Oracle Session Border Controller with Zoom Phone (Cloud Peering)

Technical Application Note

ORACLE
COMMUNICATIONS

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Contents

1 Document Overview

Zoom Phone Cloud Peering enables service providers to leverage their existing PSTN network to provide calling service to their customers. The Service Provider can utilize Oracle SBC which supports multi-Tenant Model to establish the connectivity with Zoom Phone System and multiple Enterprises.

This document focuses how to connect Oracle SBC to Zoom Phone Cloud Peering System.

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 Phone

- https://explore.zoom.us/en/products/zoom-phone/provider-exchange/
- https://zoom.us/phonesystem
- https://zoom.us/zoom-phone-features

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	30/09/22	• Initial publication

3 Intended Audience

This document describes how to connect the Oracle SBC to Zoom Phone- Cloud Peering. 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:SCZ9.0p3

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 (Release SCZ9.0.0 Only)
- AP4900 (Release SCZ9.0.0 Only)
- VME
- Oracle SBC on Public Cloud

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

4 Zoom Phone Configuration

This document only covers the steps required to configure Oracle SBC with Zoom Cloud Peering. There may be other components that are part of the Zoom Cloud Peering Setup which are not included in this document. For detailed assistance with setting up and configuring your Zoom Phone System for Cloud Peering, please reach out to Zoom Sales: https://zoom.us/contactsales

5 Infrastructure Requirements

The table below shows the list of infrastructure prerequisites for deploying Zoom Premise Peering.

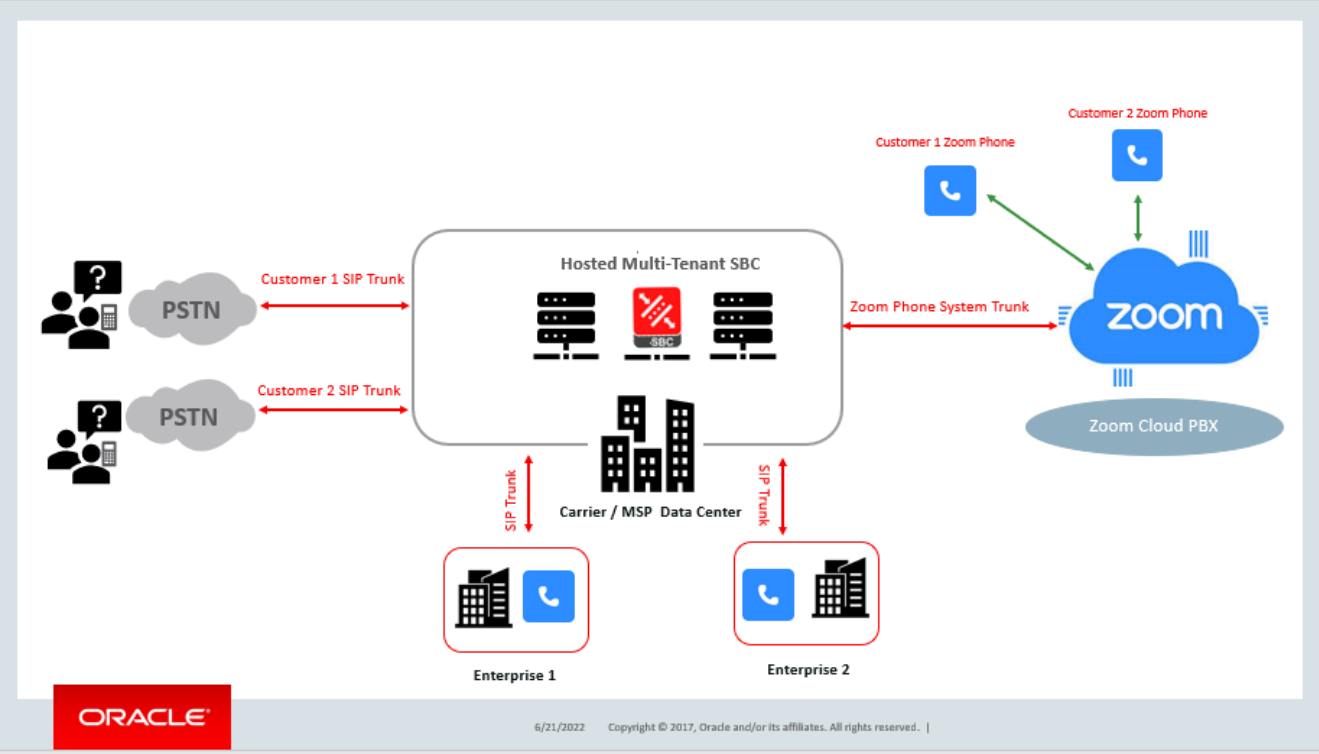
Session Border Controller (SBC)	**See Zoom Documentation for More Details**
SIP Trunks connected to the SBC	
Zoom Phone System	
Public IP address for the SBC	
Public trusted certificate for the SBC (If TLS transport is used)	
Firewall ports for Zoom Voice signaling	
Firewall IP addresses and ports for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

6 Configuration

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

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 Phone platform.

These instructions cover configuration steps between the Oracle SBC and Zoom Phone Cloud Peering. 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 a provider can utilize Oracle SBC to provide service to two Enterprise Networks. Each Customer register their Zoom Phones directly onto Zoom Cloud. These clients can be inside the corporate Network or can register from outside office premises.

PSTN Calls originating from Zoom Phone System for each customer are segregated based on DID Numbers and are routed to respective customer's PSTN Trunk from Oracle SBC.

Note : Having more than one PSTN trunks terminated onto the SBC is optional as service providers can leverage same carrier trunk to support multiple Enterprises.

Zoom adds custom header **X-To-Carrier** which can be used to identify each customer for billing prospective.

Inbound calls from PSTN to Zoom are terminated to appropriate customer user based on the assigned DID as Zoom does not require any specific header to identify users for each Tenant.

For the purpose of this application note the connection to Zoom Cloud PBX 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.

Note : Oracle SBC which is configured for Service provider model does not support WebGUI and configuration can only be performed through ACLI.

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 Phone 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

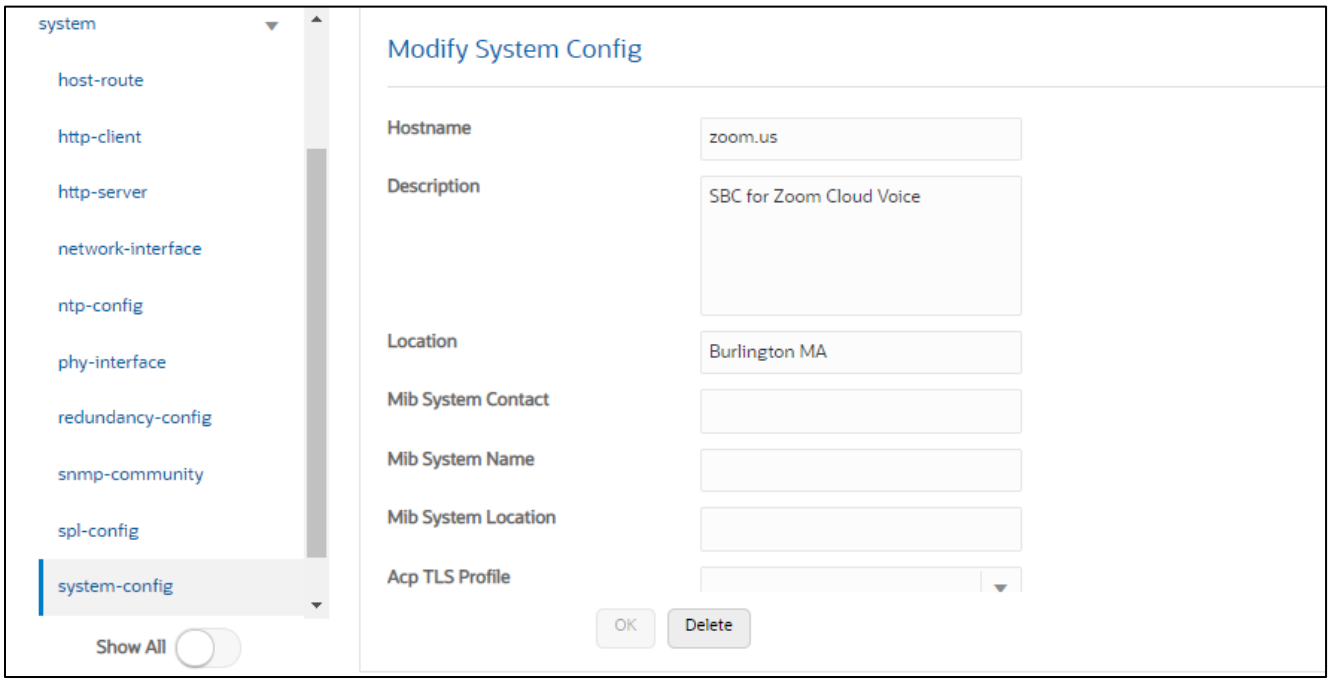
GUI Path: system/system-config

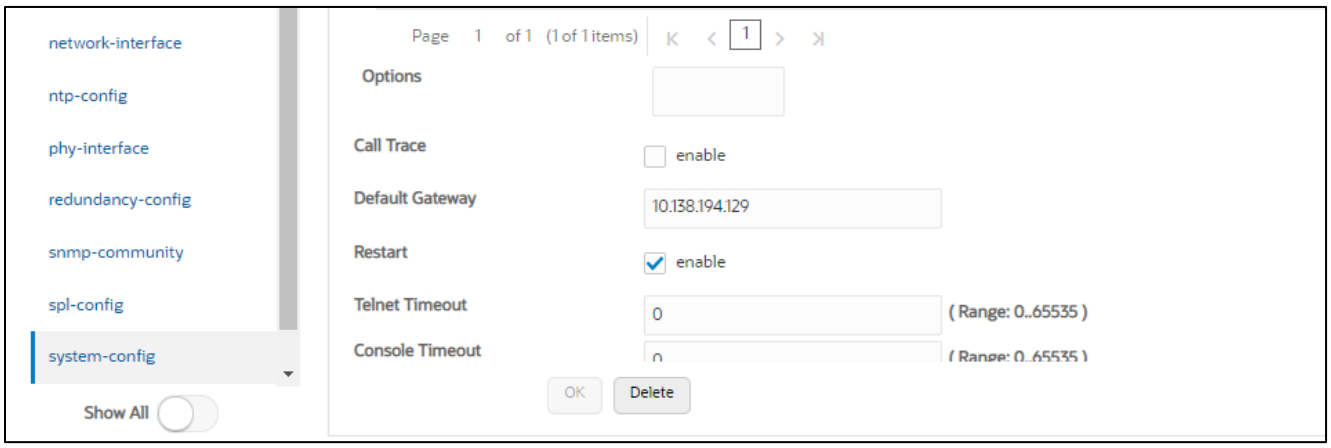
ACLI Path: config t→system→system-config

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

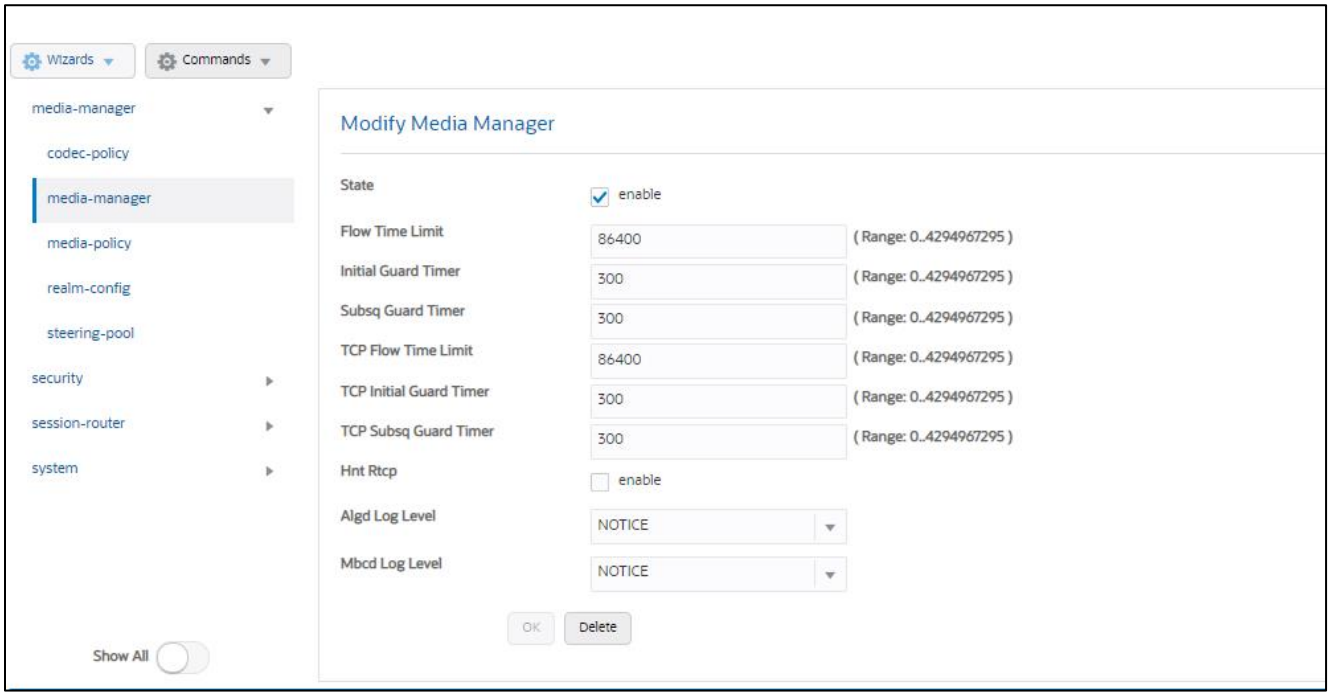
GUI Path: media-manager/media-manager

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

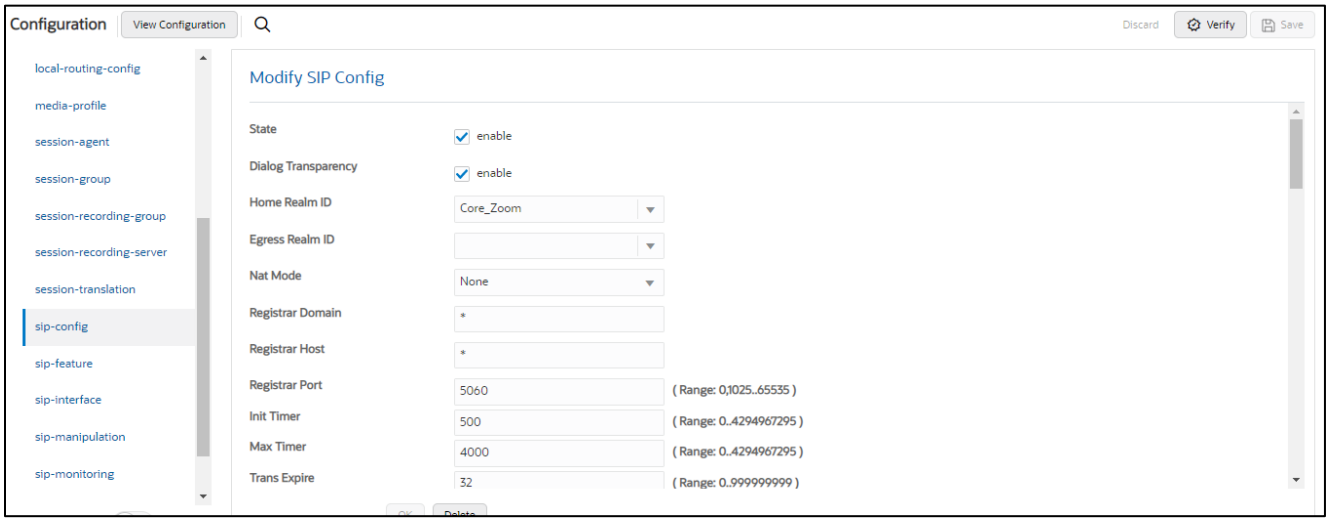
To enable SIP related objects on the Oracle SBC, you must first configure the global SIP Config element:

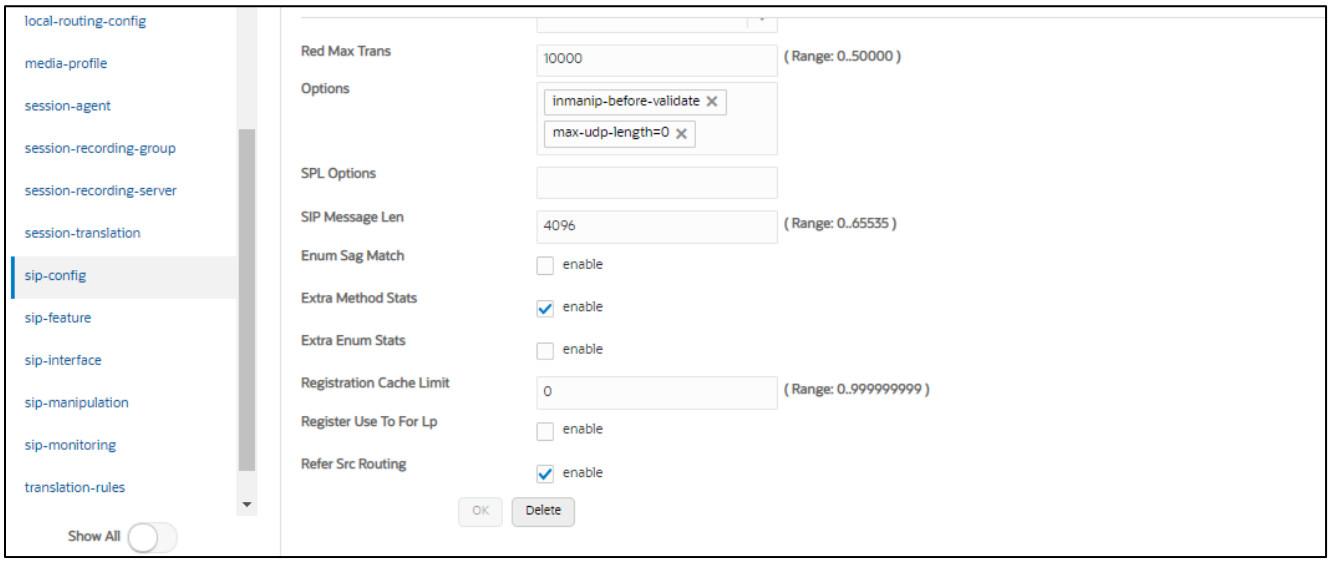
GUI Path: session-router/SIP-config

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

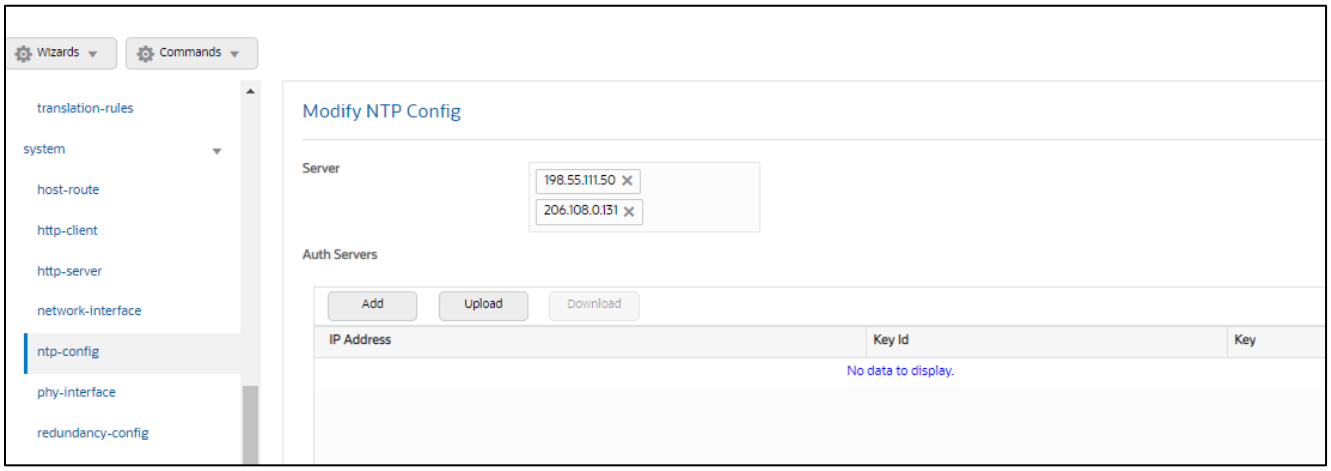
```
sip-config
      home-realm-id                Zoom
      options                      max-udp-length=0
                                     inmanip-before-validate
```

- 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 two physical interfaces, and two network interfaces.
One to communicate with Zoom Cloud Voice, the other to connect to PSTN Network.

6.3.1 Physical Interfaces

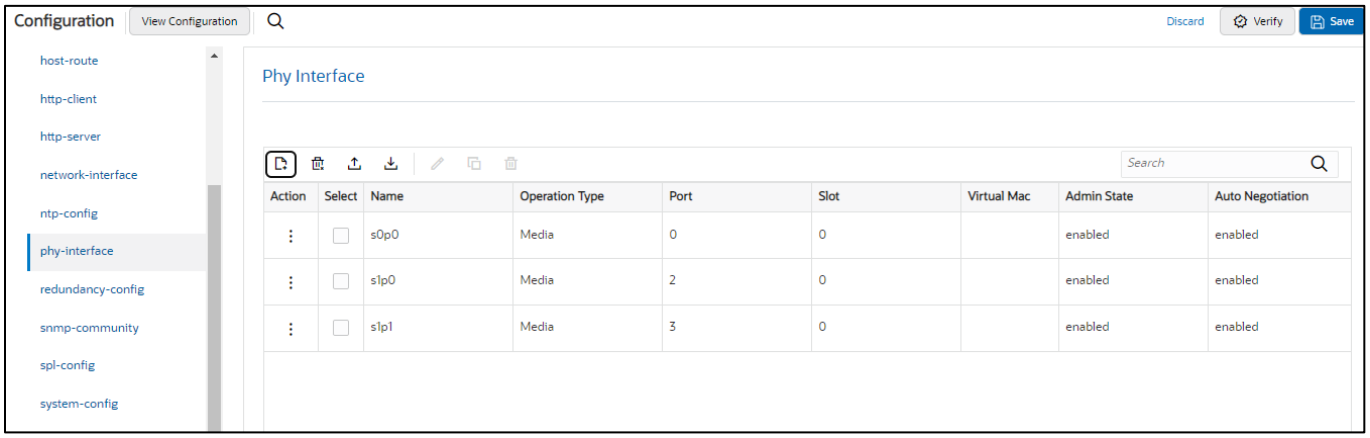
GUI Path: system/phy-interface

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.

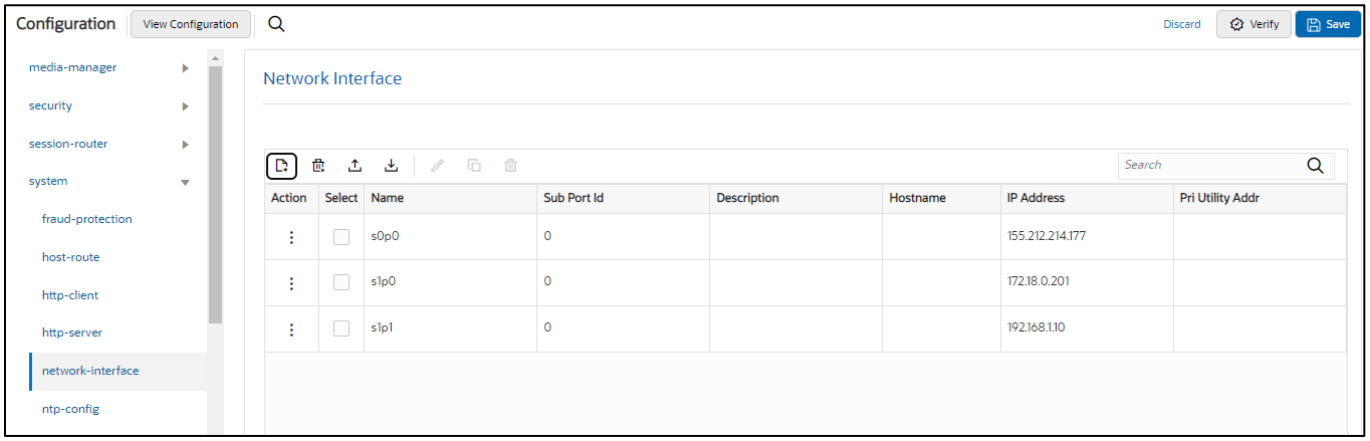
6.3.2 Network Interfaces

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                 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
```

- 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 Phone Platform

Zoom Phone 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 Phone 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

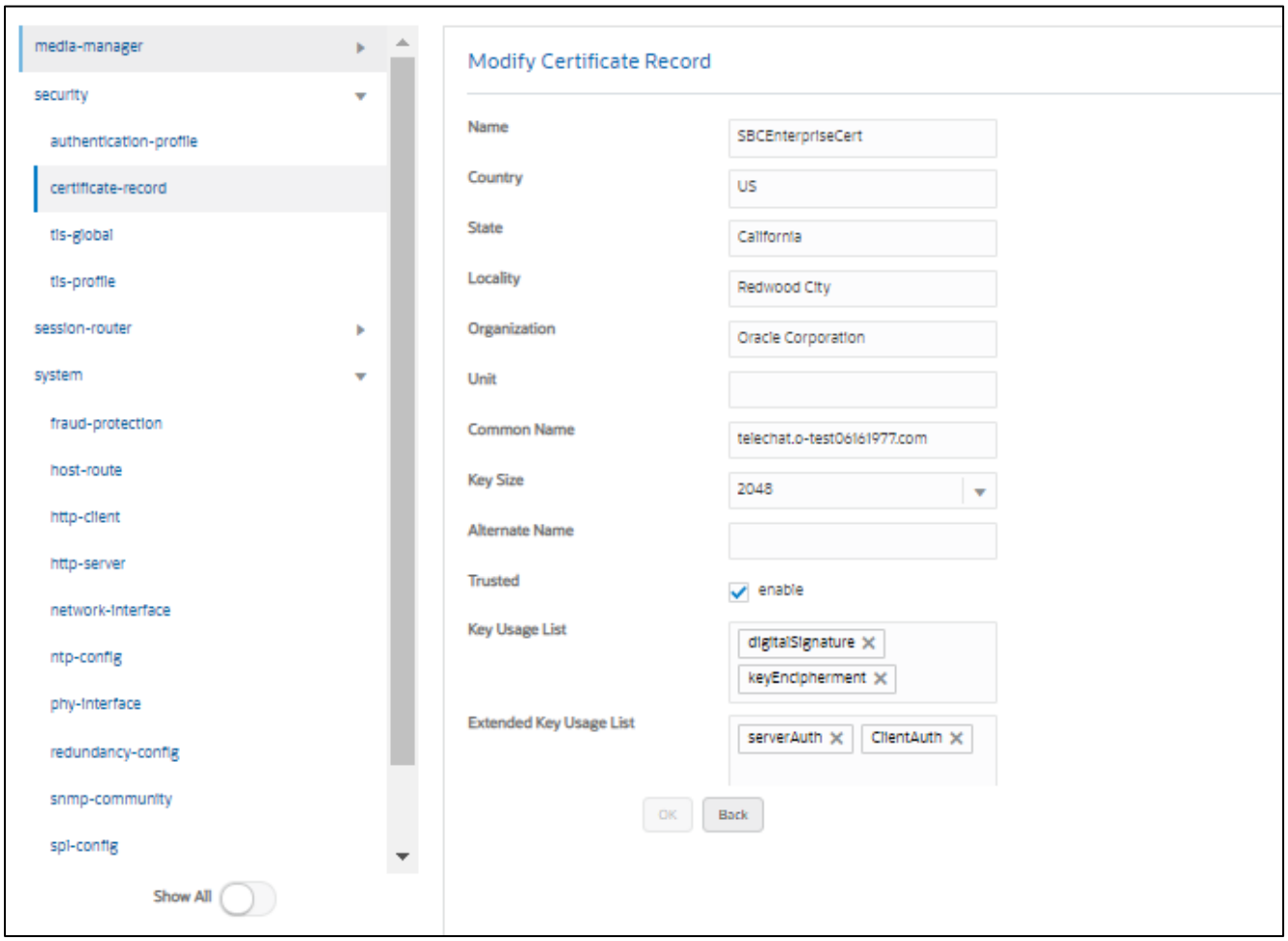
6.4.2 SBC End Entity Certificate

The SBC's end entity certificate is what is presented to Zoom Phone 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 certification 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

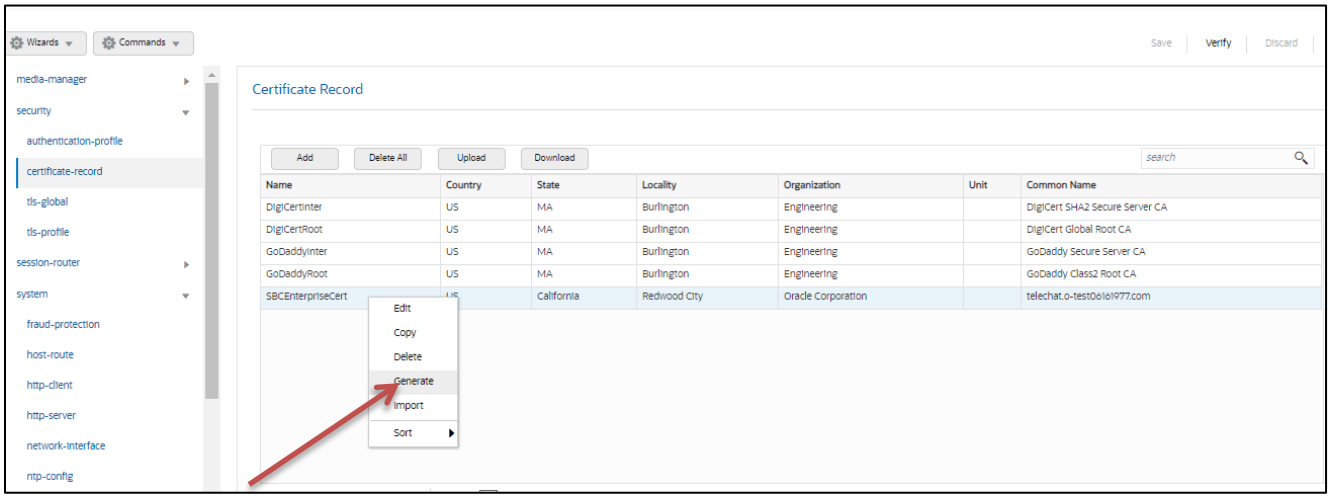
T-Systems Enterprise Services GmbH	T-TeleSec GlobalRoot Class 2
T-Systems Enterprise Services GmbH	T-TeleSec GlobalRoot Class 3

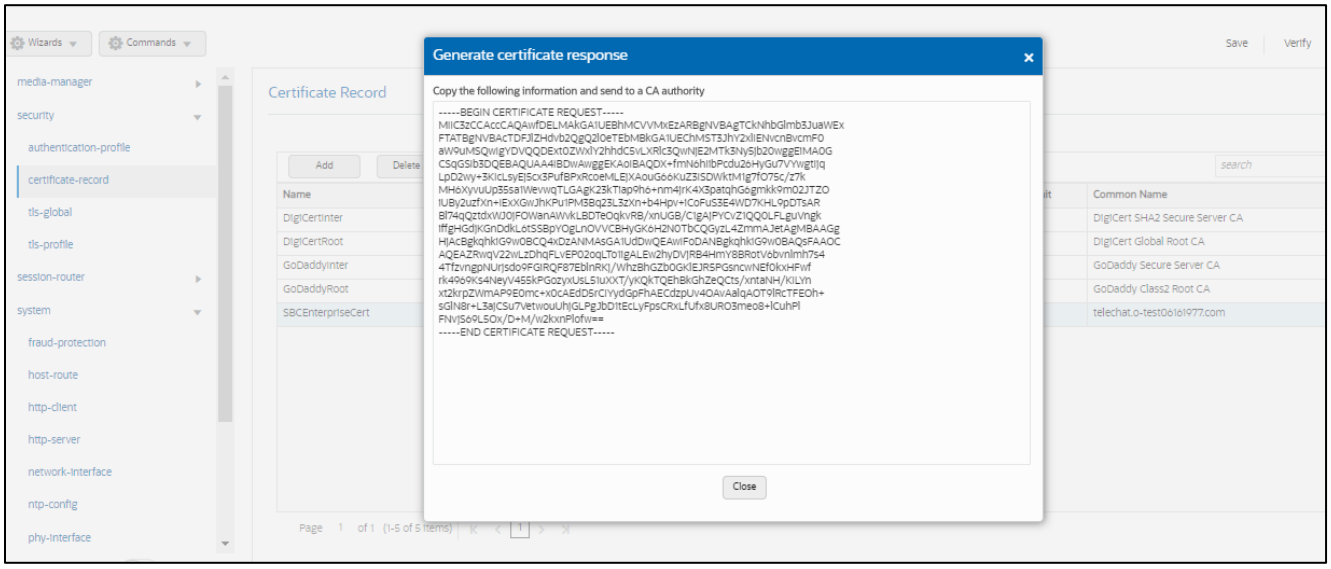
6.4.5 Generate Certificate Signing Request

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
lznX9/Gxg5X+S2QkHjNmPK+JuePqX4I=
-----END CERTIFICATE REQUEST-----

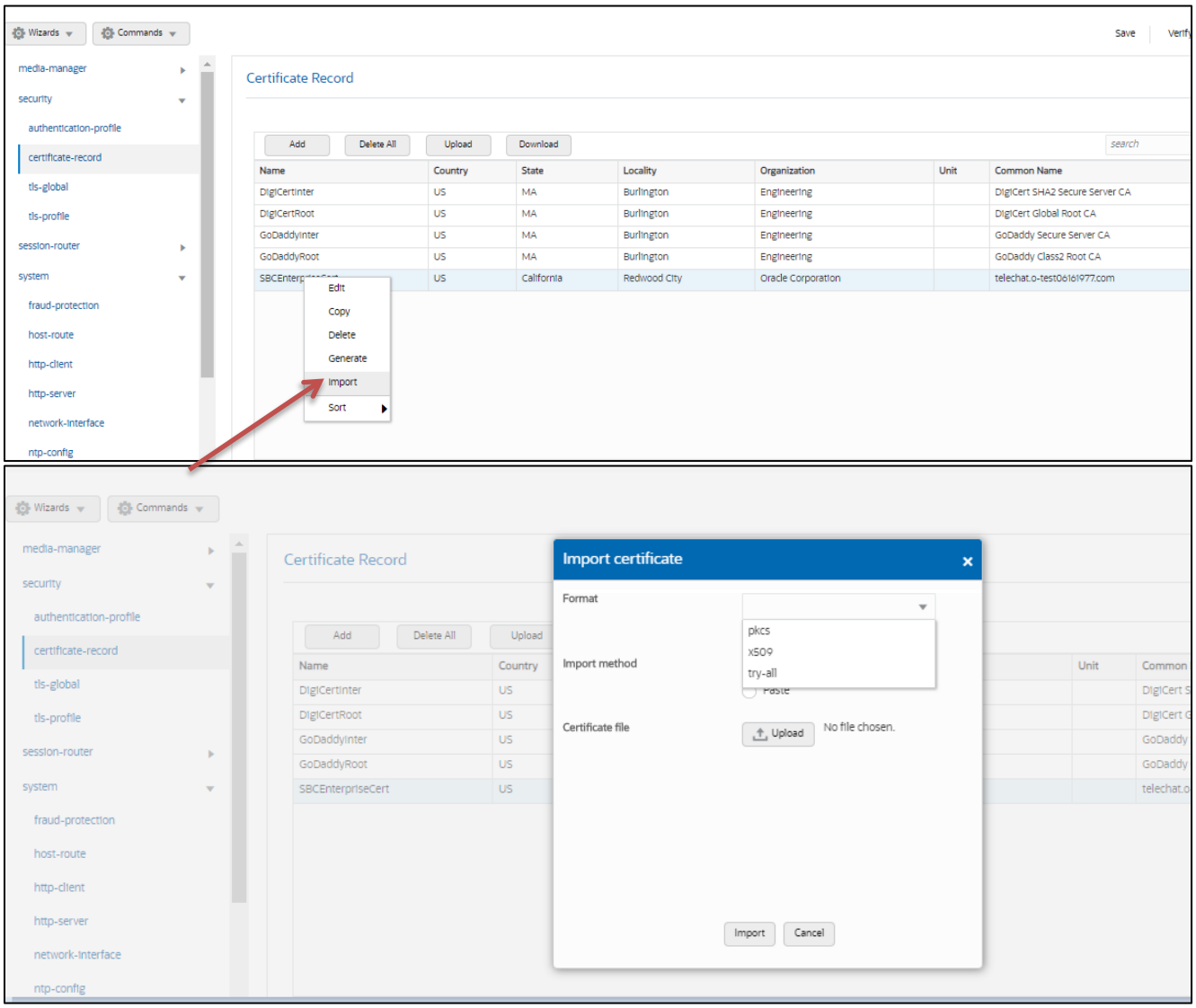
Copy/paste the text that gets printed on the screen as shown above and upload to your CA server for signature.

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.

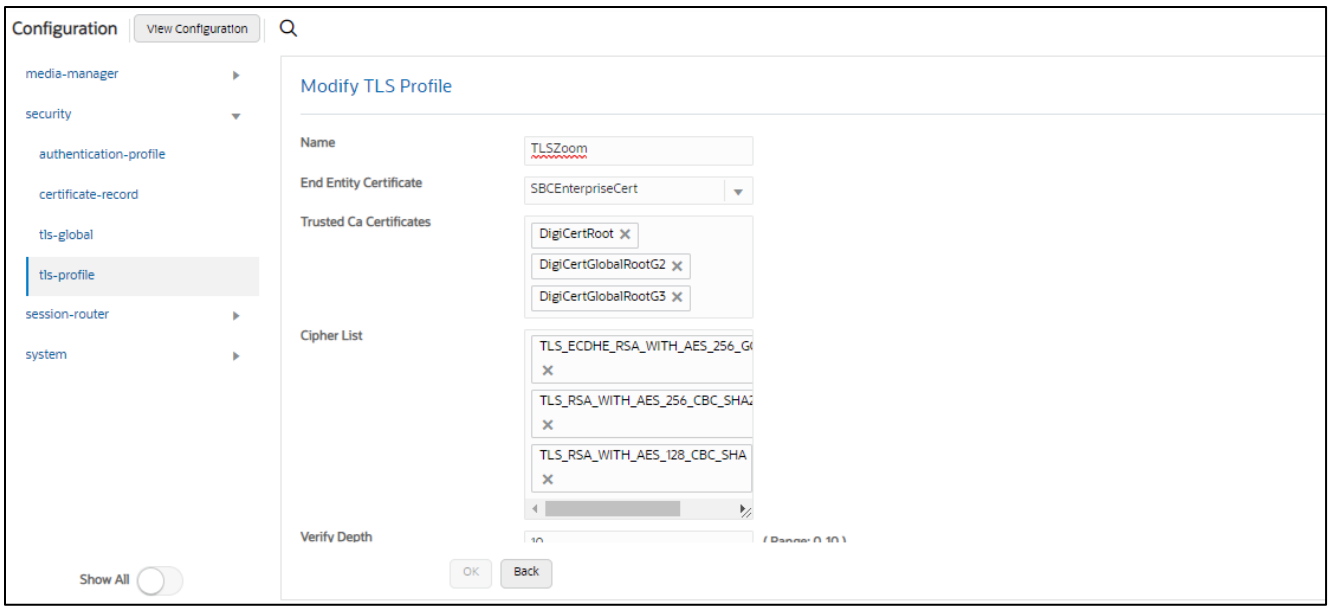
GUI Path: security/tls-profile

ACLI Path: config t→security→tls-profile

- Click Add, use the example below to configure

Zoom Cloud Peering 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 Cloud Voice.

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.

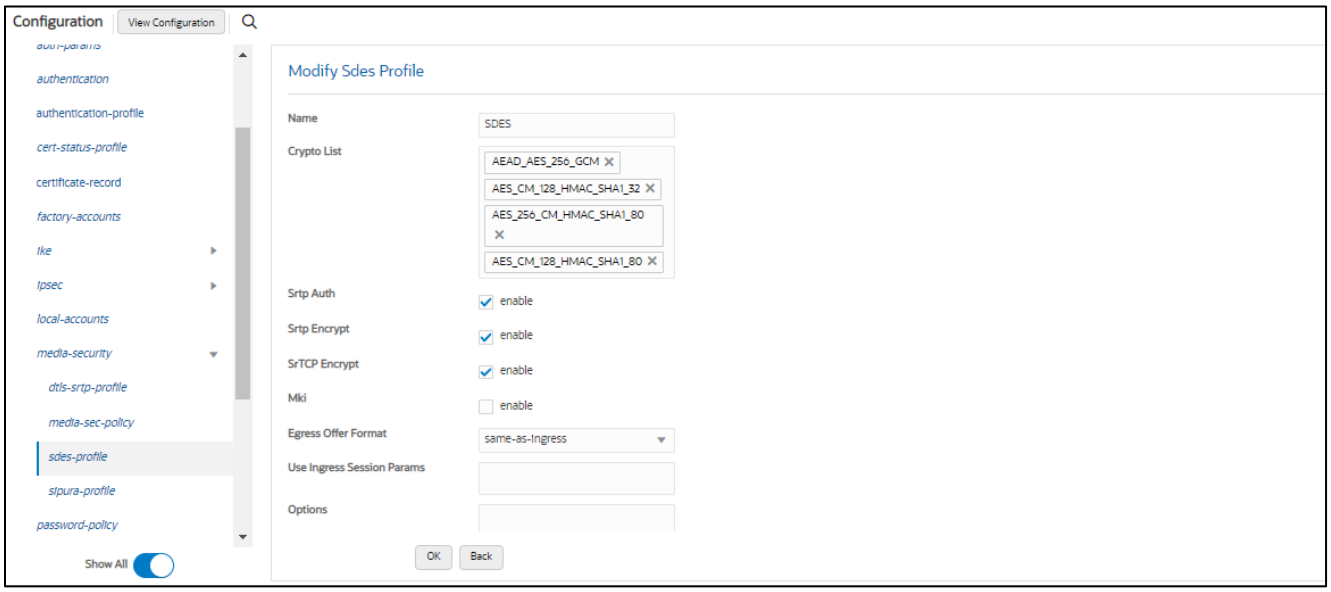
GUI Path: security/media-security/sdes-profile

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

Oracle SBC and Zoom Cloud Voice Support 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

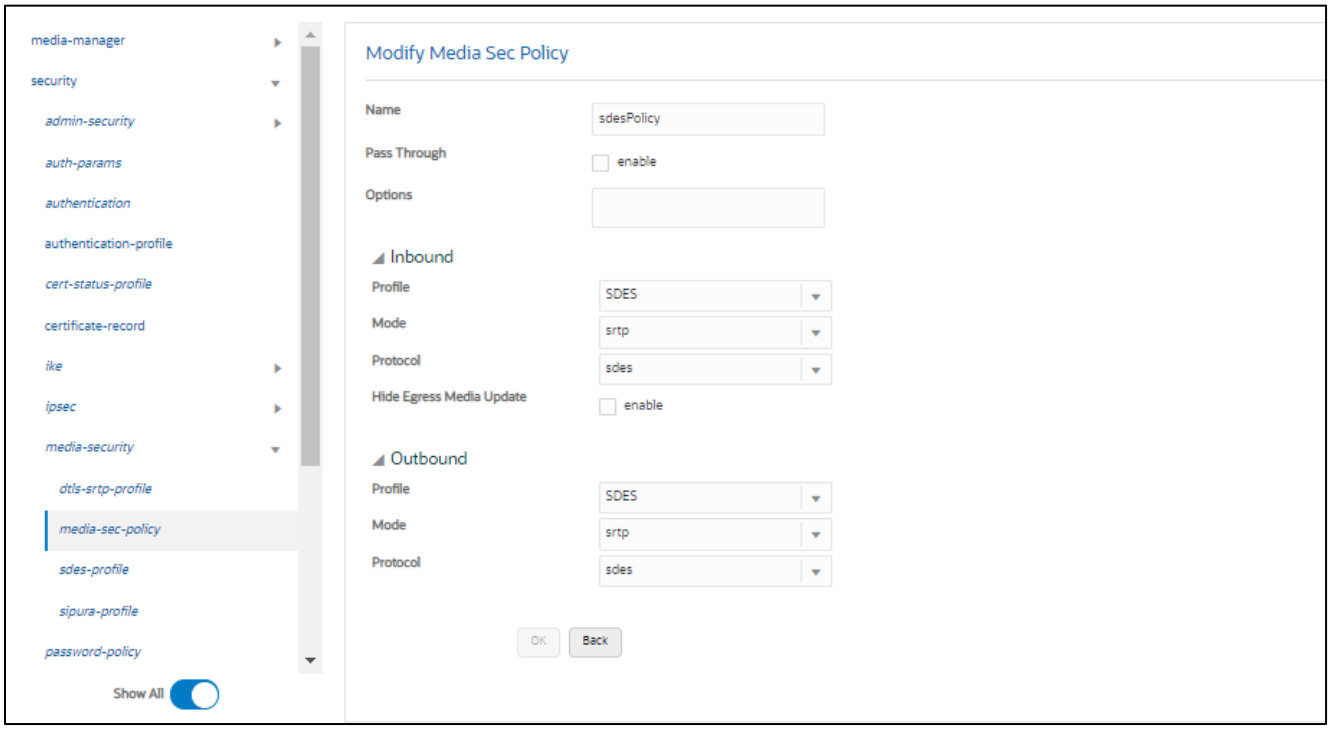
In this example, we are configuring two media security policies. One to secure and decrypt media toward Zoom, the other for non-secure media facing PSTN.

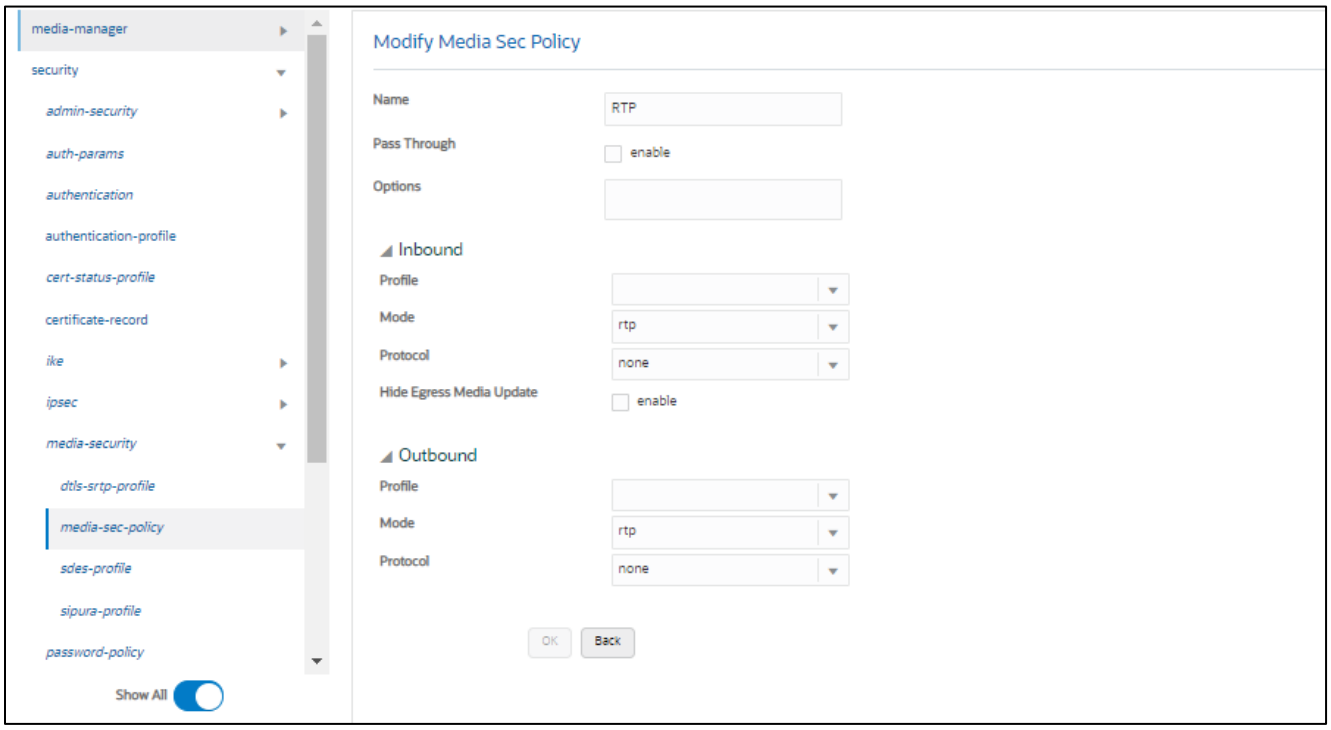
These are named as sdesPolicy and RTP.

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 Phone 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

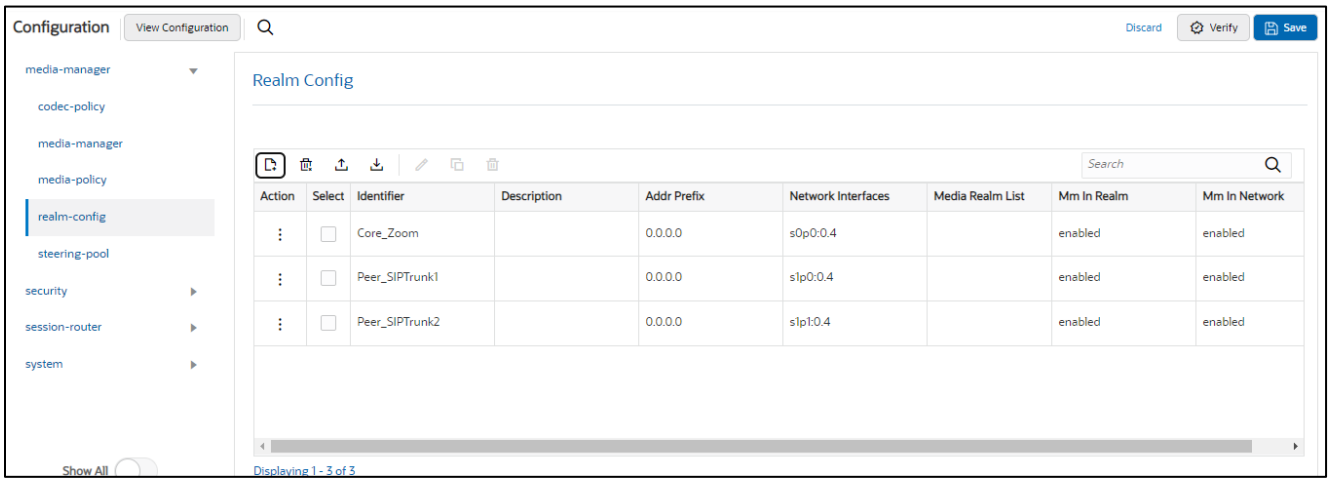
ACLI Path: config t→media-manager→realm-config

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

Config Parameter	Zoom Phone	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

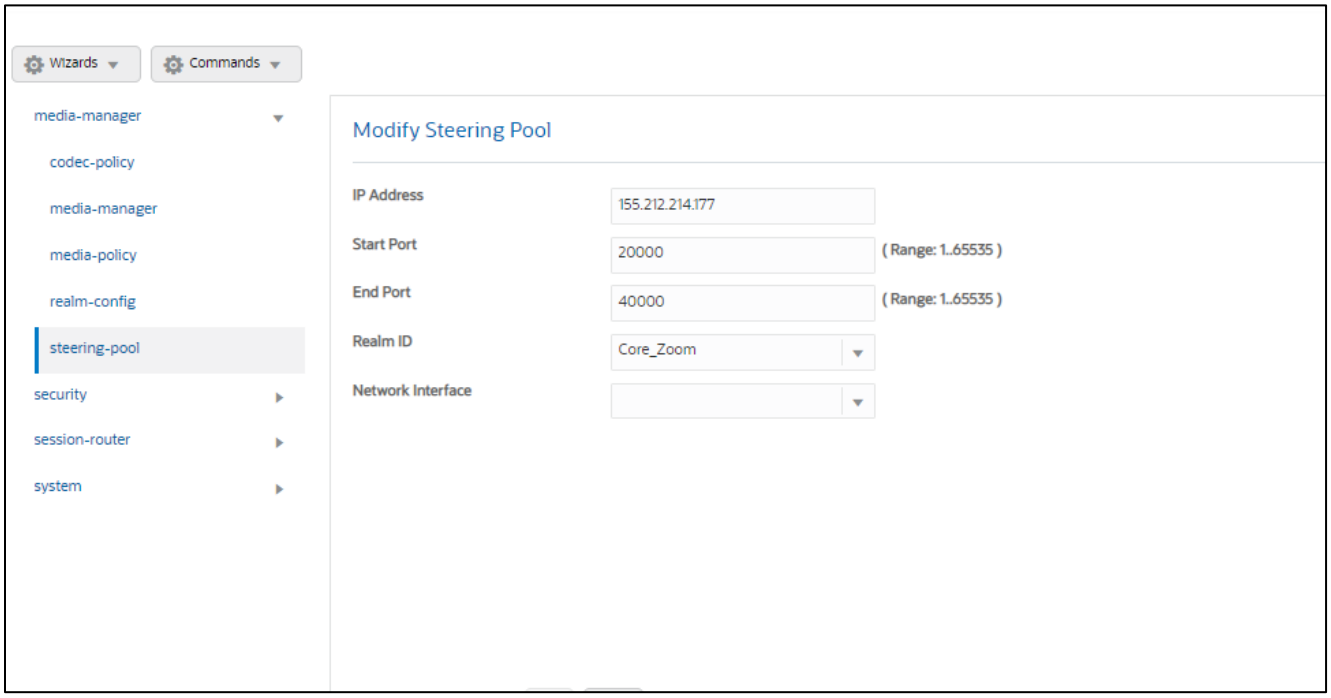
Steering pools define sets of ports that are used for steering media flows through the Oracle SBC.
These selected ports are used to modify the SDP to cause receiving session agents to direct their media toward this system.

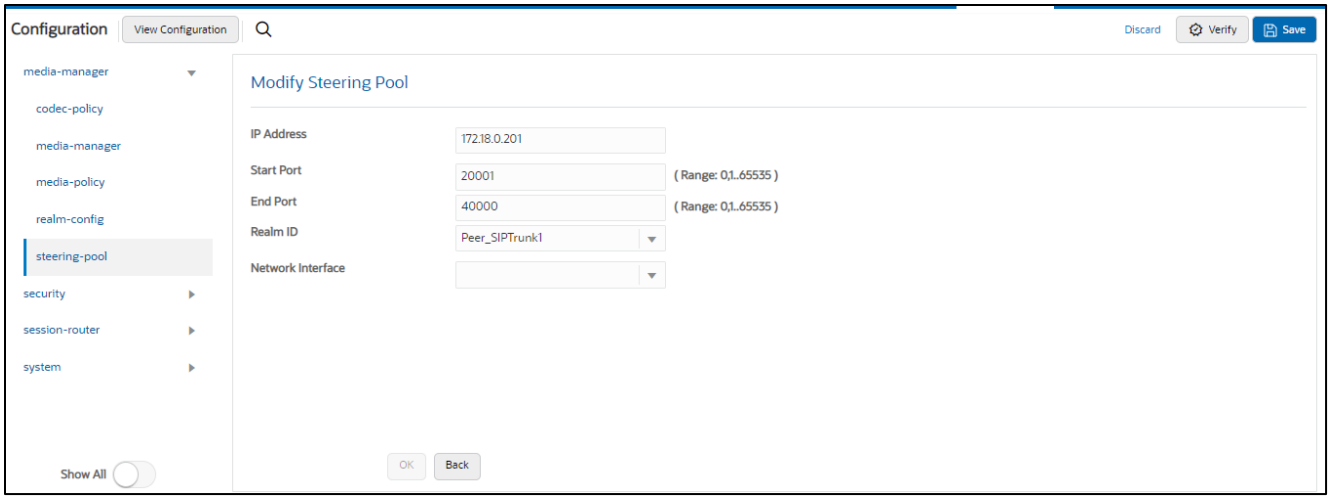
We will configure one steering pool for both PSTN Trunks and one steering pool for Zoom Phone

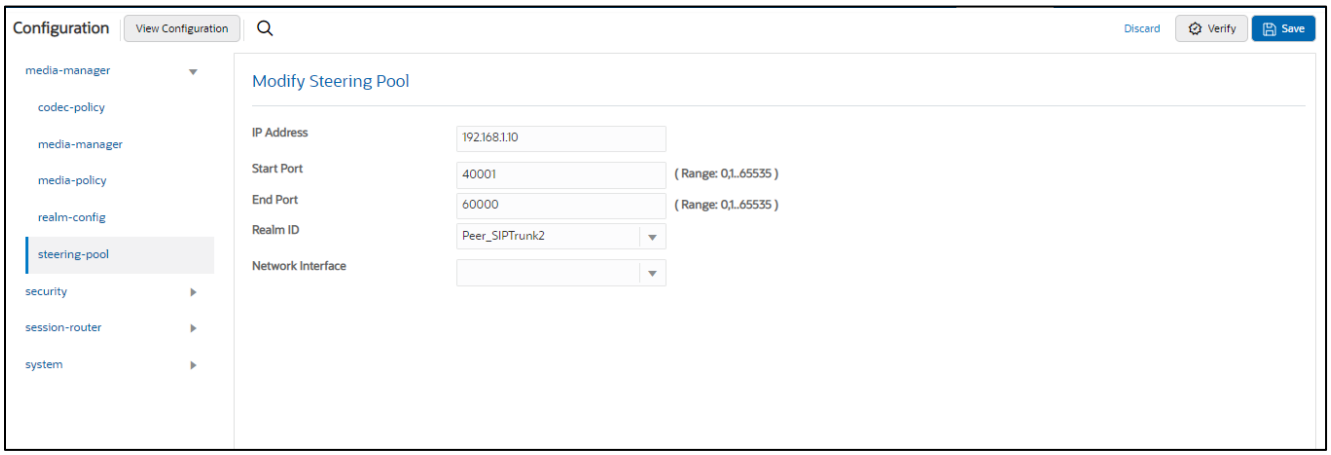
GUI Path: media-manager/steering-pool

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

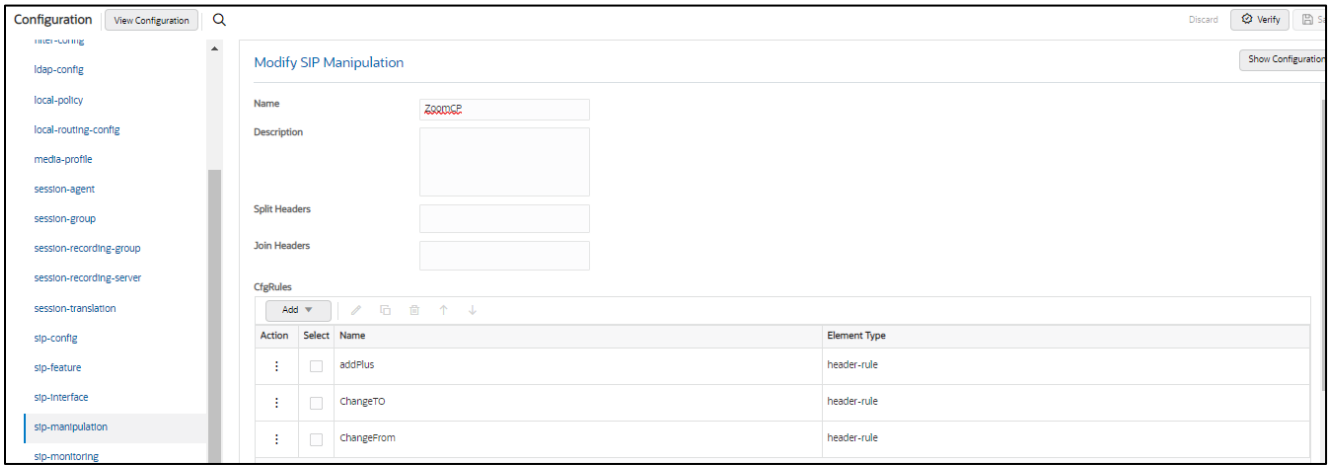
For calls to be presented to Zoom Phone from the Oracle SBC Zoom expects providers to deliver E.164 formatting in all headers which contain a PSTN routable number.

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

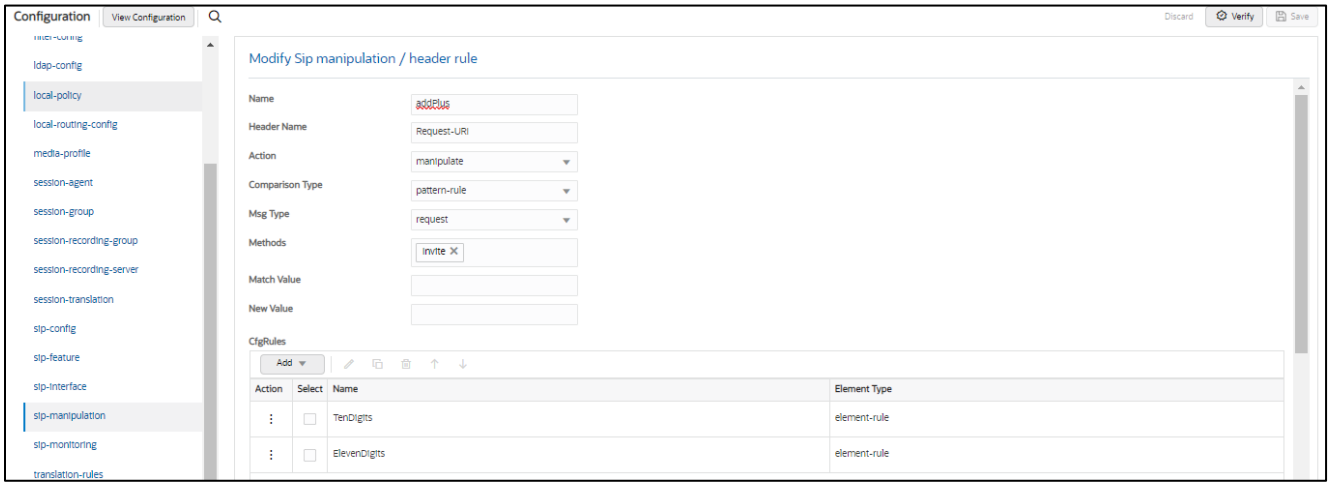
- The "**From**" header must have the IP address/FQDN of the Oracle SBC
  From: <sip:*IPaddress/FQDN*>
- The "**To**" header must contain the Zoom Phone IP address/FQDN
  To: <sip:*IPaddressofZoomSBC*>
- The "**Request URI**" header must contain the Zoom Phone IP address/FQDN
- The "**Contact**" header must have the IP address/FQDN of the Oracle SBC
  Contact: sip:*IPaddress/FQDN:PortNumber*
- P-Preferred-Identity headers should be converted to P-Asserted-Identity by the provider before sending to Zoom
- Remote-Party-ID headers are considered deprecated, and providers should convert RPID headers to P-Asserted-Identity headers before sending messages to Zoom.
- SIP REFER is not currently supported by Zoom for transferring or forwarding calls. Zoom uses Re-Invite mechanism for call transfers/forwarding.

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

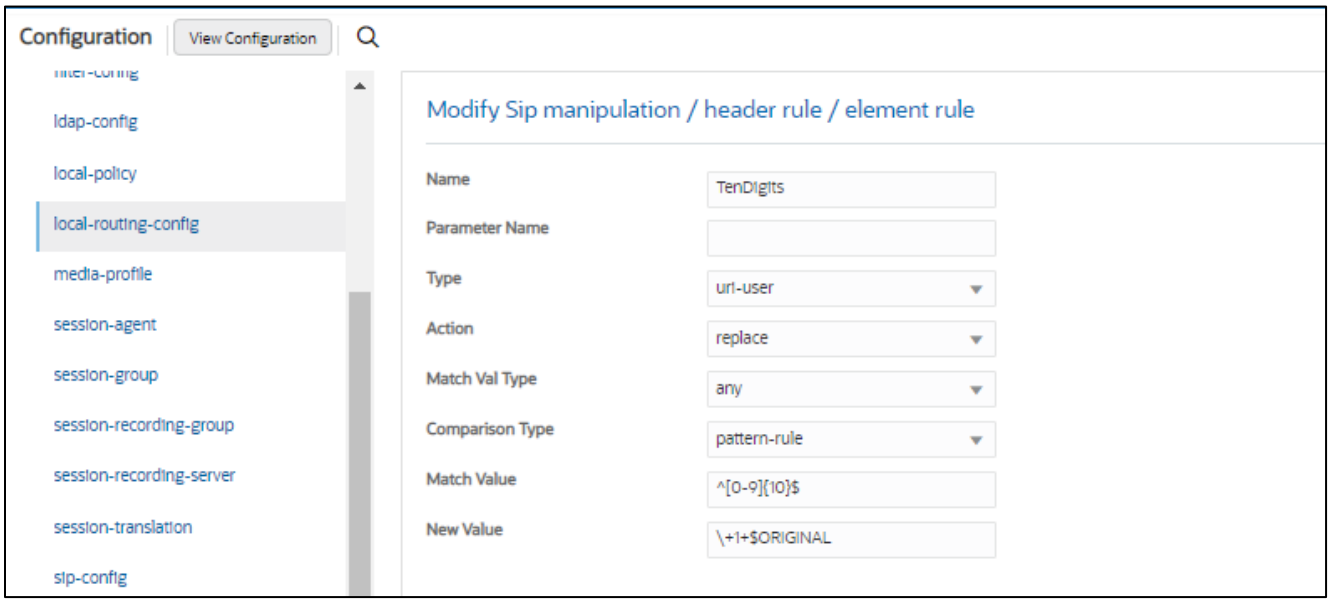
Sip-manipulation :



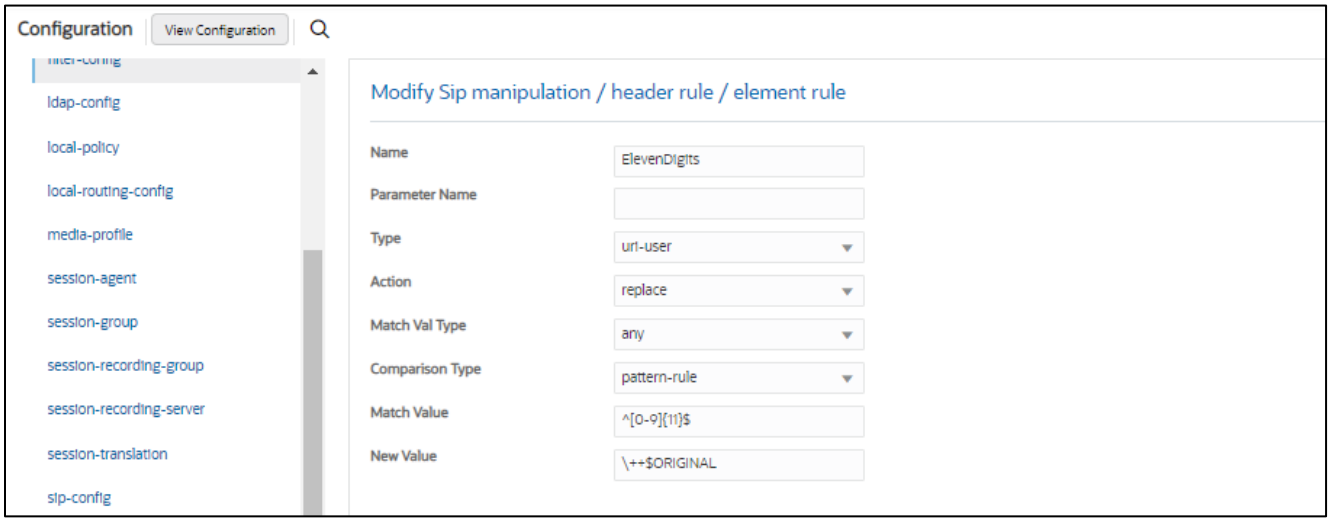
Header-rule #1



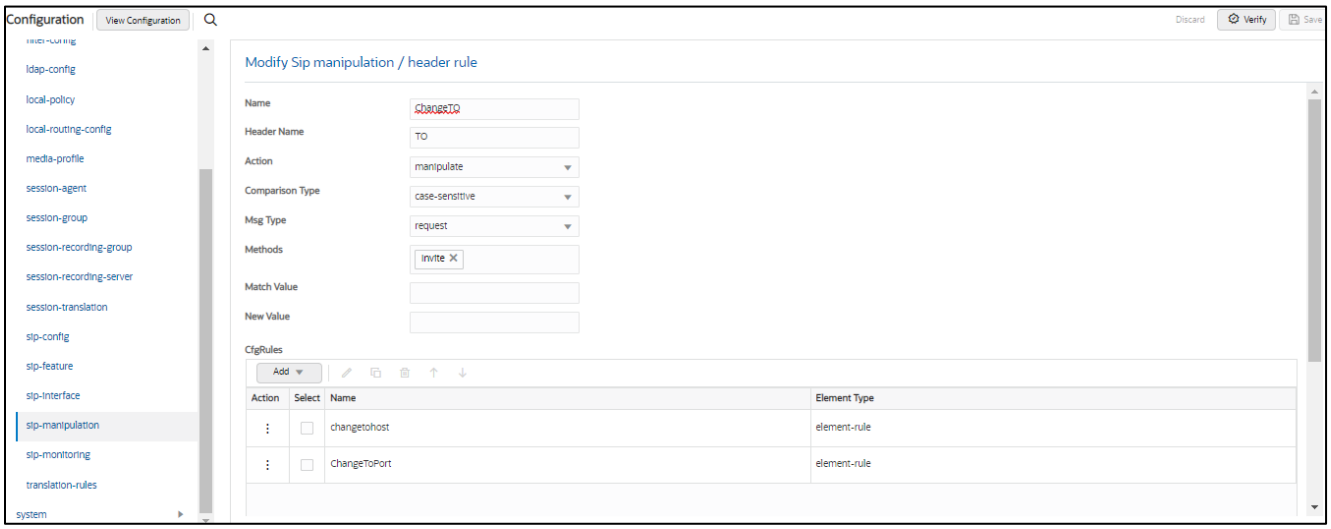
Element-rule # 1.1



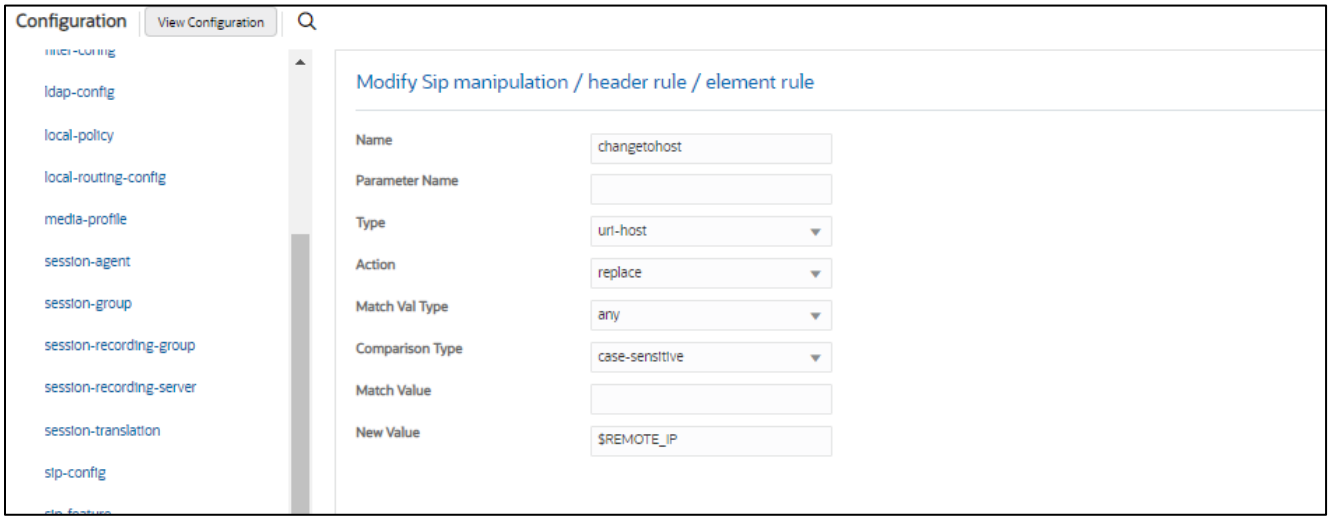
Element-rule #1.2



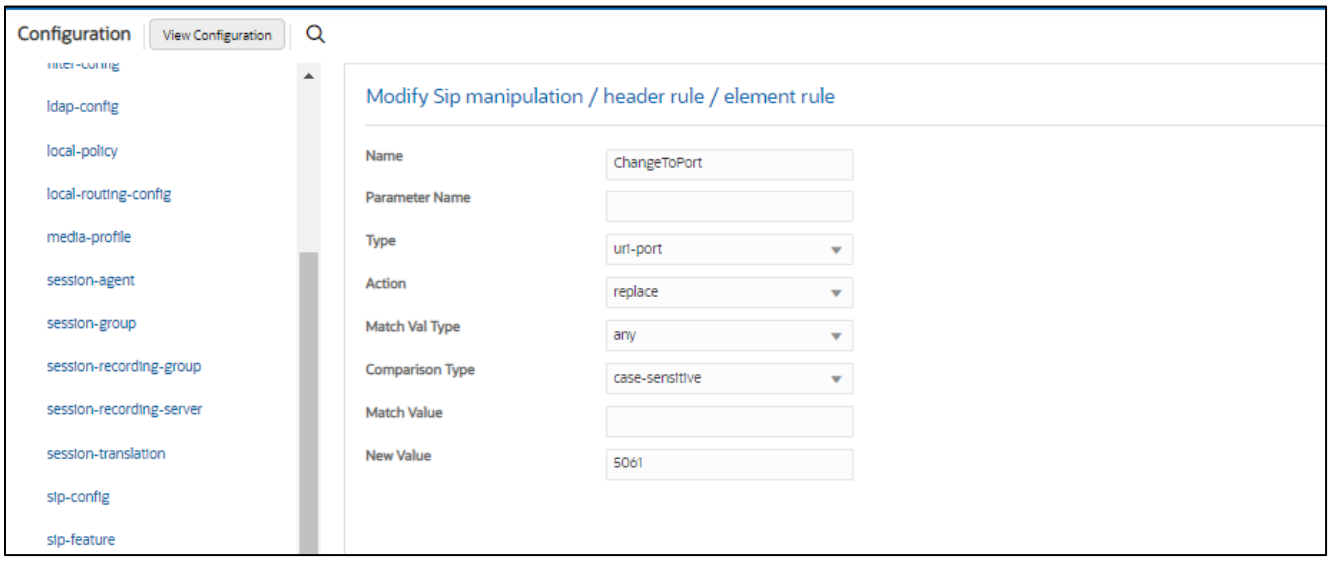
Header-rule #2



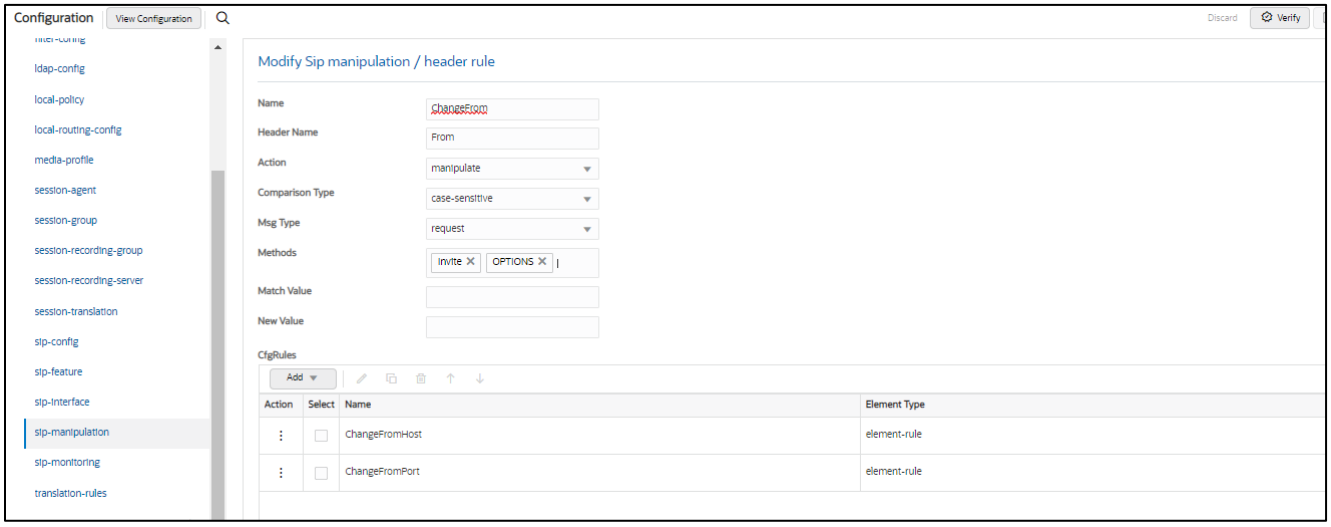
Element-rule #2.1



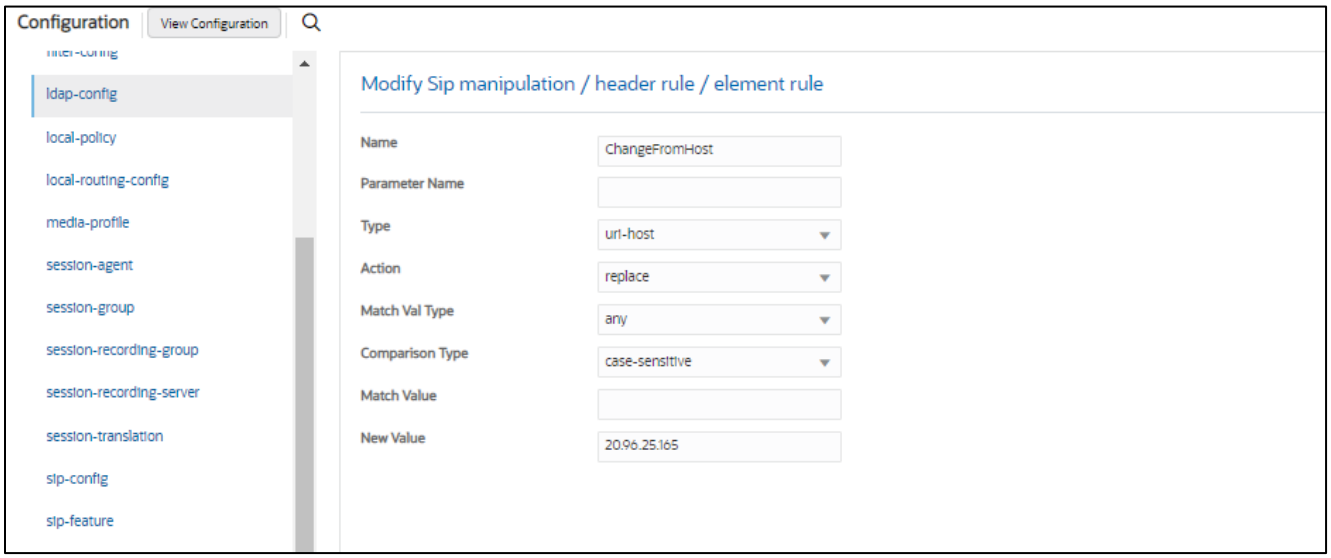
Element-rule #2.2



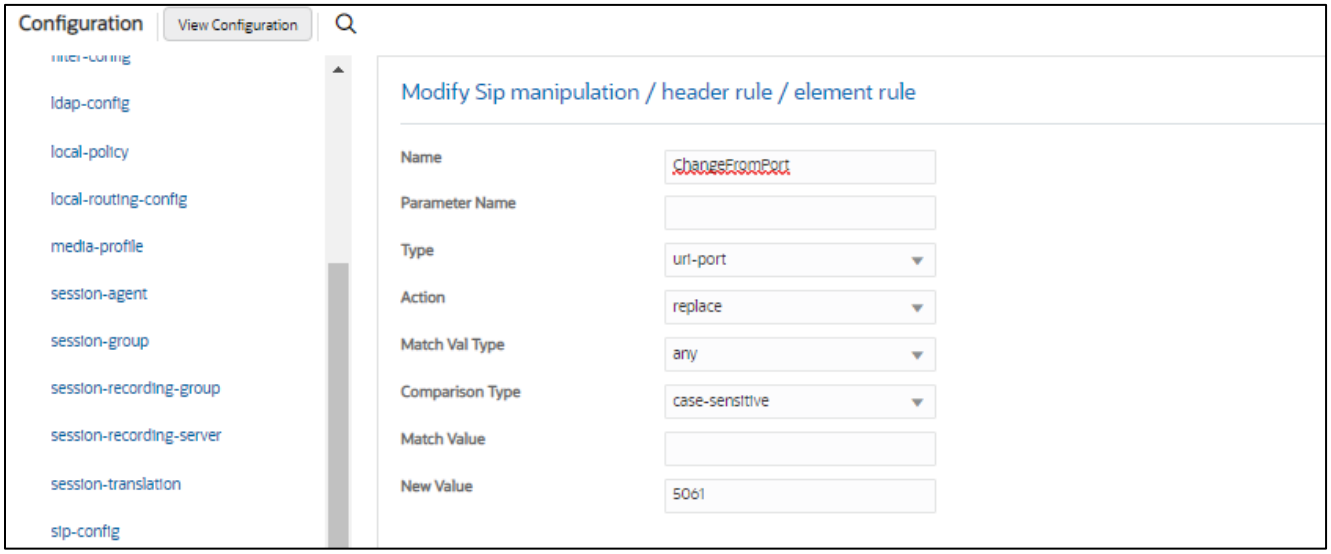
Header-rule #3



Element-rule #3.1



Element-rule #3.2



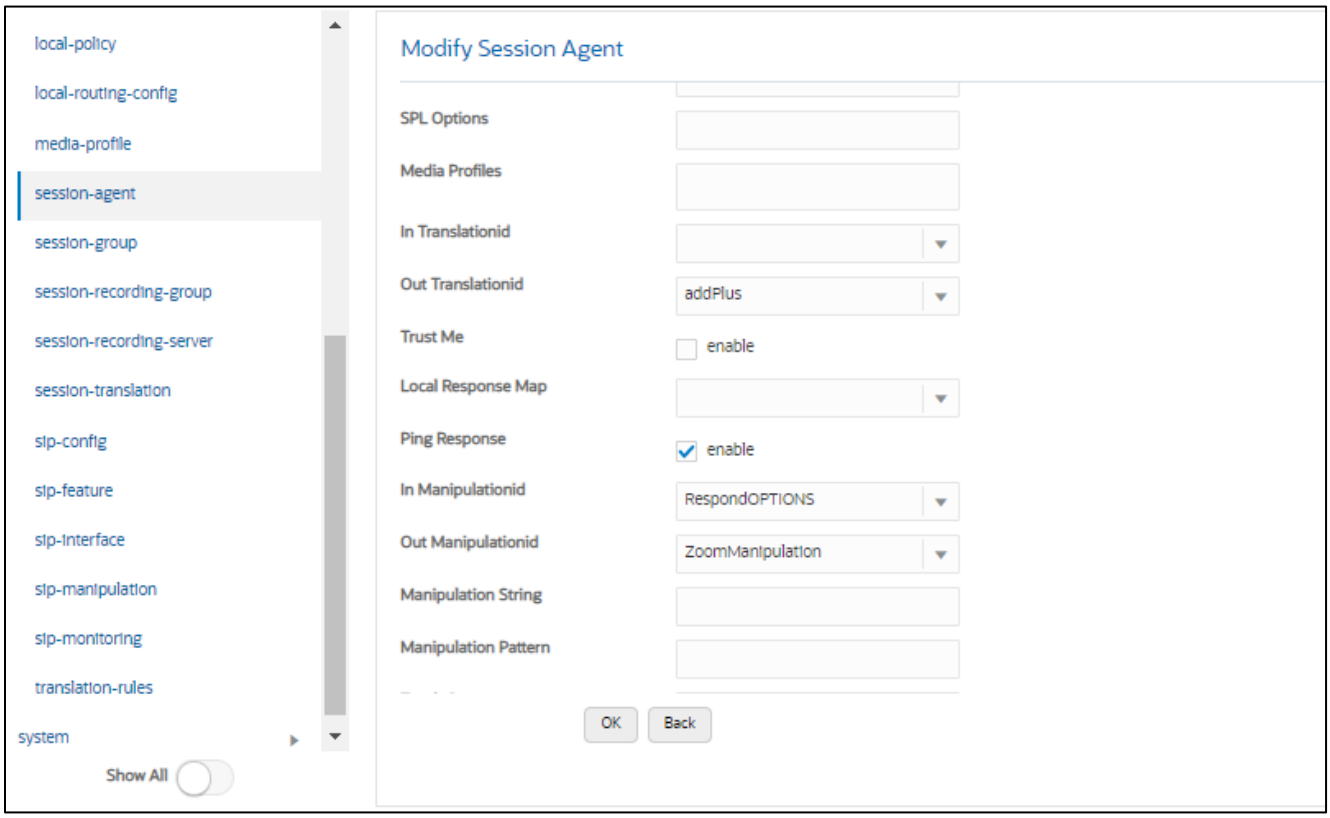
To configure the sip-manipulation from ACLI,

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

If running release SCZ830m1p7 or later, there is a new configuration parameters on the Session Agent Config element, called ping-response. When enabled on each agent, it will take that place of the following SIP-Manipulation.



To enable ping-response from ACLI-

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

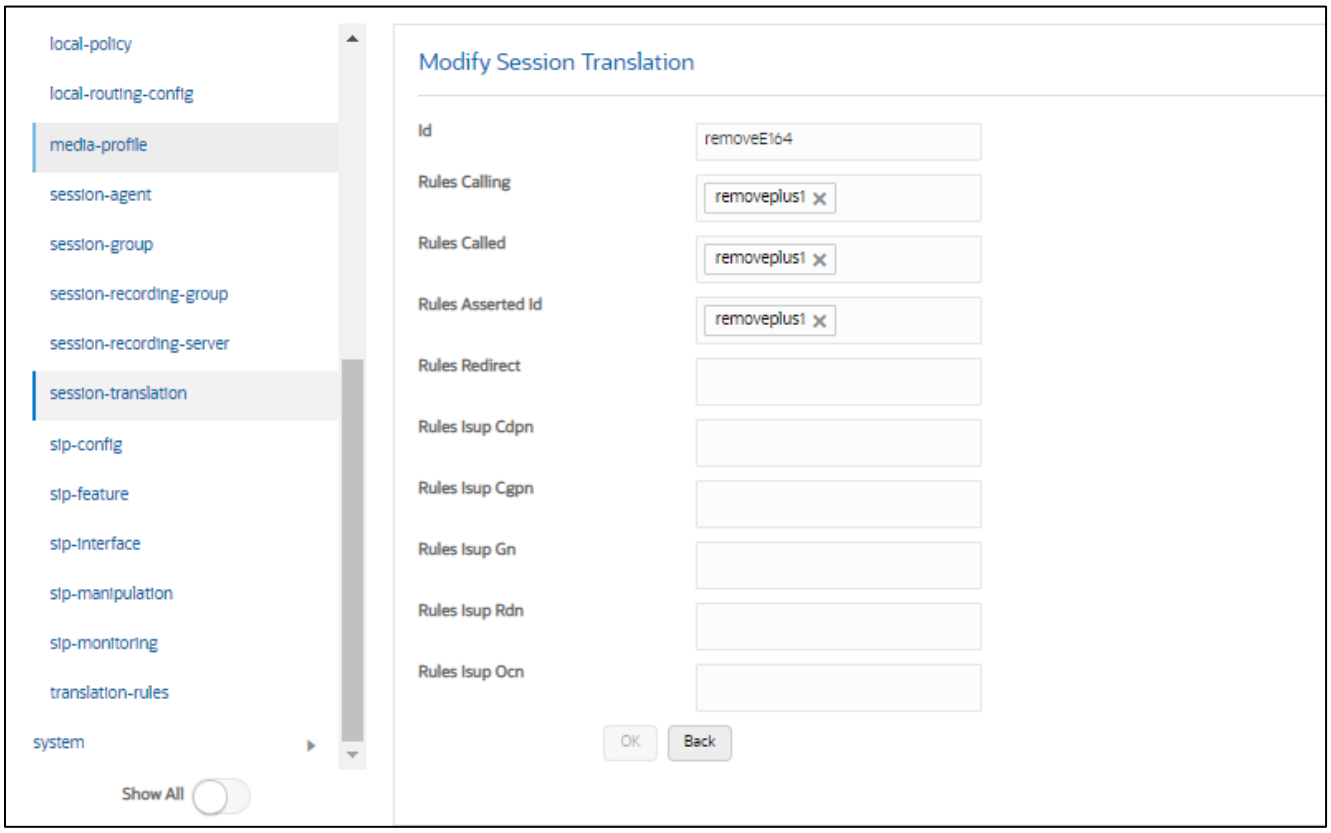
- Perform a save and activate configuration for changes to take effect.

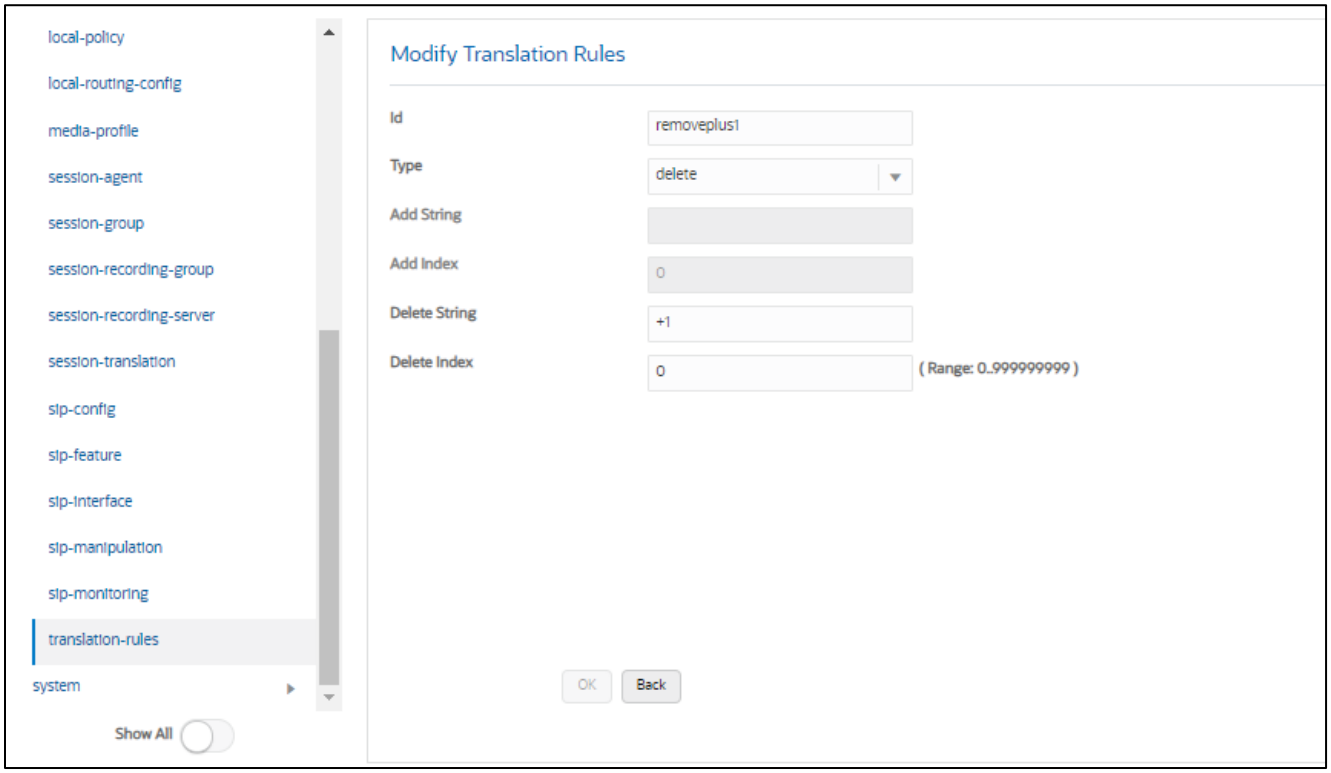
6.7.2 Session-Translation

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.

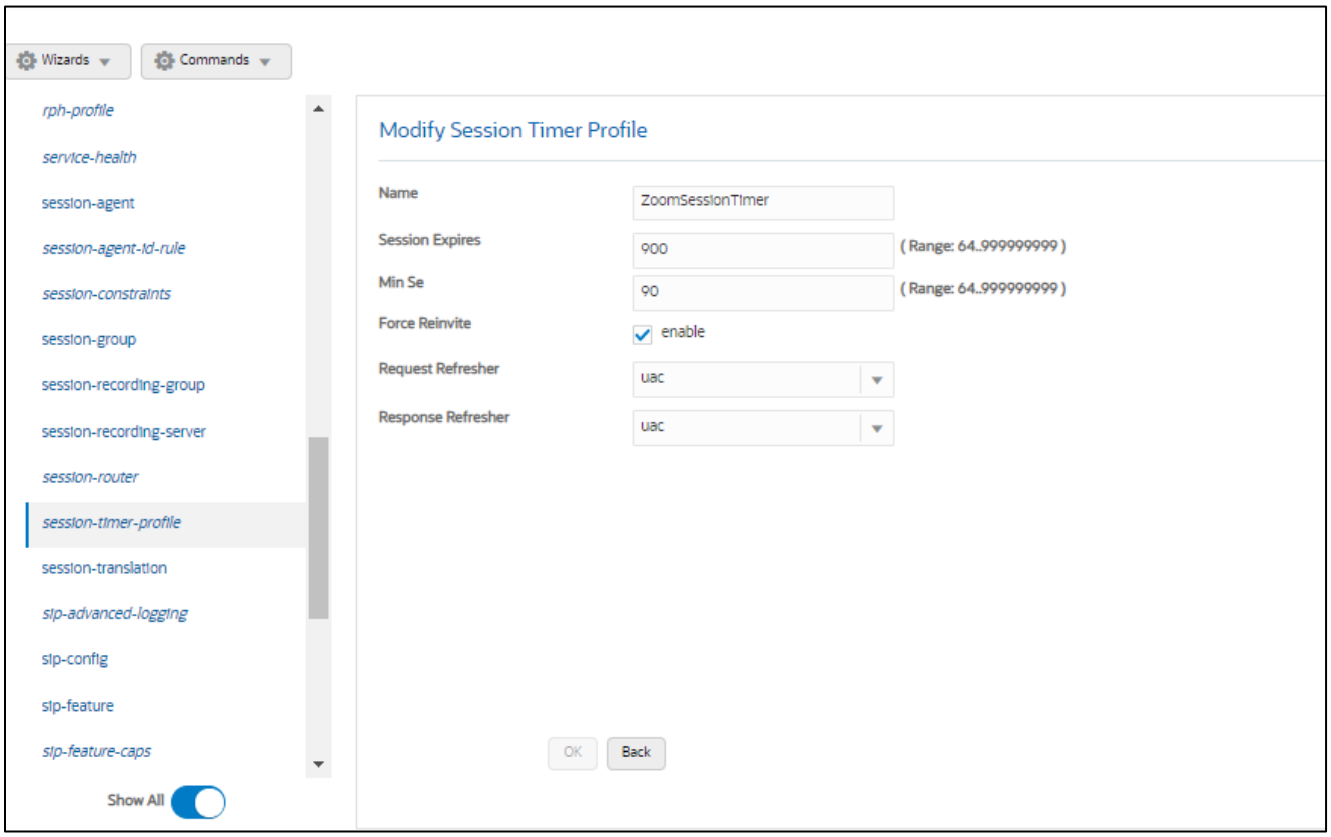
6.8 Session Timer Profile (Optional)

Zoom Phone does support RFC 4028 Session Timers In SIP. In many cases, RFC 4028 is not supported by carriers providing SIP trunking services to their customers. In order to accommodate this, the SBC will interwork between PSTN carrier and Zoom Phone in order to provide support for Session Timers in SIP.

For more information about the Oracle SBC's support for RFC4028, please see the SCZ9.0 Configuration Guide, page 726

GUI Path: session-router/session-timer-profile
ACLI Path: config t→session-router→session-timer-profile

Use the following as an example to configure session timer profile on your Oracle SBC. Some parameters may vary to fit your specific environment.




```
session-timer-profile
      name                    ZoomSessionTimer
      session-expires           900
      force-reinvite          enabled
      response-refresher        uac
```

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

6.9 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 Phone.

GUI Path: session-router/SIP-interface

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

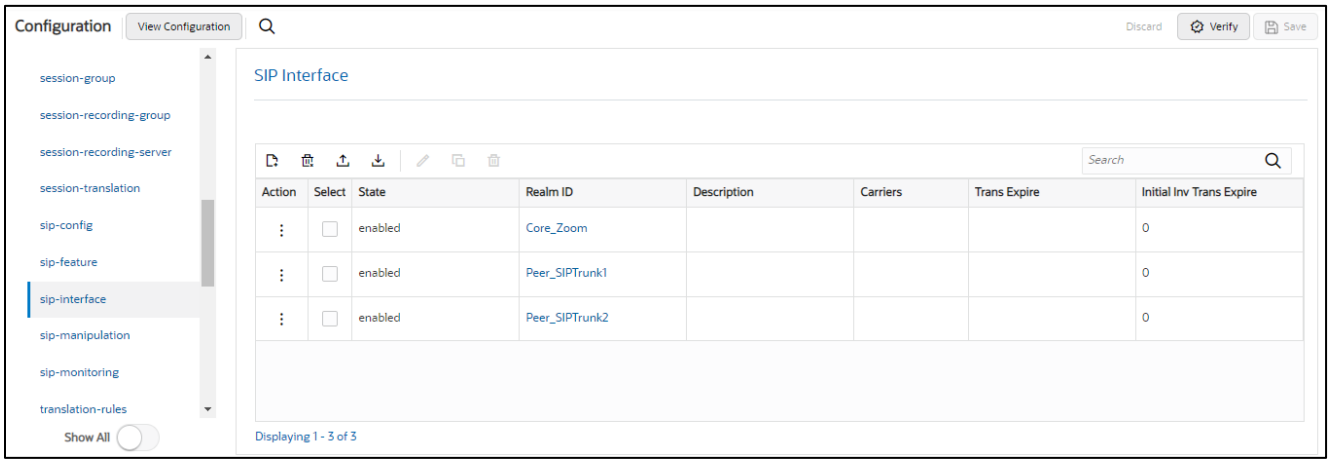
Click Add, and use the table below as an example to Configure:

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
Session Timer Profile	ZoomSessionTimer		



```
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
```

6.10 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

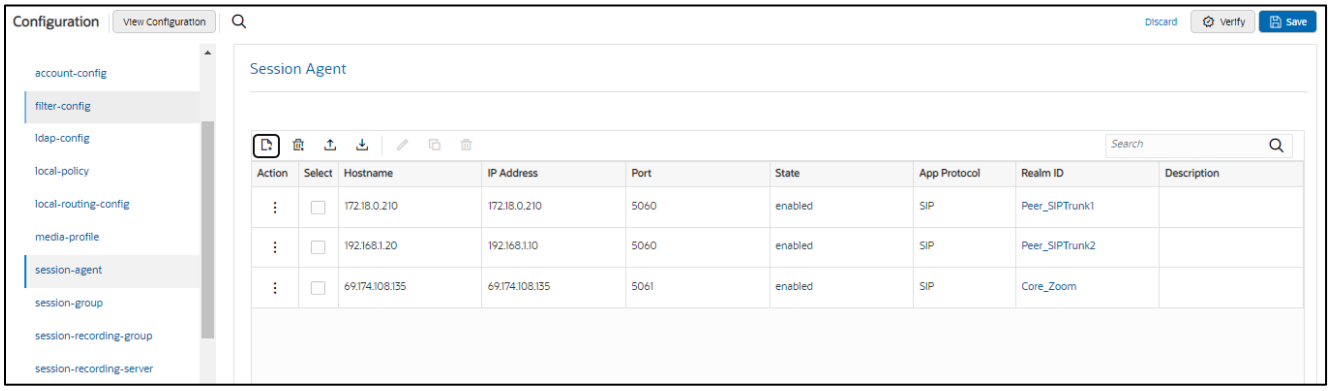
You will need to configure session agents for Zoom Phone and both Carrier SIP Trunks.

Note: In this configuration example we have used Zoom Cloud Peering Session Agents for North America Region. You will be required to configure Zoom Cloud Peering 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	SIPTrunk1	SIPTrunk2

Hostname	69.174.108.135	172.18.0.210	192.168.1.20
IP Address	69.174.108.135	172.18.0.210	192.168.1.20
Port	5061	5060	5060
Transport method	StaticTLS	UDP+TCP	UDP+TCP
Realm ID	Core_Zoom	Peer_SIPTrunk1	Peer_SIPTrunk2
Ping Method	OPTIONS	OPTIONS	OPTIONS
Ping Interval	30	30	30
Ping Response	Enabled	Enabled	Enabled



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

```
session-agent
        hostname                    69.174.108.135
        ip-address                  69.174.108.135
        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
```

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

6.11 Routing Configuration

This section outlines how to configure the Oracle SBC to route SIP traffic to and from PSTN Trunks and Zoom Phone 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.

6.11.1 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.

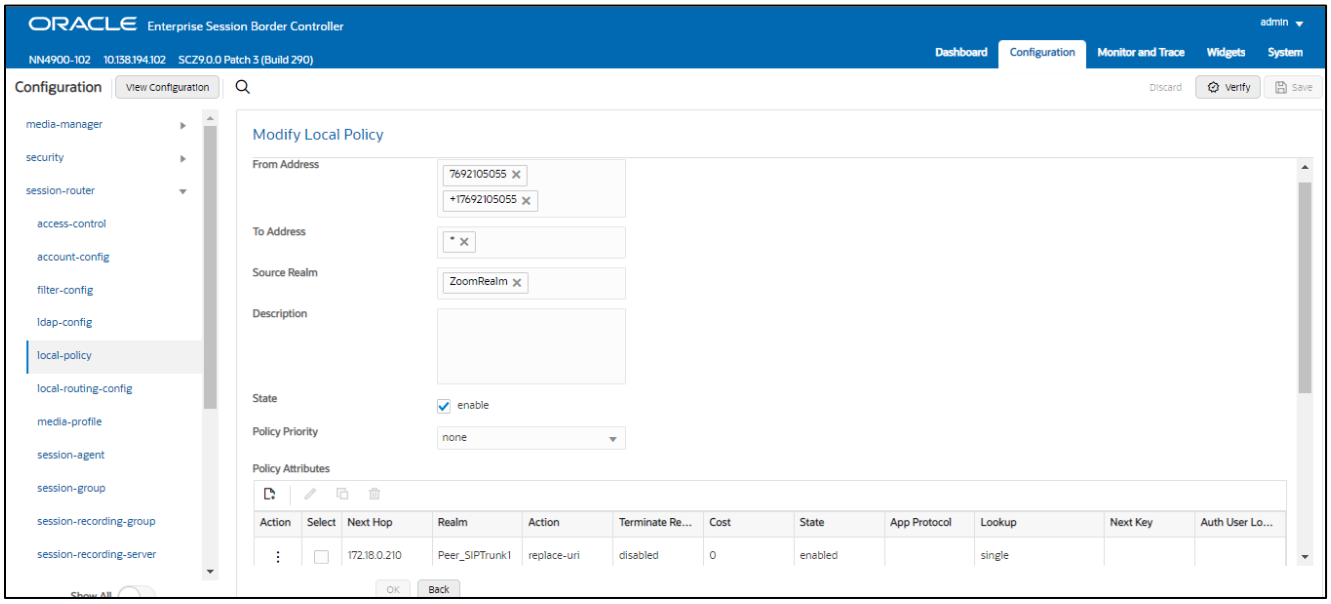
GUI Path: session-router/local-policy

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

Note : Having more than one PSTN Carrier terminated onto the SBC is optional as service providers can leverage same carrier trunk to support multiple Enterprises. It depends upon the requirement and Network Setup.

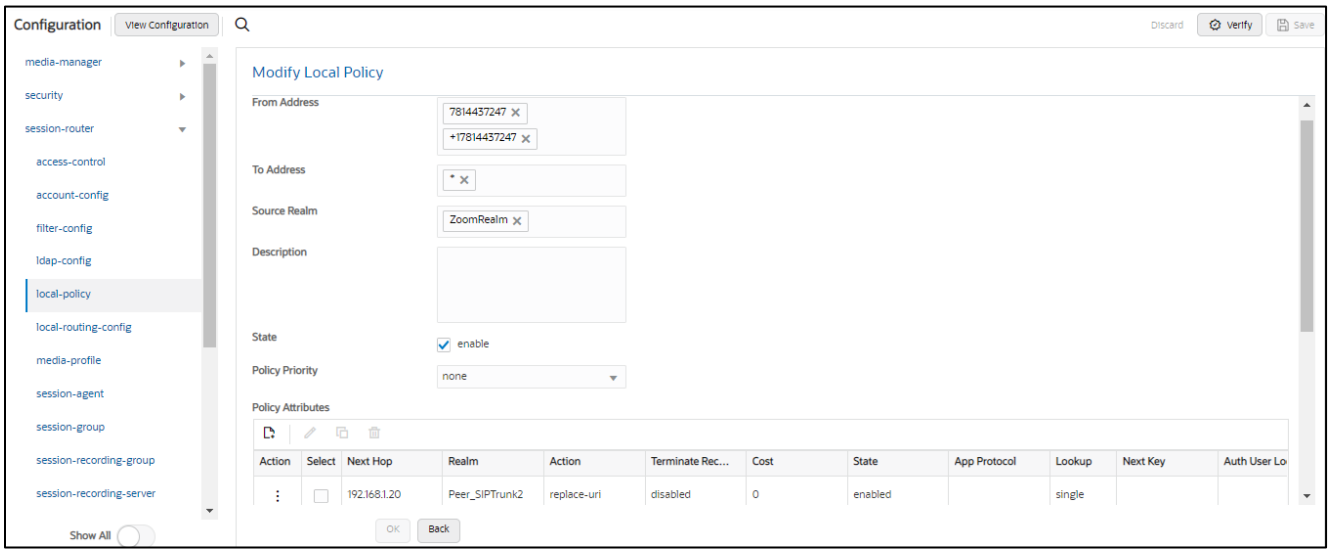
6.12.1.1 Route Calls from Zoom To Customer 1:

Calls originating from Zoom Phone System to Different customer's Carrier Trunk are segregated based on DID Range. Here in this example we DID 7692105055 belongs to Customer1 hence all calls originating from Zoom Phone System from DID 7692105055 are routed to Customer 1 Sip Trunk i.e. 172.18.0.210 through realm Peer_SIPTrunk1



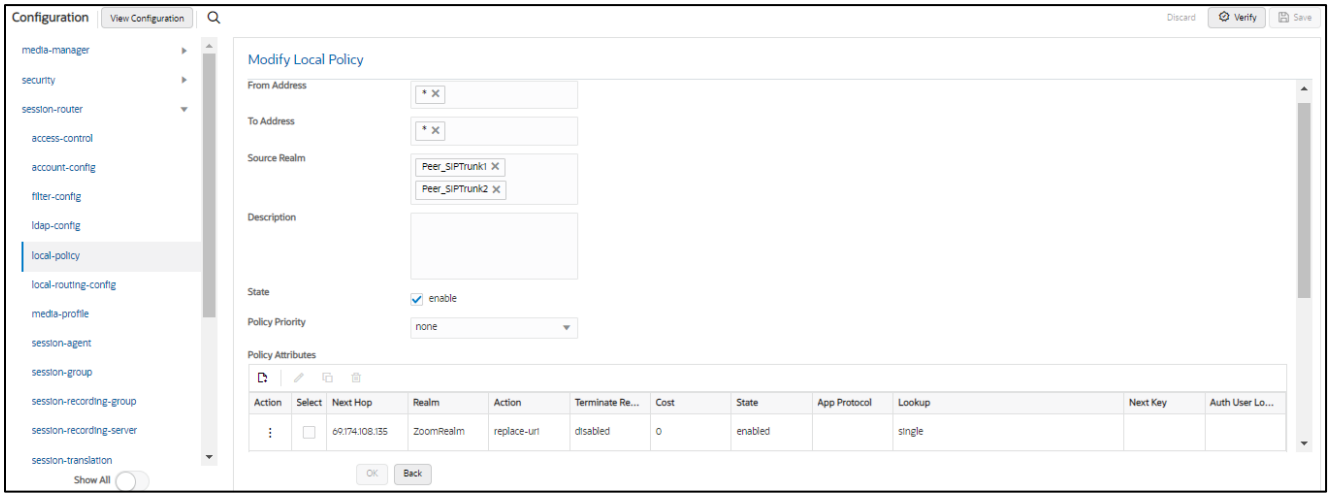
6.12.1.2 Route Calls from Zoom To Customer 2:

Similarly, in below example DID 7814437247 belongs to Customer2 hence all calls originating from Zoom Phone System from DID 7814437247 are routed to Customer 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 Phone System.



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
```

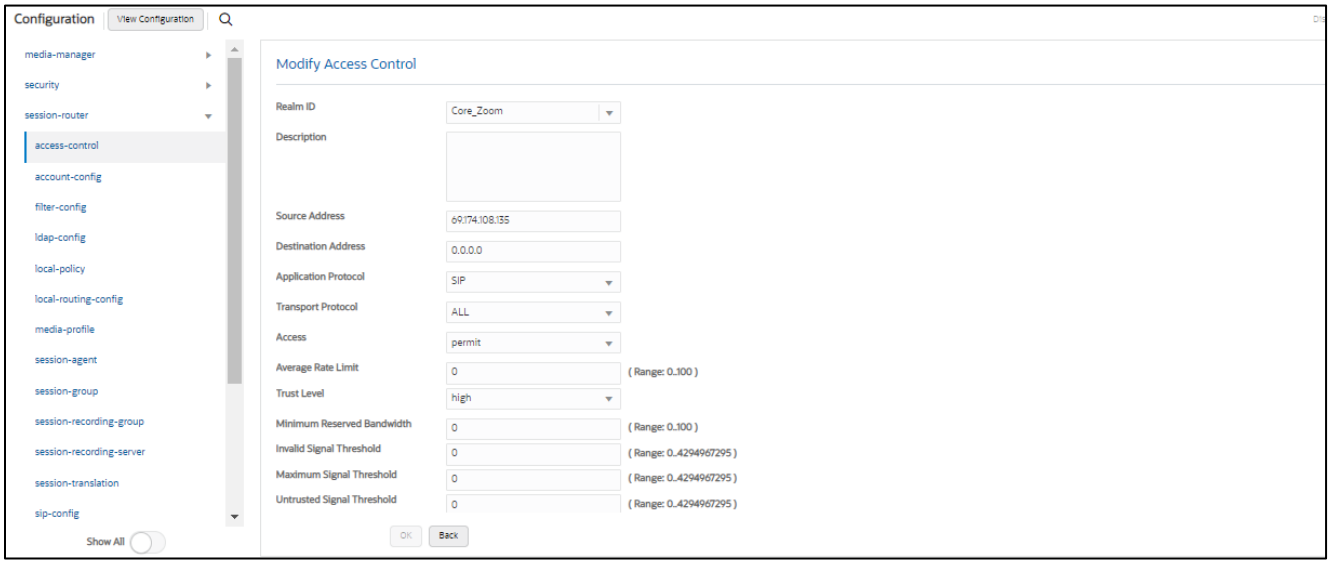
6.12 Access Controls

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                  69.174.108.135
        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.

6.13 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.

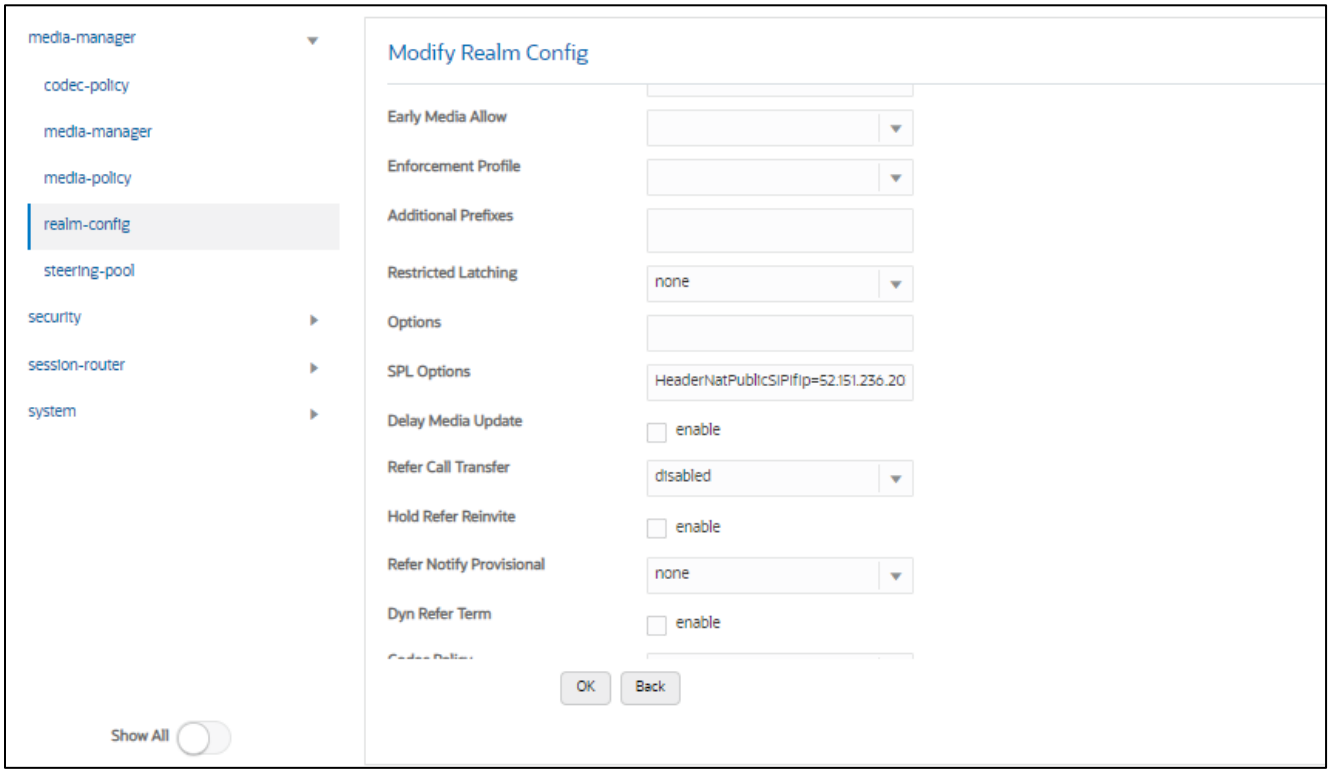
- The private IP address must be the same as the SIP Interface IP address.
- The public IP address must be the public IP address of the NAT device

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
        realm-id                    Core_Zoom
        source-address                  162.12.0.0/16
        destination-address              155.212.214.177
        application-protocol            SIP
        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
capture-receiver
        address                     192.168.1.158
        network-interface               M10:0
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-profile
      name                        CN
      subname                     wideband
      payload-type                118
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                        69.174.108.135
        ip-address                      69.174.108.135
        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-timer-profile
        name                            ZoomSessionTimer
        session-expires                 900
        force-reinvite                  enabled
        response-refresher              uac
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 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                     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-manipulation
        name                    SIPTrunkManipulation
        description              Manipulations on SIP Trunk side
        header-rule
                name                    XTraceID
                header-name                     X-Trace-ID[^]
                action                  delete
                msg-type                  request
                methods                   INVITE
        header-rule
                name                    XInstanceID
                header-name                     X-Instance-ID[^]
                action                  delete
                msg-type                  request
                methods                   INVITE
        header-rule
                name                    XDMInfo
                header-name                     X-DM-Info[^]
                action                  delete
                msg-type                  request
                methods                   INVITE
```

```
header-rule
        name                    XCapability
        header-name                X-Capability[^]
        action                  delete
        msg-type                request
        methods                 INVITE
header-rule
        name                    xpublicip
        header-name                X-PUBLIC-IP[^]
        action                  delete
        msg-type                request
        methods                 INVITE
header-rule
        name                    xorigcontact
        header-name                X-ORIGINAL-CONTACT[^]
        action                  delete
        msg-type                request
        methods                 INVITE
header-rule
        name                    xorigcallid
        header-name                X-ORIGINAL-CALLID[^]
        action                  delete
        msg-type                request
        methods                 INVITE
header-rule
        name                    xtocarrier
        header-name                X-TO-CARRIER[^]
        action                  delete
        msg-type                request
        methods                 INVITE
header-rule
        name                    xFSSupport
        header-name                X-FS-Support[^]
        action                  delete
        msg-type                request
        methods                 INVITE
header-rule
```

```
            name                    callAcme
            header-name                 From
            action                  sip-manip
            msg-type                  request
            new-value                  ACME_NAT_TO_FROM_IP
        header-rule
            name                    changeAssertedIP
            header-name                 P-Asserted-Identity
            action                  manipulate
            comparison-type               pattern-rule
            msg-type                  request
            methods                   INVITE
            element-rule
                name                      changeIP
                type                    uri-host
                action                    replace
                comparison-type                 pattern-rule
                new-value                   $LOCAL_IP
SIP-monitoring
        match-any-filter            enabled
        monitoring-filters          *
SIP-profile
        name                    forreplaces
        replace-dialogs             enabled
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 Phone
        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             GUI
```

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