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Oracle Enterprise Session Border Controller – Acme Packet 4600 and Microsoft Skype for Business for Enterprise SIP Trunking with NTT Communications

Technical Application Note

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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 (E-SBC). It assumes that the reader is familiar with basic operations of the Oracle Enterprise Session Border Controller 4600 platform.

Document Overview

This Oracle technical application note outlines the recommended configurations for the Oracle enterprise session border controller AP-4600 for connecting NTT Communications SIP Trunking service to Microsoft Skype for Business customers. The solution contained within this document has been certified using Oracle's Acme Packet OS ECZ 7.5 software

Microsoft Skype for Business provides industry-leading reliability, security, scalability, efficiency, and enterprise call and session management and is the core call control application of the collaboration portfolio. This reduces the cost and complexity of extending an enterprise's telephony system outside its network borders. Oracle Enterprise Session Border Controllers (SBCs) play an important role in SIP trunking as they are used by many ITSPs and some enterprises as part of their SIP trunking infrastructure.

This application note has been prepared as a means of ensuring that SIP trunking between Microsoft Skype for Business, Oracle E-SBCs and IP Trunking services are configured in the optimal manner.

It should be noted that while this application note focuses on the optimal configurations for the Oracle ESBC in an enterprise Microsoft Skype for Business environment, the same SBC configuration model can also be used for other enterprise SIP trunking applications with a few tweaks to the configuration for required features. In addition, it should be noted that the SBC configuration provided in this guide focuses strictly on the Microsoft SFB associated parameters. Many SBC applications may have additional configuration requirements that are specific to individual customer requirements. These configuration items are not covered in this guide. Please contact your Oracle representative with any questions pertaining to this topic.

Introduction

Audience

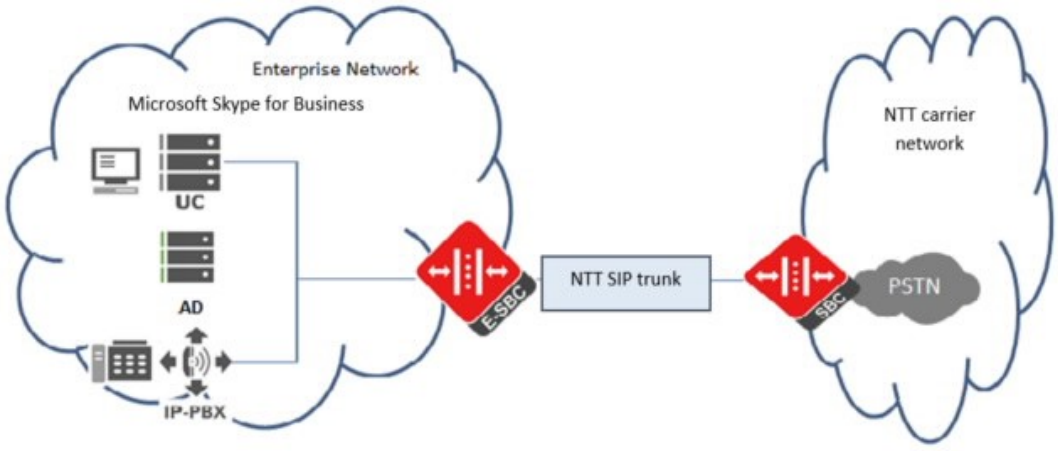
This is a technical document intended for telecommunications engineers with the purpose of configuring the Oracle Enterprise SBC and Microsoft Skype for Business Server. There will be steps that require navigating the Windows Server as well as the Acme Packet Command Line Interface (ACLI). Understanding the basic concepts of TCP/UDP, IP/Routing, and SIP/RTP are also necessary to complete the configuration and for troubleshooting, if necessary.

Requirements

- Fully functioning Skype for Business Server deployment, including Active Directory and DNS
- A dedicated Mediation Server for the SIP trunking connection
- Microsoft Skype for Business 2015 – Version 6.0.93190.0
- Skype for Business 2015 client, Version 15.0.4753.1000
- Oracle Enterprise Session Border Controller (hereafter Oracle E-SBC) 4600 series running ECZ750.

Architecture

The following reference architecture shows a logical view of the connectivity between the Skype for Business server and the SBC.



The Enterprise Network represents the customer's on-premise infrastructure, which includes the Active Directory, DNS and Skype for Business Server systems. The SIP Trunk Network represents the infrastructure of the SIP trunk provider, NTT, which provides PSTN service via the SIP trunk. The SBC provides integration of these two environments over an IP network and provides security, service reachability, interoperability/normalization of SIP messages over the IP network. The SFB Mediation Server and the SBC are the edge components that form the boundary of the SIP trunk.

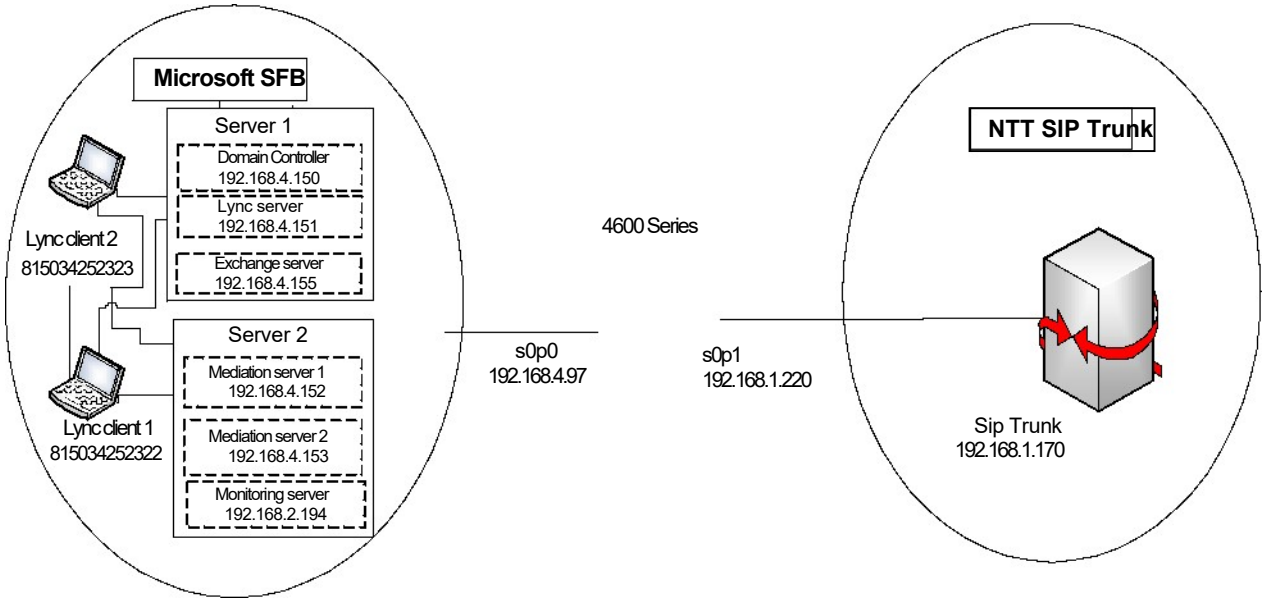
As per the NTT network requirements, the customer devices are required to register and support authentication. The Oracle ESBC supports authentication and performs registration on behalf of the Skype for Business server.

The configuration, validation and troubleshooting of these two is the focus of this document and will be described in two phases:

- Phase 1 – Configuring the Skype for Business server
- Phase 2 – Configuring the Oracle E-SBC

Lab Configuration

The following diagram, similar to the Reference Architecture described earlier in this document, illustrates the lab environment created to facilitate certification testing.



Phase 1 – Configuring the Skype for Business Server

The enterprise will have a fully functioning Skype for Business Server infrastructure with Enterprise Voice deployed and Mediation Servers dedicated to this installation. If there is no Mediation Server present for this purpose, one will have to be deployed.

There are two parts for configuring SFB Server to operate with the Oracle E-SBC:

- Adding the E-SBC as a PSTN gateway to the SFB Server infrastructure
- Creating a route within the SFB Server infrastructure to utilize the SIP trunk connected through the E-

SBC. To add the PSTN gateway, we will need:

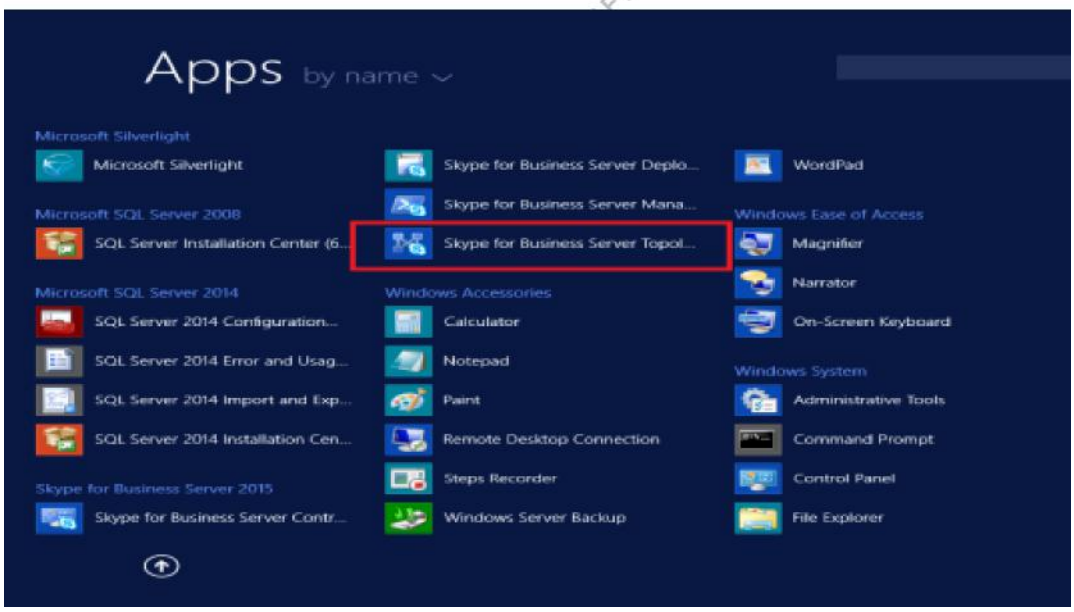
- IP addresses of the external facing NICs of the Mediation Servers
- IP address of the sip interface of the SBC facing the Mediation servers
- Rights to administer Lync Server Topology Builder
- Access to the Lync Server Topology Builder

Note: This section of the Application note only walks you through adding Oracle E-SBC to Microsoft's Skype for Business config, the assumption is that Microsoft's Skype for Business application is already installed and 100% functional.

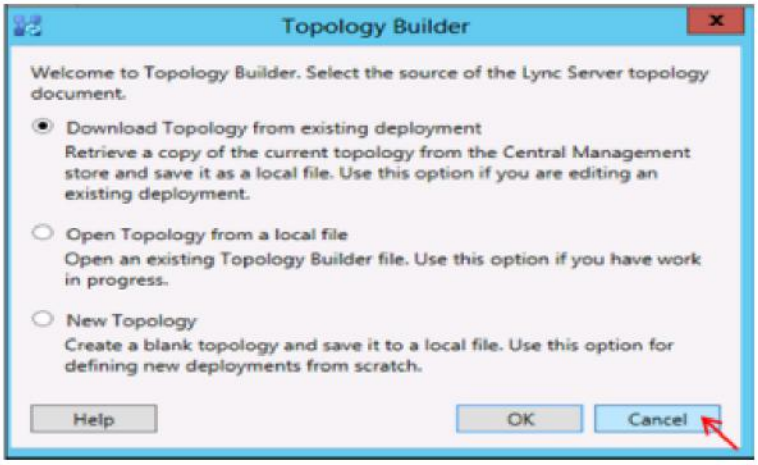
Adding the SBC as a PSTN gateway

The following process details the steps to add the E-SBC as the PSTN gateway

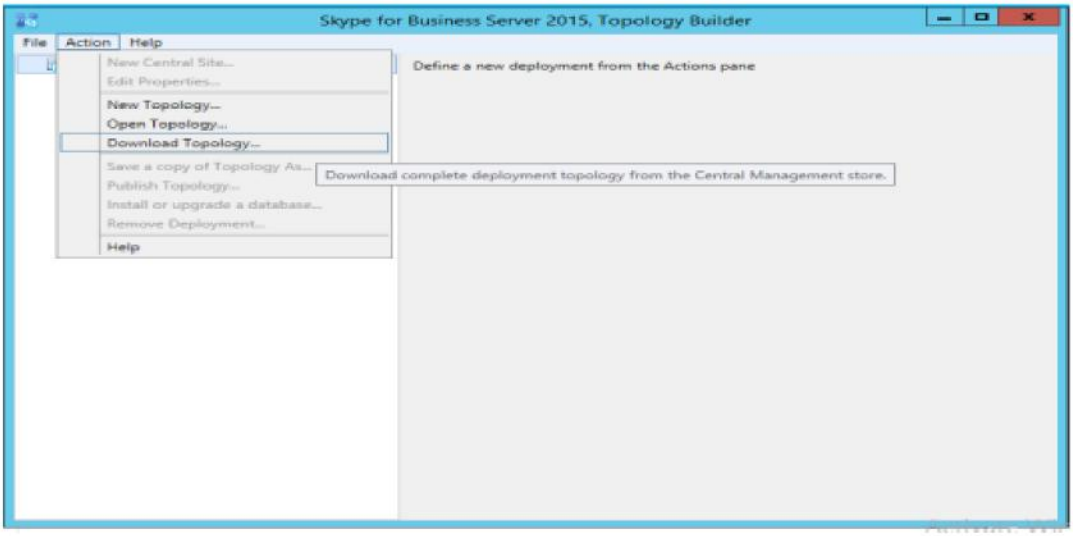
1. On the server where the Topology Builder is located, start the console.
2. From the **Start** bar, select **Skype for Business Server Topology Builder**.



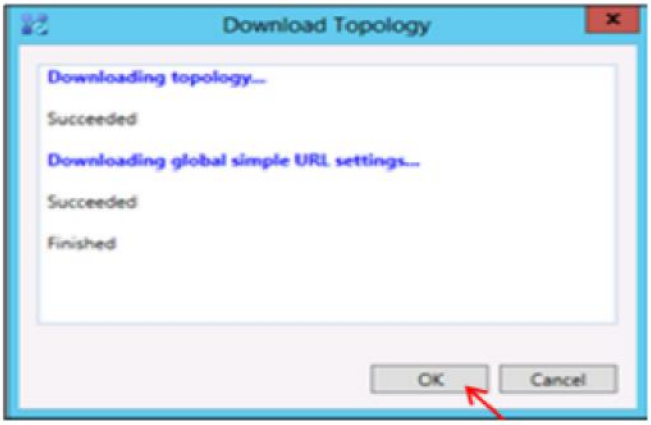
3. The opening screen of the Topology builder will be displayed. Click on the **Cancel** button.



4. The Topology Builder window will now be displayed. Click on **Action** and select **Download Topology**.

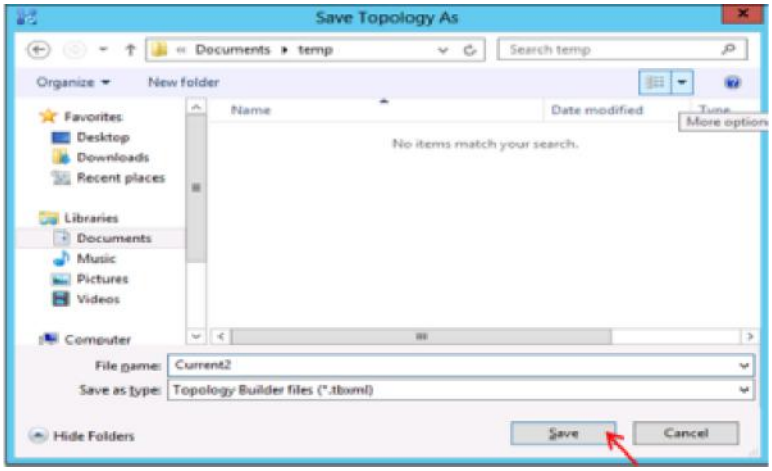


5. You will then see a screen showing that you have successfully imported the topology. Click the **Ok** button.

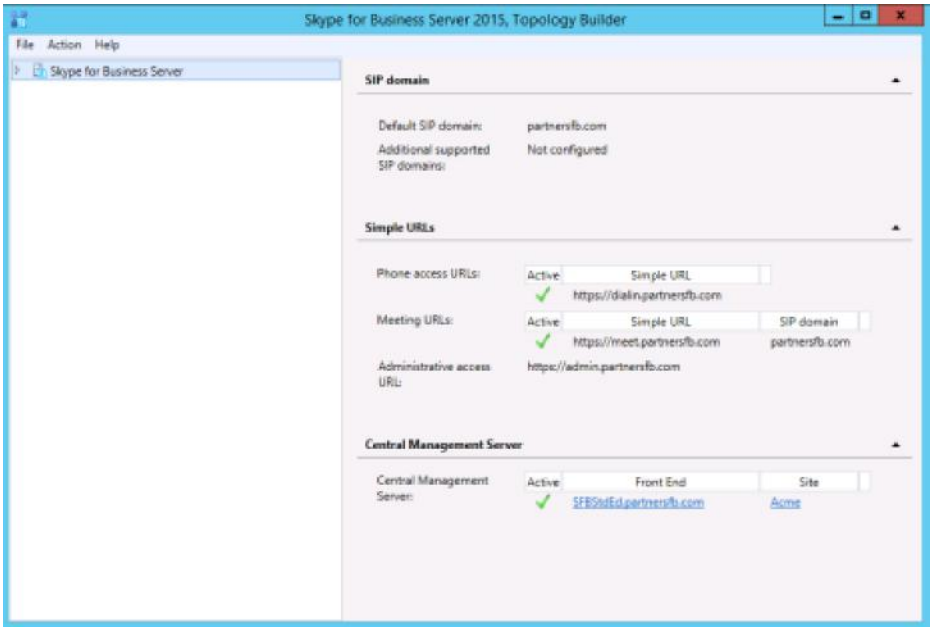


6. Next you will be prompted to save the topology which you have imported. You should revision the name or number of the topology according to the standards used within the enterprise. Click the **Save** button

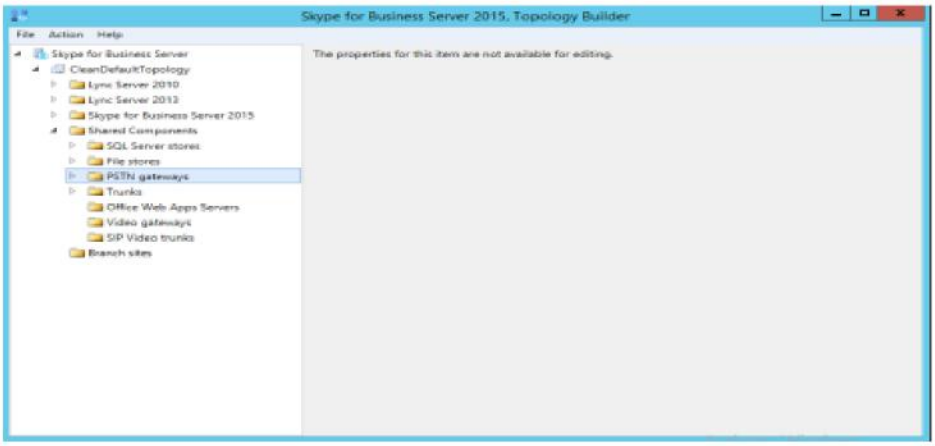
   Note: This keeps track of topology changes and, if desired, will allow you to fall back from any changes you make during this installation



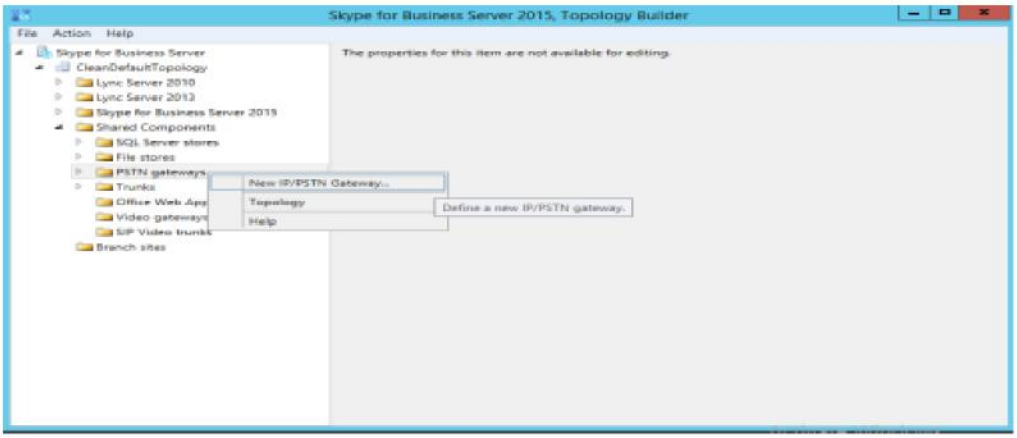
7. You will now see the topology builder screen with the enterprise's topology imported.



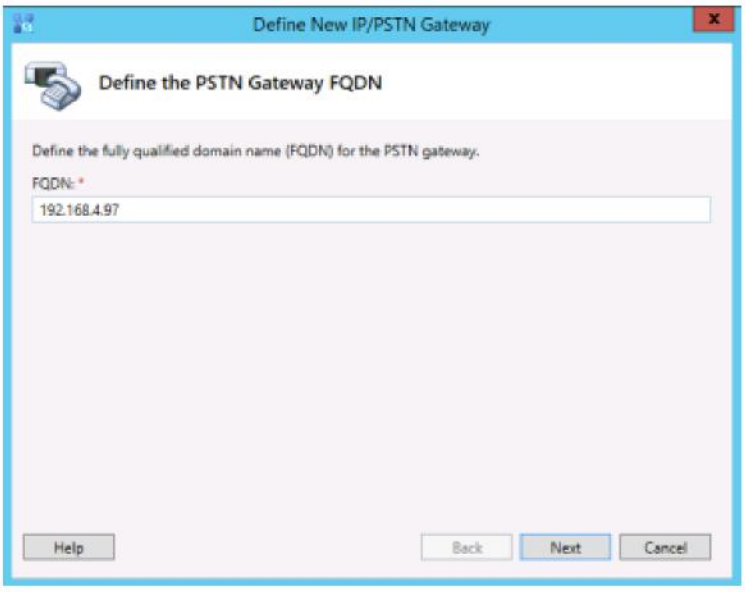
8. In the upper left hand corner, expand the site in which the PSTN gateway will be added. In our case, the site is **Bedford**. Then click on the **PSTN Gateways**



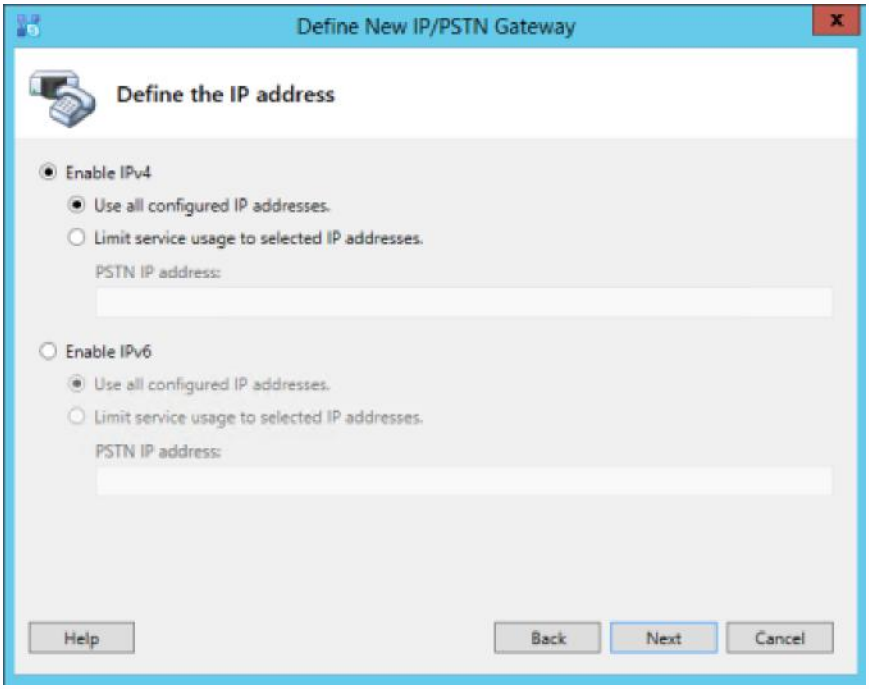
9. Right click on **PSTN gateways** and select **New IP/PSTN Gateway**.



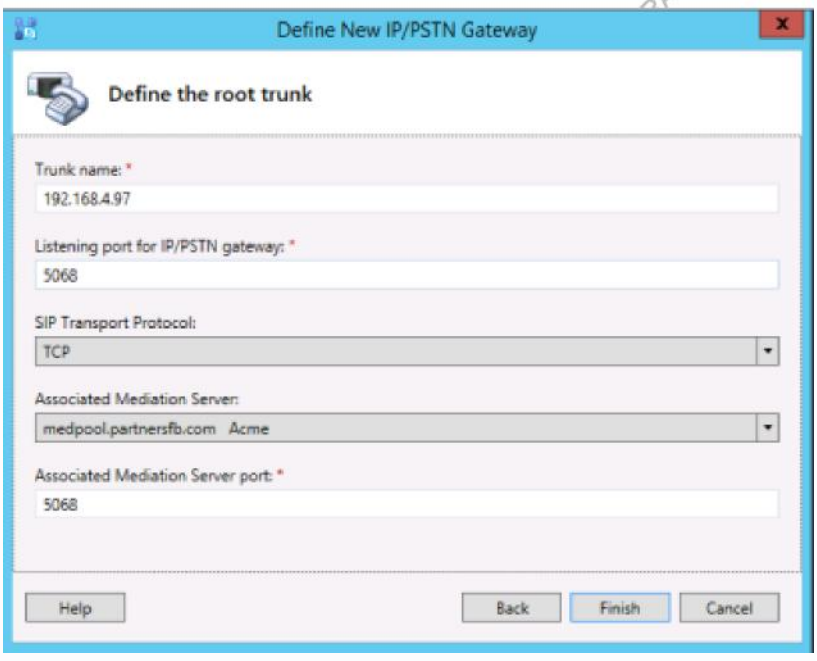
10. In the **Define New IP/PSTN Gateway** window, enter the ip address of the SIP interface of the SBC in the **FQDN** text box and click **Next**.



11. Select **Enable IPv4** in the **Define the IP address** section and click **Next**.



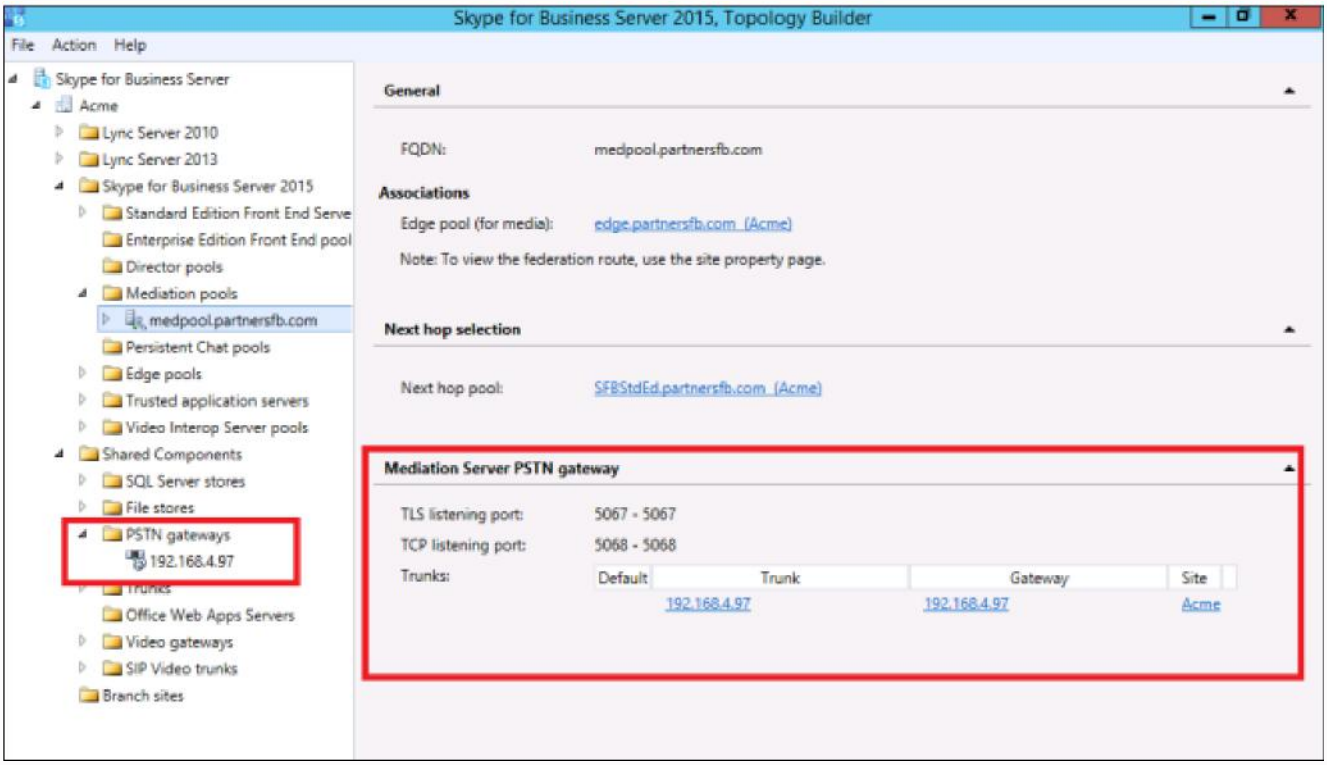
12. In the next section, enter the ip address of the SBC's sip interface under **Trunk name**. Configure the **Listening port for IP/PSTN gateway** as 5068, TCP as the **SIP Transport Protocol** and click **Finish**.



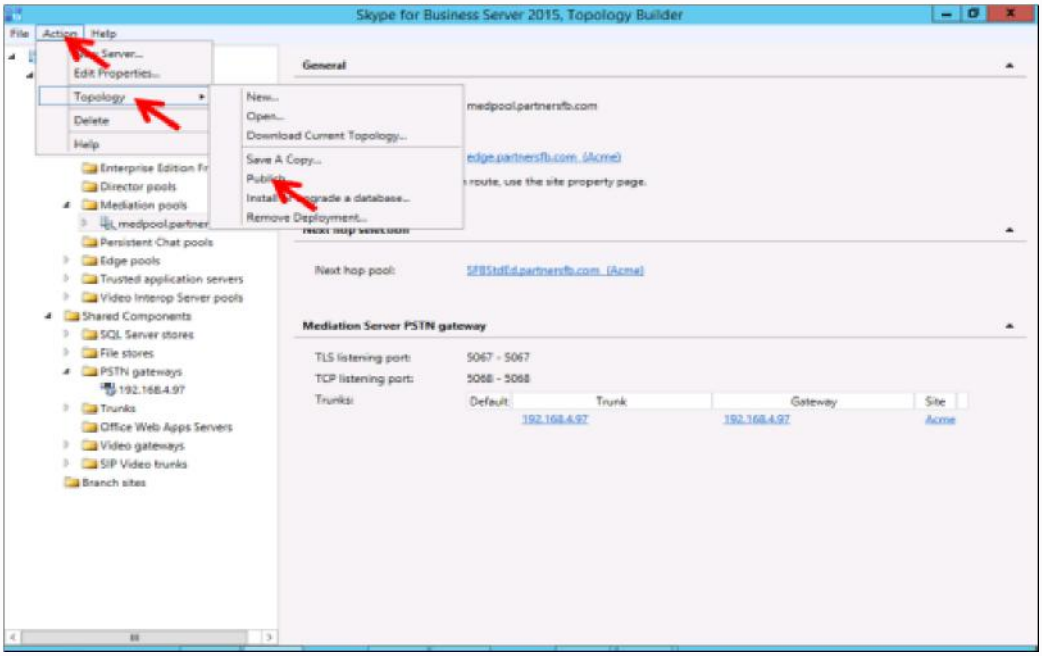
13. The PSTN gateway for the Lync server has been added. It will be listed under **PSTN gateways**.

Expand the **Mediation Pool** list and click on the Mediation Server to be utilized. In our example the Mediation Serveris **sfbmedpool.acmepacket.net**.

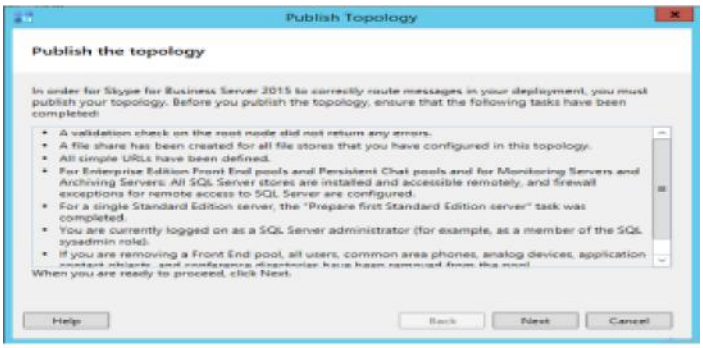
You will see that the PSTN gateway is associated with the Mediation server.



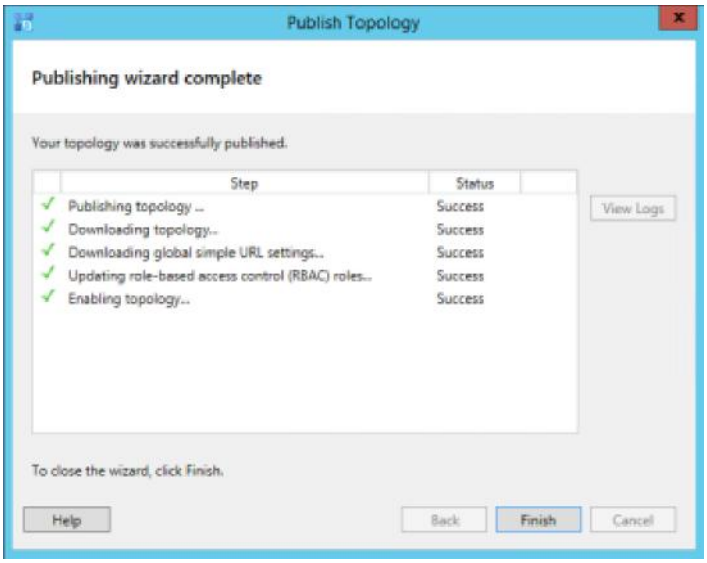
8. In the upper right hand corner of your screen under **Actions** select **Topology** then select **Publish**.



You will now see the **Publish Topology** window. Click on the **Next** button



You will now be at a window showing the databases associated with site. Click **Next**.



15.When complete you should see a window from Topology Builder stating that your topology was successfully published. Click the **Finish** button.

0 .

You will be at the Topology Builder main window, expand your site and double check that your PSTN entries are correct and that the appropriate Mediation Server has the PSTN gateway associated.

Creating a route within the Skype for Business Server infrastructure

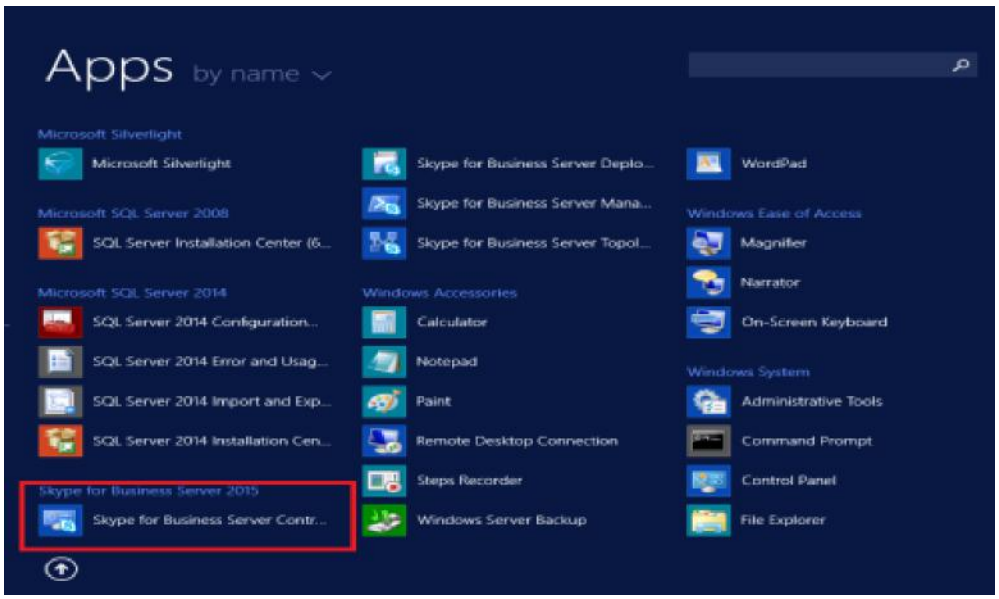
In order for the Skype for Business Server Enterprise Voice clients to utilize the SIP trunking infrastructure that has been put in place, a route will need to be created to allow direction to this egress. Routes specify how SFB Server handles calls placed by enterprise voice users. When a user places a call, the server, if necessary, normalizes the phone number to the E.164 format and then attempts to match that phone number to a SIP Uniform Resource Identifier (URI). If the server is unable to make a match, it applies outgoing call routing logic based on the number. That logic is defined in the form of a separate voice route for each set of target phone numbers listed in the location profile for a locale. For this document we are only describing how to set up a route. Other aspects which apply to Lync Server Enterprise Voice deployments such as dial plans, voice policies, and PSTN usages are not covered.

To add the route we will need:

- Rights to administer Skype for Business Server Control Panel
  - Membership in the CS Administrator Active Directory Group
- Access to the Skype for Business Server Control Panel

The following process details the steps to create the route:

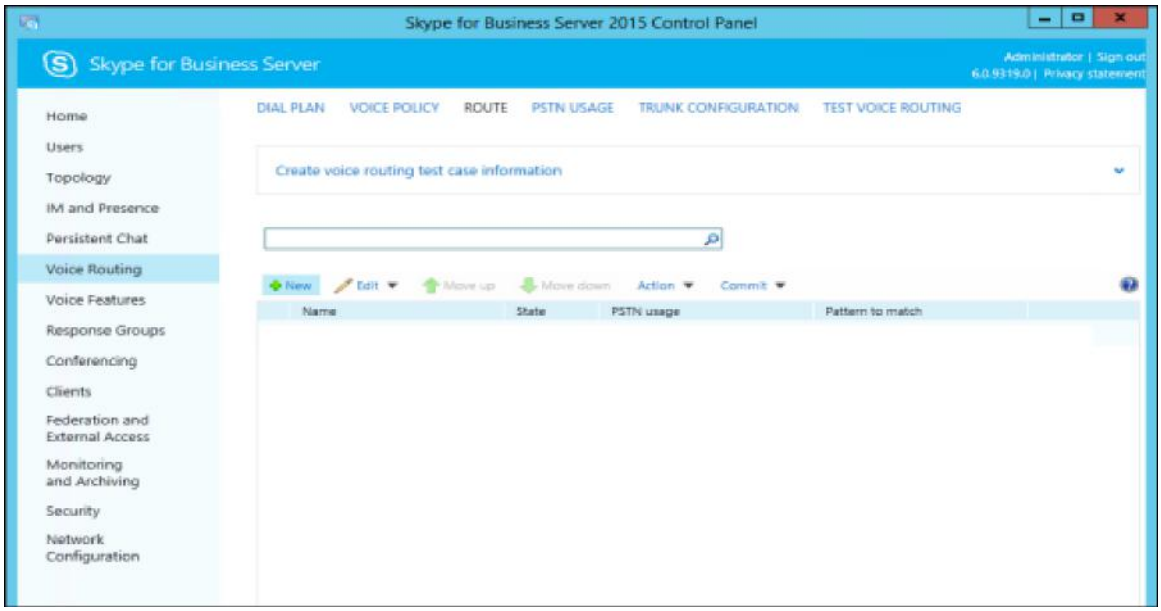
1. From the **Start** bar, select **Skype for Business Server Control Panel**.



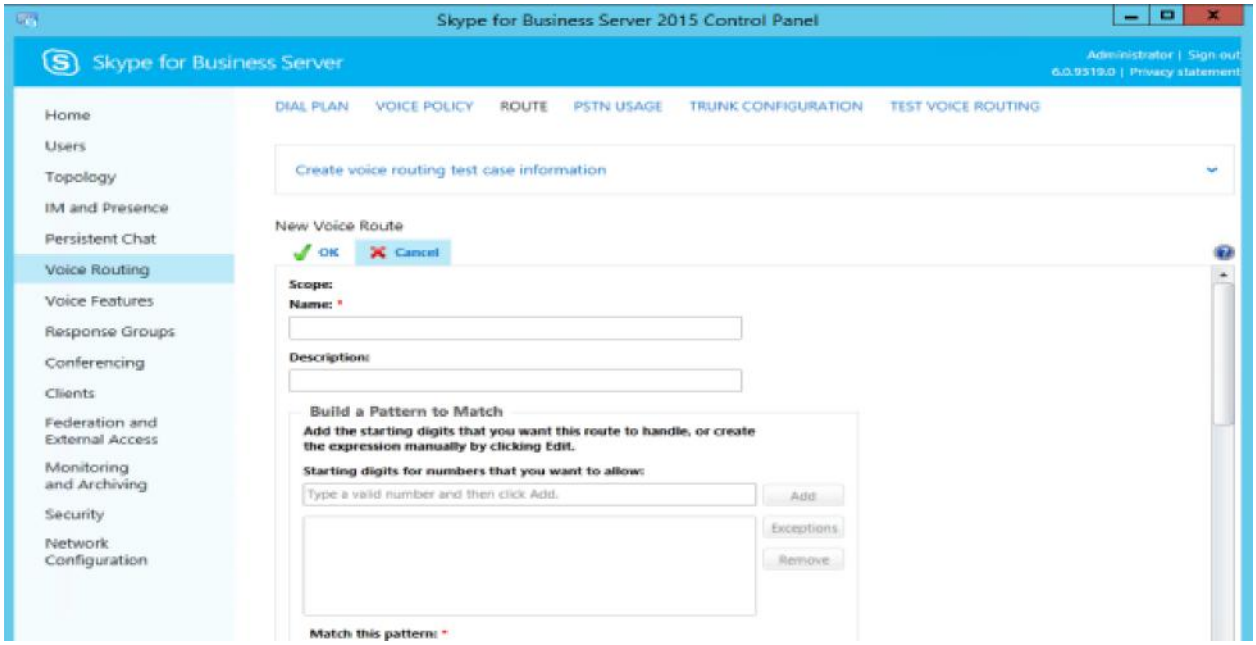
You will be prompted for credential, enter your domain username and password.

2. Once logged in, you will now be at the “Welcome Screen”. On the left hand side of the window, click on **Voice Routing**.

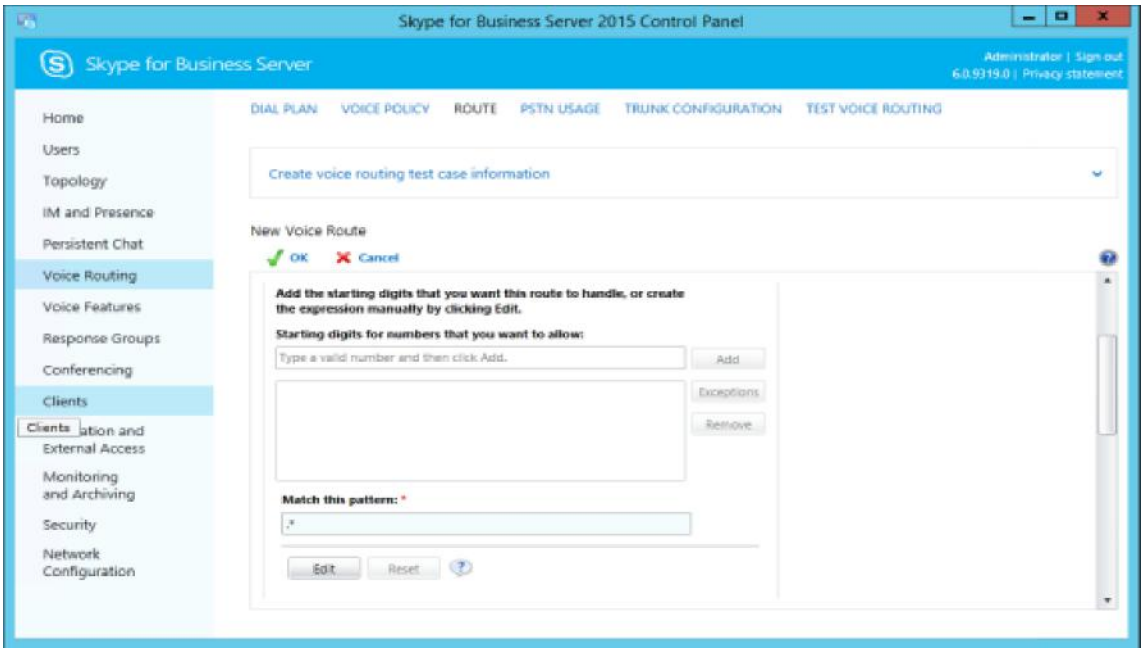
3. On the top row of the tabs, select **Route**. On the content area toolbar, click **+New**.



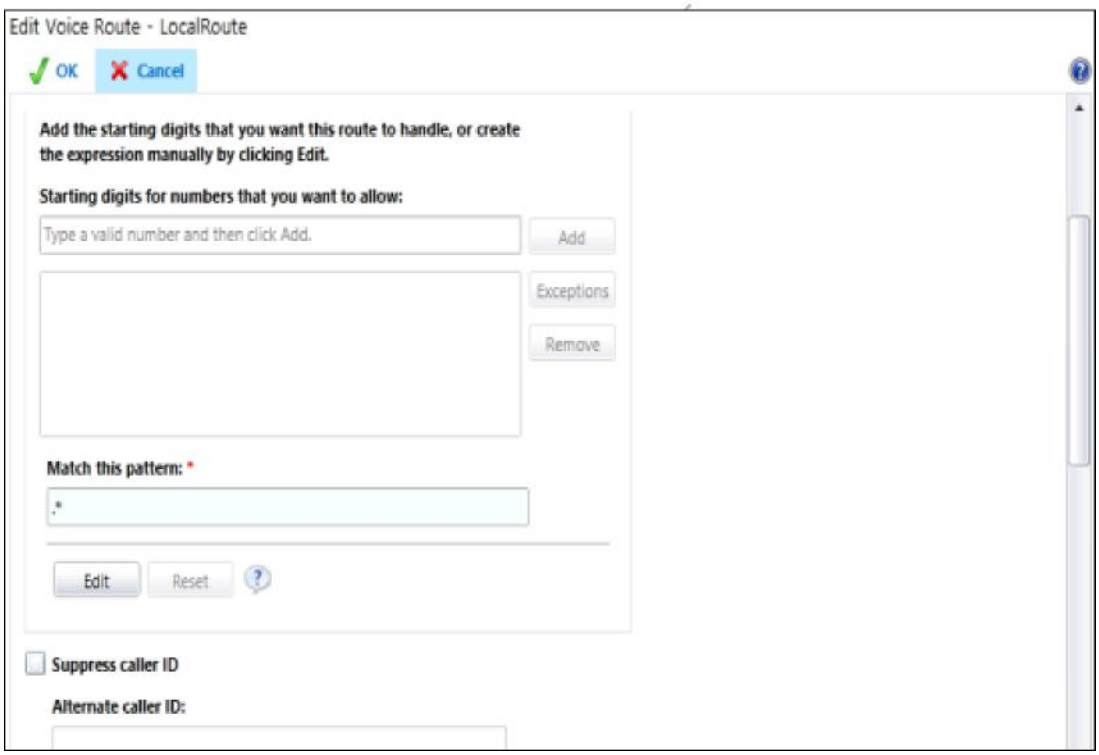
4. On the **New Voice Route** page, in the **Name** field, enter the name you have selected for the Route. In our example, it is NTT route.



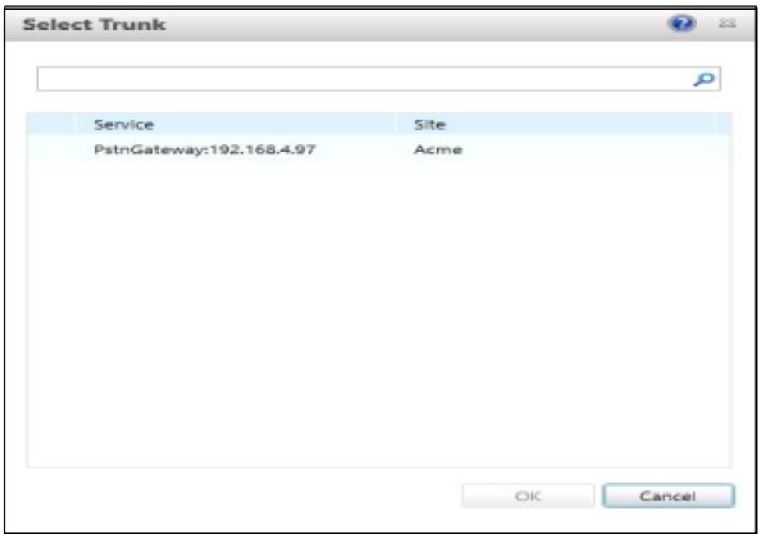
5. Next you build a Pattern Match for the phone numbers you want this route to handle. Click **Edit**.



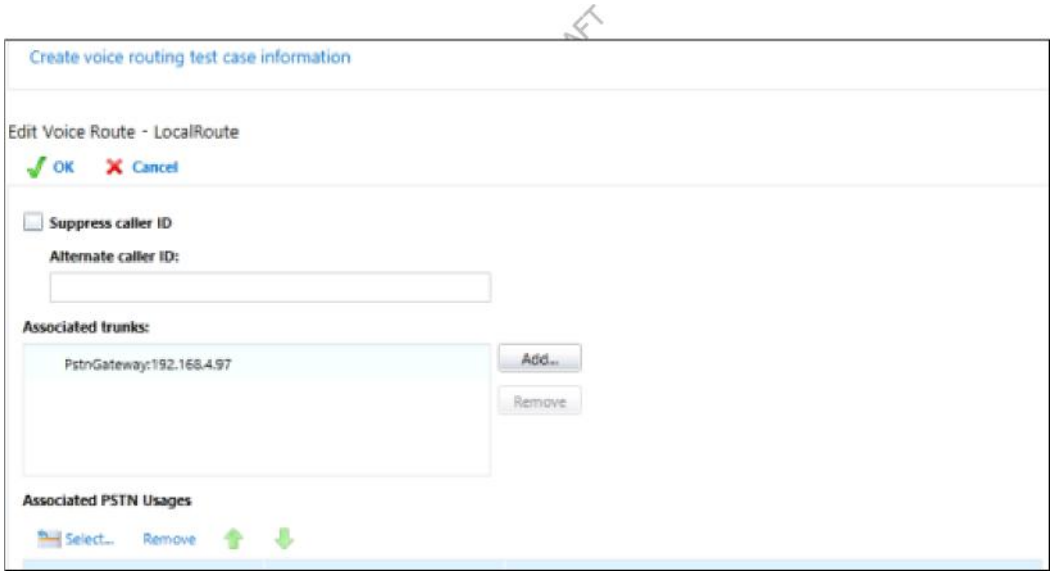
6. Next you want to associate the Voice Route with the **Trunk** you have just created. Scroll down to **Associated Trunks**, click on the **Add** button.



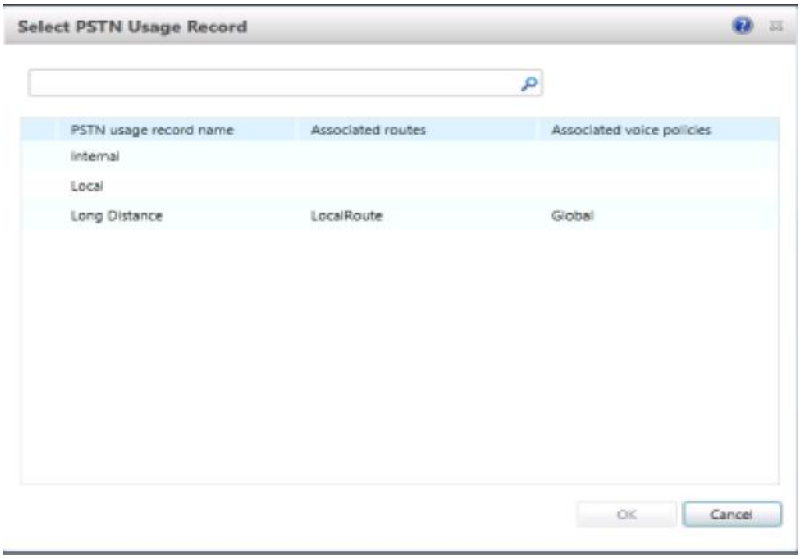
7. You will now be at a window showing available Trunks to associate your Voice Route. Click on the PSTN gateway that you just created and then click the **OK** button.



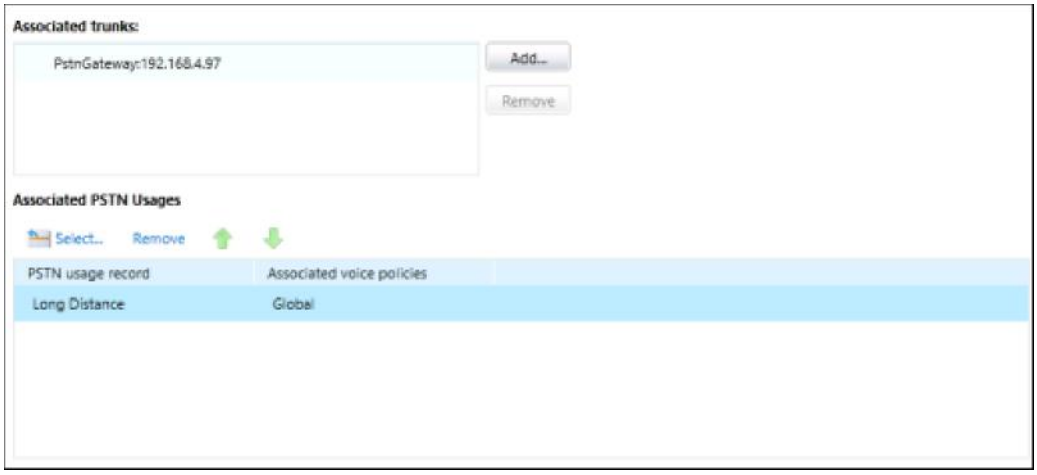
8. You can now see that you have associated your trunk with the route you created. An appropriate PSTN usage record will need to be assigned as well. In our example, we use one that was already created in the enterprise. Click on the **Select** button under **Associated PSTN Usages**.



9. In the **Select PSTN Usage Record** window displayed, select the appropriate PSTN Usage Record and click **OK**.



10. You will now see the Associated PSTN Usages which you have added. Click the **OK** button at the top of the **New Voice Route** screen.



15. You will now be at the Routes page showing the US route. Click the **Commit** drop-down menu, and then **Commit All**. If there are no errors, the new Voice Route has now been successfully created and the state will show as **Committed.**

Additional Steps

There are other aspects to a Skype for Business Server Enterprise Voice deployment such as

- Site, local, and global dial plans
- Voice Policies
- Assigning Voice Policies to users
- PSTN usage policies

Refer to MSDN technet for relevant information.

Phase 2 – Configuring the Oracle Enterprise SBC

In this section we describe the steps for configuring an Oracle Enterprise SBC, formally known as an Acme Packet Net-Net Session Director ("SBC"), for use with Microsoft Skype for Business in an NTT Communications SIP Trunk service.

In Scope

The following guide configuring the Oracle E-SBC assumes that this is a newly deployed device dedicated to a single customer. If a service provider currently has the SBC deployed and is adding Skype for Business customers, then please see the ACLI Configuration Guide on https://docs.oracle.com/cd/E85013_01/index.html for a better understanding of the Command Line Interface (CLI).

Note that Oracle offers several models of E-SBC. This document covers the setup for the 4600 platform series running Net-Net OS ECZ7.5.0 or later. If instructions are needed for other Oracle E-SBC models, please contact your Oracle representative.

Out of Scope

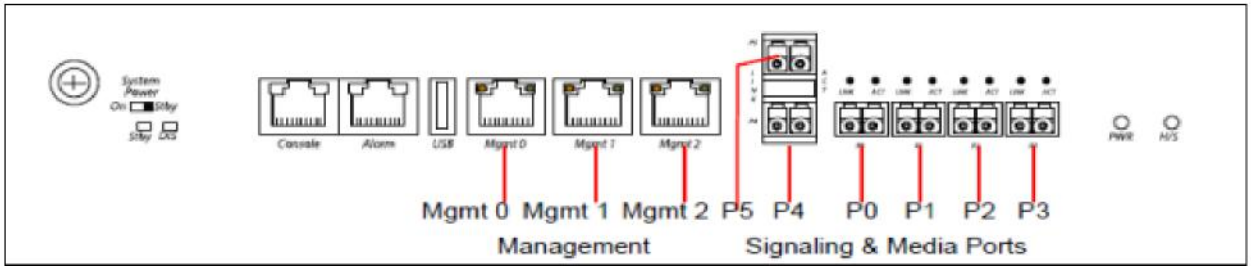
- Configuration of Network management including SNMP and RADIUS; and

What will you need

- Serial Console cross over cable with RJ-45 connector
- Terminal emulation application such as PuTTY or HyperTerm
- Passwords for the User and Superuser modes on the Oracle SBC
- IP address to be assigned to management interface (Wancom0) of the SBC - the Wancom0 management interface must be connected and configured to a management network separate from the service interfaces. Otherwise the E-SBC is subject to ARP overlap issues, loss of system access when the network is down, and compromising DDoS protection. Oracle does not support E-SBC configurations with management and media/service interfaces on the same subnet.
- IP address of Skype for Business Server external facing NIC
- IP addresses to be used for the SBC internal and external facing ports (Service Interfaces)
- IP address of the next hop gateway in the service provider network
- IP address of the enterprise DNS server

E-SBC- Getting Started

Once the Oracle E-SBC is racked and the power cable connected, you are ready to set up physical network connectivity. **Note: use the console port on the front of the E-SBC, not the one on the back.**



Plug the slot 0 port 0 (s0p0) interface into your inside (SFB server facing) network and the slot 0 port 1 (s0p1) interface into your outside (gateway facing) network. Once connected, perform you are ready to power on and perform the following steps.

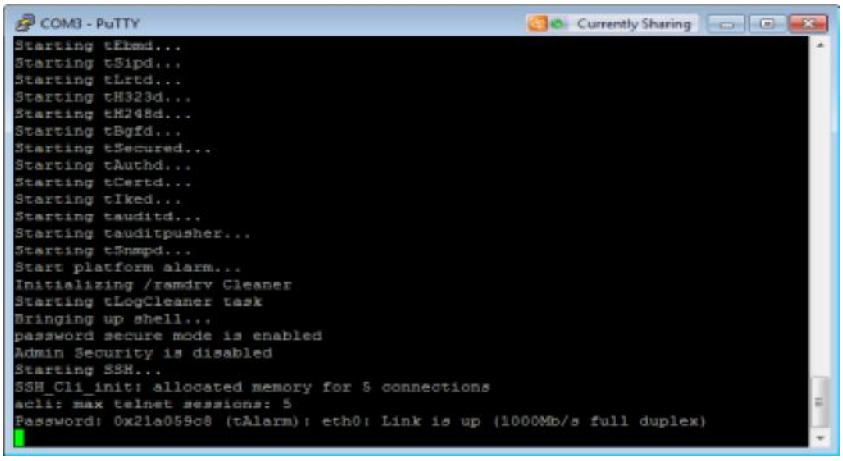
All commands are in bold, such as **`configure terminal`**; parameters in bold red such as oraclesbc1 are parameters which are specific to an individual deployment. **Note:** The ACLI is case sensitive.

Establish the serial connection and logging in the E-SBC

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

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

Power on the E-SBC and confirm that you see the following output from the bootup sequence.



Enter the following commands to login to the E-SBC and move to the configuration mode. Note that the default E-SBC password is "**acme**" and the default super user password is "**packet**".

```
Password: acme
oraclesbc1> enable
Password: packet
oraclesbc1# configure terminal
oraclesbc1(configure)#
```

You are now in the global configuration mode.

Initial Configuration – Assigning the management Interface an IP address

To assign an IP address, one has to configure the bootparams on the E-SBC by going to

oraclesbc1#configure terminal --- >bootparams

- Once you type "bootparam" you have to use "carriage return" key to navigate down
- A reboot is required if changes are made to the existing bootparams

```
ACMESYSTEM(configure)# bootparam

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

Boot File             : /boot/nnECZ750.bz
IP Address            : 192.65.79.44
VLAN                  :
Netmask               : 255.255.255.224
Gateway               : 192.65.79.33
IPv6 Address          :
IPv6 Gateway          :
Host IP               : 0.0.0.0
FTP username          : vxftp
FTP password          : vxftp123
Flags                 :
Target Name           : ACMESYSTEM
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.
```

Configuring the E-SBC

The following section walks you through configuring the Oracle Communications Enterprise SBC configuration required to work with Microsoft Skype for Business and NTT's SIP Trunk service. In the configuration, the transport protocol used between the E-SBC and SFB server is TCP and the SIP trunk is configured for UDP in this certification testing.

It is outside the scope of this document to include all the interoperability working information as it will differ in every deployment.

Surrogate registration

NTT requires the customer PBX to register in order to originate calls support authentication. Since the SFB Server cannot perform the registration, Oracle E-SBC performs surrogate registrations on behalf of the PBX.

The configuration for surrogate registration is as follows

```
surrogate-agent
        register-host                           ipvoice.jp
        register-user
                                                +81XXXXXXXXX
        X description
        realm-id                                SFB
        state                                   enabled
        customer-host
        customer-next-hop                       ipvoice.jp
        register-contact-host                   192.168.1.220
        register-contact-user                   +81XXXXXXXXXX
        password                                ******
        register-expires                        3600
        replace-contact                         disabled
        options
        route-to-registrar                      enabled
        aor-count                               1
        auth-user                               user
        max-register-attempts                   3
        register-retry-time                     1800
        count-start                             1
        register-mode                           automatic
        triggered-inactivity-interval           30
```

The E-SBC provides authentication support required for the outgoing calls from Skype for Business Server. The auth-attribute configuration below is applied on the session-agent facing SFB server.

```
session-agent
        hostname                                medpool.partnersfb.com
        transport-method                        StaticTCP
        realm-id                                SFB
        ping-method                             OPTIONS
        ping-interval                           60
        auth-attributes
                auth-realm                              ipvoice.jp
                username                                user
                password                                ********
                in-dialog-methods                       INVITE
```

SPLs required for NTT

As a part of the integration of the E-SBC with NTT trunk, two SPLs, ocSurrogateRegister-1-6.pkg and ocNttMsgConverter-0-3.pkg were developed to include 5 features required to comply with the signaling requirements.

1. As a part of the surrogate registration, E-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 E-SBC 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 messagesbe 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.
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.

The SPL - **ocSurrogateRegister-1-6.pkg** was developed to implement the features 1 and 2. This SPL is enabled by configuring the spl-option **dyn-contact-start** on the sip-interface facing SFB realm and **dyn-contact-method=randomseed** on the sip-interface facing the NTT trunk.

The SPL - **ocNttMsgConverter-0-3.pkg** was developed to implement the features 3, 4 and 5. This is enabled by configuring the spl-option **ocNttMsgConverterTagging=opposite** on the sip-interface facing SFB realm and **ocNttMsgConverterTagging=enabled** on the sip-interface facing the NTT trunk.

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 realm-config towards NTT.

```
media-policy
        name                                    NTT-Tos
        tos-settings
                media-type                              message
                media-sub-type                          sip
                tos-value                               0x05
        tos-settings
                media-type                              audio
                tos-value                               0x05
```

Number translations

NTT requires the telephone numbers in the From and To headers to be in E164 format. For the purpose of this testing, we configured a non-E164 based dial plan on Skype for Business environment. To 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.

```
translation-rules
        id                                      addforJP
        type                                    add
        add-string                              +

session-translation
        id                                      addJP
        rules-calling                           addforJP
        rules-called                            addforJP

realm-config
        identifier                              NTT-router
        network-interfaces                      s0p1:0
        media-policy                            NTT-Tos
        out-translationid                       addJP
```

A translation rule removeplus is configured to remove the plus from the telephone numbers in the From and To headers in the SIP messages being sent to SFB server and is applied on the realm towards SFB.

```
translation-rules
        id                                      removeplus
        type                                    delete
        delete-string                           +

session-translation
        id                                      DelJP
        rules-calling                           removeplus
        rules-called                            removeplus

realm-config
        identifier                              SFB
        network-interfaces                      s0p0:0
        out-translationid                       DelJP
```

SIP PRACK Interworking

In order to establish an early media session for outbound calls, Skype for Business (SFB) gateway specification mandates the PSTN gateways to offer a reliable provisional response and for inbound calls offer INVITEs with a supported header. The SBC can interwork and provide RFC 3262 PRACK interworking towards SFB and it is a mandatory configuration in all Oracle E-SBC – Microsoft SFB deployments. For this, the following need to be configured:

- Configure option 100rel-interworking on the sip-interface facing the SFB server
- Configure a sip-feature to pass the 100rel in supported and require headers
- Configure a sip-manipulation (ForEarlyMedia) to add a Require:100rel header in incoming SIP INVITE from the SFB server and delete the Supported:100rel header
- Configure a sip-manipulation (changeRSeq) for the SBC to manually increment RSeq from 1 to 2 on subsequent 183s from the mediation server – allowing the SBC to respond with a PRACK.

SIP manipulations

SFB server and NTT SIP trunk carry their own SIP and SDP design – not always these implementation methods align, causing a lot of mismatch in SIP and SDP signaling and call flow. The E-SBC helps resolve these issues with SIP manipulation feature.

We have configured a sip-manipulation to modify the signaling according to NTT specifications. This manipulation, named Changecontact (which is a nested manipulation) is applied as an out-manipulationid on the sip-interface towards NTT.

Below is a list of all the manipulations referenced by the ChangeContact sip-manipulation.

1. NATting – configured for topology-hiding.
2. ModToport – NTT requires all the To headers to contain the port number (for e.g. sip:+81XXXXXXXX@ipvoice.jp:7060). This manipulation adds the port to the To header if it does not exist.
3. AddSBCinfo – To replace the SFB related information in the User-Agent header with the SBC image version.
4. AddSupportedinReg – To add a “Supported: path” header in REGISTER messages.
5. ForREGISTER – To add the required authentication details in the REGISTERs sent to NTT trunk.
6. ModMaxforwards – To modify the Max-Forwards header value to 70 and adds the header if it is not present.
7. deltransportUDP – To remove the ‘transport’ uri-parameter from the Contact header.
8. Modcontactuserinresponses – To add + to the uri-user in Contact header.
9. 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.
10. DelReasonheader – To delete the Reason header in BYE.
11. forsessionexpirestoNTT – To delete the Min-SE header from the UPDATE message.
12. DelExpiresinINVITE – To delete the Expires header from the INVITE.
13. anonymouscall - To remove the ‘+’ from the uri-user in the RURI and To headers
14. stripblines – To remove the unwanted lines from the SDP.
15. ModReqheader – To add Require headers in the reply messages.
16. delProxyAuthinACKBYE – To delete Proxy-Authorization header in ACK, BYE and UPDATE messages.
17. Mod180 – To delete the User-Agent header, add Require and RSeq headers in the 180 Ringing SIP messages.

A sip-manipulation regrecurse is configured as the in-manipulationid on the sip-interface towards the NTT trunk. It refers to the following sip-manipulations.

1. convertresp – configured to stop recursion on the SBC when it receives 503 error message from the trunk for a REGISTER request. This is achieved by changing the status code of the 503 response to a 580 and adding the 580 code to the list of codes in stop-recurse command on the sip-interface.
2. PRACKResponseLocally – To respond to the PRACK sent by NTT with a 200 OK.

A sip-manipulation ToSFB is configured as the out-manipulationid towards the SFB server. It refers to the following sip-manipulations.

1. Topohiding – configured for topology-hiding.
2. ModRURItoSFB – To replace the random contact in the uri-user of the RURI with that of the To header
3. ModSupportedtowardsSFB – To modify the Supported header to include the UPDATE method.
4. A header rule to modify the Rack header in PRACK messages for PRACK interworking towards SFB.

A sip-manipulation Forsurragent is configured as the in-manipulationid on the sip-interface towards the SFB server. It refers to the following sip-manipulations.

1. ModSupportedfromSFB – To modify the Supported header in the SIP messages sent from the SFB server.
2. A header rule to replace the uri-user in the From header in the INVITE with the contract number.
3. OptionsResponseLocally – To respond to the OPTIONS sent by SFB server (as NTT trunk does not support OPTIONS).
4. DelAllowheader – To delete the Allow header in the SIP messages received from the SFB server.
5. Check183 – To strip SDP from 183 Session Progress messages and convert them to 180 Ringing messages as NTT does not accept 183 messages.
6. ForEarlyMedia --- To locally handle PRACK interworking
7. ChkandDrop – To drop the multiple 18X messages received from SFB that do not contain SDP.

SBC Configuration

Following is the complete configuration of the SBC:

```
codec-policy
        name                                    ToSFB
        allow-codecs                            *
        add-codecs-on-egress                    telephone-event
codec-policy
        name                                    offonlyPCMUtoNTT
        allow-codecs                            PCMU PCMA:no G729:no iLBC:no telephone-
event:no local-policy
        from-address                            *
        to-address                              *
        source-realm                            NTT-router
        policy-attribute
                next-hop                                medpool.partnersfb.com
                realm                                   SFB
                action                                  replace-uri
                app-protocol                            SIP
local-policy
        from-address                            *
        to-address                              *
        source-realm                            SFB
        policy-attribute
                next-hop                                ipvoice.jp
                realm                                   NTT-router
                action                                  replace-uri
                app-protocol                            SIP
media-manager
media-policy
        name                                    NTT-Tos
        tos-settings
                media-type                              message
                media-sub-type                          sip
                tos-value                               0x05
        tos-settings
                media-type                              audio
                tos-value                               0x05
media-profile
        name                                    PCMA
        payload-type                            8
media-profile
        name                                    PCMU
        payload-type                            0
```

```
network-interface
        name                                    s0p0
        ip-address                              192.168.4.97
        netmask                                 255.255.255.0
        gateway                                 192.168.4.1
        dns-ip-primary                          192.168.4.150
        dns-domain                              partnersfb.com
        hip-ip-list                             192.168.4.97
        icmp-address                            192.168.4.97
        ssh-address                             192.168.4.97
network-interface
        name                                    s0p1
        description                             to Cisco 2811 router
        ip-address                              192.168.1.220
        netmask                                 255.255.255.250
        gateway                                 192.168.1.1
        hip-ip-list                             192.168.1.220
        icmp-address                            192.168.1.220
phy-interface
        name                                    s0p0
        operation-type                          Media
phy-interface
        name                                    s0p1
        operation-type                          Media
        port                                    1
realm-config
        identifier                              NTT-router
        network-interfaces                      s0p1:0
        qos-enable                              enabled
        media-policy                            NTT-Tos
        out-translationid                       add81forJP
        spl-options                             ocNttMsgConverterTagging=enabled,dyn-contact-
method=randomseed
        codec-policy                            offonlyPCMUtoNTT
realm-config
        identifier                              SFB
        network-interfaces                      s0p0:0
        qos-enable                              enabled
        out-translationid                       DelJP
        spl-options                             ocNttMsgConverterTagging=opposite,dyn-contact-start
        codec-policy                            ToSFB
session-agent
        hostname                                ipvoice.jp
        ip-address                              192.168.1.170
        port                                    7060
        realm-id                                NTT-router
session-agent
        hostname                                medpool.partnersfb.com
        port                                    5068
        transport-method                        StaticTCP
        realm-id                                SFB
        ping-method                             OPTIONS
        ping-interval                           60
        auth-attributes
                auth-realm                              ipvoice.jp
                username                                user
                password                                ********
                in-dialog-methods                       INVITE
session-timer-profile
        name                                    NTT-ST
```

```
        session-expires                         180
        min-se                                  180
        response-refresher                      uac
session-translation
        id                                      DelJP
        rules-calling                           remove81
        rules-called                            remove81
session-translation
        id                                      add81forJP
        rules-calling                           addforJP
        rules-called                            addforJP
sip-config
        home-realm-id                           SFB
        registrar-domain                        *
        registrar-host                          *
        registrar-port                          5060
        options                                 inmanip-before-validate
                                                max-udp-length=0
sip-interface
        realm-id                                NTT-router
        sip-port
                address                                 192.168.1.220
                allow-anonymous                         registered
        options                                 dropResponse=183
        stop-recurse                            401,407,580
        in-manipulationid                       regrecurse
        out-manipulationid                      Changecontact
        session-timer-profile                   NTT-ST
sip-interface
        realm-id                                SFB
        sip-port
                address                                 192.168.4.97
                port                                    5068
                transport-protocol                      TCP
                allow-anonymous                         agents-only
        registration-caching                    enabled
        options                                 100rel-interworking
        in-manipulationid                       Forsurragent
        out-manipulationid                      ToSFB
sip-manipulation
        name                                    AddSBCinfo
        header-rule
                name                                    Addproductinfo
                header-name                             User-Agent
                action                                  add
                msg-type                                request
                methods                                 REGISTER
                new-value                               OracleE\-SBC/ECZ750
        header-rule
                name                                    Moduseragentforcall
                header-name                             User-Agent
                action                                  manipulate
                comparison-type                         pattern-rule
                element-rule
                        name                                    Modvalue
                        type                                    header-value
                        action                                  replace
                        comparison-type                         pattern-rule
                        match-value                             ^RTCC(.*)
                        new-value                               OracleE\-SBC/ECZ750
```

```
        header-rule
                name                                    ChecServerheaderinbye
                header-name                             Server
                action                                  manipulate
                comparison-type                         pattern-rule
                methods                                 BYE,INVITE
                element-rule
                        name                                    Modvalue
                        type                                    header-value
                        action                                  replace
                        comparison-type                         pattern-rule
                        match-value                             ^RTCC(.*)
                        new-value                               OracleE\-SBC/ECZ750
        header-rule
                name                                    delUAheader
                header-name                             User-Agent
                action                                  delete
                msg-type                                request
                methods                                 ACK,BYE,UPDATE
        header-rule
                name                                    delserverheader
                header-name                             Server
                action                                  delete
                methods                                 BYE,INVITE,PRACK,UPDATE
sip-manipulation
        name                                    AddSupportedinReg
        header-rule
                name                                    Addtheheader
                header-name                             Supported
                action                                  add
                msg-type                                request
                methods                                 REGISTER
                new-value                               path
sip-manipulation
        name                                    Addsupportedwithtimer
        header-rule
                name                                    Checksupptimer
                header-name                             Supported
                action                                  manipulate
                msg-type                                request
                methods                                 UPDATE
                element-rule
                        name                                    storevaluetimer
                        type                                    header-value
                        action                                  store
                        comparison-type                         pattern-rule
                        match-value                             timer
        header-rule
                name                                    Addsupifnotpresent
                header-name                             Supported
                action                                  add
                comparison-type                         boolean
                msg-type                                request
                methods                                 UPDATE
                match-value                             !$Checksupptimer.$storevaluetimer
                element-rule
                        name                                    addvalue
                        type                                    header-value
                        action                                  add
                        new-value                               timer
```

```
sip-manipulation
        name                                    Changecontact
        header-rule
                name                                    forprivacy
                header-name                             From
                action                                  sip-manip
                new-value                               NATting
        header-rule
                name                                    forUAinfo
                header-name                             From
                action                                  sip-manip
                new-value                               AddSBCinfo
        header-rule
                name                                    forregsupport
                header-name                             From
                action                                  sip-manip
                new-value                               AddSupportedinReg
        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                                    foranonymouscall
                header-name                             From
                action                                  sip-manip
                new-value                               anonymouscall
        header-rule
                name                                    DeleteexpiresinINVITE
                header-name                             From
                action                                  sip-manip
                new-value                               DelExpiresinINVITE
        header-rule
                name                                    forproxyauth
                header-name                             From
```

```
                action                                  sip-manip
                new-value                               DelProxyAuthinACKBYE
        header-rule
                name                                    delblines
                header-name                             From
                action                                  sip-manip
                new-value                               stripblines
        header-rule
                name                                    forSE
                header-name                             From
                action                                  sip-manip
                new-value                               forsessionexpirestoNTT
        header-rule
                name                                    delUAin180
                header-name                             From
                action                                  sip-manip
                msg-type                                reply
                new-value                               Mod180
        header-rule
                name                                    addreq
                header-name                             From
                action                                  sip-manip
                msg-type                                reply
                new-value                               ModReqheader
sip-manipulation
        name                                    Check183
        mime-sdp-rule
                name                                    for183withmedsip
                msg-type                                reply
                methods                                 INVITE
                action                                  manipulate
                comparison-type                         pattern-rule
                sdp-media-rule
                        name                                    checkcline
                        media-type                              audio
                        action                                  manipulate
                        comparison-type                         boolean
                        sdp-line-rule
                                name                                    detectc2
                                type                                    c
                                action                                  sip-manip
                                comparison-type                         pattern-rule
                                match-value
^(.*(192.168.4.152|192.168.4.153))*$
                                new-value                               Stripsdp183
        header-rule
                name                                    check18x
                header-name                             @status-line
                action                                  manipulate
                msg-type                                reply
                methods                                 INVITE
                element-rule
                        name                                    is183
                        type                                    status-code
                        action                                  sip-manip
                        match-value                             183
                        new-value                               ChkandDrop
                element-rule
                        name                                    is180
                        type                                    status-code
```

```
                        action                                  sip-manip
                        match-value                             180
                        new-value                               ChkandDrop
sip-manipulation
        name                                    ChkandDrop
        header-rule
                name                                    chkReq
                header-name                             Require
                action                                  store
                msg-type                                reply
                methods                                 INVITE
        header-rule
                name                                    drop18x
                header-name                             from
                action                                  delete
                comparison-type                         boolean
                msg-type                                reply
                methods                                 INVITE
                match-value                             !$chkReq
        header-rule
                name                                    callForEarlyMedia
                header-name                             from
                action                                  sip-manip
                new-value                               ForEarlyMedia
sip-manipulation
        name                                    Contactinreply
        header-rule
                name                                    CheckForContact
                header-name                             To
                action                                  manipulate
                msg-type                                reply
                methods                                 INVITE
                element-rule
                        name                                    Check_er
                        type                                    uri-host
                        action                                  store
        header-rule
                name                                    addroute hr
                header-name                             Record-Route
                action                                  add
                msg-type                                reply
                methods                                 INVITE
                new-value
"<sip:"+$CheckForContact.$Check er.$0+":5068;lr>"
sip-manipulation
        name                                    DelAllowheader
        header-rule
                name                                    delAllowAck
                header-name                             Allow
                action                                  delete
                comparison-type                         pattern-rule
sip-manipulation
        name                                    DelExpiresinINVITE
        header-rule
                name                                    delexpires
                header-name                             Expires
                action                                  delete
                msg-type                                request
                methods                                 INVITE
sip-manipulation
```

```
        name                                    DelProxyAuthinACKBYE
        header-rule
                name                                    delproxauth
                header-name                             Proxy-Authorization
                action                                  delete
                msg-type                                request
                methods                                 ACK,BYE,UPDATE
sip-manipulation
        name                                    DelReasonheader
        header-rule
                name                                    delreason
                header-name                             Reason
                action                                  delete
                msg-type                                request
                methods                                 BYE,CANCEL
sip-manipulation
        name                                    ForEarlyMedia
        header-rule
                name                                    delSupported
                header-name                             Supported
                action                                  delete
                match-value                             100rel
        header-rule
                name                                    addRequire
                header-name                             Require
                action                                  add
                msg-type                                request
                methods                                 INVITE
                new-value                               100rel
        mime-sdp-rule
                name                                    for183withclientip
                msg-type                                reply
                methods                                 INVITE
                action                                  manipulate
                comparison-type                         pattern-rule
                sdp-media-rule
                        name                                    checkcline
                        media-type                              audio
                        action                                  manipulate
                        comparison-type                         boolean
                        sdp-line-rule
                                name                                    detectc
                                type                                    c
                                action                                  sip-manip
                                comparison-type                         pattern-rule
                                match-value
                                                        ^(.(?!(192.168.4.152|192.168.4.153)))*$
                                new-value                               changeRSeq
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                                    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+,+opaque=\"\"
        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=\"\"
        header-rule
                name                                    DelportinRURI
                header-name                             Request-URI
                action                                  manipulate
                msg-type                                request
                methods                                 REGISTER
                element-rule
                        name                                    delport
                        type                                    uri-port
                        action                                  delete-element
                        comparison-type                         pattern-rule
sip-manipulation
        name                                    Forsurragent
        header-rule
                name                                    forsupportedinINVITE
                header-name                             From
                action                                  sip-manip
                new-value                               ModSupportedfromSFB
        header-rule
                name                                    ChangeFrom
                header-name                             From
                action                                  manipulate
                msg-type                                request
                methods                                 INVITE
                element-rule
                        name                                    NTT_from_user
                        parameter-name                          From
                        type                                    uri-user
                        action                                  replace
                        new-value                               81XXXXXXXXX
        header-rule
                name                                    respOPTIONS
                header-name                             From
                action                                  sip-manip
```

```
                new-value                               OptionsResponseLocally
        header-rule
                name                                    delallow
                header-name                             From
                action                                  sip-manip
                new-value                               DelAllowheader
        header-rule
                name                                    for183
                header-name                             From
                action                                  sip-manip
                new-value                               Check183
        header-rule
                name                                    adddomain
                header-name                             call-id
                msg-type                                out-of-dialog
                element-rule
                        name                                    addhost
                        type                                    header-value
                        action                                  find-replace-all
                        comparison-type                         pattern-rule
                        match-value                             ^((?!@).)*$
                        new-value                               $ORIGINAL+ebay.com
sip-manipulation
        name                                    Mod180
        header-rule
                name                                    check180
                header-name                             @status-line
                action                                  manipulate
                comparison-type                         pattern-rule
                element-rule
                        name                                    is180
                        type                                    status-code
                        action                                  store
                        comparison-type                         pattern-rule
                        match-value                             180
        header-rule
                name                                    delUA
                header-name                             User-Agent
                action                                  delete
                comparison-type                         boolean
                match-value                             $check180.$is180
        header-rule
                name                                    addReq
                header-name                             Require
                action                                  add
                comparison-type                         boolean
                match-value                             $check180.$is180
                new-value                               100rel
        header-rule
                name                                    addRseq
                header-name                             RSeq
                action                                  add
                comparison-type                         boolean
                match-value                             $check180.$is180
                new-value                               1
sip-manipulation
        name                                    ModAllowheader
        header-rule
                name                                    CheckAllowheader
                header-name                             Allow
```

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

```
                match-value                                     !$CheckMaxforwards.$storevalu
                e element-rule
                        name                                            addvalue
                        type                                            header-value
                        action                                          add
                        new-value                                       70
sip-manipulation
        name                                    ModRURItoSFB
        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                                    ModRURIuser
                header-name                             Request-URI
                action                                  manipulate
                msg-type                                request
                methods                                 INVITE
                element-rule
                        name                                    replaceuserinfo
                        type                                    uri-user
                        action                                  replace
                        new-value                               $CheckToheader.$storeTouriuser.$0
sip-manipulation
        name                                    ModReqheader
        header-rule
                name                                    modheader
                header-name                             Require
                action                                  find-replace-all
                msg-type                                reply
                new-value                               100rel,timer
        header-rule
                name                                    CheckReqheader
                header-name                             Require
                action                                  manipulate
                msg-type                                reply
                element-rule
                        name                                    Storevalue
                        type                                    header-value
                        action                                  store
                        comparison-type                         pattern-rule
                        match-value                             .*
        header-rule
                name                                    Checkareqandifnotaddit
                header-name                             Require
                action                                  add
                comparison-type                         boolean
                msg-type                                reply
                match-value
                                                        !$CheckReqheader.$Storevalu
                e element-rule
                        name                                    addreqvalue
```

```
                        new-value                               timer
sip-manipulation
        name                                    ModSupportedfromSFB
        header-rule
                name                                    delSupportedtimer
                header-name                             Supported
                action                                  delete
                comparison-type                         pattern-rule
                msg-type                                request
                methods                                 INVITE
                match-value                             timer
        header-rule
                name                                    CheckSupported
                header-name                             Supported
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                request
                methods                                 INVITE
                element-rule
                        name                                    add100rel
                        type                                    header-value
                        action                                  find-replace-all
                        comparison-type                         pattern-rule
                        new-value                               100rel,timer
        header-rule
                name                                    delsupportedin200
                header-name                             Supported
                action                                  delete
                msg-type                                reply
                methods                                 INVITE
                match-value                             100rel
sip-manipulation
        name                                    ModSupportedtowardsSFB
        header-rule
                name                                    CheckSupported
                header-name                             Supported
                action                                  manipulate
                comparison-type                         pattern-rule
                methods                                 INVITE
                element-rule
                        name                                    Storevalue
                        type                                    header-value
                        action                                  store
                        comparison-type                         pattern-rule
                element-rule
                        name                                    isupdate
                        type                                    header-value
                        action                                  replace
                        comparison-type                         pattern-rule
                        new-value
$CheckSupported.$Storevalue.$0+,+UPDATE
sip-manipulation
        name                                    ModToheader
        header-rule
                name                                    CheckToheader
                header-name                             To
                action                                  manipulate
                methods                                 ACK,UPDATE
                element-rule
                        name                                    Storevalue
```

```
                        type                                    uri-port
                        action                                  store
                        comparison-type                         pattern-rule
                        match-value                             .*
        header-rule
                name                                    CheckdoubleportsinTo
                header-name                             To
                action                                  manipulate
                comparison-type                         boolean
                methods                                 ACK,UPDATE
                match-value                             $CheckToheader.$Storevalue
                element-rule
                        name                                    ChangeTovalue
                        type                                    uri-port
                        action                                  replace
                        new-value                               7060
sip-manipulation
        name                                    ModToport
        header-rule
                name                                    CheckToport
                header-name                             To
                action                                  manipulate
                msg-type                                request
                methods                                 INVITE
                element-rule
                        name                                    Storeport
                        type                                    uri-port
                        action                                  store
                        match-value                             7060
        header-rule
                name                                    CheckdoubleportsinTo
                header-name                             To
                action                                  manipulate
                comparison-type                         boolean
                msg-type                                request
                methods                                 INVITE
                match-value                             !$CheckToport.$Storeport
                element-rule
                        name                                    ChangeToval
                        type                                    uri-port
                        action                                  add
                        new-value                               7060
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
sip-manipulation
        name                                    Modcontactuserinresponses
        header-rule
```

```
                name                                    Modtheuser
                header-name                             Contact
                action                                  manipulate
                msg-type                                reply
                methods                                 INVITE,UPDATE
                element-rule
                        name                                    Checkuser
                        type                                    uri-user
                        action                                  store
                        comparison-type                         pattern-rule
                element-rule
                        name                                    addplussign
                        type                                    uri-user
                        action                                  replace
                        new-value                               \+$Modtheuser.$Checkuser.$0
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
                element-rule
                        name                                    delepid
                        type                                    header-value
                        action                                  find-replace-all
                        comparison-type                         pattern-rule
                        match-value                             (.*>;)(.*;)(.*)
                        new-value                               $1+$3
        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
        header-rule
                name                                    Contact
                header-name                             Contact
                action                                  manipulate
                element-rule
                        name                                    Contact er
                        parameter-name                          ms-opaque
                        type                                    uri-param
                        action                                  delete-element
        header-rule
                name                                    delContactbye
                header-name                             Contact
                action                                  delete
```

```
                msg-type                        request
                methods                         BYE
sip-manipulation
        name                                    OptionsResponseLocally
        header-rule
                name                            rejectOptions
                header-name                     request-uri
                action                          reject
                msg-type                        request
                methods                         OPTIONS
                new-value                       200: OK
sip-manipulation
        name                                    PRACKResponseLocally
        header-rule
                name                            rejectPRACK
                header-name                     request-uri
                action                          reject
                msg-type                        request
                methods                         PRACK
                new-value                       200: OK
sip-manipulation
        name                                    Stripsdp183
        description                             For incoming 183 from Lync, strip
        SDP header-rule
                name                            check183
                header-name                     @status-line
                action                          store
                comparison-type                 pattern-rule
                element-rule
                        name                            is183
                        type                            status-code
                        action                          store
                        comparison-type                 pattern-rule
                        match-value                     183
        header-rule
                name                            delSDP
                header-name                     Content-Type
                action                          manipulate
                comparison-type                 case-insensitive
                match-value                     $check183.$is183
                element-rule
                        name                            del183SDP
                        parameter-name                  application/sdp
                        type                            mime
                        action                          delete-element
                        comparison-type                 boolean
        header-rule
                name                            delContentType
                header-name                     Content-Type
                action                          manipulate
                comparison-type                 boolean
                match-value                     $check183.$is183
                element-rule
                        name                            delCT
                        parameter-name                  *
                        type                            header-param
                        action                          delete-header
        header-rule
                name                            change183to180
                header-name                     @status-line
```

```
                action                                  manipulate
                comparison-type                         boolean
                match-value                             $check183.$is183
                element-rule
                        name                                    modStatusCode
                        type                                    status-code
                        action                                  replace
                        match-value                             183
                        new-value                               180
                element-rule
                        name                                    modReasonPhrase
                        type                                    reason-phrase
                        action                                  replace
                        comparison-type                         case-insensitive
                        new-value                               Ringing
sip-manipulation
        name                                    ToSFB
        header-rule
                name                                    ForNAT IP
                header-name                             From
                action                                  sip-manip
                new-value                               Topohiding
        header-rule
                name                                    forRURI
                header-name                             From
                action                                  sip-manip
                new-value                               ModRURItoSFB
        header-rule
                name                                    ForupdatetoSFB
                header-name                             From
                action                                  sip-manip
                new-value                               ModSupportedtowardsSFB
        header-rule
                name                                    alterPRACK
                header-name                             Rack
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                request
                methods                                 PRACK
                match-value                             (2 )(.*)
                new-value                               "1 "+$alterPRACK.$2
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                                    To
                header-name                             To
                action                                  manipulate
                element-rule
                        name                                    To
                        type                                    uri-host
                        action                                  replace
```

```
                        new-value                                   $REMOTE_IP
sip-manipulation
        name                                        anonymouscall
        header-rule
                name                                        changeRURI
                header-name                                 Request-URI
                action                                      manipulate
                msg-type                                    request
                methods                                     INVITE
                element-rule
                        name                                        storeuser
                        type                                        uri-user
                        action                                      store
                        comparison-type                             pattern-rule
                        match-value                                 ^\+184(.*$)
                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
sip-manipulation
        name                                    changeRSeq
        header-rule
                name                            addRseq
                header-name                     RSeq
                action                          manipulate
                comparison-type                 pattern-rule
                msg-type                        reply
                methods                         INVITE
                match-value                     1
                new-value                       2
sip-manipulation
        name                                    convertresp
        header-rule
                name                            change503to580
                header-name                     @status-line
                action                          manipulate
                msg-type                        reply
                element-rule
                        name                            modStatusCode
                        type                            status-code
                        action                          replace
                        comparison-type                 pattern-rule
                        match-value                     (503|403)
                        new-value                       580
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
sip-manipulation
        name                                    forsessionexpirestoNTT
        header-rule
                name                            delminSEforUPDATE
                header-name                     Min-SE
                action                          delete
                msg-type                        request
                methods                         UPDATE
sip-manipulation
        name                                    regrecurse
        header-rule
                name                            checkcseq
                header-name                     CSeq
```

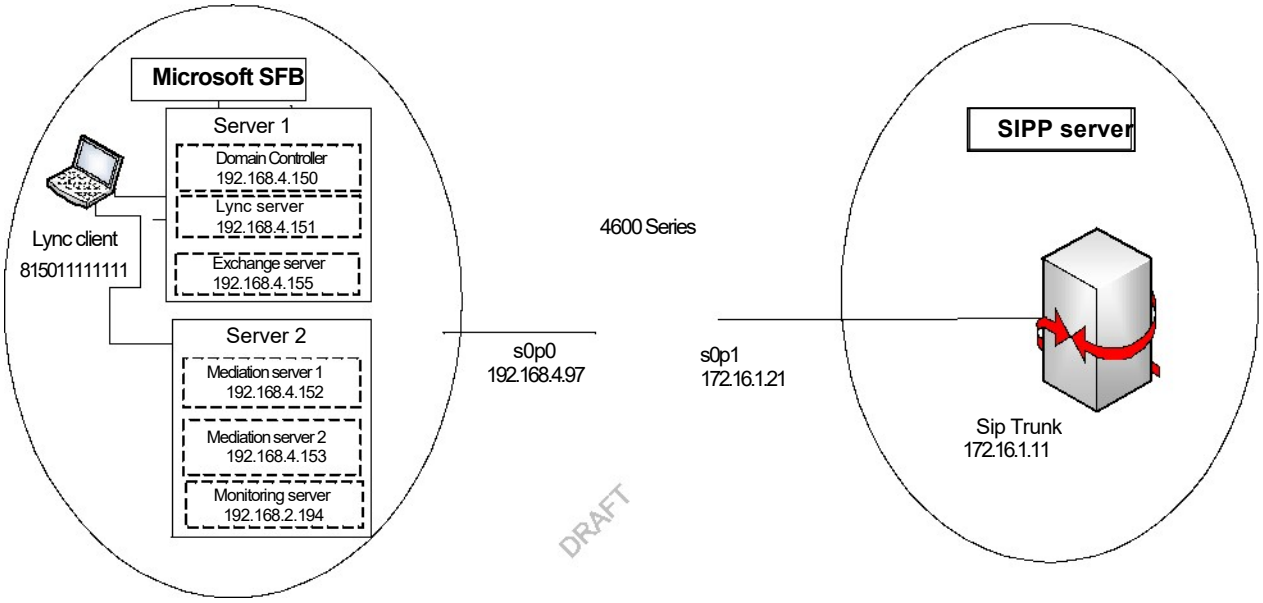
```
                action                                  sip-manip
                comparison-type                         pattern-rule
                msg-type                                reply
                match-value                             ([0-9]{1} REGISTER)
                new-value                               convertresp
        header-rule
                name                                    ModSup
                header-name                             Supported
                action                                  find-replace-all
                msg-type                                request
                methods                                 INVITE
                match-value                             100rel,timer
                new-value                               timer
        header-rule
                name                                    forprack
                header-name                             From
                action                                  sip-manip
                new-value                               PRACKResponseLocally
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=CT:99980\r\n
                element-rule
                        name                                    removealine
                        parameter-name                          application/sdp
                        type                                    mime
                        action                                  find-replace-all
                        comparison-type                         pattern-rule
                        match-value                             a=label:main-audio\r\n
spl-config
        spl-options
        plugins
                name                                    ocSurrogateRegister-1-6.pkg
        plugins
                name                                    ocNttMsgConverter-0-3.pkg
steering-pool
        ip-address                              192.168.1.220
        start-port                              41000
        end-port                                45000
        realm-id                                NTT-router
steering-pool
        ip-address                              192.168.4.97
        start-port                              20000
        end-port                                40000
        realm-id                                SFB
surrogate-agent
        register-host                           ipvoice.jp
        register-user                           +81XXXXXXXXX
        realm-id                                SFB
        customer-next-hop                       ipvoice.jp
        register-contact-host                   192.168.1.220
```

```
        register-contact-user                   +81XXXXXXXXX
        password                                ******
        register-expires                        3600
        auth-user                               user
        register-retry-time                     1800
system-config
        process-log-level                       DETAIL
        default-gateway                         192.168.1.155
translation-rules
        id                                      addforJP
        type                                    add
        add-string                              +
translation-rules
        id                                      remove81
        type                                    delete
        delete-string                           +
web-server-config
        inactivity-timeout                      0
```

SIPP based testing

Architecture

In addition to the trunk based test cases, the testing also included an exhaustive list of test cases that utilized SIPP scripts. These tests simulates corner case behavior either by SFB server or the NTT SIP trunk. The configuration for this part of testing is slightly different from the trunk based test configuration. The architecture diagram below shows the setup utilized for SIPP testing.



The ESBC configurations have been included in this guide. The configuration consists of sip-manipulations that are required for specific test cases.

For any questions regarding the configuration or the test cases, please contact your Oracle sales representative.

SBC Configuration

```
codec-policy
        name                                    TC1283
        allow-codecs                            PCMU
codec-policy
        name                                    ToSFB
        allow-codecs                            *
        add-codecs-on-egress                    telephone-event
codec-policy
        name                                    offonlyPCMUtoNTT
        allow-codecs                            PCMU PCMA:no G729 iLBC:no telephone-
event:no codec-policy
        name                                    toSFB
        allow-codecs                            *
        order-codecs                            PCMU *
local-policy
        from-address                            *
        to-address                              *
        source-realm                            NTT-router
        policy-attribute
                next-hop                                medpool.partnersfb.com
                realm                                   SFB
                app-protocol                            SIP
local-policy
        from-address                            *
        to-address                              *
        source-realm                            SFB
        policy-attribute
                next-hop                                ntt.com
                realm                                   NTT-router
                app-protocol                            SIP
media-manager
media-policy
        name                                    NTT-Tos
        tos-settings
                media-type                              message
                media-sub-type                          sip
                tos-value                               0x05
media-profile
        name                                    G729
        payload-type                            18
        parameters                              annexb=no
media-profile
        name                                    PCMA
        payload-type                            8
media-profile
        name                                    PCMU
        payload-type                            0
network-interface
        name                                    s0p0
        ip-address                              192.168.4.97
        netmask                                 255.255.255.0
        gateway                                 192.168.4.1
        dns-ip-primary                          192.168.4.150
        dns-domain                              partnersfb.com
        hip-ip-list                             192.168.4.97
        icmp-address                            192.168.4.97
```

```
network-interface
        name                                    s0p1
        description                             to SIPp
        ip-address                              172.16.1.21
        netmask                                 255.255.255.0
        gateway                                 172.16.1.15
        hip-ip-list                             172.16.1.21
        icmp-address                            172.16.1.21
        ssh-address                             172.16.1.21
phy-interface
        name                                    s0p0
        operation-type                          Media
phy-interface
        name                                    s0p1
        operation-type                          Media
        port                                    1
realm-config
        identifier                              NTT-router
        network-interfaces                      s0p1:0
        media-policy                            NTT-Tos
        out-translationid                       add81forJP
        spl-options                             ocNttMsgConverterTagging=enabled,dyn-
contact-method=randomseed
        codec-policy                            offonlyPCMUtoNTT
realm-config
        identifier                              SFB
        network-interfaces                      s0p0:0
        out-translationid                       DelJP
        spl-options                             ocNttMsgConverterTagging=opposite,dyn-contact-start
        codec-policy                            ToSFB
response-map
        name                                    for404
        entries
                recv-code                               404
                xmit-code                               404
                reason                                  Not Found
session-agent
        hostname                                medpool.partnersfb.com
        port                                    5068
        transport-method                        StaticTCP
        realm-id                                SFB
        ping-method                             OPTIONS
        ping-interval                           60
        auth-attributes
                auth-realm                              ntt.com
                username                                user
                password                                ********
                in-dialog-methods                       INVITE
session-agent
        hostname                                ntt.com
        ip-address                              172.16.1.11
        port                                    7060
        realm-id                                NTT-router
session-timer-profile
        name                                    NTT-ST
        session-expires                         180
        min-se                                  180
        response-refresher                      uac
session-translation
        id                                      DelJP
```

```
        rules-calling                           remove81
        rules-called                            remove81
session-translation
        id                                      add81forJP
        rules-calling                           addforJP
        rules-called                            addforJP
sip-config
        home-realm-id                           SFB
        registrar-domain                        *
        registrar-host                          *
        registrar-port                          5060
        options                                 inmanip-before-validate
                                                max-udp-length=0
sip-interface
        realm-id                                NTT-router
        sip-port
                address                                 172.16.1.21
                allow-anonymous                         registered
        trans-expire                            32
        registration-caching                    enabled
        options                                 dropResponse=183
                                                dropresponse=698
        stop-recurse                            401,407,580
        in-manipulationid                       inboundNTT
        out-manipulationid                      Changecontact
        response-map                            for404
        session-timer-profile                   NTT-ST
sip-interface
        realm-id                                SFB
        sip-port
                address                                 192.168.4.97
                port                                    5068
                transport-protocol                      TCP
                allow-anonymous                         agents-only
        registration-caching                    enabled
        options                                 100rel-interworking
        in-manipulationid                       Forsurragent
        out-manipulationid                      ToSFB
sip-manipulation
        name                                    AddSBCinfo
        header-rule
                name                                    Addproductinfo
                header-name                             User-Agent
                action                                  add
                msg-type                                request
                methods                                 REGISTER
                new-value                               OracleE\-SBC/ECZ750
        header-rule
                name                                    Moduseragentforcall
                header-name                             User-Agent
                action                                  manipulate
                comparison-type                         pattern-rule
                element-rule
                        name                                    Modvalue
                        type                                    header-value
                        action                                  replace
                        comparison-type                         pattern-rule
                        match-value                             ^RTCC(.*)
                        new-value                               OracleE\-SBC/ECZ750
        header-rule
```

```
                name                                    ChecServerheaderinbye
                header-name                             Server
                action                                  manipulate
                comparison-type                         pattern-rule
                methods                                 BYE,INVITE
                element-rule
                        name                                    Modvalue
                        type                                    header-value
                        action                                  replace
                        comparison-type                         pattern-rule
                        match-value                             ^RTCC(.*)
                        new-value                               OracleE\-SBC/ECZ750
        header-rule
                name                                    delUAheader
                header-name                             User-Agent
                action                                  delete
                msg-type                                request
                methods                                 ACK,BYE,UPDATE
        header-rule
                name                                    delserverheader
                header-name                             Server
                action                                  delete
                methods                                 BYE,INVITE,PRACK,UPDATE
sip-manipulation
        name                                    AddSupportedinReg
        header-rule
                name                                    Addtheheader
                header-name                             Supported
                action                                  add
                msg-type                                request
                methods                                 REGISTER
                new-value                               path
sip-manipulation
        name                                    Addsupportedwithtimer
        header-rule
                name                                    Checksupptimer
                header-name                             Supported
                action                                  manipulate
                msg-type                                request
                methods                                 UPDATE
                element-rule
                        name                                    storevaluetimer
                        type                                    header-value
                        action                                  store
                        comparison-type                         pattern-rule
                        match-value                             timer
        header-rule
                name                                    Addsupifnotpresent
                header-name                             Supported
                action                                  add
                comparison-type                         boolean
                msg-type                                request
                methods                                 UPDATE
                match-value                             !$Checksupptimer.$storevaluetimer
                element-rule
                        name                                    addvalue
                        type                                    header-value
                        action                                  add
                        new-value                               timer
sip-manipulation
```

```
        name                                    Changecontact
        header-rule
                name                                    forprivacy
                header-name                             From
                action                                  sip-manip
                new-value                               NATting
        header-rule
                name                                    forUAinfo
                header-name                             From
                action                                  sip-manip
                new-value                               AddSBCinfo
        header-rule
                name                                    forregsupport
                header-name                             From
                action                                  sip-manip
                new-value                               AddSupportedinReg
        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                                    DeleteexpiresinINVITE
                header-name                             From
                new-value                               DelExpiresinINVITE
        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                                    forproxyauth
                header-name                             From
                action                                  sip-manip
                new-value                               DelProxyAuthinACKBYE
        header-rule
                name                                    addreq
                header-name                             From
                action                                  sip-manip
                msg-type                                reply
                new-value                               ModReqheader
        header-rule
                name                                    delUAin180
                header-name                             From
                action                                  sip-manip
                msg-type                                reply
                new-value                               Mod180
        header-rule
                name                                    forSE
                header-name                             From
                new-value                               forsessionexpirestoNTT
sip-manipulation
        name                                    Check183
        mime-sdp-rule
                name                                    for183withmedsip
                msg-type                                reply
                methods                                 INVITE
                action                                  manipulate
                comparison-type                         pattern-rule
                sdp-media-rule
                        name                                    checkcline
                        media-type                              audio
                        action                                  manipulate
                        comparison-type                         boolean
                        sdp-line-rule
                                name                                    detectc2
                                type                                    c
                                action                                  sip-manip
                                comparison-type                         pattern-rule
                                match-value
^(.*(192.168.4.152|192.168.4.153))*$
                                new-value                               Stripsdp183
        header-rule
                name                                    check18x
                header-name                             @status-line
                action                                  manipulate
                msg-type                                reply
                methods                                 INVITE
                element-rule
                        name                                    is183
                        type                                    status-code
                        action                                  sip-manip
                        match-value                             183
                        new-value                               ChkandDrop
                element-rule
                        name                                    is180
                        type                                    status-code
                        action                                  sip-manip
                        match-value                             180
                        new-value                               ChkandDrop
```

```
sip-manipulation
        name                                    ChkandDrop
        header-rule
                name                                    chkReq
                header-name                             Require
                action                                  store
                msg-type                                reply
                methods                                 INVITE
        header-rule
                name                                    drop18x
                header-name                             from
                action                                  delete
                comparison-type                         boolean
                msg-type                                reply
                methods                                 INVITE
                match-value                             !$chkReq
        header-rule
                name                                    callForEarlyMedia
                header-name                             from
                action                                  sip-manip
                new-value                               ForEarlyMedia
sip-manipulation
        name                                    DelAllowheader
        header-rule
                name                                    delAllowAck
                header-name                             Allow
                action                                  delete
                comparison-type                         pattern-rule
sip-manipulation
        name                                    DelExpiresinINVITE
        header-rule
                name                                    delexpires
                header-name                             Expires
                action                                  delete
                msg-type                                request
                methods                                 INVITE
sip-manipulation
        name                                    DelProxyAuthinACKBYE
        header-rule
                name                                    delproxauth
                header-name                             Proxy-Authorization
                action                                  delete
                msg-type                                request
                methods                                 ACK,BYE,UPDATE
sip-manipulation
        name                                    DelReasonheader
        header-rule
                name                                    delreason
                header-name                             Reason
                action                                  delete
                msg-type                                request
                methods                                 BYE,CANCEL
sip-manipulation
        name                                    ForEarlyMedia
        header-rule
                name                                    delSupported
                header-name                             Supported
                action                                  delete
                match-value                             100rel
        header-rule
```

```
                name                                    addRequire
                header-name                             Require
                action                                  add
                msg-type                                request
                methods                                 INVITE
                new-value                               100rel
        mime-sdp-rule
                name                                    for183withclientip
                msg-type                                reply
                methods                                 INVITE
                action                                  manipulate
                comparison-type                         pattern-rule
                sdp-media-rule
                        name                                    checkcline
                        media-type                              audio
                        action                                  manipulate
                        comparison-type                         boolean
                        sdp-line-rule
                                name                                    detectc
                                type                                    c
                                action                                  sip-manip
                                comparison-type                         pattern-rule
                                match-value
^(.(?!(192.168.4.152|192.168.4.153)))*$
                                new-value                               changeRSeq
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                                    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+,+opaque=\"\"
        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=\"\"
        header-rule
                name                                    DelportinRURI
                header-name                             Request-URI
                action                                  manipulate
                msg-type                                request
                methods                                 REGISTER
                element-rule
                        name                                    delport
                        type                                    uri-port
                        action                                  delete-element
                        comparison-type                         pattern-rule
sip-manipulation
        name                                    Forsurragent
        header-rule
                name                                    forsupportedinINVITE
                header-name                             From
                action                                  sip-manip
                new-value                               ModSupportedfromSFB
        header-rule
                name                                    ChangeFrom
                header-name                             From
                action                                  manipulate
                msg-type                                request
                methods                                 INVITE
                element-rule
                        name                                    NTT from user
                        parameter-name                          From
                        type                                    uri-user
                        action                                  replace
                        new-value                               81XXXXXXXXX
        header-rule
                name                                    respOPTIONS
                header-name                             From
                action                                  sip-manip
                new-value                               OptionsResponseLocally
        header-rule
                name                                    delallow
                header-name                             From
                action                                  sip-manip
                new-value                               DelAllowheader
        header-rule
                name                                    for183
                header-name                             From
                action                                  sip-manip
                new-value                               Check183
sip-manipulation
        name                                    Mod180
        header-rule
                name                                    check180
                header-name                             @status-line
                action                                  manipulate
                comparison-type                         pattern-rule
                element-rule
                        name                                    is180
                        type                                    status-code
                        action                                  store
                        comparison-type                         pattern-rule
```

```
                        match-value                             180
        header-rule
                name                                    delUA
                header-name                             User-Agent
                action                                  delete
                comparison-type                         boolean
                match-value                             $check180.$is180
        header-rule
                name                                    delreqtimer
                header-name                             Require
                action                                  delete
                comparison-type                         boolean
                match-value                             $check180.$is180
        header-rule
                name                                    addRseq
                header-name                             RSeq
                action                                  add
                comparison-type                         boolean
                match-value                             $check180.$is180
                new-value                               1
        header-rule
                name                                    addreq
                header-name                             Require
                action                                  add
                comparison-type                         boolean
                match-value                             $check180.$is180
                new-value                               100rel
sip-manipulation
        name                                    ModAllowheader
        header-rule
                name                                    CheckAllowheader
                header-name                             Allow
                action                                  manipulate
                element-rule
                        name                                    Storeheadervalue
                        type                                    header-value
                        action                                  store
                        comparison-type                         pattern-rule
                        match-value                             .*
        header-rule
                name                                    Checkallowandifnotaddit
                header-name                             Allow
                action                                  add
                comparison-type                         boolean
                msg-type                                reply
                match-value                             !$CheckAllowheader.$Storeheadervalue
                element-rule
                        name                                    addheadervalue
                        type                                    header-value
                        action                                  add
                        new-value                               INVITE,BYE,CANCEL,ACK,PRACK,UPDATE
        header-rule
                name                                    Checkallowandifnotadditforinv
                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
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
                msg-type                                request
                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                                request
                methods                                 ACK,BYE,INVITE,PRACK,UPDATE
                match-value                             !$CheckMaxforwards.$storevalue
                element-rule
                        name                                    addvalue
                        type                                    header-value
                        action                                  add
                        new-value                               70
sip-manipulation
        name                                    ModRURItoSFB
        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                                    ModRURIuser
                header-name                             Request-URI
                action                                  manipulate
                msg-type                                request
                methods                                 INVITE
                element-rule
                        name                                    replaceuserinfo
                        type                                    uri-user
```

```
                        action                                  replace
                        new-value                               $CheckToheader.$storeTouriuser.$0
sip-manipulation
        name                                    ModReqheader
        header-rule
                name                                    modheader
                header-name                             Require
                msg-type                                reply
                new-value                               100rel,timer
        header-rule
                name                                    CheckReqheader
                header-name                             Require
                action                                  manipulate
                msg-type                                reply
                element-rule
                        name                                    Storevalue
                        type                                    header-value
                        action                                  store
                        comparison-type                         pattern-rule
                        match-value                             .*
        header-rule
                name                                    Checkareqandifnotaddit
                header-name                             Require
                action                                  add
                comparison-type                         boolean
                msg-type                                reply
                match-value                             !$CheckReqheader.$Storevalue
                element-rule
                        name                                    addreqvalue
                        type                                    header-value
                        action                                  add
                        new-value                               timer
sip-manipulation
        name                                    ModSupportedfromSFB
        header-rule
                name                                    delSupportedtimer
                header-name                             Supported
                action                                  delete
                comparison-type                         pattern-rule
                msg-type                                request
                methods                                 INVITE
                match-value                             timer
        header-rule
                name                                    CheckSupported
                header-name                             Supported
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                request
                methods                                 INVITE
                element-rule
                        name                                    add100rel
                        type                                    header-value
                        action                                  find-replace-all
                        comparison-type                         pattern-rule
                        new-value                               100rel,timer
        header-rule
                name                                    delsupportedin200
                header-name                             Supported
                action                                  delete
                msg-type                                reply
```

```
                methods                                 INVITE
                match-value                             100rel
sip-manipulation
        name                                    ModSupportedtowardsSFB
        header-rule
                name                                    CheckSupported
                header-name                             Supported
                action                                  manipulate
                comparison-type                         pattern-rule
                methods                                 INVITE
                element-rule
                        name                                    Storevalue
                        type                                    header-value
                        action                                  store
                        comparison-type                         pattern-rule
                element-rule
                        name                                    isupdate
                        type                                    header-value
                        action                                  replace
                        comparison-type                         pattern-rule
                        new-value
$CheckSupported.$Storevalue.$0+,+UPDATE
sip-manipulation
        name                                    ModToport
        header-rule
                name                                    CheckToport
                header-name                             To
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                request
                methods                                 INVITE
                match-value                             sip:*
                element-rule
                        name                                    Storeport
                        type                                    uri-port
                        action                                  store
                        match-value                             7060
        header-rule
                name                                    CheckdoubleportsinTo
                header-name                             To
                action                                  manipulate
                comparison-type                         boolean
                msg-type                                request
                methods                                 INVITE
                match-value                             !$CheckToport.$Storeport
                element-rule
                        name                                    ChangeToval
                        type                                    uri-port
                        action                                  add
                        new-value                               7060
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
sip-manipulation
        name                                    Modcontactuserinresponses
        header-rule
                name                                    Modtheuser
                header-name                             Contact
                action                                  manipulate
                msg-type                                reply
                methods                                 INVITE,UPDATE
                element-rule
                        name                                    Checkuser
                        type                                    uri-user
                        action                                  store
                        comparison-type                         pattern-rule
                element-rule
                        name                                    addplussign
                        type                                    uri-user
                        action                                  replace
                        new-value                               \+$Modtheuser.$Checkuser.$0
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                               ntt.com
                element-rule
                        name                                    delepid
                        type                                    header-value
                        action                                  find-replace-all
                        comparison-type                         pattern-rule
                        match-value                             (.*>;)(.*;)(.*)
                        new-value                               $1+$3
        header-rule
                name                                    To
                header-name                             To
                action                                  manipulate
                element-rule
                        name                                    To
                        type                                    uri-host
                        action                                  replace
                        new-value                               ntt.com
                element-rule
                        name                                    Toport
                        type                                    uri-port
                        action                                  sip-manip
                        new-value                               ModToport
        header-rule
                name                                    Contact
                header-name                             Contact
                action                                  manipulate
                element-rule
```

```
                        name                                    Contact_er
                        parameter-name                          ms-opaque
                        type                                    uri-param
                        action                                  delete-element
        header-rule
                name                                    delContactbye
                header-name                             Contact
                action                                  delete
                msg-type                                request
                methods                                 BYE
        header-rule
                name                                    fixContact
                header-name                             Contact
                action                                  sip-manip
                msg-type                                reply
                new-value                               modContact
sip-manipulation
        name                                    OptionsResponseLocally
        header-rule
                name                                    rejectOptions
                header-name                             request-uri
                action                                  reject
                msg-type                                request
                methods                                 OPTIONS
                new-value                               200: OK
sip-manipulation
        name                                    PRACKResponseLocally
        header-rule
                name                                    rejectPRACK
                header-name                             request-uri
                action                                  reject
                msg-type                                request
                methods                                 PRACK
                new-value                               200: OK
sip-manipulation
        name                                    Stripsdp183
        description                             For incoming 183 from Lync, strip
        SDP header-rule
                name                                    check183
                header-name                             @status-line
                action                                  store
                comparison-type                         pattern-rule
                element-rule
                        name                                    is183
                        type                                    status-code
                        action                                  store
                        comparison-type                         pattern-rule
                        match-value                             183
        header-rule
                name                                    delSDP
                header-name                             Content-Type
                action                                  manipulate
                comparison-type                         case-insensitive
                match-value                             $check183.$is183
                element-rule
                        name                                    del183SDP
                        parameter-name                          application/sdp
                        type                                    mime
                        action                                  delete-element
                        comparison-type                         boolean
```

```
        header-rule
                name                                    delContentType
                header-name                             Content-Type
                action                                  manipulate
                comparison-type                         boolean
                match-value                             $check183.$is183
                element-rule
                        name                                    delCT
                        parameter-name                          *
                        type                                    header-param
                        action                                  delete-header
        header-rule
                name                                    change183to180
                header-name                             @status-line
                action                                  manipulate
                comparison-type                         boolean
                match-value                             $check183.$is183
                element-rule
                        name                                    modStatusCode
                        type                                    status-code
                        action                                  replace
                        match-value                             183
                        new-value                               180
                element-rule
                        name                                    modReasonPhrase
                        type                                    reason-phrase
                        action                                  replace
                        comparison-type                         case-insensitive
                        new-value                               Ringing
sip-manipulation
        name                                    TC1282
        mime-sdp-rule
                name                                    rejip6
                msg-type                                request
                action                                  manipulate
                sdp-session-rule
                        name                                    test_ip6
                        action                                  manipulate
                        sdp-line-rule
                                name                                    checkip6
                                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"
sip-manipulation
        name                                    TC1283
        mime-sdp-rule
                name                                    rejcodec
                msg-type                                request
                action                                  manipulate
                sdp-media-rule
                        name                                    test_m
                        media-type                              audio
                        action                                  manipulate
                        sdp-line-rule
                                name                                    change payload
                                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"
sip-manipulation
        name                                    TC1284
        mime-sdp-rule
                name                                    rejudp
                msg-type                                request
                action                                  manipulate
                sdp-media-rule
                        name                                    test udp
                        media-type                              audio
                        action                                  manipulate
                        sdp-line-rule
                                name                                    check_payload
                                type                                    m
                                action                                  reject
                                comparison-type                         pattern-rule
                                match-value                             ^(audio)( [0-9]{4,5})( UDP 0)$
                                new-value                               "403:Not Acceptable Media"
sip-manipulation
        name                                    ToSFB
        header-rule
                name                                    ForNAT_IP
                header-name                             From
                action                                  sip-manip
                new-value                               Topohiding
        header-rule
                name                                    forRURI
                header-name                             From
                action                                  sip-manip
                new-value                               ModRURItoSFB
        header-rule
                name                                    ForupdatetoSFB
                header-name                             From
                action                                  sip-manip
                new-value                               ModSupportedtowardsSFB
        header-rule
                name                                    changetel
                header-name                             From
                action                                  sip-manip
                msg-type                                request
                new-value                               changeteluritosfb
        header-rule
                name                                    alterPRACK
                header-name                             RAck
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                request
                methods                                 PRACK
                match-value                             (2 )(.*)
                new-value                               "1 "+$alterPRACK.$2
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                                    To
                header-name                             To
                action                                  manipulate
                element-rule
                        name                                    To
                        type                                    uri-host
                        action                                  replace
                        new-value                               $REMOTE_IP
sip-manipulation
        name                                    anonymouscall
        header-rule
                name                                    changeRURI
                header-name                             Request-URI
                action                                  manipulate
                msg-type                                request
                methods                                 INVITE
                element-rule
                        name                                    storeuser
                        type                                    uri-user
                        action                                  store
                        comparison-type                         pattern-rule
                        match-value                             ^\+184(.*$)
                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.$0
                element-rule
                        name                                    addpc
                        parameter-name                          phone-context
                        type                                    uri-user-param
                        action                                  add
                        new-value                               \+81
sip-manipulation
        name                                    changeRSeq
        header-rule
                name                                    addRseq
                header-name                             RSeq
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                reply
                methods                                 INVITE
                match-value                             1
                new-value                               2
sip-manipulation
        name                                    changeforPAI
        header-rule
                name                                    modforPAI
                header-name                             From
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                out-of-dialog
                methods                                 INVITE
                element-rule
                        name                                    modFromer
                        type                                    uri-user
                        action                                  replace
                        comparison-type                         pattern-rule
                        match-value                             !($FROM_USER.$0 == $PAI_USER.$0)
                        new-value                               $PAI_USER.$0
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.$0
sip-manipulation
        name                                    changeteluritosfb
        header-rule
                name                                    formatTotel
                header-name                             To
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                request
                methods                                 INVITE
                match-value                             tel:*
                element-rule
                        name                                    getTelURIUser
                        type                                    uri-phone-number-only
                        action                                  store
                        comparison-type                         case-
                insensitive element-rule
                        name                                    rewriteTo
                        type                                    header-value
                        action                                  replace
                        comparison-type                         case-insensitive
                        new-value
"<sip:"+$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:*
                element-rule
                        name                                    getTelURIUser2
                        type                                    uri-phone-number-only
                        action                                  store
                        comparison-type                         case-
                insensitive element-rule
                        name                                    gettag
                        parameter-name                          tag
                        type                                    uri-param
                        action                                  store
                        comparison-type                         case-
                insensitive element-rule
                        name                                    rewritefrom
                        type                                    header-value
                        action                                  replace
                        comparison-type                         case-insensitive
                        new-value
"<sip:"+$formatfromtel.$getTelURIUser2.$0+"@"+$LOCAL_IP+";user=phone>"+";tag="+$formatfromtel.$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:*
                element-rule
                        name                                    getTelURIUser3
                        type                                    uri-phone-number-only
                        action                                  store
                        comparison-type                         case-
                insensitive element-rule
                        name                                    rewritePCPID
                        type                                    header-value
                        action                                  replace
                        comparison-type                         case-insensitive
                        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:*
                element-rule
                        name                                    getTelURIUser4
                        type                                    uri-phone-number-only
                        action                                  store
                        comparison-type                         case-
                insensitive element-rule
                        name                                    rewritePAI
                        type                                    header-value
                        action                                  replace
                        comparison-type                         case-insensitive
                        new-value
"<sip:"+$formatPAItel.$getTelURIUser4.$0+"@"+$REMOTE_IP+";user=phone>"
sip-manipulation
        name                                    checkPAI
        header-rule
                name                                    StorePAIuser
                header-name                             P-Asserted-Identity
                action                                  manipulate
                comparison-type                         pattern-rule
                element-rule
                        name                                    Storeuser
                        type                                    header-value
                        action                                  sip-manip
                        comparison-type                         pattern-rule
                        new-value                               changeforPAI
sip-manipulation
        name                                    checkPCPID
        header-rule
                name                                    StorePCPIDuser
                header-name                             P-Called-Party-ID
                action                                  manipulate
                comparison-type                         pattern-rule
                element-rule
                        name                                    Storeuser
                        type                                    header-value
                        action                                  sip-manip
                        comparison-type                         pattern-rule
                        new-value                               changeforPCPID
```

```
sip-manipulation
        name                                    checkRURI
        header-rule
                name                                    checkRURIhost
                header-name                             Request-URI
                action                                  manipulate
                msg-type                                request
                methods                                 INVITE
                element-rule
                        name                                    checkhost
                        type                                    uri-host
                        action                                  reject
                        comparison-type                         pattern-rule
                        match-value                             !($RURI_HOST.$0 == $LOCAL_IP.$0)
                        new-value                               "404 Not Found"
sip-manipulation
        name                                    checkTotag
        header-rule
                name                                    storeTotag
                header-name                             To
                action                                  store
                comparison-type                         pattern-rule
                match-value                             sip:*
                element-rule
                        name                                    Storetag
                        parameter-name                          tag
                        type                                    header-param
                        action                                  store
        header-rule
                name                                    checkTotag
                header-name                             To
                action                                  manipulate
                comparison-type                         boolean
                match-value                             $storeTotag.$Storetag
                element-rule
                        name                                    reinv
                        parameter-name                          tag
                        type                                    header-param
                        action                                  sip-manip
                        new-value                               rejectreinv
sip-manipulation
        name                                    checkforBYE
        header-rule
                name                                    storeBYE
                header-name                             To
                action                                  manipulate
                comparison-type                         pattern-rule
                methods                                 BYE
                element-rule
                        name                                    storetheuser
                        type                                    uri-user
                        action                                  store
                        comparison-type                         pattern-rule
        header-rule
                name                                    checkBYE
                header-name                             Request-URI
                action                                  reject
                comparison-type                         boolean
                msg-type                                request
                methods                                 BYE
```

```
                match-value                             !($RURI_USER.$0 == $TO_USER.$0)
                new-value                               404:Not Found
sip-manipulation
        name                                    convertresp
        header-rule
                name                                    change503to580
                header-name                             @status-line
                action                                  manipulate
                msg-type                                reply
                element-rule
                        name                                    modStatusCode
                        type                                    status-code
                        action                                  replace
                        comparison-type                         pattern-rule
                        match-value                             (503|403)
                        new-value                               580
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
sip-manipulation
        name                                    dropACK
        header-rule
                name                                    rejectACK
                header-name                             To
                action                                  reject
                comparison-type                         boolean
                msg-type                                request
                methods                                 ACK
                match-value                             !($RURI USER.$0 == $TO USER.$0)
                new-value                               "698:Match Not Found"
sip-manipulation
        name                                    forsessionexpirestoNTT
        header-rule
                name                                    adduacforSE
                header-name                             Session-Expires
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                request
                methods                                 INVITE,UPDATE
                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                                    modminSE
                header-name                             Min-SE
                action                                  manipulate
                comparison-type                         pattern-rule
                msg-type                                request
                methods                                 INVITE
                element-rule
                        name                                    storeminsevalue
                        type                                    header-value
                        action                                  store
                        comparison-type                         pattern-rule
                        match-value                             (.*)
                element-rule
                        name                                    changevalue
                        type                                    header-value
                        action                                  replace
                        comparison-type                         pattern-rule
                        new-value                               180
        header-rule
                name                                    delminSE
                header-name                             Min-SE
                action                                  delete
                msg-type                                reply
        header-rule
                name                                    delminSEforUPDATE
                header-name                             Min-SE
                action                                  delete
                msg-type                                request
                methods                                 UPDATE
sip-manipulation
        name                                    inboundNTT
        header-rule
                name                                    changeToperPCPID
                header-name                             From
                action                                  sip-manip
                methods                                 INVITE
                new-value                               checkPCPID
        header-rule
                name                                    changeFromperPAI
                header-name                             From
                action                                  sip-manip
                methods                                 INVITE
                new-value                               checkPAI
        header-rule
                name                                    TC1282hr
                header-name                             From
                action                                  sip-manip
                methods                                 INVITE
                new-value                               TC1282
        header-rule
                name                                    TC1283hr
                header-name                             From
                action                                  sip-manip
                msg-type                                request
                new-value                               TC1283
        header-rule
                name                                    TC1284hr
                header-name                             From
                action                                  sip-manip
```

```
                methods                                 INVITE
                new-value                               TC1284
        header-rule
                name                                    rejPRACK
                header-name                             To
                comparison-type                         pattern-rule
                methods                                 BYE,PRACK
                match-value                             sip:*
                new-value                               rejectPRACK
        header-rule
                name                                    tc2215reinv
                header-name                             From
                msg-type                                request
                new-value                               checkTotag
        header-rule
                name                                    stoprecurseforreg
                header-name                             From
                action                                  sip-manip
                msg-type                                reply
                new-value                               regrecurse
        header-rule
                name                                    hmrforack
                header-name                             From
                msg-type                                request
                methods                                 ACK
                new-value                               dropACK
        header-rule
                name                                    ModSup
                header-name                             Supported
                action                                  manipulate
                comparison-type                         case-insensitive
                msg-type                                request
                methods                                 INVITE
                match-value                             TIMER,100REL
                new-value                               timer
        header-rule
                name                                    forprack
                header-name                             From
                action                                  sip-manip
                new-value                               PRACKResponseLocally
        header-rule
                name                                    Tc1227a
                header-name                             From
                action                                  sip-manip
                methods                                 INVITE
                new-value                               checkRURI
        header-rule
                name                                    forTC1254
                header-name                             From
                action                                  sip-manip
                msg-type                                request
                methods                                 BYE
                new-value                               checkforBYE
sip-manipulation
        name                                    modContact
        header-rule
                name                                    StoreTonumber
                header-name                             To
                action                                  manipulate
                element-rule
```

```
                        name                                    StoreTonumber_er
                        type                                    uri-user-only
                        action                                  store
        header-rule
                name                                    modcon
                header-name                             Contact
                action                                  manipulate
                element-rule
                        name                                    ChangeContact_er
                        type                                    uri-user
                        action                                  add
                        new-value                               $StoreTonumber.$StoreTonumber er.$0
sip-manipulation
        name                                    regrecurse
        header-rule
                name                                    checkcseq
                header-name                             CSeq
                action                                  sip-manip
                comparison-type                         pattern-rule
                msg-type                                reply
                match-value                             ([0-9]{1} REGISTER)
                new-value                               convertresp
sip-manipulation
        name                                    rejectPRACK
        header-rule
                name                                    rejectPRACK
                header-name                             To
                action                                  reject
                comparison-type                         pattern-rule
                msg-type                                request
                methods                                 BYE,PRACK
                match-value                             !($RURI_USER.$0 == $TO_USER.$0)
                new-value                               "481:Call/Transaction Does Not
Exist" sip-manipulation
        name                                    rejectreinv
        header-rule
                name                                    rejectreinv
                header-name                             To
                action                                  reject
                comparison-type                         pattern-rule
                msg-type                                request
                methods                                 INVITE,UPDATE
                match-value                             !($RURI_USER.$0 == $TO_USER.$0)
                new-value                               "404:Not found"
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=CT:99980\r\n
                element-rule
                        name                                    removealine
                        parameter-name                          application/sdp
```

```
                        type                                    mime
                        action                                  find-replace-all
                        comparison-type                         pattern-rule
                        match-value                             a=label:main-audio\r\n
spl-config
        spl-options
        plugins
                name                                    ocSurrogateRegister-1-6.pkg
        plugins
                name                                    ocNttMsgConverter-0-3.pkg
steering-pool
        ip-address                              172.16.1.21
        start-port                              41000
        end-port                                45000
        realm-id                                NTT-router
steering-pool
        ip-address                              192.168.4.97
        start-port                              35000
        end-port                                37000
        realm-id                                SFB
surrogate-agent
        register-host                           ntt.com
        register-user                           +81XXXXXXXXX
        realm-id                                SFB
        customer-next-hop                       ntt.com
        register-contact-host                   172.16.1.21
        register-contact-user                   +81XXXXXXXXX
        password                                ******
        register-expires                        3600
        auth-user                               user
        register-retry-time                     1800
system-config
        process-log-level                       DEBUG
        default-gateway                         172.16.1.15
translation-rules
        id                                      addforJP
        type                                    add
        add-string                              +
translation-rules
        id                                      remove81
        type                                    delete
        delete-string                           +
web-server-config
        inactivity-timeout                      0
```

Troubleshooting Tools

If you find that you are not able to complete calls or have problems with the test cases, there are a few tools available for Windows Server, SFB Server, and the Oracle E-SBC like logging and tracing which may be of assistance. In this section we will provide a list of tools which you can use to aid in troubleshooting any issues you may encounter.

Since we are concerned with communication between the Skype for Business Mediation server and the SBC we will focus on the troubleshooting tools to use between those devices if calls are not working or tests are not passing.

On the Oracle SBC 4600 Series

The Oracle SBC provides a rich set of statistical counters available from the ACLI, as well as log file output with configurable detail. The follow sections detail enabling, adjusting and accessing those interfaces.

Resetting the statistical counters, enabling logging and restarting the log files.

At the SBC Console:

```
oraclesbc1# reset sipd
oraclesbc1# notify sipd debug
oraclesbc1#
enabled SIP Debugging
oraclesbc1# notify all rotate-logs
```

Examining the log files

Note: You will FTP to the management interface of the SBC with the username user and user mode password (the default is "**acme**").

```
C:\Documents and Settings\user>ftp 192.168.5.24
Connected to 192.168.85.55.
220 oraclesbc1FTP server (VxWorks 6.4) ready.
User (192.168.85.55:(none)): user
331 Password required for user.
Password: acme
230 User user logged in.
ftp> cd /ramdrv/logs
250 CWD command successful.
ftp> get sipmsg.log
200 PORT command successful.
150 Opening ASCII mode data connection for '/ramdrv/logs/sipmsg.log' (3353
bytes).
226 Transfer complete.
ftp: 3447 bytes received in 0.00Seconds 3447000.00Kbytes/sec.
ftp> get log.sipd
200 PORT command successful.
150 Opening ASCII mode data connection for '/ramdrv/logs/log.sipd' (204681
bytes).
226 Transfer complete.
ftp: 206823 bytes received in 0.11Seconds 1897.46Kbytes/sec.
ftp> bye
221 Goodbye.
```

You may now examine the log files with the text editor of your choice.

Through the Web GUI

You can also check the display results of filtered SIP session data from the Oracle Enterprise Session Border Controller, and provides traces in a common log format for local viewing or for exporting to your PC. Please check the “Monitor and Trace” section (page 145) of the Web GUI User Guide available at http://docs.oracle.com/cd/E56581_01/index.htm

Telnet

Since we are working within an architecture which uses bound TCP listening ports for functionality, the simplest form of troubleshooting can be seeing if the devices are listening on a particular port, as well as confirming that the there is nothing blocking them such as firewalls. Ensure that you have a TELNET client available on a workstation as well as on the Lync Server mediation server.

The Skype for Business Mediation server will listen on TCP port 5068 by default for SIP signaling. In our example we are listening on 5060 on the PSTN facing NIC. From the Standard Edition pool or Enterprise Edition pool the Mediation Server would be listening on port 5061. Tests may include:

- Client to pool server: **`telnet <servername> 5061`**
- Pool server to Mediation Server: **`telnet <servername> 5061`**

Appendix A

Accessing the ACLI

Access to the ACLI is provided by:

- The serial console connection;
- TELNET, which is enabled by default but may be disabled; and
- SSH, this must be explicitly configured.

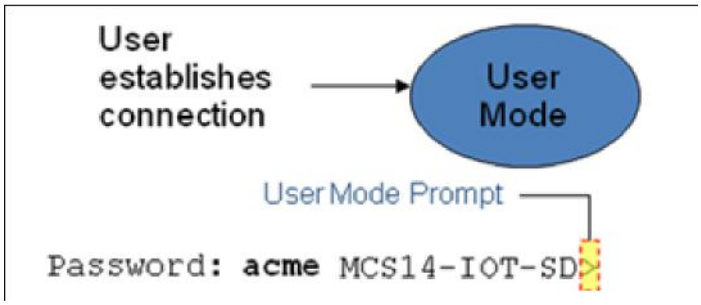
Initial connectivity will be through the serial console port. At a minimum, this is how to configure the management (eth0) interface on the SBC.

ACLI Basics

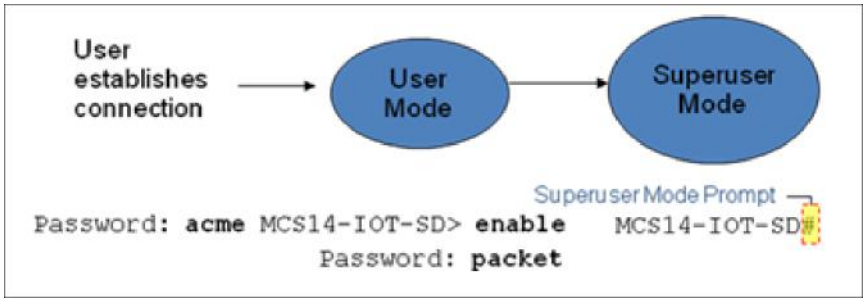
There are two password protected modes of operation within the ACLI, User mode and Superuser mode.

When you establish a connection to the SBC, the prompt for the User mode password appears. The default password is acme.

User mode consists of a restricted set of basic monitoring commands and is identified by the greater than sign (>) in the system prompt after the target name. You cannot perform configuration and maintenance from this mode.



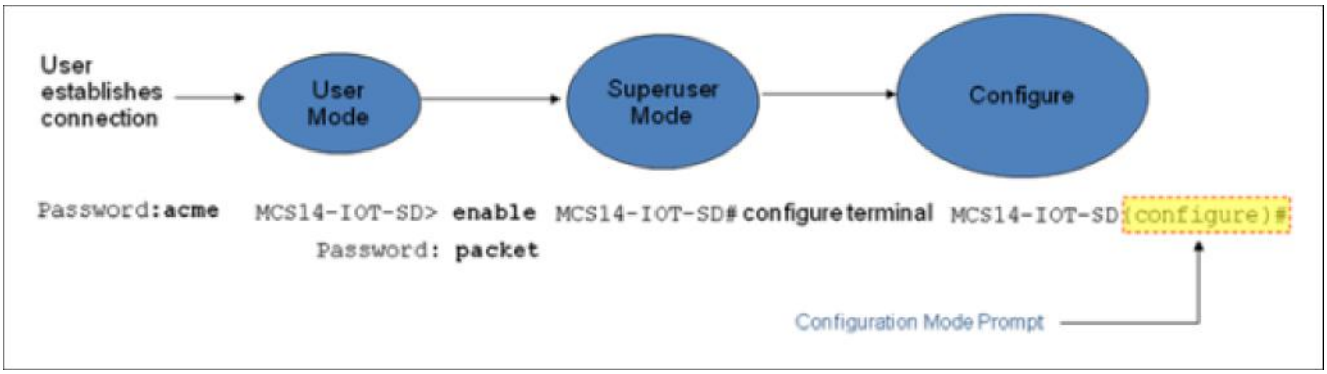
The Superuser mode allows for access to all system commands for operation, maintenance, and administration. This mode is identified by the pound sign (#) in the prompt after the target name. To enter the Superuser mode, issue the enable command in the User mode.



From the Superuser mode, you can perform monitoring and administrative tasks; however you cannot configure any elements. To return to User mode, issue the exit command.

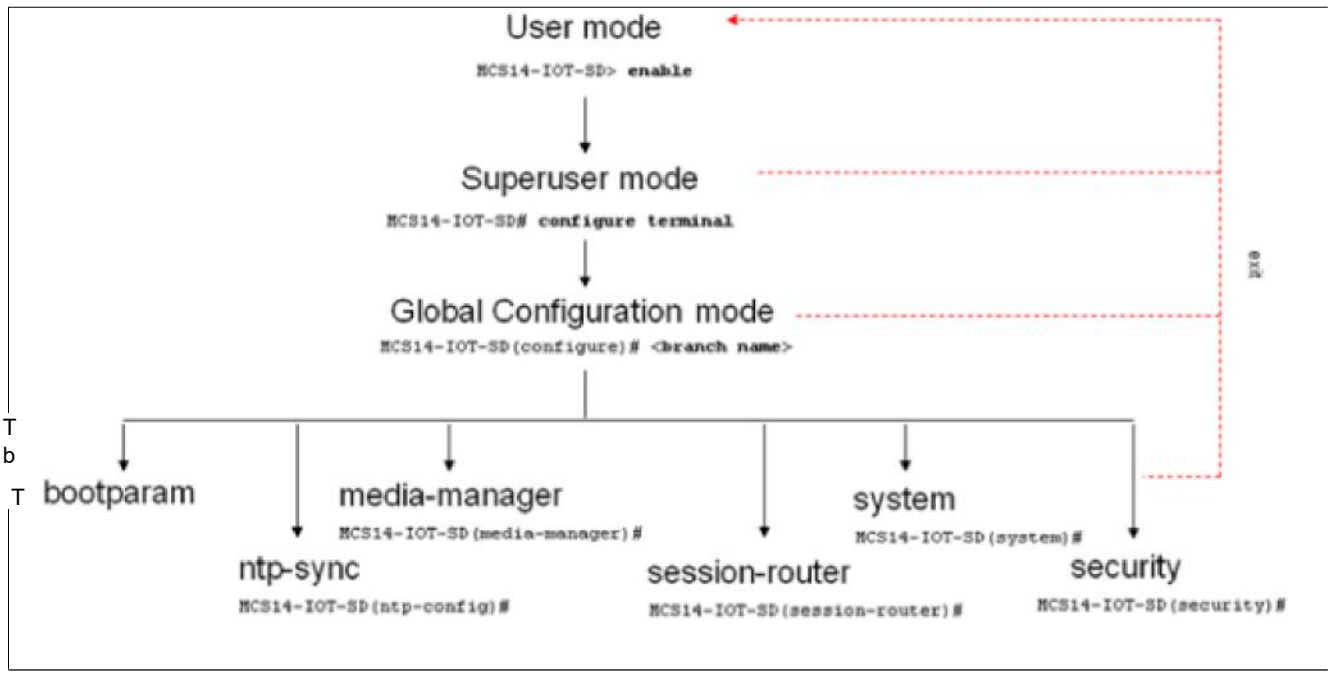
You must enter the Configuration mode to configure elements. For example, you can access the configuration branches and configuration elements for signaling and media configurations. To enter the Configuration mode, issue the **`configure terminal`** command in the Superuser mode.

Configuration mode is identified by the word configure in parenthesis followed by the pound sign (#) in the prompt after the target name, for example, **oraclesbc1(configure)#**. To return to the Superuser mode, issue the **`exit`** command.



In the configuration mode, there are six configuration branches:

- bootparam;
- ntp-sync;
- media-manager;
- session-router;
- system; and
- security.



- inet on ethernet – The IP address and subnet mask (in hex) of the management port of the SD.
- host inet –The IP address of external server where image file resides.
- user and ftp password – Used to boot from the external FTP server.
- gateway inet – The gateway IP address for reaching the external server, if the server is located in a different network.

```
'.' = clear field;  '-' = go to previous field;  q = quit
boot device             : eth0
processor number        : 0
host name               :
file name               : /tffs0/nnSCX620.gz
inet on ethernet (e)    : 10.0.3.11:ffff0000
inet on backplane (b)   :
host inet (h)           : 10.0.3.100
gateway inet (g)        : 10.0.0.1
user (u)                : anonymous
ftp password (pw) (blank = rsh)       : anonymous
flags (f)               : 0x8
target name (tn)        : MCS14-IOT-SD
startup script (s)      :
other (o)
```

The ntp-sync branch provides access to ntp server configuration commands for synchronizing the SBC time and date.
The security branch provides access to security configuration.

The system branch provides access to basic configuration elements as system-config, snmp-community, redundancy, physical interfaces, network interfaces, etc.

The session-router branch provides access to signaling and routing related elements, including H323-config, sip-config, iwf-config, local-policy, sip-manipulation, session-agent, etc.

The media-manager branch provides access to media-related elements, including realms, steering pools, dns-config, media-manager, and so forth.

You will use media-manager, session-router, and system branches for most of your working configuration.

Configuration Elements

The configuration branches contain the configuration elements. Each configurable object is referred to as an element. Each element consists of a number of configurable parameters.

Some elements are single-instance elements, meaning that there is only one of that type of the element- for example, the global system configuration and redundancy configuration.

Some elements are multiple-instance elements. There may be one or more of the elements of any given type. For example, physical and network interfaces.

Some elements (both single and multiple instance) have sub-elements. For example:

- SIP-ports - are children of the sip-interface element
- peers – are children of the redundancy element
- destinations – are children of the peer element

Creating an Element

1. To create a single-instance element, you go to the appropriate level in the ACLI path and enter its parameters. There is no need to specify a unique identifier property because a single-instance element is a global element and there is only one instance of this element.
2. When creating a multiple-instance element, you must specify a unique identifier for each instance of the element.
3. It is important to check the parameters of the element you are configuring before committing the changes. You do this by issuing the **show** command before issuing the **done** command. The parameters that you did not configure are filled with either default values or left empty.
4. On completion, you must issue the **done** command. The done command causes the configuration to be echoed to the screen and commits the changes to the volatile memory. It is a good idea to review this output to ensure that your configurations are correct.
5. Issue the **exit** command to exit the selected element.

Note that the configurations at this point are not permanently saved yet. If the SBC reboots, your configurations will be lost.

Editing an Element

The procedure of editing an element is similar to creating an element, except that you must select the element that you will edit before editing it.

1. Enter the element that you will edit at the correct level of the ACLI path.
2. Select the element that you will edit, and view it before editing it.
   The **select** command loads the element to the volatile memory for editing. The **show** command allows you to view the element to ensure that it is the right one that you want to edit.
3. Once you are sure that the element you selected is the right one for editing, edit the parameter one by one. The new value you provide will overwrite the old value.
4. It is important to check the properties of the element you are configuring before committing it to the volatile memory. You do this by issuing the **show** command before issuing the **done** command.
5. On completion, you must issue the **done** command.
6. Issue the **exit** command to exit the selected element.

Note that the configurations at this point are not permanently saved yet. If the SBC reboots, your configurations will be lost.

Deleting an Element

The **no** command deletes an element from the configuration in editing.

To delete a single-instance element,

1. Enter the **no** command from within the path for that specific element
2. Issue the **exit** command.

To delete a multiple-instance element,

1. Enter the **no** command from within the path for that particular element.
   The key field prompt, such as <name>:<sub-port-id>, appears.
2. Use the <Enter> key to display a list of the existing configured elements.
3. Enter the number corresponding to the element you wish to delete.
4. Issue the **select** command to view the list of elements to confirm that the element was removed. Note that the

configuration changes at this point are not permanently saved yet. If the SBC reboots, your configurations will be lost.

Configuration Versions

At any time, three versions of the configuration can exist on the SBC: the edited configuration, the saved configuration, and the running configuration.

- The **edited configuration** – this is the version that you are making changes to. This version of the configuration is stored in the SBC's volatile memory and will be lost on a reboot.
  To view the editing configuration, issue the **`show configuration`** command.
- The **saved configuration –** on issuing the **`save-config`** command, the edited configuration is copied into the non-volatile memory on the SBC and becomes the saved configuration. Because the saved configuration has not been activated yet, the changes in the configuration will not take effect. On reboot, the last activated configuration (i.e., the last running configuration) will be loaded, not the saved configuration.
- The **running configuration** is the saved then activated configuration. On issuing the **`activate-config`** command, the saved configuration is copied from the non-volatile memory to the volatile memory. The saved configuration is activated and becomes the running configuration. Although most of the configurations can take effect once being activated without reboot, some configurations require a reboot for the changes to take effect.
  To view the running configuration, issue command show **`running-config`**.

Saving the Configuration

The **`save-config`** command stores the edited configuration persistently.

Because the saved configuration has not been activated yet, changes in configuration will not take effect. On reboot, the last activated configuration (i.e., the last running configuration) will be loaded. At this stage, the saved configuration is different from the running configuration.

Because the saved configuration is stored in non-volatile memory, it can be accessed and activated at later time.

Upon issuing the **`save-config`** command, the SBC displays a reminder on screen stating that you must use the **`activate-config`** command if you want the configurations to be updated.


```
oraclesbc1 # save-config
Save-Config received, processing.
waiting 1200 for request to finish
Request to 'SAVE-CONFIG' has Finished,
Save complete
Currently active and saved configurations do not match!
To sync & activate, run 'activate-config' or 'reboot activate'.
oraclesbc1 #
```

Activating the Configuration

On issuing the **`activate-config`** command, the saved configuration is copied from the non-volatile memory to the volatile memory. The saved configuration is activated and becomes the running configuration.

Some configuration changes are service affecting when activated. For these configurations, the SBC warns that the change could have an impact on service with the configuration elements that will potentially be service affecting. You may decide whether or not to continue with applying these changes immediately or to apply them at a later time.

```
oraclesbc1# activate-config
Activate-Config received, processing.
waiting 120000 for request to finish
Request to 'ACTIVATE-CONFIG' has Finished,
Activate Complete
oraclesbc1#
```

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