ORACLE

Oracle Session Border Controller with Zoom Contact Center BYOC

Technical Application Note

ORACLE

COMMUNICATIONS

Disclaimer

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Contents

1 Document Overview

Designed to increase productivity, Zoom Contact Center streamlines communication to foster a greater sense of collaboration between colleagues and augment the customer experience. Oracle Enterprise SBC protect critical, real-time communications for collaboration, unified communications (UC), and contact centers. Oracle Enterprise Session Border Controller (E-SBC) lets you interconnect SIP trunks, on-premises enterprise telephony, UCaaS, CCaaS, and any other SIP service with security, reliability, quality, and scalability and can be deployed in your own network, as well as in major public clouds.

This document focuses how to connect Oracle SBC to Zoom Contact Center to provide PSTN connectivity in a BYOC environment.

Related Documentation can be found below-

1.1 Oracle SBC

- Oracle® Session Border Controller ACLI Configuration Guide
- Oracle® Session Border Controller Release Notes
- Oracle® Session Border Controller Security Guide

1.2 Zoom Contact Center

- https://explore.zoom.us/en/products/contactcenter/
- https://blog.zoom.us/introducing-zoom-contact-center/
- https://support.zoom.us/hc/en-us/categories/4423802887949-Zoom-Contact-Center-Support

2 Revision History

As a best practice always follow the latest Application note available on the Oracle TechNet Website.
https://www.oracle.com/technical-resources/documentation/acme-packet.html

Version	Date Revised	Description of Changes
1.0	06/12/2023	• Initial publication

3 Intended Audience

This document describes how to connect the Oracle SBC to Zoom Contact Center BYOC. This paper is intended for IT or telephony professionals.

Note: To zoom in on screenshots of Web GUI configuration examples, press Ctrl and +.

3.1 Validated Oracle Versions

We have successfully conducted call testing with the Oracle Communications SBC versions:SCZ9.2p3

These software releases with the configuration listed below can run on any of the following products:

- AP 1100
- AP 3900
- AP 4600
- AP 6350
- AP 6300
- AP3950
- AP4900
- VME
- Oracle SBC on Public Cloud

Please visit https://docs.oracle.com/en/industries/communications/session-border-controller/index.html for further information.

4 Infrastructure Requirements

The table below shows the list of infrastructure prerequisites for deploying Zoom Contact Center BYOC.

Session Border Controller (SBC)	**See Zoom Documentation for More Details**
SIP Trunks connected to the SBC	
Zoom Contact Center License	
Public IP address for the SBC	
Public trusted certificate for the SBC (If TLS transport is used)	
Firewall ports for Zoom Contact Center signaling	
Firewall IP addresses and ports for Zoom Contact Center media	
Media Transport Profile	
Firewall ports for client media	

5 Zoom Contact Center BYOC Configuration

This document only covers the steps required to configure Oracle SBC with Zoom Contact Center BYOC. There may be other components that are part of the Zoom Contact Center BYOC Setup which are not included in this document. The document focuses on the important configuration elements related to setting up the Zoom Contact Center environment. We have provided a reference to the Zoom configuration required in the Application Note however additional configuration elements may be required to be configured as per your respective implementation .Please refer the Zoom support articles or contact your Zoom representative for understanding of the implementation.

Please contact your Zoom Sales representative to procure the Zoom Contact Center access and License.
For detailed assistance with setting up and configuring your Zoom Contact Center BYOC System please reach out to Zoom Sales: https://zoom.us/contactsales

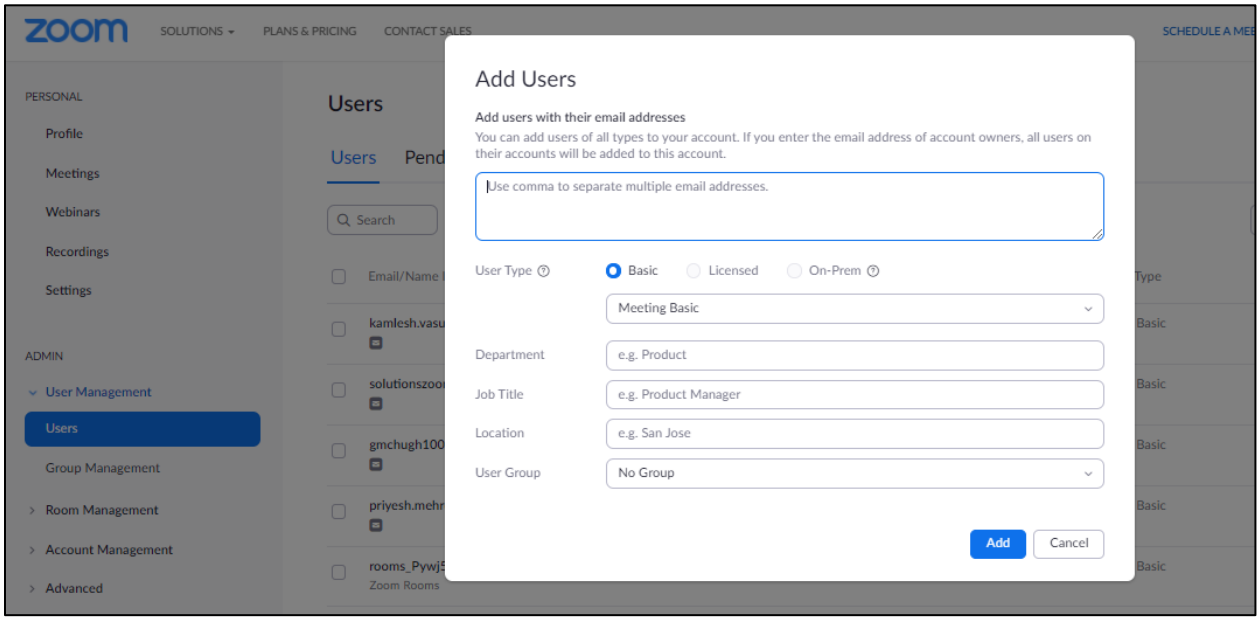
5.1 Create a Zoom User

Login to the Zoom Web Portal through your administrator credentials and

Navigate to **Admin > User Management > Users**.

Click Add to create new Zoom users.

Provide the necessary details about the New User and Click on Add to Add the User.



Once the New User is added it will start reflecting in **Admin >Users** Section on the Web portal.

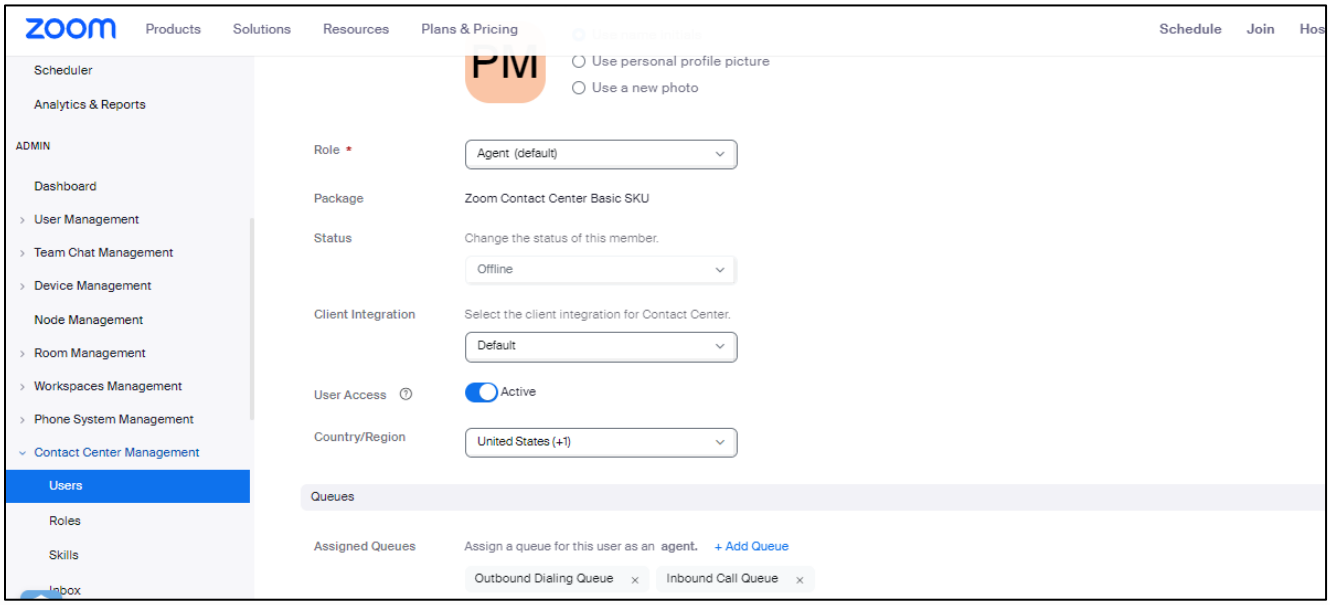
5.2 Zoom Contact Center user

Reference Zoom Article - https://support.zoom.us/hc/en-us/articles/4423978411405-Managing-Zoom-Contact-Center-users-

Zoom Contact Center admins can assign or remove Zoom Contact Center licenses to existing Zoom users. You can add an existing user in the Zoom account to Zoom Contact Center.

1. Sign into the Zoom web portal.
2. In the navigation menu, click Contact Center Management then Users.
3. Click Add.
4. In the General section, specify the following required information:
    - User(s): Click Add, select the users to assign licenses to, then click Add.
    - Role: Select the role to assign to the user.
5. (Optional) Change the user's settings.
   Note: Some settings are only available after you've added the user, and you're changing user settings.
6. Click Save.
   Users will receive an email notification.

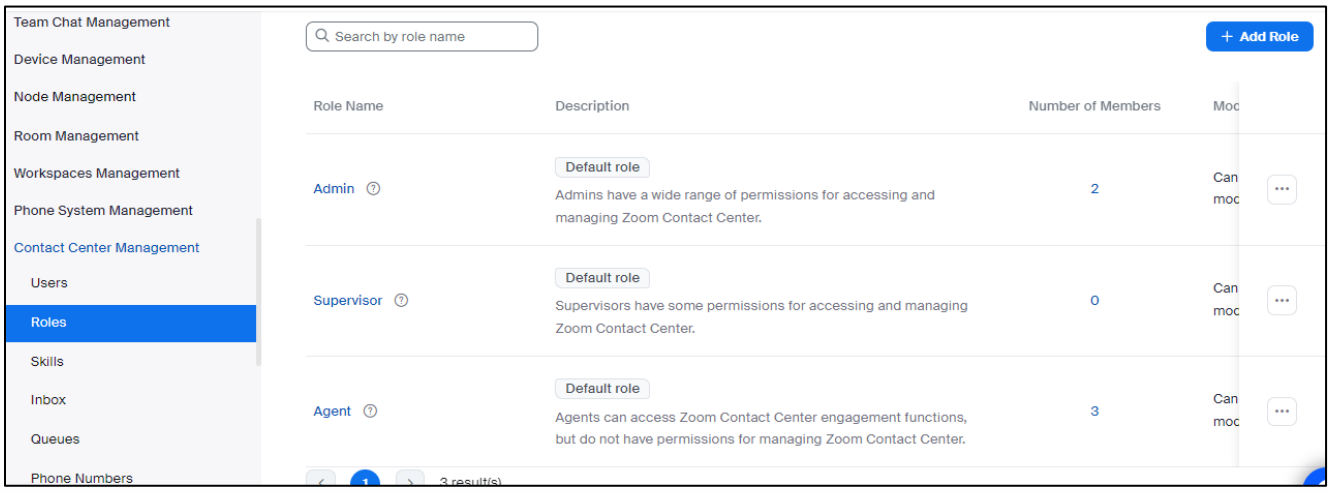
Below is an example of a sample Zoom Contact Center Agent created from Zoom Portal.



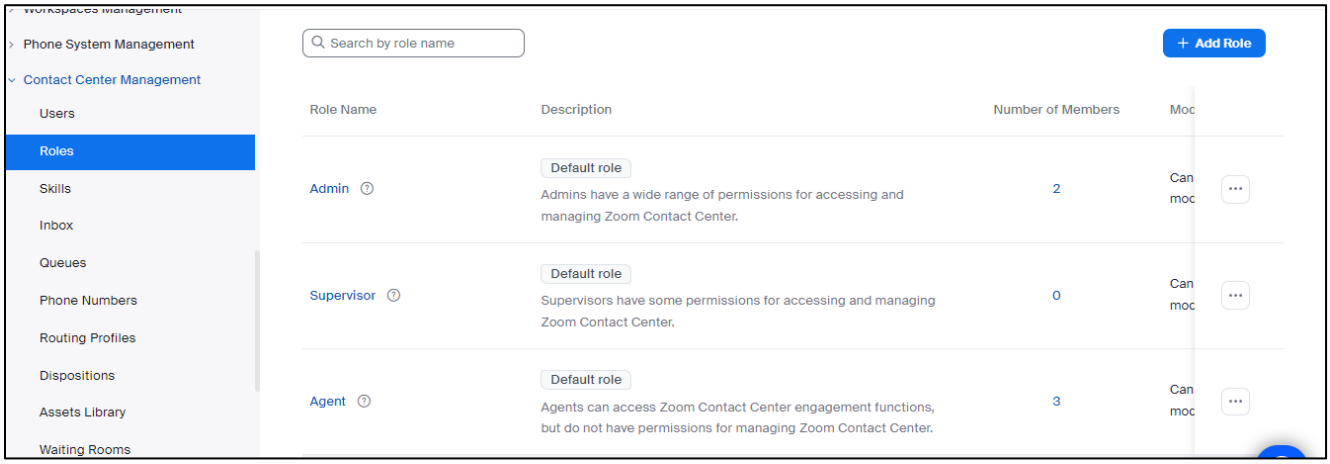
5.3 Zoom Contact Center Role

Zoom reference article - https://support.zoom.us/hc/en-us/articles/4471054202253-Using-Zoom-Contact-Center-role-management

There are three default roles that you can add members to. You can't delete these roles, but you can duplicate these roles to use as a starting point for a new custom role.



Below example from Zoom Portal displays the 2 users are created with admin privileges and 3 Users are created as Agents in the test environment.



5.4 Queues.

Zoom reference article – https://support.zoom.us/hc/en-us/articles/4423986595085-Managing-Zoom-Contact-Center-queues

Zoom Contact Center admins can create queues and add queue members. Queues determine the agents that calls are routed to. Queues also link to an existing routing profile to determine how calls are routed. After creating a queue, you can change queue settings.

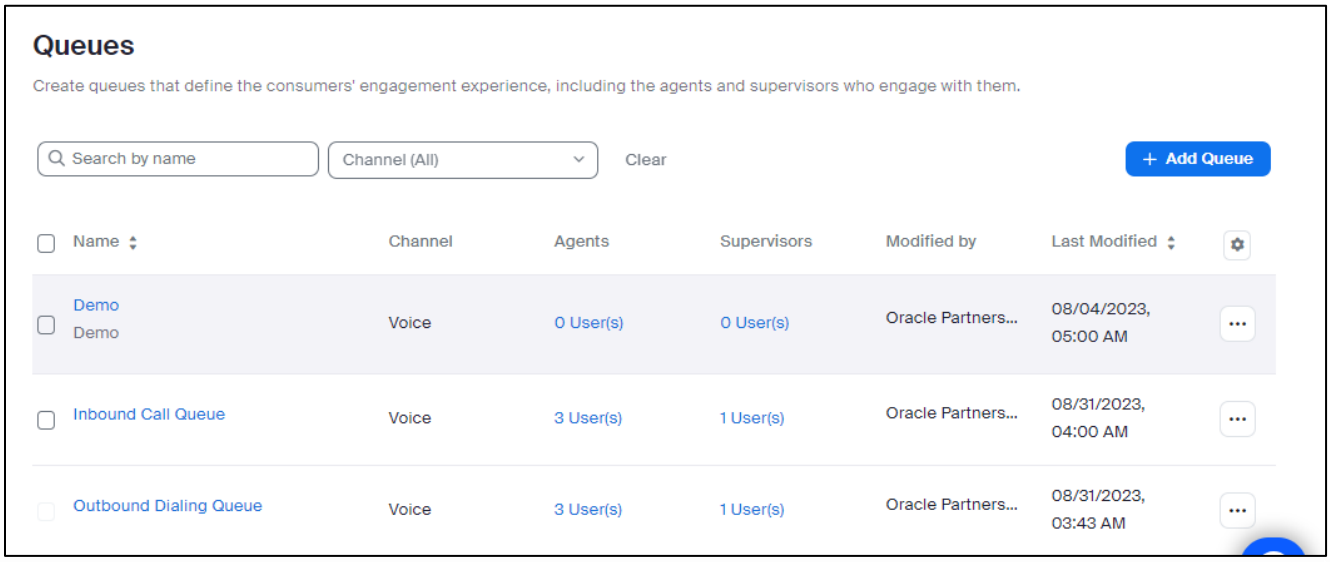
To create a queue -

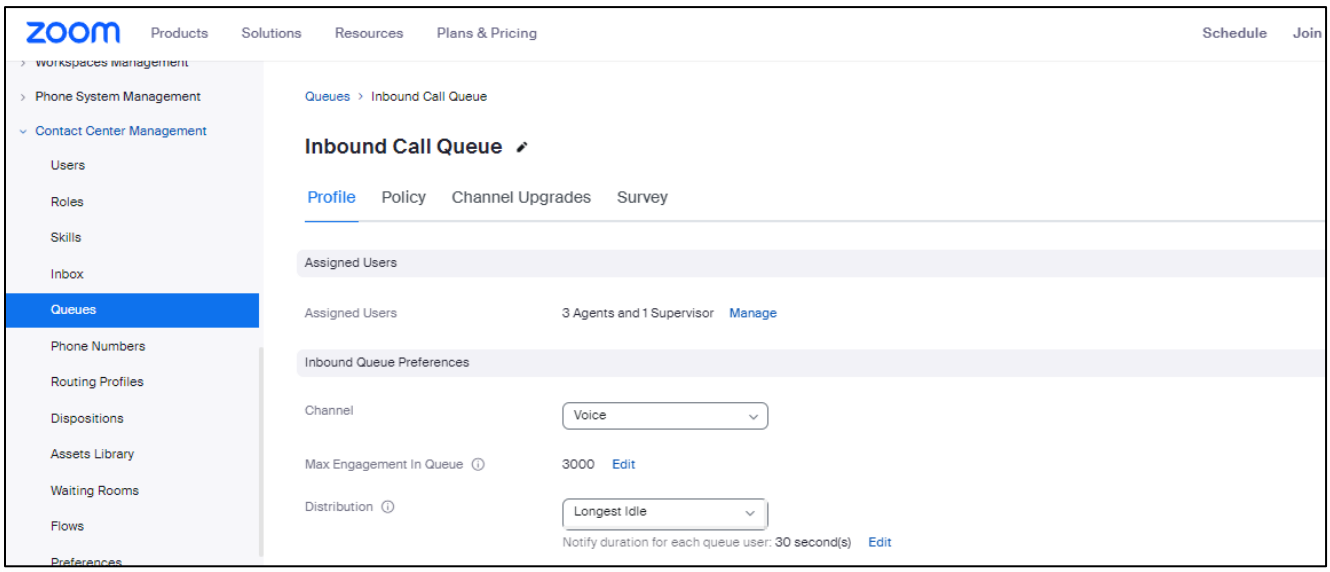
1. Sign into the Zoom web portal.
2. In the navigation menu, click **Contact Center Management** then **Queues**.
3. Click **Add**.
4. Enter the following information:

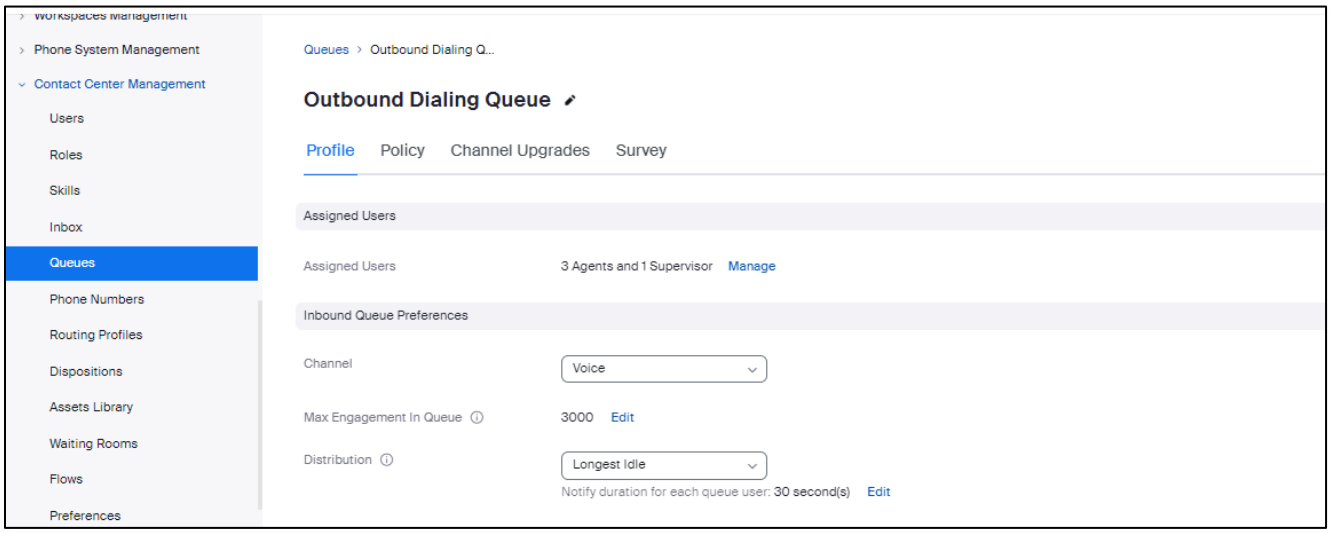
- **Name**: Enter a display name to help identify the queue.
- **Description (Optional)**: Enter a description for the queue.
- **Channel**: Select the channel type for the queue. This corresponds to the flow channel and trigger type.
    - **Voice (Choose Voice for BYOC voice calls)**
- **Agents**: Click **Add** to add agents as queue members.

5. Click **Save**.

Below example shows the 2 voice channel queues we have created for the test environment.







5.5 Add the Oracle Session Border Controller.

You must add the Oracle SBCs Public IP onto the Zoom Portal that will establish the connectivity with Zoom Contact Center BYOC.

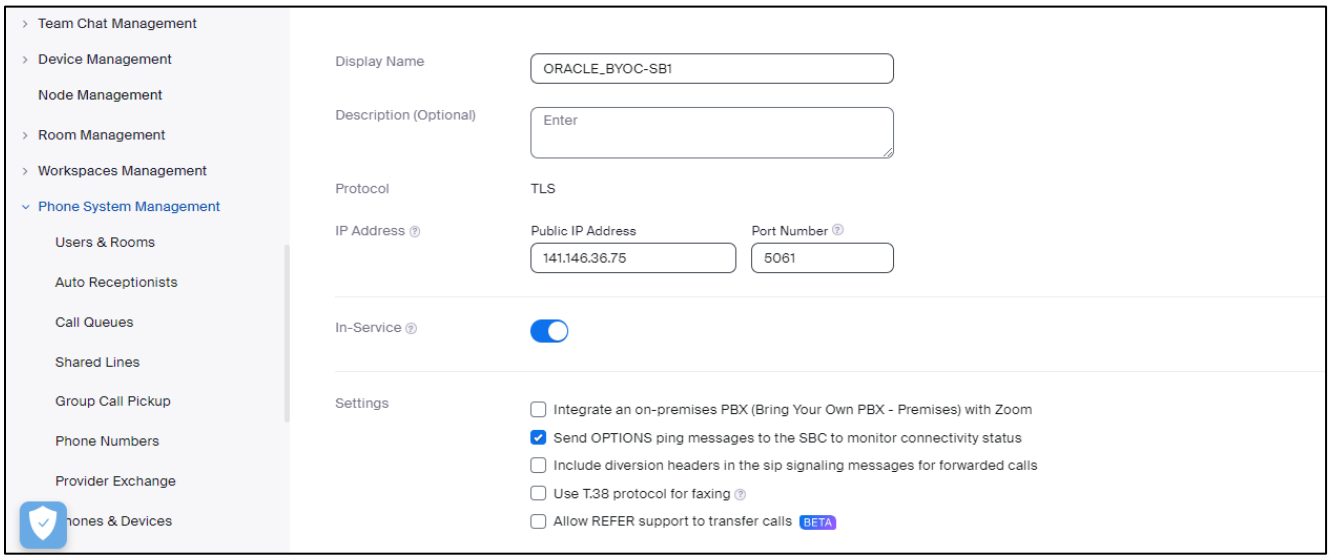
Navigate to Phone System Management > Company info > Account settings > Session Border Controllers > Manage

Enter the Oracle SBCs Public IP address and port

Enable below parameters.

Integrate an on-premises PBX (Bring Your Own PBX - Premises) with Zoom

Send OPTIONS ping messages to the SBC to monitor connectivity status



You can add more than one SBCs. Once the SBCs are added contact your Zoom representative to whitelist the IP and Port in their ACLs before you can start sending traffic and check the SIP connectivity through SIP OPTIONS once the transport is established.

5.6 Route Group

Route Groups are composed of one or more Session Border Controllers and assigned to SIP groups to determine the routing behavior for BYOC-P and BYOP-P calls. When a Route Group is assigned to a Region, calls are originated or terminated on the Zoom data centers that are part of that Region.

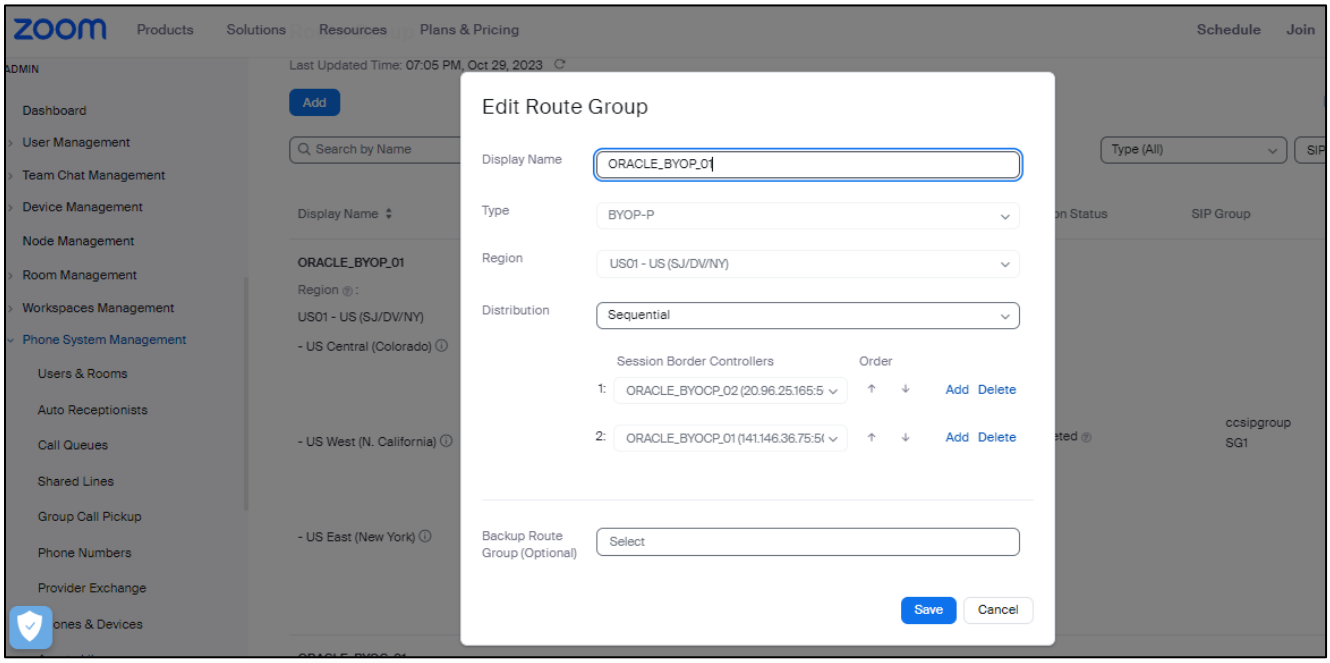
To create a route group.

Navigate to Phone System Management > Company info > Account settings > Route Groups

Click Add

Enter the Display Name
Type – BYOC-P
Region – Choose the appropriate region as per the geographic details of your implementation.
Distribution type – Can be sequential or Load Balancing.

Below is an example of Route Group from Zoom Admin Center.



Once you add the Route Group Click on the Provision Button. It will take approximately 10 mins for the route group to provision and the state will change to In Progress and further completed once it is provisioned.

Contact Center Route Group

Region :	Sequential :					
US01 - US (SJ/DV/NY)						
- US West (N. California)	ORACLE_BYOCP_... (141.146.36.75:5061)	BYOC-P	--	Provision	Edit	···
- US Central (Colorado)	ORACLE_BYOCP_... (141.146.36.75:5061)					
- US East (New York)	ORACLE_BYOCP_... (141.146.36.75:5061)					

Display Name	Session Border Controllers	Type	Backup Route Group	Provision Status	SIP Group	
testRG						
Region :	Load Balancing :					
US01 - US (SJ/DV/NY)						
- US Central (Colorado)	ORACLE_BYOCP_... (141.146.36.75:5061)	BYOC-P	--	In Progress	Edit	···
- US West (N. California)	ORACLE_BYOCP_... (141.146.36.75:5061)					
- US East (New York)	ORACLE_BYOCP_... (141.146.36.75:5061)					

ORACLE_BYOP_01

Region :	Sequential :					
US01 - US (SJ/DV/NY)						
- US Central (Colorado)	ORACLE_BYOCP_... (20.96.25.165:5061)					
	ORACLE_BYOCP_... (141.146.36.75:5061)					
- US West (N. California)	ORACLE_BYOCP_... (20.96.25.165:5061)	BYOP-P	--	Completed	ccsipgroup SG1	Edit ···
	ORACLE_BYOCP_... (141.146.36.75:5061)					
- US East (New York)	ORACLE_BYOCP_... (20.96.25.165:5061)					
	ORACLE_BYOCP_... (141.146.36.75:5061)					

5.7 SIP Group

Define SIP Groups and assign Route Groups to them, so as to route the calls placed by BYOC numbers. Any outgoing calls from the SIP Groups will be routed to the specific Route Groups.
Creating SIP group is mandatory as you will require them while uploading BYOC Numbers.

To create a SIP group

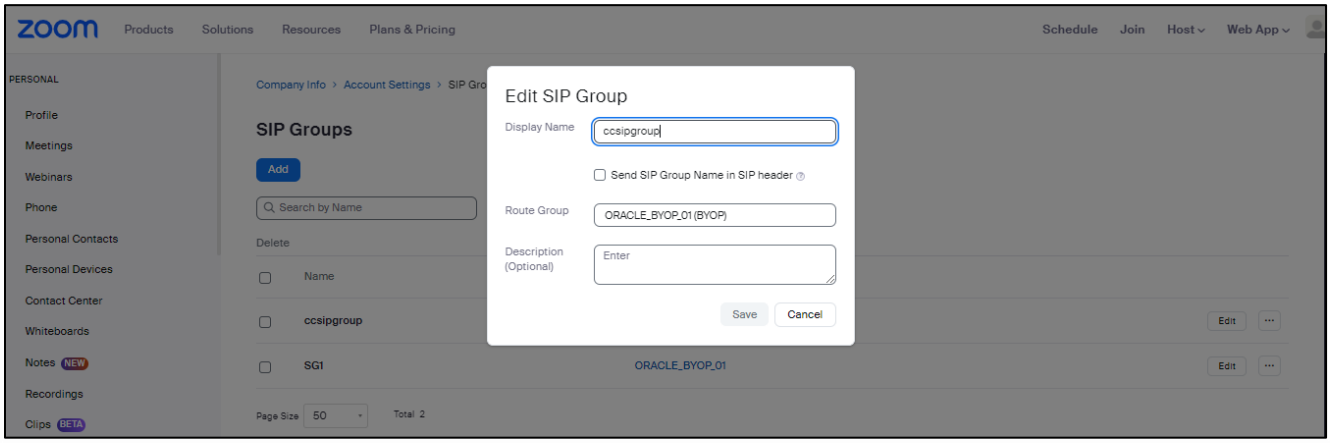
Navigate to Phone System Management > Company info > Account settings > Sip Groups

Enter Display Name

Select one of the previously created route group to bind the route group to the SIP Group.

Click Save

Below is an example from the Zoom Web Portal of the SIP Group.



5.8 Add Contact Center BYOC Number

You can add your phone numbers provided by your own carriers into Zoom. These numbers can act as entry point to a flow.

Reference article - https://support.zoom.us/hc/en-us/articles/4471534794893-Managing-Zoom-Contact-Center-phone-numbers

Navigate to Contact Center Management > Phone Numbers.

1.Choose BYOC Section to add the BYOC Number.

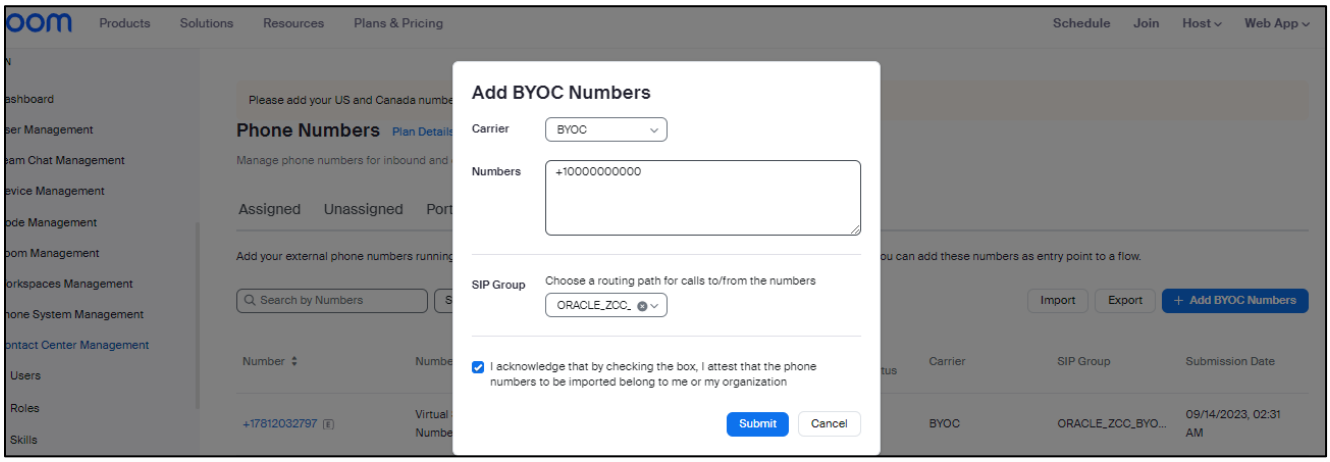
Click on Add BYOC Numbers

You can add the numbers individually or can upload a csv file as well.

Site – Chose a site for your implementation.

Carrier – BYOC

SIP Group – Choose the SIP Group created previously in Step 5.7



5.9 Contact Center Flows

The Zoom Contact Center flow editor is a graphical programming environment for creating and adjusting channel workflows.

Reference article - https://support.zoom.us/hc/en-us/sections/4424229774861-Flow-Editor

To create Flows Navigate to **Contact Center Management > Flows**

Add Flow

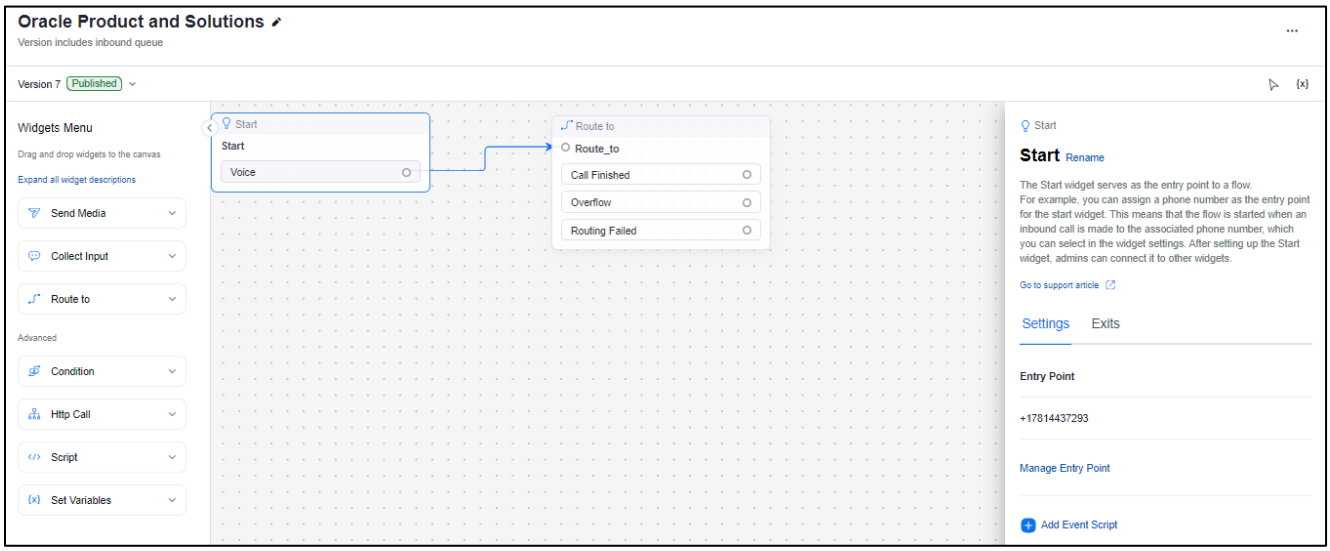
Create the appropriate flows as per your organization needs.

Below is an example of a sample inbound call flow that uses a BYOC number as an entry point. The customer is the below example dial the number to reach Zoom Contact center. These calls will be routed from the carrier trunk to Oracle SBC which will terminate it to the Zoom Contact Center Platform.

Please follow Zoom Support articles to create the flows according to your need.

Below article demonstrates how to manage a flow entry point to assign a BYOC number to the flow.

https://support.zoom.us/hc/en-us/articles/4472948997133-Customizing-the-Start-widget

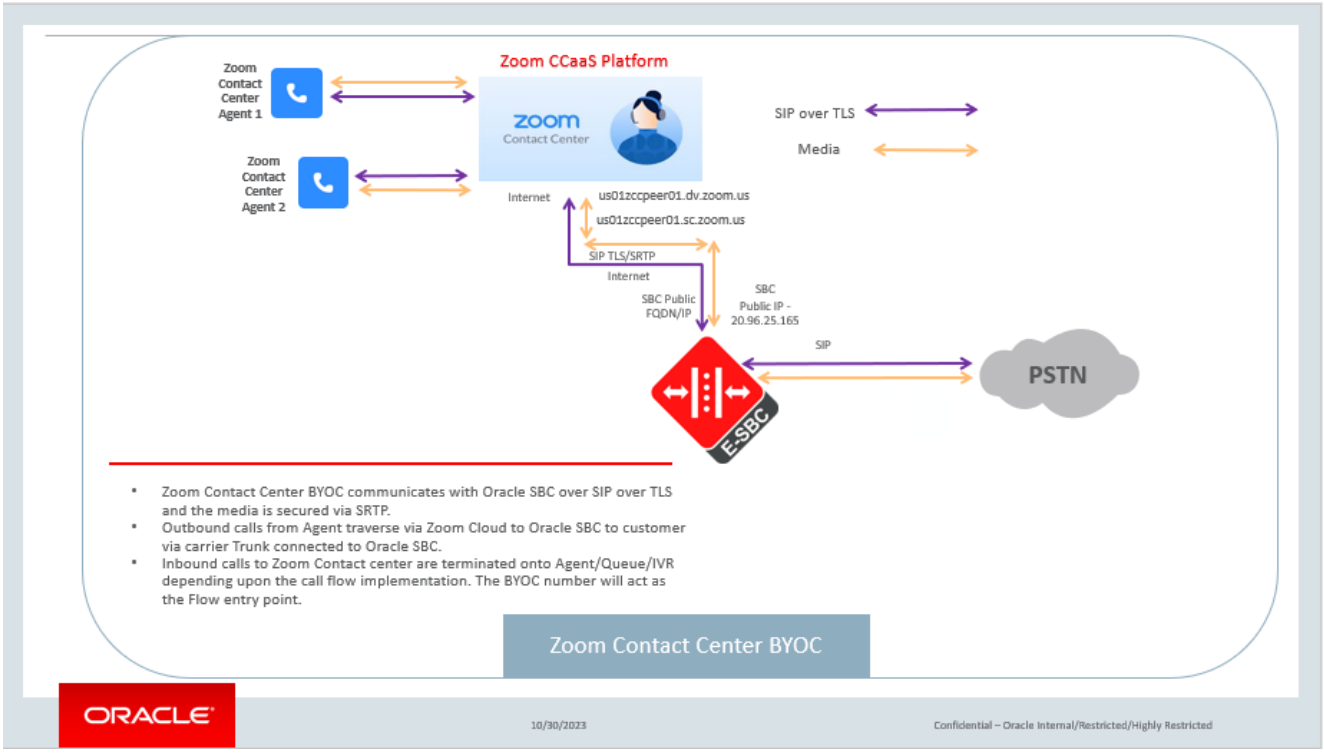


6 Configuration

This chapter provides step-by-step guidance on how to configure Oracle SBC for interworking with Zoom Contact Center BYOC.

All testing were performed in Oracle Labs. Below is an outline of the network setup used to conduct all testing between the Oracle SBC and Zoom Contact Center BYOC platform.

These instructions cover configuration steps between the Oracle SBC and Zoom Contact Center BYOC. The complete interconnection of other entities, such as connection of the SIP trunk, 3rd Party PBX and/or analog devices are not fully covered in this instruction. The details of such connection are available in other instructions produced by the vendors of retrospective components.



Above Figure illustrates how customers can utilize Oracle SBC to connect to provide PSTN connectivity to Zoom Contact Center Agents. PSTN Calls originating from Zoom Contact Center BYOC System are routed to customer's PSTN Trunk from Oracle SBC.

Inbound calls from PSTN to Zoom Contact Center are terminated to the Contact Center Flow entry Point from which the calls are routed for further treatment as per your organizational needs.

For the purpose of this application note the connection to Zoom Contact Center and Oracle SBC is TLS/SRTP.

6.1 Prerequisites

Before you begin, make sure that you have the following per every SBC you want to pair:

- Public IP address
- Public certificate issued by one of the supported CAs
- Zoom Public CA certificates to add to trust store of SBC

There are two methods for configuring the Oracle SBC, ACLI, or GUI.For the purposes of this note, we'll provide both ACLI and WebGUI examples.

This guide assumes the Oracle SBC has been installed, management interface has been configured, product selected and entitlements have been assigned. If you require more information on how to install your SBC platform, please refer to the ACLI configuration guide.

Any configuration parameter not specifically listed below can remain at the ORACLE SBC default value and does not require a change for connection to Zoom Contact Center BYOC to fuction properly,however this should note should be treated as basic guidelines and there may be a need to implement additional Oracle SBC configuration parameters in your production setup.

Contact your Oracle Sales representative if you require assistance in configuring the Oracle SBC.

Note: All network parameters, ip addresses, hostnames etc..are specific to Oracle Labs, and cannot be used outside of the Oracle Lab enviroment. They are for example purposes only!!!

6.2 Global Configuration Elements

Before you can configuration more granular parameters on the SBC, there are four global configuration elements that must be enabled (nap optional) to proceed.

- System-Config
- Media-manager-Config
- SIP-Config
- Ntp-config

6.2.1 System-Config

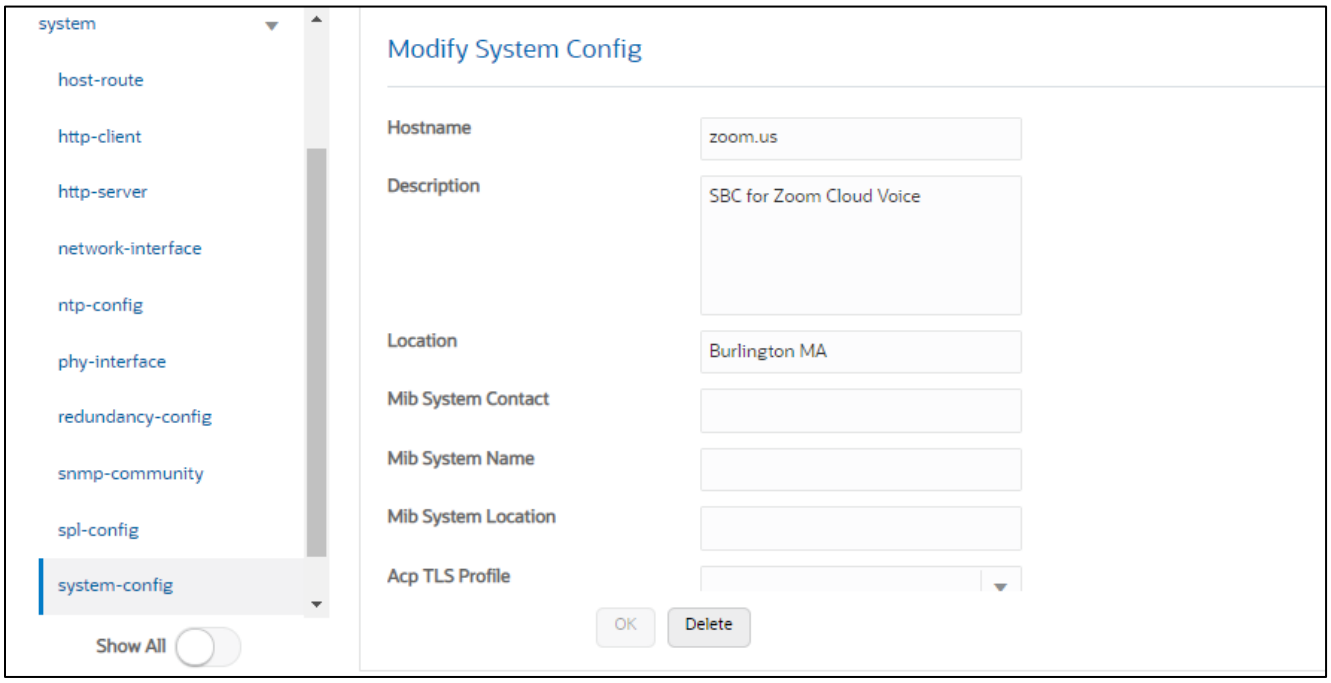
To configure system level functionality for the ORACLE SBC, you must first enable the system-config

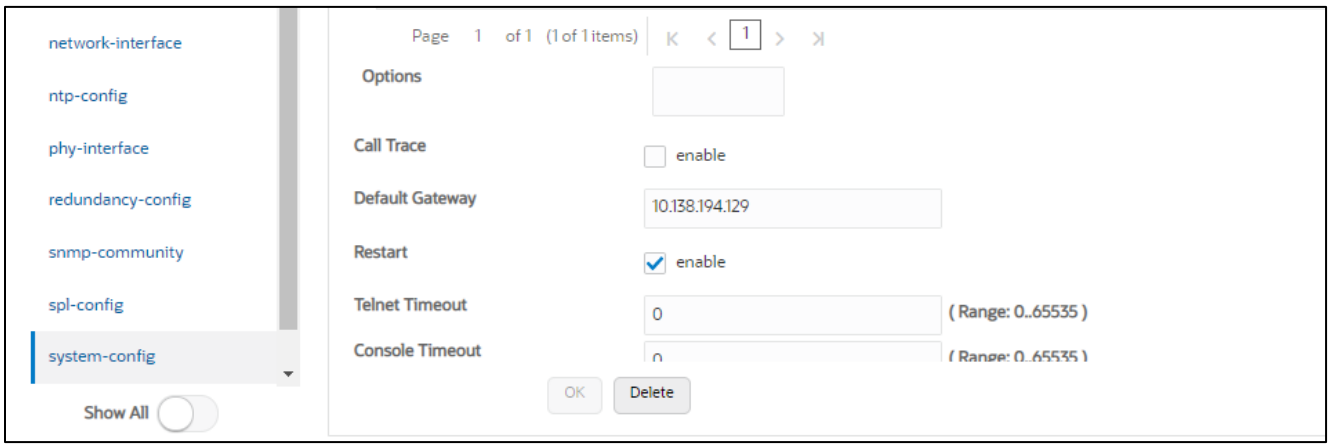
GUI Path: system/system-config

ACLI Path: config t→system→system-config

Note: The following parameters are optional but recommended for system config

- Hostname
- Description
- Location
- Default-gateway *(recommend using the management interface gateway for this global setting)*





- Click the OK at the bottom of the screen.

To configure system-config from ACLI –

ACLI Path: config t→system→system-config

```
system-config
      hostname                    oraclesbc.com
      description                 SBC for Zoom Cloud Voice
      location                    Burlington, MA
```

- Perform a save and activate configuration for changes to take effect.

6.2.2 Media Manager

To configure media functionality on the SBC, you must first enabled the global media manager

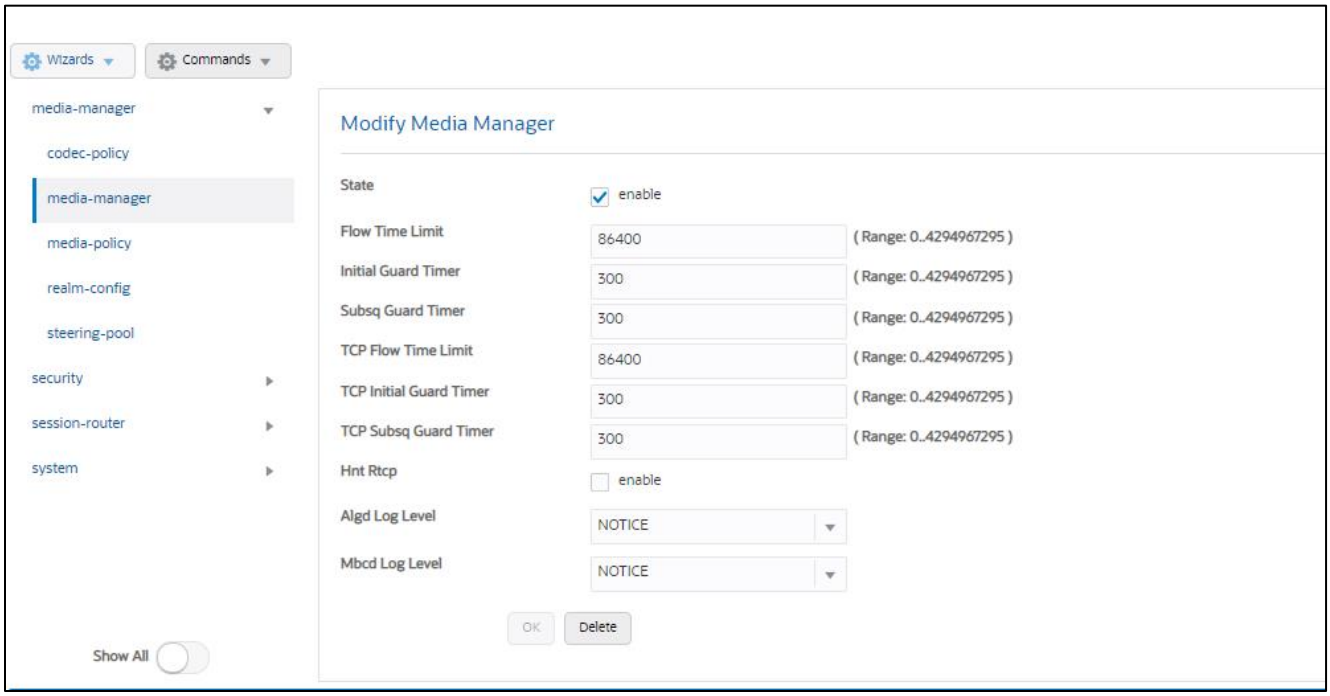
GUI Path: media-manager/media-manager

ACLI Path: config t→media-manager→media-manager-config

The following options are recommended for global media manager to help secure the SBC.

- Max-untrusted-signalling
- Min-untrusted-signalling

The values in both these fields are related to the SBC's security configuration. For more detailed security configuration options, please refer to the SBC's Security Guide.



- Click OK at the bottom.

To enable media-manager from ACLI –

ACLI Path: config t→media-manager→media-manager-config

```
media-manager
      state                    enabled
```

- Perform a save and activate configuration for changes to take effect.

6.2.3 SIP Config

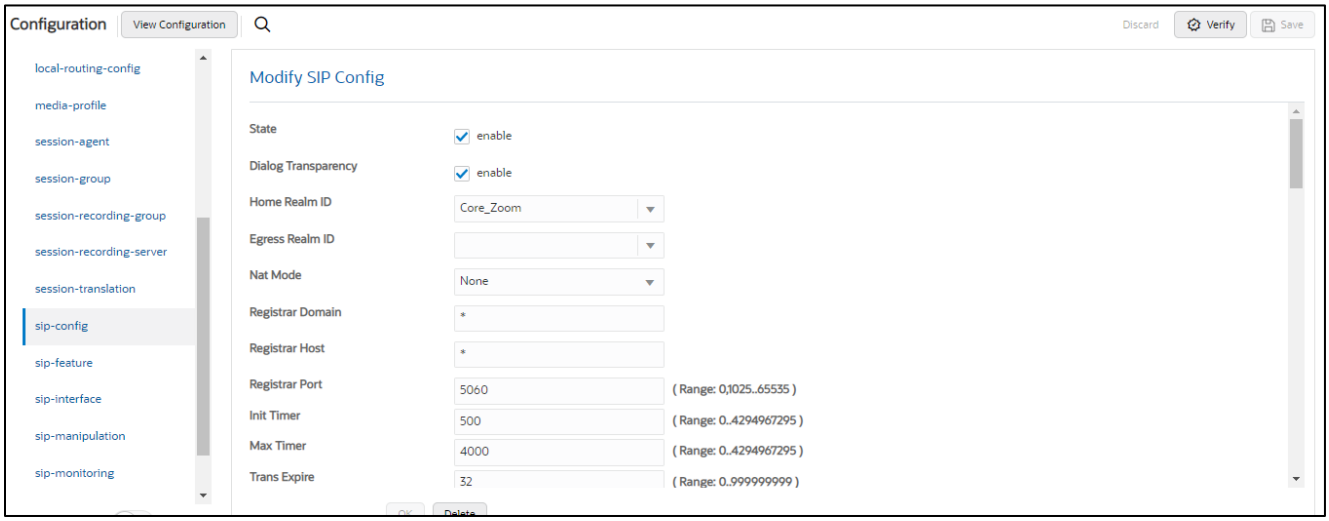
To enable SIP related objects on the Oracle SBC, you must first configure the global SIP Config element:

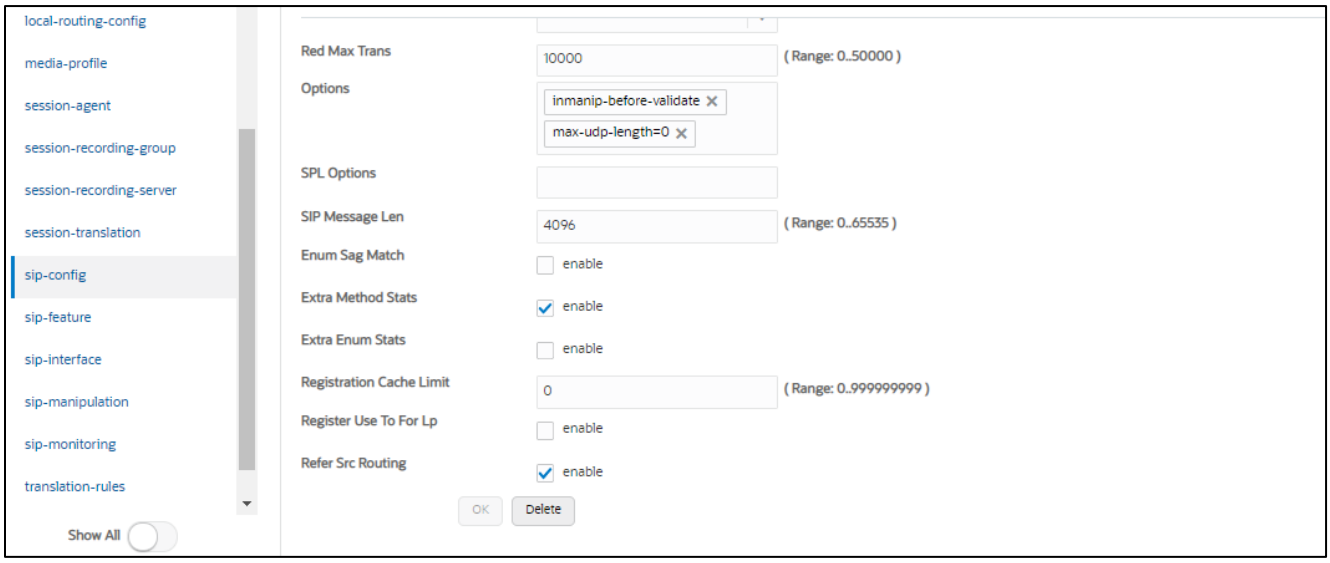
GUI Path: session-router/SIP-config

ACLI Path: config t→session-router→SIP-config

The following are recommended parameters under the global SIP-config:

- Options: Click Add, in pop up box, enter the string: inmanip-before-validate
- Click Apply/Add another, then enter: max-udp-length=0
- Press OK in box
- Home Realm ID (Optional)





- Click OK at the bottom

To configure sip config from ACLI.

ACLI Path: config t→session-router→sip-config

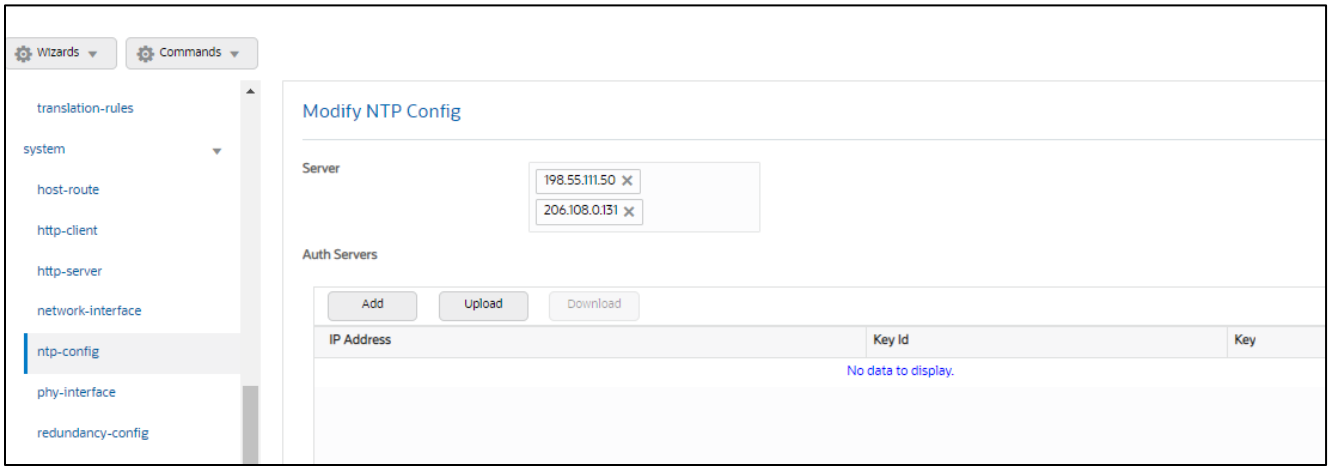
```
sip-config
      home-realm-id                    Zoom
      options                        max-udp-length=0
                                       inmanip-before-validate
```

- Perform a save and activate configuration for changes to take effect.

6.2.4 NTP Config

GUI Path: system/ntp-config

ACLI Path: config t→system→ntp-config



- Click OK at the bottom

To configure ntp-config from ACLI –

ACLI Path: config t→system→ntp-sync

```
ntp-config
      server                    216.239.35.0
```

- Perform a save and activate configuration for changes to take effect.

6.3 Network Configuration

To connect the SBC to network elements, we must configure both physical and network interfaces.
For the purposes of this example, we will configure three physical interfaces, and three network interfaces.
One to communicate with Zoom Cloud Voice, the other to connect to PSTN Networks.

Note: It is not required to have to PSTN terminations and just one Carrier trunk is required to route calls to and From Zoom Contact Center.

6.3.1 Physical Interfaces

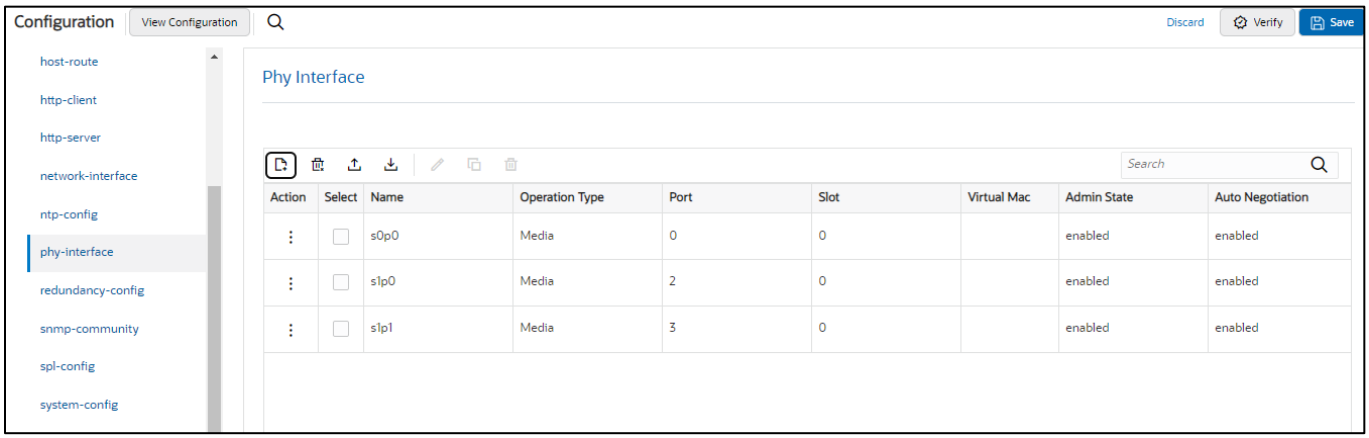
GUI Path: system/phy-interface

ACLI Path: config t→system→phy-interface

- Click Add, use the following table as a configuration example:

Config Parameter	Zoom	PSTN1	PSTN2
Name	s0p0	s1p0	s1p1
Operation Type	Media	Media	Media
Slot	0	1	1
Port	0	0	0

Note: Physical interface names, slot and port may vary depending on environment



- Click OK at the bottom of each after entering config information.

To configure phy-interface from ACLI –

ACLI Path: config t→system→phy-interface

```
phy-interface
      name                    s0p0
      operation-type             Media
phy-interface
      name                    s0p1
      operation-type             Media
      port                 1
phy-interface
      name                    s1p0
      operation-type             Media
      slot                 1      slot
```

- Perform a save and activate configuration for changes to take effect.

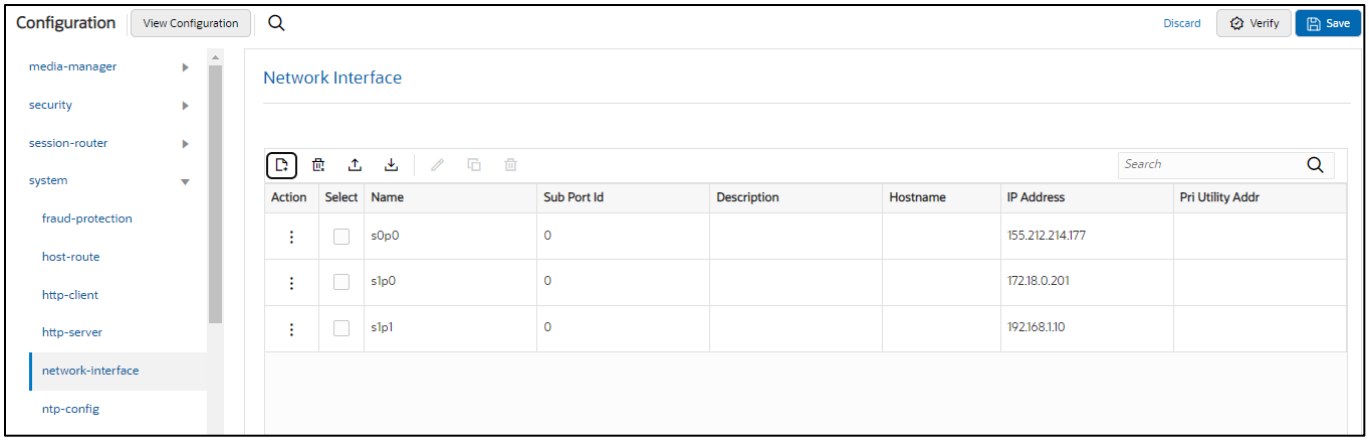
6.3.2 Network Interfaces

GUI Path: system/network-interface

ACLI Path: config t→system→network-interface

- Click Add, use the following table as a configuration example:

Configuration Parameter	Zoom	PSTN1	PSTN2
Name	s0p0	s1p0	s1p1
Hostname	Domain (if applicable)		
IP Address	155.212.214.177	172.18.0.201	192.168.1.10
Netmask	255.255.255.0	255.255.0.0	255.255.255.0
Gateway	155.212.214.1	172.18.0.1	192.168.1.1
DNS Primary IP	8.8.8.8		
DNS Domain	Domain(if applicable)		



- Click OK at the bottom of each after entering config information

To configure network-interface from ACLI –

ACLI Path: config t→system→network-interface

```
network-interface
      name                s0p0
      ip-address          155.212.214.177
      netmask             255.255.255.192
      gateway             155.212.214.1
      dns-ip-primary      8.8.8.8
      dns-domain          telechat.o-test06161977.com
network-interface
      name                s1p0
      ip-address          172.18.0.201
      netmask             255.255.0.0
      gateway             172.18.0.1
network-interface
      name                s1p1
      ip-address          192.168.1.10
      netmask             255.255.255.0
      gateway             192.168.1.1
```

- Perform a save and activate configuration for changes to take effect.

6.4 Security Configuration

This section describes how to configure the SBC for both TLS and SRTP communication with Zoom Contact Center BYOC Platform.

Zoom Contact Center BYOC allows UDP or TLS connections from SBC's for SIP traffic, and RTP or SRTP for media traffic. For our testing, the connection between the Oracle SBC and Zoom Contact Center BYOC platform was secured via TLS/SRTP.

This setup requires a certificate signed by one of the trusted Cerificate Authorities.

6.4.1 Certificate Records

"Certificate-records" are configuration elements on Oracle SBC which captures information for a TLS certificate such as common-name, key-size, key-usage etc.

This section walks you through how to configure certificate records, create a certificate signing request, and import the necessary certificates into the SBC's configuration.

GUI Path: security/certificate-record

ACLI Path: config t→security→certificate-record

For the purposes of this application note, we'll create Five certificate records.They are as follows:

- SBC Certificate (end-entity certificate)
- DigiCertGlobalRootCA- In our setup SBC certificate is signed from DigiCertGlobalRootCA
- DigiCert Intermidiate Cert (this is optional – only required if your server certificate is signed by an intermediate).In our setup we have DigiCert SHA2 Secure Server CA as the Intermediate CA.

These Certificates can be downloaded at below links –

- https://cacerts.digicert.com/DigiCertGlobalRootCA.crt.pem
- https://www.digicert.com/kb/digicert-root-certificates.htm#intermediates

The follow certificates must be installed onto the SBC to trust the TLS Certificate provided by Zoom for TLS negotiation.DigiCert TLS Certificates can be downloaded at below Links.

- https://cacerts.digicert.com/DigiCertGlobalRootCA.crt.pem
- https://cacerts.digicert.com/DigiCertGlobalRootG2.crt.pem
- https://cacerts.digicert.com/DigiCertGlobalRootG3.crt.pem

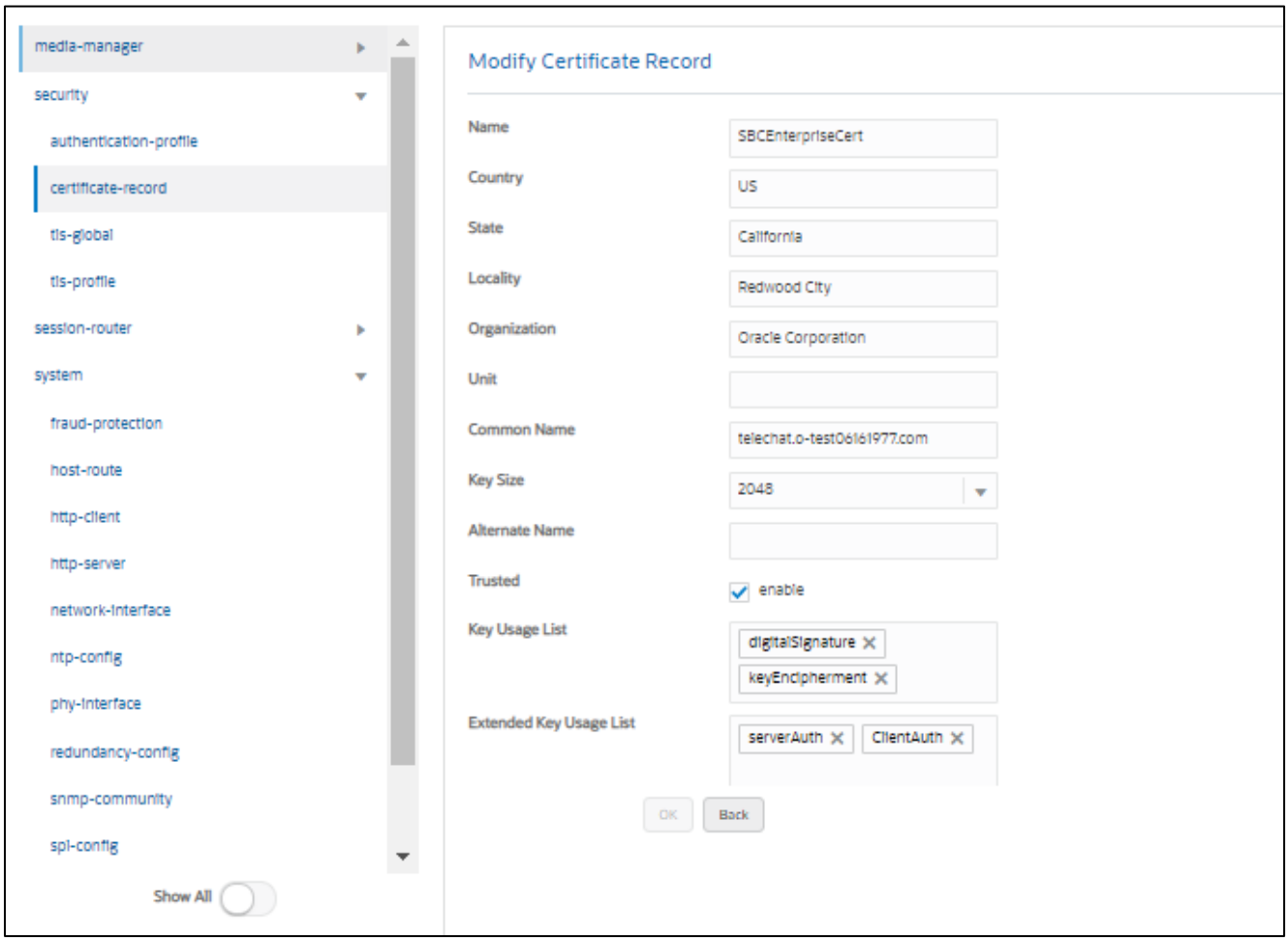
6.4.2 SBC End Entity Certificate

The SBC's end entity certificate is what is presented to Zoom Contact Center BYOC signed by your CA authority which is trusted by Zoom (Please see section 6.5.1 for detailed Zoom Supported CA Vendors), in this example we are using Digicert as our signing authority. The certificate must include a common name.
For this, we are using an fqdn as the common name.

- Common name: (**telechat.o-test06161977.com**)

To Configure the certificate record:

- Click Add, and configure the SBC certificate as shown below:



- Click OK at the bottom
- Next, using this same procedure, configure certificate records for Root CA and Intermediate Certificates

To configure certificate-record from ACLI –

ACLI Path: config t→security→certificate-record

```
certificate-record
    name                    SBCEnterpriseCert
    state                   California
    locality                Redwood City
    organization            Oracle Corporation
    unit                    Oracle CGBU
    common-name             telechat.o-test06161977.com
    extended-key-usage-list serverAuth
                            ClientAuth
```

- Perform a save and activate configuration for changes to take effect.

- Next, using this same procedure, configure certificate records for the Root CA certificates

6.4.3 Root CA and Intermediate Certificates

The following, DigitCertRootGlobalRootCA and DigiCert SHA2 Secure Server CA are the root and intermediate CA certificates used to sign the SBC's end entity certificate.

To trust Zoom certificates, your SBC must have below DigiCert Global Root CA, DigiCert Global Root G2 and DigiCert Global Root G3 installed.

Note : Since both Oracle SBC and Zoom use DigiCert Global Root CA only one certificate record should be created for the DigiCert Global Root CA certificate.

Please use the following table as a configuration reference: Modify the table according to the certificates in your environment.

Config Parameter	Digicert Intermediate	DigiCertGlobalRootCA	DigiCertGlobalRootG2	DigiCertGlobalRootG3
Common Name	DigiCert SHA2 Secure Server CA	DigiCert Global Root CA	DigiCert Global Root G2	DigiCert Global Root G3
Key Size	2048	2048	2048	2048
Key-Usage-List	digitalSignature keyEncipherment	digitalSignature keyEncipherment	digitalSignature keyEncipherment	digitalSignature keyEncipherment
Extended Key Usage List	serverAuth	serverAuth	serverAuth	serverAuth
Key algor	rsa	rsa	rsa	rsa
Digest-algor	Sha256	Sha256	Sha256	Sha256

6.4.4 Zoom Approved CA Vendors

Below is the list of Zoom approved CA Vendors. Oracle SBC Certificate can be signed by any of these Certificate Authorities.

Certificate Issuer Organization	Common Name or Certificate Name
Buypass AS-983163327	Buypass Class 2 Root CA
Buypass AS-983163327	Buypass Class 3 Root CA
Baltimore	Baltimore CyberTrust Root
Cybertrust, Inc	Cybertrust Global Root

DigiCert Inc	DigiCert Assured ID Root CA
DigiCert Inc	DigiCert Assured ID Root G2
DigiCert Inc	DigiCert Assured ID Root G3
DigiCert Inc	DigiCert Global Root CA
DigiCert Inc	DigiCert Global Root G2
DigiCert Inc	DigiCert Global Root G3
DigiCert Inc	DigiCert High Assurance EV Root CA
DigiCert Inc	DigiCert Trusted Root G4
GeoTrust Inc.	GeoTrust Global CA
GeoTrust Inc.	GeoTrust Primary Certification Authority
GeoTrust Inc.	GeoTrust Primary Certification Authority - G2
GeoTrust Inc.	GeoTrust Primary Certification Authority - G3
GeoTrust Inc.	GeoTrust Universal CA
GeoTrust Inc.	GeoTrust Universal CA 2
Symantec Corporation	Symantec Class 1 Public Primary Certification Authority - G4
Symantec Corporation	Symantec Class 1 Public Primary Certification Authority - G6
Symantec Corporation	Symantec Class 2 Public Primary Certification Authority - G4
Symantec Corporation	Symantec Class 2 Public Primary Certification Authority - G6
Thawte, Inc.	Thawte Primary Root CA
Thawte, Inc.	Thawte Primary Root CA - G2
Thawte, Inc.	Thawte Primary Root CA - G3
VeriSign, Inc.	VeriSign Class 1 Public Primary Certification Authority - G3
VeriSign, Inc.	VeriSign Class 2 Public Primary Certification Authority - G3
VeriSign, Inc.	VeriSign Class 3 Public Primary Certification Authority - G3
VeriSign, Inc.	VeriSign Class 3 Public Primary Certification Authority - G4
VeriSign, Inc.	VeriSign Class 3 Public Primary Certification Authority - G5
VeriSign, Inc.	VeriSign Universal Root Certification Authority
AffirmTrust	AffirmTrust Commercial
AffirmTrust	AffirmTrust Networking

AffirmTrust	AffirmTrust Premium
AffirmTrust	AffirmTrust Premium ECC
Entrust, Inc.	Entrust Root Certification Authority
Entrust, Inc.	Entrust Root Certification Authority - EC1
Entrust, Inc.	Entrust Root Certification Authority - G2
Entrust, Inc.	Entrust Root Certification Authority - G4
Entrust.net	Entrust.net Certification Authority (2048)
GlobalSign	GlobalSign
GlobalSign	GlobalSign
GlobalSign	GlobalSign
GlobalSign nv-sa	GlobalSign Root CA
The GoDaddy Group, Inc.	Go Daddy Class 2 CA
GoDaddy.com, Inc.	Go Daddy Root Certificate Authority - G2
Starfield Technologies, Inc.	Starfield Class 2 CA
Starfield Technologies, Inc.	Starfield Root Certificate Authority - G2
QuoVadis Limited	QuoVadis Root CA 1 G3
QuoVadis Limited	QuoVadis Root CA 2
QuoVadis Limited	QuoVadis Root CA 2 G3
QuoVadis Limited	QuoVadis Root CA 3
QuoVadis Limited	QuoVadis Root CA 3 G3
QuoVadis Limited	QuoVadis Root Certification Authority
Comodo CA Limited	AAA Certificate Services
AddTrust AB	AddTrust Class 1 CA Root
AddTrust AB	AddTrust External CA Root
COMODO CA Limited	COMODO Certification Authority
COMODO CA Limited	COMODO ECC Certification Authority
COMODO CA Limited	COMODO RSA Certification Authority
The USERTRUST Network	USERTrust ECC Certification Authority
The USERTRUST Network	USERTrust RSA Certification Authority

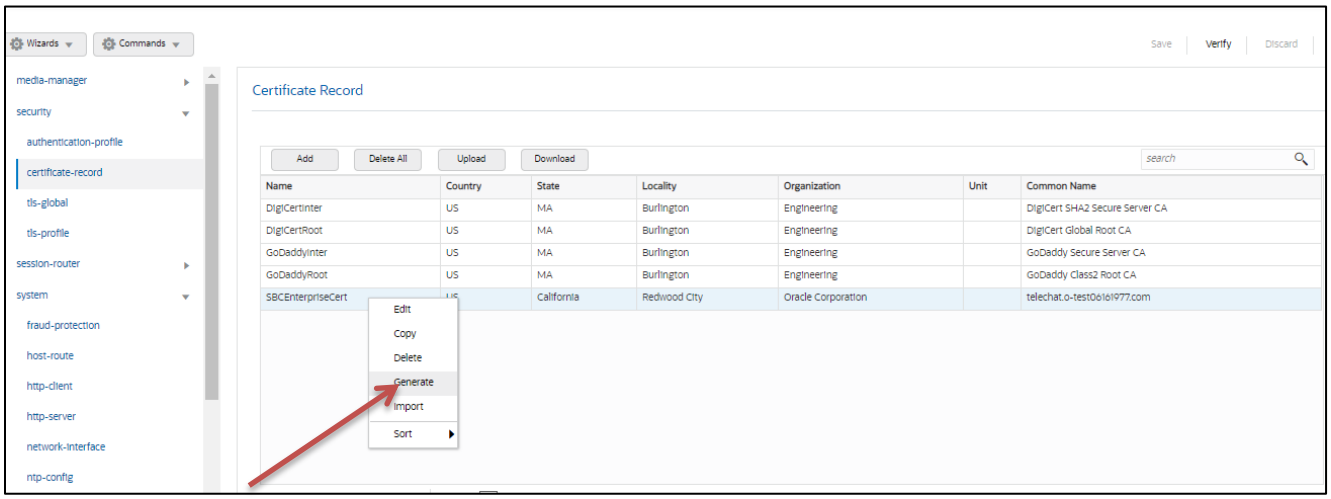
T-Systems Enterprise Services GmbH	T-TeleSec GlobalRoot Class 2
T-Systems Enterprise Services GmbH	T-TeleSec GlobalRoot Class 3

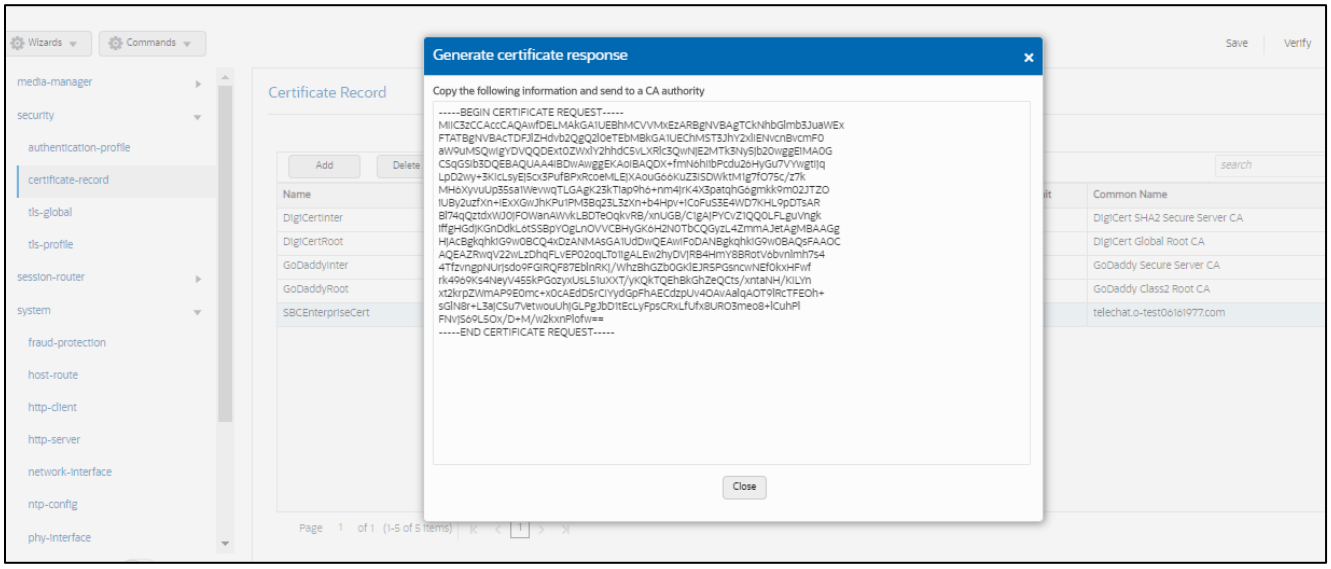
6.4.5 Generate Certificate Signing Request

Now that the SBC's certificate has been configured, create a certificate signing request for the SBC's end entity only.

This is not required for any of the Root CA or intermidiate certificates that have been created.

On the certificate record page in the Oracle SBC GUI, select the SBC's end entity certificate that was created above, and click the "generate" tab at the top:





- copy/paste the text that gets printed on the screen as shown above and upload to your CA server for signature.
- Also note, at this point, **a save and activate is required** before you can import the certificates to each certificate record created above.

To Perform the Steps From ACLI use the below command –

generate-certificate-request SBCEnterpriseCert

This Step generates a text on Screen as shown below –

-----BEGIN CERTIFICATE REQUEST-----
MIIC4zCCAcsCAQAwazELMAkGA1UEBhMCVVMxCzAJBgNVBAgTAk1BMRMwEQYDVQQ
HEwpCdXJsaW5ndG9uMRQwEgYDVQQKEwtFbmdpbmVlcmluZzEkMCIGA1UEAxMbdGVs
ZWNoYXQuby10ZXN0MDYxNjE5NzcuY29tMIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8A
MIIBCgKCAQEAr3AmjF15PcIcWiB/kFExUGNHQHIbkJi28MDbcprO/KLXIHQysSnw
UWz34XLBfLQ6rS4MLyEMR8Nt8GGNSIWKiR431LsX7L+yGWvRjcBFP6DIHtH0Vuqm
ixVaUJpg5luPY6SvT1shyu26iLlBsLfem43tbKq5jz/jrvaUzyhlCvAQ23c1oS5a
D4UiF2mNOuSqxvmkx50a3/BNYbKecLNOxvKQyyTMgffNpASbZuW+eMEUKI5iB+AB
/AAoZRP4bn4qlE3wn8pJsNm8Pjxy4hbz24ySgmaN9iXpP1FdRw0TemfCsNazZRuK
DsviWJfunZYTzRfDe5pJToMH4u1zt2fK1QIDAQABoDMwMQYJKoZIhvcNAQkOMSQw
IjALBgNVHQ8EBAMCBaAwEwYDVR0lBAwwCgYIKwYBBQUHAwEwDQYJKoZIhvcNAQEL
BQADggEBADD5Y+u08LxmTMIsJ2Rjc8cgPZocTqBDXN0tp27S4FuB/01ikBBdG3YV
Ffp7/Q8ZeFHHgU/rMzeF8Gpo9Cc6JUGGux3/ws8ZkgRBxsNlG276i7pFN1vCIjEP
89AGxtryioRMc4kcdPpLJNQ10Qx1zKobHMTftGLDI6jN2pvn3zYHH8qA9V/1/yKa
3n0j33EuTrvTlQ5P4IgyVJqSBkdI29T1gXY6O8JVFLCQefTrF4TLc6teNzxXMdPw
PHoPu9hM3scGOWOHQnODXOFeq2AxBQzAa0/Cjf7Bw3l3POmMcIOawgDecZ8UjHpJ
IznX9/Gxg5X+S2QkHjNmPK+JuePqX4I=
-----END CERTIFICATE REQUEST-----

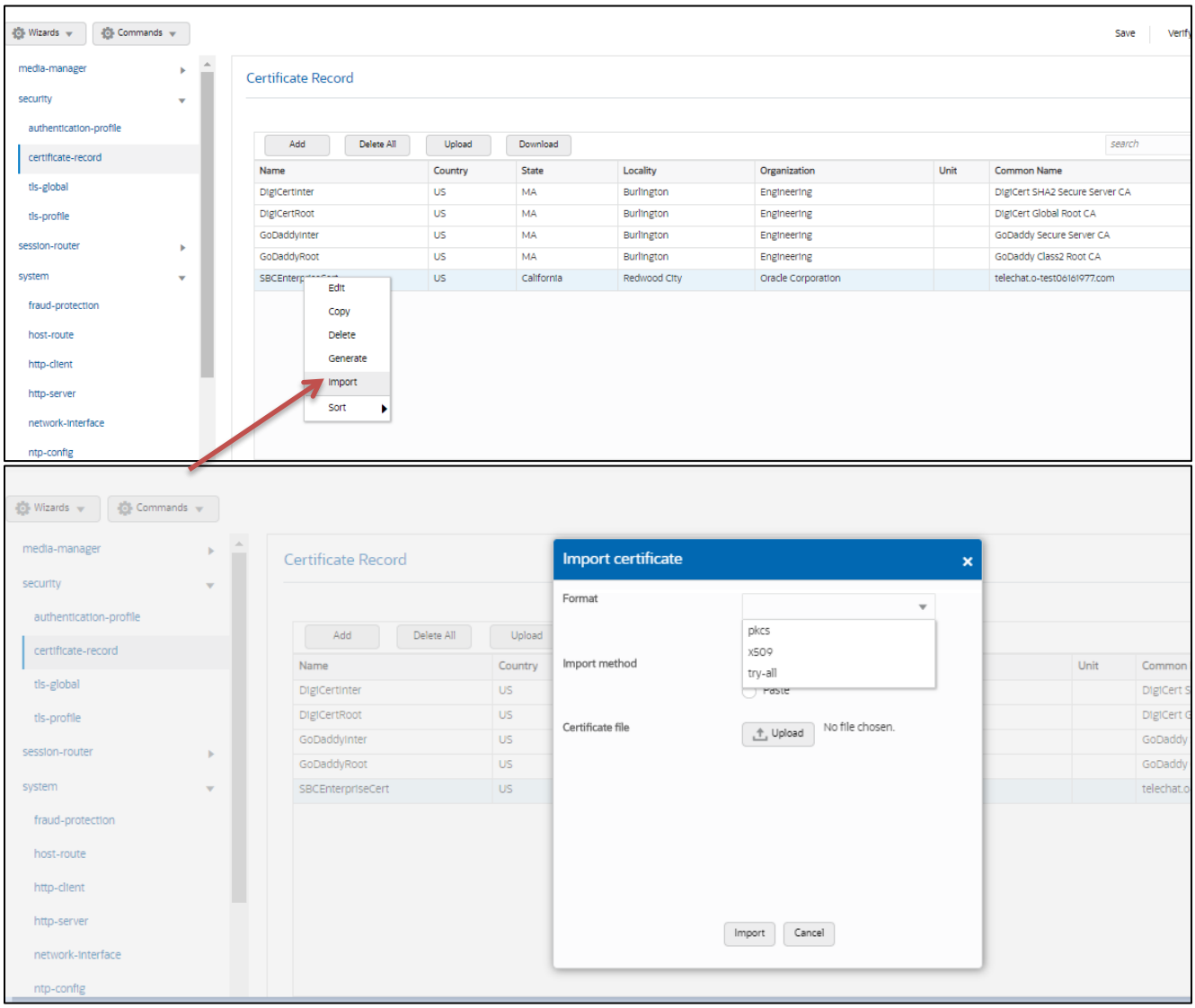
Copy/paste the text that gets printed on the screen as shown above and upload to your CA server for signature.

Also note, at this point, **another save and activate is required** before you can import the certificates to each certificate record created above.

Once you have received the signed certificate back from your signing authority, we can now import all certificates to the SBC configuration.

6.4.6 Import Certificates to SBC

Once certificate signing request has been completed – import the signed certificate to the SBC.
Please note – all certificates including root and intermediate certificates are required to be imported to the SBC.
Once all certificates have been imported, issue **save/activate** from the WebGUI



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

- DigiCertIntermediate
- DigiCertGlobalRootCA
- DigiCertGlobalRootG2
- DigiCertGlobalRootG3

At this stage, all required certificates have been imported.

To import the certificate from ACLI follow below procedure -

```
import-certificate try-all SBCEnterpriseCert

The System will show a prompt as below -

IMPORTANT:
      Please enter the certificate in the PEM format.
      Terminate the certificate with ";" to exit.......
```


```
-----BEGIN CERTIFICATE REQUEST-----
MIIC4zCCAcsCAQAwazELMAkGA1UEBhMCVVMxCzAJBgNVBAgTAk1BMRMwEQYDVQQH
EwpCdXJsaW5ndG9uMRQwEgYDVQQKEwtFbmdpbmVlcmluZzEkMCIGA1UEAxMbdGVs
ZWNoYXQuby10ZXN0MDYxNjE5NzcuY29tMIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8A
MIIBCgKCAQEAr3AmjF15PcIcWiB/kFExUGNHQHIbkJi28MDbcprO/KLXIHQysSnw
UWz34XLBfLQ6rS4MLyEMR8Nt8GGNSIWKiR431LsX7L+yGWvRjcBFP6DIHtH0Vuqm
ixVaUJpg5luPY6SvT1shyu26iLlBsLfem43tbKq5jz/jrvaUzyhlCvAQ23c1oS5a
D4UiF2mNOuSqxvmkx50a3/BNYbKecLNOxvKQyyTMgffNpASbZuW+eMEUKI5iB+AB
/AAoZRP4bn4qlE3wn8pJsNm8Pjxy4hbz24ySgmaN9iXpP1FdRw0TemfCsNazZRuK
DsviWJfunZYTzRfDe5pJToMH4u1zt2fK1QIDAQABoDMwMQYJKoZIhvcNAQkOMSQw
IjALBgNVHQ8EBAMCBaAwEwYDVR0lBAwwCgYIKwYBBQUHAwEwDQYJKoZIhvcNAQEL
BQADggEBADD5Y+u08LxmTMIsJ2Rjc8cgPZocTqBDXN0tp27S4FuB/01ikBBdG3YV
Ffp7/Q8ZeFHHgU/rMzeF8Gpo9Cc6JUGGux3/ws8ZkgRBxsNlG276i7pFN1vCIjEP
89AGxtryioRMc4kcdPpLJNQ10Qx1zKobHMTftGLDI6jN2pvn3zYHH8qA9V/1/yKa
3n0j33EuTrvTlQ5P4IgyVJqSBkdI29T1gXY6O8JVFLCQefTrF4TLc6teNzxXMdPw
PHoPu9hM3scGOWOHQnODXOFeq2AxBQzAa0/Cjf7Bw3l3POmMcIOawgDecZ8UjHpJ
lznX9/Gxg5X+S2QkHjNmPK+JuePqX4I=
-----END CERTIFICATE REQUEST-----;
```


save and activate your configuration.

Repeat these steps to import all the root and intermediate CA certificates into the SBC.

6.4.7 TLS Profile

TLS profile configuration on the SBC allows for specific certificates to be assigned.

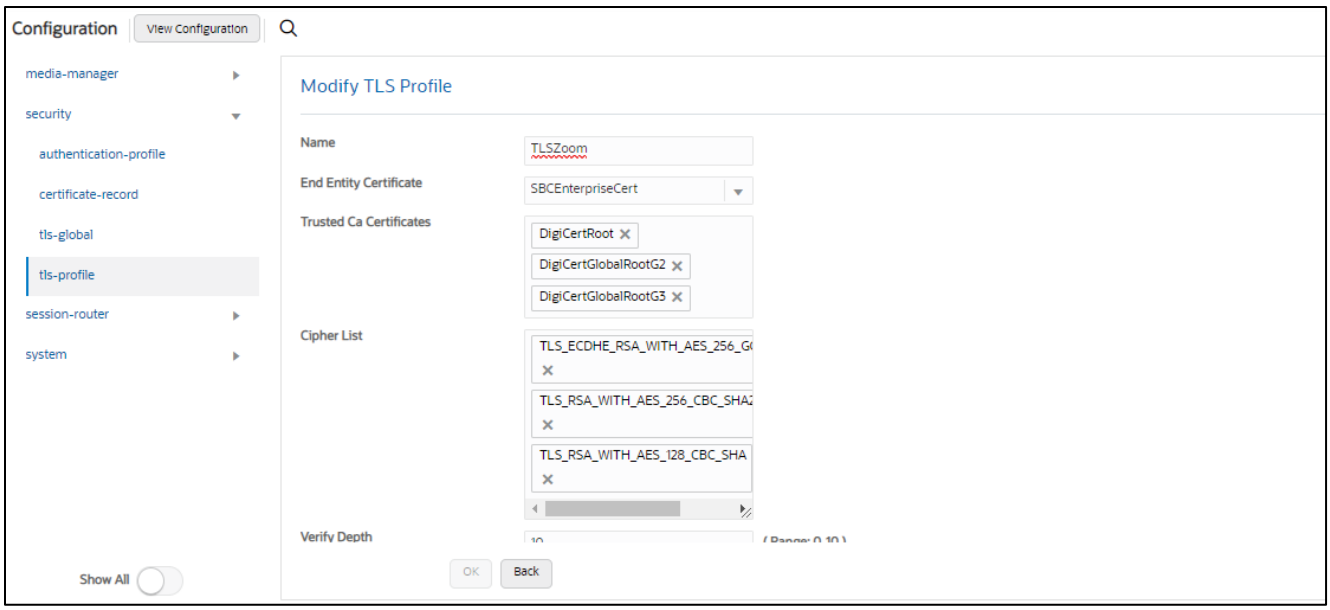
GUI Path: security/tls-profile

ACLI Path: config t→security→tls-profile

- Click Add, use the example below to configure

Zoom Contact Center BYOC supports the following signalling ciphers that need to be added to the TLS profile:

TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384
TLS_RSA_WITH_AES_256_CBC_SHA256
TLS_RSA_WITH_AES_128_CBC_SHA



- Click OK at the bottom

To configure tls-profile from ACLI –

ACLI Path: config t→security→tls-profile

```
tls-profile
  name                        TLSZoom
     end-entity-certificate          SBCEnterpriseCert
     trusted-ca-certificates          DigiCertRoot
                                 DigiCertGlobalRootG2
                                 DigiCertGlobalRootG3
     cipher-list                    TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384
                                 TLS_RSA_WITH_AES_256_CBC_SHA256
                                 TLS_RSA_WITH_AES_128_CBC_SHA
     mutual-authenticate              enabled
```

- Perform a save and activate configuration for changes to take effect.

6.5 Media Security Configuration

This section outlines how to configure support for media security between the ORACLE SBC and Zoom Contact Center.

6.5.1 Sdes-profile

This is the first element to be configured for media security, where the algorithm and the crypto's to be used are configured.

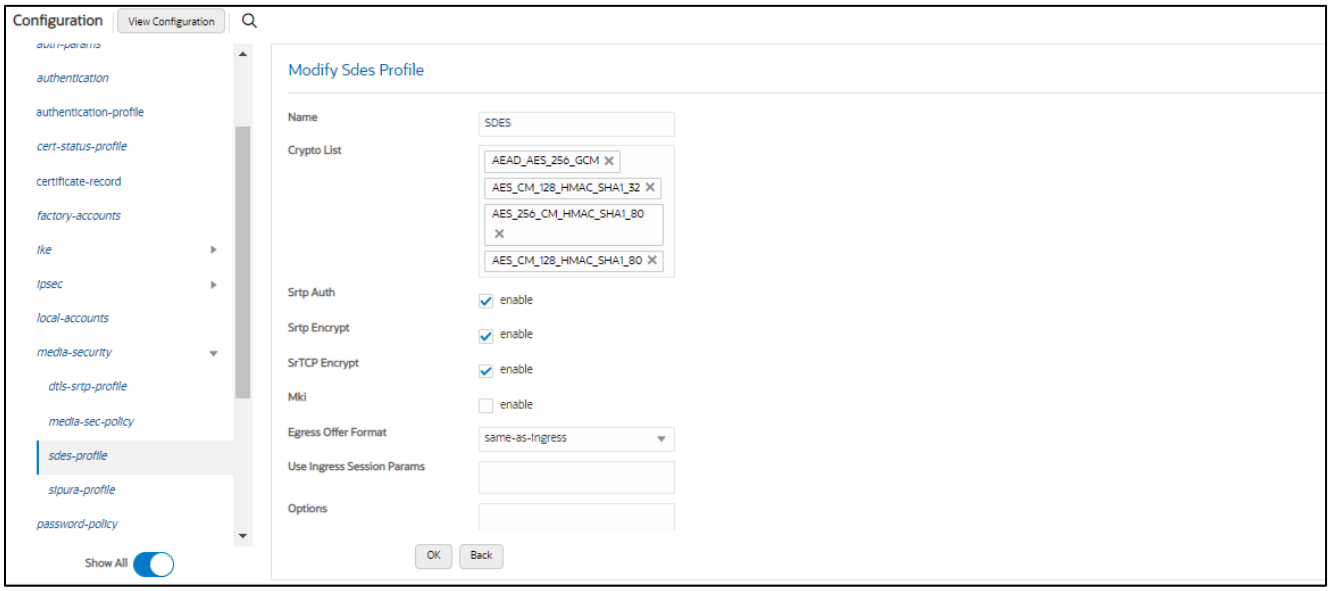
GUI Path: security/media-security/sdes-profile

ACLI Path: config t→security→media-security→sdes-profile

Oracle SBC and Zoom Contact center BYOC the following media ciphers for SRTP:

AEAD_AES_256_GCM
AES_CM_256_HMAC_SHA1_80
AES_CM_128_HMAC_SHA1_80
AES_CM_128_HMAC_SHA1_32

Click Add, and use the example below to configure.



- Click OK at the bottom

To configure sdes-profile from ACLI –

ACLI Path: config t→security→media-security→sdes-profile

```
sdes-profile
    name                    SDES
    crypto-list             AEAD_AES_256_GCM
                            AES_CM_128_HMAC_SHA1_32
                            AES_256_CM_HMAC_SHA1_80
                            AES_CM_128_HMAC_SHA1_80
```

- Perform a save and activate configuration for changes to take effect.

6.5.2 Media Security Policy

Media-sec-policy instructs the SBC how to handle the SDP received/sent under a realm (RTP, SRTP or any of them) and, if SRTP needs to be used, the sdes-profile that needs to be used

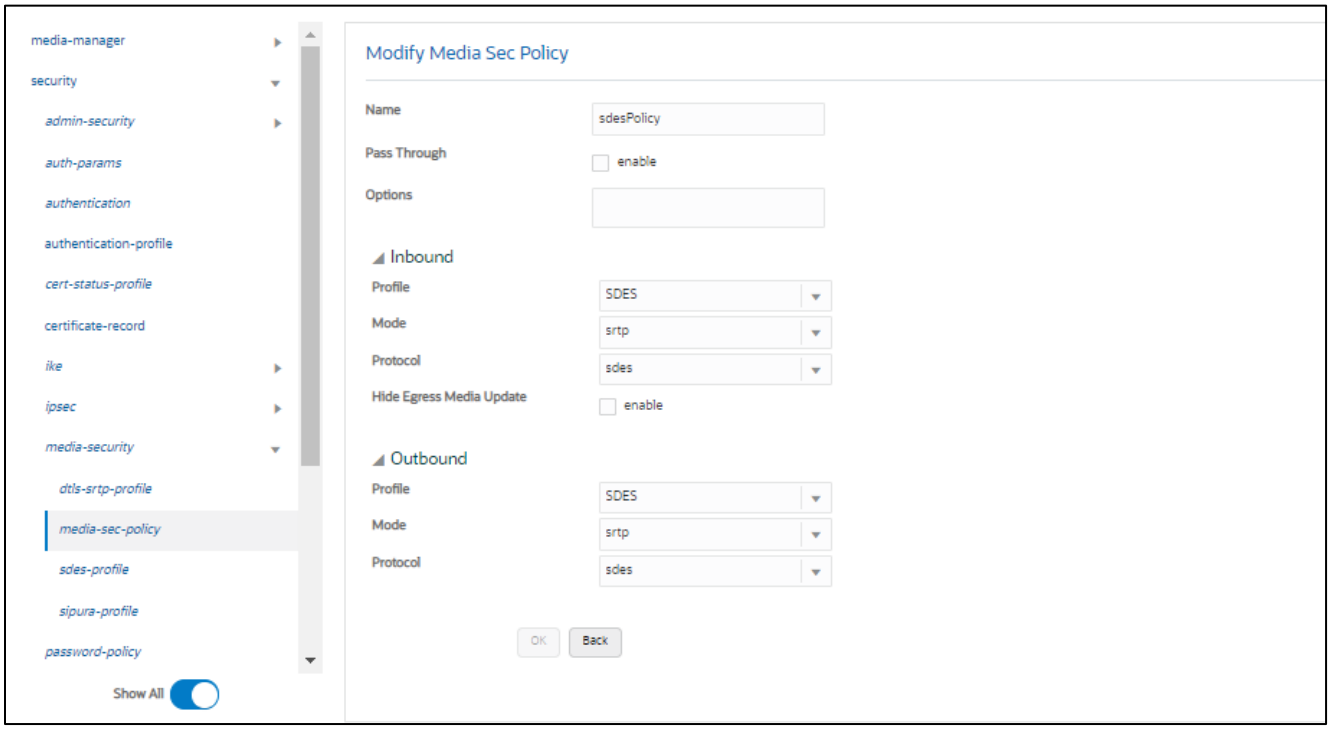
In this example, we are configuring two media security policies. One to secure and decrypt media toward Zoom, the other for non-secure media facing PSTN.

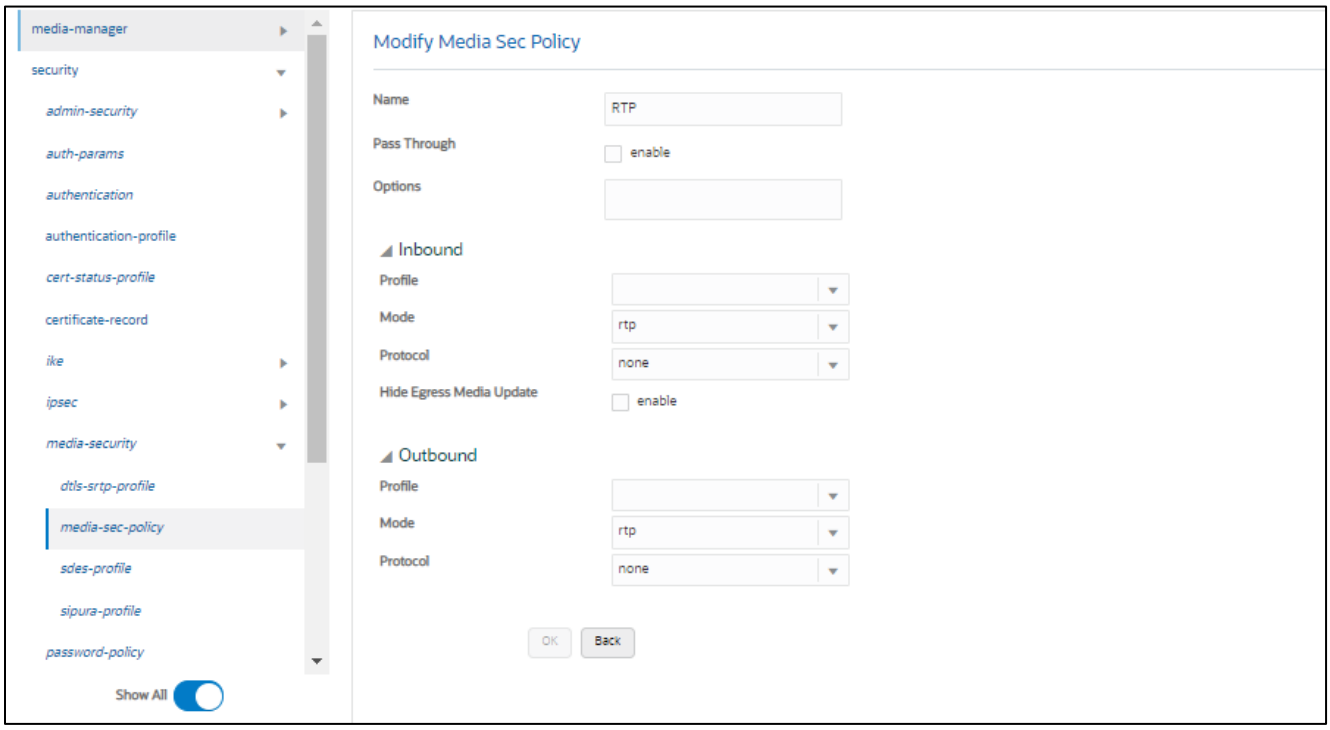
These are named as sdesPolicy and RTP.

GUI Path: security/media-security/media-sec-policy

ACLI Path: config t→security→media-security→media-sec-policy

- Click Add, use the examples below to configure





To configure media security from ACLI.

ACLI Path: config t→security→media-security→media-sec-policy

```
media-sec-policy
    name                    RTP
media-sec-policy
    name                    sdesPolicy
    inbound
        profile                 SDES
        mode                     srtp
        protocol                 sdes
    outbound
        profile                 SDES
        mode                     srtp
        protocol                 sdes
```

- Perform a save and activate configuration for changes to take effect.

6.6 Media Configuration

This section will guide you through the configuration of realms and steering pools, both of which are required for the SBC to handle signaling and media flows toward Zoom and PSTN.

6.6.1 Realm Config

Realms are a logical distinction representing routes (or groups of routes) reachable by the Oracle Session Border Controller and what kinds of resources and special functions apply to those routes. Realms are used as a basis for determining ingress and egress associations to network interfaces.

Zoom Realm

This is a standalone realm facing Zoom Contact Center BYOC Platform

PSTN Realms

In the below example 1, Peer_SIPTrunk1 represents the Sip realm for customer 1.Similarly another realm is created for Peer_SIPTrunk2 which represents the Sip Trunk for customer 2.These realms are bound to different network interfaces (subnets) in this example.

GUI Path; media-manager/realm-config

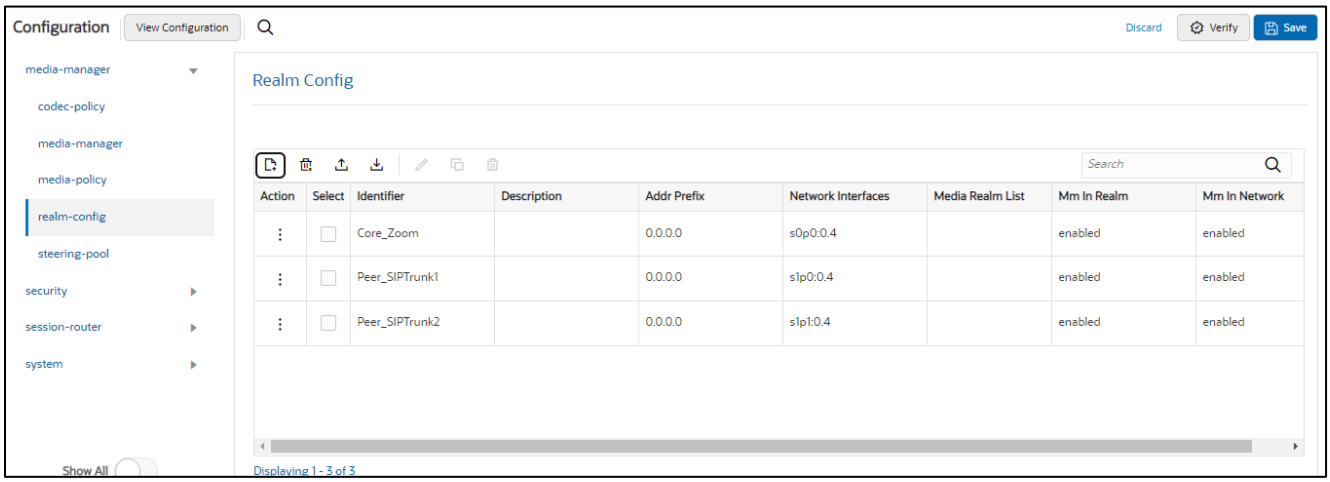
ACLI Path: config t→media-manager→realm-config

- Click Add, and use the following table as a configuration example for the three realms used in this configuration example

Config Parameter	Zoom Contact Center BYOC	PSTN Realm1	PSTN Realm2
Identifier	Core_Zoom	Peer_SIPTrunk1	Peer_SIPTrunk2
Network Interface	s0p0:0	s1p0:0	s1p1:0
Mm in realm	☑	☑	☑
Access-control-trust-level	High	High	High
Media Sec policy	sdespolicy	RTP	RTP

Also notice, the realm configuration is where we assign some of the elements configured earlier in this document, i.e.

- Network interface
- Media security policy



To configure realm-config from ACLI –

ACLI Path - config t→media-manger→realm-config

```
realm-config
        identifier                      Core_Zoom
        network-interfaces                s0p0:0.4
        mm-in-realm                     enabled
        media-sec-policy                  sdesPolicy
        out-manipulationid                ZoomOutManip
        access-control-trust-level          high
realm-config
        identifier                      Peer_SIPTrunk1
        network-interfaces                s1p0:0.4
        mm-in-realm                     enabled
        media-sec-policy                  RTP
        access-control-trust-level          high
realm-config
        identifier                      Peer_SIPTrunk2
        network-interfaces                s1p1:0.4
        mm-in-realm                     enabled
        media-sec-policy                  sdesPolicy
        access-control-trust-level          high
```

- Perform a save and activate configuration for changes to take effect.

6.6.2 Steering Pools

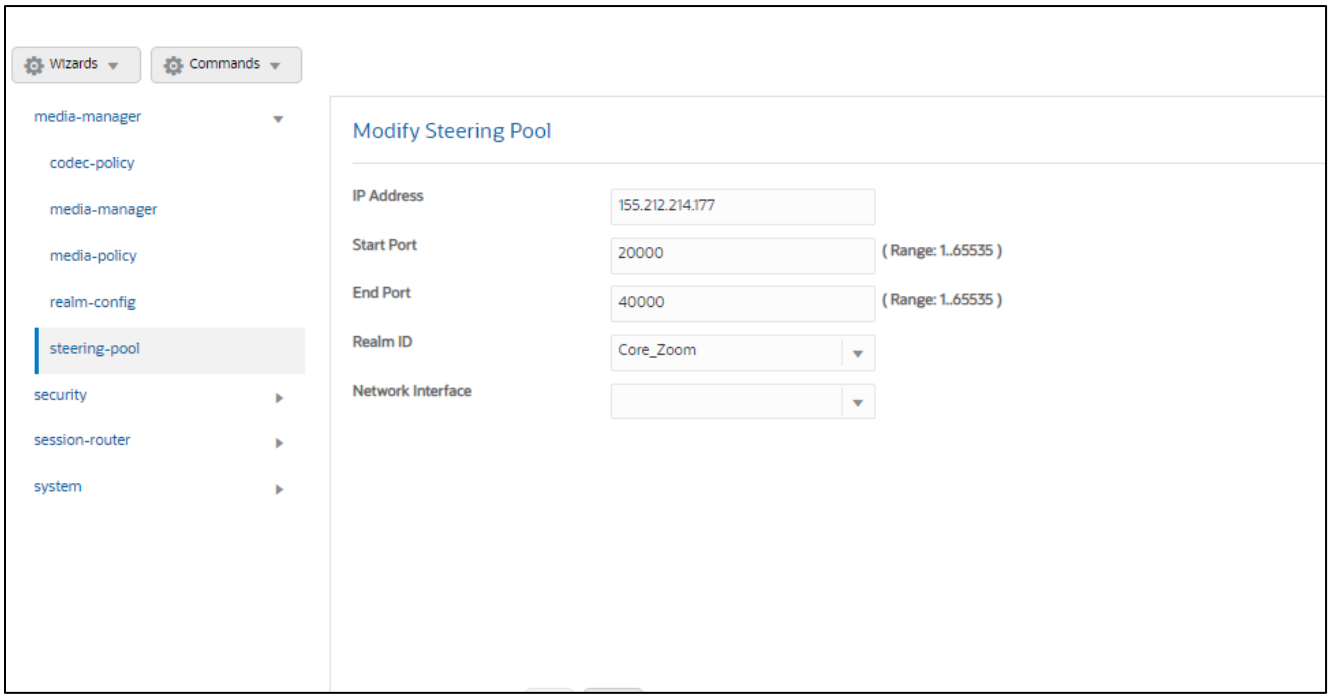
Steering pools define sets of ports that are used for steering media flows through the Oracle SBC.
These selected ports are used to modify the SDP to cause receiving session agents to direct their media toward this system.

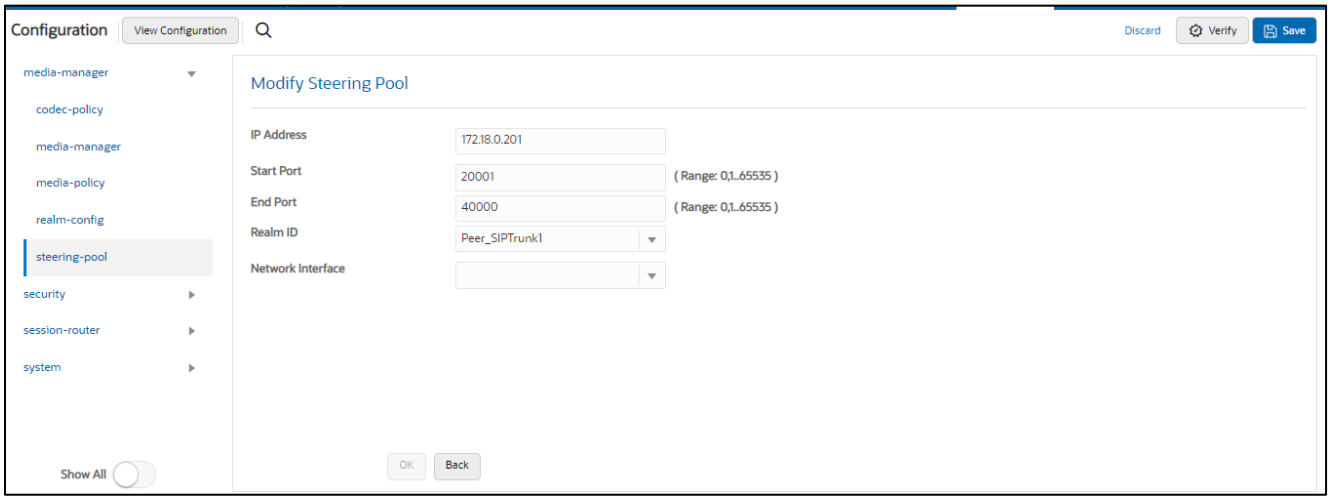
We will configure one steering pool for both PSTN Trunks and one steering pool for Zoom Contact Center BYOC

GUI Path: media-manager/steering-pool

ACLI Path: config t→media-manager→steering-pool

- Click Add, and use the below examples to configure





To configure steering-pool from ACLI

ACLI Path: config t→media-manger→steering-pool

```
steering-pool
        ip-address          155.212.214.177
        start-port          10000
        end-port            20000
        realm-id            Core_Zoom
steering-pool
        ip-address          172.18.0.201
        start-port          20001
        end-port            40000
        realm-id            Peer_SIPTrunk1
steering-pool
        ip-address          192.168.1.10
        start-port          40001
        end-port            60000
        realm-id            Peer_SIPTrunk2
```

- Perform a save and activate configuration for changes to take effect.

6.7 SIP Modifications

This section outlines the configuration parameters required for processing, modifying, and securing SIP signaling traffic.

6.7.1 SIP Manipulations

In order to comply with the signaling message requirements of Carrier and Zoom we have applied following sip-manipulations towards Zoom Side.

Note: You may have to build sip-manipulations to cover the signaling requirement from Carrier Trunk.

6.7.1.1 Manipulation towards Zoom Side

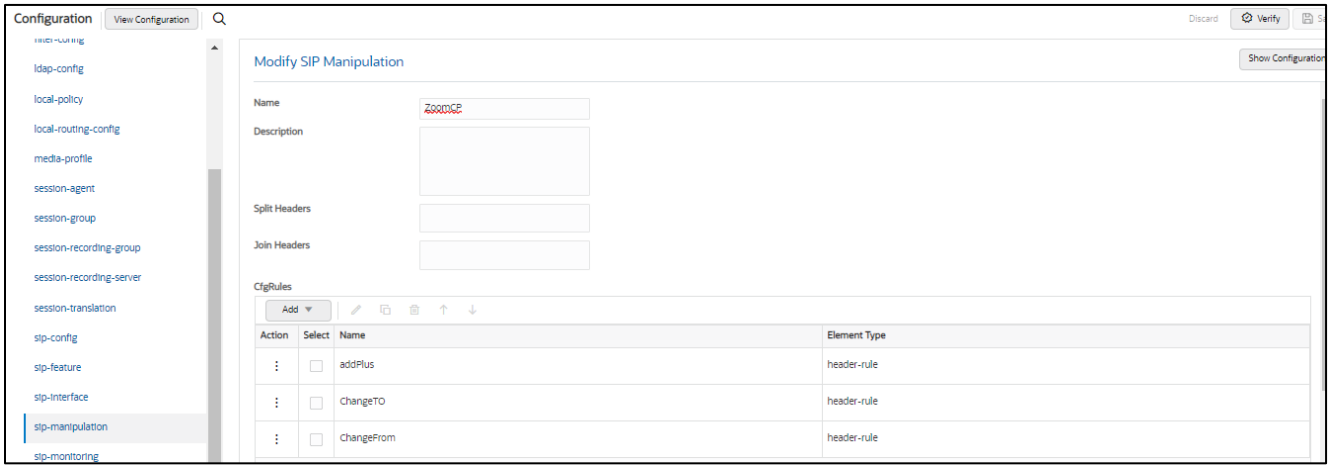
For calls to be presented to Zoom Contact Center BYOC the number must be in E.164 format for all SIP headers.

Besides, Options ping from Contact Center peering SBC to Zoom must be formatted as follows. The same formatting is to be followed for calls.

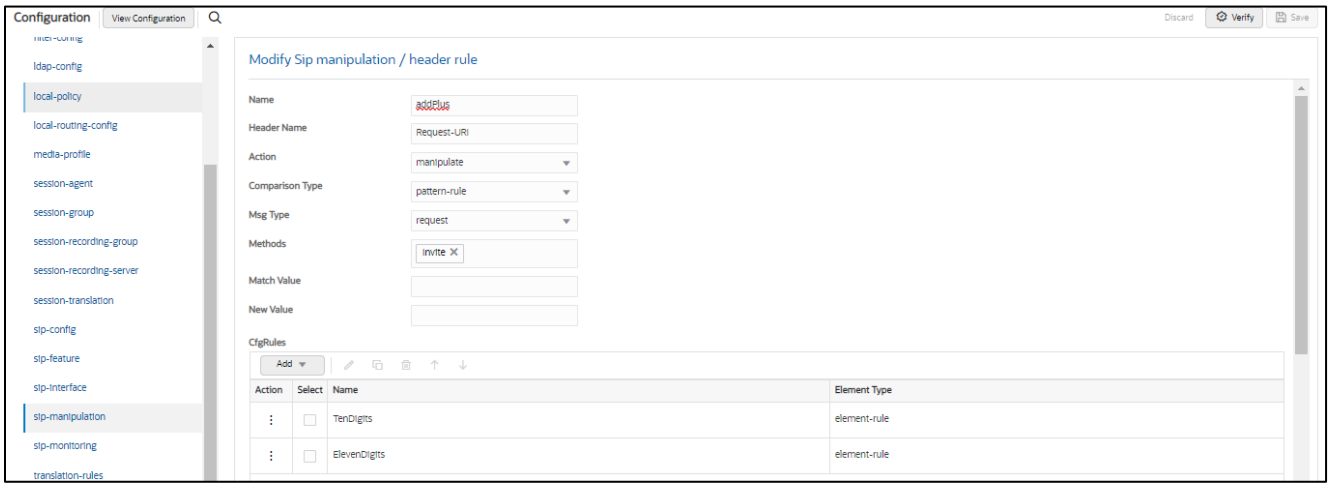
- The "**From**" header should have the IP address/FQDN of the Oracle SBC
  From: <sip:*IPaddress/FQDN*>
- The "**To**" header should contain the Zoom Contact Center BYOC IP address/FQDN
  To: <sip:*IPaddressofZoomSBC*>
- The "**Request URI**" header must contain the Zoom Contact Center BYOC IP address/FQDN
- The "**Contact**" header must have the IP address/FQDN of the Oracle SBC
  Contact: sip:*IPaddress/FQDN:PortNumber*

To achieve this we have created following Header manipulation rule on Oracle SBC.

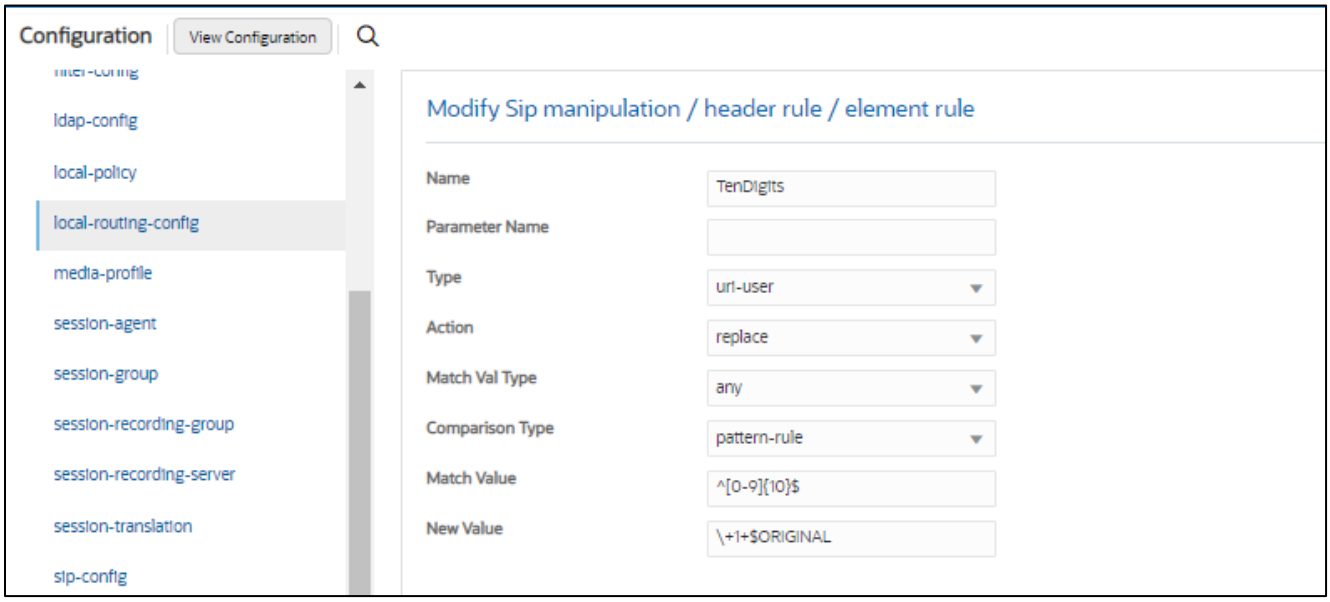
Sip-manipulation :



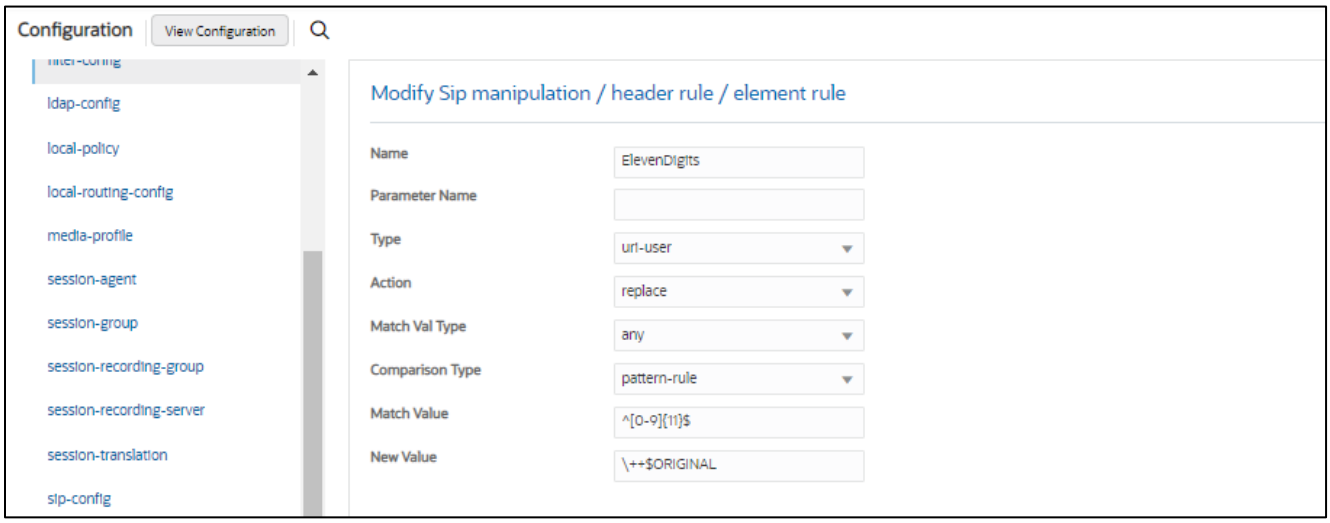
Header-rule #1



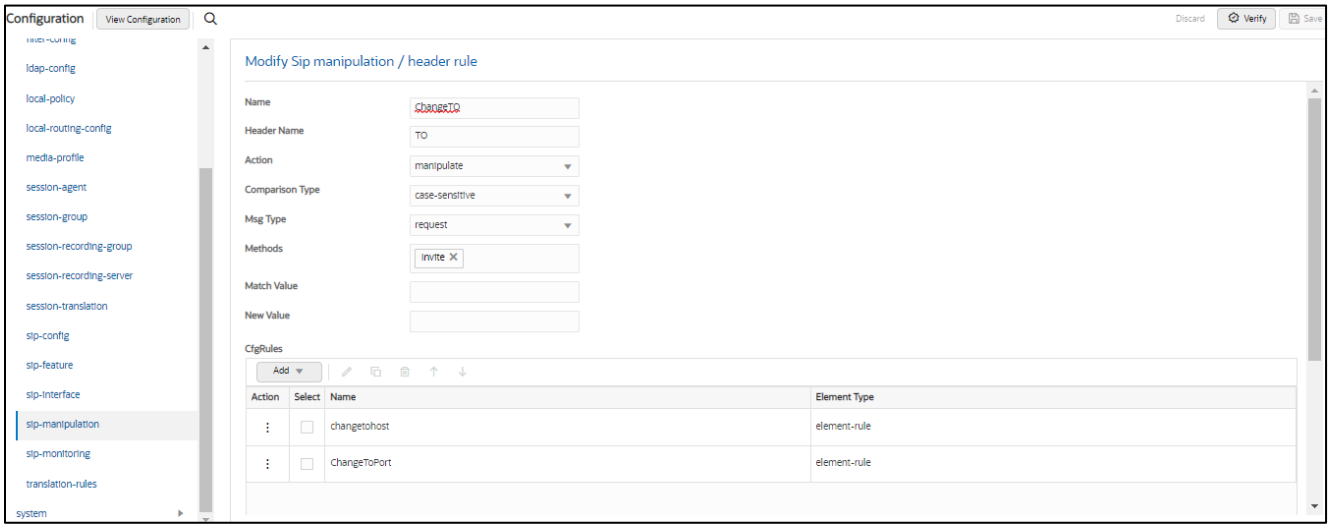
Element-rule # 1.1



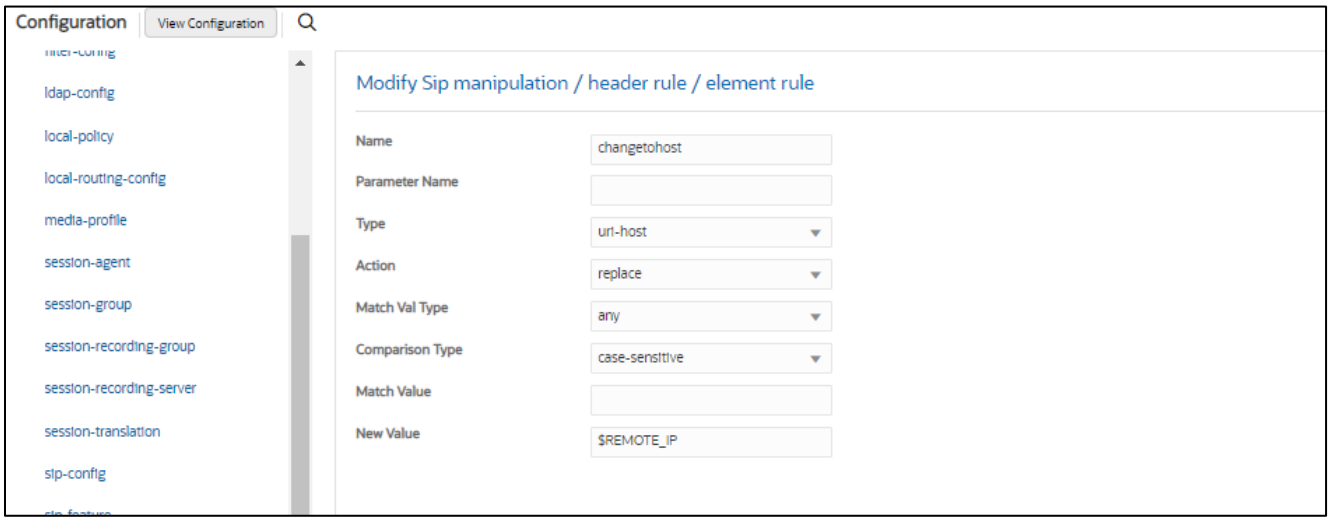
Element-rule #1.2



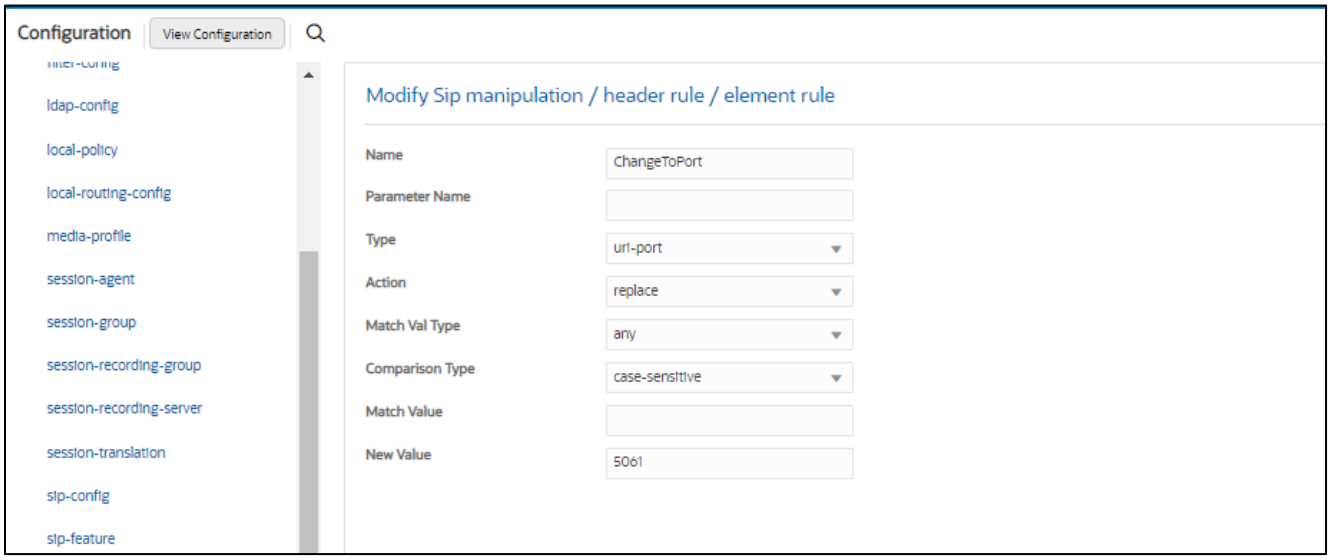
Header-rule #2



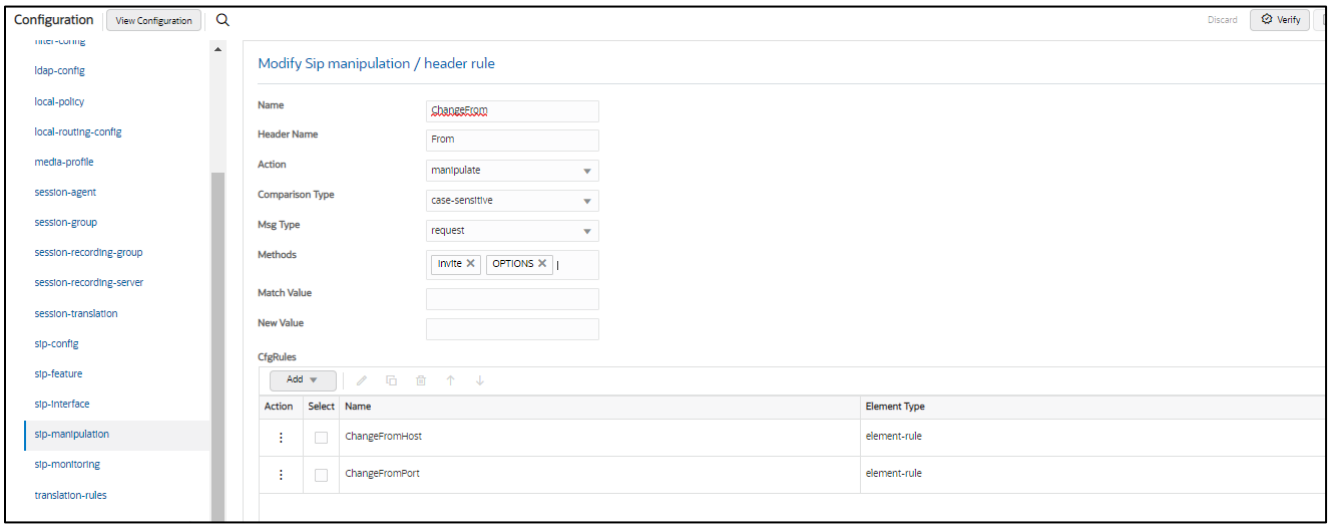
Element-rule #2.1



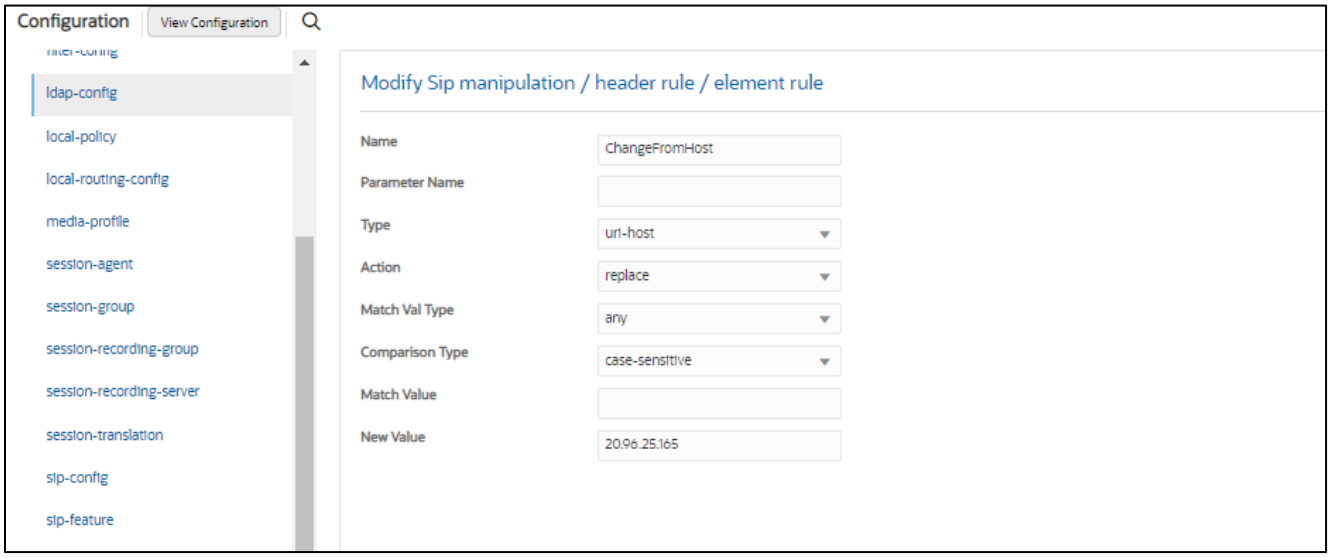
Element-rule #2.2



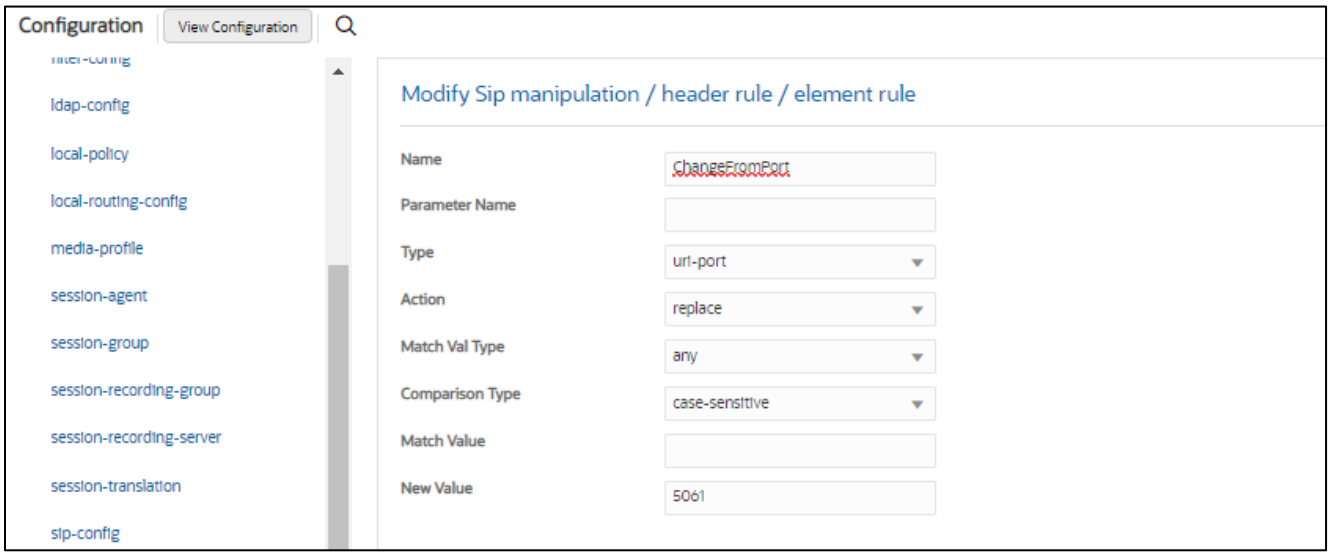
Header-rule #3



Element-rule #3.1



Element-rule #3.2



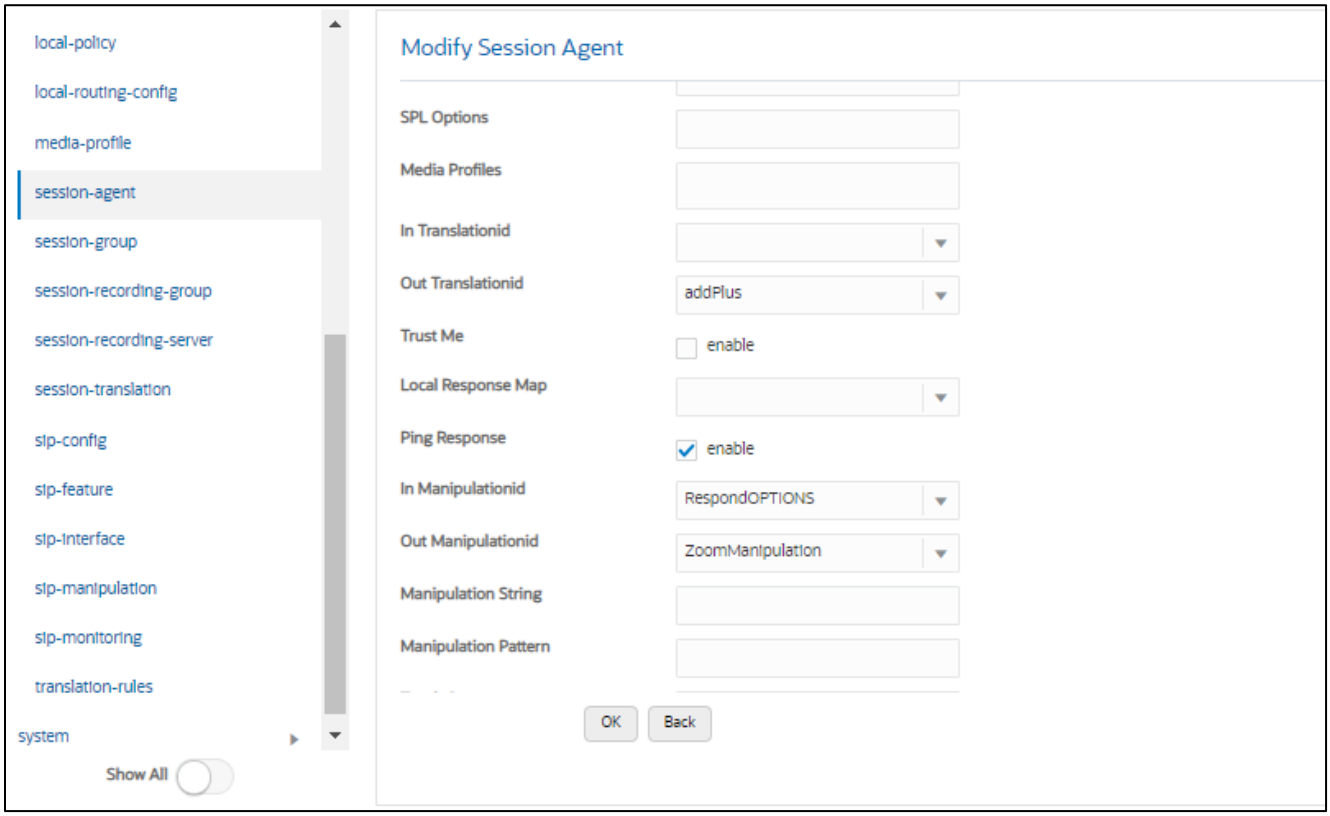
To configure the sip-manipulation from ACLI,

Navigate to config t→session-router→sip-manipulation

```
sip-manipulation
    name                        ZoomCP
    header-rule
        name                        addPlus
        header-name                     Request-URI
        action                      manipulate
        comparison-type                 pattern-rule
        msg-type                    request
        methods                     Invite
        element-rule
            name                        TenDigits
            type                        uri-user
            action                      replace
            comparison-type                 pattern-rule
            match-value                     ^[0-9]{10}$
            new-value                       \+1+$ORIGINAL
        element-rule
            name                        ElevenDigits
            type                        uri-user
            action                      replace
            comparison-type                 pattern-rule
            match-value                     ^[0-9]{11}$
            new-value                       \++$ORIGINAL
    header-rule
        name                        ChangeTO
        header-name                     TO
        action                      manipulate
        msg-type                    request
        methods                     Invite
        element-rule
            name                        changetohost
            type                        uri-host
            action                      replace
            new-value                       $REMOTE_IP
        element-rule
            name                        ChangeToPort
            type                        uri-port
            action                      replace
            new-value                       5061
    header-rule
        name                        ChangeFrom
        header-name                     From
        action                      manipulate
        msg-type                    request
        methods                     Invite
element-rule
            name                        ChangeFromHost
            type                        uri-host
            action                      replace
            new-value                       20.96.25.165
        element-rule
            name                        ChangeFromPort
            type                        uri-port
            action                      replace
            new-value                       5061
```

6.7.1.2 Responding to Options Ping

The ping response parameter can be enabled on the Session Agents to locally respond to the OPTIONS ping sent towards SBC from Zoom and Carrier.



To enable ping-response from ACLI-

```
SolutionsLab-vSBC-2(session-agent)# ping-response enabled
```

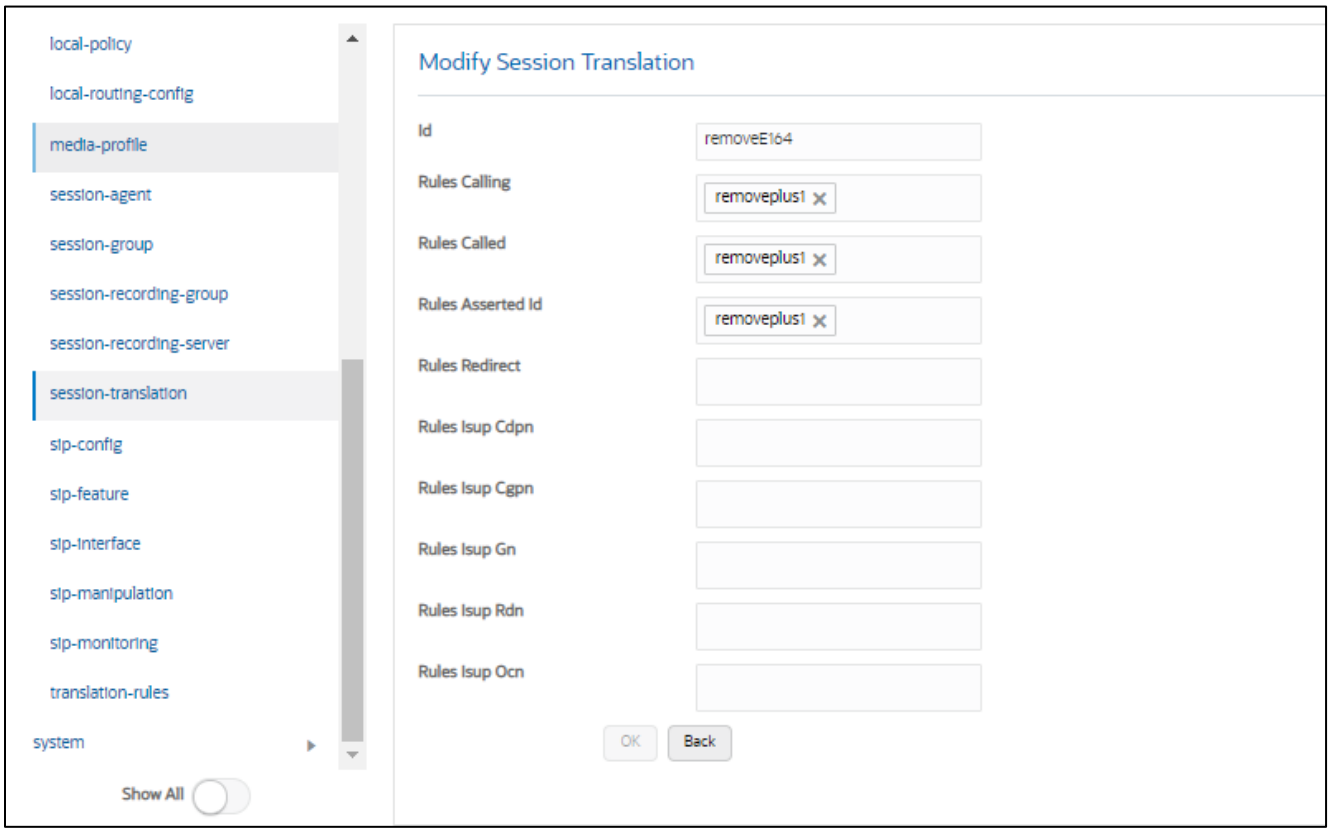
- Perform a save and activate configuration for changes to take effect.

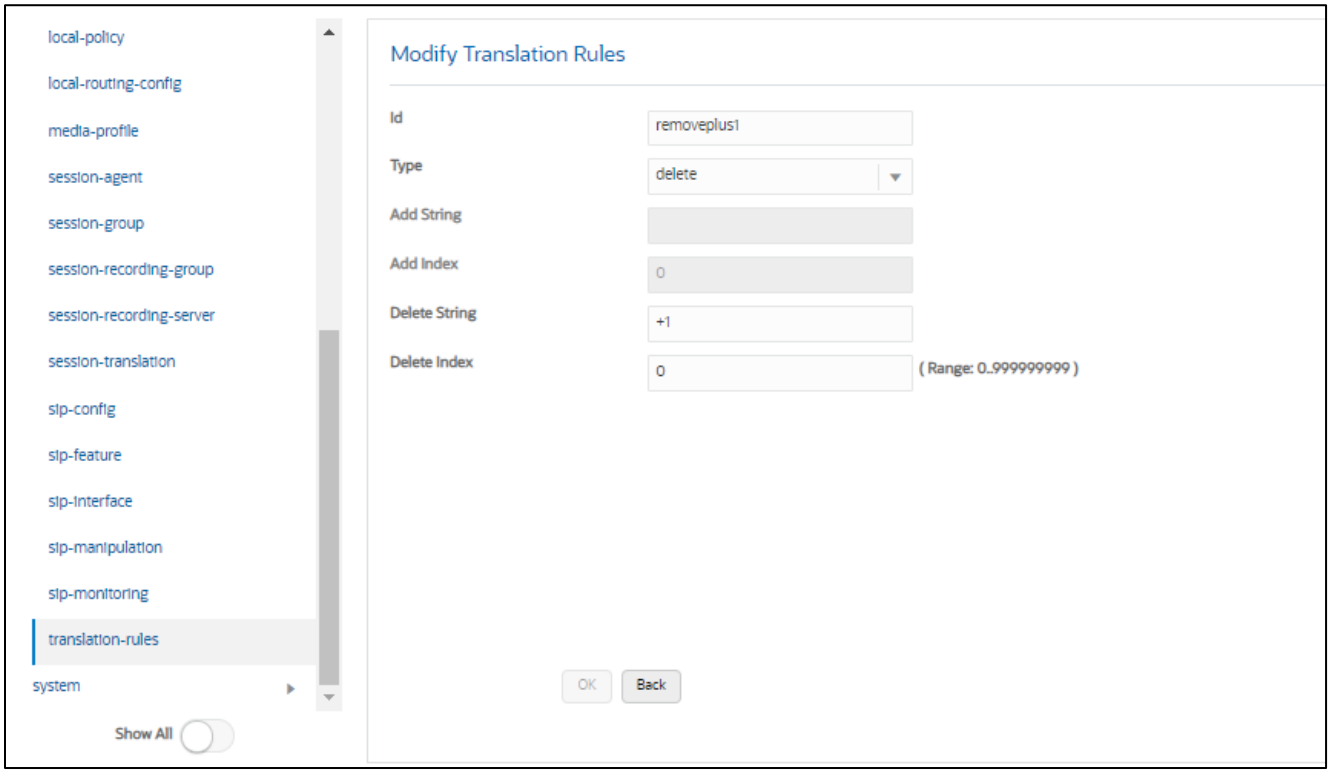
6.7.2 Session-Translation

The following session-translation is created and applied as out-translationid on the Session-Agent towards Carriers. This session-translation is created to remove +1 when call is sent towards Carrier as Carrier in this case requires calls to be presented in 10 digit dial format.

GUI Path: session-router/session-translation

ACLI Path: config t→ session-router → session-translation





To configure session-translation from ACLI

```
session-translation
        id                          removeE164
        rules-calling                   removeplus1
        rules-called                    removeplus1
        rules-asserted-id                 removeplus1
translation-rules
        id                          removeplus1
        type                          delete
        delete-string                   +1
```

- Perform a save and activate configuration for changes to take effect.

6.8 SIP Interface

The SIP interface defines the transport addresses (IP address and port) upon which the Oracle SBC receives and sends SIP messages

Configure two SIP interfaces, one associated with PSTN Realm, and the other for Zoom Contact Center BYOC.

GUI Path: session-router/SIP-interface

ACLI Path: config t→session-router→sip-interface

Click Add, and use the table below as an example to Configure:

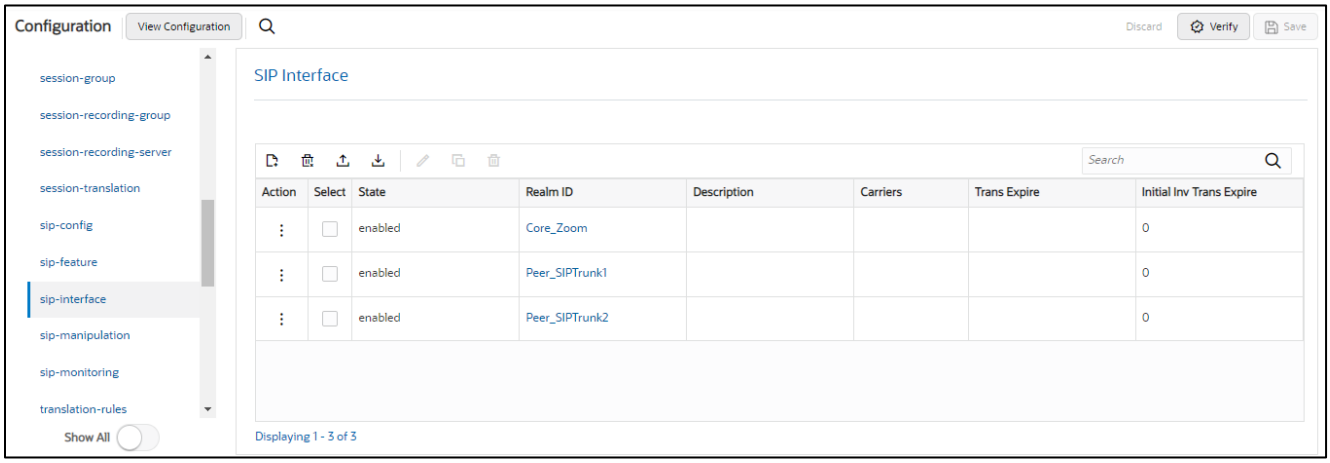
Please note, this is also where we will be assigned some of the configuration elements configured earlier in this document, i.e.

- TLS Profile
- Session-timer-profile
- SIP-Manipulations

Use the following as an example to configure SIP interfaces:

Config Parameter	Zoom	SIPTrunk	SIPTrunk
Realm ID	Core_Zoom	Peer_SIPTrunk1	Peer_SIPTrunk2
Out manipulationid	ZoomCP		

SIP Port Config Parmeter	Zoom	SIP Trunk	SIP Trunk
Address	155.212.214.177	172.18.0.201	192.168.1.10
Port	5061	5060	5060
Transport protocol	TLS	UDP	UDP
TLS profile	TLSZoom		
Allow anonymous	agents-only	agents-only	agents-only



```
sip-interface
        realm-id                        Core_Zoom
        description                     Interface for Zoom Phone
        sip-port
                address                         155.212.214.177
                port                            5061
                transport-protocol              TLS
                tls-profile                     TLSZoom
                allow-anonymous                 agents-only
        out-manipulationid              ACME_NAT_TO_FROM_IP
        sip-profile                     fireplaces
        session-timer-profile           ZoomSessionTimer
sip-interface
        realm-id                        Peer_SIPTrunk1
        sip-port
                address                         172.18.0.201
                allow-anonymous                 agents-only
sip-interface
        realm-id                        Peer_SIPTrunk2
        sip-port
                address                         192.168.1.10
                allow-anonymous                 agents-only
```

6.9 Session Agents

Session Agents are configuration elements which are trusted agents that can both send and receive traffic from the ORACLE SBC with direct access to the trusted data path.

GUI Path: session-router/session-agent

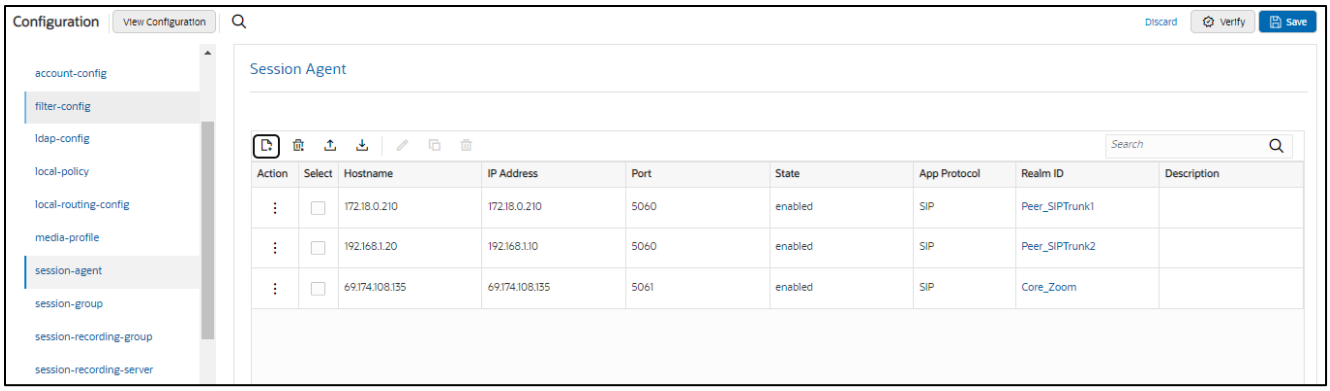
ACLI Path: config t→session-router→session-agent

You will need to configure session agents for Zoom Contact Center BYOC and both Carrier SIP Trunks.

Note: In this configuration example we have used Zoom Contact Center BYOC Session Agents for North America Region. You will be required to configure Zoom Contact Center BYOC Session Agents as per your specific region.
Contact your Zoom representative for detailed list of Zoom IP Addresses.

- Click Add, and use the table below to configure:

Config parameter	Zoom CC SA1	Zoom CC SA2	SIPTrunk1	SIPTrunk2
Hostname	us01zccpeer01.sc.zoom.us	us01zccpeer01.dv.zoom.us	172.18.0.210	192.168.1.20
IP Address	204.80.108.250	50.239.204.250	172.18.0.210	192.168.1.20
Port	5061	5060	5060	5060
Transport method	StaticTLS	UDP+TCP	UDP+TCP	UDP+TCP
Realm ID	Core_Zoom	Peer_SIPTrunk1	Peer_SIPTrunk1	Peer_SIPTrunk2
Ping Method	OPTIONS	OPTIONS	OPTIONS	OPTIONS
Ping Interval	30	30	30	30
Ping Response	Enabled	Enabled	Enabled	Enabled



- Hit the OK tab at the bottom of each when applicable

```
session-agent
        hostname                    us01zccpeer01.sc.zoom.us
        ip-address                  204.80.108.250
        port                        5061
        transport-method            StaticTLS
        realm-id                    Core_Zoom
        ping-method                 OPTIONS
        ping-interval               30
        ping-response               enabled
session-agent
        hostname                    us01zccpeer01.dv.zoom.us
        ip-address                  50.239.204.250
        port                        5061
        transport-method            StaticTLS
        realm-id                    Core_Zoom
        ping-method                 OPTIONS
        ping-interval               30
        ping-response               enabled

session-agent
        hostname                    172.18.0.210
        ip-address                  172.18.0.210
        transport-method            UDP+TCP
        realm-id                    Peer_SIPTrunk1
        ping-method                 OPTIONS
        ping-interval               30
        ping-response               enabled
session-agent
        hostname                    192.168.1.20
        ip-address                  192.168.1.20
        transport-method            UDP+TCP
        realm-id                    Peer_SIPTrunk2
        ping-method                 OPTIONS
        ping-interval               30
        ping-response               enabled
```

- Perform a save and activate configuration for changes to take effect.

6.10 Routing Configuration

This section outlines how to configure the Oracle SBC to route SIP traffic to and from PSTN Trunks and Zoom Contact Center BYOC Platform.

The Oracle SBC has multiple routing options that can be configured based on environment. For the purpose of this example configuration, we are utilizing the Oracle SBC's Local Policy Routing for all traffic to and from Zoom.

6.10.1 Local Policy Configuration

Local Policy config allows for the SBC to route calls from one end of the network to the other based on routing criteria.

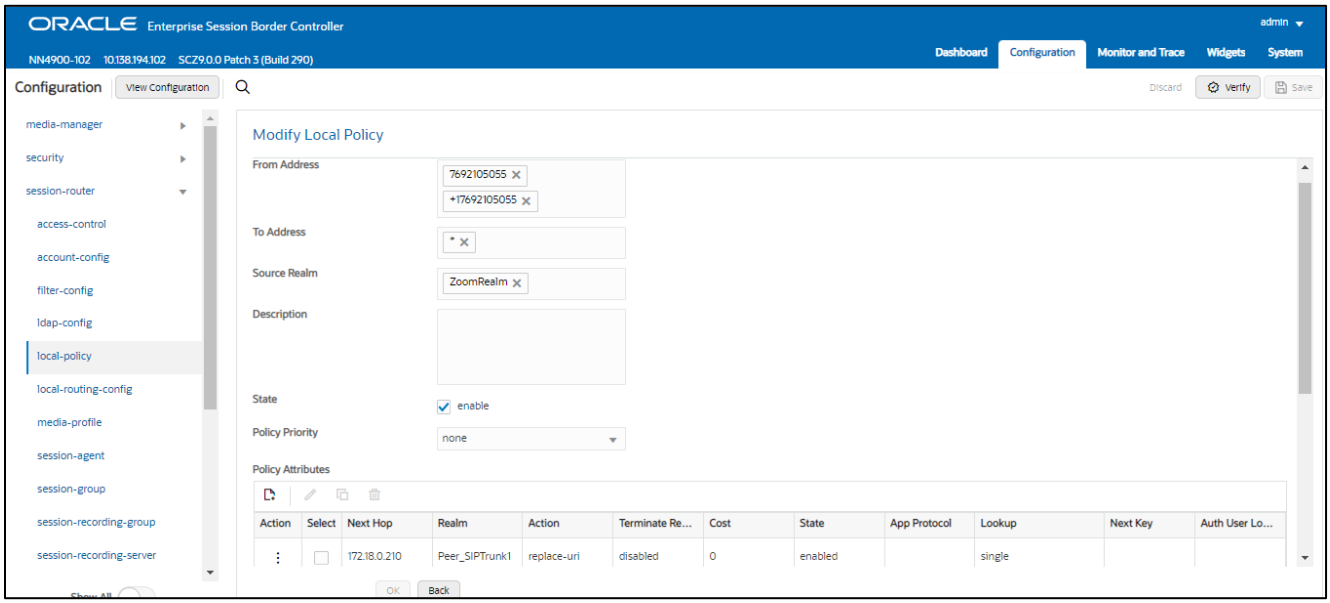
GUI Path: session-router/local-policy

ACLI Path: config t→session-router→local-policy

Note : Having more than one PSTN Carrier terminated onto the SBC is optional as only one carrier trunk is required to terminate BYOC calls to and from Zoom Contact Center.

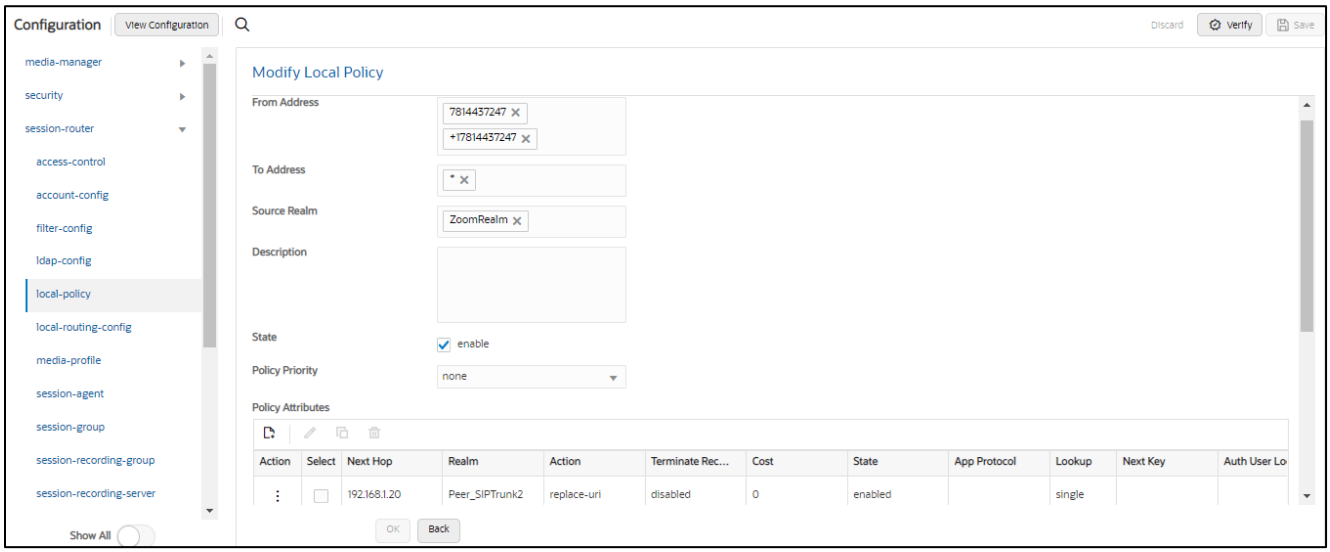
6.12.1.1 Route Calls from Zoom To Customer 1:

Calls originating from Zoom Contact Center BYOC System are routed to carrier trunk for PSTN termination. Here in this example we DID 7692105055 belongs to Carrier 1 hence all calls originating from Zoom Contact Center BYOC System from DID 7692105055 are routed to Carrier 1 Sip Trunk i.e. 172.18.0.210 through realm Peer_SIPTrunk1



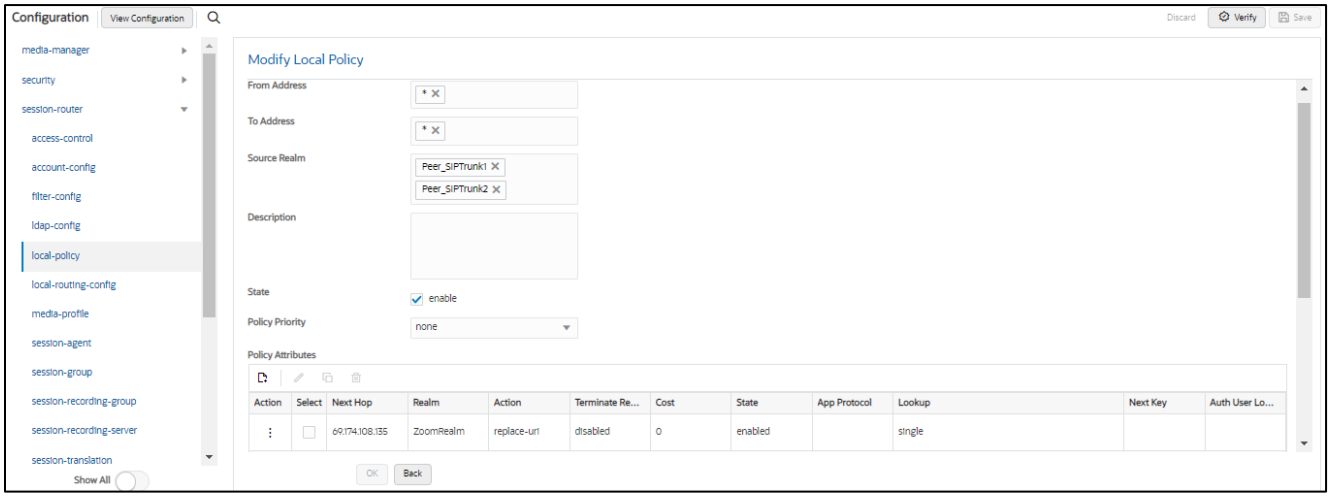
6.12.1.2 Route Calls from Zoom To Customer 2:

Similarly, in below example DID 7814437247 belongs to Carrier2 hence all calls originating from Zoom Contact Center BYOC System from DID 7814437247 are routed to Carrier 2 Sip Trunk i.e. 192.168.1.20 through realm Peer_SIPTrunk2



6.12.1.3 Route Calls from Sip Trunks to Zoom:

Below local policies route all the Calls from Peer_SIPTrunk1 and Peer_SIPTrunk2 to Zoom Contact Center BYOC System. The calls with terminate onto the Zoom Contact Flow that has an entry point with the DID.



To configure local-policy from ACLI

```
local-policy
    from-address                7692105055
                            +17692105055
    to-address                  *
    source-realm                Core_Zoom
    policy-attribute
        next-hop                  172.18.0.210
        realm                    Peer_SIPTrunk1
        action                   replace-uri
local-policy
    from-address                7814437247
                            +17814437247
    to-address                  *
    source-realm                Core_Zoom
    policy-attribute
        next-hop                  192.168.1.20
        realm                    Peer_SIPTrunk2
        action                   replace-uri
local-policy
    from-address                 *
    to-address                  *
    source-realm                Peer_SIPTrunk1 Peer_SIPTrunk2

    policy-attribute
        next-hop                  162.12.233.60
        realm                    Core_Zoom
        action                   replace-uri
```

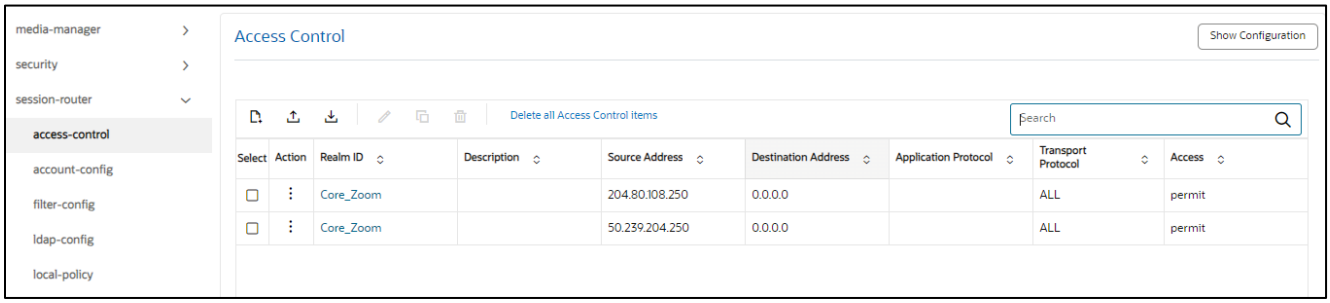
6.11 Access Controls

To enhance the security of your Oracle Session Border Controller, we recommend configuration access controls to limit traffic to only trusted IP addresses on all public facing interfaces.

GUI Path: session-router/access-control

ACLI Path: config t→session-router→access-control

Please use the example below to configure access controls in your environment for rest of the Zoom IP's, as well as SIPTrunk IP's (if applicable).



- Click OK at the bottom

Save and activate your configuration**.**

To configure access-control from ACLI, Navigate to -

config t→session-router→access-control

```
access-control
        realm-id                    Core_Zoom
        source-address                  204.80.108.250
application-protocol            SIP
        trust-level                 high
access-control
        realm-id                    Core_Zoom
        source-address                  50.239.204.250
application-protocol            SIP
        trust-level                 high
```

Similarly create access controls for Sip Trunks if required.

Notice the trust level on this ACL is set to high. When the trust level on an ACL is set to the same value of as the access control trust level of its associated realm, this create an implicit deny, so only traffic from IP addresses configured as ACL's with the same trust level will be allowed to send traffic to the SBC. For more information about trust level on ACL's and Realms, please see the [SBC Security Guide, Page 3-10](#).

6.12 SBC Behind NAT SPL configuration

This configuration is needed when your SBC is behind a NAT device. This is configured to avoid loss in voice path and SIP signaling.

The Support for SBC Behind NAT SPL plug-in changes information in SIP messages to hide the end point located inside the private network. The specific information that the Support for SBC Behind NAT SPL plug-in changes depends on the direction of the call.

For example, from the NAT device to the SBC or from the SBC to the NAT device.

Configure the Support for SBC Behind NAT SPL plug-in for each SIP interface that is connected to a NAT device. One public-private address pair is required for each SIP interface that uses the SPL plug-in, as follows.

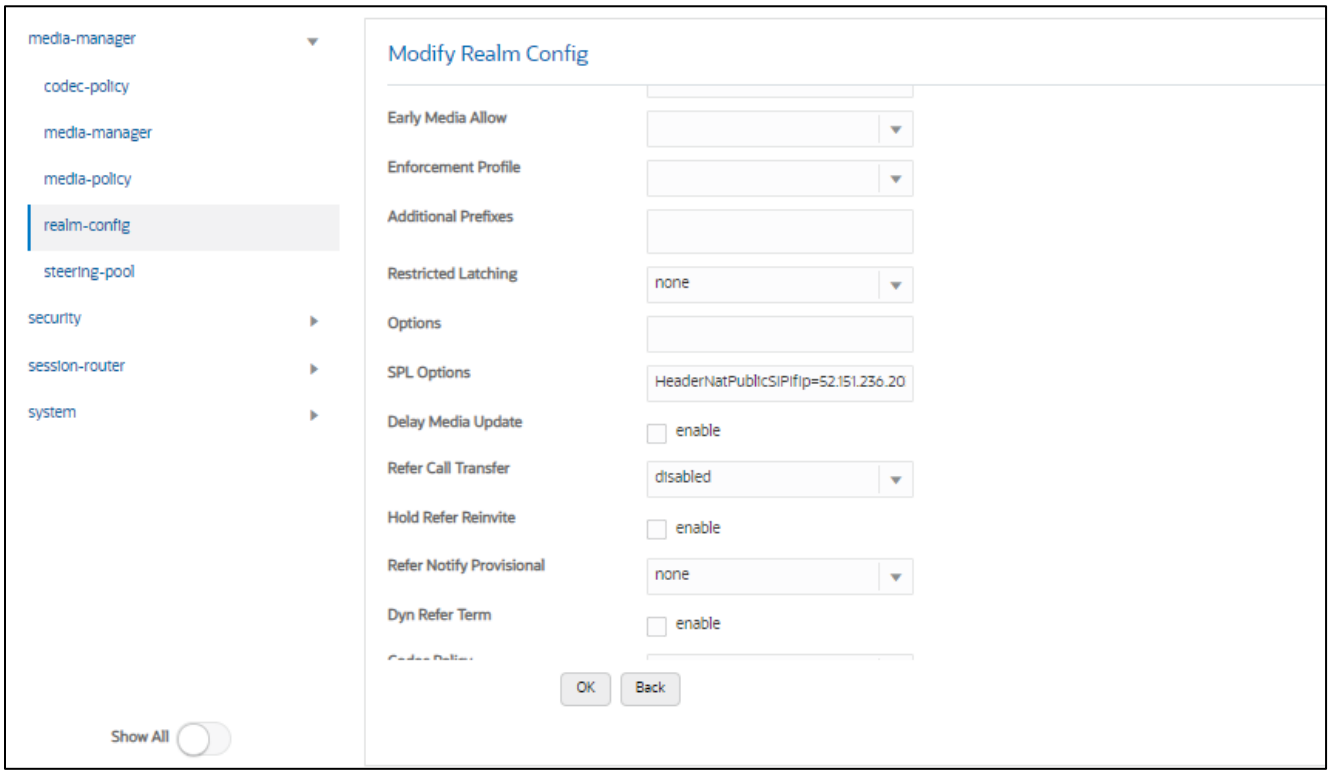
- The private IP address must be the same as the SIP Interface IP address.
- The public IP address must be the public IP address of the NAT device

Here is an example configuration with SBC Behind NAT SPL config. The SPL is applied to the Zoom side SIP interface.

To configure SBC Behind NAT SPL Plug in, Go to session-router->SIP-interface->spl-options and input the following value, save, and activate.

HeaderNatPublicSIPIfIp=52.151.236.203,HeaderNatPrivateSIPIfIp=10.0.4.4,Here 52.151.236.203 is an example value and should be your public IP address.

Here HeaderNatPublicSIPIfIp is the public interface ip and HeaderNatPrivateSIPIfIp is the private ip.



This configuration would be applied to each SIP Interface in the ORACLE SBC configuration that was deployed behind a Nat Device.

7. ACLI Running Configuration

```
access-control
        access-control
        realm-id                    Core_Zoom
        source-address                  204.80.108.250
        trust-level                 high
access-control
        realm-id                    Core_Zoom
        source-address                  50.239.204.250
        trust-level                 high
access-control
        realm-id                    Peer_SIPTrunk1
        source-address                  172.18.0.210
        destination-address              172.18.0.201
        application-protocol            SIP
        trust-level                 high
access-control
        realm-id                    Peer_SIPTrunk2
        source-address                  192.168.1.20
        destination-address              192.168.1.10
        application-protocol            SIP
        trust-level                 high
certificate-record
        name                        DigiCertGlobalRootCA
        common-name                     DigiCertGlobalRootCA
certificate-record
        name                        DigiCertGlobalRootG2
        common-name                     DigiCertGlobalRootG2
certificate-record
        name                        DigiCertGlobalRootG3
        common-name                     DigiCertGlobalRootG3
certificate-record
        name                        DigiCertInter
        common-name                     DigiCert SHA2 Secure Server CAcertificate-record
certificate-record
        name                        SBCEnterpriseCert
        state                       California
```

```
        locality                        Redwood City
        organization                    Oracle Corporation
        unit                            Oracle CGBU
        common-name                     telechat.o-test06161977.com
        extended-key-usage-list         serverAuth
                                        ClientAuth
codec-policy
        name                            OptimizeCodecs
        allow-codecs                    * G722:no PCMA:no CN:no SIREN:no RED:no G729:no
        add-codecs-on-egress            PCMU
filter-config
        name                            all
        user                            *
local-policy
        from-address                    7692105055
                                        +17692105055
        to-address                      *
        source-realm                    Core_Zoom
        policy-attribute
                next-hop                172.18.0.210
                realm                   Peer_SIPTrunk1
                action                  replace-uri
local-policy
        from-address                    7814437247
                                        +17814437247
        to-address                      *
        source-realm                    Core_Zoom
        policy-attribute
                next-hop                192.168.1.20
                realm                   Peer_SIPTrunk2
                action                  replace-uri
local-policy
        from-address                    *
        to-address                      *
        source-realm                    Peer_SIPTrunk1
        policy-attribute
                next-hop                162.12.233.60
```

```
            realm                    Core_Zoom
            action                   replace-uri
local-policy
      from-address                   *
      to-address                     *
      source-realm                   Peer_SIPTrunk2
      policy-attribute
            next-hop                 162.12.233.60
            realm                    Core_Zoom
            action                   replace-uri
media-manager
      max-untrusted-signaling        1
      min-untrusted-signaling        1
media-sec-policy
      name                           RTP
media-sec-policy
      name                           sdesPolicy
      inbound
            profile                  SDES
            mode                     srtp
            protocol                 sdes
      outbound
            profile                  SDES
            mode                     srtp
            protocol                 sdes
network-interface
      name                           s0p0
      ip-address                     155.212.214.177
      netmask                        255.255.255.192
      gateway                        155.212.214.1
      dns-ip-primary                 8.8.8.8
      dns-domain                     solutionslab.cgbuburlington.com
network-interface
      name                           s1p0
      ip-address                     172.18.0.201
      netmask                        255.255.0.0
      gateway                        172.18.0.1
```

```
network-interface
        name                          s1p1
        ip-address                    192.168.1.10
        netmask                       255.255.255.0
        gateway                       192.168.1.1
ntp-config
        server                        198.55.111.50
                                    206.108.0.131
phy-interface
        name                          s0p0
        operation-type                Media
phy-interface
        name                          s1p0
        operation-type                Media
        port                        2
phy-interface
        name                          s1p1
        operation-type                Media
        port                        3
realm-config
        identifier                  Core_Zoom
        network-interfaces            s0p0:0.4
        mm-in-realm                 enabled
        media-sec-policy              sdesPolicy
        out-manipulationid            ZoomOutManip
        access-control-trust-level      high
realm-config
        identifier                  Peer_SIPTrunk1
        network-interfaces            s1p0:0.4
        mm-in-realm                 enabled
        media-sec-policy              RTP
        access-control-trust-level      high
realm-config
        identifier                  Peer_SIPTrunk2
        network-interfaces            s1p1:0.4
        mm-in-realm                 enabled
        media-sec-policy              sdesPolicy
```

```
        access-control-trust-level          high
sdes-profile
        name                                SDES
        crypto-list                         AEAD_AES_256_GCM
                                            AES_CM_128_HMAC_SHA1_32
                                            AES_256_CM_HMAC_SHA1_80
                                            AES_CM_128_HMAC_SHA1_80
session-agent
        hostname                            us01zccpeer01.sc.zoom.us
        ip-address                          204.80.108.250
        port                                5061
        transport-method                    StaticTLS
        realm-id                            Core_Zoom
        ping-method                         OPTIONS
        ping-interval                       30
        ping-response                       enabled
session-agent
        hostname                            us01zccpeer01.dv.zoom.us
        ip-address                          50.239.204.250
        port                                5061
        transport-method                    StaticTLS
        realm-id                            Core_Zoom
        ping-method                         OPTIONS
        ping-interval                       30
        ping-response                       enabled
session-agent
        hostname                            172.18.0.210
        ip-address                          172.18.0.210
        transport-method                    UDP+TCP
        realm-id                            Peer_SIPTrunk1
        ping-method                         OPTIONS
        ping-interval                       30
        ping-response                       enabled
        rfc2833-mode                        preferred
        rfc2833-payload                     101
session-agent
        hostname                            192.168.1.20
```

```
        ip-address                      192.168.1.20
        transport-method                UDP+TCP
        realm-id                        Peer_SIPTrunk2
        ping-method                     OPTIONS
        ping-interval                   30
        ping-response                   enabled
session-translation
        id                              addPlus
        rules-calling                   addPlus
        rules-called                    addPlus
session-translation
        id                              removeE164
        rules-calling                   removeplus1
        rules-called                    removeplus1
        rules-asserted-id               removeplus1
SIP-config
        home-realm-id                   Core_Zoom
        registrar-domain                *
        registrar-host                  *
        registrar-port                  5060
        options                         inmanip-before-validate
                                        max-udp-length=0
        extra-method-stats              enabled
sip-interface
        realm-id                        Core_Zoom
        description                     Inerface for Zoom Contact Center BYOC
        sip-port
                address                 155.212.214.177
                port                    5061
                transport-protocol      TLS
                tls-profile             TLSZoom
                allow-anonymous         agents-only
        out-manipulationid              ACME_NAT_TO_FROM_IP
        sip-profile                     forreplaces
        session-timer-profile           ZoomSessionTimer
sip-interface
        realm-id                        Peer_SIPTrunk1
```

```
        sip-port
                address                         172.18.0.201
                allow-anonymous                 agents-only
sip-interface
        realm-id                        Peer_SIPTrunk2
        sip-port
                address                         192.168.1.10
                allow-anonymous                 agents-only
sip-manipulation
        name                            RespondOPTIONS
        header-rule
                name                            Respond2OPTIONS
                header-name                     from
                action                          reject
                methods                         OPTIONS
                new-value                       "200 OK"

SIP-monitoring
        match-any-filter                enabled
        monitoring-filters              *
steering-pool
        ip-address                      155.212.214.177
        start-port                      10000
        end-port                        20000
        realm-id                        Core_Zoom
steering-pool
        ip-address                      172.18.0.201
        start-port                      20001
        end-port                        40000
        realm-id                        Peer_SIPTrunk1
steering-pool
        ip-address                      192.168.1.10
        start-port                      40001
        end-port                        60000
        realm-id                        Peer_SIPTrunk2
system-config
        hostname                        zoom.us
```

```
        description                    SBC for Zoom Contact Center BYOC
        location                       Burlington,MA
        system-log-level               NOTICE
        default-gateway                10.138.194.129
        source-routing                 enabled
        snmp-agent-mode                v1v2
tls-global
        session-caching                enabled
tls-profile
   name                            TLSZoom
        end-entity-certificate         SBCEnterpriseCert
        trusted-ca-certificates        DigiCertRoot
                                   DigiCertGlobalRootG2
                                   DigiCertGlobalRootG3
        cipher-list                    TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384
                                   TLS_RSA_WITH_AES_256_CBC_SHA256
                                   TLS_RSA_WITH_AES_128_CBC_SHA
        mutual-authenticate            enabled
translation-rules
        id                         addPlus
        type                       add
        add-string                 +1
translation-rules
        id                         removeplus1
        type                       delete
        delete-string              +1
web-server-config
        http-interface-list        GU
```

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