Oracle Enterprise Session Border Controller and Avaya Aura System Manager 7.1 for Enterprise SIP Trunking with NTT Communications

Technical Application Note

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Revision History

Version	Description of Changes	Date Revision Completed
1.1	Oracle SBC and Avaya Aura with NTT	18-07-2022

Table of Contents

1. Intended Audience

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

2. Document Overview

This Oracle technical application note outlines the configuration needed to set up the interworking between Oracle SBC and Avaya Aura along with NTT Communications SIP Trunking. The solution contained within this document has been tested using Oracle Communication 840p10. Our scope of this document is only limited to testing Oracle SBC withAvayaAura and NTT SIP Trunk.

It should be noted that while this application note focuses on the optimal configurations for the Oracle SBC in aAvayaAura and NTT Communications.Many SBC applications may have additional configuration requirements that are specific to individual customer requirements. These configuration items are not covered in this guide. Please contact your Oracle representative with any questions pertaining to this topic.

Please note that the IP address, FQDN and config name and its details given in this document is used as reference purpose only. The same details cannot be used in customer config and the end users can use the configuration details according to their network requirements.

3. Introduction

3.1.Audience

This is a technical document intended for telecommunications engineers with the purpose of configuring Avaya Aura for calling using Oracle Enterprise SBC and the NTT SIP Trunk.There will be steps that require navigating theAvayaAura and Oracle SBC GUI interface .Having an understanding of the basic concepts of TCP/UDP, IP/Routing, DNS server and SIP/RTP are also necessary to complete the configuration and for troubleshooting, if necessary.

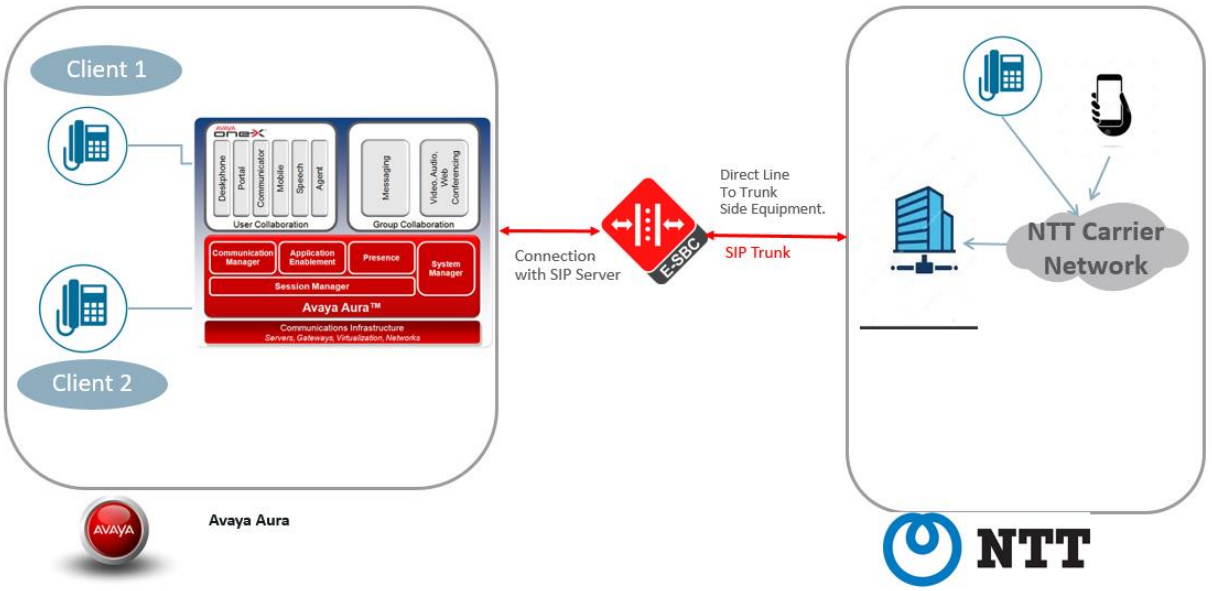
3.2. Requirements

- Avaya Aura Session Manager 7.
- NTT SIP Trunk
- Oracle Enterprise Session Border Controller (hereafter Oracle SBC) running 8.4.0 version

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

Software Used	Avaya Aura Session Manager Version	Avaya Communication Manager	SBC Version	NTT Software Version
Revision 1	R7.1.3	R016x.03.0.141.0	8.4.0 p10	

3.3. Architecture



Client's 1 and 2 numbers are provided by the NTT and are registered with theAvayaAura.
Oracle SBC performs surrogate registration forAvayatowards NTT with client1's number.

4. Configuring the SBC

This chapter provides step-by-step guidance on how to configure Oracle SBC for interworking withAvayaAura Platform

4.1. Validated Oracle SBC version

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

- AP 1100
- AP 3900
- AP 4600
- AP 6350
- AP 6300
- VME
- AP 3950(Release 9.0 onwards)
- AP 4900(Release 9.0 onwards)

5. New SBC configuration

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

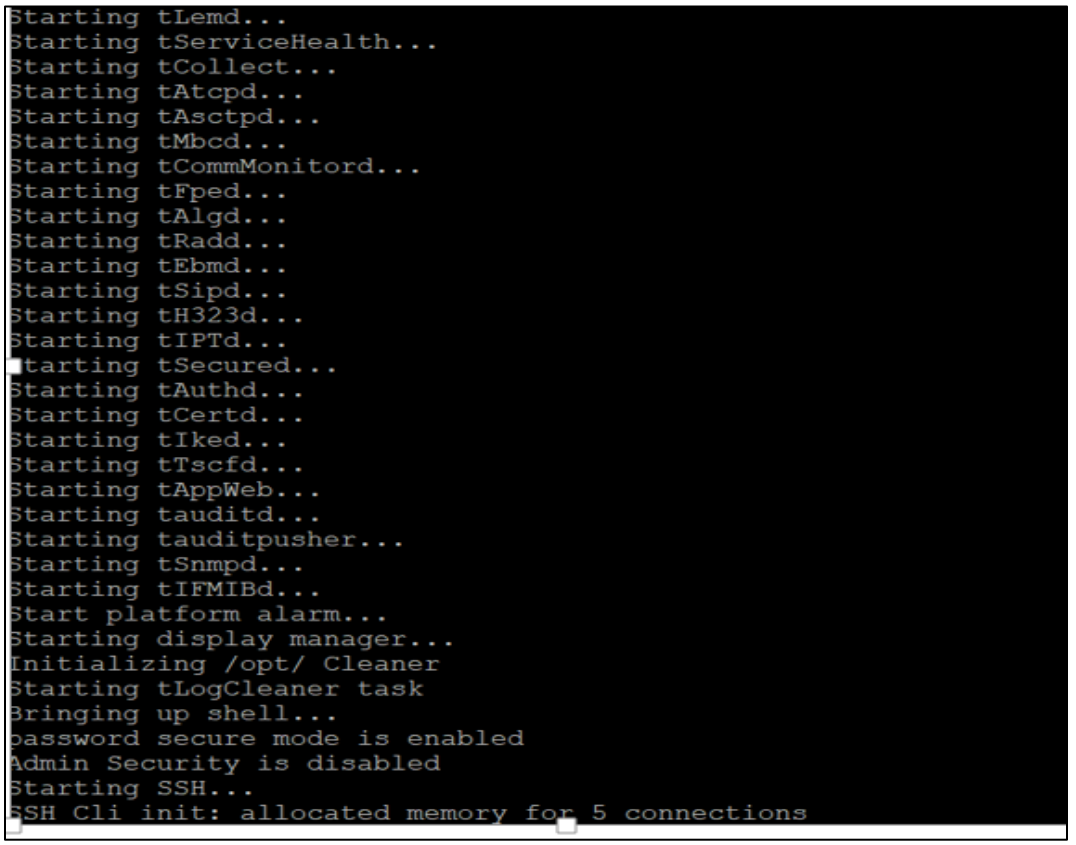
5.1. Establishing a serial connection to the SBC

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

Note: This doesn't apply to VME and cloud deployments.

Start the terminal emulation application using the following settings:

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

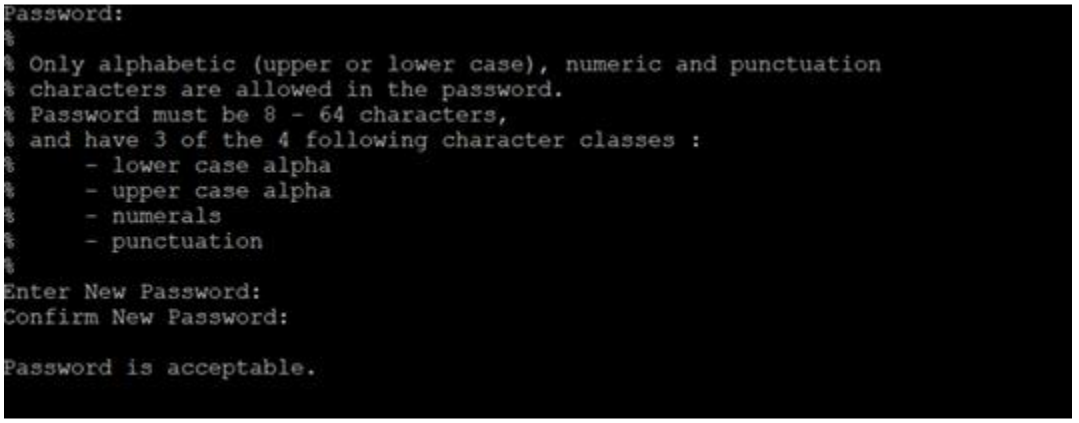


Power on the SBC and confirm that you see the following output from the boot-up sequence

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

Note: The password is different for cloud and VME deployments. Please check therequired documentation

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



Now set the management IP of the SBC by setting the IP address in bootparam to access bootparam. Go to Configure terminal->bootparam.

Note: There is no management IP configured by default.

```
NN4600-100# conf t
NN4600-100(configure)# bootparam

'.' = clear field;  '-' = go to previous field;  q = quit

Boot File               : /boot/nnSCZ830m1p7.bz
IP Address              : 10.138.194.139
VLAN                    : 0
Netmask                 : 255.255.255.192
Gateway                 : 10.138.194.129
IPv6 Address            :
IPv6 Gateway            :
Host IP                 :
FTP username            : vxftp
FTP password            : vxftp
Flags                   :
Target Name             : NN4600-100
Console Device          : COM1
Console Baudrate        : 115200
Other                   :

NOTE: These changed parameters will not go into effect until reboot.
Also, be aware that some boot parameters may also be changed through
PHY and Network Interface Configurations.



NN4600-100(configure)#
NN4600-100(configure)#
NN4600-100(configure)#
```

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

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

```
NN4600-100# setup product

------------------------------------------------------------
WARNING:
Alteration of product alone or in conjunction with entitlement
changes will not be complete until system reboot

Last Modified 2019-06-28 14:05:33
------------------------------------------------------------
 1 : Product       : Enterprise Session Border Controller

Enter 1 to modify, d' to display, 's' to save, 'q' to exit. [s]:
```

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

Save the changes and reboot the SBC.

```
Entitlements for Enterprise Session Border Controller
Last Modified: Never
------------------------------------------------------------------
 1 : Session Capacity                          : 0
 2 :   Advanced                                :
 3 : Admin Security                            :
 4 : Data Integrity (FIPS 140-2)               :
 5 : Transcode Codec AMR Capacity              : 0
 6 : Transcode Codec AMRWB Capacity            : 0
 7 : Transcode Codec EVRC Capacity             : 0
 8 : Transcode Codec EVRCB Capacity            : 0
 9 : Transcode Codec EVS Capacity              : 0
 10: Transcode Codec OPUS Capacity             : 0
 11: Transcode Codec SILK Capacity             : 0

Enter 1 - 11 to modify, d' to display, 's' to save, 'q' to exit. [s]: 1

  Session Capacity (0-128000)                  : 500

Enter 1 - 11 to modify, d' to display, 's' to save, 'q' to exit. [s]: 3

************************************************************
CAUTION: Enabling this feature activates enhanced security
functions. Once saved, security cannot be reverted without
resetting the system back to factory default state.
************************************************************
  Admin Security (enabled/disabled)            :

Enter 1 - 11 to modify, d' to display, 's' to save, 'q' to exit. [s]: 5

  Transcode Codec AMR Capacity (0-102375)      : 50

Enter 1 - 11 to modify, d' to display, 's' to save, 'q' to exit. [s]: 2

    Advanced (enabled/disabled)                : enabled

Enter 1 - 11 to modify, d' to display, 's' to save, 'q' to exit. [s]: 10

  Transcode Codec OPUS Capacity (0-102375)     : 50

Enter 1 - 11 to modify, d' to display, 's' to save, 'q' to exit. [s]: 11

  Transcode Codec SILK Capacity (0-102375)     : 50
```

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

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

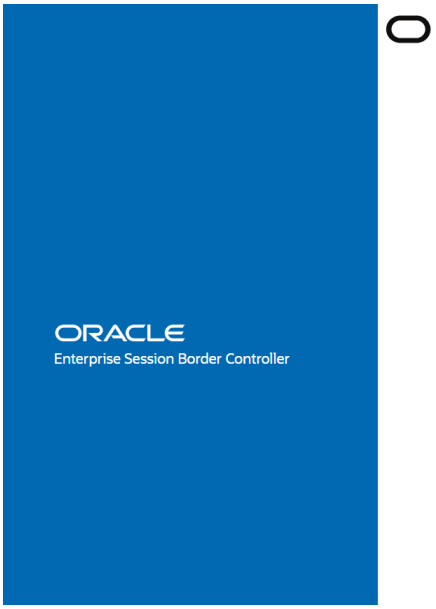
Enable the web-server-config to access the SBC using Web GUI. Save and activate the config

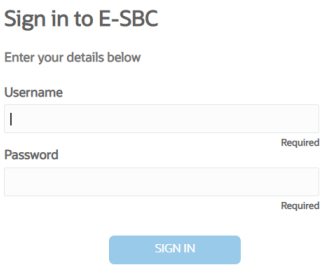
```
state                                   enabled
inactivity-timeout                      5
http-state                              enabled
http-port                               80
https-state                             disabled
https-port                              443
http-interface-list                     REST,GUI
tls-profile
last-modified-by                        admin@console
last-modified-date                      2020-04-03 00:21:22
```

5.2.Configure SBC using Web GUI

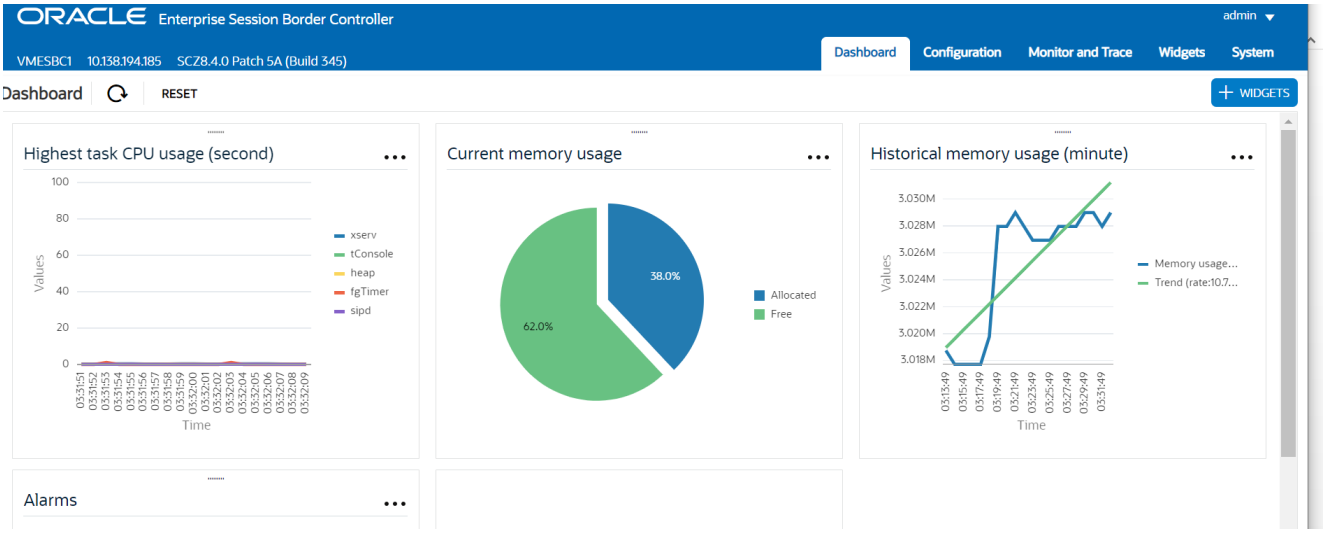
In this app note, we configure SBC using the WebGUI.

The Web GUI can be accessed through the url http://<SBC_MGMT_IP>.



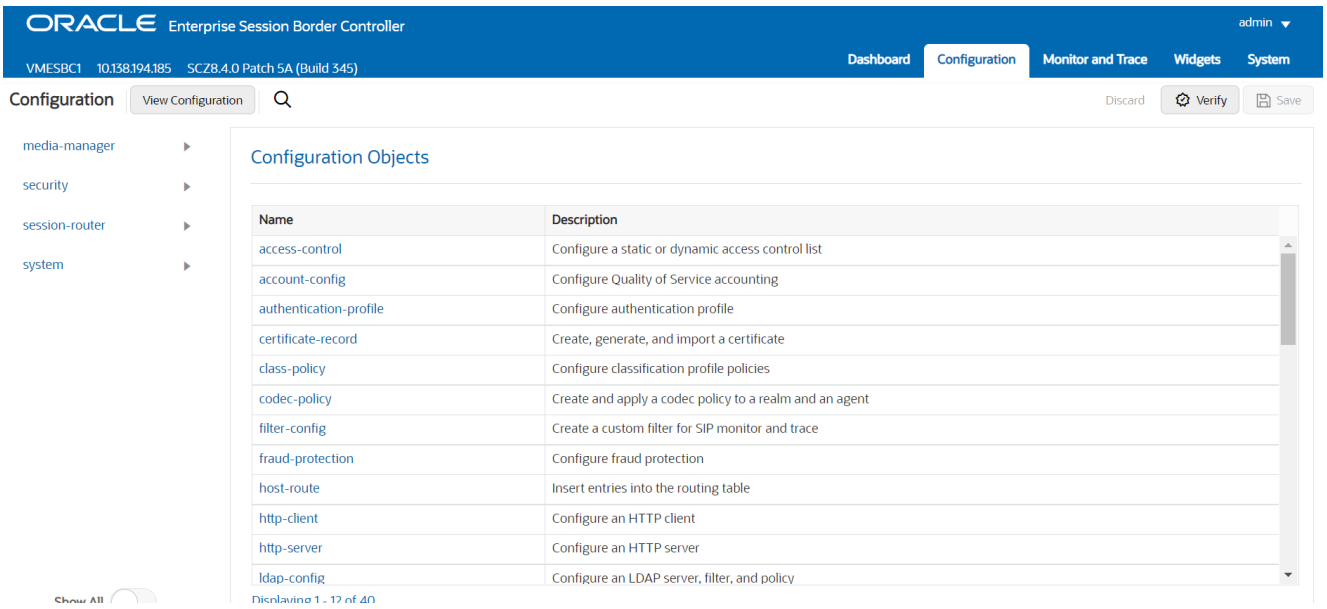


For login use username user and password of user to login as user mode. For username admin and password of super user to login as super user mode.



Go to

Configuration as shown below, to configure the SBC



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

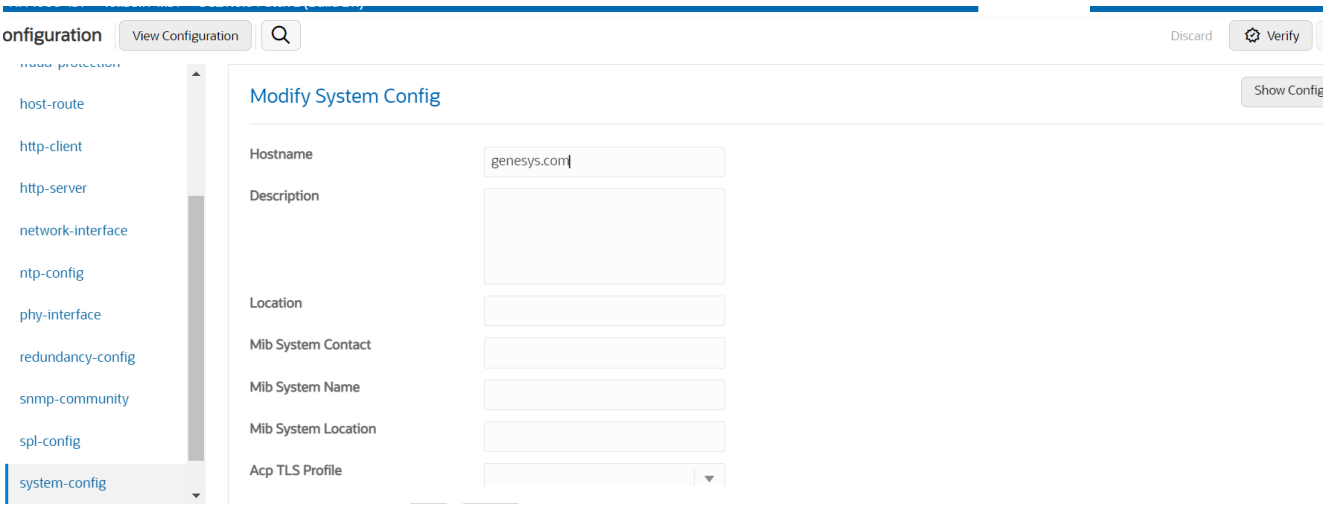
https://docs.oracle.com/en/industries/communications/enterprise-session-border-controller/8.4.0/webgui/esbc_scz840_webgui.pdf

The expert mode is used for configuration.

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

5.3.Configure system-config

Go to system->system-config



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

https://docs.oracle.com/en/industries/communications/enterprise-session-border-controller/8.4.0/releasenotes/esbc_scz840_releasenotes.pdf

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

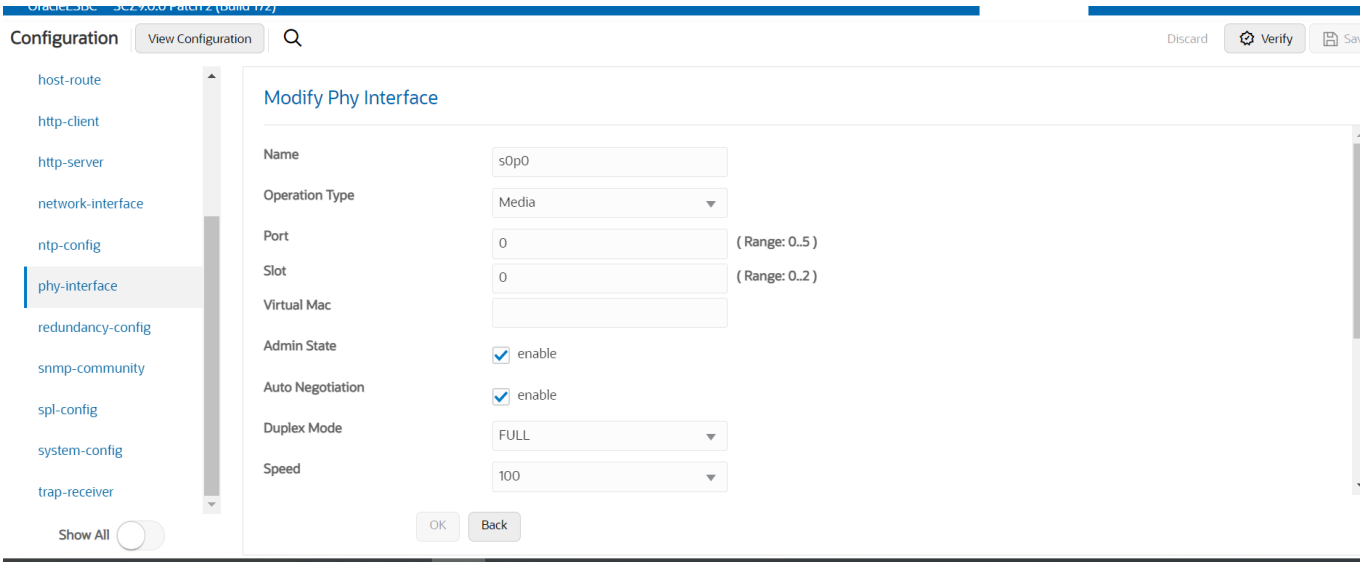
5.4.Configure Physical Interface values

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

You will first configure the slot 0, port 0 interface designated with the name S0P0.
This will be the port plugged into your (connection to the Avaya) interface.
NTT TRUNK side is configured on the slot 0 port 1.

Parameter Name	Avaya (S0P0)	NTT TRUNK (S1P0)
Slot	0	0
Port	0	1
Operation Mode	Media	Media

Below is the screenshot for creating a phy-interface on S0P0. Create a similar interface for Sip Trunk as well from the Web GUI. The table above specifies the values for both Avaya and NTT TRUNK.



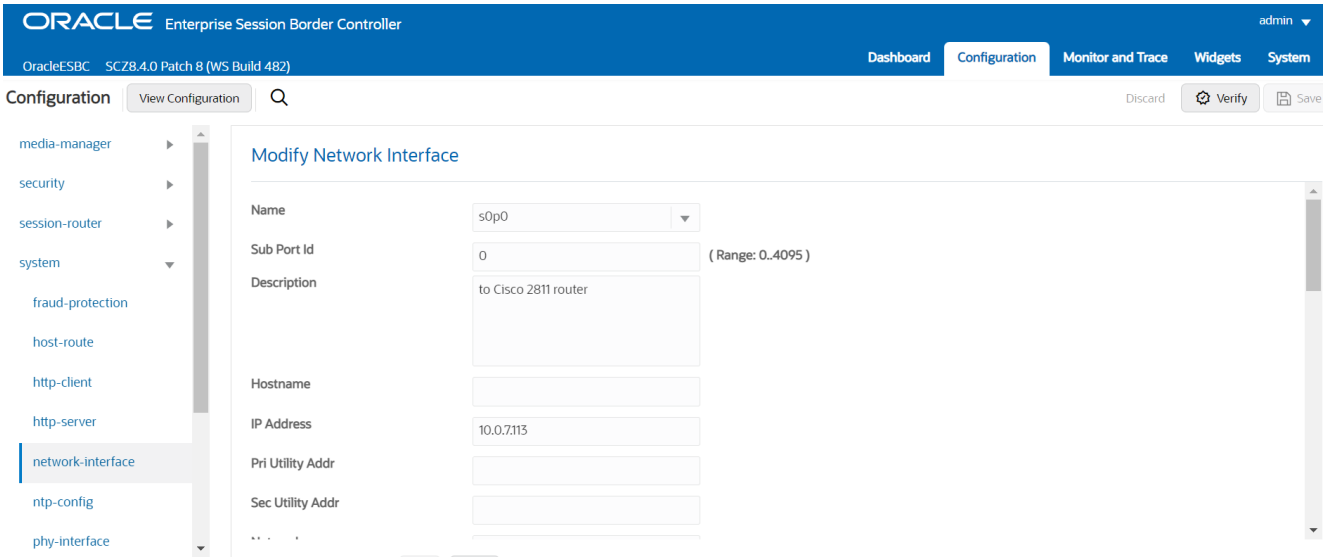
5.5. Configure Network Interface values

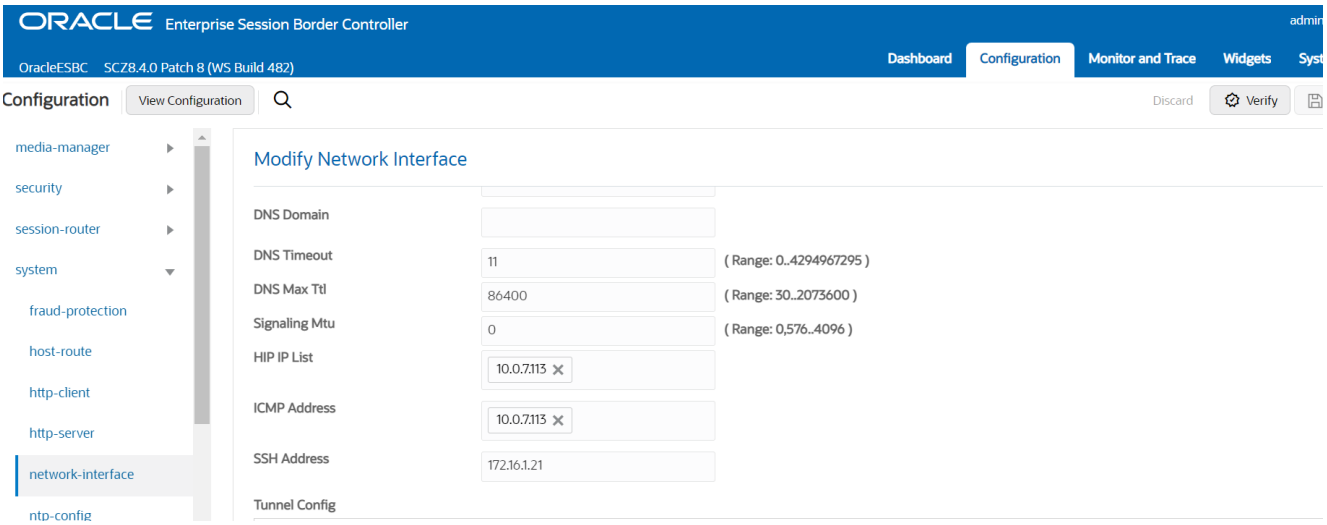
To configure network-interface, go to system->Network-Interface. Configure two interfaces,

- Avaya
- NTT Trunk

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

Parameter Name	Avaya Network Interface	NTT Trunk
Name	S1P0	S0P0
IP address	172.18.0.139	10.0.7.113
Netmask	255.255.0.0	255.255.255.248
Gateway	172.18.0.1	10.0.7.114
DNS-IP Primary	8.8.8.8	8.8.8.8

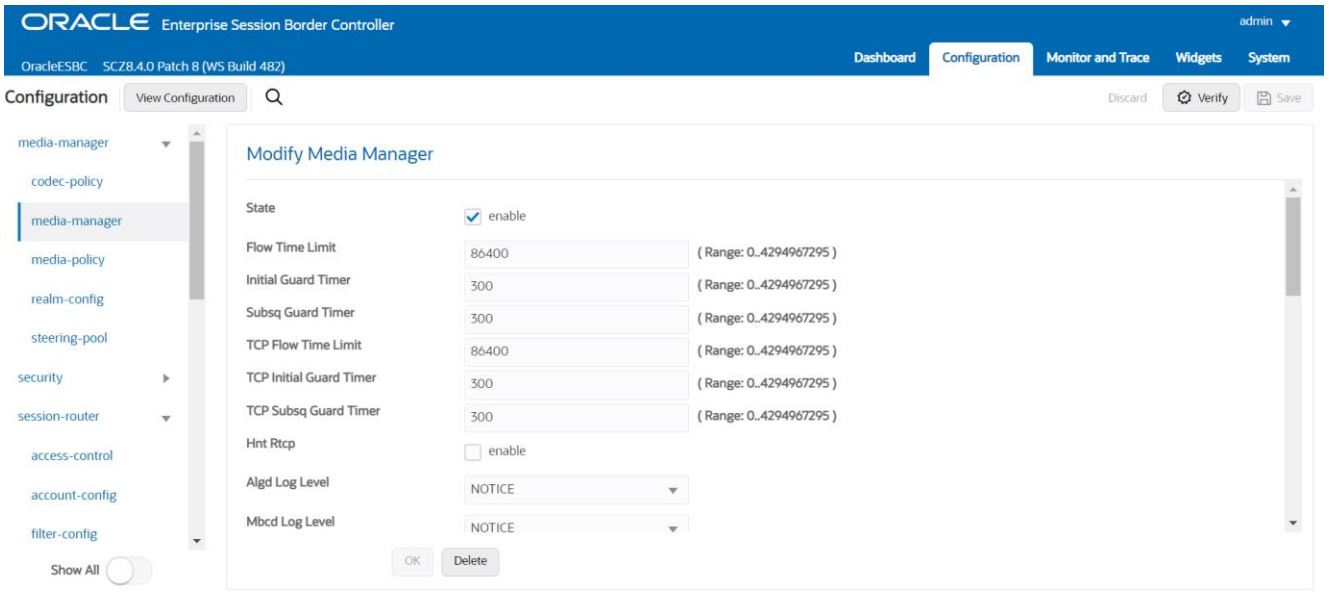




Similarly configure network interfaces for S0P0 (NTT Trunk) as well

5.6.Enable media manager

Media-manager handles the media stack required for SIP sessions on the SBC. Enable the media manager by checking the state as enabled.



5.7.SPLs required for NTT

As part of the integration of the ESBC with NTT trunk, three SPLs, SurrogateRegister.0.3.spl, NttMsgConverter.0.3.spl , SurrogateContact.0.6.spl were developed to include 5 features required to comply with the signaling requirements. All these spl's are available in the SBC by default.

1. As a part of the surrogate registration, SBC is required to send a unique/random user-info portion in every REGISTER request that is sent to the NTT SIP trunk as well as outgoing INVITE messages for calls.
2. The ESBC is required to apply validity check to an incoming INVITE from the SIP trunk before sending out 100 TRYING and subsequent 1xx, 2xx messages to progress the call. It is expected that the incoming INVITE Request-URI user portion will contain the same randomized value that the E-SBC sent in the most recent REGISTER message to the trunk
3. NTT regulation requires that the tag size of From/To headers in the SIP messages be under 32 bytes. The tags sent by Avaya in the originating SIP messages are large in size, approximately 51 bytes.
4. NTT specification also requires that the Rseq, Cseq, Session ID (in SDP) be under the value of 999900 and the SDP o line username character length be a maximum of 10 bytes. The E-SBC receives messages from Enterprise PBX – Cisco Unified Communications Manager with a large

RSeq value in 18x messages which it forwards as is. Also, the SDP o line username is 19 bytes in length (generated by Avaya).

5. E-SBC is expected check RURI user portion of incoming CANCEL request for the AoR and compare it with the AoR specified in the Request-URI of the initial INVITE received.. If the value is different, E-SBC should respond with a 481 Call/Transaction Does Not Exist.
6. NTT also requires that the Host IP in the Call-ID is same as the IP of the Egress-interface communicating with NTT-Trunk

The SPL SurrogateRegister.0.3.spl was developed to implement the features 1 and 2. This SPL is enabled by configuring the spl-option

- dyn-contact-start on the realm facing Avaya and
- dyn-contact-method=randomseed on the realm facing the NTT trunk.

The SPL NttMsgConverter.0.3.spl - was developed to implement the features 3, 4 and 5.
This is enabled by configuring the spl-option

- ocNttMsgConverterTagging=opposite on the realm facing Avaya and
- ocNttMsgConverterTagging=enabled on the realm facing the NTT trunk.

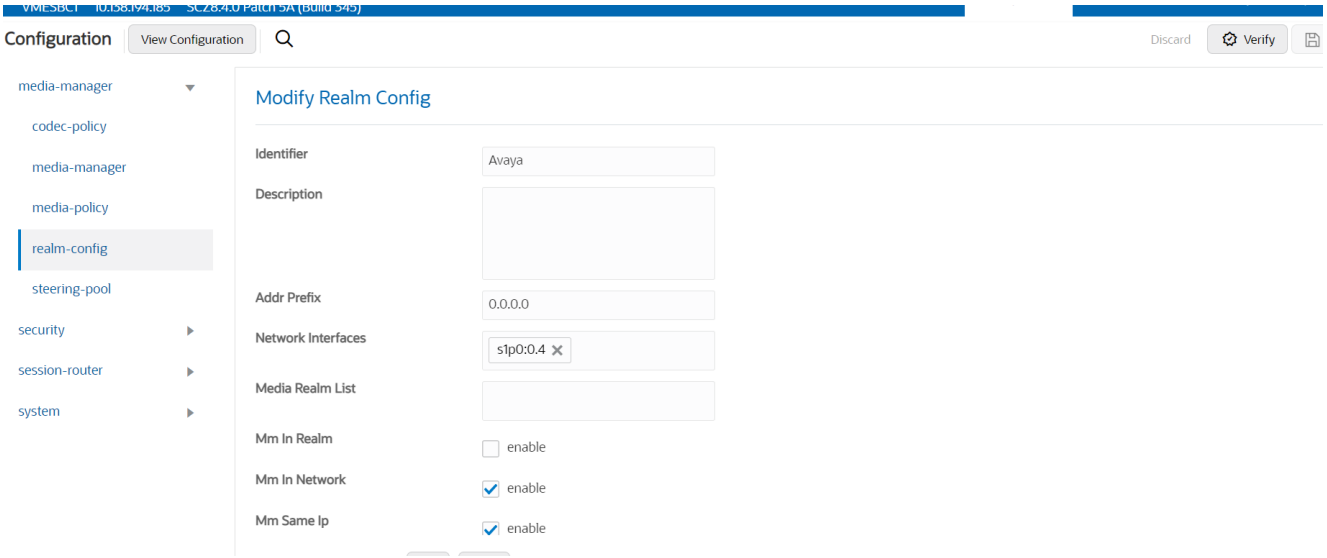
The SurrogateContact.0.6.spl was developed to implement the feature 6
This is enabled by configuring the spl-option

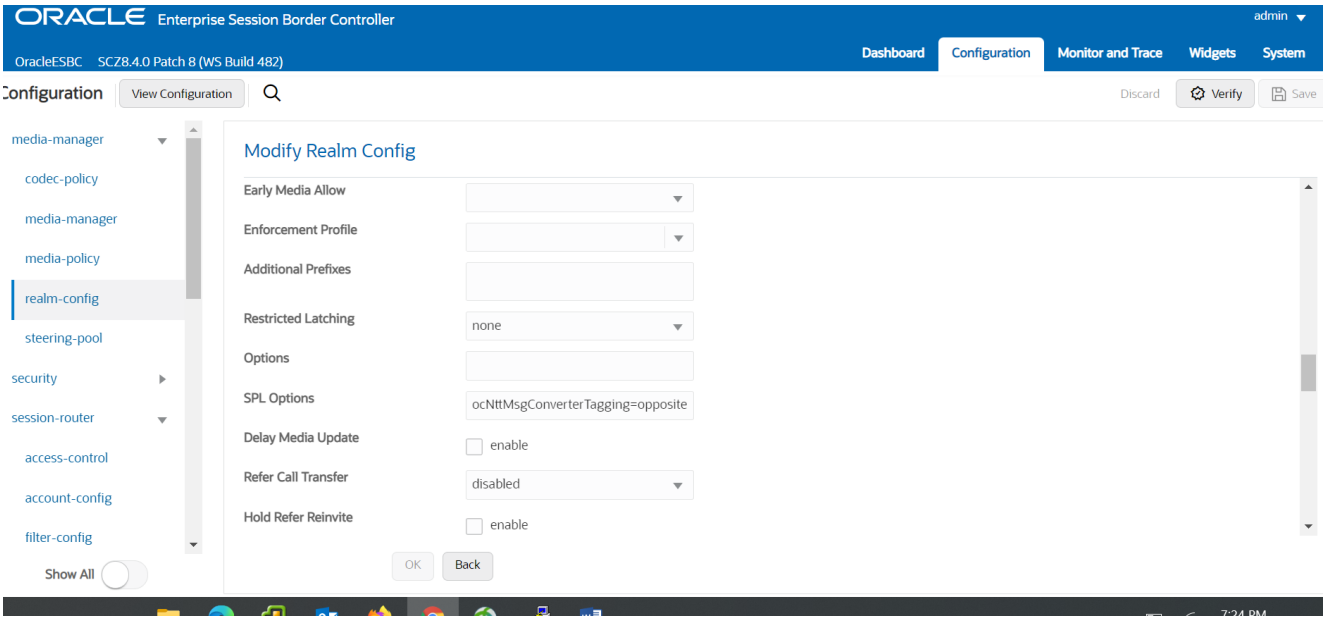
- Control-Surr-Reg in the spl-options on sip-interface facing NTT Trunk

5.8.Configure Realms

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

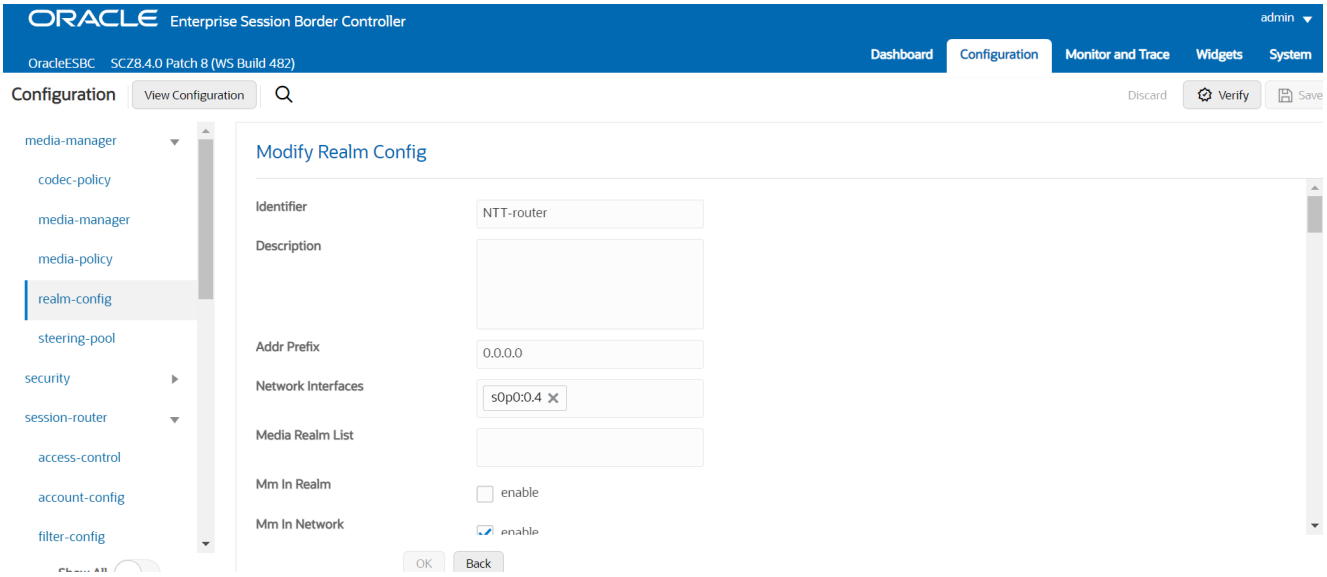
In the below case, Realm name is given asAvaya

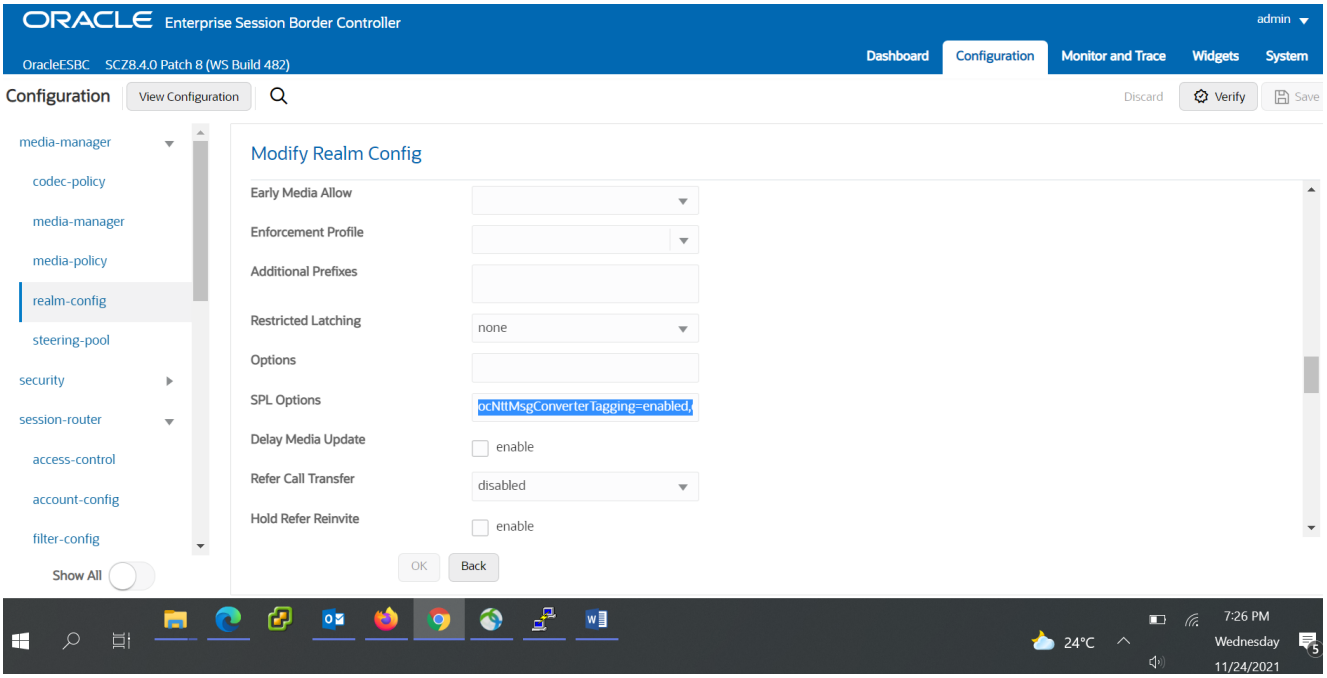




As explained in the last section," ocNttMsgConverterTagging=opposite,dyn-contact-start" is configured towardsAvayarealm.

Similarly for NTT trunk, a realm is created,realm is named as NTT-Router for realm facing NTT Trunk.





As mentioned in last section ,the spl-options “ocNttMsgConverterTagging=enabled,dyn-contact-method=randomseed” are configured in the NTT realm

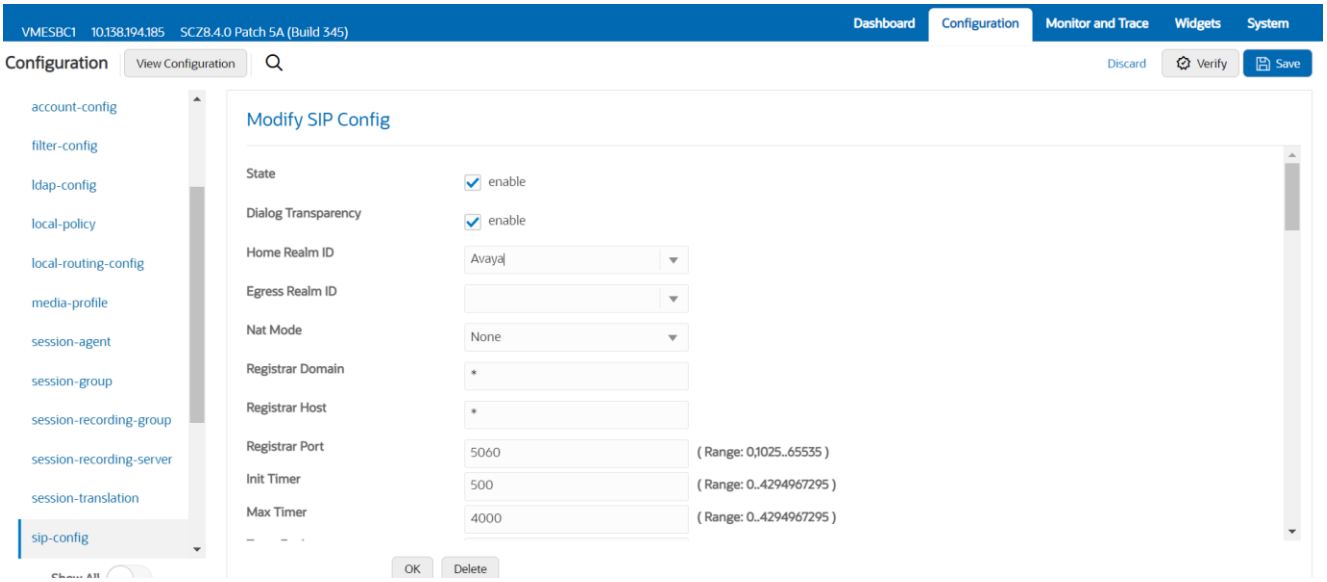
5.9.Enable sip-config

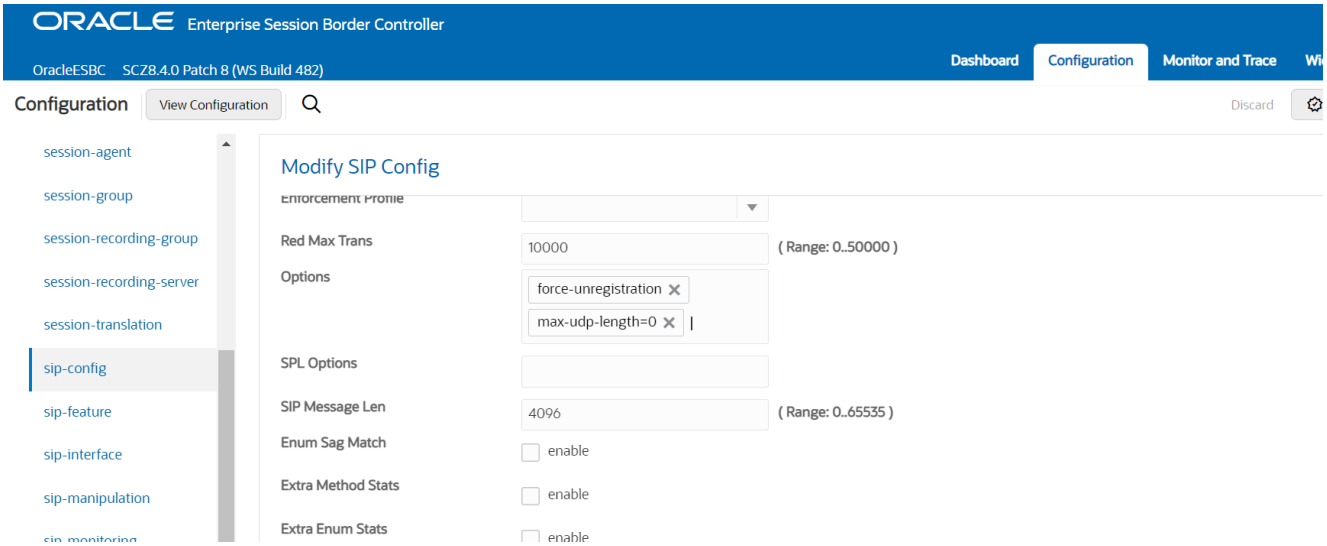
SIP config enables SIP handling in the SBC.
Make sure the home realm-id, registrar-domain and registrar-host are configured.

Also add the options to the sip-config as shown below.

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

- add max-udp-length =0.
- inmanip-before-validate





5.10. Configure SIP Manipulation

There are 4 sip-manips that are applied in the sip-interfaces.

1. Avaya
    a. To Avaya-Applied as Out Manipulationid
    b. Forsurragent-Applied as In Manipulationid
2. NTT
    a. Changecontact-Applied as Out Manipulationid
    b. ModSupportedfromntt-Applied as In Manipulationid

Below is a detailed explanation of every rule in the sip-manip.

Avaya SIP-Manipulations

Note: In this app note ,we have used the CLI snippets of each sip manipulation as it is easier to cover all the manipulations. You can also use the WEBGUI to configure the sip-manipulations mentioned here

Forsurragent-(Avaya-In-Manipulation)

This manipulation is configured as in-manipulation from Avaya.
There are 4 sip-manipulations configured.

- ModSupportedinINVITE –To delete the Supported 100 rel
- rejectOptions- To respond to 200 OK for OPTIONS Sip message from Avaya.
- Addrequireininv – To add Require 100 rel in Invite for PRACK interworking
- CheckFrom – To check whether the From number is within the NTT range.If not replace it with NTT number (Useful for external diversion cases as well)

```
sip-manipulation
        name                                    Forsurragent
        description
        split-headers
        join-headers
        header-rule
                name                                    forsupportedinINVITE
                header-name                             From
                action                                  sip-manip
                comparison-type                         case-sensitive
                msg-type                                any
                methods
                match-value
                new-value                               ModSupportedinINVITE
        header-rule
                name                                    rejectOptions
                header-name                             From
                action                                  reject
                comparison-type                         case-sensitive
                msg-type                                request
                methods                                 OPTIONS
                match-value
```

```
                new-value                                       200:OK

    header-rule
                name                                            addrequireininv
                header-name                                     Require
                action                                          add
                comparison-type                                 case-sensitive
                msg-type                                        any
                methods                                         INVITE
                match-value
                new-value                                       100rel

  header-rule
                name                                            CheckFrom
                header-name                                     From
                action                                          manipulate
                comparison-type                                 case-sensitive
                msg-type                                        request
                methods                                         INVITE
                match-value
                new-value
                element-rule
                        name                                            CheckUser1
                        parameter-name
                        type                                            uri-user
                        action                                          store
                        match-val-type                                  any
                        comparison-type                                 pattern-rule
                        match-value                                     ^81343340[0-9]{3}$
                        new-value
                element-rule
                        name                                            CheckUser2
                        parameter-name
                        type                                            uri-user
                        action                                          store
                        match-val-type                                  any
                        comparison-type                                 pattern-rule
                        match-value                                     ^81343344[0-9]{3}$
                        new-value
                element-rule
                        name                                            chgUser
                        parameter-name
                        type                                            uri-user
                        action                                          replace
                        match-val-type                                  any
                        comparison-type                                 boolean
match-value                                                     !
($CheckFrom.$CheckUser1 | $CheckFrom.$CheckUser2)
                        new-value                                       81343340201

sip-manipulation
        name                                            ModSupportedinINVITE

        header-rule
                name                                            delete100rel
                header-name                                     Supported
                action                                          delete
```

```
                methods                                 INVITE,UPDATE
                match-value                             *100rel*
```

To Avaya(Avaya-Out-Manipulation)

This manipulation is configured as out-manipulation towards Avaya.

There are three manipulations under this master sip-manipulation. Each sip-manipulation is configured separately and then mapped to sip-manip inside the master sip-manipulation as shown below

```
sip-manipulation
        name                                    ToAvaya
        description                             Sip manipulation towards Avaya on
SIP interface
        split-headers
        join-headers
        header-rule
                name                                    ForNAT_IP
                header-name                             From
                action                                  sip-manip
                comparison-type                         case-sensitive
                msg-type                                any
                methods
                match-value
                new-value                               Topohiding
        header-rule
                name                                    forRURI
                header-name                             From
                action                                  sip-manip
                comparison-type                         case-sensitive
                msg-type                                any
                methods
                match-value
                new-value                               ModRURItoAvaya
        header-rule
                name                                    RemoveTimertoAvaya1
                header-name                             From
                action                                  sip-manip
                comparison-type                         case-sensitive
                msg-type                                any
                methods
                match-value
                new-value                               RemoveTimertoAvaya
        header-rule
                name                                    changetel
                header-name                             From
                action                                  sip-manip
                comparison-type                         case-sensitive
                msg-type                                request
                methods
                match-value
                new-value                               changeteluritoavaya
        header-rule
                name                                    ToChangeConactTowardsAvaya
                header-name                             From
                action                                  sip-manip
                comparison-type                         case-sensitive
```

```
                msg-type                                any
                methods
                match-value
                new-value                               ToAvayaChangecontact
        header-rule
                name                                    ForupdatetoAvaya
                header-name                             From
                action                                  sip-manip
                comparison-type                         case-sensitive
                msg-type                                any
                methods
                match-value
                new-value                               ModSupportedtowardsAvaya
```

Topohiding:

Configured for hiding the topology,towards Avaya

```
sip-manipulation
        name                                    Topohiding
        header-rule
                name                                    From
                header-name                             From
                action                                  manipulate
                element-rule
                        name                                    From_header
                        type                                    uri-host
                        action                                  replace
                        new-value                               $LOCAL_IP
        header-rule
                name                                    st
                header-name                             To
                action                                  manipulate
                element-rule
                        name                                    To
                        type                                    uri-host
                        action                                  replace
                        new-value                               $REMOTE_IP
```

ModRURIto Avaya

This sip-manip is for replacing the random contact in the uri-user of the RURI with that of the To header

```
sip-manipulation
        name                                    ModRURItoAvaya
        header-rule
                name                                    CheckToheader
                header-name                             To
                action                                  manipulate
                msg-type                                request
                methods                                 INVITE
                element-rule
                        name                                    storeTouriuser
                        type                                    uri-user
                        action                                  store
                        comparison-type                         pattern-rule
        header-rule
                name                                    request
                header-name                             Request-URI
```

```
                action                                  manipulate
                msg-type                                request
                methods                                 INVITE
                element-rule
                        name                                    storeTouriuser
                        parameter-name                          Request-URI
                        type                                    uri-user
                        action                                  replace
                        comparison-type                         pattern-rule
                        new-value
$CheckToheader.$storeTouriuser.$0
```

RemoveTimertoAvaya

This sip-manip is for removing the unneccesary headers towards Avaya.SinceAvayadoesn't support update for session –refresh , we are deleting

- Session-Expires and Min-SE from INVITE and UPDATE headers.
- Update method from Supported in Invite

Also adding back the 100rel ,we deleted from the Supported header in Invite deleted in the previous sip-manip

```
sip-manipulation
        name                                    RemoveTimertoAvaya
        header-rule
                name                                    RemoveSessionExp
                header-name                             Session-Expires
                action                                  delete
                methods                                 INVITE,UPDATE
        header-rule
                name                                    RemoveSuportedUpdate
                header-name                             Supported
                action                                  delete
                msg-type                                request
                methods                                 UPDATE
        header-rule
                name                                    RemoveMinSEfromRequest
                header-name                             Min-SE
                action                                  delete
                msg-type                                request
                methods                                 INVITE,UPDATE
        header-rule
                name                                    ModifySupportedInvite
                header-name                             Supported
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                request
                methods                                 Invite
                match-value                             (100rel)(.*)
                new-value                               $1
```

Changeteluritoavaya

To convert the tel uri to sip uri in From,To,PCPID and PAI headers.

```
sip-manipulation
        name                                    changeteluritoavaya
        description                             Change tel URI to SIP towardsAvaya
        split-headers
        join-headers
        header-rule
                name                                    formatTotel
                header-name                             To
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                request
                methods                                 INVITE
                match-value                             tel:*
                new-value
                element-rule
                        name                                    getTelURIUser
                        parameter-name
                        type                                    uri-phone-number-
only
                        action                                  store
                        match-val-type                          any
                        comparison-type                         case-insensitive
                        match-value
                        new-value
                element-rule
                        name                                    rewriteTo
                        parameter-name
                        type                                    header-value
                        action                                  replace
                        match-val-type                          any
                        comparison-type                         case-insensitive
                        match-value
                        new-value
"sip:"+$formatTotel.$getTelURIUser.$0+"@"+$REMOTE_IP+";user=phone"
        header-rule
                name                                    formatfromtel
                header-name                             From
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                request
                methods                                 INVITE
                match-value                             tel:*
                new-value
                element-rule
                       name                                    getTelURIUser2
                       parameter-name
                      type                                   uri-phone-number-
only
                        action                                  store
                        match-val-type                          any
                        comparison-type                         case-insensitive
                        match-value
                        new-value
```

```
                element-rule
                        name                                    gettag
                        parameter-name                          tag
                        type                                    uri-param
                        action                                  store
                        match-val-type                          any
                        comparison-type                         case-insensitive
                        match-value
                        new-value
                element-rule
                        name                                    rewritefrom
                        parameter-name
                        type                                    header-value
                        action                                  replace
                        match-val-type                          any
                        comparison-type                         case-insensitive
                        match-value
                        new-value
"sip:"+$formatfromtel.$getTelURIUser2.$0+"@"+$LOCAL_IP+";user=phone"+";tag="+$form
atfromtel.$gettag.$0
        header-rule
                name                                    formatPCPIDtel
                header-name                             P-Called-Party-ID
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                request
                methods                                 INVITE
                match-value                             tel:*
                new-value
                element-rule
                        name                                    getTelURIUser3
                        parameter-name
                        type                                    uri-phone-number-
only                        action                                  store
                        match-val-type                          any
                        comparison-type                         case-insensitive
                        match-value
                        new-value
                element-rule
                        name                                    rewritePCPID
                        parameter-name
                        type                                    header-value
                        action                                  replace
                        match-val-type                          any
                        comparison-type                         case-insensitive
                        match-value
                        new-value
"sip:"+$formatPCPIDtel.$getTelURIUser3.$0+"@"+$REMOTE_IP+";user=phone"
        header-rule
                name                                    formatPAItel
                header-name                             P-Asserted-Identity
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                request
                methods                                 INVITE
                match-value                             tel:*
                new-value
```

```
                element-rule
                        name                                    getTelURIUser4
                        parameter-name
                        type                                    uri-phone-number-
only
                        action                                  store
                        match-val-type                          any
                        comparison-type                         case-insensitive
                        match-value
                        new-value
                element-rule
                        name                                    rewritePAI
                        parameter-name
                        type                                    header-value
                        action                                  replace
                        match-val-type                          any
                        comparison-type                         case-insensitive
                        match-value
                        new-value
"sip:"+$formatPAItel.$getTelURIUser4.$0+"@"+$REMOTE_IP+";user=phone"
```

ToAvayaChangecontact

For changing contact towards Avaya so that it dispays the dialed number instead of random contact

```
sip-manipulation
        name                                    ToAvayaChangecontact
        description                             Change the "Conatct" header
towards Avaya
        split-headers
        join-headers
        header-rule
                name                                    modforcontact
                header-name                             Contact
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                any
                methods                                 INVITE,UPDATE
                match-value
                new-value
                element-rule
                        name                                    modContactuser
                        parameter-name
                        type                                    uri-user
                        action                                  replace
                        match-val-type                          any
                        comparison-type                         pattern-rule
                        match-value                             !($TO_USER.$0 ==
$CONTACT_USER.$0)
                        new-value                               $TO_USER.$0
```

ModSupportedtowardsAvaya

For adding UPDATE in the supported towards Avaya.

```
sip-manipulation
        name                                    ModSupportedtowardsAvaya
        description
        split-headers
        join-headers
        header-rule
                name                                    CheckSupported
                header-name                             Supported
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                any
                methods                                 INVITE
                match-value
                new-value
                element-rule
                        name                                    Storevalue
                        parameter-name
                        type                                    header-value
                        action                                  store
                        match-val-type                          any
                        comparison-type                         pattern-rule
                        match-value
                        new-value
                element-rule
                        name                                    isupdate
                        parameter-name
                        type                                    header-value
                        action                                  replace
                        match-val-type                          any
                        comparison-type                         pattern-rule
                        match-value
                        new-value
$CheckSupported.$Storevalue.$0+,+UPDATE
```

NTT SIP-Manipulations

ModSupportedfromntt –(NTT-In-Manipulation):

The following manipulation is configured as in-manipulation from NTT. There are manipulations under this master sip-manipulation. Each sip-manipulation is configured separately and then mapped to sip-manip inside the master sip-manipulation as shown below

```
sip-manipulation
        name                                    ModSupportedfromntt
        header-rule
                name                                    delete100rel
                header-name                             Supported
                action                                  delete
                methods                                 INVITE
                match-value                             100rel
header-rule
                name                                    changeFromperPAI
                header-name                             From
                action                                  sip-manip
                comparison-type                         case-sensitive
                msg-type                                any
                methods                                 INVITE
                match-value
                new-value                               checkPAI

        header-rule
                name                                    rejectPRACK
                header-name                             Request-URI
                action                                  reject
                comparison-type                         case-sensitive
                msg-type                                request
                methods                                 PRACK
                match-value
                new-value                               200: OK
header-rule
                name                                    checkPCPID2
                header-name                             P-Called-Party-ID
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                out-of-dialog
                methods                                 INVITE
                element-rule
                        name                                    modToer
                        type                                    header-value
                        action                                  sip-manip
                        comparison-type                         pattern-rule
                        new-value                               changeforPCPID
        header-rule
                name                                    tc1282
                header-name                             To
                action                                  sip-manip
```

```
                msg-type                                request
                methods                                 INVITE
                new-value                               checkip6
        header-rule
                name                                    tc1283
                header-name                             To
                action                                  sip-manip
                msg-type                                request
                methods                                 INVITE
                new-value                               tc1283
        header-rule
                name                                    tc1284
                header-name                             To
                action                                  sip-manip
                msg-type                                request
                methods                                 INVITE
                new-value                               tc1284
```

Manipulation for PCPID Comparison:

This manipulation changes the To user id if it doesn't match with the PCPID.

```
sip-manipulation
        name                                    changeforPCPID
        header-rule
                name                                    modforPCPID
                header-name                             To
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                out-of-dialog
                methods                                 INVITE
                element-rule
                        name                                    modToer
                        type                                    uri-user
                        action                                  replace
                        comparison-type                         pattern-rule
                        match-value                             !($TO_USER.$0 ==
$PCPID_USER.$0)
                        new-value                               $PCPID_USER.$0
```

Manipulation for checking IP6 and rejecting in SDP

This manipulation is for checking whether the SDP has IPv6 and rejecting it with 406 Not Acceptable.

```
sip-manipulation
        name                                    checkip6
        mime-sdp-rule
                name                                    check
                msg-type                                request
                methods                                 INVITE
                action                                  manipulate
                sdp-session-rule
                        name                                    check2
                        action                                  manipulate
```

```
                        sdp-line-rule
                                name                                    From
                                type                                    o
                                action                                  reject
                                comparison-type                         pattern-
rule
                                match-value                             ^([0-
9]{ 10}) ([0-9]{10}) ([0- 9]{10}) (IN IP6 .*)$
                                new-value                               "403:Not
Acceptable Protocol"
```

Manipulation for changing PAI

This manipulation changes the PAI value to the To value

```
sip-manipulation
        name                                    changeforPAI
        description
        split-headers
        join-headers
        header-rule
                name                                    modforPAI
                header-name                             From
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                out-of-dialog
                methods                                 INVITE
                match-value
                new-value
                element-rule
                        name                                    modFromer
                        parameter-name
                        type                                    uri-user
                        action                                  replace
                        match-val-type                          any
                        comparison-type                         pattern-rule
                        match-value                             !($FROM_USER.$0 ==
$PAI_USER.$0)
                        new-value                               $PAI_USER.$0
```

Manipulation for checking different protocol value in m line

This manipulation is for checking whether the SDP m line has UDP and to reject it with 403 Not Acceptable Media .

```
sip-manipulation
        name                                    tc1283
        mime-sdp-rule
                name                                    check
                msg-type                                request
                methods                                 INVITE
```

```
                action                                  manipulate
                sdp-media-rule
                        name                                    test
                        media-type                              audio
                        action                                  manipulate
                        sdp-line-rule
                                name                                    change
                                type                                    m
                                action                                  reject
                                comparison-type                         pattern-
rule
                                match-value
^(audio)( [0-9]{4,5})( UDP 0)$
                                new-value                               "403:Not
Acceptable Media"
```

Manipulation for checking incompatible codecs

The below manipulation checks for incompatible codecs and rejects it with 403:codecs Not Allowed.

```
sip-manipulation
        name                                    tc1284
        mime-sdp-rule
                name                                    check
                msg-type                                request
                methods                                 INVITE
                action                                  manipulate
                sdp-media-rule
                        name                                    test
                        media-type                              audio
                        action                                  manipulate
                        sdp-line-rule
                                name                                    change
                                type                                    m
                                action                                  reject
                                comparison-type                         pattern-
rule
                                match-value
^(audio)( [0-9]{4,5})( RTP/AVP 9 15 18 4)$
                                new-value
"403:Codecs Not Allowed"
```

Changecontact- (NTT-Out-Manipulation):

This manipulation is configured as out-manipulation towards NTT. There are manipulations under this master sip-manipulation. Each sip-manipulation is configured separately and then mapped to sip-manip inside the master sip-manipulation as shown below

```
sip-manipulation
```

```
name                                    Changecontact
header-rule
        name                                    forprivacy
        header-name                             From
        action                                  sip-manip
        new-value                               NATting
header-rule
        name                                    forPAIandRPI
        header-name                             From
        action                                  sip-manip
        new-value                               PAIandRPI
header-rule
        name                                    forUAinfo
        header-name                             From
        action                                  sip-manip
        new-value                               AddSBCinfo
header-rule
        name                                    Toremovecallinfo
        header-name                             From
        action                                  sip-manip
        new-value                               removecallinfo
header-rule
        name                                    forregsupport
        header-name                             From
        action                                  sip-manip
        new-value                               AddSupportedinReg
header-rule
        name                                    outboundinvite
        header-name                             From
        action                                  sip-manip
        new-value                               ModSupportedoutboundINVITE
header-rule
        name                                    regrule
        header-name                             From
        action                                  sip-manip
        new-value                               ForREGISTER


header-rule
        name                                    formaxforwards
        header-name                             From
        action                                  sip-manip
        new-value                               ModMaxforwards
header-rule
        name                                    fortransportudp
        header-name                             From
        action                                  sip-manip
        new-value                               deltransportUDP
header-rule
        name                                    forplusinresponse
        header-name                             From
        action                                  sip-manip
        new-value                               Modcontactuserinresponses
header-rule
        name                                    formodallowheader
        header-name                             From
        action                                  sip-manip
```

```
        new-value                                ModAllowheader
header-rule
        name                                     forreasonheader
        header-name                              From
        action                                   sip-manip
        new-value                                DelReasonheader
header-rule
        name                                     forupdatemessage
        header-name                              From
        action                                   sip-manip
        new-value                                ModUPDATEmessage
header-rule
        name                                     DeleteexpiresinINVITE
        header-name                              From
        action                                   sip-manip
        new-value                                DelExpiresinINVITE
header-rule
        name                                     forSEtoNTT
        header-name                              From
        action                                   sip-manip
        new-value                                forsessionexpirestoNTT
header-rule
        name                                     foranonymouscall
        header-name                              From
        action                                   sip-manip
        new-value                                anonymouscall
header-rule
        name                                     remblines
        header-name                              From
        action                                   sip-manip
        new-value                                stripblines
header-rule
        name                                     forfromport
        header-name                              From
        action                                   sip-manip
        new-value                                inviteffromport
header-rule
        name                                     forprivacy1
        header-name                              From
        action                                   sip-manip
        new-value                                Privacy

 header-rule
        name                                     Toremovemsgid
        header-name                              From
        action                                   sip-manip
        comparison-type                          case-sensitive
        msg-type                                 any
        methods
        match-value
        new-value                                removeP-AV-Message-Id
header-rule
        name                                     ToremoveUser_to_User
        header-name                              From
        action                                   sip-manip
        comparison-type                          case-sensitive
        msg-type                                 any
```

```
                methods
                match-value
                new-value                               removeUser-to-User
        header-rule
                name                                    ToremoveHistory_Info
                header-name                             From
                action                                  sip-manip
                comparison-type                         case-sensitive
                msg-type                                any
                methods
                match-value
                new-value                               removeHistory-Info
        header-rule
                name                                    ToremoveAlert_Info
                header-name                             From
                action                                  sip-manip
                comparison-type                         case-sensitive
                msg-type                                any
                methods
                match-value
                new-value                               removeAlert-Info


header-rule
                name                                    fordateavayaidplocation
                header-name                             From
                action                                  sip-manip
                comparison-type                         case-sensitive
                msg-type                                any
                methods
                match-value
                new-value                               RemDateavayaidplocation
        header-rule
                name                                    modsdpsline
                header-name                             From
                action                                  sip-manip
                comparison-type                         case-sensitive
                msg-type                                any
                methods
                match-value
                new-value                               modsessionline
        header-rule
                name                                    forproxyauth
                header-name                             From
                action                                  sip-manip
                comparison-type                         case-sensitive
                msg-type                                any
                methods
                match-value
                new-value                               DelProxyAuthinACKBYE
        header-rule
                name                                    forptime
                header-name                             From
                action                                  sip-manip
                comparison-type                         case-sensitive
                msg-type                                any
                methods
```

```
        match-value
        new-value                       replaceemptimewithptime
header-rule
        name                            delUAin180
        header-name                     From
        action                          sip-manip
        comparison-type                 case-sensitive
        msg-type                        reply
        methods
        match-value
        new-value                       Mod180
header-rule
        name                            adduserphoneinRURIINVITE
        header-name                     From
        action                          sip-manip
        comparison-type                 case-sensitive
        msg-type                        any
        methods
        match-value
        new-value                     addtheuserphoneinRURIINVITE
header-rule
        name                            ToremoveDiversion
        header-name                     From
        action                          sip-manip
        comparison-type                 case-sensitive
        msg-type                        any
        methods
        match-value
        new-value                       removeDiversion

header-rule
        name                            RemoveSDPand18x
        header-name                     From
        action                          sip-manip
        comparison-type                 case-sensitive
        msg-type                        any
        methods
        match-value
        new-value                       delSDPfrom18x
header-rule
        name                            Toaddreq100relin180
        header-name                     From
        action                          sip-manip
        comparison-type                 case-sensitive
        msg-type                        any
        methods                         INVITE
        match-value
        new-value                       AddReq100relto18x
```

NATting

This sip manipulation is configured for topology hiding.
NTT requires that the host part in the From and To headers in INVITE should be “ipvoice.jp”

```
sip-manipulation
        name                                    NATting
        header-rule
                name                                    From
                header-name                             From
                action                                  manipulate
                element-rule
                        name                                    From_header
                        type                                    uri-host
                        action                                  replace
                        new-value                               ipvoice.jp
        header-rule
                name                                    To
                header-name                             To
                action                                  manipulate
                element-rule
                        name                                    To
                        type                                    uri-host
                        action                                  replace
                        new-value                               ipvoice.jp
                element-rule
                        name                                    Toport
                        type                                    uri-port
                        action                                  sip-manip
                        new-value                               ModToport
```

The below manipulation is a part of NATing sip-manipulation.
NTT requires the port be 7060 in the To header of Invite. This manipulation adds the port to the To header if it does not exist.

```
sip-manipulation
        name                                    ModToport
        header-rule
                name                                    CheckToport
                header-name                             To
                action                                  manipulate
                element-rule
                        name                                    Storeport
                        type                                    uri-port
                        action                                  store
                        match-value                             7060
        header-rule
                name                                    CheckdoubleportsinTo
                header-name                             To
                action                                  manipulate
                comparison-type                         boolean
                match-value                             !$CheckToport.$Storeport
                element-rule
                        name                                    ChangeToval
                        type                                    uri-port
                        action                                  add
                        new-value                               7060
```

PAIandRPI

To delete the Remote-Party-ID and P-Asserted-Identity headers sent by Avaya.

```
sip-manipulation
        name                                    PAIandRPI
        header-rule
                name                                    delRPI
                header-name                             Remote-Party-ID
                action                                  delete
                methods                                 INVITE,UPDATE
        header-rule
                name                                    delPAI
                header-name                             P-Asserted-Identity
                action                                  delete
                methods                                 BYE,INVITE,UPDATE
```

AddSBCinfo

To replace theAvayarelated information in the User-Agent header with the SBC image version. The pattern to be matched can be changed according to the customer's requirements.

```
sip-manipulation
        name                                    AddSBCinfo
        header-rule
                name                                    Addproductinfo
                header-name                             User-Agent
                action                                  add
                msg-type                                request
                methods                                 REGISTER
                new-value                               OracleE\-SBC/SCZ840p10
        header-rule
                name                                    Moduseragentforcall
                header-name                             User-Agent
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                request
                methods
ACK,BYE,INVITE,PRACK,UPDATE
                element-rule
                        name                                    Modvalue
                        type                                    header-value
                        action                                  replace
                        comparison-type                         pattern-rule
                        match-value                             ^Epi(.*)
                        new-value                               OracleE\-
SBC/SCZ840p10

        header-rule
                name                                    Moduseragentforcall2
                header-name                             User-Agent
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                request
                methods
ACK,BYE,INVITE,PRACK,UPDATE
                element-rule
```

```
                        name                                    Modvalue
                        type                                    header-value
                        action                                  replace
                        comparison-type                         pattern-rule
                        match-value                             ^SIP(.*)
                        new-value                               OracleE\-
SBC/SCZ840p10
```

AddSupportedinReg

NTT requires that the Path header be added to every Register message.
Below sip-manipulation is configured to add Path header

```
sip-manipulation
        name                                    AddSupportedinReg
        header-rule
                name                                    Addtheheader
                header-name                             Supported
                action                                  add
                msg-type                                request
                methods                                 REGISTER
        new-value                               path
```

ModSupportedoutboundINVITE

To replace the value of Supported header in INVITE with 100rel,timer towards NTT.

```
sip-manipulation
        name                                    ModSupportedoutboundINVITE
        header-rule
                name                                    CheckSupported
                header-name                             Supported
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                request
                methods                                 INVITE
                element-rule
                        name                                    Storevalue
                        type                                    header-value
                        action                                  store
                        comparison-type                         pattern-rule
                element-rule
                        name                                    add100rel
                        type                                    header-value
                        action                                  find-replace-all
                        comparison-type                         pattern-rule
                        new-value                               100rel,timer
```

ForREGISTER

To add the required authentication details in the REGISTERs sent to NTT trunk.
Also the sip-manipulation adds user=phone in From,To and Request-URI of Register

```
sip-manipulation
        name                                    ForREGISTER
        header-rule
                name                                    Delroute
```

```
                header-name                                     Route
                action                                          delete
                msg-type                                        request
                methods                                         REGISTER
        header-rule
                name                                            Delauthparams
                header-name                                     Authorization
                action                                          manipulate
                msg-type                                        request
                methods                                         REGISTER
                element-rule
                        name                                            storevalue
                        type                                            header-value
                        action                                          store
                        comparison-type                                 pattern-rule
                        match-value                                     (.+)(, auth-
params=sha1-credential)
                element-rule
                        name                                            delparam
                        type                                            header-value
                        action                                          replace
                        comparison-type                                 pattern-rule
                        new-value
$Delauthparams.$storevalue.$1
        header-rule
                name                                            addContentlength
                header-name                                     Content-Length
                action                                          add
                msg-type                                        request
                methods                                         REGISTER
                new-value                                       0
        header-rule
                name                                            delexpires
                header-name                                     Expires
                action                                          delete
                msg-type                                        request
                methods                                         REGISTER
        header-rule
                name                                            adduserphoneinFrom
                header-name                                     From
                action                                          manipulate
                msg-type                                        request
                methods                                         INVITE,REGISTER
                element-rule
                        name                                            adduserphone
                        parameter-name                                  user
                        type                                            uri-param
                        action                                          add
                        new-value                                       phone
        header-rule
                name                                            adduserphoneinTo
                header-name                                     To
                action                                          manipulate
                msg-type                                        request
                methods                                         INVITE,REGISTER
                element-rule
                        name                                            adduserphonto
```

```
                        parameter-name                          user
                        type                                    uri-param
                        action                                  add
                        new-value                               phone
        header-rule
                name                                    adduserphoneinRURIINVITE
                header-name                             Request-URI
                action                                  manipulate
                msg-type                                request
                methods                                 INVITE
                element-rule
                        name                                    adduserequalphone
                        parameter-name                  user
                        type                                    uri-param
                        action                                  add
                        new-value                               phone
        header-rule
                name                                    Forinvitedelauthparams
                header-name                             Proxy-Authorization
                action                                  manipulate
                msg-type                                request
                methods                                 INVITE
                element-rule
                        name                                    storethevalue
                        type                                    header-value
                        action                                  store
                        comparison-type                 pattern-rule
                        match-value                             (.+)(, auth-
params=sha1-credential)
                element-rule
                        name                                    delparam
                        type                                    header-value
                        action                                  replace
                        comparison-type                 pattern-rule
                        new-value
$Forinvitedelauthparams.$storethevalue.$1
        header-rule
                name                                    addopaqueinReg
                header-name                             Authorization
                action                                  manipulate
                comparison-type                 pattern-rule
                msg-type                                request
                methods                                 REGISTER
                element-rule
                        name                                    storeentireheader
                        type                                    header-value
                        action                                  store
                        comparison-type                 pattern-rule
                        match-value                             (.+)(,
algorithm=MD5)
                element-rule
                        name                                    addopaqueparam
                        parameter-name                  opaque
                        type                                    header-value
                        action                                  replace
                        comparison-type                 pattern-rule
```

```
                        new-value
$addopaqueinReg.$storeentireheader.$1+$addopaqueinReg.$storeentireheader.$2+,+opaq
ue=\"\"
        header-rule
                name                                    addopaqueinINVITE
                header-name                             Proxy-authorization
                action                                  manipulate
                msg-type                                request
                methods                                 INVITE
                element-rule
                        name                                    Checkheader
                        type                                    header-value
                        action                                  store
                        comparison-type                         pattern-rule
                        match-value                             (.+)(,
algorithm=MD5)
                element-rule
                        name                                    addopaqueinheader
                        type                                    header-value
                        action                                  replace
                        comparison-type                         pattern-rule
                        new-value
$addopaqueinINVITE.$Checkheader.$1+$addopaqueinINVITE.$Checkheader.$2+,+opaque=\"\
"
```

ModMaxforwards

To modify the Max-Forwards header value to 70 and adds the header if it is not present.

```
sip-manipulation
        name                                    ModMaxforwards
        description                             Look for Max-Forwards header,
change it to 70 and if not present, add it
        header-rule
                name                                    CheckMaxforwards
                header-name                             Max-Forwards
                action                                  manipulate
                methods
ACK,BYE,INVITE,PRACK,UPDATE
                element-rule
                        name                                    storevalue
                        type                                    header-value
                        action                                  store
                        comparison-type                         pattern-rule
                element-rule
                        name                                    add70
                        type                                    header-value
                        action                                  find-replace-all
                        comparison-type                         pattern-rule
                        new-value                               70
        header-rule
                name                                    Addmaxforwardsifnotpresent
                header-name                             Max-Forwards
                action                                  add
                comparison-type                         boolean
                msg-type                                reply
                methods
ACK,BYE,INVITE,PRACK,UPDATE
```

```
                match-
value                                   !$CheckMaxforwards.$storevalue
                element-rule
                        name                                            addvalue
                        type                                            header-value
                        action                                          add
                        new-value                                       70
```

deltransportUDP

To remove the ‘transport’ uri-parameter from the Contact header.

```
sip-manipulation
        name                                    deltransportUDP
        header-rule
                name                                    Remtransportudp
                header-name                             Contact
                action                                  manipulate
                methods                                 INVITE,UPDATE
                element-rule
                        name                                    delparam
                        parameter-name                          transport
                        type                                    uri-param
                        action                                  delete-element
```

Modcontactuserinresponses

This sip-manipulation is for modifying the required parameters in the responses towards NTT .

```
sip-manipulation
        name                                    Modcontactuserinresponses
        header-rule
                name                                    Replacesupported200
                header-name                             Supported
                action                                  manipulate
                msg-type                                reply
                methods                                 INVITE,UPDATE
                new-value                               timer
        header-rule
                name                                    Modusergaent
                header-name                             User-Agent
                action                                  delete
                msg-type                                reply
                methods                                 INVITE,UPDATE
        header-rule
                name                                    Modmaxf
                header-name                             Max-Forwards
                action                                  delete
                msg-type                                reply
                methods                                 INVITE,UPDATE
        header-rule
                name                                    is180
                header-name                             @status-line
                action                                  store
                comparison-type                         pattern-rule
                methods                                 INVITE,UPDATE
                element-rule
```

```
                        name                                    Addinrerply
                        type                                    status-code
                        action                                  store
                        comparison-type                         pattern-rule
                        match-value                             180
        header-rule
                name                                    Supported
                header-name                             Supported
                action                                  delete
                comparison-type                         boolean
                msg-type                                reply
                methods                                 INVITE,UPDATE
                match-value                             $is180.$Addinrerply
```

ModAllowheader

Modifies the Allow header value in INVITE and UPDATE to include the methods, INVITE,BYE,CANCEL,ACK,PRACK,UPDATE and adds the Allow header if it is not present.

```
sip-manipulation
        name                                    ModAllowheader
        header-rule
                name                                    CheckAllowheader
                header-name                             Allow
                action                                  manipulate
                methods                                 INVITE,UPDATE
                element-rule
                        name                                    Storeheadervalue
                        type                                    header-value
                        action                                  store
                        comparison-type                         pattern-rule
                        match-value                             .*
                element-rule
                        name                                    Modallow
                        type                                    header-value
                        action                                  replace
                        new-value
INVITE,BYE,CANCEL,ACK,PRACK,UPDATE
        header-rule
                name                                    Checkallowandifnotaddit
                header-name                             Allow
                action                                  add
                comparison-type                         boolean
                msg-type                                request
                methods                                 INVITE,UPDATE
                match-
value                           !$CheckAllowheader.$Storeheadervalue
                element-rule
                        name                                    addheadervalue
                        type                                    header-value
                        action                                  add
                        new-value
INVITE,BYE,CANCEL,ACK,PRACK,UPDATE
        header-rule
                name                                    deleteAllow
                header-name                             Allow
                action                                  delete
                 methods                                 ACK
```

DelReasonheader

To delete the Reason header in BYE.

```
sip-manipulation
        name                                    DelReasonheader
        header-rule
                name                                    delreason
                header-name                             Reason
                action                                  delete
                msg-type                                request
                methods                                 BYE
```

ModUPDATEmessage

To modify the Supported header in UPDATEs to include only timer

```
sip-manipulation
        name                                    ModUPDATEmessage
        header-rule
                name                                    ModSupportedheader
                header-name                             Supported
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                request
                methods                                 UPDATE
                element-rule
                        name                                    keeptimeronly
                        type                                    header-value
                        action                                  replace
                        comparison-type                         pattern-rule
                        new-value                               timer
```

DelExpiresinINVITE

To delete the Expires header from the INVITE

```
sip-manipulation
        name                                    DelExpiresinINVITE
        header-rule
                name                                    delexpires
                header-name                             Expires
                action                                  delete
                msg-type                                request
                methods                                 INVITE
```

forsessionexpirestoNTT

To modify the value in the Session-Expires header to 180

```
sip-manipulation
        name                                    forsessionexpirestoNTT
        header-rule
                name                                    adduacforSE
                header-name                             Session-Expires
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                request
                methods                                 INVITE
```

```
                element-rule
                        name                                    storesevalue
                        type                                    header-value
                        action                                  store
                        comparison-type                         pattern-rule
                        match-value                             (.*)
                element-rule
                        name                                    addrefresheruac
                        type                                    header-value
                        action                                  replace
                        comparison-type                         pattern-rule
                        new-value
180+;+refresher=uac
        header-rule
                name                                    adduacforSE2
                header-name                             Min-SE
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                request
                methods                                 INVITE
                element-rule
                        name                                    storesevalue
                        type                                    header-value
                        action                                  store
                        comparison-type                         pattern-rule
                        match-value                             (.*)
                element-rule
                        name                                    addrefresheruac
                        type                                    header-value
                        action                                  replace
                        comparison-type                         pattern-rule
                        new-value                               180
```

anonymouscall

NTT requires anonymous call be in a particular format.This sip-manipulation is used to change request-uri and To headers in INVITE of anonymous calls. Modify the pattern value according to the numbers provided by NTT.

```
sip-manipulation
        name                                    anonymouscall
        header-rule
                name                                    changeRURI
                header-name                             Request-URI
                action                                  manipulate
                msg-type                                request
                methods                                 INVITE
                element-rule
                        name                                    storeuser
                        type                                    uri-user
                        action                                  store
                        comparison-type                         pattern-rule
                        match-value                             ^\+184(.*$)
                element-rule
                        name                                    striptheplus
                        type                                    uri-user
                        action                                  replace
```

```
                        comparison-type                 boolean
                        match-value
$changeRURI.$storeuser
                        new-value                       $ORIGINAL-^"+"
        header-rule
                name                                    addphonecontext
                header-name                             Request-URI
                action                                  manipulate
                comparison-type                         boolean
                msg-type                                request
                methods                                 INVITE
                match-value                             $changeRURI.$storeuser.$0
                element-rule
                        name                            addtheparam
                        parameter-name                  phone-context
                        type                            uri-user-param
                        action                          add
                        new-value                       \+81
        header-rule
                name                                    ModToheader
                header-name                             To
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                request
                methods                                 INVITE
                element-rule
                        name                            storetheuser
                        type                            uri-user
                        action                          store
                        comparison-type                 pattern-rule
                        match-value                     ^\+184(.*$)
                element-rule
                        name
Striptheplusfromuriuser
                        type                            uri-user
                        action                          replace
                        comparison-type                 boolean
                        match-value
$ModToheader.$storetheuser
                        new-value                       $ORIGINAL-^"+"
        header-rule
                name                                    addphonecontextinTo
                header-name                             To
                action                                  manipulate
                comparison-type                         boolean
                msg-type                                request
                methods                                 INVITE
                match-value
$ModToheader.$storetheuser.$0
                element-rule
                        name                            addpc
                        parameter-name                  phone-context
                        type                            uri-user-param
                        action                          add
                        new-value                       \+81
```

stripblines

To remove the unwanted lines from the SDP as per NTT requirements.

```
sip-manipulation
        name                                    stripblines
        header-rule
                name                                    blinefix
                header-name                             Content-Type
                action                                  manipulate
                element-rule
                        name                                    removeb1
                        parameter-name                          application/sdp
                        type                                    mime
                        action                                  find-replace-all
                        comparison-type                         pattern-rule
                        match-value                             b=TIAS:64000\r\n
                element-rule
                        name                                    removeb2
                        parameter-name                          application/sdp
                        type                                    mime
                        action                                  find-replace-all
                        comparison-type                         pattern-rule
                        match-value                             b=AS:64\r\n
                element-rule
                        name                                    removemaxptime
                        parameter-name                          application/sdp
                        type                                    mime
                        action                                  find-replace-all
                        comparison-type                         pattern-rule
                        match-value                             a=maxptime:20\r\n
                element-rule
                        name                                    removemaxptime2
                        parameter-name                          application/sdp
                        type                                    mime
                        action                                  find-replace-all
                        comparison-type                         pattern-rule
                        match-value                             EpiSIPphone-epi-
8.5.000.64
                        new-value                               session
                element-rule
                        name                                    removemaxptime4
                        parameter-name                          application/sdp
                        type                                    mime
                        action                                  replace
                        comparison-type                         pattern-rule
                        match-value                             Session Name=*
                        new-value                               Session
Name=session
                element-rule
                        name                                    removemaxptime5
                        parameter-name                          application/sdp
                        type                                    mime
                        action                                  replace
                        match-value                             o=-
                        new-value                               o= Avaya
                element-rule
                        name                                    ssrc
                        parameter-name                          application/sdp
```

```
                        type                                    mime
                        action                                  replace
                        comparison-type                         pattern-rule
                        match-value                             a =ssrc(.*)\n\r
        mime-sdp-rule
                name                                    sdp
                msg-type                                request
                methods                                 INVITE
                action                                  manipulate
                sdp-media-rule
                        name                                    user
                        media-type                              audio
                        action                                  manipulate
                        sdp-line-rule
                                name                                    audio2
                                type                                    a
                                action                                  delete
                                comparison-type                         pattern-
rule
                                match-value                             ^ssrc.*
                sdp-session-rule
                        name                                    oline
                        action                                  manipulate
                        sdp-line-rule
                                name                                    replaceo
                                type                                    o
                                action                                  replace
                                match-value                             -
                                new-value                               Avaya
```

inviteffromport

This sip-manipulation is configured to change user-param and port in REGISTER.The new value should be left blank for Register To and From port as NTT does not support From and To ports in Register message.

```
sip-manipulation
        name                                    inviteffromport
        header-rule
                name                                    From
                header-name                             From
                action                                  manipulate
                msg-type                                request
                methods                                 REGISTER
                element-rule
                        name                                    From_port
                        parameter-name                          From
                        type                                    uri-param-name
                        action                                  replace
                        match-value                             user
        header-rule
                name                                    To
                header-name                             To
                action                                  manipulate
                msg-type                                request
                methods                                 REGISTER
                element-rule
                        name                                    From_port
```

```
                        parameter-name                          To
                        type                                    uri-param-name
                        action                                  replace
                        match-value                             user
        header-rule
                name                                    From_port
                header-name                             From
                action                                  manipulate
                msg-type                                request
                methods                                 INVITE,REGISTER,UPDATE
                element-rule
                        name                                    From_port
                        parameter-name                          From
                        type                                    uri-port
                        action                                  replace
                        match-value                             4080
        header-rule
                name                                    To_port
                header-name                             To
                action                                  manipulate
                msg-type                                request
                methods                                 REGISTER
                element-rule
                        name                                    From_port
                        parameter-name                          From
                        type                                    uri-port
                        action                                  replace
                        match-value                             7060
```

Privacy

This sip-manipulation deletes the Privacy header from the requests :ACK,BYE,CANCEL,INVITE,PRACK,UPDATE

```
sip-manipulation
        name                                    Privacy
        header-rule
                name                                    deletePriv
                header-name                             Privacy
                action                                  delete
                msg-type                                request
                methods
ACK,BYE,CANCEL,INVITE,PRACK,UPDATE
```

Toremovemsgid

To remove P-AV-Message-Id sent by Avaya in the messages towards NTT

```
sip-manipulation
        name                                    removeP-AV-Message-Id
        description                             Remove P-AV-Message-Id
        split-headers
        join-headers
        header-rule
                name                                    Stripmessageid
                header-name                             P-AV-Message-Id
```

```
                action                                  delete
                comparison-type                         case-sensitive
                msg-type                                any
                methods                                 INVITE,UPDATE
                match-value
                new-value
```

removeUser-to-User

To remove User-to-User sent by Avaya in the messages towards NTT

```
sip-manipulation
        name                                    removeUser-to-User
        description                             Remove User-to-User
        split-headers
        join-headers
        header-rule
                name                                    Stripmessageid
                header-name                             User-to-User
                action                                  delete
                comparison-type                         case-sensitive
                msg-type                                any
                methods                                 INVITE,UPDATE
                match-value
                new-value
```

removeHistory-Info

To remove History-Info sent by Avaya in the messages towards NTT

```
sip-manipulation
        name                                    removeHistory-Info
        description                             Remove History-Info header
        split-headers
        join-headers
        header-rule
                name                                    Stripmessageid
                header-name                             History-Info
                action                                  delete
                comparison-type                         case-sensitive
                msg-type                                any
                methods                                 INVITE,UPDATE
                match-value
                new-value
```

removeAlert-Info

To remove Alert-Info sent by Avaya in the messages towards NTT

```
sip-manipulation
        name                                    removeAlert-Info
```

```
        description                                 Remove Alert-Info header
        split-headers
        join-headers
        header-rule
                name                                        Stripmessageid
                header-name                                 Alert-Info
                action                                      delete
                comparison-type                             case-sensitive
                msg-type                                    any
                methods                                     INVITE,UPDATE
                match-value
                new-value
```

RemDateavayaidplocation

To remove Date, Av-Global-Session-ID,P-Location,Authorization,P-Charging-Vector,Max-Breadth,Endpoint-View,Accept-language

```
sip-manipulation
        name                                        RemDateavayaidplocation
        description
        split-headers
        join-headers
        header-rule
                name                                        delDate
                header-name                                 Date
                action                                      delete
                comparison-type                             case-sensitive
                msg-type                                    any
                methods
ACK,BYE,INVITE,PRACK,UPDATE
                match-value
                new-value
        header-rule
                name                                        delAvayaSessionID
                header-name                                 Av-Global-Session-ID
                action                                      delete
                comparison-type                             case-sensitive
                msg-type                                    any
                methods
ACK,BYE,INVITE,PRACK,UPDATE
                match-value
                new-value
        header-rule
                name                                        delplocation
                header-name                                 P-Location
                action                                      delete
                comparison-type                             case-sensitive
                msg-type                                    any
                methods
ACK,BYE,INVITE,PRACK,UPDATE
                match-value
                new-value
        header-rule
                name                                        delAuthorization
                header-name                                 Authorization
```

```
                action                                  delete
                comparison-type                         case-sensitive
                msg-type                                any
                methods
ACK,BYE,INVITE,PRACK,UPDATE
                match-value
                new-value
        header-rule
                name                                    delPChargingVector
                header-name                             P-Charging-Vector
                action                                  delete
                comparison-type                         case-sensitive
                msg-type                                any
                methods
ACK,BYE,INVITE,PRACK,UPDATE
                match-value
                new-value
        header-rule
                name                                    delEndpointView
                header-name                             Endpoint-View
                action                                  delete
                comparison-type                         case-sensitive
                msg-type                                any
                methods
                match-value
                new-value
        header-rule
                name                                    delmaxbreadth
                header-name                             Max-Breadth
                action                                  delete
                comparison-type                         case-sensitive
                msg-type                                any
                methods
                match-value
                new-value
        header-rule
                name                                    delacceptlan
                header-name                             Accept-Language
                action                                  delete
                comparison-type                         case-sensitive
                msg-type                                any
                methods
                match-value
                new-value
```

DelProxyAuthinACKBYE

To delete Proxy-auth sent by Avaya towards NTT.

```
sip-manipulation
        name                                    DelProxyAuthinACKBYE
        description                             Delete ProxyAuth in ACK, BYE
        split-headers
        join-headers
        header-rule
                name                                    delproxauth
```

```
                header-name                             Proxy-Authorization
                action                                  delete
                comparison-type                         case-sensitive
                msg-type                                request
                methods                                 ACK,BYE,UPDATE
                match-value
                new-value
```

Replacemptimewithptime

To replace maxptime with ptime towards NTT

```
sip-manipulation
        name                                    replacemptimewithptime
        description
        split-headers
        join-headers
        mime-sdp-rule
                name                                    addptime
                msg-type                                request
                methods
                action                                  manipulate
                comparison-type                         case-sensitive
                match-value
                new-value
                sdp-media-rule
                        name                                    addSDPptime
                        media-type                              audio
                        action                                  manipulate
                        comparison-type                         case-sensitive
                        match-value
                        new-value
                        sdp-line-rule
                                name                                    addptimelr
                                type                                    a
                                action                                  find-
replace-all
                                comparison-type                         case-
sensitive
                                match-value
maxptime:60
                                new-value                               ptime:20
```

Mod180

To delete User-agent in the 180 response towards NTT

```
sip-manipulation
        name                                    Mod180
        description                             Modify180 message
        split-headers
```

```
        join-headers
        header-rule
                name                                    check180
                header-name                             @status-line
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                any
                methods
                match-value
                new-value
                element-rule
                        name                                    is180
                        parameter-name
                        type                                    status-code
                        action                                  store
                        match-val-type                          any
                        comparison-type                         pattern-rule
                        match-value                             180
                        new-value
        header-rule
                name                                    delUA
                header-name                             User-Agent
                action                                  delete
                comparison-type                         boolean
                msg-type                                any
                methods
                match-value                             $check180.$is180
                new-value
```

removeDiversion

To remove diversion header towards NTT in case of external diversion by Avaya user.

```
sip-manipulation
        name                                    removeDiversion
        description                             Remove Diversion header
        split-headers
        join-headers
        header-rule
                name                                    Stripmessageid
                header-name                             Diversion
                action                                  delete
                comparison-type                         case-sensitive
                msg-type                                any
                methods                                 INVITE
                match-value
                new-value
```

delSDPfrom18x

To delete SDP from 18x messages towards NTT

```
sip-manipulation
        name                                    delSDPfrom18x
        description                             Delete SDP from all 18x messages
towards NTT
        split-headers
        join-headers
        header-rule
                name                                    chk18x
                header-name                             @status-line
                action                                  store
                comparison-type                         case-sensitive
                msg-type                                reply
                methods                                 INVITE
                match-value
                new-value
                element-rule
                        name                                    bool18x
                        parameter-name
                        type                                    status-code
                        action                                  store
                        match-val-type                          any
                        comparison-type                         case-sensitive
                        match-value                             183|180
                        new-value
        mime-sdp-rule
                name                                    delSDP
                msg-type                                reply
                methods                                 INVITE
                action                                  delete
                comparison-type                         boolean
                match-value                             $chk18x.$bool18x
                new-value
        header-rule
                name                                    is183
                header-name                             @status-line
                action                                  store
                comparison-type                         pattern-rule
                msg-type                                reply
                methods                                 INVITE
                match-value
                new-value
                element-rule
                        name                                    is183
                        parameter-name
                        type                                    status-code
                        action                                  store
                        match-val-type                          any
                        comparison-type                         pattern-rule
                        match-value                             183
                        new-value
```

AddReq100relto18x

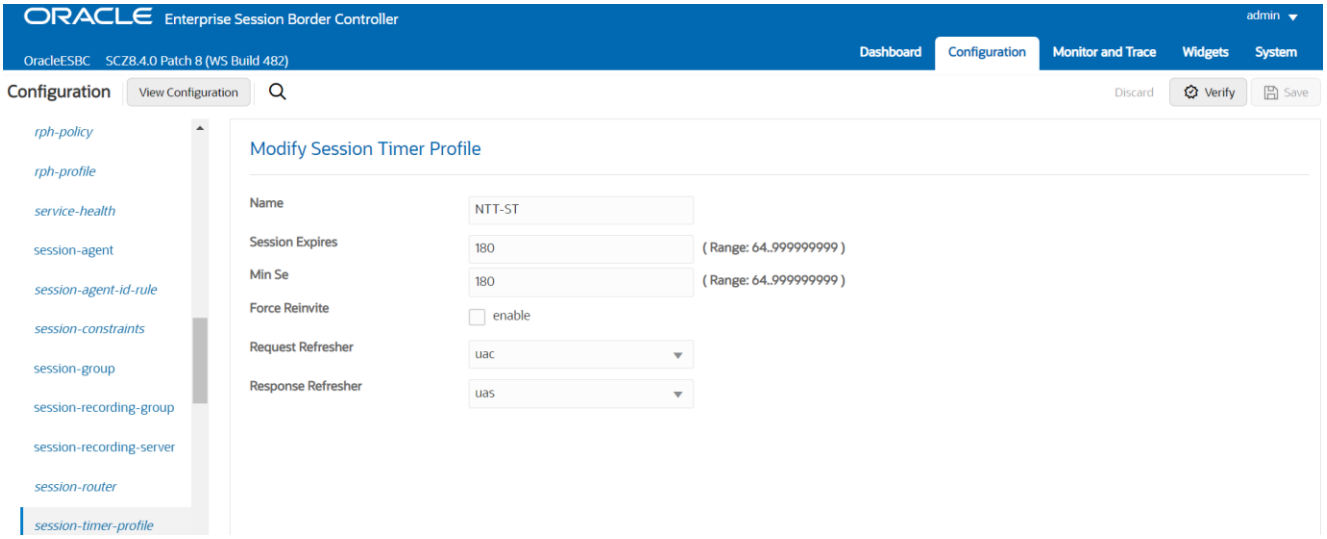
To add Require:100 Rel header if the response towards NTT is 18x

```
sip-manipulation
        name                                    AddReq100relto18x
        description                             Add Req 100 rel to 18x messages
towards NTT
        split-headers
        join-headers
        header-rule
                name                                    chk18x
                header-name                             @status-line
                action                                  store
                comparison-type                         case-sensitive
                msg-type                                reply
                methods                                 INVITE
                match-value
                new-value
                element-rule
                        name                                    bool18x
                        parameter-name
                        type                                    status-code
                        action                                  store
                        match-val-type                          any
                        comparison-type                         case-sensitive
                        match-value                             180
                        new-value
        header-rule
                name                                    addrequire100relin180
                header-name                             Require
                action                                  add
                comparison-type                         boolean
                msg-type                                reply
                methods                                 INVITE
                match-value                             $chk18x.$bool18x
                new-value                               100rel
        header-rule
                name                                    addRseqto180
                header-name                             RSeq
                action                                  add
                comparison-type                         boolean
                msg-type                                reply
                methods                                 INVITE
                match-value                             $chk18x.$bool18x
                new-value                               1
```

5.11. Configure Session-Timer Profile

The Oracle® Enterprise Session Border Controller provides a SIP session timer feature that, when enabled, forwards the re-INVITE or UPDATE requests from a User Agent Client (UAC) to a User Agent Server (UAS) in order to determine whether or not a session is still active. This refresh feature works for both UAs and proxies.

To support UPDATE for session-refresh towards NTT,we configure session-time profile .



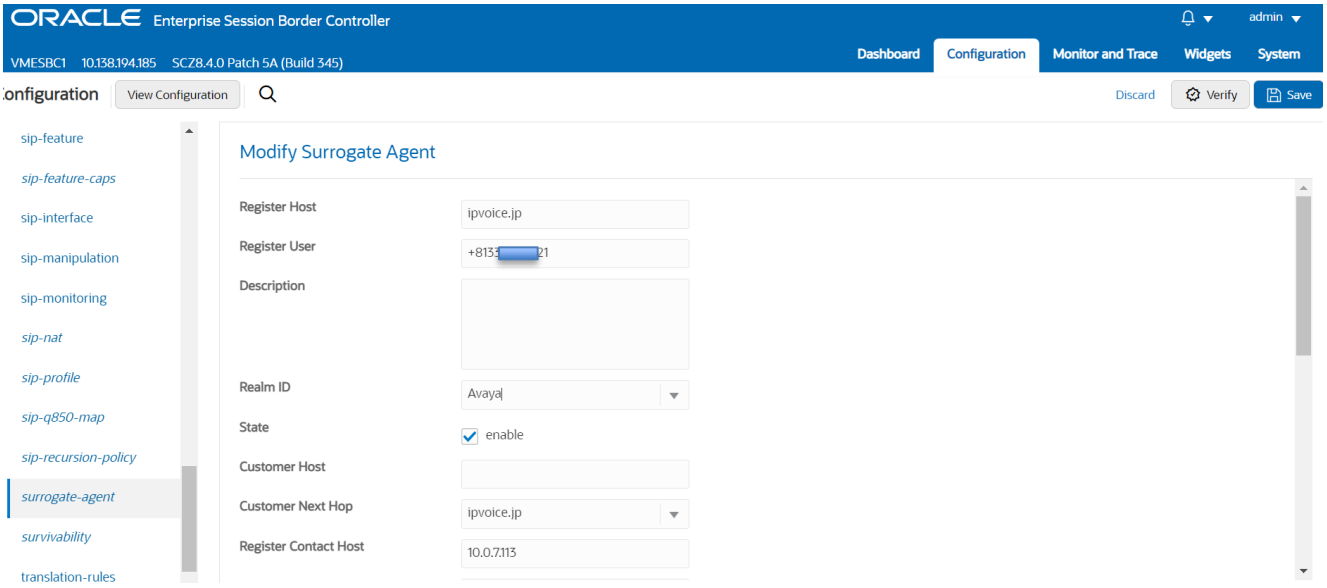
Apply the timer –profile on the sip-interface towards NTT.

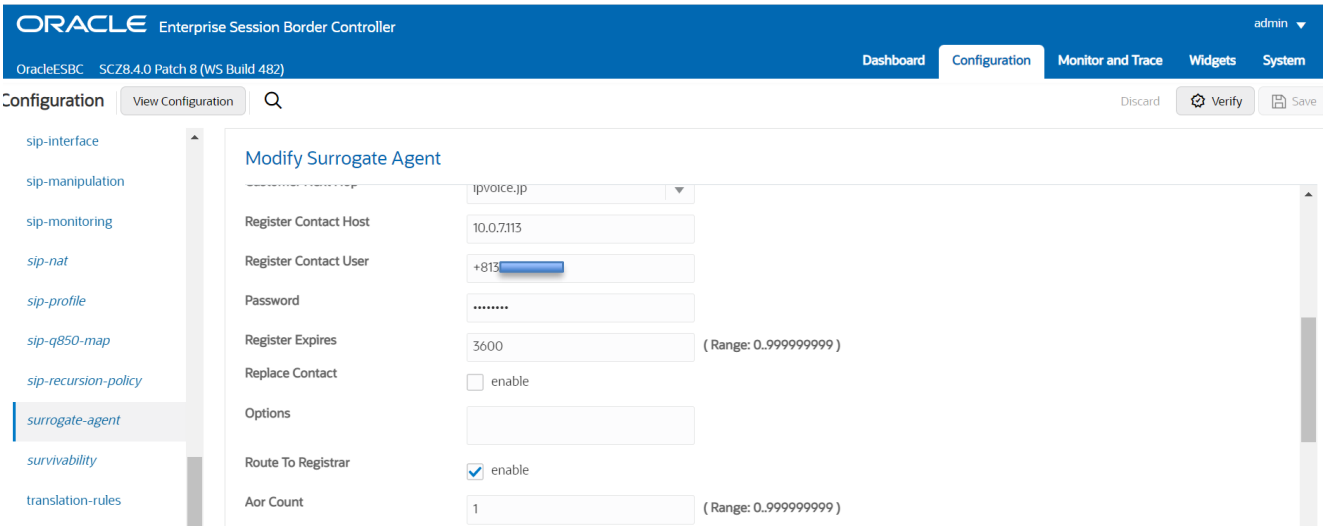
5.12. Configure Surrogate-agent

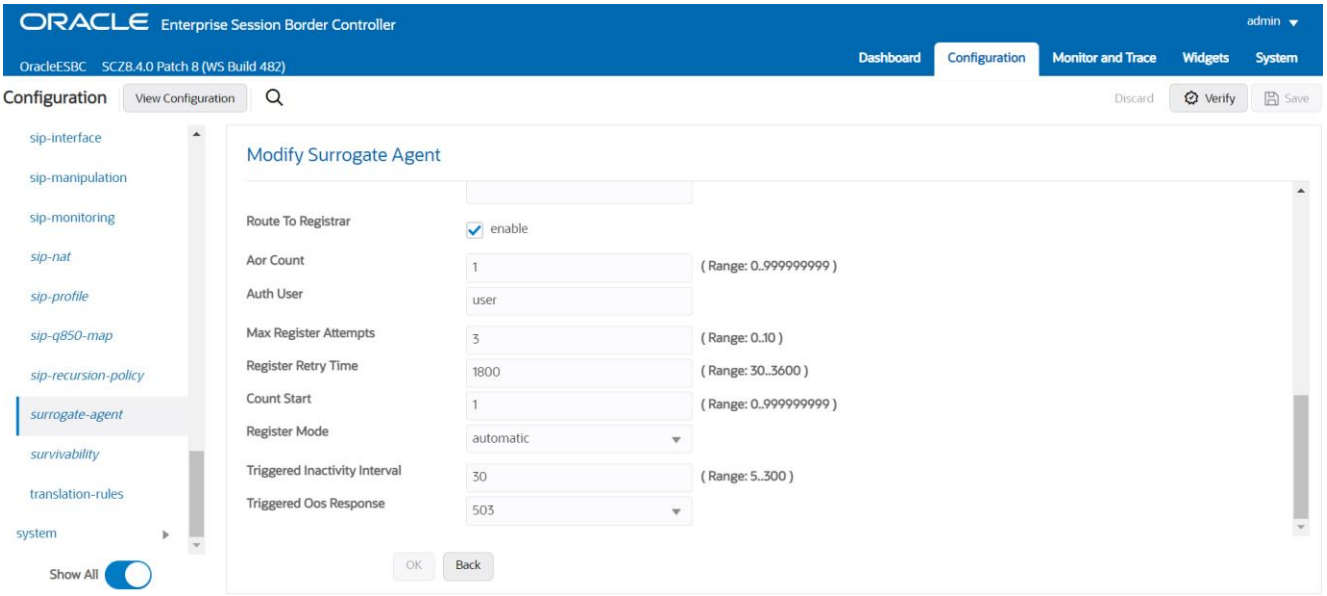
NTT requires the customer PBX to register in order to originate calls support authentication. SinceAvayacannot perform the registration, Oracle ESBC performs surrogate registrations on behalf of the PBX

Configure the following for surrogate registration to be successful

- Register Host
- Register User
- Realm-ID
- Customer-NextHop (Session Agent of NTT)
- Register-Contact-Host (IP of the Egress Interface toards NTT)
- Register-Contact-User (Phone number)
- Auth-User
- Auth-Passwd


ORACLE Enterprise Session Border Controller
admin
VMESBC1 10.138.194.185 SCZ8.4.0 Patch 5A (Build 345)
Dashboard
Configuration
Monitor and Trace
Widgets
System
onfiguration
View Configuration
Discard
Verify
Save
sip-feature
sip-feature-caps
sip-interface
sip-manipulation
sip-monitoring
sip-nat
sip-profile
sip-q850-map
sip-recursion-policy
surrogate-agent
survivability
translation-rules
Modify Surrogate Agent
Register Host
ipvoice.jp
Register User
+8133 21
Description
Realm ID
Avaya
State
enable
Customer Host
Customer Next Hop
ipvoice.jp
Register Contact Host
10.0.7.113

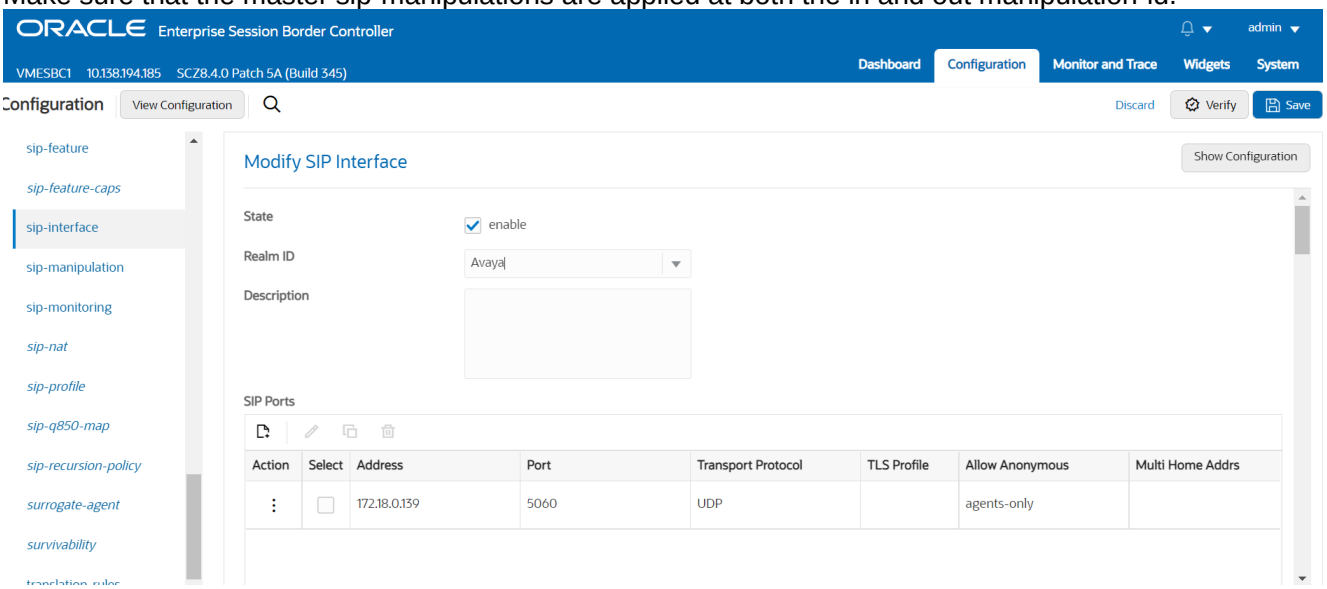

ORACLE Enterprise Session Border Controller
admin
OracleESBC SCZ8.4.0 Patch 8 (WS Build 482)
Dashboard
Configuration
Monitor and Trace
Widgets
System
Configuration
View Configuration
Discard
Verify
Save
sip-interface
sip-manipulation
sip-monitoring
sip-nat
sip-profile
sip-q850-map
sip-recursion-policy
surrogate-agent
survivability
translation-rules
Modify Surrogate Agent
ipvoice.jp
Register Contact Host
10.0.7.113
Register Contact User
+813
Password
Register Expires
3600
(Range: 0..999999999)
Replace Contact
enable
Options
Route To Registrar
enable
Aor Count
1
(Range: 0..999999999)



5.13. Configure SIP Interfaces.

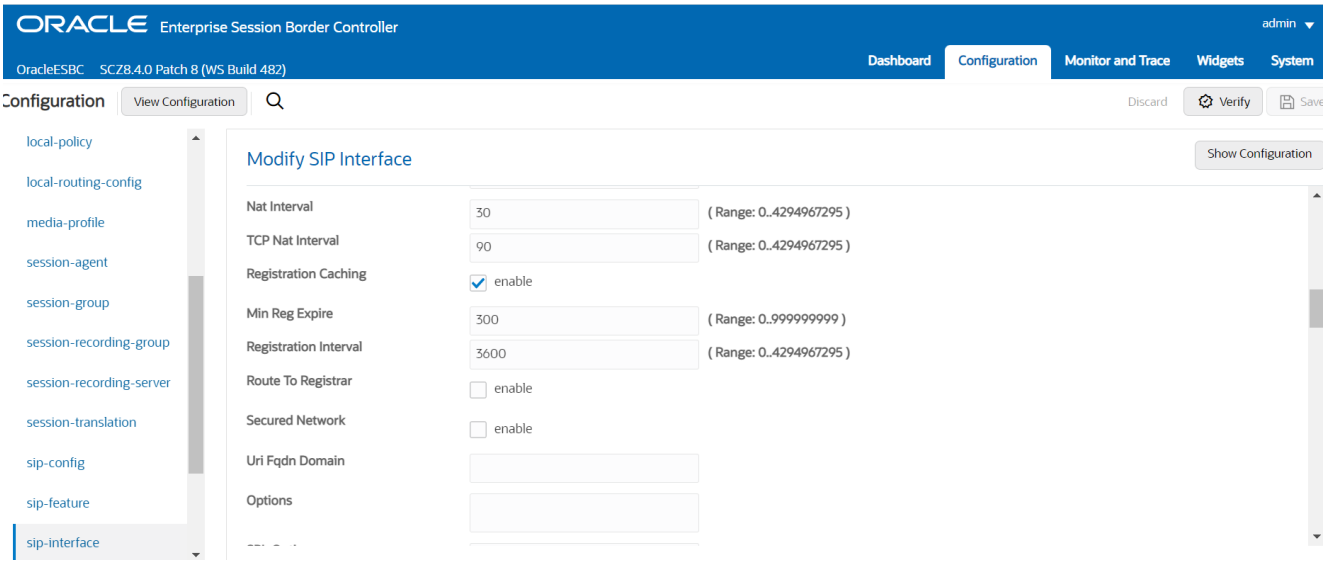
Navigate to sip-interface under session-router and configure the sip-interface as shown below
Avaya interface is confured with UDP port and allow-anonymous as “agents-only”

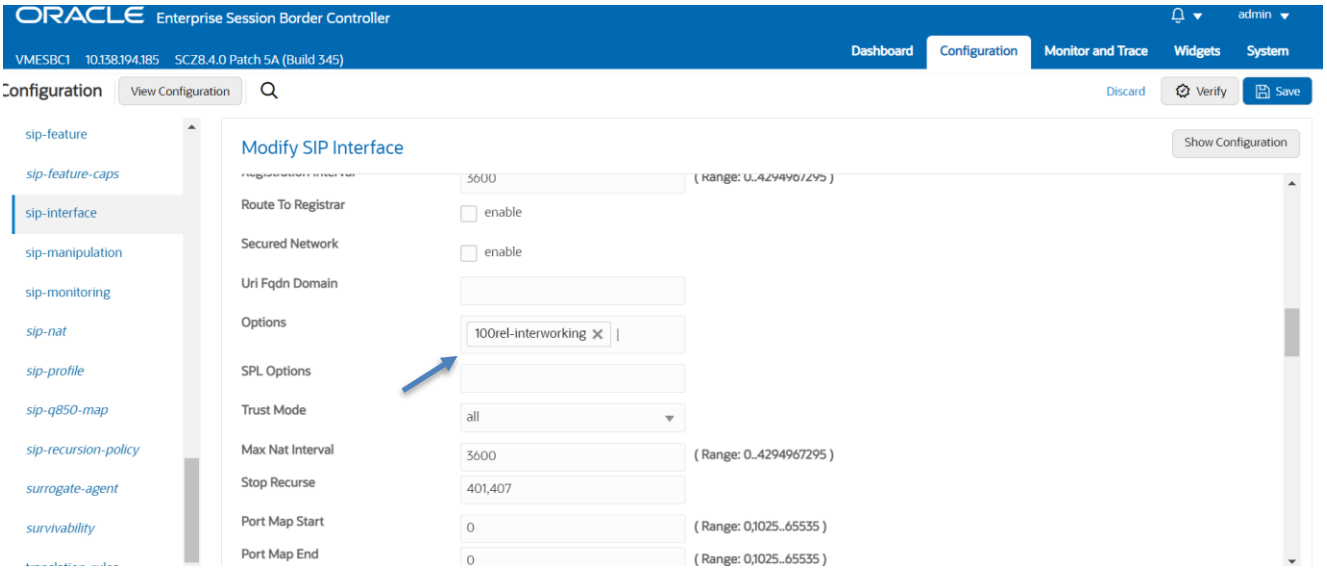
Make sure that the master sip-manipulations are applied at both the in and out manipulation-id.



Make sure the following configuration is there in sip-interface before moving to the next configuration

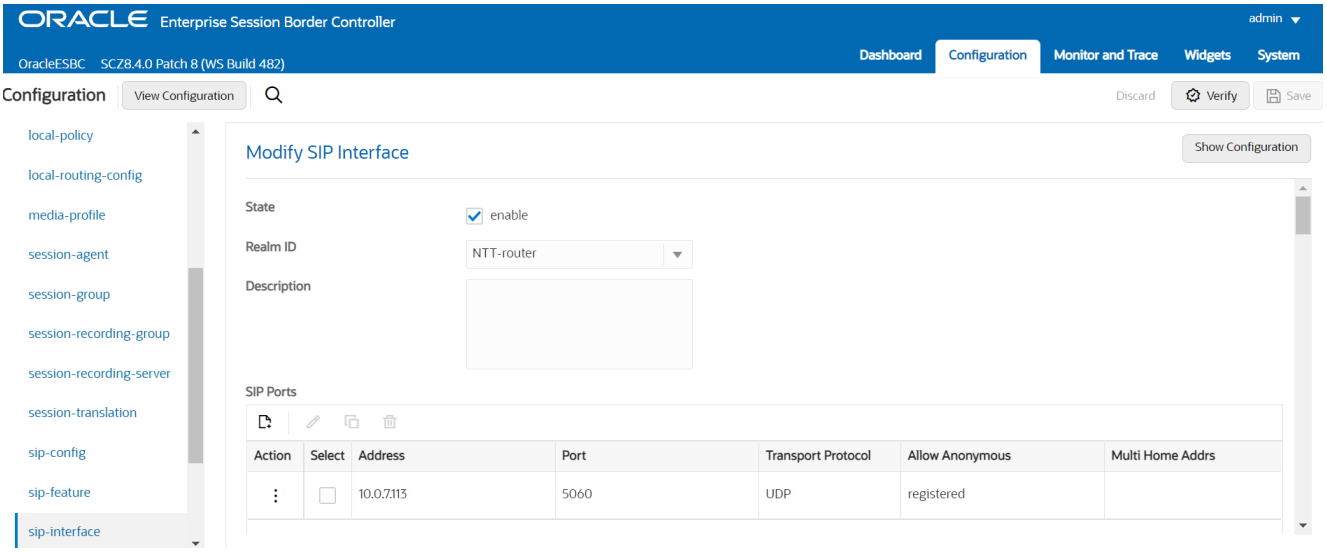
1. 100rel-interworking is set for early media support from SBC.
2. The sip-manipulations for in and out manipulations





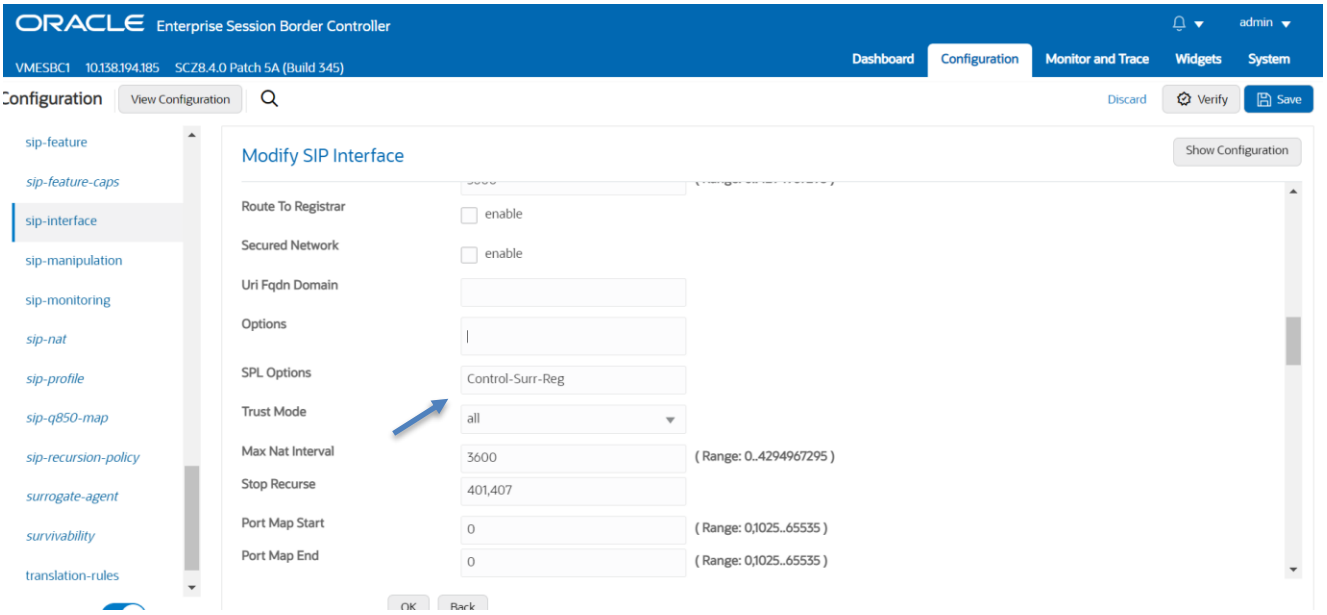
NTT Sip-interface-Config

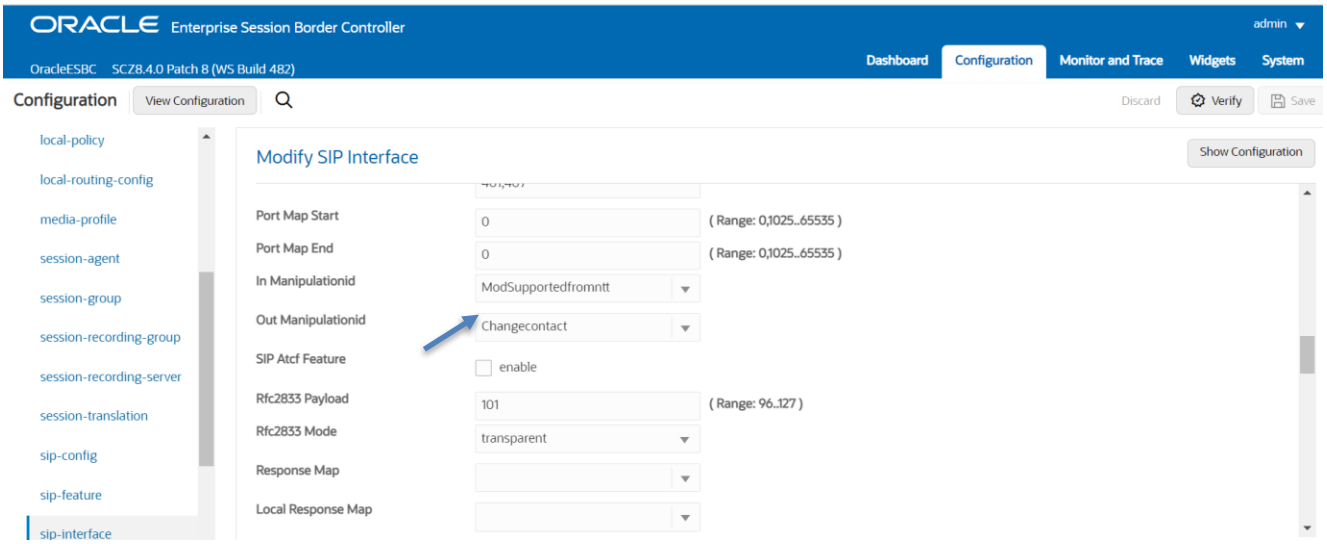
Configure a sip-interface for NTT with transport set as UDP and allow-anonymous set as “registered only”

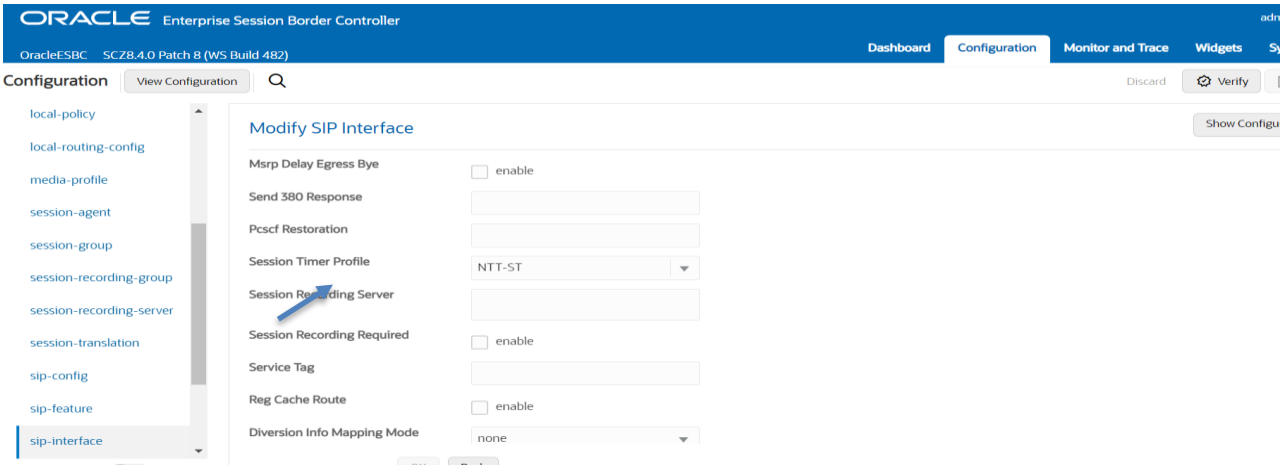


Make sure the following configuration is there in sip-interface before moving to the next configuration

1. Control-Surr-Reg is configured as SPL-options for enabling the SurrogateContact.0.6.spl
2. The sip-manipulations for in and out manipulations.
3. Session-Timer Profile







Once sip-interface is configured – the SBC is ready to accept traffic on the allocated IP address.
Now configure where the SBC sends the outbound traffic.

5.14. Configure session-agent

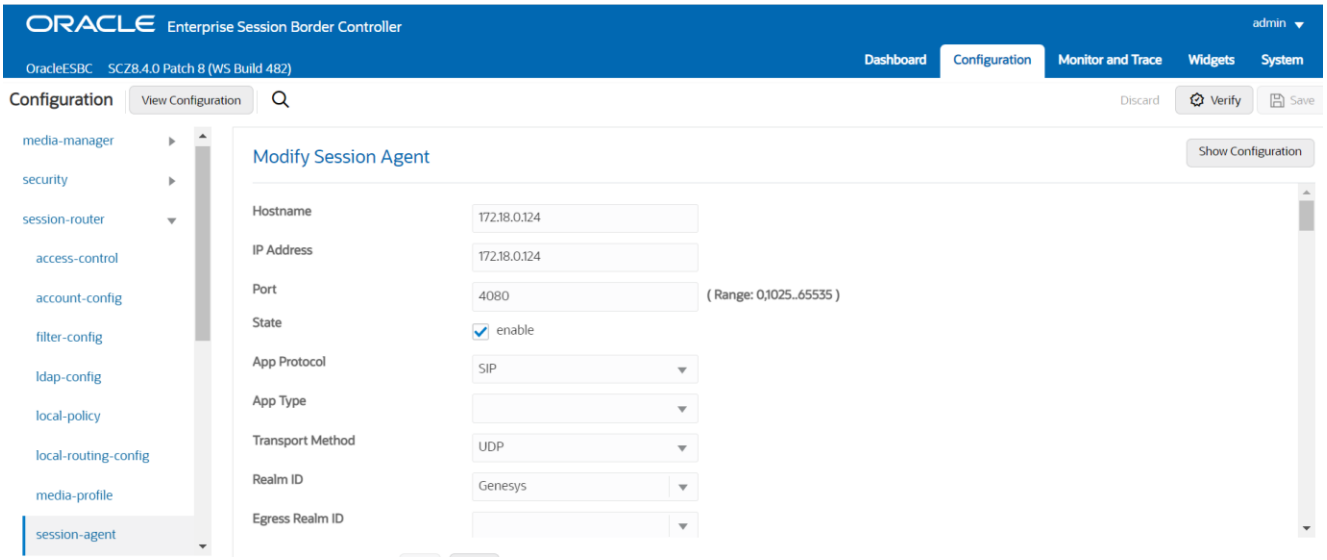
Session-agents are config elements which are trusted agents who can send/receive traffic from the SBC with direct access to trusted data path..

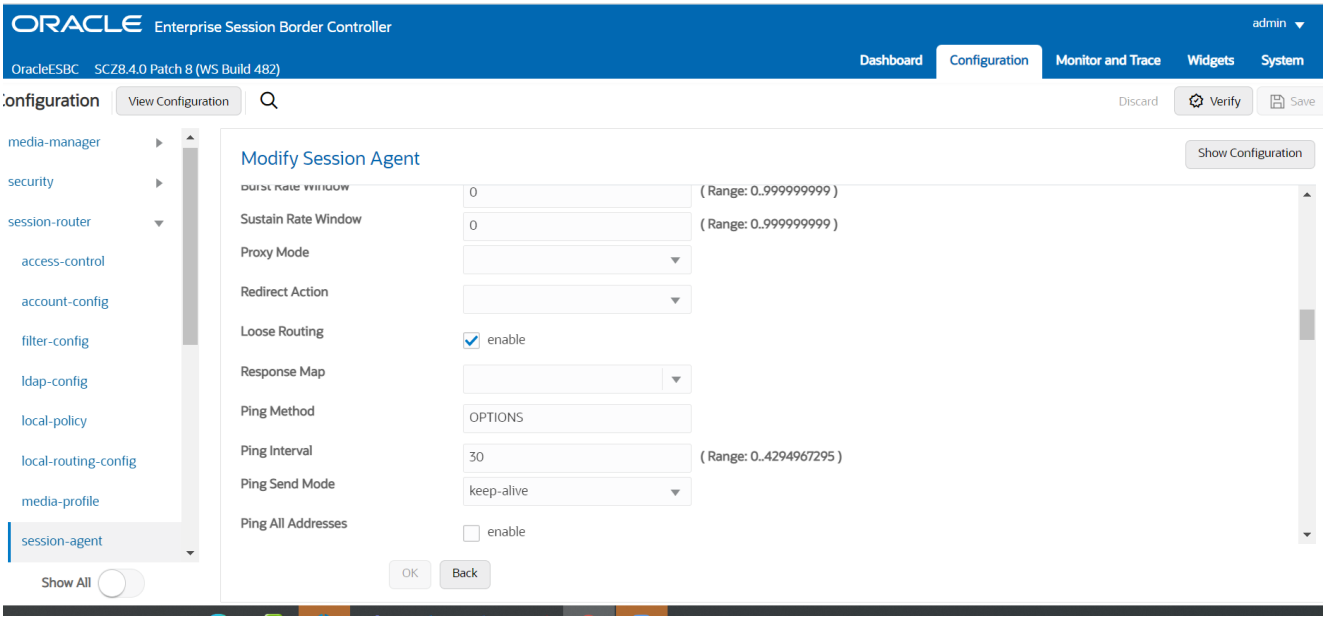
Configure the session-agent forAvayawith the following parameters.
Go to session-router->Session-Agent.

- hostname as hostname ofAvaya SIP Server
- IP address asAvayaAura IP address
- port (Avaya Aura port)
- realm-id – needs to match the realm created for Avaya
- transport set to “UDP”

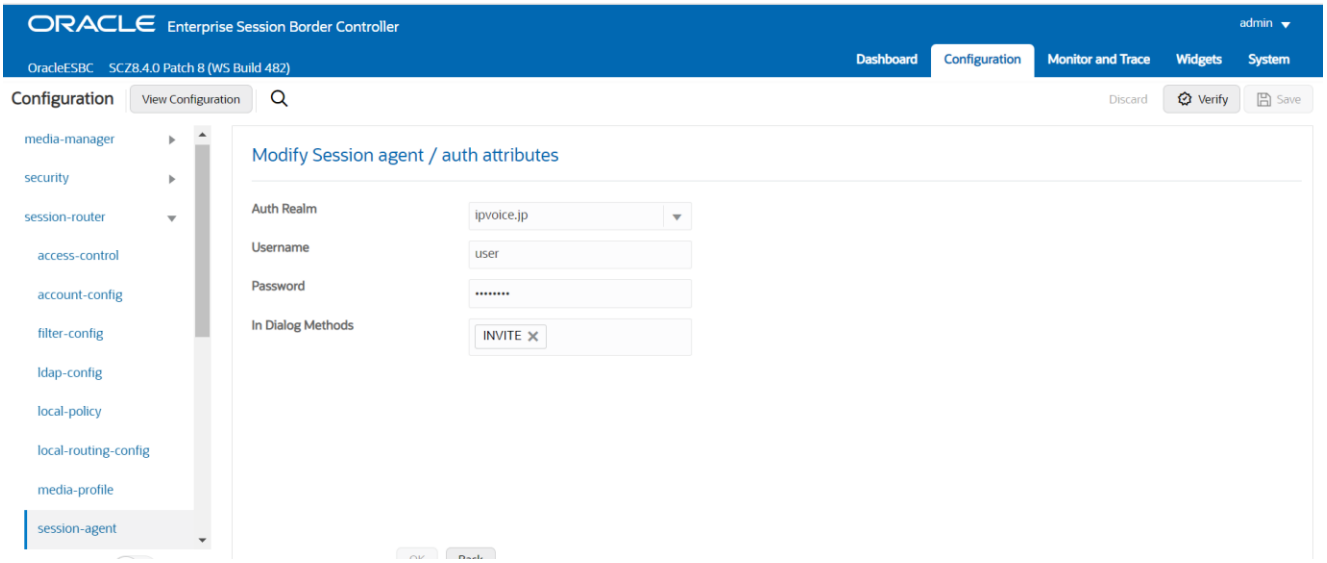
- In addition to the above configuration, Auth Attributes are configured to challenge the requests coming fromAvaya

- Username and Password are those provided by NTT trunk.



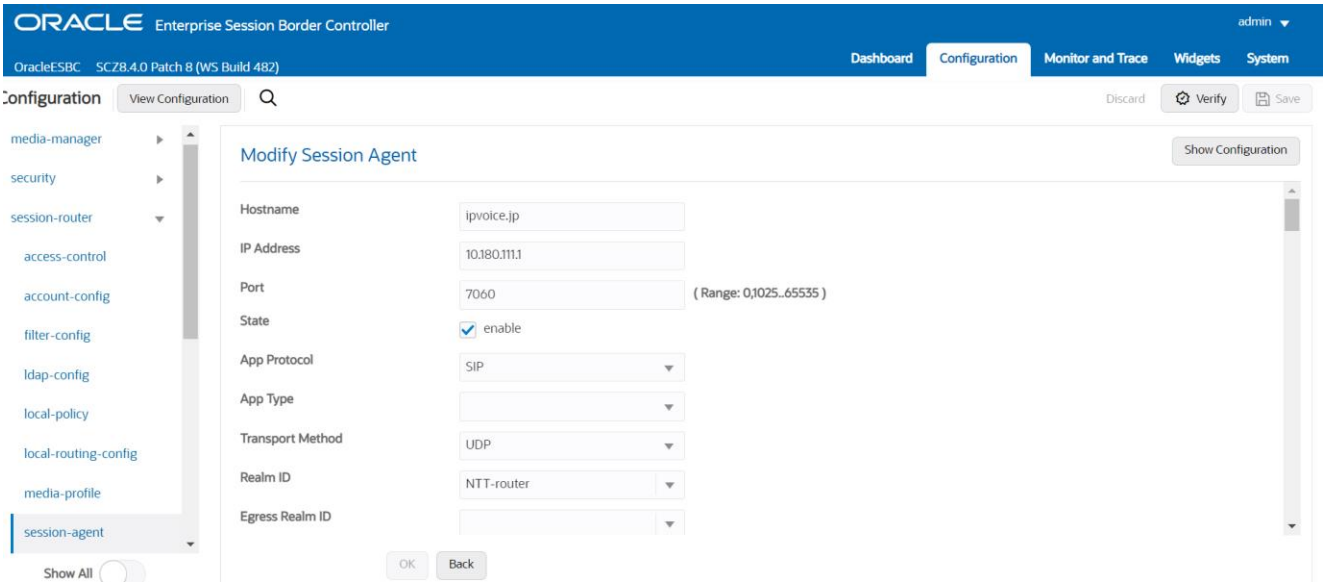


User name and password to be configured in the auth-attributes of session-agent are provided by NTT.



Similarly, Configure the session-agent for NTT TRUNK Go to session-router->Session-Agent.

- Host name set to ipvoice.jp
- IP address to ip-address of NTT Trunk.
- port 7060
- realm-id – needs to match the realm created for NTT TRUNK.
- transport set to “UDP”



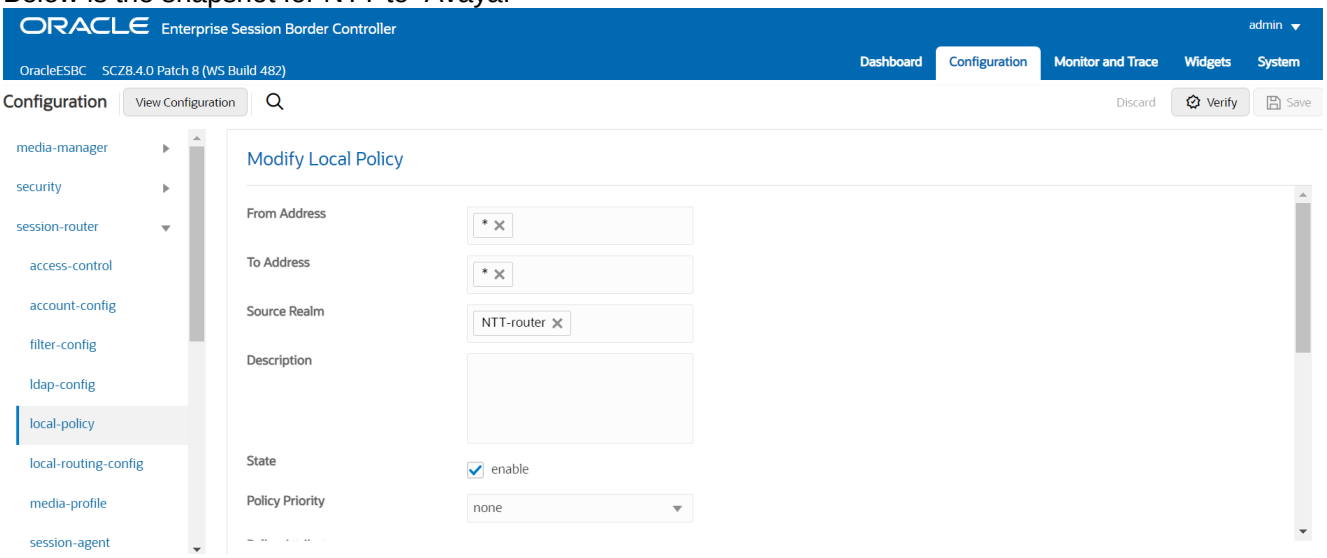
5.15. Configure local-policy

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

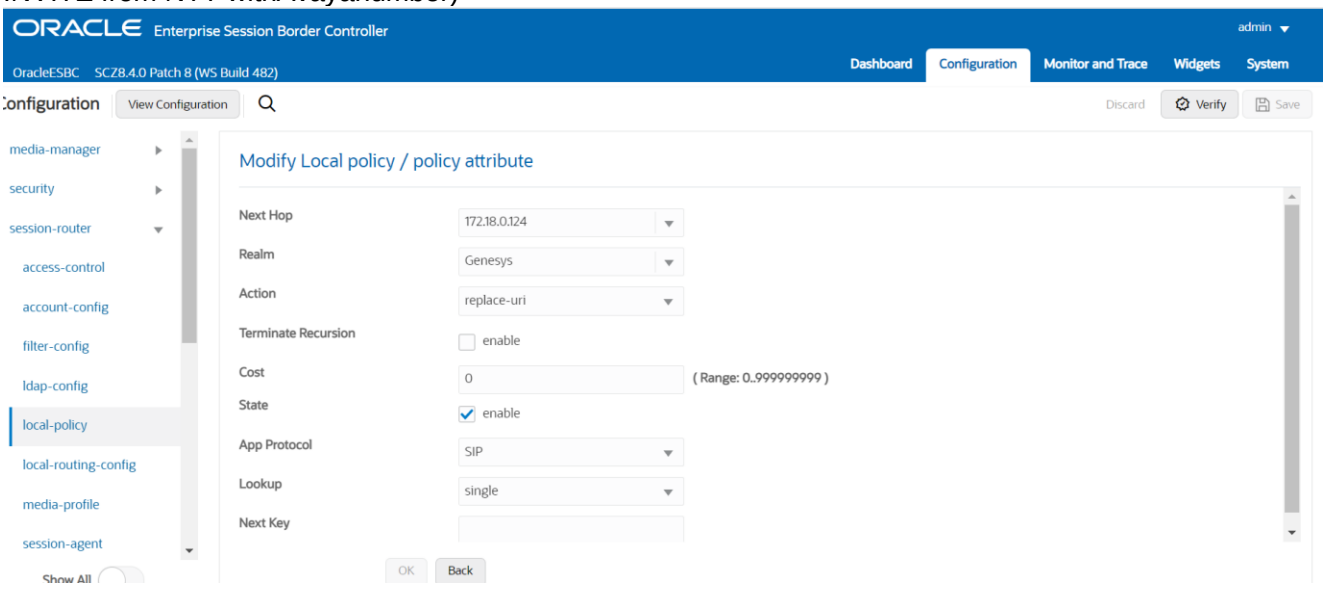
Configure two local-policies

- FromAvayato NTT
- From NTT to Avaya

Below is the snapshot for NTT to Avaya.



For this local-policy (only) set the action as replace-uri as shown .(to replace the contact-user received in INVITE from NTT withAvayanumber)



Similarly configure local-policy fromAvayato NTT with action set as none.

5.16. Configure Codec Policy

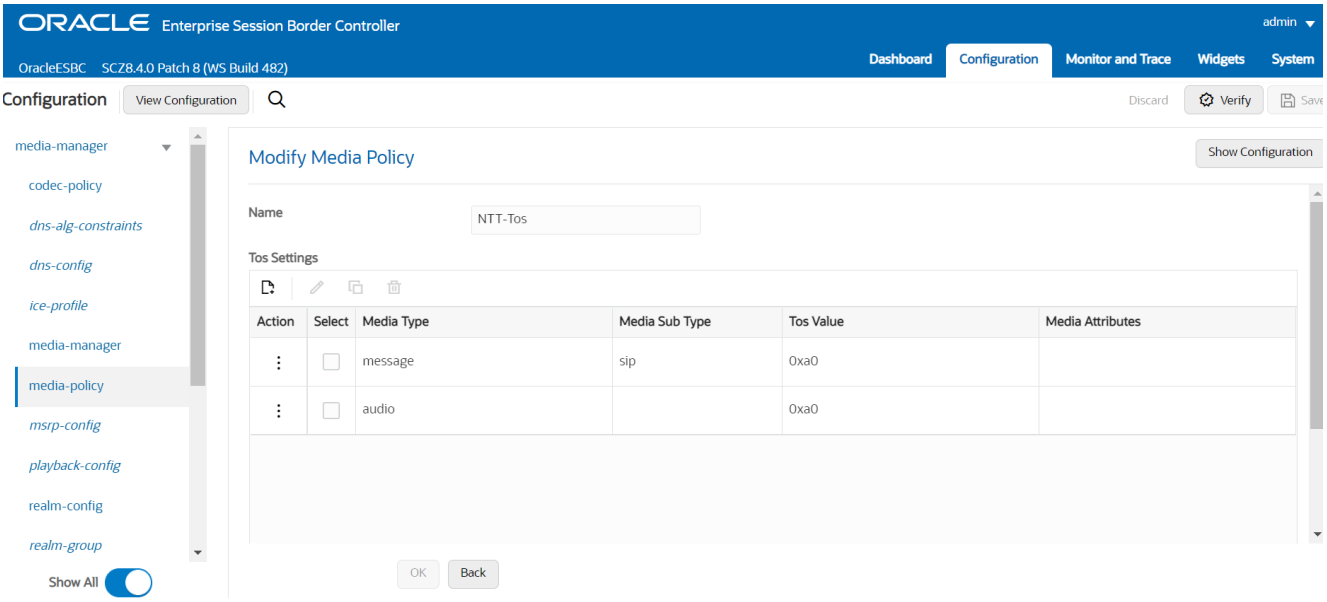
The Oracle Session Border Controller (SBC) uses codec policies to describe how to manipulate SDP messages as they cross the SBC. The SBC bases its decision to transcode a call on codec policy configuration and the SDP. Each codec policy specifies a set of rules to be used for determining what codecs are retained, removed, and how they are ordered within SDP.

Note: this is an optional config – configure codec policy only if deemed required.

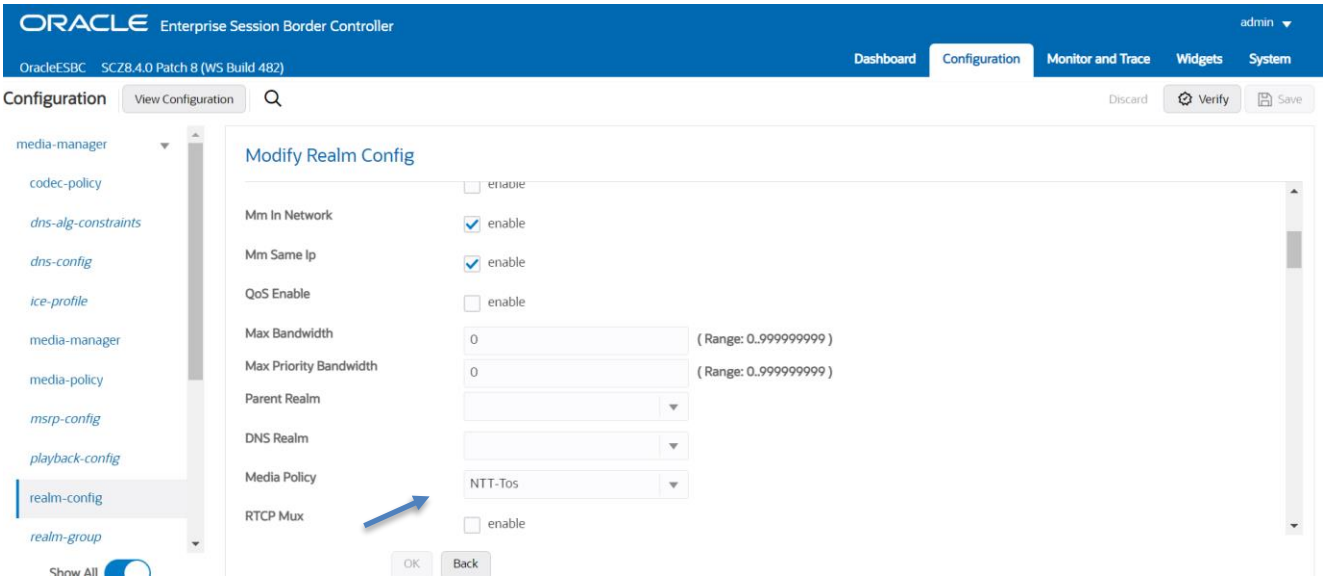
5.17. Configure Media Policy

NTT requires that the TOS value for SIP and RTP be set to 5. The following media-policy is configured and applied on the realmconfig towards NTT.

Go to Media-manager and configure media-policy as shown below.

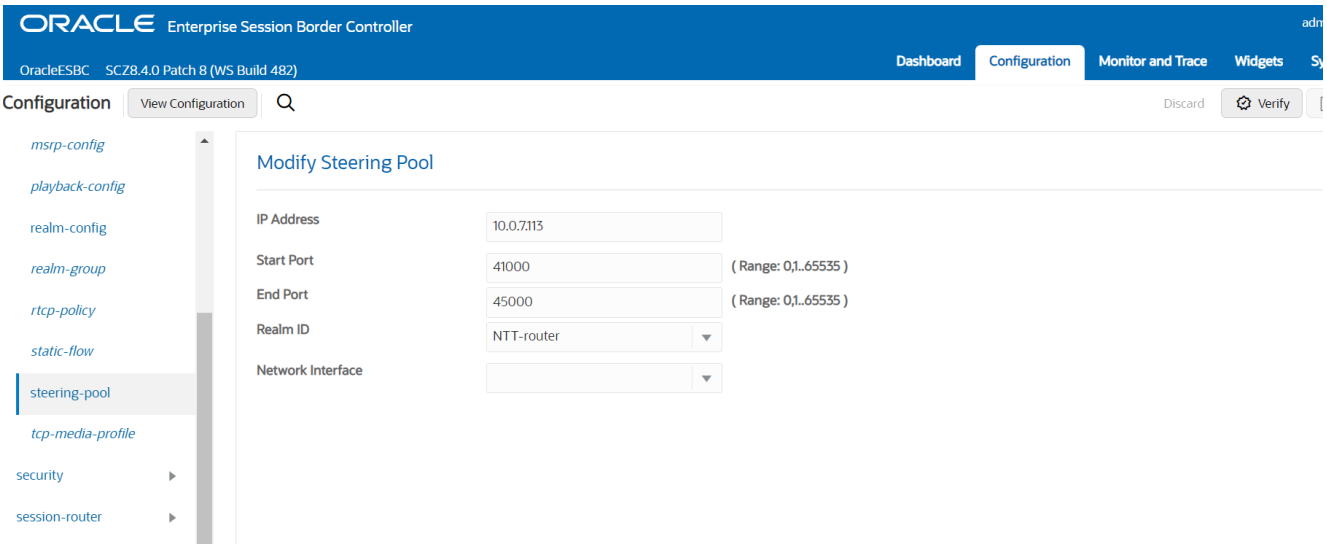


Apply this media-policy to the NTT realm as shown below.



5.18. Configure steering-pool

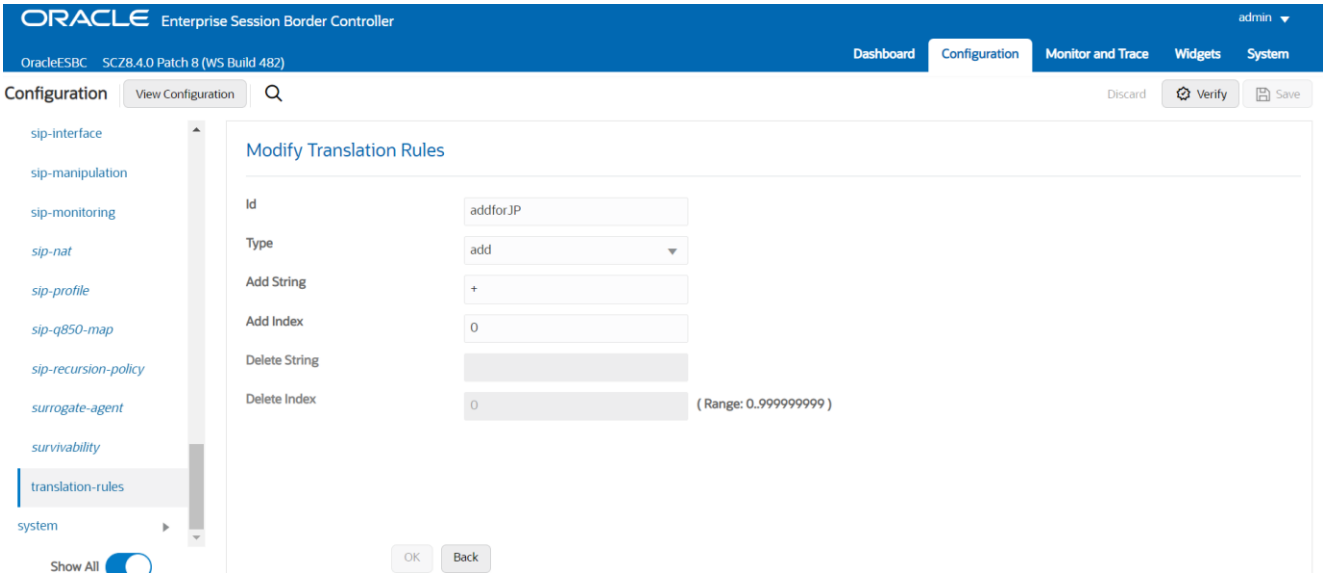
Steering-pool config allows configuration to assign port range for media handling on the SBC. Configure steering pool for both the realms.



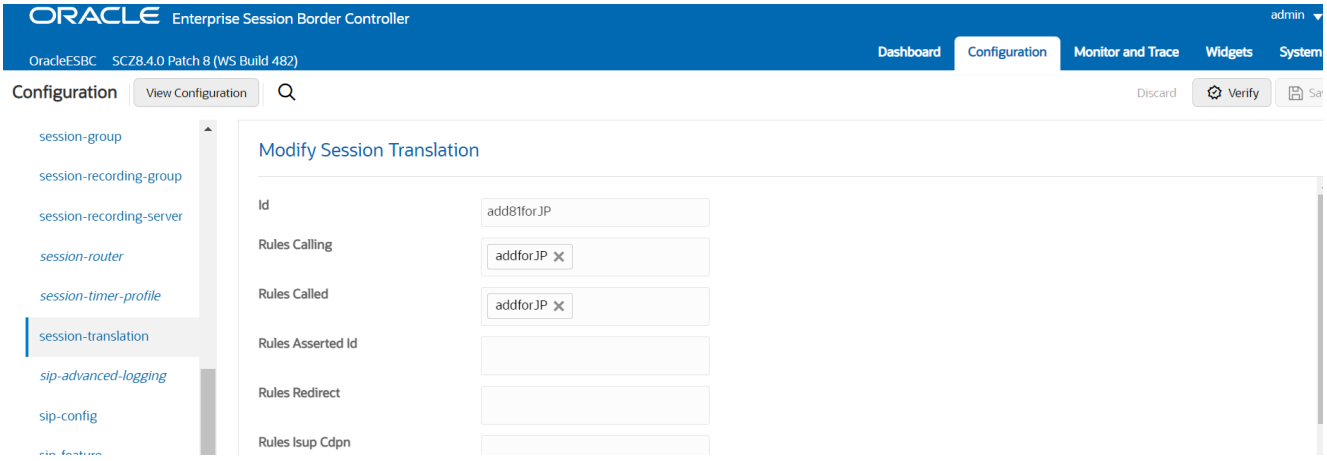
5.19. Number Translation

NTT requires the telephone numbers in the From and To headers to be in E164 format. SinceAvayadoes not send the numbers in E164 format, we configure a translation rule to add + to the uri-users of the From and To headers of the INVITEs going to NTT and apply it on the realm towards NTT.

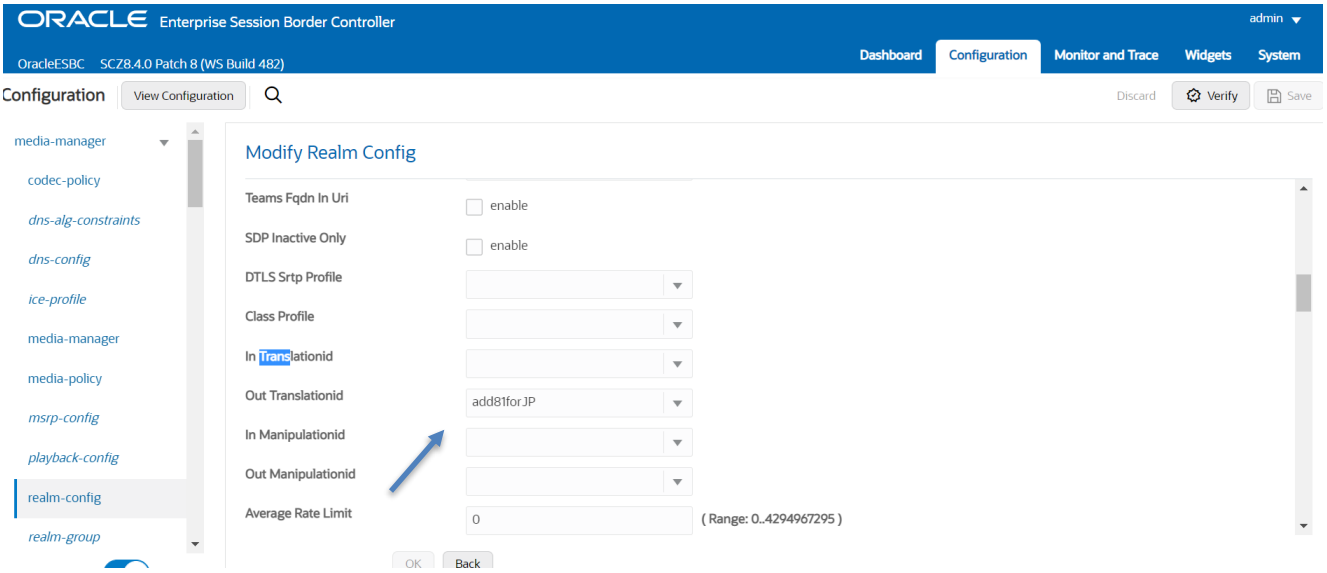
Go to session-router->translation-rules and add the following



Now add the above rule to session-translation.



Apply the above translation to the realm-config of NTT as shown.



Similarly add translation rules for removing the + towardsAvayaand apply it to the realm-config facing Avaya.

6. Existing SBC configuration

If the SBC being used withAvayais an existing SBC with functional configuration with a SIP trunk, following configuration elements are required:

- New realm-config
- New sip-interface
- New session-agent
- Sip Manipulation
- New steering-pools
- New Local-policy
- Codec-policy

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

7. Security Configuration

DoS and DdoS settings can protect against malicious and non-malicious SIP flooding attacks from untrusted sources without adversely affecting service to trusted peers. Attacks can be prevented through configuration of Access Control Lists, appropriately sized traffic queues, and trust level settings that will limit or blacklist endpoints that become abusive. Configuration of these parameters will differ based upon the configuration model used – peering, access or hybrid.

Note that a truly comprehensive and effective DdoS prevention design requires analysis of traffic patterns, SIP message contents and performance characteristics of all peer devices to provide message thresholds, CAC, and traffic policing settings. Please contact your Oracle Sales representative for information on professional services designed to implement customized DdoS settings.

Please refer to the following app notes for further assistance.

DDOS Prevention Configuration for SIP Access environments
DDOS Prevention Configuration for SIP Peering environments

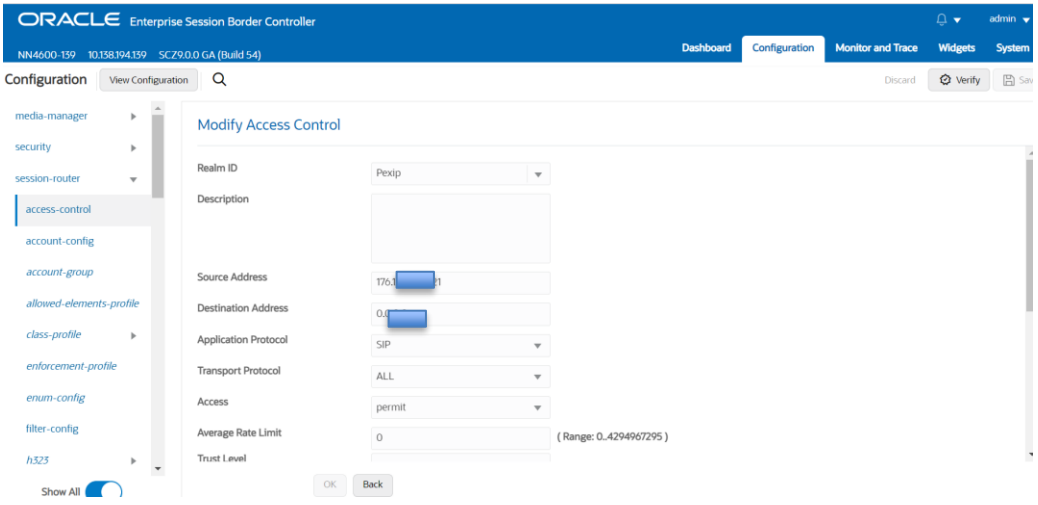
7.1. Access-control Lists

Using a list of IP addresses and subnets that are allowable as packet sources, you can configure what traffic the Oracle® Enterprise Session Border Controller accepts and what it denies. All IP packets arriving on the management interface are subject; if it does not match your configuration for system ACL, then the Oracle® Enterprise Session Border Controller drops it.

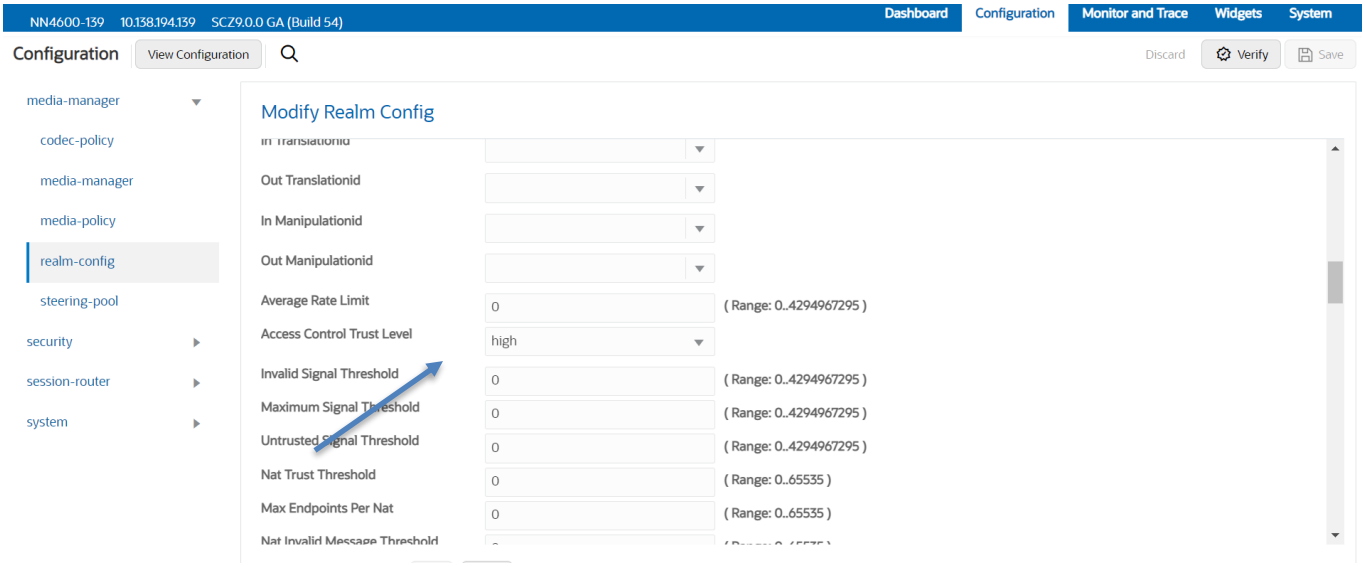
Configure the IP-addresses listed in the address list provided by NTT.Make sure the trust level is set to high here

Go to Session-Router-Access-control. Configure the realm-id (NTT)and source-address (address given by NTT here)

Configure the trust level as High.



Make sure the access control in the realm-configuration of NTT (NTT realm)is set to high as shown.



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