Nexmo SIP Trunking Configuration Guide

Skype for Business 6.0.9319 With Oracle E-SBC Acme Packet 3820 ECZ7.3.0 Patch 2 (Build 75)

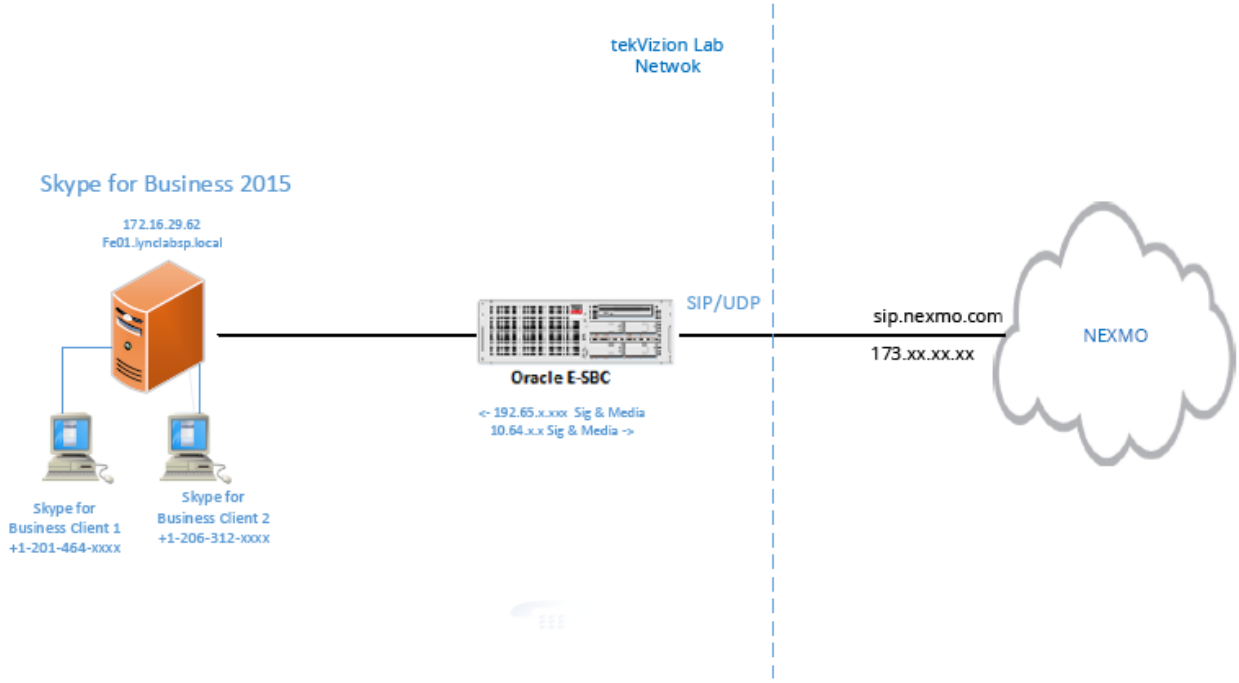
July 2017

1 Audience

This document is intended for the SIP trunk customer's technical staff and Value Added Retailer (VAR) having installation and operational responsibilities. This configuration guide provides steps for configuring Skype for Business 6.0.9319 and Oracle Enterprise SBC Acme Packet 3820 ECZ7.3.0 Patch 2 (Build 75) to Nexmo SIP Trunking services.

2 SIP Trunking Network Components

The network for the SIP trunk reference configuration is illustrated below and is representative of a Skype for Business and Oracle SBC configuration to Nexmo SIP trunking.



2.1 Network Components

Component	Version	Comments
Skype for Business	6.0.9319	
Oracle E-SBC	Acme Packet 3820 ECZ7.3.0 Patch 2 (Build 75)	
Microsoft Exchange Server 2016	15.1.225.42	Microsoft Exchange UM

Skype for Business Client	15.0.47.7.1000	
Cisco IP Phone	Model: CP-7965	This Cisco IP Phone is the PSTN test device
	App Load ID: jar45sccp.9-4-2TH1-1.sbn	
	Boot Load ID: tnp65.9-3-1-CR17.bin	

3 Features

3.1.1 Features Supported

- Incoming and outgoing off-net calls using G711ULAW & G711ALAW voice codecs
- Calling Line (number) Identification Presentation
- Calling Line (number) Identification Restriction
- Call hold and resume
- Call transfer (unattended and attended)
- Call Conference
- Call forward (All, No answer)
- DTMF relay both directions (RFC2833)
- Media flow-through on Oracle E-SBC

3.1.2 Features Not Supported by PBX

- None

3.1.3 Features Not Tested

- None

3.1.4 Caveats and Limitations

- No Session Audit message is sent from Nexmo
- Session refresh is always done by Nexmo. Skype for Business does Session refresh only through UPDATE message and Nexmo does not support UPDATE.

4 Configuration

4.1 IP Address Worksheet

The specific values listed in the table below and in subsequent sections are used in the lab configuration described in this document, and are for **illustrative purposes only**. The customer must obtain and use the values for your deployment.

Component	Lab Value	Customer Value
Oracle E-SBC		
LAN IP Address	10.70.59.40	
LAN Subnet Mask	255.255.255.0	
WAN IP Address	192.xx.xx.xxx	
WAN Subnet Mask	255.255.255.128	
Skype for Business		
System IP Address	172.16.29.62	

4.2 Configuring Skype for Business

This section describes the Skype for Business configuration necessary to support connectivity to Oracle E-SBC. A SIP trunk is established between Skype for Business and Oracle E-SBC for use by signaling traffic to and from Nexmo via Oracle E-SBC.

4.2.1 Enable TCP Mode

Skype for Business and Oracle E-SBC will communicate over TCP since UDP is not supported by Skype for Business. To enable TCP mode in Skype for Business follow the steps below.

1. Navigate to **Mediation Pools** in the Skype for Business Topology Builder
2. Here we use the co-located mediation server to communicate with the Oracle E-SBC
3. Right click and click **Edit**
4. Assign **Listening ports** for TCP on the Skype for Business side
5. Check **Enable TCP Port** option

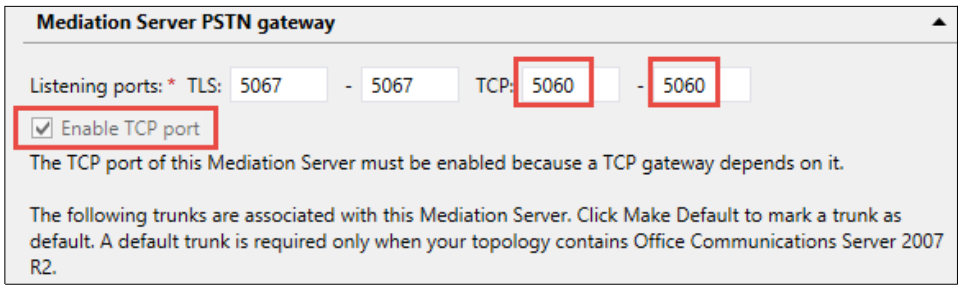
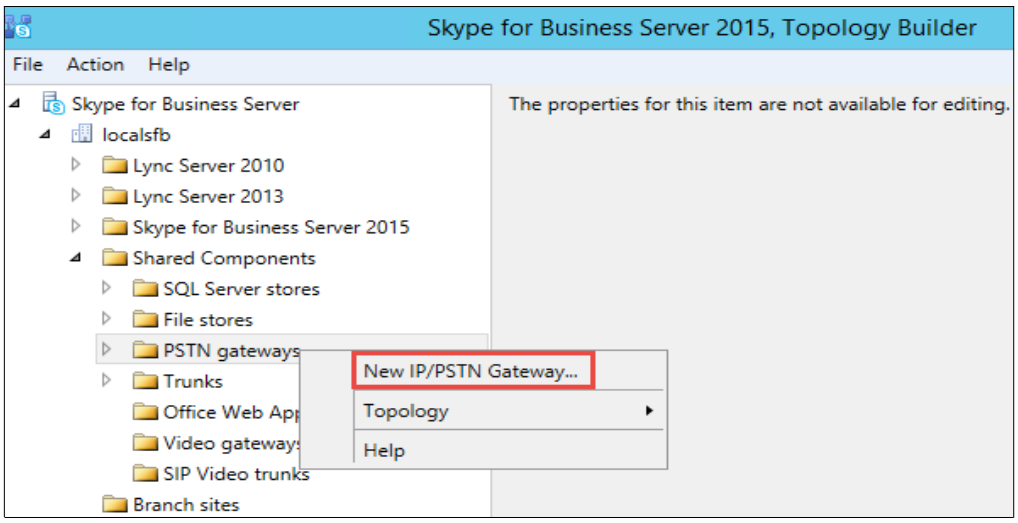


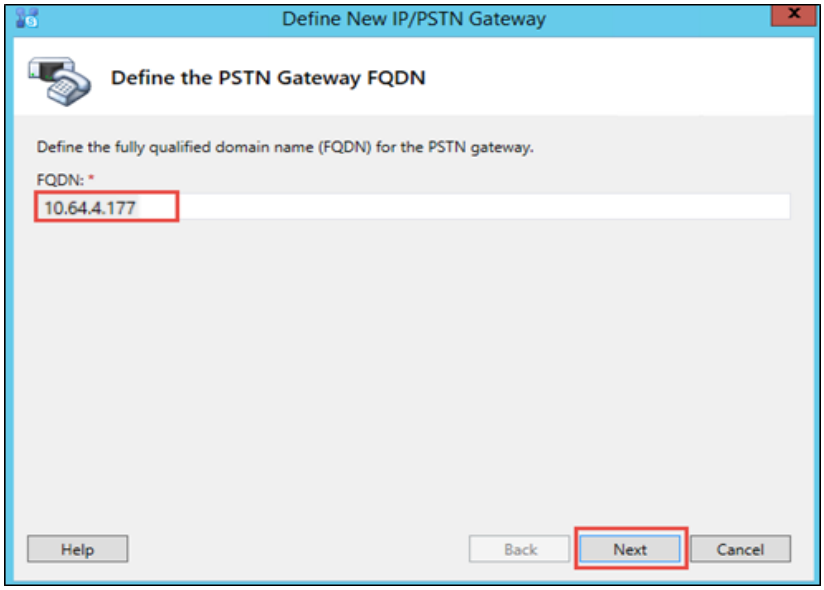
Figure 2: TCP Mode

4.2.2 Adding a Trunk

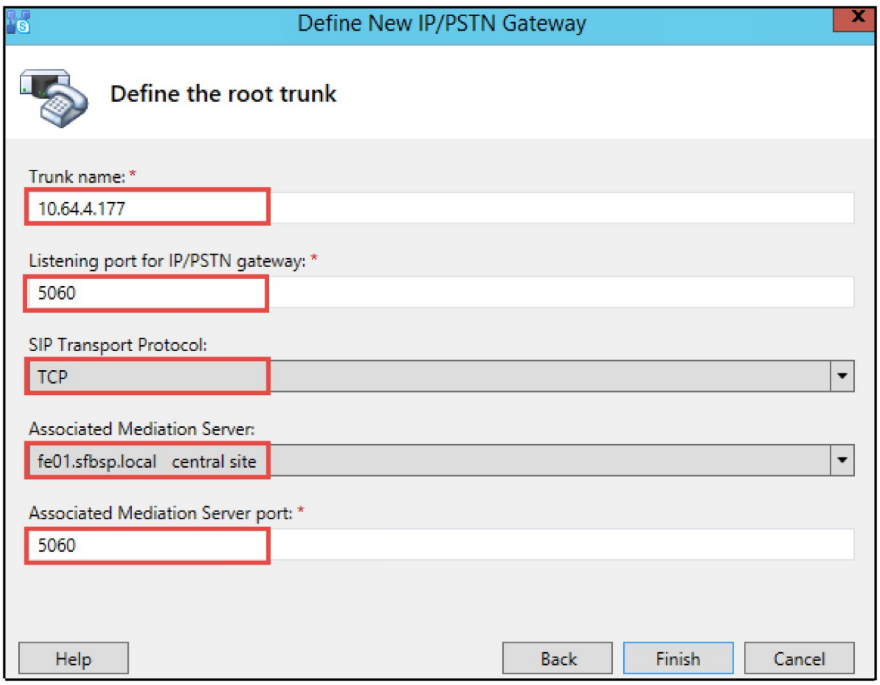
1. Right click on the **PSTN gateways** option and select **New IP/PSTN Gateway**



2. Enter the IP address of the Oracle E-SBC
3. Click **Next**

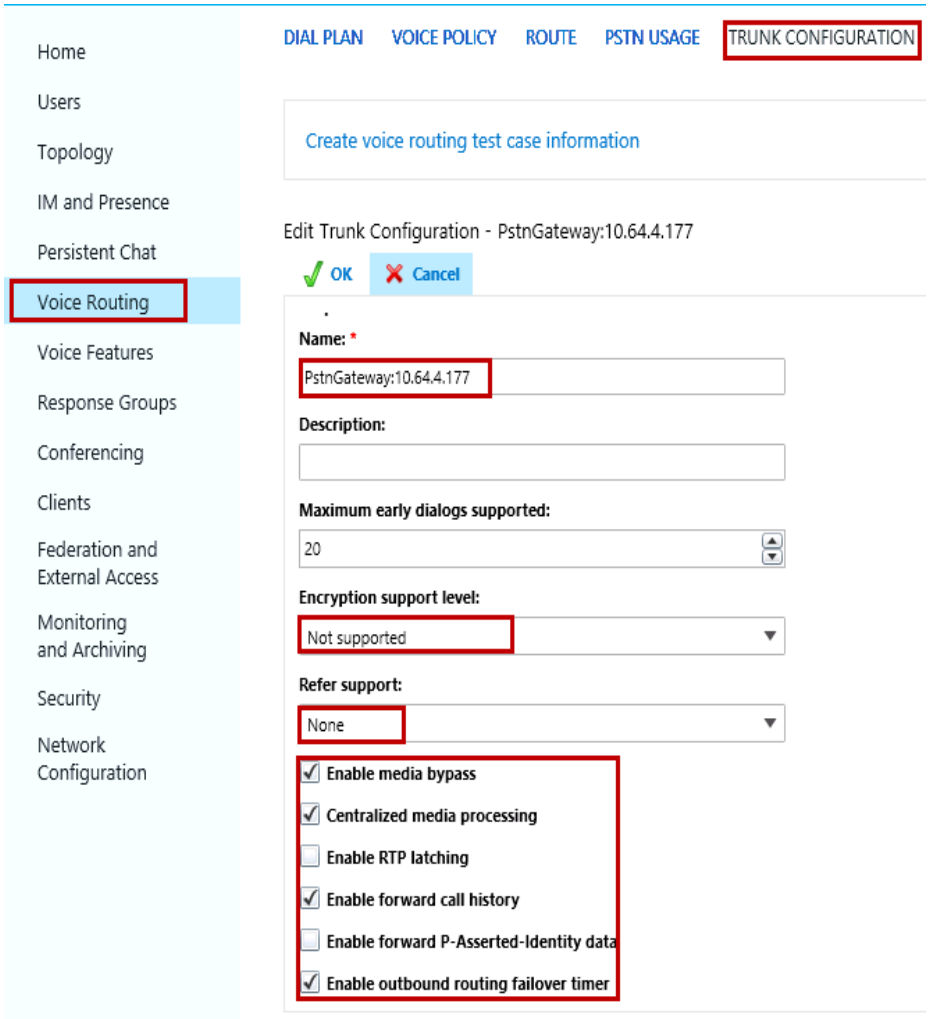


4. In **Define the root trunk** page
5. **Trunk name:** 10.64.4.177 (Oracle E-SBC LAN IP)
6. **Listening Port for IP/PSTN Gateway:** 5060, Configure the listening port of the SBC
7. **SIP Transport Protocol:** Select **TCP**
8. **Associated Mediation Server:** fe01.sfbsp.local,Select the mediation pool to be associated
9. **Associated Mediation Server port:** 5060
10. Click **Finish**
11. Publish the topology for the configuration to be reflected



4.2.3 Trunk Configuration

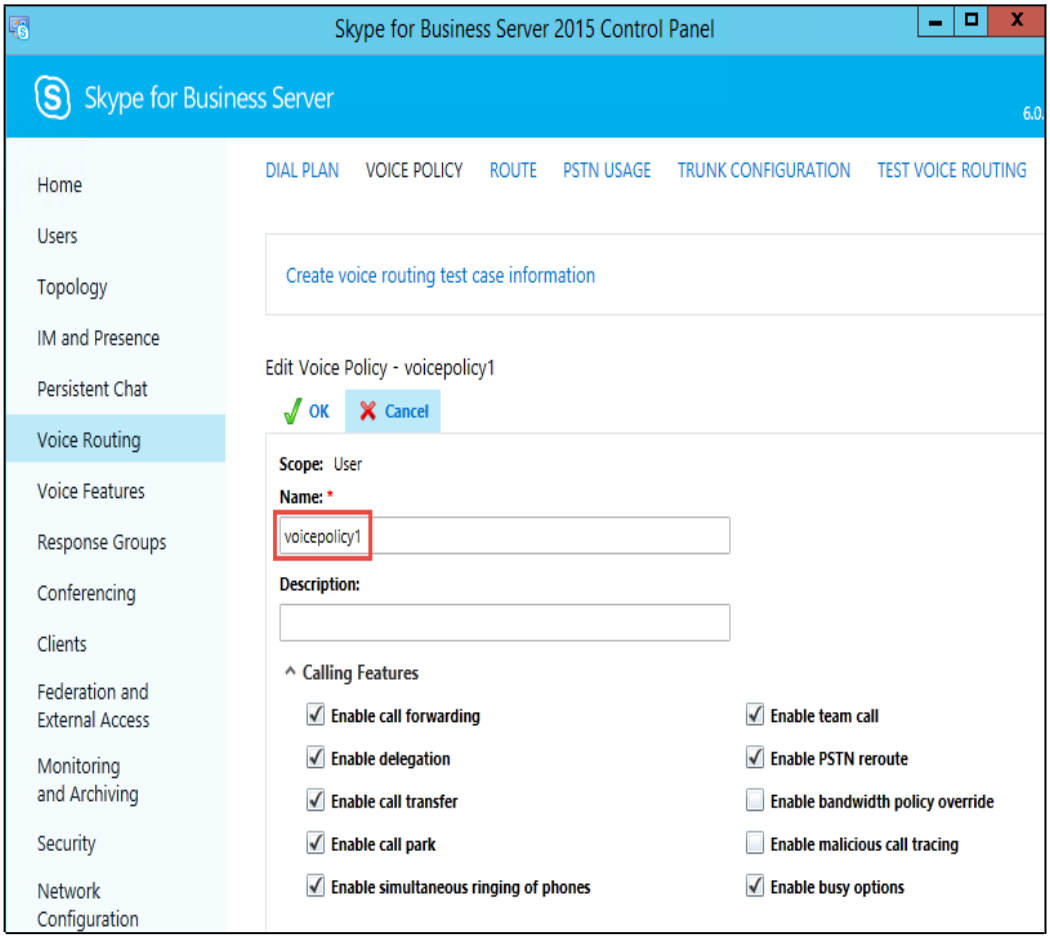
1. Open the Skype for Business Control Panel
2. Navigate to **Voice Routing**
3. Go to the **TRUNK CONFIGURATION** page
4. Click **New** and select **Pool Trunk**
5. In the **Select a Service** page, select the trunk added in section 4.2.2
6. Assign a name
7. Set **Encryption Support Level:** Select *Not supported*
8. Set **Refer Support:** *None*
9. Set the remaining options as seen in the figure below
10. Click **OK** and **Commit** the changes.



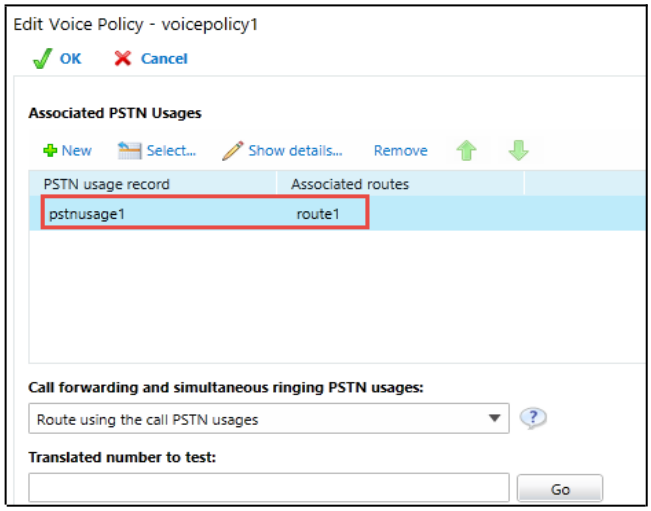
4.2.4 Voice Routing

The trunk created in the previous step needs to be assigned to a Route. This is done so that when a Skype for Business user dials a call out to the Nexmo, the calls terminate via the configured Oracle E-SBC trunk.

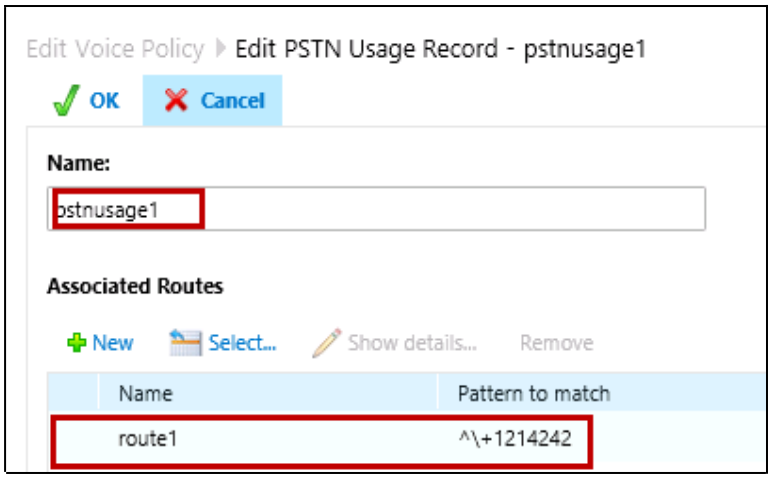
1. Open the Skype for Business control panel
2. Navigate to **Voice Routing → VOICE POLICY**
3. A **Dial Plan** can be configured for users if any digit modifications are needed. Here the Global Dial Plan is used.
4. Configure a **Voice Policy** for the users to use when dialing a call out to the Oracle E-SBC

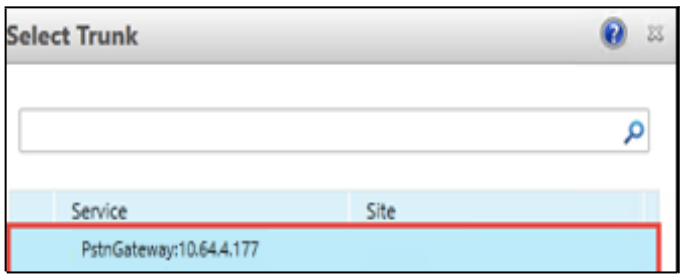


5. Click **New** under **Associated PSTN Usages** to create a new PSTN Usage
6. Assign a name
7. Click **New** under **Associated Routes** to create a new Route



8. Assign a **Name** for the new route
9. Create a match pattern for the calls going out under **Build a Pattern to match** section. Here **"+1214242**" is used to match PSTN number.
10. Select the Trunk under **Associated trunks** section and click **OK**



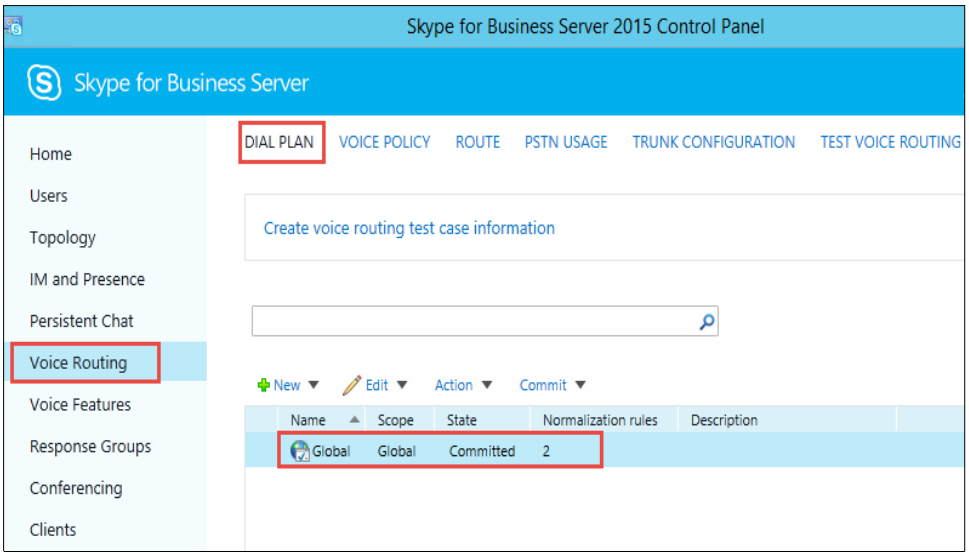


11. Save the Route
12. Save the PSTN Usage
13. Save the Voice Policy
14. Commit all the changes

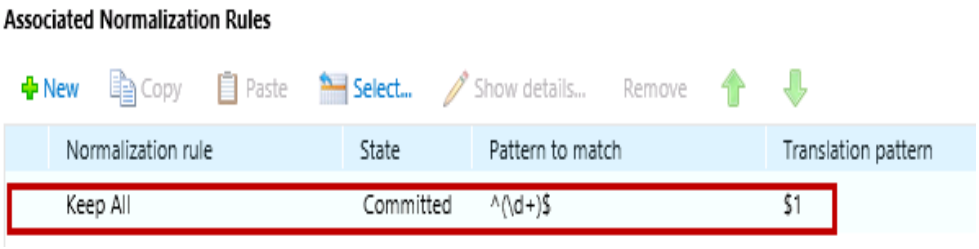
4.2.5 Dial Plan

Dial Plan is used to strip or insert digits.

1. Navigate to **Voice Routing** section in the **Skype for Business Control Panel**
2. Select **Global Dial Plan.** Here the Global Dial Plan is used.



3. Open the Global dial plan
4. Navigate to **Associated Normalization Rules** and add normalization rules
5. **Keep All** is a default normalization rule which allows all the numbers
6. **Save** the changes



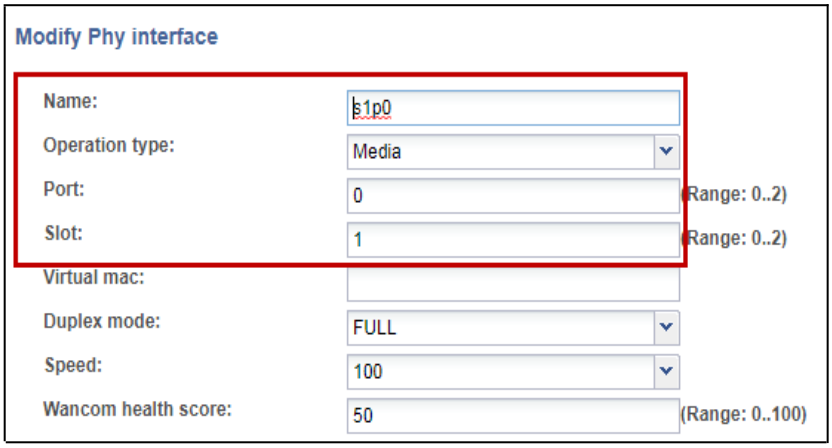
4.3 Oracle E-SBC Configuration

4.3.1 Create Physical Interfaces

This section defines the physical interfaces to the Skype for Business and Nexmo networks.

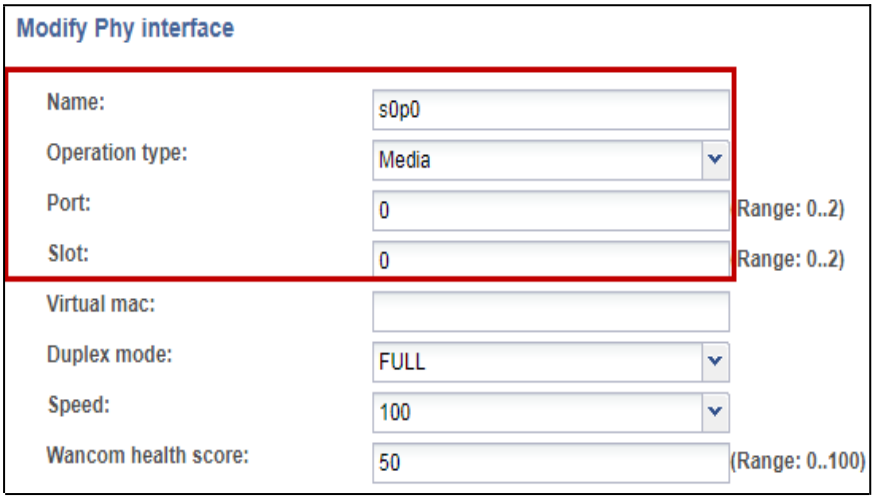
4.3.1.1 Physical Interface for Skype for Business

1. Navigate to **Configuration → Objects → system → phy-interface**
2. Click **Add**
3. **Name:** s1p0
4. **Operation Type:** Media
1. **Port:** 0
5. **Slot:** 1
6. Click **OK**



4.3.1.2 Physical Interface for Nexmo

1. Navigate to **Configuration → Objects → system → phy-interface**
2. Click **Add**
3. **Name:** s0p0
4. **Operation Type:** Media
2. **Port:** 0
5. **Slot:** 0
6. Click **OK**

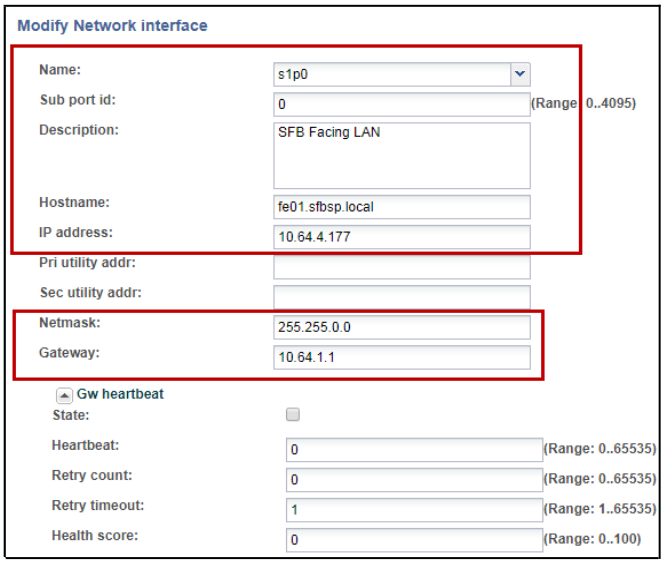


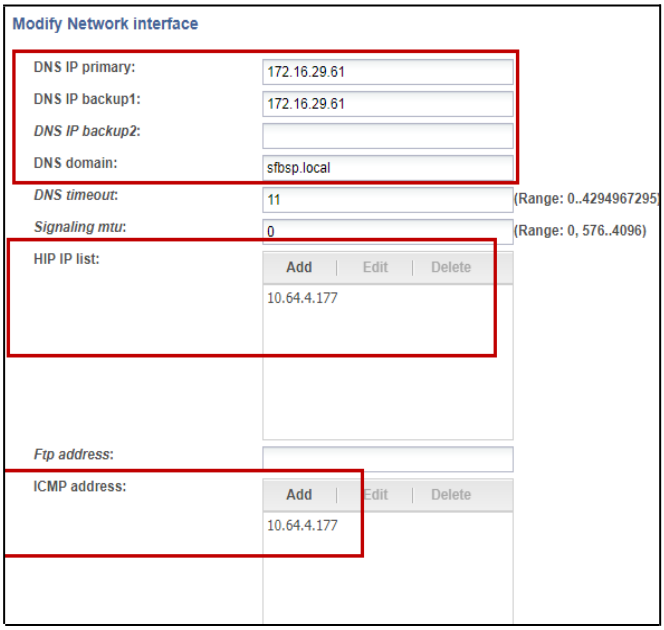
4.3.2 Create Network Interfaces

This section defines the network interfaces to the Skype for Business and Nexmo networks.

4.3.2.1 Network Interface for Skype for Business

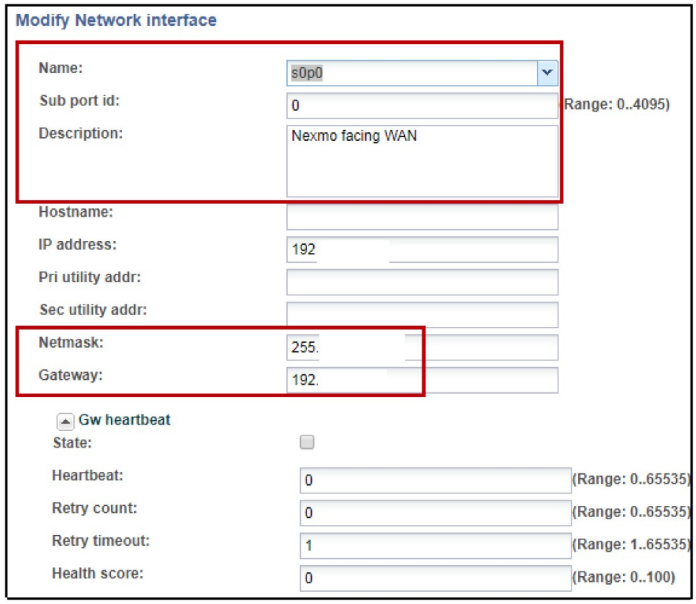
1. Navigate to **Configuration → Objects → system → network-interface**
2. Click **Add**
3. **Name:** s1p0
4. **Sub port id:** 0
5. **Hostname:** fe01.sfpsp.local (Skype for Business FQDN)
6. **IP address:** 10.64.4.177 (E-SBC LAN IP)
7. **Netmask:** 255.255.0.0
8. **Gateway:**10.64.1.1
9. Click **OK**

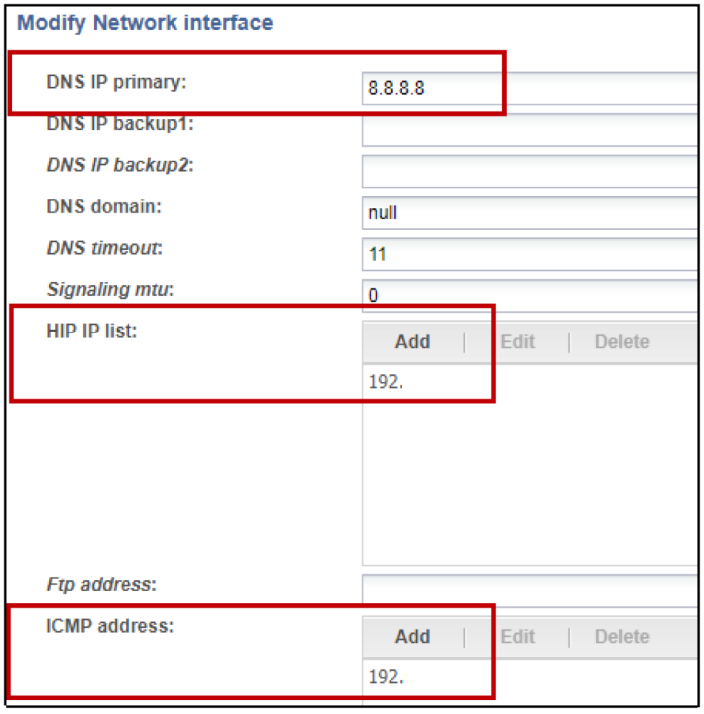




4.3.2.2 Network Interface for Nexmo

1. Navigate to **Configuration → Objects → system → network-interface**
2. Click **Add**
3. **Name:** s0p0
4. **Sub port id:** 0
5. **IP address:** 192.xx.xx.xxx (E-SBC WAN IP)
6. **Netmask:** 255.xxx.x.x
7. **Gateway:**192.x.x.x
8. Click **OK**



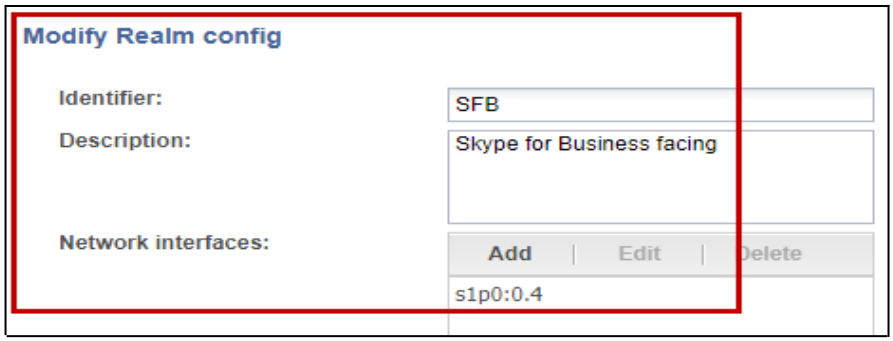


4.3.3 Create Realm-config

Realms are used as a basis for determining egress and ingress associations between physical and network interfaces.

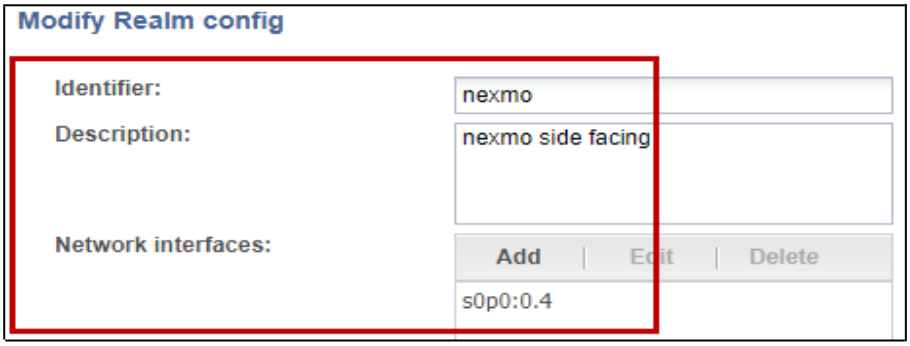
4.3.3.1 Realm for Skype for Business

1. Navigate to **Configuration → Objects → media-manager → realm-config**
2. Click **Add**
3. **Identifier:** SFB
4. **Network Interfaces:** Click Add and select Skype for Business Network interface
5. Click **OK**



4.3.3.2 Realm for Nexmo

1. Navigate to **Configuration → Objects → media-manager → realm-config**
2. Click **Add**
3. **Identifier:** nexmo
4. **Network Interfaces:** Click Add and select Nexmo Network interface
5. Click **OK**

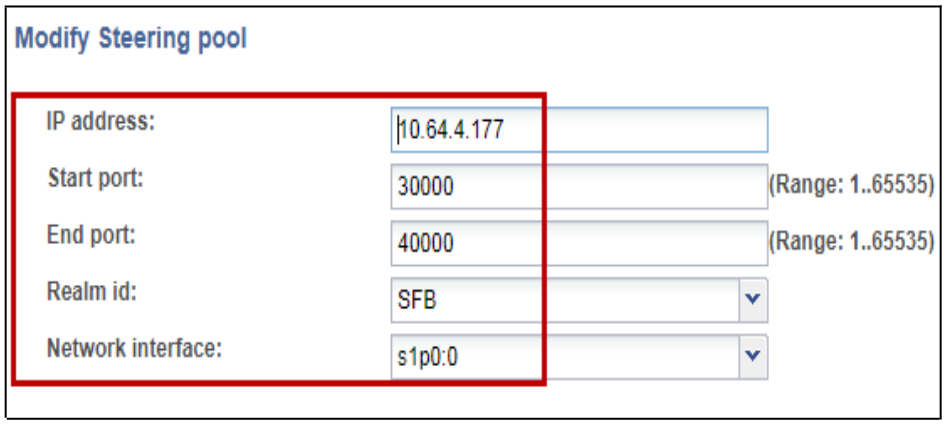


4.3.4 Create Steering Pool

Steering pool define sets of ports that are used for steering media flows through the Acme Packet E-SBC.

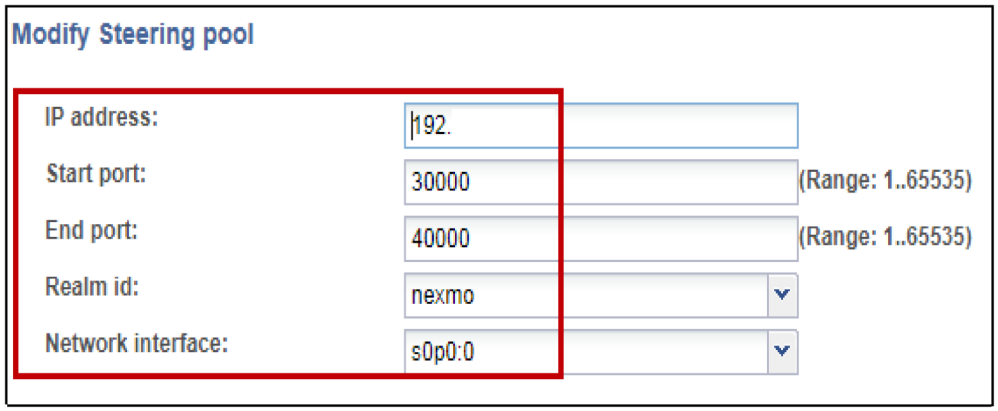
4.3.4.1 Steering Pool for Skype for Business

1. Navigate to **Configuration → Objects → media-manager → steering-pool**
2. Click **Add**
3. **IP Address:** 10.64.4.177 (E-SBC LAN IP)
4. **Realm ID:** SFB (Realm of Skype for Business)
5. **Network Interface:** Select Skype for Business Network interface
6. Click **OK**



4.3.4.2 Steering pool for Nexmo

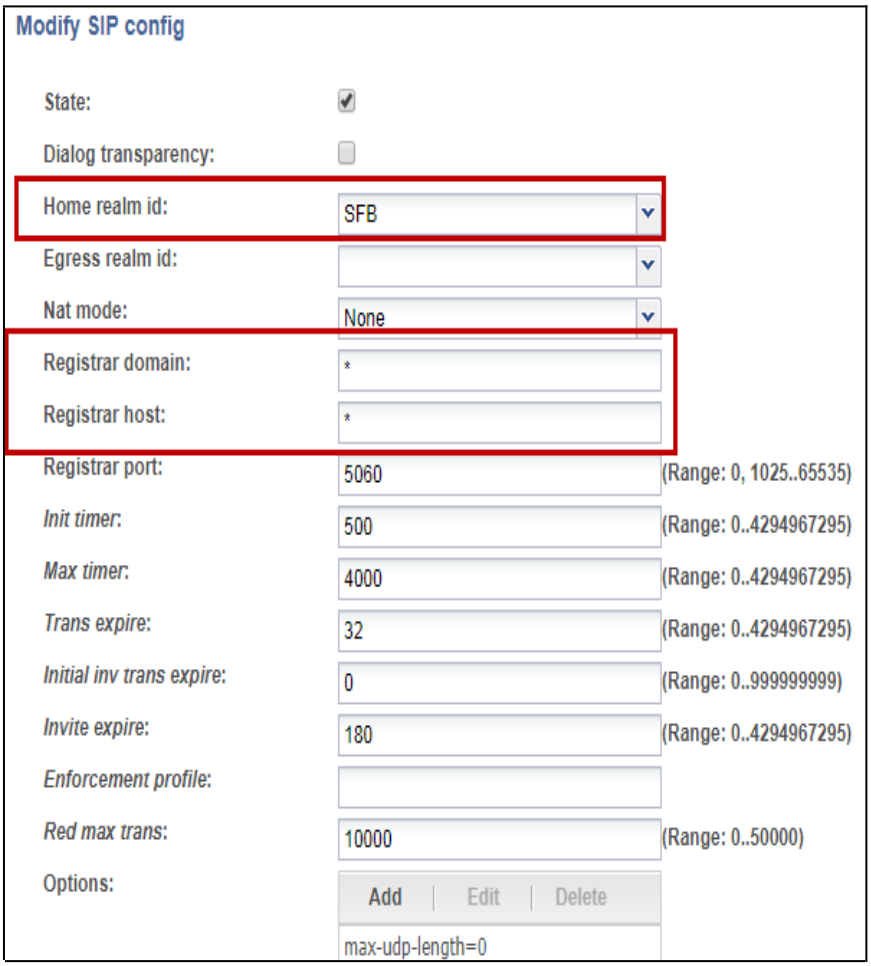
1. Navigate to **Configuration → Objects → media-manager → steering-pool**
2. Click **Add**
3. **IP Address:** 192.x.x.x (E-SBC WAN IP)
4. **Realm ID:** nexmo (Realm of Nexmo)
5. **Network Interface:** Select Nexmo Network interface
6. Click **OK**



4.3.5 Modify SIP Config

SIP-config sets the values for the Acme Packet SIP operating parameters.

1. Navigate to **Configuration → Objects → session-router → sip-config → Modify**
2. **Home Realm ID:** SFB (Realm of Skype for Business)
3. **Registrar Domain:** * (This option is required when using Registration Method)
4. **Registrar Host:** * (This option is required when using Registration Method)
5. Click **OK**

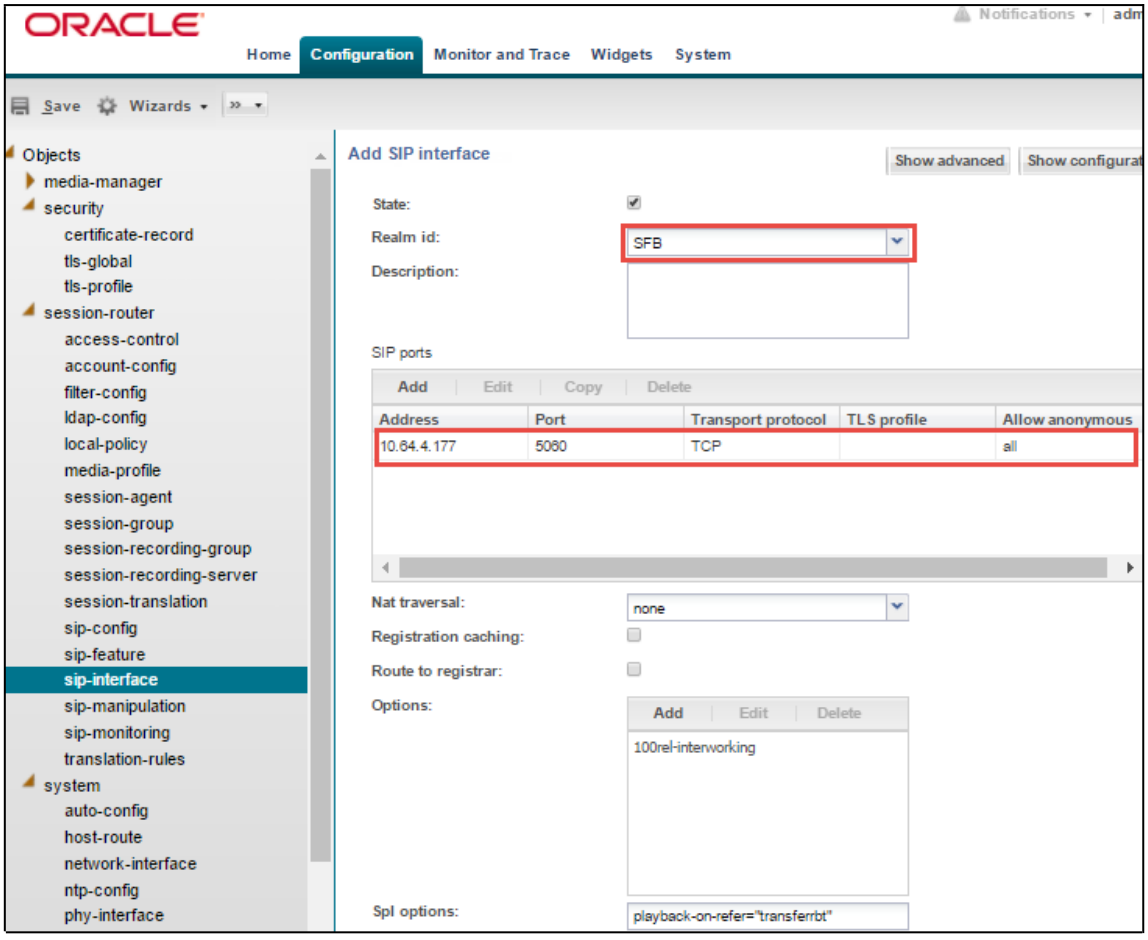


4.3.6 Create SIP Interface

SIP interface defines the signaling interface (IP address and port) to which the Acme Packet E-SBC sends and receives SIP messages. SIP Interface and Realm ID are created for both Skype for Business and Nexmo

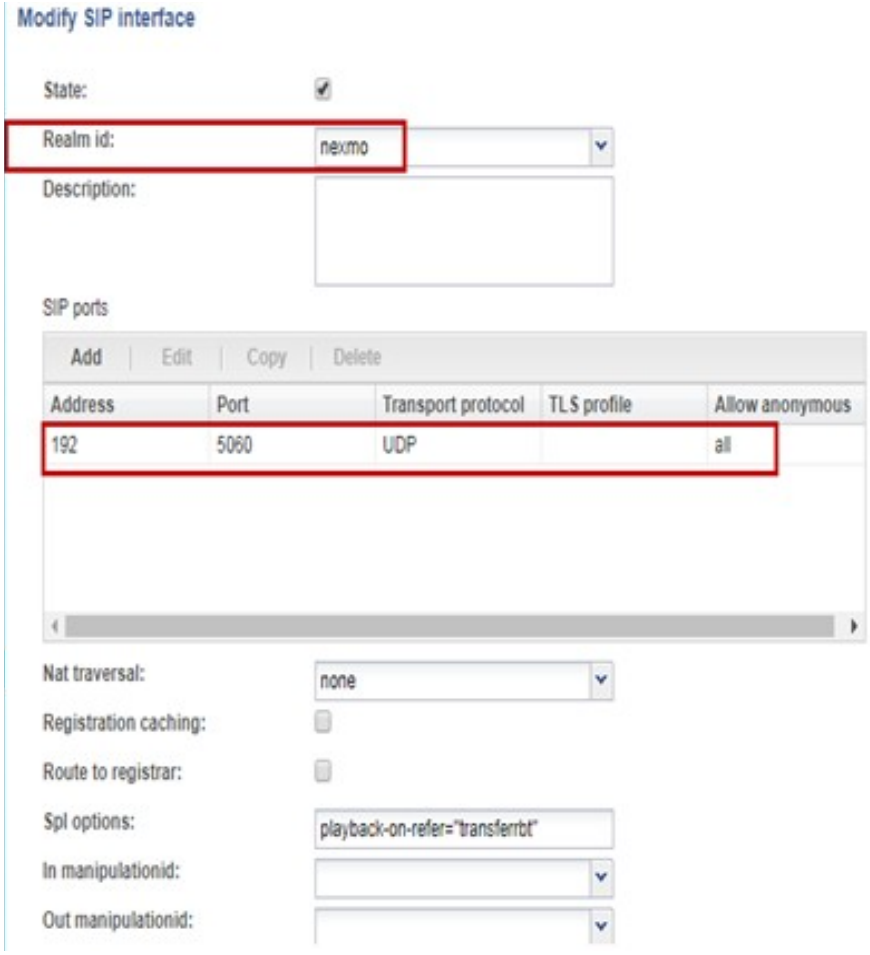
4.3.6.1 SIP Interface for Skype for Business

1. Navigate to **Configuration → Objects → session-router → sip-interface**
2. Click **Add**
3. **Realm ID:** SFB
4. **SIP Ports:** Click Add
5. **Address:** Enter the SBC LAN IP address
6. **Port:** Configure the SBC listening port for TCP
7. **Transport Protocol:** TCP
8. **Allow Anonymous**: *all*, for example
9. Click **OK**



4.3.6.2 SIP Interface for Nexmo

1. Navigate to **Configuration → Objects → session-router → sip-interface**
2. Click **Add**
3. **Realm ID:** Nexmo
4. **SIP Ports:** Click Add
5. **Address:** Enter the SBC WAN IP Address
6. **Port:** Configure the SBC listening port for TCP
7. **Transport Protocol:** UDP
8. **Allow Anonymous**: *all,* for example
9. Click **OK**

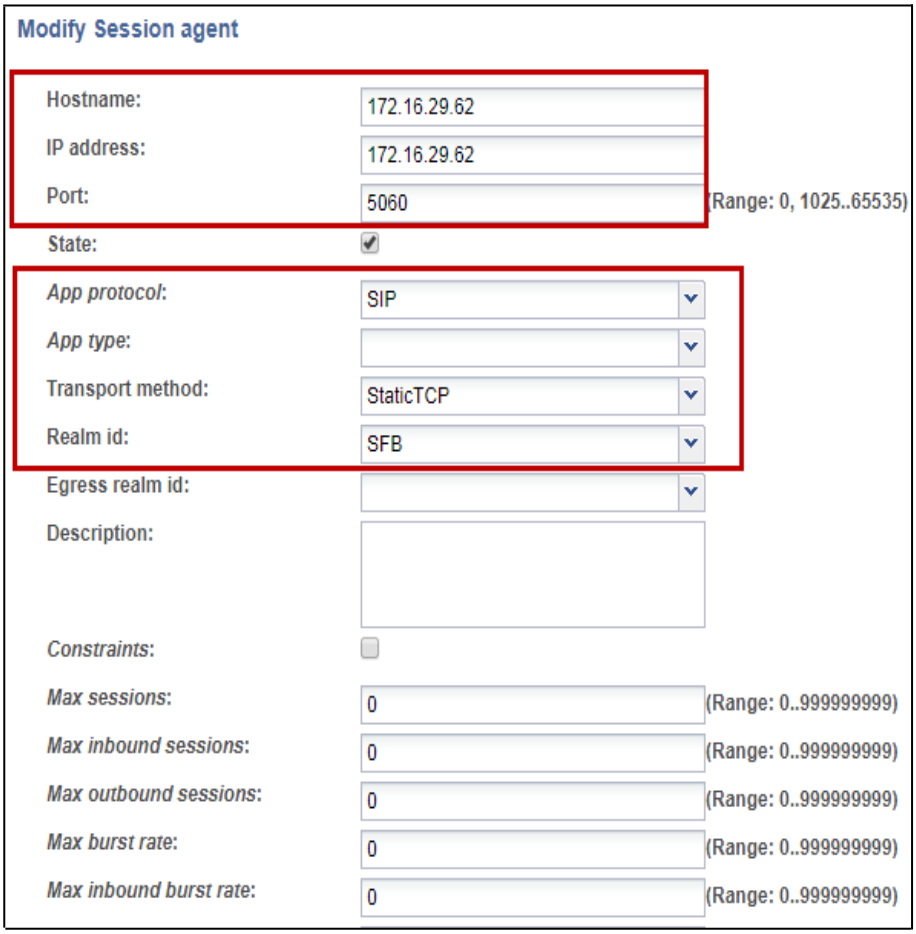


4.3.7 Create Session Agent

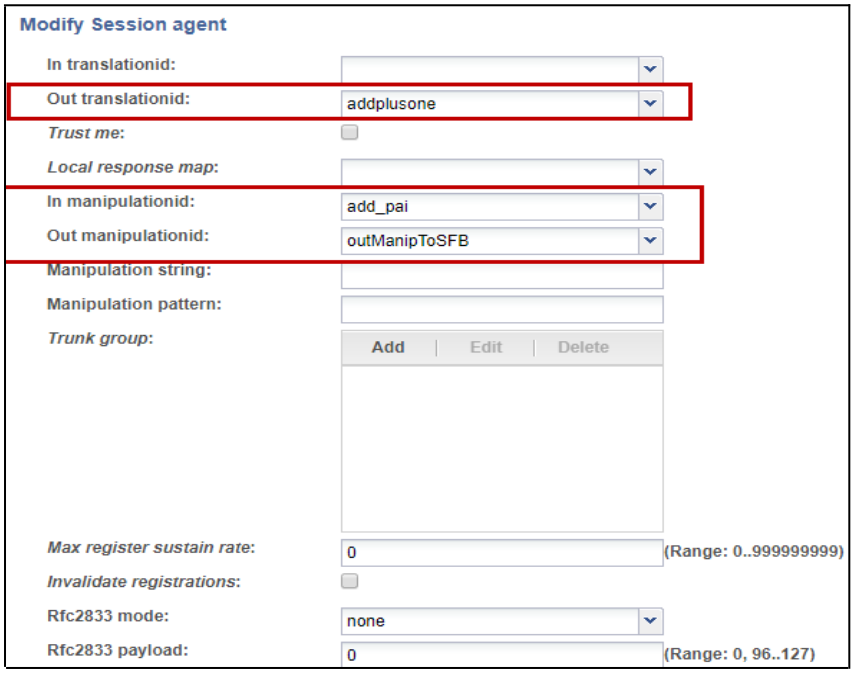
A session agent defines an internal “next hop” signaling entity for the SIP traffic. A realm is associated with a session agent to identify sessions coming from or going to the session agent. Session agents are created for both Skype for Business and Nexmo.

4.3.7.1 Session Agent for Skype for Business

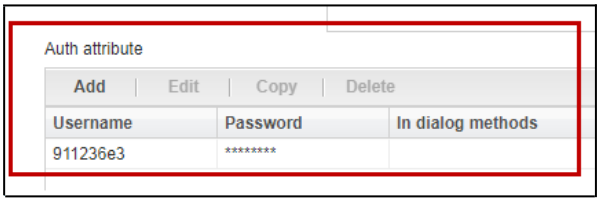
1. Navigate to **Configuration → Objects → session-router → session-agent**
2. Click **Add** or **Modify**
3. **Hostname:** 172.16.29.62, for example
4. **IP Address:** 172.16.29.62, for example
5. **Port:** Configure the PBX listening port
6. **Transport Method:** StaticTCP
7. **Realm ID:** SFB



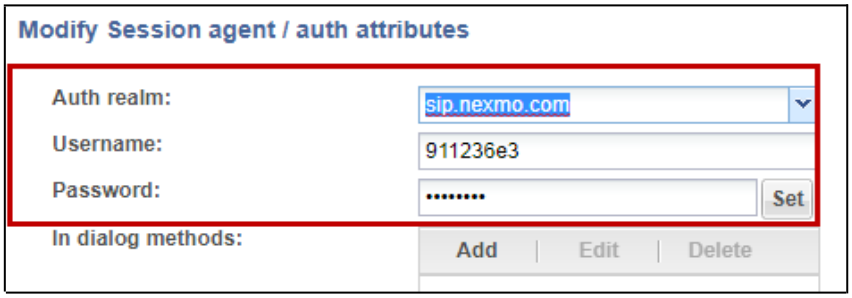
8. **Out translationid:** addplusone
9. **In manipulationid:** add_pai
10. **Out manipulationid:** outManipToSFB



11. Click **Add** under **Auth attribute**

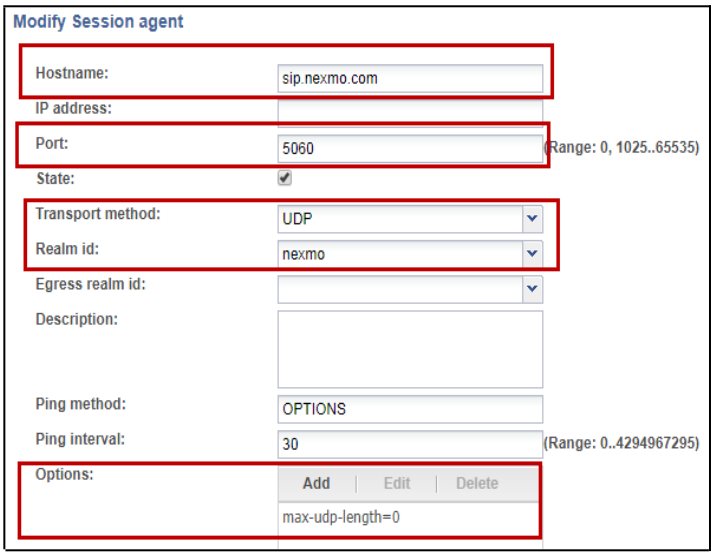


12. **Auth Realm**: Nexmo FQDN (sip.nexmo.com is used for this test) provided by Nexmo
13. **Username**: User name (911236e3 is used for this test) provided by Nexmo
14. **Password**: Password provided by Nexmo
15. Click **OK**

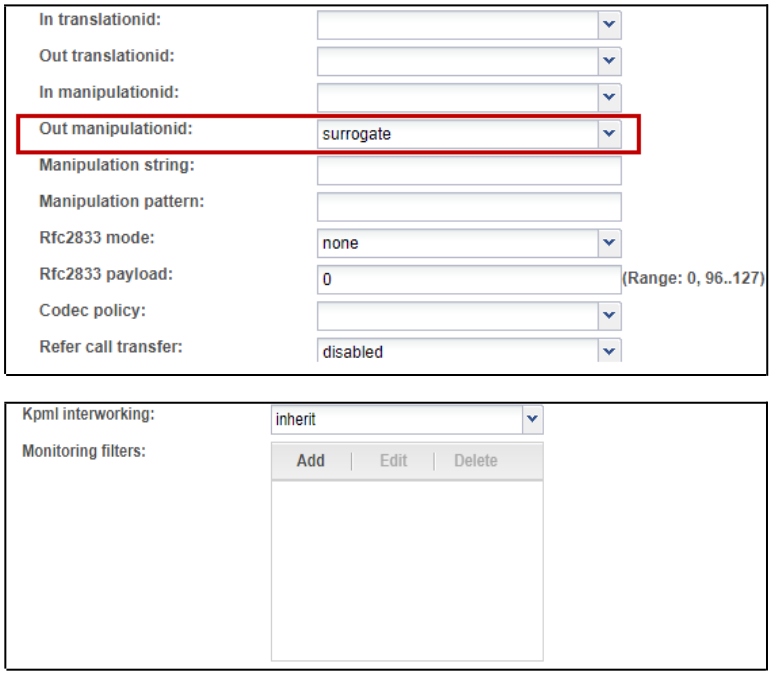


4.3.7.2 Session Agent for Nexmo

1. Navigate to **Configuration → Objects → session-router → session-agent**
2. Click **Add** or **Modify**
3. **Hostname:** Enter the hostname (sip.nexmo.com is issued for this test)
4. **Port:** Configure the PBX listening port
5. **Transport method:** UDP
6. **Realm ID:** Nexmo
7. **Options:** max-udp-length=0 (Note: This setting allows the SBC to fragment UDP packets. Otherwise the maximum size a UDP packet may be is 1500 bytes.). Without this setting, E-SBC sends “513 MESSAGE TOO LARGE” if a UDP packet length is more than 1500 bytes.



8. **Out manipulationid:** Surrogate
9. Click **OK**

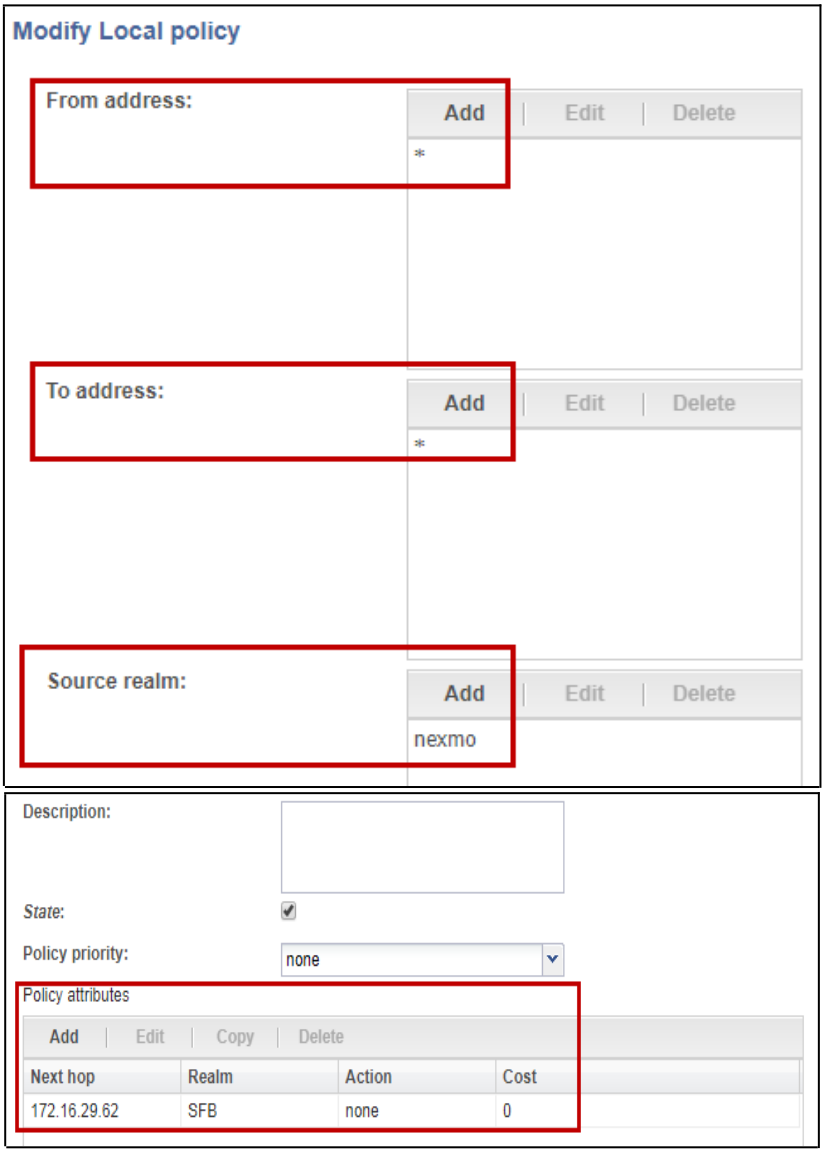


4.3.8 Create Local Policy

Local policies are defined to allow any SIP request from Skype for Business realm to be routed to the Nexmo realm and vice-versa.

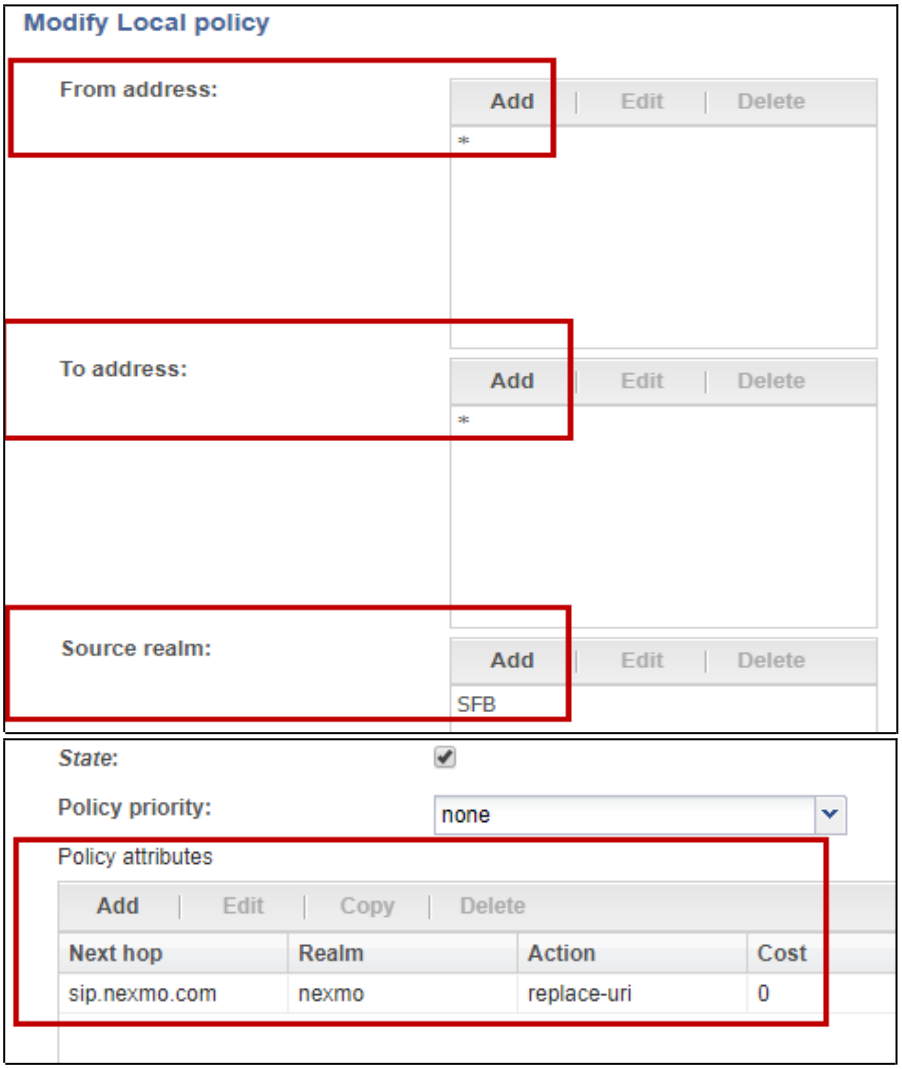
4.3.8.1 Local Policy for Skype for Business

1. Navigate to **Configuration → Objects → session-router → local-policy**
2. Click **Add** or **Modify**
3. **From Address:** * - Used in this example
4. **To Address**: * - Used in this example
5. **Source Realm:** nexmo
6. **Policy Attributes:** Add or Edit
7. **Next Hop:** Enter the Skype For Business IP Address
8. **Realm:** SFB
9. **Cost:** 0
10. Click **OK**



4.3.8.2 Local Policy for Nexmo

1. Navigate to **Configuration → Objects → session-router → local-policy**
2. Click **Add** or **Modify**
3. **From Address:** * is used in this example
4. **To Address**: ***** - This is used in this example
5. **Source realm:** SFB
6. **Policy Attributes:** Add or Edit
7. **Next Hop:** Enter the Nexmo FQDN
8. **Realm:** nexmo
9. **Action:** *replace-uri* is used in this example
10. **Cost:** 0
11. Click **OK**

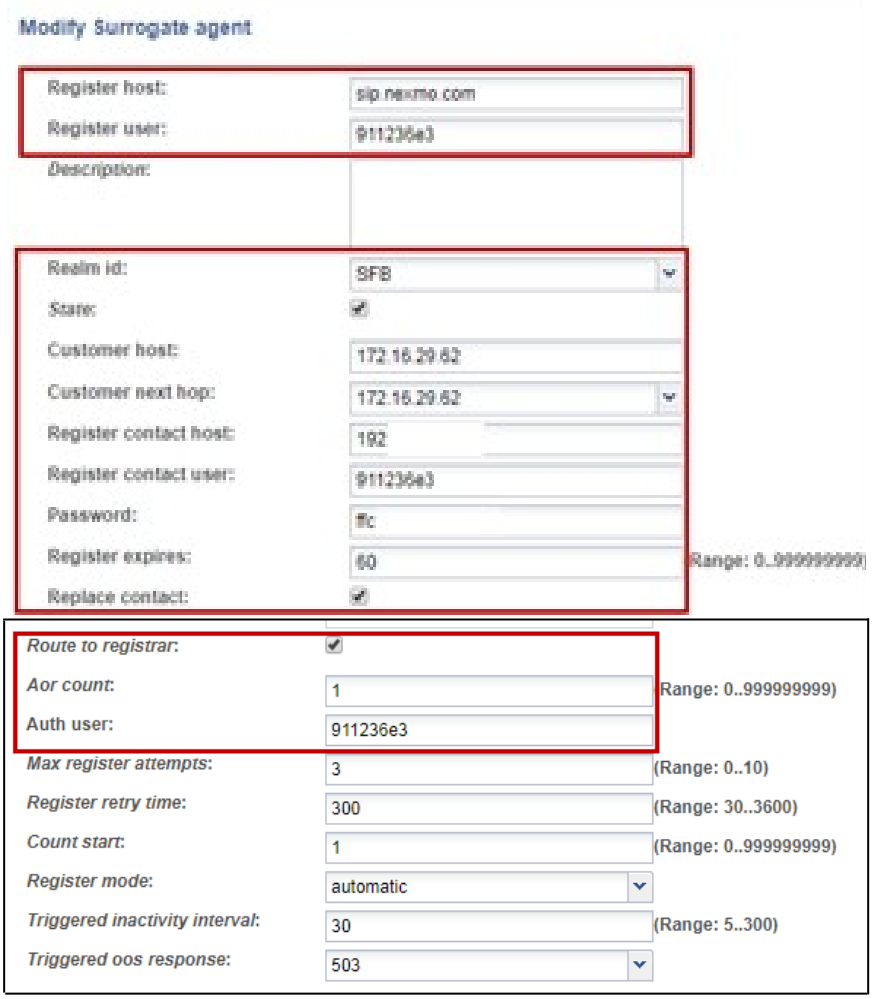


4.3.9 Create Surrogate Agent

Surrogate registration allows the Acme Packet SBC to perform trunk side registrations to the Nexmo network. The values for register-user, register-contact-user and password are provided by Nexmo.

1. Navigate to **Configuration → Objects → Show advanced → session-router → surrogate-agent**
2. **Register Host:** sip.nexmo.com is used in this example
3. **Register User**: 911236e3 is used in this example
4. **Realm ID:** SFB
5. **Customer Host:** 172.16.29.62 (Skype for Business IP)
6. **Customer Next Hop:** 172.16.29.62 (Skype for Business IP)
7. **Register Contact Host:** SBC WAN IP
8. **Register Contact User:** 911236e3 is used in this example

9. **Password:** Type the Authentication password
10. **Register Expires:** 60 is used for this test
11. **Route to Registrar:** Enabled
12. **Auth User:** 911236e3 is used in this example
13. Click **OK**



4.3.10 Create Translation Rules

The below translation rule is applied to Out translationid of Skype for Business Session agent. This adds + in the user part of the TO header.

1. Navigate to **Configuration → Objects → session-router → translation-rules**
2. Click **Add**
3. **ID:** addplus1 (Identifier name used for this test)
4. **Type:** add
5. **Add String:** +

4.3.11 Create SIP Manipulation

SIP manipulation specifies rules for manipulating the contents of specified SIP headers. For the Compliance test, a set of SIP manipulations were configured that contain a set of SIP header manipulation rules (HMR) on traffic From or To with respect to Nexmo and Skype for Business.

4.3.11.1 SIP Manipulation for Skype for Business

add_pai rule is applied in the SIP header coming from Skype for business to Oracle E-SBC. The manipulation script is assigned to **In manipulationid** of Session agent of Skype for Business.

```
sip-manipulation
      name                        add_pai[1]
      description
      split-headers
      join-headers
      header-rule
            name                  add_pai[2]
            header-name           P-ASSERTED-IDENTITY
            action                add
            comparison-type       case-sensitive
            msg-type              request
            methods               INVITE
            match-value
            new-value             <sip:+$FROM_USER.$0+@192.xx.xx.xxx;user=phone>


      header-rule
            name                  inactsendonlytosendrecv[3]
            header-name           Content-Type
            action                manipulate
            comparison-type       case-sensitive
            msg-type              request
            methods               INVITE
            match-value
```

1 HMR for SIP headers coming from Skype for Business to E-SBC

2 SIP manipulation rule developed to insert P-Asserted-Identity header

3 SIP manipulation rule developed to change SDP attribute from INACTIVE to SENDRECV in the INVITE

```
        new-value
        element-rule
            name                    inactivetosendrecv
            parameter-name          application/sdp
            type                    mime
            action                  find-replace-all
            match-val-type          any
            comparison-type         case-sensitive
            match-value             a=inactive
            new-value               a=sendrecv
        element-rule
            name                    sendonlytosendrecv[4]
            parameter-name          application/sdp
            type                    mime
            action                  find-replace-all
            match-val-type          any
            comparison-type         case-sensitive
            match-value             a=sendonly
            new-value               a=sendrecv
    header-rule
        name                        sessionrefresh[5]
        header-name                 Session-Expires
        action                      manipulate
        comparison-type             case-sensitive
        msg-type                    reply
        methods
        match-value
        new-value
        element-rule
            name                    uactouas
            parameter-name
            type                      header-value
            action                    find-replace-all
            match-val-type            any
            comparison-type           case-sensitive
            match-value               refresher=uas
            new-value                 refresher=uac
```

outManipToSFB rule is applied to SIP headers sending from Oracle E-SBC to Skype for business. The manipulation script is assigned to **out manipulationid** of Session agent of Skype for Business.

```
sip-manipulation
    name                        outManipToSFB[6]
    description                 To SFB
```

4 SIP manipulation rule developed to change SDP attribute from SENDONLY to SENDRECV in the INVITE

5 SIP manipulation rule developed to change Session refresher parameter from UAS to UAC in the response message

6 HMR for SIP headers sending from E-SBC to Skype for Business.

split-headers
join-headers
header-rule
name From[7]
header-name From
action manipulate
comparison-type case-sensitive
msg-type request
methods
match-value
new-value
element-rule
name From_header
parameter-name
type uri-host
action replace
match-val-type any
comparison-type case-sensitive
match-value
new-value $LOCAL_IP
header-rule
name To[8]
header-name To
action manipulate
comparison-type case-sensitive
msg-type request
methods
match-value
new-value
element-rule
name To
parameter-name
type uri-host
action replace
match-val-type any
comparison-type case-sensitive
match-value
new-value sfpsp.local

header-rule
name modURI[9]
header-name Request-uri
action manipulate
comparison-type case-sensitive
msg-type any
methods

7 SIP manipulation rule developed for changing the URI host IP to local SBC LAN IP in the FROM header
8 SIP manipulation rule developed for changing the URI host IP to Skype for Business FQDN in the TO header
9 SIP manipulation rule developed to replace the URI host IP to Skype for Business FQDN in the REQUEST-URI

```
        match-value
        new-value
        element-rule
            name                mod2
            parameter-name
            type                uri-host
            action              replace
            match-val-type      fqdn
            comparison-type     case-sensitive
            match-value
            new-value           sfbsp.local
```

4.3.11.2 SIP Manipulation for Nexmo

Surrogate rule is applied to SIP header coming from Oracle E-SBC to Nexmo. The manipulation script is assigned to **out manipulationid** of Session agent of Nexmo.

```
sip-manipulation
    name                    surrogate[10]
    description
    split-headers
    join-headers
    header-rule
        name                ModURI[11]
        header-name         request-uri
        action              manipulate
        comparison-type     case-sensitive
        msg-type            any
        methods
        match-value
        new-value
        element-rule
            name            mod2
            parameter-name
            type            uri-host
            action          replace
            match-val-type  fqdn
            comparison-type case-sensitive
            match-value
            new-value       sip.nexmo.com+:+$REMOTE_PORT
    header-rule
        name                from_nexmo[12]
        header-name         FROM
        action              manipulate
```

10 HMR for SIP headers sending from E-SBC to Nexmo network

11 SIP manipulation rule developed for replacing the URI host IP with Nexmo FQDN and the remote port number in the REQUEST_URI

12 SIP manipulation rule developed for replacing the URI host IP to SBC WAN IP in the FROM header

```
        comparison-type         case-sensitive
        msg-type                request
        methods
        match-value
        new-value
        element-rule
            name                from_add_nexmo
            parameter-name
            type                uri-host
            action              replace
            match-val-type      any
            comparison-type     case-sensitive
            match-value
            new-value           $LOCAL_IP
    header-rule
        name                    contact[13]
        header-name             CONTACT
        action                  manipulate
        comparison-type         case-sensitive
        msg-type                request
        methods
        match-value
        new-value
        element-rule
            name                contactlocalip
            parameter-name
            type                uri-host
            action              replace
            match-val-type      ip
            comparison-type     case-sensitive
            match-value
            new-value           $LOCAL_IP
        element-rule
            name                contactlocalport[14]
            parameter-name
            type                uri-port
            action              replace
            match-val-type      any
            comparison-type     case-sensitive
            match-value
            new-value           $LOCAL_PORT
        element-rule
            name                contactuserpart[15]
            parameter-name
            type                uri-user
            action              add
```

13 SIP manipulation rule developed for replacing the URI host IP to SBC WAN IP in the CONTACT header

14 SIP manipulation rule developed for replacing the Contact Port to SBC port number in the CONTACT header

15 SIP manipulation rule developed for adding the valid FROM header digits in the URI User part of CONTACT header

```
            match-val-type      any
            comparison-type     case-sensitive
            match-value
            new-value           $FROM_USER.$0
    header-rule
        name                    nexmooptions
        header-name             FROM
        action                  manipulate
        comparison-type         case-sensitive
        msg-type                any
        methods                 OPTIONS
        match-value
        new-value
        element-rule
            name                nexmooptions[16]
            parameter-name
            type                uri-host
            action              replace
            match-val-type      any
            comparison-type     case-sensitive
            match-value
            new-value           $LOCAL_IP
    header-rule
        name                    nexmosipoptions[17]
        header-name             TO
        action                  manipulate
        comparison-type         case-sensitive
        msg-type                any
        methods                 OPTIONS
        match-value
        new-value
        element-rule
            name                nexmosipoptions
            parameter-name
            type                uri-host
            action              replace
            match-val-type      any
            comparison-type     case-sensitive
            match-value
            new-value           sip.nexmo.com
    header-rule
        name                    nexmtoheader[18]
        header-name             TO
        action                  manipulate
        comparison-type         case-sensitive
```

16 SIP manipulation rule developed for replacing the URI host IP to SBC WAN IP in the FROM header in the OPTIONS message

17 SIP manipulation rule developed for replacing the URI host IP to Nexmo FQDN in the TO header in the OPTIONS message

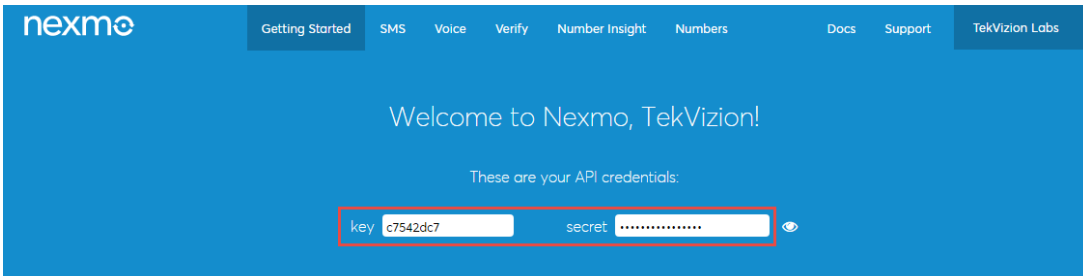
18 SIP manipulation rule developed for replacing the URI host IP to Nexmo FQDN in the TO header

msg-type request
methods
match-value
new-value
element-rule
name nexmotoheader
parameter-name
type uri-host
action replace
match-val-type any
comparison-type case-sensitive
match-value
new-value sip.nexmo.com

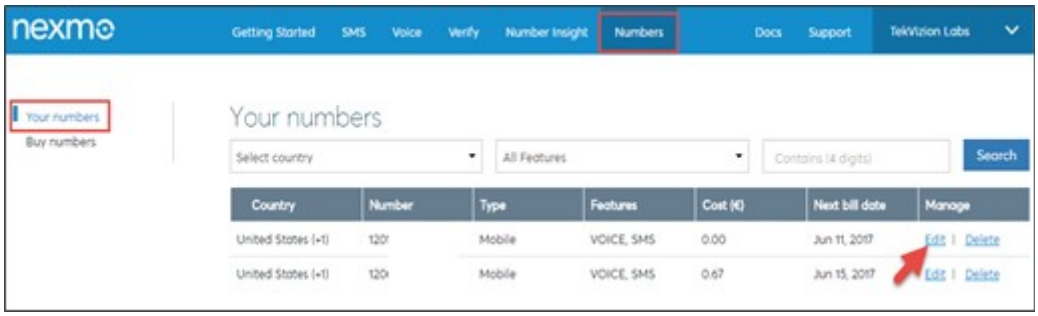
4.4 Nexmo Configuration

4.4.1 Configure Numbers in Nexmo Account

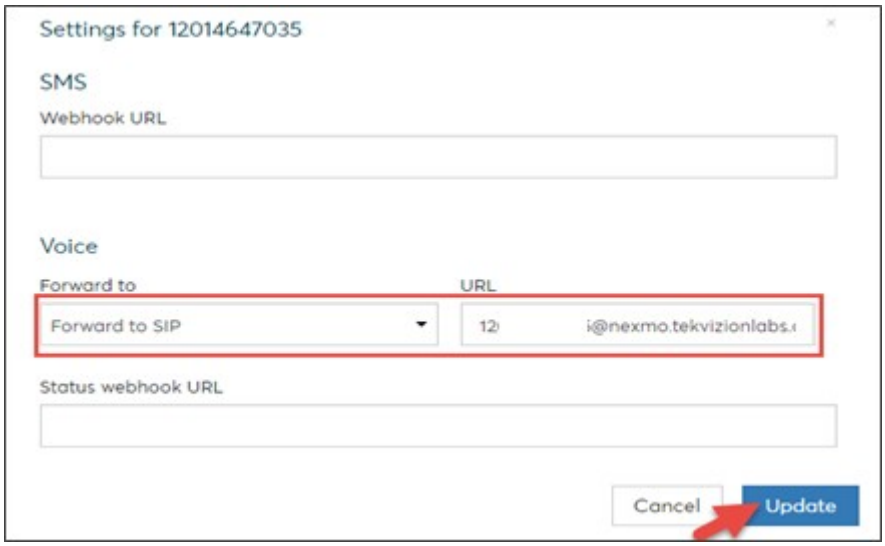
1. Login to the Nexmo account using the credentials provided at the time of registration. A **Key** and **Secret** will be displayed on the dashboard and this can be used as the username and password for Registration SIP Trunks.



2. In order to provide the URL to which the call has to be routed from Nexmo, navigate to the **Numbers** tab
3. Click **Edit** against each number as shown below



4. A pop-up will be displayed
5. Select the "**Forward to**" and provide the URL to which the calls route
6. Click **Update** to save the changes



5 Summary of Tests and Results

N/S = Not Supported N/T= Not Tested N/A= Not Applicable

Test Case #	Test Case Description	Result	Notes
1	Calling Party Disconnects Before Answer	PASS	

2	Calling Party Disconnects After Answer	PASS	
3	Called Party Disconnects After Answer	PASS	
4	Three Way Calling	PASS	
5	Calling Party Presentation Restricted	PASS	
6	Calling Party Disconnect Before Answer	PASS	
7	Calling Party Disconnects after Answer	PASS	
8	Called Party Disconnects after Answer	PASS	
9	Calling Party Receives Busy	PASS	
10	International Outbound Dialing	PASS	
11	Outbound Call Forward Always	PASS	
12	Outbound Call Forward Not Available (Ring No Answer)	PASS	
13	Outbound Consultative Call Transfer	PASS	
14	Outbound Semi-Attended/Blind Call Transfer	PASS	
15	Outbound Call Hold	PASS	
16	Terminate Early Media Outbound Call Before Answer	PASS	
17	Early Media Forward Call	PASS	
18	Outbound, Wait for Session Audit	PASS	No Session Audit message is sent by Nexmo. HMR rule is applied in E-SBC to initiate Nexmo to send Session refresh at specified interval.
19	Inbound, Wait for Session Audit	PASS	
20	Outbound DTMF (RTPevent)	PASS	
21	Inbound DTMF(RTPevent)	PASS	