termination Sequence :	Select v		
Shared Addresses System Presence ACLs Communication Profile		Call Routing Settings  + Home Location:	Phonerlite v		
		Conference Factory Set:	Select v		
		Call History Settings Enable Centralized Call History? :			
<					

You can repeat the above steps to add more users to the Session Manager.

### Below are the configuration which are specific to Avaya Remote Worker configuration.

#### 4.8. Adding the Oracle SBC as a SIP Entity and Entity Link for Remote Worker

Click on Routing under the Elements section

On the Routing tab, select SIP Entities from the menu on the left side of the screen. Click New to add the SBC as a SIP entity as shown below.

- Set Name: SBC4600 (example in this configuration)
- Set FQDN or IP Address: This is the "inside" IP address of Oracle E-SBC, 10.50.232.77 in this example.
- Set Type: Other
- Set Location: Select Phonerlite from drop down (example in this configuration)
- Set Time Zone: America/New\_York (example in this configuration)
- Under Entity Links, Click Add
- Set SIP Entity 1: Select acme-sm which was previously configured
- Set SIP Entity 2: leave the default value SBC4600
- Set Protocol: UDP/TCP/TLS based on our testing
- Set Ports: Set both Ports to 5060/5061 for testing
- Set Connection Policy: trusted

Leave all other fields as default values and click "Commit" to save the configuration.

	m Manager 8.1		Users 🗸 🎤 I	Elements v	Services v	Widge	ets v Shortcuts v		Search	🔰 📮 ╞ adi
Home	Routing	Use	r Management							
Routing		^ Î	SIP Enti	ty Detail	s			Commit Cancel		Help
Doma	ains		General							
Locat	tions					* Name:	SBC4600	]		
<u> </u>					* FQDN or I		10.232.50.77	]		
Cond	litions					Type:	Other 🗸	1		
Adap	tations	×				Notes:				
SIP Er	ntities				A	daptation:	×			
Entity	/ Links						Phonerlite ~			
2								×		
Time	Ranges			* S	IP Timer B/F (in	-				
Routi	ng Policies						Use Global Setting V			
Dial	Patterns					tial name:				
					Call Detail F	Securable:				
Regu	lar Expressions			Com	mProfile Type P	-	None V			
	<				improvine Type P	rererence.				

							-			
a L Aura⊗ System Manager 8.1	Users 🗸 🎤 Elements 🗸	Services ~   Widge	ts ∨ Sho	rtcuts ~			Search	A =   adm		
Home Routing User	r Management									
Routing ^	Primary Session Manag	er Bandwidth Association:	~							
Domains	Backup Session Manag	er Bandwidth Association:	~							
Locations	Entity Links Override Port & Transport with DNS SRV:									
Conditions	Add Remove									
Adaptations 🗸 🗸	2 Items 👌							Filter: Enable		
	Name 🔺	SIP Entity 1	Protocol	Port	SIP Entity 2	Port		licy Deny New Service		
SIP Entities	* acme-sm_SBC4600	Racme-sm	UDP ~	* 5060	SBC4600	* 5060				
Entity Links	Select : All, None	Kacme-sm	TLS Y	* 5061	SBC4600	* 5061	trusted			
Time Ranges	SIP Responses to an	OPTIONS Request								
Routing Policies	Add Remove									
Notaling Folicies	0 Items 🛛 💝							Filter: Enable		
Dial Patterns 🗸	Response Code & Reas	on Phrase					Mark Entity N Up/Down	otes		
Regular Expressions										
					Commit Cancel					

We can use the configured Avaya Session Manager as another SIP entity for remote worker too.

### 4.9. Enabling Remote Office

Navigate to: Elements->Session Manager->Network Configuration->Remote Access, Click New

- Set Name: Remote\_worker for this setup.
- Click New under SIP Proxy Mapping Table. Add the Oracle SBC outside interface IP address for SIP Proxy Public Address.
- Click New under SIP Proxy Private IP Address. Add the Oracle SBC inside interface IP address for SIP Private Address.
- Click Commit to save the configuration.

avaya 🔒 l ra ® System Manager 8.1	isers ∨ <b>⊁</b> Elements ∨ <b>¢</b> Services ∨          W	lidgets v Shortcuts v	Search	▲ ≡
Home Routing Sessi	on Manager			
Session Manager	Romoto Access Configuration		Commit Cancel	H
Dashboard	Remote Access Configuration		commit Cancer	
Session Manager Ad				
Global Settings	*Name: Remote_worker			
Communication Prof	note.			
Network Configur ^	Click to open Remote Access Reference Map 🖲			
Failover Groups	SIP Proxy Mapping			
Local Host Nam	SIP Proxy Mapping Table			
	O New O Delete			
Remote Access	SIP Proxy Public Address (Reference A)	Session Manager (Reference C)	IP Address Family (Reference C)	
SIP Firewall		acme-sm 🖂	IPv4 🖂	
Device and Locati 👻 🗸	Select : All, None			
<				

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AVAYA & U Aura® System Manager 8.1	sers 🗸 🖌 Elements 🗸 💠 Services 🗸   Widge	ets 🗸 Shortcuts 🗸			Search	▲ ≡	ad
Home Routing Sessio	on Manager						
Session Manager	SIP Proxy Mapping Table						
Dashboard	O New ODelete						-
Session Manager Ad	SIP Proxy Public Address (Reference A)	Session Manager (Referen	ice C) IP Add	dress Family	(Reference C)		
Global Settings	Select : All, None	acme-sm 🔽	IPv4	~			
Communication Prof							
Network Configur ^	SIP Proxy Private IP Addresses						
Failover Groups	O New ODelete						_
Local Host Nam	SIP Private Address (Reference B)	:	SBC Type	Securable	Note		
Remote Access	10.232.50.77  Select : All, None		Avaya SBC 🔽				
SIP Firewall							
Device and Locati 🗡 🗸							_
<	*Required		Commit Cancel				

With this, Avaya Session Manager Configuration is complete.

# 5. Configuring the SBC

This chapter provides step-by-step guidance on how to configure Oracle SBC for Avaya Session Manager and Twilio Elastic SIP Trunking. In this SBC config, Twilio Elastic SIP trunk side is secure (TLS/SRTP) and Avaya Core Side is unsecure (UDP or TCP/RTP). If the Oracle SBC being deployed is new, with no existing configuration, the simplest way to configure it to interface with Avaya Session Manager is by utilizing the <u>Configuration Assistant</u> feature.

### 5.1. Validated Oracle SBC version

Oracle conducted tests with Oracle SBC 8.4 / SBC 9.0 software – this software with the configuration listed below can run on any of the following products:

- AP 1100
- AP 3900
- AP 4600
- AP 6300
- AP 6350
- AP 3950 (Starting from SBC 9.0 version)
- AP 4900 (Starting from SBC 9.0 version)
- VME

## 6. New SBC configuration

If the customer is looking to setup a new SBC from scratch, please follow the section below.

### 6.1. Establishing a serial connection to the SBC

Connect one end of a straight-through Ethernet cable to the front console port (which is active by default) on the SBC and the other end to console adapter that ships with the SBC, connect the console adapter (a DB-9 adapter) to the DB-9 port on a workstation, running a terminal emulator application such as Putty. Start the terminal emulation application using the following settings:

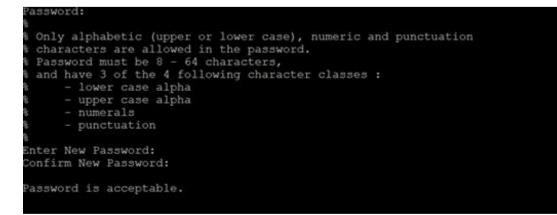
- Baud Rate=115200
- Data Bits=8
- Parity=None
- Stop Bits=1
- Flow Control=None

Power on the SBC and confirm that you see the following output from the boot-up sequence

Starting tLemd
Starting tServiceHealth
Starting tCollect
Starting tAtcpd
Starting tAsctpd
Starting tMbcd
starting tCommMonitord
starting tFped
Starting tAlgd
Starting tRadd
Starting tEbmd
Starting tSipd
Starting tH323d
Starting tbfdd
Starting tIPTd
Starting tSecured
Starting tAuthd
Starting tCertd
Starting tIked
Starting tTscfd
Starting tFcgid
Starting tauditd
Starting tauditpusher
Starting tSnmpd
Starting tIFMIBd
Start platform alarm
Starting display manager
Initializing /opt/ Cleaner
Starting tLogCleaner task
Bringing up shell
Starting acliMgr
password secure mode is enabled
Admin Security is disabled
Password:

Enter the default password to log in to the SBC. Note that the default SBC password is "acme" and the default super user password is "packet".

Both passwords have to be changed according to the rules shown below.



Now set the management IP of the SBC by setting the IP address in bootparam.

To access bootparam. Go to Configure terminal->bootparam.

```
NN4600-139# conf t
NN4600-139(configure)# bootparam
'.' = clear field; '-' = go to previous field; q = quit
Boot File
                       : /boot/nnSCZ840p3B.bz
                       : 10.138.194.139
IP Address
VLAN
Netmask
Gateway
                       : 10.138.194.129
IPv6 Address
IPv6 Gateway
Host IP
FTP username
                       : vxftp
                     : vxftp
FTP password
Flags
Target Name
Console Baudrate
Other
NOTE: These changed parameters will not go into effect until reboot.
Also, be aware that some boot parameters may also be changed through
PHY and Network Interface Configurations.
       ERROR : space in /boot
                                     (Percent Free: 40)
NN4600-139(configure)#
```

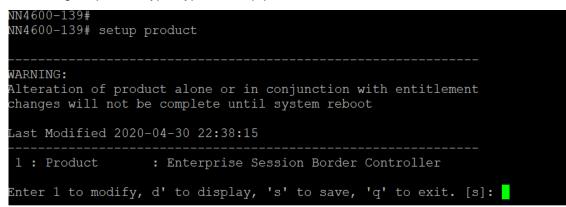
#### SBC 9.0 bootparam screen

```
NN4600-139# conf t
NN4600-139(configure)# bootparam
Boot File
                         : /boot/nnSCZ900p2.bz
                         : 10.138.194.139
IP Address
Netmask
                         : 10.138.194.129
IPv6 Address
IPv6 Gateway
Host IP
FTP username
                           *******
FTP password
Flags
Target Name
                         : NN4600-139
Console Device
Console Baudrate
Other
NOTE: These changed parameters will not go into effect until reboot.
Also, be aware that some boot parameters may also be changed through
PHY and Network Interface Configurations.
        ERROR : space in /boot
                                        (Percent Free: 5)
NN4600-139(configure)#
NN4600-139(configure)#
```

Note: There is no management IP configured by default.

Setup product type to Enterprise Session Border Controller as shown below.

To configure product type, type in setup product in the terminal



Enable the features for the ESBC using the setup entitlements command as shown

Save the changes and reboot the SBC.

Entitlements for Enterprise Session Borde Last Modified: Never	r Controller
<ol> <li>Session Capacity</li> <li>Advanced</li> <li>Admin Security</li> <li>Data Integrity (FIPS 140-2)</li> <li>Transcode Codec AMR Capacity</li> <li>Transcode Codec EVRC Capacity</li> <li>Transcode Codec EVRC B Capacity</li> <li>Transcode Codec EVRC Capacity</li> <li>Transcode Codec EVS Capacity</li> <li>Transcode Codec OPUS Capacity</li> <li>Transcode Codec SILK Capacity</li> </ol>	: 0 : : : : : : : : : : : : : : : : : :
Enter 1 - 11 to modify, d' to display, 's	' to save, 'q' to exit. [s]: 1
Session Capacity (0-128000)	: 500
Enter 1 - 11 to modify, d' to display, 's	' to save, 'q' to exit. [s]: 3
**************************************	enhanced security reverted without ult state.
Enter 1 - 11 to modify, d' to display, 's	' to save, 'q' to exit. [s]: 5
Transcode Codec AMR Capacity (0-102375)	: 50
Enter 1 - 11 to modify, d' to display, 's	' to save, 'q' to exit. [s]: 2
Advanced (enabled/disabled)	: enabled
Enter 1 - 11 to modify, d' to display, 's	' to save, 'q' to exit. [s]: 10
Transcode Codec OPUS Capacity (0-102375	) : 50
Enter 1 - 11 to modify, d' to display, 's	' to save, 'q' to exit. [s]: 11
Transcode Codec SILK Capacity (0-102375	) : 50

The SBC comes up after reboot and is now ready for configuration.

Go to configure terminal->system->http-server-config.

Enable the http-server-config to access the SBC using Web GUI. Save and activate the config.

NN4600-139(http-server)# NN4600-139(http-server)# show	
http-server	
name	webServerInstance
state	enabled
realm	
ip-address	
http-state	enabled
http-port	80
https-state	disabled
https-port	443
http-interface-list	REST,GUI
http-file-upload-size	0
tls-profile	
auth-profile	
last-modified-by	Ø
last-modified-date	2021-01-25 00:16:28
NN4600-139(http-server)#	

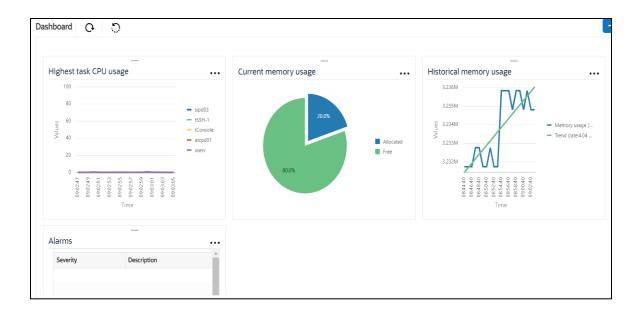
### 6.2. Configure SBC using Web GUI

In this app note, we configure SBC using the WebGUI.

The Web GUI can be accessed through the url <u>http://<SBC\_MGMT\_IP</u>>.

	0		
		Sign in to E-SBC	
ORACLE		Enter your details below Username	
Enterprise Session Border Controller		 Password	Required
		SCAIN	Required

The username and password is the same as that of CLI.



Go to Configuration as shown below, to configure the SBC

			Dashboard	Configuration	Monitor and Trace	Widgets	System
Wizards 👻	🔅 Commands 🔻				Save Verify	Discard	Sear
media-manager	•	Configuration Objects					
security	Þ.	Name	Description				
session-router	Þ						
system	•	access-control	Configure a static or dynamic access control list				Î
		account-config	Configure Quality of Service accounting				- 1
		authentication-profile	Configure authentication profile				
		certificate-record	Create, generate, and import a certificate				
		class-policy	Configure classification profile policies				
		codec-policy	Create and apply a codec policy to a realm and an agent				
		filter-config	Create a custom filter for SIP monitor and trace				
		fraud-protection	Configure fraud protection				
		host-route	Insert entries into the routing table				
		http-client	Configure an HTTP client				
		http-server	Configure an HTTP server				*

Kindly refer to the GUI User Guide given below for more information.

https://docs.oracle.com/en/industries/communications/enterprise-session-bordercontroller/9.0.0/webgui/web-gui-guide.pdf

The expert mode is used for configuration.

**Tip:** To make this configuration simpler, one can directly search the element to be configured, from the Objects tab available.

### 6.3. Configure system-config

Go to system->system-config

	Session Border Controller					admi
			Dashboard	Configuration	Monitor and Trace	Widgets Sy
🐼 Wizards 🔻					Save Verify	Discard
http-client	Modify System Config					Show Configura
http-server network-interface ntp-config phy-interface redundancy-config	Hostname Description	OracleSBC				
snmp-community	Location					
spl-config	Mib System Contact					
system-config	Mib System Name					
tdm-config trap-receiver	Mib System Location Acp TLS Profile OK	Delete				

Please enter the default gateway value in the system config page.

ORACI	_E Enterprise	Session Border Controller						adn
					Dashboard	Configuration	Monitor and Trace	Widgets S
🐼 Wizards 🔻	🚯 Commands 👻						Save Verify	Discard
http-client	^	Modify System Confi	3					Show Configu
http-server		Displaying 0 - 0 of 0 Options						
network-interfa	ce	Call Trace						
ntp-config								
phy-interface			10.138.194.129					
redundancy-co	nfig	Restart	🖌 enable					
snmp-commur	ity		0	( Range: 065535 )				
spl-config			0	( Range: 065535 )				
			5	( Range: 020 )				
		Alarm Threshold						
tdm-config		Add						
Wizards Commands Com								
Show All								

For VME, transcoding cores are required. Please refer the documentation here for more information

https://docs.oracle.com/en/industries/communications/enterprise-session-bordercontroller/9.0.0/releasenotes/esbc-release-notes.pdf

The above step is needed only if any transcoding is used in the configuration. If there is no transcoding involved, then the above step is not needed.

### 6.4. Configure Physical Interface values

To configure physical Interface values, go to System->phy-interface.

Please configure M00 for Twilio side and M10 for Avaya side.

Parameter Name	Twilio Elastic Sip Trunk side (M00)	Avaya side (M10)
Slot	0	0
Port	0	1
Operation Mode	Media	Media

Please configure M00 interface as below.

	Session Border Controller					
				Dashboard	Configuration	Monitor and Trace
🚯 Wizards 🔻 🚯 Commands 👻						Save Verify
host-route	Add Phy Interface					
http-client						
http-server	Name	M00				
network-interface	Operation Type	Media 💌				
	Port	0	(Range: 05)			
ntp-config	Slot	0	(Range: 02)			
phy-interface	Virtual Mac					
redundancy-config	Admin State	✓ enable				
snmp-community	Auto Negotiation	🖌 enable				
spl-config	Duplex Mode	FULL				
system-config	Speed	100 💌				
trap-receiver	ОК	Back				

Please configure M10 interface as below

		i prise o				Dashboard	Configuration	Monitor	and Trace
🔅 Wizards 🔻	Comma	ands 💌						Save	Verify
session-router	►	^	Add Phy Interface						
system	•								
fraud-protection			Name	M10					
host-route			Operation Type	Media 💌					
			Port	0	(Range: 05)				
http-client			Slot	1	(Range: 02)				
http-server			Virtual Mac						
network-interface			Admin State	✓ enable					
ntp-config			Auto Negotiation	✓ enable					
phy-interface			Duplex Mode	FULL					
redundancy-config			Speed	100 💌					
snmp-community		~	ОК В	ack					
Show All									

2///0

### 6.5. Configure Network Interface values

To configure network-interface, go to system->Network-Interface. Configure interface

The table below lists the parameters, to be configured for both the interfaces.

Parameter Name	Twilio side Network interface	Avaya side Network interface
Name	M00	M10
Host Name		
IP address		10.232.50.78
Netmask	255.255.255.192	255.255.255.0
Gateway		10.232.50.1

Please configure network interface M00 as below

					Dashboard	Configuration	Monitor and Trace	Widgets
Wizards 👻 🧔 Commands	5 🐨						Save Verify	Discard
host-route	Add Network Inter	face						
http-client	Name	M00	×					
network-interface	Sub Port Id Description	0		(Range: 04095)				
ntp-config phy-interface								
redundancy-config	Hostname							
snmp-community	IP Address		1					
spl-config	Pri Utility Addr		1					
system-config	Sec Utility Addr							
trap-receiver		OK Back						

11/1/1/10

Similarly, configure network interface M10 as below

UITALLE Enterprise S	ession Border Controller						Ϋ́ Υ
				Dashboard	Configuration	Monitor and Trace	Widgets
🔅 Wizards 🔻						Save Verify	Discard
host-route	Add Network Interface						
http-client	Name	M10	•				
http-server	Sub Port Id	0	(Range: 04095)				
network-interface	Description						
ntp-config							
phy-interface							
redundancy-config	Hostname						
snmp-community	IP Address	10.232.50.78					
spl-config	Pri Utility Addr	10.232.50.78					
system-config	Sec Utility Addr	10.252.50.70					
trap-receiver		ack					
Show All							

### 6.6. Enable media manager

Media-manager handles the media stack required for SIP sessions on the SBC. Enable the media manager option as below.

In addition to the above config, please set the max and min untrusted signaling values to 1. Go to Media-Manager->Media-Manager

ORACI	_E Enterprise	Session Border Controller					ć
				Dashboard	Configuration	Monitor and Trace	Widgets
🚯 Wizards 🔻	Commands 🔻					Save Verify	Discard
media-manager codec-policy	*	Modify Media Manager					
media-manage	r	State	✓ enable				
media-policy		Flow Time Limit	86400	(Range: 04294967295)			
realm-config		Initial Guard Timer	300	(Range: 04294967295)			
steering-pool		Subsq Guard Timer	300	(Range: 04294967295)			
Steering-poor		TCP Flow Time Limit	86400	(Range: 04294967295)			
security	•	TCP Initial Guard Timer	300	(Range: 04294967295)			
session-router	•	TCP Subsq Guard Timer	300	(Range: 04294967295)			
system	•	Hnt Rtcp	enable				
		Algd Log Level	NOTICE				
		Mbcd Log Level	NOTICE				
Show All		ОК	Delete				

ORACL	Enterprise	Session Border Controller				ас
				Dashboard Configura	tion Monitor and Trace	Widgets
🚯 Wizards 🔻	🚯 Commands 🔻				Save Verify	Discard
media-manager	•	Modify Media Manager				
codec-policy			1000	[minBerowiczitorezo]		
media-manager		Media Policing	✓ enable			
media-policy		Max Arp Rate	10	(Range: 0100)		
		Max Signaling Packets	0	(Range: 04294967295)		
realm-config		Max Untrusted Signaling	1	(Range: 0.100)		
steering-pool	- 11	Min Untrusted Signaling	1	(Range: 0100)		
security	•	Tolerance Window	30	(Range: 04294967295)		
session-router	•	Untrusted Drop Threshold	0	(Range: 0100)		
system		Trusted Drop Threshold	0	(Range: 0100)		
	v	Acl Monitor Window	30	( Range: 53600 )		
fraud-protection	n	Trap On Demote To Deny	enable			
host-route						
Show All	~	ОК	Delete			

### 6.7. Configure Realms

Navigate to realm-config under media-manager and configure a realm as shown below The name of the Realm can be any relevant name according to the user convenience.

Use the following table as a configuration example for the two realms used in this configuration:

Config Parameter	Twilio Side	Avaya Side
Identifier	TwilioRealm	AvayaRealm
Network Interface	M00	M10
Mm in realm	ß	$\square$
FQDN		
Media Sec policy	sdespolicy	RTP
Access Control Trust Level	High	High
Codec-Policy	Twiliocodec	AvayaCodec

In the below case, Realm name is given as TwilioRealm for Twilio Elastic SIP Trunking Side Please set the Access Control Trust Level as high for this realm

ORACI	_E Enterpri	se Session Border Controller					Û ▲ a
				Dashboard	Configuration	Monitor and Trace	Widgets
🚯 Wizards 🔻	Commands	•				Save Verify	Discard
media-manager		Add Realm Config					
codec-policy media-manage	r	Identifier	TwilioRealm				
media-policy		Description					
realm-config							
steering-pool							
security	►	Addr Prefix	0.0.0.0				
session-router	•	Network Interfaces	M00:0.4 ×				
system	•	Media Realm List					
		Mm In Realm	aldena 📢				
Show All		OK	Back				

ORACI	LE Ent	erprise	Session Border Controller				
					Dashboard	Configuration	Monitor and Trace
						_	
🔅 Wizards 🔻	🔅 Comm	ands 🔻					Save Verify
media-manager	•	^	Add Realm Config				
codec-policy			Out Translationid		•		
media-manage	r		In Manipulationid		•		
media-policy			Out Manipulationid		•		
realm-config			Average Rate Limit	0	(Range: 04294967295)		
steering-pool			Access Control Trust Level	high	v		
security	►		Invalid Signal Threshold	0	(Range: 04294967295)		
session-router	►		Maximum Signal Threshold	0	(Range: 04294967295)		
system	•		Untrusted Signal Threshold	0	(Range: 04294967295)		
fraud-protectio	in		Nat Trust Threshold	0	(Range: 065535)		
host-route		~	May Endnainte Dar Nat	ack			

1 1 1 1 1 1 1 7 2

2///

Similarly, Realm name is given as AvayaRealm for Avaya side. Please set the Access Control Trust Level as high for this realm too.

ORAC	LE Enterprise	Session Border Controller					Û.▲ a
				Dashboard	Configuration	Monitor and Trace	Widgets
🔅 Wizards 🔻	🔅 Commands 🔻					Save Verify	Discard
media-manager	•	Add Realm Config					
codec-policy							
media-manage	er	Identifier	AvayaRealm				
media-policy		Description					
realm-config							
steering-pool							
security	Þ	Addr Prefix	0.0.0.0				
session-router	•	Network Interfaces	M10:0.4 🗙				
system	Þ	Media Realm List					
		Mm In Realm	📝 enable				
Show All	$\bigcirc$	ОК	Back				

ORACI	LE Ente	erprise S	Session Border Controller					
					Dashboard	Configuration	Monitor a	nd Trace
🔅 Wizards 🔻	🏠 Comma	ands 🔻					Save	Verify
media-manager	•	^	Add Realm Config					
codec-policy			Out Translationid		•			
media-manage	er		In Manipulationid		•			
media-policy			Out Manipulationid		·			
realm-config			Average Rate Limit	0	(Range: 04294967295)			
steering-pool			Access Control Trust Level	high				
security	►		Invalid Signal Threshold	0	(Range: 04294967295)			
session-router	►		Maximum Signal Threshold	0	(Range: 04294967295)			
system	•		Untrusted Signal Threshold	0	(Range: 04294967295)			
fraud-protectio	in		Nat Trust Threshold	0	(Range: 065535)			
host-route Show All		~	May Endnointe Dar Mat	ack				

For more information on Access Control Trust Level, please refer to SBC Security guide link given below:

https://docs.oracle.com/en/industries/communications/session-border-controller/9.0.0/security/securityguide.pdf

### 6.8. Configuring a certificate for SBC

This section describes how to configure the SBC for TLS and SRTP communication for Twilio Elastic SIP Trunking.

Twilio Elastic SIP Trunking allows TLS connections from SBC's for SIP traffic, and SRTP for media traffic. It requires a certificate signed by one of the trusted Certificate Authorities. The process includes the following steps:

- 1) Create a certificate-record "Certificate-record" are configuration elements on Oracle SBC which captures information for a TLS certificate such as common-name, key-size, key-usage etc.
- SBC 1 certificate-record assigned to SBC
- Root 1 certificate-record for root cert
- 2) Deploy the SBC and Root certificates on the SBC

### Step 1 – Creating the certificate record

Twilio Elastic SIP Trunking uses certificates from a CA (Certificate Authority) for establishing the TLS connections from SBC's for SIP traffic, and SRTP for media traffic. It is important that you add the following root certificate to establish TLS connection from the link given below:

https://www.twilio.com/docs/sip-trunking#rootCA

				Dashboard	Configuration	Monitor and Trace
🔅 Wizards 🔻	Commands 🔻					Save Verify
media-manager	•	Modify Certificate Record				
security	•					
authentication-profi	le	Name	TwilioRootCACertChain			
certificate-record		Country	US			
tls-global		State	MA			
tls-profile		Locality	Burlington			
session-router	•	Organization	Engineering			
system	•	Unit	Solutions			
		Common Name	Chain CA Cert			
		Key Size	2048 💌			
		Alternate Name				
		ОК В	ack			

					Dashboard	Configuration	Monitor and Trace
🔯 Wizards 💌 🔯 Cor media-manager	mmands 🔻	Modify Certificate Recor	d				Save Verify
security authentication-profile certificate-record tls-global tls-profile session-router system	•	Key Size Alternate Name Trusted Key Usage List Extended Key Usage List Key Algor Digest Algor Ecdsa Key Size	2048 enable digitalSignature × keyEncipherment × rsa sha256 p256	▼ ▼ ▼ ▼			
Show All		ОК	Back				

The table below specifies the parameters required for certificate configuration. Modify the configuration according to the certificates in your environment.

Config Parameter	DigiCert Root CA				
Common Name	DigiCert Global Root CA				
Key Size	2048				
Key-Usage-List	digitalSignature				
	keyEncipherment				
Extended Key Usage List	serverAuth				
Key algor	rsa				
Digest-algor	Sha256				

## Step 2 – Deploy SBC & root certificates

Once certificate record has been created – import the signed certificate to the SBC. Please note – all certificates including root certificates are required to be imported to the SBC. Once done, issue save/activate from the WebGUI

Import certificate	)	×
Format:	try-all	<u> </u>
Import method:	• File  Paste	1 I
Certificate file:		Browse
	h	e
		е
		e 
	Import Cancel	

Repeat these steps to import all the root certificates into the SBC:

At this stage all the required certificates have been imported to the SBC for Twilio Elastic SIP Trunk.

## 6.9. TLS-Profile

A TLS profile configuration on the SBC allows for specific certificates to be assigned. Go to security-> TLS-profile config element and configure the tls-profile as shown below The below is the TLS profile configured for the Twilio Elastic SIP Trunk side:

		e session border controller						
					Dashboard	Configuration	Monitor and Trace	Widgets
🔅 Wizards 💌	Commands	<b>r</b>					Save Verify	Discard
media-manager	Þ	Modify TLS Profile						
security authentication- certificate-reco tls-global tls-profile		Name End Entity Certificate Trusted Ca Certificates Cipher List	TLSProfile Enterprise DigiCertRoot ×	<b>v</b>				
session-router system	Þ	Verify Depth Mutual Authenticate	10 enable	.d ( Range: 010 )				
- John	r	TLS Version Options	tlsv12	•				
Show All		0	K Back					

## 6.10. Configure SIP Interfaces

Navigate to sip-interface under session-router and configure the sip-interface as shown below. Please configure the below settings under the sip-interface.

Please Configure sip-interface for the Twilio Elastic SIP Trunk side as below:

- Tls-profile needs to match the name of the tls-profile previously created
- Set allow-anonymous to agents-only to ensure traffic to this sip-interface only comes from the particular Session agents added to the SBC.

	Session Border Contro	ler					Û •
					Dashboard Configuration	Monitor and Trace	Widgets
🔅 Wizards 🔻						Save Verify	Discard
session-agent	Modify SIP Inter	face					Show Conf
session-recording-group	State		✓ enable				
session-recording-server	Realm ID		TwilioRealm	•			
session-translation	Description						
sip-config							
sip-feature							
sip-interface	SIP Ports						
sip-manipulation	Add						
sip-monitoring	Address	Port	Transport Protocol	TLS Profile	Allow Anonymous	Multi Home Addrs	
sti-server		5061	TLS	TLSProfile	agents-only		
Show All		ОК Ва	ack				

Similarly, Please Configure sip-interface for the Avaya side as below:

ession Border Cont	troller						Q 🔻 a
				Dashboard	Configuration	Monitor and Trace	Widgets
						Save Verify	Discard
Modify SID Int	orfaco						Show Confi
	enace						
State		🖌 enable					
Realm ID		AvayaRealm	T				
Description							
SIP Ports							
bhA							
	Dent	Transment Danta and	TI C Desfile	All			
		-	TLS Profile	-	N	Autu Home Addrs	
10.232.30.78				agents-only			
	ОК	Back					
	Modify SIP Int State Realm ID Description	Realm ID Description SIP Ports Add Address Port	Modify SIP Interface         State <ul> <li>enable</li> <li>AvayaRealm</li> </ul> Description <ul> <li>SIP Ports</li> </ul> State <ul> <li>Add</li> <li>Address</li> <li>Port</li> <li>Transport Protocol</li> <li>ID.232.50.78</li> <li>5060</li> <li>UDP</li> </ul>	Modify SIP Interface         State <ul> <li>enable</li> <li>AvayaRealm</li> <li>Description</li> </ul> SIP Ports         State <ul> <li>Add</li> </ul> Address       Port       Transport Protocol       TLS Profile         10.2322.50.78       5060       UDP	Dashboard         Modify SIP Interface         State         Realm ID       AvayaRealm         Description       Image: Colspan="2">Image: Colspan="2" Image: Colspa="2" Image: Colspan="2" Image: Colspan="2" Image: Colspa="2" Image	Modify SIP Interface       Image: mable         State       Image: mable         Realm ID       AvayaRealm         Description       Image: mable         SIP Ports       SIP Ports         Add       Image: mable         Address       Port       Transport Protocol       TLS Profile       Allow Anonymous       M         10.2322.5078       000       000       agents-only       Image: master state	Configuration       Monitor and Trace         Save       Verify    Modify SIP Interface          State <ul> <li>enable</li> <li>AvayaRealm</li> <li>Description</li> <li>AvayaRealm</li> <li>Image: Configuration</li> <li>SIP Ports</li> <li>State</li> <li>Add</li> <li>Address</li> <li>Port</li> <li>Transport Protocol</li> <li>Tics Profile</li> <li>Allow Anonymous</li> <li>Multi Home Addrs</li> <li>Image: Configuration</li> <l< td=""></l<></ul>

Once sip-interface is configured – the SBC is ready to accept traffic on the allocated IP address.

# 6.11. Configure session-agent

Session-agents are config elements which are trusted agents who can send/receive traffic from the SBC with direct access to trusted data path. Session-agents are config elements which are trusted agents who can send/receive traffic from the SBC with direct access to trusted data path.

Go to session-router->Session-Agent and Configure the session-agents for the Twilio Elastic SIP Trunk

- Host name to "oracle.pstn.twilio.com", port to 5061
- realm-id needs to match the realm created for the Twilio Elastic SIP Trunk
- transport set to "staticTLS"

	Session Border Controller					¢.
			Dashb	oard Configuration	Monitor and Trace	Widgets
🐼 Wizards 🔻					Save Verify	Discard
session-agent	Add Session Agent					
session-group						
session-recording-group	Hostname	oracle.pstn.twilio.com				
session-recording-server	IP Address					
-	Port	5061	(Range: 0,102565535)			
session-translation	State	✓ enable				
sip-config	App Protocol	SIP				
sip-feature	Арр Туре					
sip-interface		•				
sip-manipulation	Transport Method	StaticTLS 🔹				
	Realm ID	TwilioRealm				
sip-monitoring	Egress Realm ID					
sti-server ✓						
Show All	OK	ack				

\*\*NOTE: Connection to Twilio Elastic SIP Trunking is available in multiple geographic edge locations. If you wish to manually connect to a specific geographic edge location that is closest to the location of your communications infrastructure, you may do so by pointing your communications infrastructure to any of the following localized Termination SIP URIs:

- {example}.pstn.ashburn.twilio.com (North America Virginia)
- {example}.pstn.umatilla.twilio.com (North America Oregon)
- {example}.pstn.dublin.twilio.com (Europe Ireland)
- {example}.pstn.frankfurt.twilio.com (Europe Frankfurt)
- {example}.pstn.singapore.twilio.com (Asia Pacific Singapore)
- {example}.pstn.tokyo.twilio.com (Asia Pacific Tokyo)
- {example}.pstn.sao-paulo.twilio.com (South America São Paulo)
- {example}.pstn.sydney.twilio.com (Asia Pacific Sydney)

Click here for more information on Twilio Elastic SIP Trunking IP Address

Similarly, configure the session-agents for the Avaya Side as below:

	Session Border Controller						- <b>-</b> a
				Dashboard	Configuration	Monitor and Trace	Widgets
🚯 Wizards 🔻						Save Verify	Discard
session-agent	Add Session Agent						
session-group							
session-recording-group	Hostname	10.232.50.127					
session-recording-server	IP Address	10.232.50.127					
session recording server	Port	5060	(Range: 0,102565535	1			
session-translation	State		(				
sip-config		enable					
	App Protocol	SIP	*				
sip-reature	Арр Туре		T				
sip-interface	Transport Method						
sip-manipulation	nansporemetalou	UDP+TCP	v				
	Realm ID	AvayaRealm					
sip-monitoring	Egress Realm ID		T				
sti-server							
	ОК	Back					
sip-feature sip-interface sip-manipulation sip-monitoring	App Protocol App Type Transport Method Realm ID	UDP+TCP	•				

## 6.12. Configure local-policy

Local policy config allows for the SBC to route calls from one end of the network to the other based on routing criteria. To configure local-policy, go to Session-Router->local-policy.

	Session Border Controller					<b>₩ v</b> e
			Dashboard	Configuration	Monitor and Trace	Widgets
🔅 Wizards 🔻 🔅 Commands 🔻					Save Verify	Discard
access-control	Modify Local Policy					
account-config	From Address	* ×				
filter-config	To Address					
ldap-config	10 Autress	* ×				
local-policy	Source Realm	AvayaRealm 🗙				
local-routing-config	Description					
media-profile						
session-agent						
session-group	State	🖌 enable				
session-recording-group	Policy Priority	none				
session-recording-server	ОК	Back				

To route the calls from Avaya side to Twilio side, Use the below local -policy

	Session Border Controller								Ĥ.
						Dashbo	ard Configuration	Monitor and	
	_								
Wizards 🔻 🔯 Commands 🔻								Save	/erify Dise
^ access-control	Modify Local Policy	/							
account-config	Description								
filter-config									
ldap-config									
local-policy	State		enable						
local-routing-config	Policy Priority	nor	ie	•					
media-profile	Policy Attributes								
session-agent	Add								
session-group	Next Hop	Realm	Action	Terminate Recursi	ion Cos	st State	App Protocol	Lookup	Next Key
session-recording-group	oracle.pstn.twilio.com	TwilioRealm	none	disabled	0	enabled	SIP	single	
session-recording-server		OK Back							
Show All									

To route the calls from the Twilio Elastic SIP Trunk side to Avaya side, Use the below local -policy

	Session Border Controller					Û.▲ a
			Dashboard	Configuration	Monitor and Trace	Widgets
🔅 Wizards 🔻					Save Verify	Discard
access-control	Modify Local Policy					
account-config filter-config	From Address	* ×				
ldap-config	To Address	* X				
local-policy	Source Realm	TwilioRealm 🗙				
local-routing-config	Description					
media-profile						
session-agent						
session-group	State	✓ enable				
session-recording-group	Policy Priority	none 🔻				
session-recording-server	ОК	Back				

DRACLE Enterprise	Session Border Co	ntroller							
						Dashl	board Configurati	ion Monitor	and Trace W
Wizards 🔻								Save	Verify [
access-control	Modify Local	Policy							
account-config									
filter-config									
ldap-config									
local-policy	State		🗸 enable						
local-routing-config	Policy Priority		none	•					
media-profile	Policy Attributes								
session-agent	Add								
session-group	Next Hop	Realm	Action	Terminate Recursion	Cost	State	App Protocol	Lookup	Next Key
session-recording-group	10.232.50.127	AvayaRealm	none	disabled	0	enabled		single	
session-recording-server									

# 6.13. Configure steering-pool

Steering-pool config allows configuration to assign IP address(es), ports & a realm.

Avaya side steering pool.

ORACI	_E Enterprise	Session Border Controller						Û.▲ a
					Dashboard	Configuration	Monitor and Trace	Widgets
🔅 Wizards 🔻	Commands 🔻						Save Verify	Discard
media-manager	•	Add Steering Pool						
codec-policy media-manage	r	IP Address	10.232.50.78					
media-policy		Start Port	25000	(Range: 165535)				
realm-config		End Port	29999	(Range: 165535)				
steering-pool		Realm ID	AvayaRealm	•				
security	•	Network Interface		•				
session-router	►							
system	►							
		ОКВ	ack					
Show All	$\sum$							

Twilio side steering pool.

ORACI	LE Enterprise	Session Border Controller						Û.▲ a
					Dashboard	Configuration	Monitor and Trace	Widgets
🔅 Wizards 🔻	🔅 Commands 🔻						Save Verify	Discard
media-manager	Ŧ	Add Steering Pool						
codec-policy								
media-manage	r	IP Address						
media-policy		Start Port	10000	( Range: 16	5535)			
realm-config		End Port	19999	( Range: 16	5535)			
steering-pool		Realm ID	TwilioRealm	•				
security	•	Network Interface		-				
session-router	•							
system	•							
		ОК	Back					
Show All		UN	LONG N					

## 6.14. Configure Ping Response

To simplify the ORACLE SBC configuration, from GA Release SCZ830m1p7, there is a new parameter introduced under the **Session agent** configuration element. The parameter name is **Ping response**.

### **Ping Response:**

When this parameter is enabled, the SBC responds with a 200 OK to all Sip Options Pings it receives from trusted agents. This takes the place of the current Sip Manipulation, RepondOptions.

	Session Border Controller						Û ▲ a
			Da	shboard	Configuration	Monitor and Trace	Widgets
🔅 Wizards 🔻						Save Verify	Discard
Idap-config	Modify Session Agent						Show Confi
local-policy	Hostname	oracle.pstn.twilio.com					
local-routing-config	IP Address						
media-profile	Port	5061	(Range: 0,102565535)				
session-agent	State	✓ enable					
session-group	App Protocol	SIP					
session-recording-group	Арр Туре	•					
session-recording-server	Transport Method	StaticTLS 🔹					
session-translation	Realm ID	TwilioRealm					
sip-config	Foress Realm ID						
Show All	ОК	Back					

ORACLE Enterprise Set	ssion Border Controller						Û 🔺	admin
			Da	shboard	Configuration	Monitor and Trace	Widgets	Syste
🔅 Wizards 🔻						Save Verify	Discard	Se
Inter-config	Modify Session Agent						Show Cor	nfiguratior
local-policy	Out Translationid	•						
local-routing-config media-profile	Trust Me Local Response Map	enable						
session-agent	Ping Response	✓ enable	<u> </u>					
session-group session-recording-group	In Manipulationid Out Manipulationid	•						
session-recording-server	Manipulation String							
session-translation	Manipulation Pattern							
sip-config	Trunk Group							
sip-feature sip-interface	Max Register Sustain Rate	0	(Range: 099999999)					
Show All	ОК	Back						

## 6.15. Configure Codec Policy

The Oracle Session Border Controller (SBC) uses codec policies to describe how to manipulate SDP messages as they cross the SBC. The SBC bases its decision to transcode a call on codec policy configuration and the SDP. Note: this is an optional config – configure codec policy only if deemed required. Go to media manager ---- codec policy

Configure the below Codec policy for Avaya Side. Assign this codec policy to the AvayaRealm.

Session Border Controller					Û 🔺 g
		Dashboard	Configuration	Monitor and Trace	Widgets
				Save Verify	Discard
Add Codec Policy					
Name	AvayaCodec				
Allow Codecs	* X PCMA:no X				
	PCMU:no 🗙				
Add Codecs On Egress	G729 🗙				
Order Codecs					
Packetization Time	20				
Force Ptime	enable				
Secure Dtmf Cancellation	enable				
ОК	Back				
	Add Codec Policy Name Allow Codecs Add Codecs On Egress Order Codecs Packetization Time Force Ptime Secure Dtmf Cancellation	Add Codec Policy         Name       AvayaCodec         Allow Codecs <ul> <li></li></ul>	Add Codec Policy         Name       AvayaCodec         Allow Codecs       * * PCMA:no *         PCMU:no *       PCMU:no *         Add Codecs On Egress       G729 *         Order Codecs	Add Codec Policy         Name       AvayaCodec         Allow Codecs <td< td=""><td>Dashboard       Configuration       Monitor and Trace         Save       Verify             Add Codec Policy             Name       AvayaCodec             Allow Codecs        <ul> <li> <li> <ul> <li> <li> <ul> <li> <li> <ul> <li> <li> <li> </li> <li> <li> <li> </li> <li> <li> </li></li></li></li></li></li></ul>          Add Codecs On Egress        <ul> <li> <li> <li> <li> <li> <li> <li> </li> <li> <li> <li> <li> </li> <li> <li> <li> <li> <li> </li> <li> </li> <li> <li> <li> <li> <li> <li> </li> <li> </li> <li> <li> </li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></ul></li></li></ul></li></li></ul></li></li></ul></td></td<>	Dashboard       Configuration       Monitor and Trace         Save       Verify             Add Codec Policy             Name       AvayaCodec             Allow Codecs <ul> <li> <li> <ul> <li> <li> <ul> <li> <li> <ul> <li> <li> <li> </li> <li> <li> <li> </li> <li> <li> </li></li></li></li></li></li></ul>          Add Codecs On Egress        <ul> <li> <li> <li> <li> <li> <li> <li> </li> <li> <li> <li> <li> </li> <li> <li> <li> <li> <li> </li> <li> </li> <li> <li> <li> <li> <li> <li> </li> <li> </li> <li> <li> </li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></li></ul></li></li></ul></li></li></ul></li></li></ul>

Configure the below Codec policy for Twilio Side, Assign this codec policy to the TwilioRealm.

	LC Ente	erprise S	Session Border Controller						Ĥ▲ d
						Dashboard	Configuration	Monitor and Trace	Widgets
🔅 Wizards 🔻	Comma	inds 🔻						Save Verify	Discard
media-manager	•	^	Add Codec Policy						
codec-policy media-manage	٩r		Name	Twiliocodec					
media-policy			Allow Codecs	* x					
realm-config			Add Codecs On Egress	PCMA 🗙 P	CMU 🗙				
steering-pool				G722 🗙					
security	Þ		Order Codecs						
session-router	•		Packetization Time	20					
access-control account-config			Force Ptime	enable					
filter-config		~	Secure Dtmf Cancellation	Back					
Show All	$\bigcirc$		UK	DUCK					

# 6.16. Configure sdes profile

Please go to →Securit	v → Media Securit	v →sdes profile	and create the	policy as below.
		,		

ORACI	LE En	terprise S	Session Border Controller					a
					Dashboard	Configuration	Monitor and Trace	Widgets
🔅 Wizards 🔻	🔅 Comm	nands 🔻					Save Verify	Discard
certificate-recon		^	Add Sdes Profile					
ike	►		Name	SDES				
ipsec	►		Crypto List	AES_CM_128_HMAC_SHA1_80 ×				
local-accounts				AES_CM_128_HMAC_SHA1_32 X				
media-security	•		Srtp Auth	✓ enable				
dtls-srtp-pro	file	11	Srtp Encrypt	✓ enable				
media-sec-p	olicy		SrTCP Encrypt	✓ enable				
sdes-profile			Mki	enable				
sipura-profile	2	11	Egress Offer Format	same-as-ingress 🔹				
password-polic	v		Use Ingress Session Params					
Show All	$\bigcirc$	~	ОК	Back				

# 6.17. Configure Media Security Profile

Please go to  $\rightarrow$ Security  $\rightarrow$  Media Security  $\rightarrow$ media Sec policy and create the policy as below: Create Media Sec policy with name SDES which will have the sdes profile created above. Assign this media policy to Twilio Realm as it use TLS/SRTP.

ORACI	LE Ent	erprise S	ession Border Controller						a
						Dashboard	Configuration	Monitor and Trace	Widgets
🔅 Wizards 🔻	🔅 Comm	ands 🔻						Save Verify	Discard
certificate-reco		^	Add Media Sec Policy						
ike	Þ		Name	SDES					
ipsec	►		Pass Through	enable					
local-accounts			Options						
media-security	/ •		Inbound						
dtls-srtp-pro	ofile		Profile	SDES 💌					
media-sec-p	oolicy		Mode	srtp	•				
sdes-profile			Protocol	sdes	•				
sipura-profile	le	1	Hide Egress Media Update	enable					
password-polic	cy		Outbound						
Show All		~	ОК	Back					

Similarly, Create Media Sec policy with name RTP to convert srtp to rtp for the Avaya side which will use only TCP/UDP as transport protocol. Assign this media policy to the Avaya Realm.

2///0

ORACI	_E Enterpris	e Session Border Controller					a
				Dashboard	Configuration	Monitor and Trace	Widgets
🔅 Wizards 💌	Commands	Ŧ				Save Verify	Discard
certificate-reco	rd ^	Add Media Sec Policy					
factory-accoun	ts						
ike	•	Name	RTP				
ipsec	) F	Pass Through	enable				
local-accounts		Options					
media-security	Ŧ	Inbound					
dtls-srtp-pro		Profile	v				
media-sec-p	olicy	Mode	rtp 💌				
sdes-profile		Protocol	none 🔻				
sipura-profile	2	Hide Egress Media Update	enable				
password-polic		Outbound					
Show All	Ň	ОК	Back				

# 6.18. Configure Translation Rules

The translation rules sub-element is where the actual translation rules are created. Go to Session router  $\rightarrow$  translation-rules and create the below rule.

ORACLE Enterprise Set	ssion Border Controller						Û ▲ ac
				Dashboard	Configuration	Monitor and Trace	Widgets
Wizards v Ö Commands v session-group						Save Verify	Discard
session-recording-group	Add Translation Rules						
session-recording-server	Id	addplus					
session-translation	Туре	replace v					
sip-config	Add String	+					
sip-feature	Add Index	0					
sip-interface	Delete String						
sip-manipulation	Delete Index	0	(Range: 0999999999)				
sip-monitoring							
sti-server							
translation-rules							
system							
Show All	ОК	Back					

2///

ORACLE Enterprise Se	ssion Border Controller						Û 🔺	admi
				Dashboard	Configuration	Monitor and Trace	Widgets	Sy
🔯 Wizards 🔻						Save Verify	Discard	
session-group	Add Translation Rules							
session-recording-group								
session-recording-server	ld	removeplus						
session-translation	Туре	delete 🔻						
sip-config	Add String							
sip-feature	Add Index	0						
sip-interface	Delete String	*						
sip-manipulation	Delete Index	0	(Range: 0999999999)					
sip-monitoring								
sti-server								
translation-rules								
system								
Show All	OK	Back						

# 6.19. Configure Session Translation Rules

A session translation defines how translation rules are applied to calling and called numbers. Go to Session Router  $\rightarrow$  session-translation and configure the below translation rules.

ORACLE Enterprise Ses	ssion Border Controller					Û 🔺 s
			Dashboard	Configuration	Monitor and Trace	Widgets
🐼 Wizards 🔻					Save Verify	Discard
session-agent	Add Constant Translation					
session-group	Add Session Translation					
session-recording-group	Id	toAvaya				
session-recording-server	Rules Calling	removeplus 🗙				
session-translation	Rules Called	removeplus 🗙				
sip-config	Rules Asserted Id	Control of A				
sip-feature	Rules Asserted Id					
sip-interface	Rules Redirect					
sip-manipulation	Rules Isup Cdpn					
sip-monitoring	Rules Isup Cgpn					
sti-server	Rules Isup Gn					
translation-rules						
system	Rules Isup Rdn					
Show All	ОК	Back				

Add the below translation rule to Avaya side as Avaya rejects call with + sign

Add the below translation rule to Twilio side as PSTN expects call with + sign.

	Session Border Controller					Û 🔺
			Dashboard	Configuration	Monitor and Trace	Widgets
🔅 Wizards 🔻					Save Verify	Discard
local-policy	Add Session Translation					
media-profile	ld	toTwilio				
session-agent	Rules Calling	addPlus 🗙				
session-group	Rules Called	addPlus 🗙				
session-recording-group	Rules Asserted Id					
session-translation	Rules Redirect					
sip-config	Rules Isup Cdpn					
sip-feature	Rules Isup Cgpn					
sip-interface v Show All	ОК	Back				

Please add the above session translation rules to Avaya realm as shown below

ORACL	LE Enterp	orise Se	ssion Border Controller							
						Dashboard	Configuration	Monitor and Trace	Widgets	
🔅 Wizards 👻	🔅 Command	ls 🔻						Save Verify	Discard	
media-manager	•	^	Modify Realm Config							
codec-policy media-manage	r		Identifier	AvayaRealm						
media-policy			Description							
realm-config steering-pool		Ŀ								
security	F		Addr Prefix	0.0.0.0						
session-router	•		Network Interfaces	M10:0.4 🗙						
access-control account-config			Media Realm List							
filter-config			Mm in Realm Mm in Network	🖌 enable						
ldap-config			Mm Same Ip	✓ enable ✓ enable						
local-policy		~	OK							

111111

7///0

	nterprise Ses	ssion Border Controller						ب
					Dashboard	Configuration	Monitor and Trace	Widgets
🔅 Wizards 👻	mands 🔻						Save Verify	Discard
media-manager	•	Modify Realm Config						
codec-policy media-manager		DTLS Srtp Profile	<b>v</b>					
media-policy		Srtp Msm Passthrough	enable					
realm-config		Class Profile	Ŧ					
steering-pool		In Translationid	toTwilio 🔻					
security	•	Out Translationid	toAvaya 🔻					
session-router	•	In Manipulationid	Ψ					
access-control		Out Manipulationid	<b>.</b>					
account-config		Average Rate Limit	0	(Range: 04294967295)				
filter-config		Access Control Trust Level	none 🔻					
ldap-config		Invalid Signal Threshold	0	( Range: 04294967295 )				
		Maximum Signal Threshold	0	( Range: 04294967295 )				
local-policy	~	ОК В	Back					

With this, SBC configuration is complete

# 7. SBC configuration for Avaya Remote Worker

This section of Avaya Remote Worker configuration is included for Avaya remote endpoints that register through the Oracle SBC to the Avaya Session Manager. This would require additional configuration to be configured on the Oracle SBC along with the SIP trunking config as mentioned in the earlier description of the test bed. To complete the particular testing we have configured Avaya endpoints which will register to Avaya Session Manager through the SBC. SBC will handle the calls based on the registration information present in the cache. **Please note that Avaya Remote worker Access side is secured (TLS/SRTP) and Avaya Core side is unsecured (UDP or TCP/RTP)** 

In order to achieve the requirement we have made below configuration on the Oracle SBC

Access and Core Realm for Avaya Remote worker Steering Pool associated with the Realm for Avaya Remote worker Sip-interface associated with the Realm for Avaya Remote worker (Optional) A local-policy to route the registration requests from this Realm to the SIP Server.

Note -The local-policy element is optional as we can enable the Route to registrar parameter on the sipinterface config to route the requests to the Registrar.

The registrar host and port is configured in the sip-config element on the SBC. The remote endpoint sends register requests from Avaya Access Realm onto the SBC and then SBC registers these endpoints onto the Avaya Core Realm maintaining the registration cache in its database to route inbound calls to these endpoint.

Below are the snippets from the Oracle SBC Web GUI for the Remote worker configuration.

## 7.1. Configure Realms

Navigate to realm-config under media-manager and configure a realm as shown below The name of the Realm can be any relevant name according to the user convenience.

Use the following table as a configuration example for the two realms used in this configuration:

Config Parameter	AvayaAccess Side	Avaya Core Side
Identifier	AvayapublicRealm	AvayaCoreRealm
Network Interface	M00	M10
Mm in realm		
FQDN		
Media Sec policy	sdespolicy	RTP
Access Control Trust Level	High	High
Codec-Policy	Twiliocodec	AvayaCodec

In the below example, Realm name is given as AvayapublicRealm for Avaya Access Side. Please set the Access Control Trust Level as medium for this realm

-///X

ORACI	Enterprise	Session Border Controller					Û.▲ a
				Dashboard	Configuration	Monitor and Trace	Widgets
🔅 Wizards 🔻	🔅 Commands 🔻					Save Verify	Discard
media-manager	•	Modify Realm Config					
codec-policy							
media-manage		Identifier	AvayapublicRealm				
media-policy		Description					
realm-config							
steering-pool							
security	•	Addr Prefix	0.0.0.0				
session-router	•	Network Interfaces	M00:0.4 🗙				
system	•	Media Realm List					
		Mm In Realm	✓ enable				
		OK	Back				
Show All							

	LE Enterprise	Session Border Controller					<b>▼</b> (
				Dashboard	Configuration	Monitor and Trace	Widgets
🚯 Wizards 🔻	🚯 Commands 🔻					Save Verify	Discard
media-manager	•	Modify Realm Config					
codec-policy		Out Translationid					
media-manage	r	In Manipulationid					
media-policy		Out Manipulationid					
realm-config		Average Rate Limit	0	(Range: 04294967295)			
steering-pool		Access Control Trust Level	medium 💌				
security	►	Invalid Signal Threshold	10	(Range: 04294967295)			
session-router	•	Maximum Signal Threshold	30	(Range: 04294967295)			
system		Untrusted Signal Threshold	10	(Range: 04294967295)			
System	•	Nat Trust Threshold	0	(Range: 065535)			
		Max Endpoints Per Nat	0	( Range: 065535 )			
Show All		ОК	Back				

ORACL	E Enterprise	Session Border Controller					Û 🔺
				Dashboard	Configuration	Monitor and Trace	Widgets
🚯 Wizards 💌	🏷 Commands 👻					Save Verify	Discard
media-manager	•	Modify Realm Config					
codec-policy media-manager		Identifier	AvayaCoreRealm				
media-policy		Description					
realm-config							
steering-pool							
ecurity	►	Addr Prefix	0.0.0.0				
session-router	•	Network Interfaces	M10:0.4 🗙				
system	•	Media Realm List					
		Mm In Realm	✓ enable				
Show All		ОК	Back				

### Similarly, Realm name is given as AvayaCoreRealm for Avaya Core side

## 7.2. Enable sip-config

SIP config enables SIP handling in the SBC. Make sure the home realm-id, registrar-domain and registrar-host are configured. Also add the options to the sip-config as shown below.

To configure sip-config, Go to Session-Router->sip-config and in options, add the below

- add max-udp-length =0
- reg-cach-mode=from

ORACLE	Enterprise	Session Border Controller						Û▲ 9
					Dashboard	Configuration	Monitor and Trace	Widgets
🔅 Wizards 🔻 🔅 🕻	Commands 🔻						Save Verify	Discard
session-agent session-group	^	Modify SIP Config						
session-recording-gro	oup	State	v enable					
session-recording-ser	rver	Dialog Transparency	venable					
session-translation		Home Realm ID	AvayaCoreRealm	v				
sip-config		Egress Realm ID		•				
sip-feature		Nat Mode	None	•				
sip-interface		Registrar Domain	*					
sip-manipulation		Registrar Host	*					
sip-monitoring		Registrar Port	5060		(Range: 0,102565535)			
sti-server		Init Timer	500		(Range: 04294967295)			
Show All	~	C	Delete Delete					

	Session Border Controller				Û ▲ a
			Dashboard Configuration	Monitor and Trace	Widgets
🔅 Wizards 🔻				Save Verify	Discard
session-agent	Modify SIP Config				
session-group	Trans Expire				
session-recording-group	-	32	(Range: 04294967295)		
	Initial Inv Trans Expire	0	(Range: 0999999999)		
session-recording-server	Invite Expire	180	(Range: 04294967295)		
session-translation	Session Max Life Limit	0			
sip-config	Enforcement Profile	v			
sip-feature	Red Max Trans	10000	(Range: 050000)		
sip-interface	Options	max-udp-length=0 🗙			
sip-manipulation		reg-cache-mode=from $\mathbf{X}$			
sip-monitoring	SPL Options				
sti-server	SIP Message Len	4096	(Range: 065535)		
V	ОК D	elete			
Show All					

## 7.3. Enable media manager

Media-manager handles the media stack required for SIP sessions on the SBC. Enable the media manager option as below.

In addition to the above config, please set the max and min untrusted signaling values to 9. which takes care of Access Realm. Go to Media-Manager->Media-Manager

ORACI	_E Enterprise	Session Border Controller					i
				Dashboard	Configuration	Monitor and Trace	Widgets
🚯 Wizards 🔻	🔅 Commands 👻					Save Verify	Discard
media-manager codec-policy	•	Modify Media Manager					
media-manage	r	State	✓ enable				
media-policy		Flow Time Limit	86400	(Range: 04294967295)			
realm-config		Initial Guard Timer	300	(Range: 04294967295)			
realm-coning		Subsq Guard Timer	300	(Range: 04294967295)			
steering-pool		TCP Flow Time Limit	86400	(Range: 04294967295)			
security	•	TCP Initial Guard Timer	300	(Range: 04294967295)			
session-router	•	TCP Subsq Guard Timer	300	(Range: 04294967295)			
system	•	Hnt Rtcp	enable				
		Algd Log Level	NOTICE 💌				
		Mbcd Log Level	NOTICE <b>v</b>				
		OK	Delete				
Show All	$\supset$						

ORAC	LE Enterprise	Session Border Controller					Û 🔺
				Dashboard	Configuration	Monitor and Trace	Widgets
🗘 Wizards 👻	Commands v					Save Verify	Discard
media-manager	v	Modify Media Manager	r				
codec-policy		Red Sync Comp Time	1000	(Range: 04294967295)			
media-manage	er	Media Policing	🖌 enable				
media-policy		Max Signaling Bandwidth	1000000	(Range: 7100010000000)			
realm-config		Max Untrusted Signaling	9	(Range: 0100)			
steering-pool		Min Untrusted Signaling	9	(Range: 0.100)			
		Tolerance Window	30	(Range: 04294967295)			
security	+	Untrusted Drop Threshold	0	(Range: 0100)			
session-router	+	Trusted Drop Threshold	0	(Range: 0100)			
system	•	Acl Monitor Window	30	(Range: 53600)			
		Trap On Demote To Deny	enable				
		OK	Delete				
Show All		UK	Delete				

# 7.4. Configure SIP Interfaces

Navigate to sip-interface under session-router and configure the sip-interface as shown below. Please configure the below settings under the sip-interface.

Please Configure sip-interface for the for Avaya Access side as below:

- Tls-profile needs to match the name of the tls-profile created earlier.
- Set allow-anonymous to Registered to ensure traffic to this sip-interface only comes from the registered user.
- Set NAT traversal to always for the remote workers to register.
- Enable Registration Caching and Route to Register

	Session Border Con	troller					Û ▲ a
					Dashboard Con	figuration Monitor and Trace	Widgets
🔅 Wizards 🔻						Save Verify	Discard
local-routing-config	Modify SIP Int	erface					Show Confi
media-profile							
session-agent	State		🗸 enable				
session-group	Realm ID		AvayapublicRealm	v			
session-recording-group	Description						
session-recording-server							
session-translation							
sip-config	SIP Ports						
sip-feature	Add						
sip-interface	Address	Port	Transport Protocol	TLS Profile	Allow Anonymous	Multi Home Addrs	
sip-manipulation		5061	TLS	TLSProfile	registered		
Show All		OK	Back				

	Session Border Controller					Ĥ▲ g
			Dashboard	Configuration	Monitor and Trace	Widgets
🔅 Wizards 💌					Save Verify	Discard
session-agent	Modify SIP Interface					Show Confi
session-recording-group	Nat Traversal	always 💌				
session-recording-server	Nat Interval	30	(Range: 04294967295)			
session-translation	TCP Nat Interval	90	(Range: 04294967295)			
sip-config	Registration Caching	🖌 enable				
	Min Reg Expire	300	(Range: 0999999999)			
sip-feature	Registration Interval	3600	(Range: 04294967295)			
sip-interface	Route To Registrar	🖌 enable				
sip-manipulation	Secured Network	enable				
sip-monitoring	Uri Fqdn Domain					
sti-server	Options					
Show All	ОК	Back				

////

Similarly, Please Configure sip-interface for the Avaya Core side as below:

	Session Border Con	troller						Û ▲ a
					Dashboard	Configuration	Monitor and Trace	Widgets
🔅 Wizards 🔻							Save Verify	Discard
session-agent	Modify SIP Int	erface						Show Confi
session-recording-group	State		🖌 enable					
session-recording-server	Realm ID		AvayaCoreRealm	V				
session-translation	Description							
sip-config								
sip-feature								
sip-interface	SIP Ports							
sip-manipulation	Add							
sip-monitoring	Address	Port	Transport Protocol	TLS Profile	Allow Anonymous		Multi Home Addrs	
sti-server	10.232.50.77	5060	UDP		agents-only			
Show All		ОК	Back					

Once sip-interface is configured – the SBC is ready to accept traffic on the allocated IP address.

# 7.5. Configure steering-pool

Steering-pool config allows configuration to assign IP address(es), ports & a realm.

Avaya Access side steering pool.

ORACLO	🗲 Ente	rprise Se	ession Border Controller						Û▲ a
						Dashboard	Configuration	Monitor and Trace	Widgets
🚯 Wizards 👻 📢	🔅 Commar	nds 🔻						Save Verify	Discard
realm-config		^	Add Steering Pool						
steering-pool		i.	IP Address						
security	•		Start Port	40000	(Range: 165535)				
session-router	*		End Port	49999	(Range: 165535)				
access-control			Realm ID	AvayapublicRealm	<b>v</b>				
account-config			Network Interface		<b>v</b>				
filter-config					•				
ldap-config									
local-policy									
local-routing-conf	fig								
media-profile		~	ОК Ва	ick					
Show All									

## Avaya Core side steering pool.

ORACI	LE Enterprise	Session Border Controller							Û.▲ a
						Dashboard	Configuration	Monitor and Trace	Widgets
🔅 Wizards 🔻	Commands 🔻							Save Verify	Discard
realm-config	^	Add Steering Pool							
steering-pool		IP Address	10.232.50.77						
security session-router	* *	Start Port	30000		(Range: 165535)				
access-control		End Port	34999		(Range: 165535)				
account-config	1	Realm ID Network Interface	AvayaCoreRealm	• •					
filter-config				×					
ldap-config									
local-policy									
local-routing-co	onfig								
media-profile	~	ОК	Back						
Show All									

# 7.6. Configure local-policy (Optional)

Local policy config allows for the SBC to route calls from one end of the network to the other based on routing criteria. To configure local-policy, go to Session-Router->local-policy.

To route the calls from Avaya Access side to Avaya Core side and vice versa, Use the below local -policy

	Session Border Controller					Û 🔺 🧯
			Dashboard	Configuration	Monitor and Trace	Widgets
🔅 Wizards 🔻					Save Verify	Discard
access-control	Modify Local Policy					
account-config						
filter-config	From Address	* ×				
ldap-config	To Address	* ×				
local-policy	Source Realm	AvayapublicRealm 🗙				
local-routing-config	Description					
media-profile						
session-agent						
session-group	State					
session-recording-group	State	✓ enable				
session-recording-server	Policy Priority	none 💌				
~	ОК	Back				
Show All						

	e Session Border Co	ntroller								Û 🔺
						Dashbo	ard Configuratio	n Monitor a	nd Trace	Widgets
🔅 Wizards 🔻								Save	Verify	Discard
access-control	Modify Local	Policy								
account-config	Description									
filter-config										
ldap-config										
local-policy	State									
local-routing-config	Policy Priority	•	enable 🕐							
media-profile		r	none	•						
session-agent	Policy Attributes									
session-group	Add									
session-recording-group	Next Hop	Realm	Action	Terminate Recursion	Cost	State	App Protocol	Lookup	Next Ke	ey
session-recording-server	10.232.50.127	AvayaCoreRealm	none	disabled	0	enabled	SIP	single		
session-recording-server		OK Back	<							
Show All			_							

# 8. New SBC config/Deployment Using Configuration Assistant

When you first log on to the E-SBC, the system requires you to set the configuration parameters necessary for basic operation. To help you set the initial configuration with minimal effort, the E-SBC provides the Configuration Assistant. The Configuration Assistant, which you can run from the Web GUI or the Acme Command Line Interface (ACLI), asks you questions and uses your answers to set parameters for managing and securing call traffic. You can use the Configuration Assistant for the initial set up to make to the basic configuration. Please check "Configuration Assistant Operations" in the <u>Web GUI User Guide</u> and "Configuration Assistant Workflow and Checklist" in the <u>ACLI Configuration Guide</u>

Please note, applying a configuration to the SBC via the Configuration Assistant will overwrite any existing configuration currently applied to the SBC. We highly recommend this only be used for initial setup of the SBC. This feature is not recommended to be used to make changes to existing configurations.

## 8.1. Section Overview and Requirements

This section describes how to use our Configuration Assistant feature as a quick and simple way to configure the Oracle SBC for integration with Avaya Session Manager and Twilio Elastic SIP Trunking. The pre-requisite are given below.

- SBC running release SCZ840p7 or later which will have this template package by default added to the SBC code.
- TLS certificate for the SBC preferably in PKCS format, or CSR is generated by the SBC. For Twilio side, list of supported CA's can be found <u>here</u>

The following outline assumes you have established initial access to the SBC via console and completed the following steps:

- Configured boot parameters for management access
- Setup Product
- Set Entitlements
- Configured HTTP-Server to establish access to SBC GUI

### 8.2. Initial GUI Access

The Oracle SBC WebGui can be accessed by entering the following in your web browser: http(s)://<SBC Management IP>.

The username and password are the same as that of the CLI.

If there is no configuration on the SBC, the configuration assistant will show immediately upon login to the SBC GUI as shown below

Select a PBX Template	Select a SIP Trunk Template
ZoomPhone	Select PBX Template to list the corresponding SIP Side template
Microsoft Teams	
Microsoft ACS	
Cisco	
Avaya Session Manager	
Upload a Configuration	Upload a Template Package
Drag and Drop	Drag and Drop
Select a file or drop one here.	Select a file or drop one here.

2///0

As we can see, there are some templates of PBX populated in the template and we can select the PBX template that we want to use with our Twilio trunk and for this document, we have selected Avaya Session Manager template and once we select that, it asks us to select the SIP trunk template. After we select Twilio trunk template, the Next option would be enabled.

Select a PBX Template	Select a SIP Trunk Template	Next 🔰
Microsoft Teams	TwilioSIPTrunking	
Microsoft ACS	GenericSipTrunk	
Cisco	IntelepeerSipTrunking	
Avaya Session Manager	ATTIPtrunking	
GenericPBX	BellCanadatrunking	
Jpload a Configuration	Upload a Template Package	
Drag and Drop	Drag and Drop	
Select a file or drop one here.	Select a file or drop one here.	

# Click Next: The following "Notes" will be displayed related to pre-requisite

Сс	nfiguration Assistant - Notes			:
	Back	Next >		
	PBX Template Notes for Avaya Session Manager	SIP Trunk Template Notes for TwilioSIPTrunking	^	
	Warning: - Proceeding with the Configuration Assistant results in erasing the existing configuration.	Warning: - Proceeding with the Configuration Assistant results in erasing the existing configuration.		
	Pre-requisites:	Pre-requisites:		
	<ul> <li>Connect Port 0 of the Session Border Controller (SBC) to your network.</li> <li>Ensure that Transcoding resources are installed on your system (Hardware only).</li> <li>Configure at least one Transcoding core on your system (Virtual Machine Edition only).</li> <li>This template supports ONLY UDP/TCP configuration.</li> <li>Enable the Advanced entitlement on the system.</li> <li>Set Session Capacity in the entitlement.</li> <li>Set the system time.</li> </ul>	<ul> <li>Connect Port 1 of the Session Border Controller (SBC) to your network.</li> <li>Ensure that Transcoding resources are installed on your system (Hardware only).</li> <li>Configure at least one Transcoding core on your system (Virtual Machine Edition only).</li> <li>Add the SRTP license to the system.</li> <li>Enable the Advanced entitlement on the system.</li> <li>Set Session Capacity in the entitlement.</li> <li>Set the system time.</li> </ul>		
		Decommondations	$\checkmark$	

////

# Click *Next* and we get the below screen where we need to enter the details for SBC configuration.

Configuration Assistant - Avaya Session M	anager Network						×
<b>K</b> Back 1 2	3 4	5	6	7	8	Skip 💙	^
Avaya Session Avaya Session Manager Agent Network	Transcoding Twilio Elastic SIP Trunk Network	Twilio Session T Agent	ranscoding	Root Trusted Certificate	SBC Certificate for Twilio		~
Let's configure the	interface that comm	unicates with yo	our Avaya	Session Mar	nager		
	Realm Name 🕲						^
		R	Required				
	Port Number 🕐						
	Port 0		•				
		R	Required				
	Slot Number 🕐						
	Slot 0		•				
		R	Required				~

# 8.3. Configuration Assistant Template Navigation

### 8.3.1. Page 1-Avaya Session manager Network

Page 1 of the template is where you will configure the network information to connect Avaya Session Manager.

Configuration As	ssistant - Av	aya Session	Manager Ne	etwork						×
K Back	1	2	3	4	5	6	7	8	Skip 🖒	^
	Avaya Session Manager Network	Avaya Session Agent	Transcoding	Twilio Elastic SIP Trunk Network	Twilio Session Agent	Transcoding	Root Trusted Certificate	SBC Certificate for Twilio		~
	Let's	s configure t	he interface	that commu	unicates with	your Avay	a Session Ma	nager		
			Realm Nan	ne O						^
						Required				
			Port Numb	er 🕐						
			Port 0			•				
						Required				
			Slot Numb	er 🕐						
			Slot 0			•				
						Required				~

Next to each field is a help icon. If you hover over the icon, you will be provided with a description or definition of each filed. Also, pay close attention to which fields are listed as "required".

### 8.3.2. Page 2-Avaya Session agent

Page 2 of the template is where you will configure the Avaya Session Agent details where you will enter the next hop IP address and port for sip signaling to and from your Avaya Session Agent. Please fill the required fields and click Next.

Configuration A	ssistant - Av	aya Sessio	n Agent							×
K Back	<b>O</b>	2		4	_ 5 _	6	7	8	Skip 🖒	^
	Avaya Session Manager Network	Avaya Session Agent	Transcoding	Twilio Elastic SIP Trunk Network	Twilio Session Agent	Transcoding	Root Trusted Certificate	SBC Certificate for Twilio		~
			Let's con	figure the S	ession Agent	for Avaya				
		Α	waya Session Age	nt hostname 🕲						^
					Required	4				
		μ	waya Session Ager	nt IP Address 🔊						
		μ	waya Session Age	nt Port						
					Required	4				
		Г	וח אטוו אאש בפרח	nd Hoctname /ID	addrocc for 🧑	No Vo	m			*

### 8.3.3. Page 3 - Avaya side Transcoding

Page 3 is where you will be able to configure transcoding between the SBC and Avaya Session Manager. Once transcoding features is set to "yes", you will then have an option to select additional media codecs you want included in offers/answers towards Avaya Session Manager. If you select yes to either question regarding media codecs, you will be presented with a required drop down. You can select as many codecs from the list presented.

K Back     Avaya Session     Transcoding   Select media codecs for your     On or on the select media codecs for your     On or on the select media codecs for your     On or on the select media codecs for your     On or on the select media codecs for your     On or on the select media codecs for your     On or on the select media codecs for your     On or on the select media codecs for your     On or on the select media codecs for your     On or on the select media codecs for your     On or on the select media codecs on your     On or on the select media codecs on your     On or on the select media codecs on your     On or on the select media codecs on your     Desconting     Desconting     Desconting     Desconting     Desconting     Desconting     Desconting     Desconting <th>Avaya Session Manager Network       Avaya Session Agent       Transcoding SIP Trunk Network       Twilio Session Agent       Transcoding Certificate       SBC Certificate for Twilio         Let's configure transcoding       Do you want to enable transcoding on the SBC?       Image: Notice of the second secon</th> <th>nfiguration A</th> <th>Assistant - Tr</th> <th>ranscoding</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>	Avaya Session Manager Network       Avaya Session Agent       Transcoding SIP Trunk Network       Twilio Session Agent       Transcoding Certificate       SBC Certificate for Twilio         Let's configure transcoding       Do you want to enable transcoding on the SBC?       Image: Notice of the second secon	nfiguration A	Assistant - Tr	ranscoding								
Manager Agent SIP Trunk Agent Certificate for Twilio   Let's configure transcoding   Do you want to enable transcoding on the SBC? No Yes   Do you want to select media codecs for your No Yes   Select media codecs © PCMU x G722 x	Manager Network       Agent       SIP Trunk Network       Agent       Certificate       for Twilio         Let's configure transcoding         Do you want to enable transcoding on the SBC? Interview of the SBC? Interview o	<b>〈</b> Back	<b>•</b>	<b>•</b>	3	4	5	6	7	8	Next 💙	^
Do you want to enable transcoding on the SBC?  No Yes Do you want to select media codecs for your Avaya Session Manager? Select media codecs ③   PCMU × G722 ×	Do you want to enable transcoding on the SBC? O No Yes Do you want to select media codecs for your Avaya Session Manager? Select media codecs O PCMU X G722 X		Manager		Transcoding	SIP Trunk		Transcoding				~
Do you want to select media codecs for your Avaya Session Manager? Select media codecs © PCMU X G722 X	Do you want to select media codecs for your Avaya Session Manager? Select media codecs © PCMU X G722 X					Let's configu	ıre transcodir	ng				
Avaya Session Manager? Select media codecs ③ PCMU 🗙 G722 🗙	Avaya Session Manager? Select media codecs PCMU × G722 ×			I	Do you want to e	nable transcoding	g on the SBC? 🧿	No Yes	5			
PCMU 🗙 G722 🗙	PCMU X G722 X						cs for your	3 No	/es			
					Select media cod	lecs 🕐						
Required	Required				PCMU 🗙 G	722 🗙						
							Requi	red				

#### 8.3.4. Page 4 - Twilio Elastic SIP Trunk Network

Page 4 of the template is where you will configure the network information to connect to Twilio Elastic SIP trunk Network. Please fill the required fields and Press Next.

Configuration A	Assistant - Tv	vilio Elastic S	IP Trunk Ne	twork						×
K Back	0	0	<b>•</b>	4	5	6	7	8	Skip 🖒	^
	Avaya Session Manager Network	Avaya Session Agent	Transcoding	Twilio Elastic SIP Trunk Network	Twilio Session Agent	Transcoding	Root Trusted Certificate	SBC Certificate for Twilio		~
	Let's	configure the	e interface t	hat commur	icates with T	wilio Elasti	c SIP Trunk N	letwork		
			Realm Nar	ne Ø						^
				٩		Required				
			Port Numb Port 1	er O		v				
						Required				
			Slot Numb	er 🕐						
			Slot 0			•				
						Required				~

8.3.5. Page 5 - Twilio Session Agent

Page 5 of the template is where you will configure the Twilio Session Agent details where you will enter the next hop IP address and port for sip signaling to and from your Twilio Elastic SIP trunk. Please fill the required fields and click Next.

K Back	<b>~</b> —				5	- 6 -	- 7 -	8	Skip 🖒
	Avaya Session Manager Network	Avaya Session Agent	Transcoding	Twilio Elastic SIP Trunk Network	Twilio Session Agent	Transcoding	Root Trusted Certificate	SBC Certificate for Twilio	
			Let's c	onfigure ses	sion agent fo	or Twilio			
		Tw	rilio Session Ager	nt hostname 🔊					
		Tw	ilio Session Ager	nt IP Address 🕲	Required	4			
		Tw	rilio Session Ager	nt Port 🕲					
					Required				

#### 8.3.6. Page 6 - Twilio side Transcoding

Page 6 is where you will be able to configure transcoding between the SBC and Twilio Trunk. Once transcoding features is set to "yes", you will then have an option to select additional media codecs you want included in offers/answers toward Twilio trunk. If you select yes to either question regarding media codecs, you will be presented with a required drop down. You can select as many codecs from the list presented.

Configuration	Assistant - Tı	anscoding								×
K Back	<b>_</b>	•	<b>•</b>	<b>•</b>	•	6	7	8	Next >	^
	Avaya Session Manager Network	Avaya Session Agent	Transcoding	Twilio Elastic SIP Trunk Network	Twilio Session Agent	Transcoding	Root Trusted Certificate	SBC Certificate for Twilio		*
			I	Let's configu	re transcodir	ng				
		E	)o you want to er	nable transcoding	g on the SBC?   Ø	No Yes	5			
			)o you want to se wilio Elastic SIP	elect media codeo trunk?	s for your	3 No 🚫 Y	'es			
		S	elect media cod	ecs 🕐						
			G729 🗙 PCN	× AM						
					Requir	red				

### 8.3.7. Page 7 - Import Digi Cert Root CA Certificate for Twilio Side

Page 7 of this template is where the SBC will import the DigiCert Root CA certificate, which Twilio uses to sign the certs it presents to the SBC during the TLS handshake. Importing the DigiCert Root CA certs is enabled by default.

Configuration A	Assistant - Ro	oot Trusted (	Certificate								×
K Back	<b>v</b>	<b>•</b>	<b>•</b>	<b>v</b>	<b>•</b>	•	7	8	Next	>	^
	Avaya Session Manager Network	Avaya Session Agent	Transcoding	Twilio Elastic SIP Trunk Network	Twilio Session Agent	Transcoding	Root Trusted Certificate	SBC Certificate for Twilio			~
	I	_et's start pro	ovisioning th	ne root truste	ed certificate	for Twilio El	astic SIP tru	nk.			
		Do you con Cert	sent to installing	the DigiCert Roo	ot 🕐 No	Yes					^
			umber: :e0:56:90:42:46:1	b1:a1:75:6a:c9:59: VithRSAEncryptio							l
		C=US O=Diį OU=v	giCert Inc /ww.digicert.com iigiCert Global Rc								¥

### 8.3.8. Page 8 - SBC Certificates for Twilio side

#### PKCS12 Import

By default, the SBC is set to import a certificate in PKCS 12 format. This is the simplest and recommended way to add a certificate to the Oracle SBC. Using this method, you will add the SBC's hostname under "FQDN or Common Name" field, upload a certificate from a supported CA, and enter the certificates password.

K Back	<b>_</b>		<b></b>				<b></b>	8	Review	
	Avaya Session Manager Network	Avaya Session Agent	Transcoding	Twilio Elastic SIP Trunk Network	Twilio Session Agent	Transcoding	Root Trusted Certificate	SBC Certificate for Twilio		
		Let	's start prov	isioning SB	C certificates	for Twilio Si	de			
			Certificate p	provisioning type	0					
			PKCS12			W				
			Fully Qualifi	ind Domain Nam	a ar Common Nav	Required				
			Fully Qualit	ied Domain Nam	e or Common Nar	ne o				
			PKCS12 cert	tificate (.p12 or .p	fx) ⑦	Required				

### **Certificate Signing Request (CSR)**

The alternative to importing a PKCS12 certificate to the SBC is to configure a certificate and generate a certificate signing request that you will have signed by a supported CA

Same as PKCS12, you will enter the SBC's hostname under "FQDN or Common Name" and "Country" field (required) and answer the remaining question presented on this page (optional).

Configuratio	on Assistant - SB	C Certificate f	for Twilio							×
K Ba	ack	•	<b>_</b>			•	<b></b>	8	Review	^
	Avaya Session Manager Network	Avaya Session Agent	Transcoding	Twilio Elastic SIP Trunk Network	Twilio Session Agent	Transcoding	Root Trusted Certificate	SBC Certificate for Twilio		>
		Let	's start prov	visioning SB	C certificates	for Twilio S	ide			
			Certificate p	provisioning type	0					^
			CSR			•				
						Required				
			Fully Qualif	ied Domain Nam	e or Common Nar	me O				
						D 1				
			Country 🕲			Required				
			Country							
										~
			State							·

### 8.4. Review

At the end of the template, you will notice in the top right, a "*Review*" tab. If all 8 pages presented across the top are showing green, indicting there are no errors with the information entered, click on the "Review" tab.

iguration As	ssistant - SB	C Certificate	for Twilio							
K Back	<b>•</b>	<b>·</b>	<b>·</b>	<b>v</b>	<b>_</b>	<b>_</b>	<b>·</b>	8	Review	1
	Avaya Session Manager Network	Avaya Session Agent	Transcoding	Twilio Elastic SIP Trunk Network	Twilio Session Agent	Transcoding	Root Trusted Certificate	SBC Certificate for Twilio		、
		Let	t's start prov	visioning SB	C certificates	for Twilio S	ide			
			Certificate p	provisioning type	0					,
			CSR			•				
						Required				
			Fully Qualif	ied Domain Nam	e or Common Nar	me 🕐				
			sbc.com							
						Required				
			Country 🕐							
			US							

The screen looks like below after clicking the Review Tab.

iguration Assistant - Summary			
			Download 👻 App
Avaya Session Manager Network	🥒 Edit	Configuration	TwilioCSR CSR
Realm Name			
Avaya			Сору
Port Number			
Devit 0		certificate-record	
Port 0		name	DigiCertRootCe
Slot Number		common-name certificate-record	DigiCert Root
		name	TwilioCSB
Slot 0		common-name	sbc.com
Network IP Address		extended-key-usage-list	serverAuth
			ClientAuth
10.4.5.6		codec-policy	
Network IP subnet mask		name allow-codecs	AvayaCodecPoli *
Network IP Sublict Hidsk		add-codecs-on-egress	PCMU G722
255.255.255.0		codec-policy	
		name	TwilioCodecPol
Network Gateway IP Address		allow-codecs	*
10.4.5.1		add-codecs-on-egress	G729 PCMA
101 101		http-contron	

On the left side of the review contains the entries for each page. Each page has an "*Edit*" tab that can be used to make changes to the information entered on that specific page without having to go through the entire template again.

On the right side of the review page, under the "*Configuration*" tab is the ACLI output from the SBC. This is the complete configuration of the SBC based on the information entered throughout the template. Also on the right side of the review page you may see another tab, "*TwilioCSR CSR*".

On Page 8 of the template, if you chose CSR from the drop down menu instead of PKCS, the SBC configures a certificate record and generates a certificate signing request for you as shown below.

guration Assistant - Summary			
			Download 🔻 Appl
Avaya Session Manager Network	🧪 Edit	Configuration	TwilioCSR CSR
Realm Name			
Avaya			Г Сору
Port Number			
Port 0		BEGIN CERTIFICATE REQUEST- MIICujCCAaICAQAwVzELMAkGA1UEBhM	 CVVMxCzAJBgNVBAgTAk1BMRMwEQYDVQ
Slot Number			FbmdpbmVlcmluZzEQMA4GA1UEAxMHc2 DggEPADCCAQoCggEBANEin8yxgibSlh
Slot 0		ADcHJ7b8k76WFwLvDYjBjEXtjYGPwaU	ZHXsVPos15oz26AA3wI7NiO+jRKv2Dj 1jex+U/W4iCzYSYAFEz+KF5Fj12cPYo
Network IP Address		Bi5+n3YBrZA1qWrOB+EezELxzn48070	bPErUVaIfK4aTTeXSL1SThF0gu94WHU
10.4.5.6		BYTPzFRZdNCy7BUSST0usBjTcEyYcdp	q7hiird+GjvU9d30u2bTV3+gkYP+bMD h/nXubX84N/TR1GYzqmSTdVrsV+5p49
Network IP subnet mask			JDjEPMA0wCwYDVR0PBAQDAgWgMA0GCS k9i7qaR0r9cg98eIIsKCo37aXatTERc
255.255.255.0			MiX0Dx8EegJqOfb8T04ZecoPaJJbrbG sVp8fYX+WIUrKPEUMhp1N5+miuj1nxu
Network Gateway IP Address		LEvFs2HlqeIPgnr1wDoxA0syGqFxtfH BybU+bD2yRI0u3AuMxfxlS7cviGIFrk	QAzie8M0eRMQDGXFzQyLou+T8e2iZIn UTOPS0qreRdp62cfjHX31tdmIPr0Fkj
10.4.5.1		DC+FKABAU4zHqKD+M9bEQOfx4i94+k+	

Click the copy button under the CSR, and paste the output into a text file. Next, provide the txt file to your CA for signature. Once the certificate is signed by a Twilio supported CA, you will need to import that certificate into the SBC manually, either via ACLI or through the GUI.

Note: if you chose to import a certificate in PKCS12 format on page 8, the CSR tab will not be present under review.

## 8.5. Download and/or Apply

Now that the entries provided throughout the template have been reviewed, and the CSR has been copied into a text file (optional), the template provides you with the ability to "Download" the config by clicking the "*Download*" tab on the top right. Next, click the "*Apply*" button on the top right, and you will see the following pop up box appear.

ssistant - Epilogue		×
Perform the following actions after th	ne system reboots to complete the deployment.	Confirm
	Actions to be performed for TwilioSIPTrunking	
	Assistant - Epilogue Perform the following actions after the sto be performed for Avaya Session Manager e actions required for this template.	Perform the following actions after the system reboots to complete the deployment. s to be performed for Avaya Session Manager Actions to be performed for TwilioSIPTrunking

Now you can click "*Confirm*" to confirm you want to apply the configuration to the SBC. The SBC will reboot. When it comes back up, the SBC will have a basic configuration in place for Avaya Session Manager with Twilio SIP trunking.

## 8.6. Configuration Assistant Access

Upon initial login, if the Configuration Assistant Template does not immediately appear on the screen, you can access by clicking on the "SYSTEM" tab, top right of your screen. After that, click on the "Configuration Assistant" tab, top left. This allows end users to access the Configuration Assistance at any time through the SBC GUI.

	e Session Border Controller				Û 🔺	admin 🔻
SolutionsLab-vSBC-1 10.1.1.4 SC	28.4.0 Patch 8 (Build 485)	Dashboard	Configuration	Monitor and Trace	Widgets	System
System Configuration Assistant			Force HA Switch	hover 🗘 Reboot	🛃 Suppo	rt information
File Management	File Management Objects					ľ
	Name	Description				
	Audit Log	Audit changes by all users on the system.				
	Backup Configuration	Manage backup configurations.				
	Configuration CSV	Upload/Download/Delete configuration CSVs.				
	Fraud Protection Table	Manage fraud protection table.				
	Local Route Table	Manage Local route table.				
	Log	System logs.				
	Playback Media	Upload/Download/Delete playback media.				
	SPL Plug In	Upload/Download/Delete SPL plugins.				
	Software Image	Upload/Dowpload/Delete software images				

# 9. Existing SBC configuration

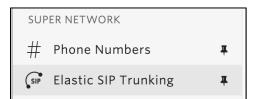
If the SBC being used is an existing SBC with functional configuration, following configuration elements are required:

- New realm-config
- Configuring a certificate for SBC Interface
- <u>TLS-Profile</u>
- <u>New sip-interface</u>
- <u>New session-agent</u>
- <u>New steering-pools</u>
- <u>New local-policy</u>
- New Codec Policy
- <u>SDES Profile</u>
- Media-sec-Policy
- <u>New Translation Rules</u>
- Session Translation Rules

Please follow the steps mentioned in the above chapters to configure these elements.

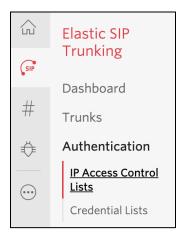
# **10** Twilio Elastic SIP Trunking Configuration

From your <u>Twilio Console</u>, navigate to the <u>Elastic SIP Trunking</u> area (or click on the sip icon on the left vertical navigation bar).



### 10.1. Create an IP-ACL rule

Click on Authentication in the left navigation, and then click on IP Access Control Lists.



Create a new IP-ACL, for example call it "Oracle" and add your SBCs IP addresses.

Oracle		
Properties		
FRIENDLY	Oracle	
	at •••	
IP-ACL SID	AI	
ASSOCIATED	O	
SIP TRUNKS		
ASSOCIATED	_	
SIP DOMAINS	_	
IP Address I	Panges	
II Address I	anges	
		IP Access Control Lists may have up to 100 IP addresses.
+ IP ADDRES	S RANGE	FRIENDLY NAME
155.212.21	4.102 / 32	
	4.102 - 155.212.214.102	155.212.214.102 ×

## 10.2. Create a new Trunk

For each geographical region desired (e.g., North America, Europe), create a new Elastic SIP Trunk.

Now click on Trunks again on the left vertical navigation bar, and create a new Trunk.

	Create A New SIP Trunk	×
Name your new SIP T	runk, then configure it in the following steps.	
	Cancel	Create

Under the **General Settings** you can enable different features as desired.

Features
To learn more about SIP Trunking features, please see our user documentation. 🖸
Call Recording ()
Enabled Calls will be recorded.
Call Recording
Record from ringing ~
Recording Trim
Disabled Silence will not be trimmed from recording
Secure Trunking ()
<b>Enabled</b> TLS must be used to encrypt SIP messages on port 5061, and SRTP must be used to encrypt the media packets. Any non-encrypted calls will be rejected
Call Transfer (SIP REFER)
Enabled Twilio will consume an incoming SIP REFER from your communications infrastructure and create an INVITE message to the address in the Refer-To header
Enable PSTN Transfer Allow Call Transfers to the PSTN via your Trunk.
Symmetric RTP(i)
<b>Enabled</b> Twilio will detect where the remote RTP stream is coming from and start sending RTP to that destination instead of the one negotiated in the SDP
Additional Features

## In the Termination section, select a Termination SIP URI.

Termination URI			
communications infrastructure	to direct SIP traffic towards Tw	ilio. Be sure to select a	unk. This URI will be used by your localized SIP URI to ensure your traffic takes ent to US1. Learn more about Termination
TERMINATION SIP URI	oracle	.pstn.twilio.com	
	Show Localized URIs		

Click on "Show localized URI's" and copy and paste this information as you will use this on your SBC to configure your Trunk.

oracle.pstn.ashburn.twilio.com
oracle.pstn.umatilla.twilio.com
oracle.pstn.dublin.twilio.com
oracle.pstn.frankfurt.twilio.com
oracle.pstn.sao-paulo.twilio.com
oracle.pstn.singapore.twilio.com
oracle.pstn.tokyo.twilio.com
oracle.pstn.sydney.twilio.com

or

### Assign the IP ACL ("Oracle") that you created in the previous step.

Authentication View all Aut	nentication lists		
The following IP ACLs and Creden	tial Lists will be used to authenticate the	e INVITE for	termination calls inbound to Twilio.
IP ACCESS CONTROL LISTS	$Oracle\times$	$\times \!$	0
CREDENTIAL LISTS	Click to select a Credential List	$\sim$	•

In the **Origination** section, we'll need to add Origination URI's to route traffic towards your Oracle SBC. The recommended practice is to configure a redundant mesh per geographic region (in this context a region is one of North America, Europe, etc.). In this case, we configure two Origination URIs, each egressing from a different Twilio Edge.

Click on 'Add New Origination URI', we'll depict the configuration for North America:

	Add Origination URL	$\times$
ORIGINATION SIP URI	sip:155.212.215.102;edge=ashburn	
PRIORITY	10 Priority ranks the importance of the URI. Values range from 0 to 65535, where the lowest number represents the highest importance.	
WEIGHT	10 Weight is used to determine the share of load when more than one URI has the same priority. Its values range from 1 to 65535. The higher the value, the more load a URI is given.	
ENABLED	ON	
	Cancel Add	d _

Continue to add the other Origination URIs, so you have the following configuration:

Or	gination URIs						
	Configure the IP address (or FQDN) of the network element entry point into your communications infrastructure (e.g. IP-PBX, SBC).						
Sho	w more about provisioning for high service availability						
Ŧ	ORIGINATION URI	PRIORITY	WEIGHT	ENABLED			
	sip:155.212.214.102;edge=ashburn	10	10	~	$\times$		
	sip:155.212.214.103;edge=umatilla	20	10	~	×		

In this example, Origination traffic is first routed via Twilio's Ashburn edge, if that fails then we'll route from Twilio's Umatilla edge.

### **10.3. Associate Phone Numbers on your Trunk**

In the **Numbers** section of your Trunk, add the Phone Numbers that you want to associate with each Trunk. Remember to associate the Numbers from a given country in the right Trunk. For example, associate US & Canada Numbers with the North American Trunk and European Numbers with the European Trunk etc.

Numbers	5				View my Address
	<b>ng Update:</b> Each nu o enable from one o		be associated with an emergen time.	icy address with matching	g ISO Country. Please
Number	~		Filter		Choose Action $ \smallsetminus $
NUMBER	FRIENDLY NAME	COUNTRY	EMERGENCY CALLING STATUS	EMERGENCY ADDRESS	
+1		US	Enabled	375 BEALE ST 3rd floor st	uite, SF, CA, 94105
+1		US	Enabled	375 BEALE ST 3rd floor st	uite, SF, CA, 94105
+1		US	Disabled		

## **11. Verification of Sample Call flows**

Once the configuration is complete, we can try making sample calls and can check the signaling path between Twilio Elastic Sip Trunk (PSTN Users) and Avaya Users

 Make Call from Avaya user to the Twilio Elastic Sip Trunk and check the call flow. The calls flow from Avaya SIP Interface to Twilio Elastic SIP Trunking Interface and to Twilio Session Agent and the call reaches the PSTN user after that.

					Dashboard	Configuration	Monitor and Trace	Widgets
iessions	Session List 8066255B-1DA7-EB11-1	0426-16399107	x89A7@10.232.50.2 ×					
Registrations		1121 11000101						
ubscriptions				ession Summary	-	_		
abacriptions	10.232.50.1	-		232.50.78				54.172.60.
Notable Events	2021-04-29 01:54:34.946	+	INVITE (324)	$\land$				
	2021-04-29 01:54:34.947	-	Status:100 (324)	¶ H				
	2021-04-29 01:54:34.960			FLOW ADD, ID				
	2021-04-29 01:54:34.960	1.00	MEDIA	FLOW ADD, IE	=16777218,	DIRECTION=0	CALLED	
	2021-04-29 01:54:34.964		EGRESS RC	DUTE, TYPE=, N	EXT HOP=si	p:+9173383911	01@aura.com	
	2021-04-29 01:54:34.964					-	INVITE (324)	
	2021-04-29 01:54:35.061						Status:100 (324	)
	2021-04-29 01:54:36.202						Status:183 (324	)
	2021-04-29 01:54:36.219		MEDIA H	LOW MODIFY,	ID=16777218	, DIRECTION	-CALLED	
	2021-04-29 01:54:36.220		MEDIA F	LOW MODIFY, I	D=16777217	, DIRECTION=	-CALLING	
	2021-04-29 01:54:36.225	-	Status:183 (324)	+				
	2021-04-29 01:54:45.685						Status:200 (324	)
	2021-04-29 01:54:45.695		Status:200 (324)	+				
	2021-04-29 01:54:45.711	+	ACK (324)					
	2021-04-29 01:54:45.714					+	ACK (324)	
			ing and ing a	n paratanan (nanata				
			Refresh Exp	ort diagram Expor	t session details			

ORACLE Enterprise	Session Border Controller							Û 🗕	admin
					Dashboard	Configuration	Monitor and Trace	Widgets	Syst
Sessions	Session List 8066255B-1DA7-EB11-9	42F-1A3881DA	\89A7@10.232.50.2 ¥						
Registrations	2021-04-29 01:54:34.964	1				→	INVITE (324)		<b>→</b>
Subscriptions	2021-04-29 01:54:35.061						Status:100 (324)		+
Subscriptions	2021-04-29 01:54:36.202					<b>←</b>	Status:183 (324)		•
Notable Events	2021-04-29 01:54:36.219		MEDIA I	FLOW MODIF	Y, ID=1677721	8, DIRECTION	=CALLED		
	2021-04-29 01:54:36.220		MEDIA F	LOW MODIF	Y, ID=1677721	, DIRECTION=	=CALLING		
	2021-04-29 01:54:36.225	←	Status:183 (324)	+					
	2021-04-29 01:54:45.685					<b>→</b>	Status:200 (324)		•
	2021-04-29 01:54:45.695		Status:200 (324)	+					
	2021-04-29 01:54:45.711	<b>→</b>	ACK (324)	$\rightarrow$					
	2021-04-29 01:54:45.714					+	ACK (324)		
	2021-04-29 01:55:01.410					<b>→</b>	BYE (1)		+
	2021-04-29 01:55:01.413	←	BYE (1)						
	2021-04-29 01:55:01.430	<b>→</b>	Status:200 (1)	<b>→</b>					
	2021-04-29 01:55:01.433					<b>→</b>	Status:200 (1)		$\rightarrow$
	2021-04-29 01:55:01.437		MEDIA F	LOW DELETI	E, ID=16777217	7, DIRECTION=	-CALLING		
	2021-04-29 01:55:01.438		MEDIA 1	FLOW DELET	E, ID=1677721	8, DIRECTION	=CALLED		
						Details f	or INVITE (324)		
			Refresh Exp	port diagram Ex	xport session details				

2///

2. When we register Avaya Remote Worker, we can see the registration happening through Oracle SBC to Avaya Session Manager as given below.

	rprise Session Border Controller							ΰ.	admin
					Dashboard	Configuration	Monitor and Trace	Widgets	Syst
Sessions	Registration List 020055abfec34et	v 8072ea7380r	42df6						
Registrations	The Bound of List		ALG10 A						
			[+] Ses:	sion Summa	ry				
Subscriptions	122.166.131.2	10			10.232.5	0.77		10.232.50	).127
Notable Events	2021-04-29 02:00:48.342	+	REGISTER (34168)	$\rightarrow$					
Notable Events	2021-04-29 02:00:48.345		EGRESS ROUT	E, TYPE=loc	al-policy, NE	XT HOP=sip:10	.232.50.127:5060		
	2021-04-29 02:00:48.345					<b>→</b>	REGISTER (3416	8) –	
	2021-04-29 02:00:48.352					←	Status:401 (34168	5)	•
	2021-04-29 02:00:48.354	←	Status:401 (34168)	+					
	2021-04-29 02:00:48.695	+	REGISTER (34169)	$\rightarrow$					
	2021-04-29 02:00:48.698		EGRESS ROUT	E, TYPE=loc	al-policy, NE	XT HOP=sip:10	.232.50.127:5060		
	2021-04-29 02:00:48.698					→	REGISTER (3416	9) -	
	2021-04-29 02:00:48.708					←	Status:200 (34169	9	+
	2021-04-29 02:00:48.710	←	Status:200 (34169)	+					
			SIP N	lessage Det	ails				
			Refresh Export d	liagram Exp	ort session details				

3. Make Call from Avaya Remote user to the Twilio Elastic Sip Trunk user and check the call flow. Now, there will be 2 call legs (hair pinned call) as the call reaches Avaya Session Manager first and then reaches Twilio trunk user after that as given below.

////

	erprise Session Border Controller			Dashboard Configur	ation Monitor and Trace	Widgets
essions						
	Session List a6418588e4074f01	885c03591974b88f 🗙				
egistrations		[+] :	Session Summa	rv		
bscriptions	122.166.131.21			10.232.50.77	10.	232.50.12
	2021-04-29 02:02:27.290	→ INVITE (30056)				
table Events	2021-04-29 02:02:27.290	← Status:100 (30056)	+			
	2021-04-29 02:02:27.305		FLOW ADD, ID	=33554433, DIRECTION	N=CALLING	
	2021-04-29 02:02:27.306	STOCK STOCK		=33554434, DIRECTIO		
	2021-04-29 02:02:27.312	EGRESS ROUTE, T	YPE=, NEXT H	OP= <sip:919535410905@< td=""><td>aura.com;transport=tls&gt;</td><td></td></sip:919535410905@<>	aura.com;transport=tls>	
	2021-04-29 02:02:27.312		1		INVITE (30056)	-
	2021-04-29 02:02:27.319				Status:100 (30056)	
	2021-04-29 02:02:27.323			·	Status:407 (30056)	
	2021-04-29 02:02:27.324			+	ACK (30056)	
	2021-04-29 02:02:27.328	← Status:407 (30056)	+			
	2021-04-29 02:02:28.000	→ ACK (30056)				
	2021-04-29 02:02:28.048	→ INVITE (30057)	<b>→</b>			
	2021-04-29 02:02:28.049	← Status:100 (30057)	+			
	2021-04-29 02:02:28.064	EGRESS ROUTE, T	YPE=, NEXT H	OP= <sip:919535410905(< td=""><td>@aura.com;transport=tls&gt;</td><td></td></sip:919535410905(<>	@aura.com;transport=tls>	
	2021-04-29 02:02:28.064			+	INVITE (30057)	-
		1	1010		C + 100 (30057)	
		Refresh E:	port diagram Ex	port session details		

			5	5		5			
	rise Session Border Controller							Û 🔺	admin
					Dashboard	Configuration	Monitor and Trace	Widgets	Syst
							-		
Sessions									
Desistations	Session List a6418588e4074f018	385c03591974b88f 🗙							
Registrations			[+] Ses	ssion Summary	,				
Subscriptions	10.232.50.127		10.232	2.50.78				54.172.60	).0
Notable Events	2021-04-29 02:02:28.083	→ INVITE	E (30057)			T			
Notable Events	2021-04-29 02:02:28.084	← Status:10	0 (30057)	+					
	2021-04-29 02:02:28.099		MEDIA FL	OW ADD, ID=	50331649, DI	RECTION=CA	LLING		
	2021-04-29 02:02:28.100 MEDIA FLOW HAIRPIN								
	2021-04-29 02:02:28.100	2021-04-29 02:02:28.100 MEDIA FLOW ADD, ID=50331650, DIRECTION=CALLED							
	2021-04-29 02:02:28.103	2021-04-29 02:02:28.103 EGRESS ROUTE, TYPE=, NEXT HOP= <sip:+919535410905@aura.com;transport=tls></sip:+919535410905@aura.com;transport=tls>							
	2021-04-29 02:02:28.103					<b>→</b>	INVITE (30057)	_	$\rightarrow$
	2021-04-29 02:02:28.198					←	Status:100 (30057	)	+
	2021-04-29 02:02:29.065					←	Status:183 (30057	)	+
	2021-04-29 02:02:29.086		MEDIA FLO	W MODIFY, II	D=50331650,	DIRECTION=	CALLED		
	2021-04-29 02:02:29.087		MEDIA FLO	W MODIFY, II	)=50331649, I	DIRECTION=0	CALLING		
	2021-04-29 02:02:29.092	← Status:18	3 (30057)	+					
	2021-04-29 02:02:40.318					←	Status:200 (30057	)	+
	2021-04-29 02:02:40.330	← Status:20	0 (30057)	+					
	2021-04-29 02:02:40.709	→ ACK (	(30057)	$\rightarrow$					
			Refresh Expo	ort diagram Expo	ort session details				

4. Make Call from the Twilio Elastic Sip Trunk to Avaya User and check the call flow. The calls flow from Twilio Elastic SIP Trunking Interface to Avaya SIP Interface and the call reaches the Avaya user after that.

7////

URACLE Ent	erprise Session Border Controller			Li 🗸 aun
			Dashboard Configurati	ion Monitor and Trace Widgets Sy
Sessions				
Registrations	Session List 49451ffc697c96a9253e9	7df44043fe9@0.0.0.0 ×		
0		[+] Session Sum	nmary	
Subscriptions	54.172.60.2		10.232.50.78	10.232.50.127
Notable Events	2021-04-29 02:25:43.377	INVITE (541073) $\bigwedge \longrightarrow$	٨	
Notable Events	2021-04-29 02:25:43.378 +	— Status:100 (541073) 👖 🕂	۲ (	
	2021-04-29 02:25:43.391	MEDIA FLOW ADD	, ID=50331649, DIRECTION=	CALLING
	2021-04-29 02:25:43.392	MEDIA FLOW ADD	, ID=50331650, DIRECTION=	CALLED
	2021-04-29 02:25:43.394	EGRESS ROUTE, TYPE=local-polic	cy, NEXT HOP=sip:+17692105	055@10.232.50.127:5060
	2021-04-29 02:25:43.394		+	INVITE (541073)
	2021-04-29 02:25:43.401		←	Status:100 (541073) +
	2021-04-29 02:25:43.462		←	Status:180 (541073) +
	2021-04-29 02:25:43.467 ←	— Status:180 (541073) ←		
	2021-04-29 02:26:02.699		←	Status:200 (541073) +
	2021-04-29 02:26:02.718	MEDIA FLOW MODI	FY, ID=50331650, DIRECTION	N=CALLED
	2021-04-29 02:26:02.719	MEDIA FLOW MODIF	Y, ID=50331649, DIRECTION	I=CALLING
	2021-04-29 02:26:02.723 ←	— Status:200 (541073) ←		
	2021-04-29 02:26:02.827 +	ACK (541073) →		
	2021-04-29 02:26:02.830		<b>→</b>	ACK (541073) →
		Refresh Export diagram	Export session details	
		Refresh Export diagram	Export session details	

5. Make Call from Twilio Elastic Sip Trunk user to Avaya Remote user and check the call flow. Now, there will be 2 call legs (hair pinned call) as the call reaches Avaya Session Manager first and then reaches Avaya Remote user after that as given below

ORACLE Ente	erprise Session Border Controller							۵.	admir
					Dashboard	Configura	tion Monitor and Trace	Widgets	Sy
Sessions	Session List 4f529a30969	)e421dad38e8	4446572a4@0.0.0.0 🗙						
Registrations			[4]	Session Sun	nman/				_
Subscriptions	54.172.	50.1		Jession Jul	10.232.50.78		1	0.232.50.1	27
	2021-04-29 02:14:06.8		INVITE (105203)	)					-
Notable Events	2021-04-29 02:14:06.8	2 +	Status:100 (105203)	+					
	2021-04-29 02:14:06.8	8	MEDIA	FLOW ADD	, ID=16777217, DIR	ECTION	=CALLING		
	2021-04-29 02:14:06.898 MEDIA FLOW ADD, ID=16777218, DIRECTION=CALLED								
	2021-04-29 02:14:06.9	0	EGRESS ROUTE, TYP	E=local-polic	cy, NEXT HOP=sip:	+1850790	4044@10.232.50.127:50	60	
	2021-04-29 02:14:06.9	0				+	INVITE (105203)	-	
	2021-04-29 02:14:06.9	8				←	Status:100 (105203)		+
	2021-04-29 02:14:06.9	6		ME	DIA FLOW HAIRF	IN			
	2021-04-29 02:14:07.6	7					Status:180 (105203)		+
	2021-04-29 02:14:07.6	2 ←	Status:180 (105203)	+					
	2021-04-29 02:14:12.0	9					Status:200 (105203)		+
	2021-04-29 02:14:12.0	8	MEDIA F	LOW MODI	FY, ID=16777218, D	IRECTIO	N=CALLED		
	2021-04-29 02:14:12.0	8	MEDIA F	LOW MODIF	FY, ID=16777217, D	IRECTIO	N=CALLING		
	2021-04-29 02:14:12.0	3 +	Status:200 (105203)	+					
	2021-04-29 02:14:12.1	7 →	ACK (105203)	$\longrightarrow$					
		•	Refresh	Export diagram	Export session details				

	erprise Session Border Controller			Dashboard (	Configuration	Monitor and Trace	Widgets	Sy
Sessions	Session List 4f529a305	690e421dad38e84446572a4@0.0.0.0 ×						
Registrations								_
Subscriptions	10 000 50 107		Session Summar	/		100	166 101 0	
	10.232.50.127	10.232.50	0.77			122	.166.131.2	10
Notable Events	2021-04-29 02:14:06.919	INVITE (105203) -	<b>→</b>					
	2021-04-29							
	02:14:06.920	Status: 100 (105203)	7	5.0				
	2021-04-29	MEDIA FLOW ADD, ID=33554433, DIRECTION=CALLING						
	02:14:06.934	MEDIA FLOW ADD, ID-53554455, DIRECTION-CALLING						
	2021-04-29	MEDIA FLOW HAIRPIN						
	02:14:06.935							
	2021-04-29	MEDIA FLOW ADD, ID=33554434, DIRECTION=CALLED						
	02:14:06.936						-	
	2021-04-29	EGRESS ROUTE, TYPE=local-policy,		0		10 C T	TLS;ob;	
	02:14:06.939	acme_nat=183	507904044+122.16	6.131.210@192.1	168.1.6:5005	15>		
	2021-04-29 02:14:06.939			+		INVITE (105203)	-	-
	2021-04-29							
	2021-04-29			- I -	¢	tatue-100 (105203)		

## Appendix A

Following are the test cases that are executed between Avaya User with the Twilio Elastic SIP Trunk (PSTN user). Please note that Avaya User here refers both Avaya User inside Enterprise network as well as Avaya Remote worker.

////

Serial Number	Test Cases Executed	Result
1	Avaya user disconnects an inbound connected call	Pass
2	Avaya user disconnects an outbound connected call	Pass
3	Twilio Elastic SIP Trunk user disconnects an inbound connected call	Pass
4	Twilio Elastic SIP Trunk User disconnects an outbound connected call	Pass
5	Avaya user places inbound call from Twilio Elastic SIP Trunk user on hold and then resumes	Pass
6	Avaya user makes outbound call to Twilio Elastic SIP Trunk user and put that call on hold and then resumes	Pass
7	Twilio Elastic SIP Trunk user places inbound call from Avaya user on hold and then resumes	Pass
8	Twilio Elastic SIP Trunk user makes outbound call to Avaya user and put that call on hold and then resumes	Pass
9	Avaya user places inbound call from Twilio Elastic SIP Trunk user on hold for over 15/30 minutes and then resumes	Pass
10	Avaya user makes outbound call to Twilio Elastic SIP Trunk user and places the call on hold for over 15/30 minutes and then resumes	Pass
11	Inbound Twilio Elastic SIP Trunk call to Avaya blind transferred to second Avaya/ PSTN User	Pass
12	Outbound Twilio Elastic SIP Trunk call from Avaya user blind transferred to second Avaya/ PSTN User	Pass
13	Inbound Twilio Elastic SIP Trunk Call to Avaya consultatively transferred to Avaya/ PSTN User	Pass
14	Outbound Twilio Elastic SIP Trunk call from Avaya user consultatively transferred to Avaya/ PSTN User	Pass
15	Avaya user makes outbound call to Twilio Elastic SIP Trunk user and makes a conference call by adding another Avaya/ PSTN user.	Pass

16	Twilio Elastic SIP Trunk user makes outbound call to Avaya user and Avaya user makes a conference call by adding another Avaya/ PSTN user.	Pass
17	Avaya user mutes inbound call from Twilio Elastic SIP Trunk user and then unmutes	Pass
18	Avaya user mutes outbound call made to Twilio Elastic SIP Trunk user and then unmutes	Pass
19	Twilio Elastic SIP Trunk user mutes inbound call from Avaya user and then unmutes	Pass
20	Twilio Elastic SIP Trunk user mutes outbound call made to Avaya user and then unmutes	Pass
21	Twilio Elastic SIP Trunk User disconnects outbound call to Avaya user before it is answered	Pass
22	Avaya user disconnects outbound call to Twilio Elastic SIP Trunk user before it is answered	Pass

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