



Oracle Enterprise Communications Broker & Oracle Enterprise Session Border Controller with Avaya Aura 7.0, Cisco's UCM 11.0, Microsoft's Lync2013, Skype for Business & CCE

[Technical Application Note](#)

Disclaimer

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Intended Audience

This is a technical document intended for telecommunications engineers with the purpose of configuring the Oracle Communications Enterprise-SBC, Microsoft Skype for Business, Avaya Aura Session Manager and Cisco Unified Communications Manager. There will be steps that require navigating Microsoft 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.

Document Overview

This technical application note documents the implementation of the Oracle Enterprise Session Border Controller (ESBC) in an Enterprise network consisting of multi-vendor Unified Communications platforms – Microsoft's Cloud Connector Edition & Skype for Business 2015, Avaya Aura Session Manager and Cisco Unified Communications Manager - connecting to a SIP trunk.

Introduction

Requirements

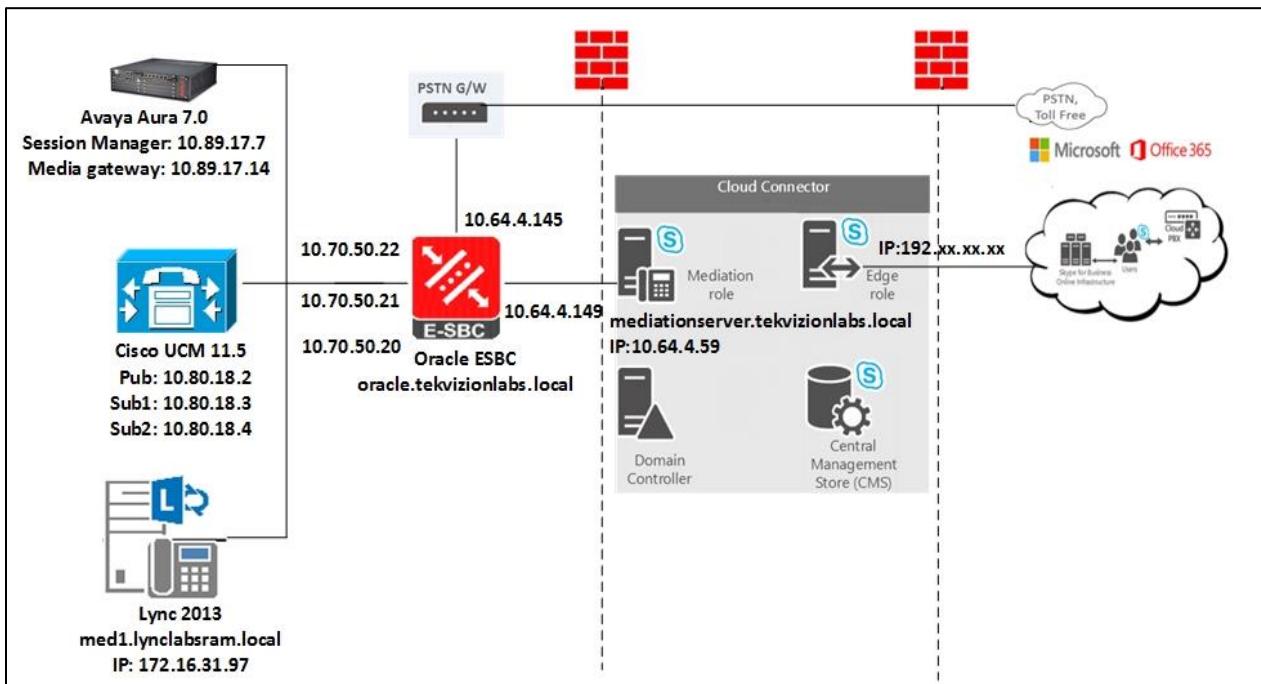
- Oracle Enterprise Session Border Controller ECZ750 or higher
- Microsoft Skype for Business 2015
- Microsoft Lync 2013
- Microsoft Cloud Connector Edition
- Avaya Aura 7.0
- Cisco Unified Communications Manager 11.0
- SIP Trunk (Verizon)

Components, Versions and Debugging Tools

Components and Debugging Tools	Version
E-SBC	Acme Packet 3900 ECZ7.5.0 or above
Microsoft Lync 2013 Server	5.0.8308.872
Microsoft Lync 2013 Client	15.0.4551.1007
Microsoft Skype for Business Cloud Server	6.0.9319.377
Microsoft Cloud Connector Edition	1.4.2
Microsoft Skype for Business 2015 Client	16.0.4417.1000
Cisco Unified Communication Manager	11.5.1.12900-21
Avaya Aura	7.0
Wireshark	2.2.7
CLS Logger for Skype for Business	6.0.9319.0

Lab Configuration

The following diagram illustrates the lab environment created by tekVizion to facilitate certification testing. tekVizion is a Certification house dedicated to the telecommunications industry. Their core services include consulting/solution design, interoperability/verification testing, integration, custom software development and solution support services.



The network architecture consists of two areas. Area 1 represents the Enterprise network and Area 2 is the service provider network. The Enterprise network has the ESBC at its core connecting together multiple UC platforms.

Configuring the Oracle Enterprise SBC

In this section we describe the steps for configuring an Oracle Enterprise SBC (E-SBC) for use with the Oracle ECB, Microsoft CCE & Skype for Business, Cisco CUCM, and Avaya Aura. The E-SBC will connect the Enterprise network to the Service Provider network in a SIP trunking scenario.

In Scope

The following guide for configuring the Oracle SBC assumes that this is a newly deployed device dedicated to a single customer. Please see the ACLI Configuration Guide on http://docs.oracle.com/cd/E61547_01/index.html for a better understanding of the Command Line Interface (CLI).

Note that Oracle offers several models of the SBC. This document covers the setup for the 1100, 3820, 4500, 4600, and 6300 platforms running OS ECZ7.3.0 MR-1 or later. If instructions are needed for other Oracle SBC models, please contact your Oracle representative.

Out of Scope

- Configuration of Network management including SNMP and RADIUS
- Configuration of Distributed Denial of Service (DDoS) protection parameters as these are based on individual customer requirements.

What will you need

- RJ45/DB9 serial adapter provided with the SBC, along with a straight-through Ethernet cable to go from the adapter to the SBC's console port (on the rear of the 1100, 4600, and 6300, and the front of the 3820 and 4500).
- 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 the management interface (eth0, labeled Mgmt0 on the SBC chassis) of the SBC - the eth0 management interface must be connected and configured to a management network separate from the service interfaces. Otherwise the SBC is subject to ARP overlap issues, loss of system access when the network is down, and compromised DDoS protection. Oracle does not support SBC configurations with management and media/service interfaces on the same subnet.
- IP address of the Oracle ECB.
- IP addresses to be used for the SBC internal and external facing ports (Service Interfaces)

SBC- Getting Started

Once the Oracle 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 SBC, not the one on the back, on platforms such as the 3820 and 4500 that have two console ports.

Plug the slot 0 port 0 (s0p0) interface into your outside (SIP Trunk-facing) network and the slot 1 port 0 (s1p0) interface into your inside (ECB-facing) network. Once connected, 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 CLI is case sensitive.

Establish the serial connection and logging in the SBC

Confirm the SBC is powered off and connect one end of a straight-through Ethernet cable to the console port on the SBC and the other end to console adapter that ships with the SBC, connect the console adapter (a DB9 adapter) to the DB9 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 SBC and confirm that you see the following output from the bootup sequence.

```
COM3 - PuTTY
Starting tEbmnd...
Starting tSipd...
Starting tLrtd...
Starting tH323d...
Starting tH248d...
Starting tBgfld...
Starting tSecured...
Starting tAuthd...
Starting tCertd...
Starting tIked...
Starting tAuditd...
Starting tAuditpusher...
Starting tSmnpd...
Start platform alarm...
Initializing /ramdrv Cleaner
Starting tLogCleaner task
Bringing up shell...
password secure mode is enabled
Admin Security is disabled
Starting SSH...
SSH_Cli_init: allocated memory for 5 connections
acl1: max telnet sessions: 8
Password: Ox21a059c8 (tAlarm): eth0: Link is up (1000Mb/s full duplex)
```

Enter the following commands to login to the SBC and move to the configuration mode. Note that the default 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 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. **Note these example boot parameters are specific to the 4600 platform. Other platforms will have different boot parameters. Use nnECZ730m1.64.bz for the 1100, 4500, 4600, and the 6300. Use nnECZ730m1.32.bz for the 3820.**

```
ORACLESBCL (configure) # bootparam

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

Boot File	:	/boot/nnECZ750.bz
IP Address	:	192.168.79.44
VLAN	:	
Netmask	:	255.255.255.224
Gateway	:	192.168.79.33
IPv6 Address	:	
IPv6 Gateway	:	
Host IP	:	0.0.0.0
FTP username	:	vxftp
FTP password	:	vxftp123
Flags	:	
Target Name	:	oraclesbc1
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 SBC

The following section walks you through configuring the Oracle Enterprise SBC in an environment with Microsoft Lync, Skype for Business, Cisco CUCM, and Avaya Aura.

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

Please note – All the configs sections contain output of “show running-config short” – the short command only prints out non-standard configs required for the SBC to operate in the model configured

High Availability

The Mgmt1 and Mgmt2 (labeled wancom1 and wancom2 in the configuration) ports which are on the rear panel of the SBC are used for the purpose of High Availability on the E-SBC. Crossover cables must be connected between these ports on the SBCs, i.e. Mgmt1 to Mgmt1 and Mgmt2 to Mgmt2. Please refer to the “High Availability Nodes” in the ACLI configuration guide for ECZ730 for more details.

Local Policies

Path: `configure terminal > session-router > local-policy`

Policy number	Trigger	Destination	Logic
1	25/52600025	Avaya	<ul style="list-style-type: none"> All extensions which start with 25 – would terminate on Avaya cluster If an external (outside of the local network) user dials 52600025 – those calls also would land on Avaya Cluster
2	26/52600026	CUCM	<ul style="list-style-type: none"> All extensions which start with 26 – would terminate on CUCM cluster

			<ul style="list-style-type: none"> If an external (outside of the local network) user dials 52600026 – those calls also would land on CUCM Cluster
3	27/52600027	Lync 2013	<ul style="list-style-type: none"> All extensions which start with 27 – would terminate on SFB medPool If an external (outside of the local network) user dials 52600027 – those calls also would land on Mediation server pool
4	28/52600028	O365	<ul style="list-style-type: none"> All extensions which start with 28 – would terminate on SFB online running on Office 365 – these calls would route via CCE If an external (outside of the local network) user dials 52600028 – those calls also would land on Office365 medPool
5	*	PSTN	<ul style="list-style-type: none"> Any calls sourced by Avaya/CUCM/SFB/CCE realms would be delivered to PSTN
6	2432 2601 5270002601	LDAP	<ul style="list-style-type: none"> The following numbers 2432/2601/5270002601 were configured specifically for LDAP based routing – 2432 was a Avaya user, 2601 & 5270002601 were CUCM users.
7	med1.lynclabsram.local	Lync2013	<ul style="list-style-type: none"> This policy was created to assist with refer-call-transfer feature where the SBC terminates REFER message and sets up a new call based on refer-to header.
8	mediationserver.tekvizionlabs.local	CCE	<ul style="list-style-type: none"> This policy was created to assist with refer-call-transfer feature where the SBC terminates REFER message and sets up a new call based on refer-to header
9	9876543210	SFB	<ul style="list-style-type: none"> All calls made to 9876543210 would be routed to SFB
10	*	Lync2013	<ul style="list-style-type: none"> All OPTIONS messages that landed on the SBC would be routed to Lync 2013 for proper OPTIONS handling.

Please Note – the numbers in brackets below are only for reference for the table above

```
(1) local-policy
    from-address *
    to-address 25
    source-realm 52600025
    policy-attribute *
        next-hop 10.89.17.7
        realm AvayaRealm
(2) local-policy
    from-address *
    to-address 26
    source-realm 52700026
    policy-attribute *
```

	next-hop	10.80.18.3
	realm	CUCMRealm
(3) local-policy		
	from-address	*
	to-address	27
		52800027
	source-realm	*
	policy-attribute	
	next-hop	med1.lynclabsram.local
	realm	inside
(4) local-policy		
	from-address	*
	to-address	28
		52900028
	source-realm	*
	policy-attribute	
	next-hop	mediationserver.tekvizionlabs.local
	realm	outside
(5) local-policy		
	from-address	*
	to-address	2142425
		800
		9725
	source-realm	*
	description	topstn
	policy-attribute	
	next-hop	10.64.1.72
	realm	PSTN
(6) local-policy		
	from-address	*
	to-address	2432
		2601
		5270002601
	source-realm	*
	policy-attribute	
	next-hop	ldap:ldapCfg
	realm	inside
(7) local-policy		
	from-address	*
	to-address	med1.lynclabsram.local
	source-realm	*
	policy-attribute	
	next-hop	med1.lynclabsram.local
	realm	inside
(8) local-policy		
	from-address	*
	to-address	mediationserver.tekvizionlabs.local
	source-realm	*
	policy-attribute	
	next-hop	mediationserver.tekvizionlabs.local
	realm	outside
(9) local-policy		
	from-address	*
	to-address	9876543210
	source-realm	*
	policy-attribute	

next-hop	172.16.29.71
realm	toSFB
(10) local-policy	
from-address	*
to-address	*
source-realm	outside
policy-attribute	
next-hop	med1.lynclabsram.local
realm	inside
methods	OPTIONS

Media Manager

Path: **configure terminal > media-manager > media-manager > select > done**

media-manager	
initial-guard-timer	86400
options	xcode-gratuitous-rtcp-report-generation

Network Interfaces

Path: **configure terminal > system > network-interface**

network-interface	
name	s0p0
description	WAN
ip-address	10.64.4.149
netmask	255.255.0.0
gateway	10.64.1.1
gw-heartbeat	
state	enabled
dns-ip-primary	10.64.4.61
dns-domain	tekvizionlabs.local
hip-ip-list	
10.64.4.149	
10.64.4.145	
10.64.4.147	
icmp-address	
10.64.4.149	
10.64.4.145	
10.64.4.147	
network-interface	
name	s0p1
description	LAN
ip-address	10.70.50.20
netmask	255.255.255.0
gateway	10.70.50.1
dns-ip-primary	172.16.31.91
dns-domain	lynclabsram.local
hip-ip-list	
10.70.50.20	
10.70.50.21	
10.70.50.22	
10.70.50.23	
icmp-address	
10.70.50.20	
10.70.50.21	
10.70.50.22	
10.70.50.23	

Physical Interfaces

Path: `configure terminal > system > phy-interface`

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

Realm Configs

Path: `configure terminal > media-manager > realm-config`

Realm	Audio	Transcoding	RTCP generation
Avaya	RTP	CN generation enabled	Yes
CUCM	RTP	G729 only, no PCMU/PCMA	Yes
PSTN	RTP	G711 only	Yes
Inside (Lync2013)	RTP	G711 only	Yes
Outside (Office365 SFB)	SRTP	G711 only, CN generation enabled	Yes
Outside-rtp (Office365 SFB)	RTP	G711 only	No
toSFB	SRTP	G711 only, CN generation enabled	Yes

```
realm-config
  identifier                  AvayaRealm
  network-interfaces          s0p1:0
  media-sec-policy            RTP
  early-media-allow           none
  codec-policy                Xcode
  rtcp-policy                 rtcpGen
realm-config
  identifier                  CUCMRealm
  network-interfaces          s0p1:0
  media-sec-policy            RTP
  codec-policy                G729only
  codec-manip-in-realm        enabled
  rtcp-policy                 rtcpGen
realm-config
  identifier                  PSTN
  network-interfaces          s0p0:0
  media-sec-policy            RTP
  codec-policy                G711Only
  rtcp-policy                 rtcpGen
realm-config
```

identifier	inside
network-interfaces	s0p1:0
media-sec-policy	RTP
spl-options	comfort-noise-generate
codec-policy	G711Only
rtcp-policy	rtcpGen
realm-config	
identifier	outside
network-interfaces	s0p0:0
media-sec-policy	SRTP
spl-options	comfort-noise-generate
codec-policy	G711Only
rtcp-policy	rtcpGen
realm-config	
identifier	outside-rtp
network-interfaces	s0p0:0
realm-config	
identifier	toSFB
network-interfaces	s0p1:0
media-sec-policy	RTP
codec-policy	Xcode
rtcp-policy	rtcpGen

Playback Config

Path: **configure terminal > media-manager > playback-config**

We utilize the local playback feature of the SBC to play ring back tone during transfers. The ringback tone is played based on REFER termination. You must upload an audio file (in .raw format) to /code/media onto the ESBC for the media you want played during the transfer. A separate file is required for each different codec type, even if the media itself is the same.

The playback configuration is defined listing the media files that you want to play. The playback-config element is configured under media-manager.

playback-config	
name	transferrbt
entry	
encoding	PCMU
filename	US_ringbackPCMU.raw
bytes-per-sec	8000

The playback options can be applied to realms, sip-interfaces or session agents using the **spl-options** command.

Realm which requires media playback on REFER termination needs to have the following spl-options enabled

```
oraclesbc1(sip-interface)# spl-options  playback-on-refer="transferrbt"
oraclesbc1(sip-interface)# done
```

Session Agents

Path: `configure terminal > session-router > session-agent`

Session agent	Transport	Enabled features
10.64.1.72 (PSTN)	TCP	OPTIONS
10.80.18.3 (CUCM cluster)	TCP	OPTIONS
10.89.17.7 (Avaya Aura)	TCP	OPTIONS
172.16.29.71 (SFB)	TCP	OPTIONS
med1.lynclabsram.local(Lync 2013)	TLS	OPTIONS REFER termination
mediationserver.tekvizionlabs.local (CCE – SFB)	TLS	OPTIONS REFER Termination Delete +1 from RequestURI/TO/FROM headers

```

session-agent
    hostname                10.64.1.72
    ip-address              10.64.1.72
    transport-method        StaticTCP
    realm-id                PSTN
    description              PSTN
    ping-method              OPTIONS; hops=0
    ping-interval            30
session-agent
    hostname                10.80.18.3
    ip-address              10.80.18.3
    transport-method        StaticTCP
    realm-id                CUCMRealm
    description              CUCM
    ping-method              OPTIONS; hops=0
    ping-interval            30
session-agent
    hostname                10.89.17.7
    ip-address              10.89.17.7
    transport-method        StaticTCP
    realm-id                AvayaRealm
    description              Avaya
    ping-method              OPTIONS; hops=0
    ping-interval            30
session-agent
    hostname                172.16.29.71
    ip-address              172.16.29.71
    transport-method        StaticTCP
    realm-id                toSFB
    ping-method              OPTIONS
    ping-interval            30
session-agent

```

hostname	med1.lynclabsram.local
ip-address	172.16.31.97
port	5067
transport-method	StaticTLS
realm-id	inside
ping-method	OPTIONS;hops=0
ping-interval	30
refer-call-transfer	enabled
session-agent	
hostname	mediationserver.tekvizionlabs.local
ip-address	10.64.4.59
port	5067
transport-method	StaticTLS
realm-id	outside
ping-method	OPTIONS;hops=0
ping-interval	30
in-translationid	delplus1
refer-call-transfer	enabled

Session Translation

Path: **configure terminal > session-router > session-translation**

session-translation	
id	addPlus
rules-calling	addPlus1
rules-called	addPlus1
session-translation	
id	delplus1
rules-calling	delPlus1
rules-called	delPlus1

SIP Config

Path: **configure terminal > session-router > sip-config > select**

sip-config	
home-realm-id	inside
registrar-domain	*
registrar-host	*
registrar-port	5060
options	max-udp-length=0

SIP Interfaces

Path: **configure terminal > session-router > sip-interface**

SIP-Interface	IP-Address	Transport	Optional features
AvayaRealm	10.70.50.21	TCP	<ul style="list-style-type: none"> Configure NatIpAvaya as out-manipulation Change 183 session progress to 180 Ringing
CUCMRealm	10.70.50.22	TCP	<ul style="list-style-type: none"> Enabled Secured-Network to allow calls into this realm with SRTP while not using TLS signaling Configured NatIp as out-manipulation

PSTN	10.64.4.145	TCP	<ul style="list-style-type: none"> Enabled Playback feature while terminating REFER Apply NatIp as out-manipulation
Inside	10.70.50.20	TCP & TLS	<ul style="list-style-type: none"> Enabled Secured-Network to allow calls into this realm with SRTP while not using TLS signaling Enabled Playback feature while terminating REFER Apply Stripsdp183 as in-manipulation Apply NatIpLync as out-manipulation
Outside	10.64.4.149	TCP&TLS	<ul style="list-style-type: none"> Apply Stripsdp183 as in-manipulation Apply NatIpCce as out-manipulation
outside-rtp	10.64.4.147	TCP	
toSFB	10.70.50.23	TCP	

```

sip-interface
    realm-id                               AvayaRealm
    sip-port
        address                            10.70.50.21
        transport-protocol                 TCP
        allow-anonymous                   agents-only
    out-manipulationid                  NAT_IP_Avaya
    response-map                         change183to180

sip-interface
    realm-id                               CUCMRealm
    sip-port
        address                            10.70.50.22
        transport-protocol                 TCP
        allow-anonymous                   agents-only
    secured-network                      enabled
    out-manipulationid                  NAT_IP

sip-interface
    realm-id                               PSTN
    sip-port
        address                            10.64.4.145
        transport-protocol                 TCP
        allow-anonymous                   agents-only
        spl-options                        playback-on-refer="transferrbt"
    out-manipulationid                  NAT_IP

sip-interface
    realm-id                               inside
    sip-port
        address                            10.70.50.20
        transport-protocol                 TCP
        allow-anonymous                   agents-only
    sip-port
        address                            10.70.50.20
        port                                5061

```

```

        transport-protocol           TLS
        tls-profile                  LyncTLS
        allow-anonymous               agents-only
        secured-network               enabled
        spl-options                   playback-on-refer="transferrbt"
        in-manipulationid            StripSdp183
        out-manipulationid           NatIpLync

sip-interface
    realm-id                      outside
    sip-port
        address                     10.64.4.149
        transport-protocol          TCP
        allow-anonymous               agents-only
    sip-port
        address                     10.64.4.149
        port                         5061
        transport-protocol          TLS
        tls-profile                  CCETLS
        allow-anonymous               agents-only
        in-manipulationid            StripSdp183
        out-manipulationid           NatIpCce

sip-interface
    realm-id                      outside-rtp
    sip-port
        address                     10.64.4.147
        transport-protocol          TCP

sip-interface
    realm-id                      toSFB
    sip-port
        address                     10.70.50.23
        transport-protocol          TCP
        allow-anonymous               agents-only

```

SIP Manipulations (Header Manipulation Rules – HMR)

Path: `configure terminal > session-router > sip-manipulation`

SIP manipulation (HMR)	Purpose
Changeinactosendonly	<ul style="list-style-type: none"> Following HMR changes inactive attribute in SDP to sendonly
NatIp	<ul style="list-style-type: none"> NAT From/To/Request-URI/PAI headers to contain appropriate uri-host info & Delete ms-source header from the INVITE
NatIpAvaya	<ul style="list-style-type: none"> NAT From/To/Request-URI/PAI headers to contain appropriate uri-host PAI header required to contain specific info – had to delete and overwrite contents from “From” header
NatIpCce	<ul style="list-style-type: none"> NAT From/To/Request-URI/PAI/Contact headers to contain appropriate uri-host Add +1 to refered by header Check if Request-uri/From/To contain 10 digits – if they do – add +1 Delete phone-context parameter from “From” header
NatIpLync	<ul style="list-style-type: none"> NAT From/To/Request-URI/PAI/Contact headers

Stripsdp183	<ul style="list-style-type: none"> Check & delete SDP from 183 Session Progress message, delete SDP & change inactive to sendonly
alter4xxOPTIONS	<ul style="list-style-type: none"> Change 483 & 404 responses OPTIONS to 200 OK
delReqNatIp	<ul style="list-style-type: none"> Delete Require Header & Apply NatIp sip-manipulation
alterreferby	<ul style="list-style-type: none"> NAT uri-host part of referer-By header
stripRR	<ul style="list-style-type: none"> Delete any record-route headers

```

sip-manipulation
    name                                Changeinactive2sendonly
    description                         Change inactive to sendonly for pstn tran
    header-rule
        name                               changeSDP
        header-name                        Content-Type
        action                             manipulate
        msg-type                           request
        methods                            INVITE
        element-rule
            name                             inact2sendonly
            parameter-name                   application/sdp
            type                            mime
            action                           find-replace-all
            comparison-type                 pattern-rule
            match-value                     a=inactive
            new-value                        a=sendonly

sip-manipulation
    name                                NatIP
    header-rule
        name                               From
        header-name                        From
        action                            manipulate
        msg-type                           request
        element-rule
            name                             fromEr
            type                            uri-host
            action                           find-replace-all
            new-value                        oracle.tekvisionlabs.local

    header-rule
        name                               To
        header-name                        To
        action                            manipulate
        msg-type                           request
        element-rule
            name                             ToEr
            type                            uri-host
            action                           find-replace-all
            new-value                        $REMOTE_IP

    header-rule
        name                               RequestURI
        header-name                        request-uri
        action                            manipulate
        methods                           INVITE

```

```

element-rule
    name
    type
    action
    new-value
        ruriEr
        uri-host
        find-replace-all
        $REMOTE_IP

header-rule
    name
    header-name
    action
    element-rule
        name
        type
        action
        new-value
            alterPAI
            P-Asserted-Identity
            manipulate
            alterPAIER
            uri-host
            find-replace-all
            $LOCAL_IP

header-rule
    name
    header-name
    action
    methods
        msSource
        ms-call-source
        delete
        INVITE

sip-manipulation
    name
        NatIpAvaya
    header-rule
        name
        header-name
        action
        msg-type
        element-rule
            name
            type
            action
            new-value
                From
                From
                manipulate
                request
                fromEr
                uri-host
                find-replace-all
                oracle.tekvizionlabs.local
        element-rule
            name
            type
            action
                store_user
                uri-user
                store
        header-rule
            name
            header-name
            action
            msg-type
            element-rule
                name
                type
                action
                new-value
                    To
                    To
                    manipulate
                    request
                    ToEr
                    uri-host
                    find-replace-all
                    $REMOTE_IP

    header-rule
        name
        header-name
        action
        methods
        element-rule
            name
            type
            action
            new-value
                RequestURI
                request-uri
                manipulate
                INVITE
                ruriEr
                uri-host
                find-replace-all
                $REMOTE_IP

header-rule

```

```

        name                               delPAI
        header-name                         P-Asserted-Identity
        action                             delete
        msg-type                           request
        methods                            INVITE

    header-rule
        name                               msSource
        header-name                         ms-call-source
        action                             delete
        methods                            INVITE

    header-rule
        name                               createPAI
        header-name                         Contact
        action                             manipulate
        msg-type                           request
        methods                            INVITE
        match-value
        element-rule
            name                             updateContact
            type                            uri-user
            action                           find-replace-all
            new-value                         $From.$store_user.$0

    header-rule
        name                               storeContact
        header-name                         Contact
        action                             store
        comparison-type                   pattern-rule
        msg-type                           request
        methods                            INVITE

    header-rule
        name                               addPAI
        header-name                         P-Asserted-Identity
        action                             add
        comparison-type                   boolean
        msg-type                           request
        methods                            INVITE
        match-value
        new-value                           $delPAI
                                            $storeContact.$0

sip-manipulation
    name                               NatIpCce
    header-rule
        name                               From
        header-name                         From
        action                             manipulate
        methods                            INVITE
        element-rule
            name                             fromEr
            type                            uri-host
            action                           find-replace-all
            new-value                         oracle.tekvizionlabs.local

    header-rule
        name                               To
        header-name                         To
        action                             manipulate
        methods                            INVITE
        element-rule

```

```

        name                      ToEr
        type                     uri-host
        action                   find-replace-all
        new-value

mediationserver.tekvizionlabs.local
    header-rule
        name                      RequestURI
        header-name               request-uri
        action                   manipulate
        methods                  INVITE
        element-rule
            name                    ruriEr
            type                     uri-host
            action                  find-replace-all
            new-value

mediationserver.tekvizionlabs.local
    header-rule
        name                      alterPAI
        header-name               P-Asserted-Identity
        action                   manipulate
        element-rule
            name                    alterPAIER
            type                     uri-host
            action                  find-replace-all
            new-value                $LOCAL_IP

    header-rule
        name                      Contact
        header-name               Contact
        action                   manipulate
        methods                  INVITE
        element-rule
            name                    contactEr
            type                     uri-host
            action                  find-replace-all
            new-value                oracle.tekvizionlabs.local

    header-rule
        name                      AddPlus1
        header-name               referred-by
        action                   manipulate
        element-rule
            name                    addplus1
            type                     uri-user
            action                  find-replace-all
            new-value                "+1"+$ORIGINAL

    header-rule
        name                      alterreferby
        header-name               From
        action                   sip-manip
        msg-type                 request
        new-value

    header-rule
        name                      removePC
        header-name               From
        action                   manipulate
        methods                  INVITE
        element-rule

```

```

        name                                removePCER
        parameter-name                      phone-context
        type                                 uri-user-param
        action                               delete-element

header-rule
    name                                FromUser
    header-name                         from
    action                               manipulate
    methods                             INVITE
    element-rule
        name                                fromEr
        type                                 uri-user
        action                              find-replace-all
        match-value                         ^(\d{10})
        new-value                            "+1"+$ORIGINAL

header-rule
    name                                Plus1RURI
    header-name                         Request-URI
    action                               manipulate
    element-rule
        name                                PlusRURIER
        type                                 uri-user
        action                              find-replace-all
        match-value                         ^(\d{10})
        new-value                            "+1"+$ORIGINAL
    element-rule
        name                                PlusRURI_store
        type                                 uri-user
        action                               store

header-rule
    name                                Plus1To
    header-name                         To
    action                               manipulate
    element-rule
        name                                PlusToEr
        type                                 uri-user
        action                              find-replace-all
        match-value                         ^(\d{10})
        new-value                            "+1"+$ORIGINAL
    element-rule
        name                                copyRURI
        type                                 uri-user
        action                              find-replace-all
        match-value                         ^(\d{4})

$Plus1RURI.$PlusRURI_store.$0
sip-manipulation
    name                                NatIpLync

header-rule
    name                                from
    header-name                         From
    action                               sip-manip
    new-value                            NAT_IP

header-rule
    name                                alterPAI
    header-name                         P-Asserted-Identity

```

```

action                         manipulate
methods                        INVITE
element-rule
    name                         alterPAIEr
    type                          uri-host
    action                        find-replace-all
    new-value                     oracle.tekvizionlabs.local

header-rule
    name                         alterContact
    header-name                   Contact
    action                        manipulate
    methods                       INVITE
    element-rule
        name                        alterContactEr
        type                          uri-host
        action                        find-replace-all
        new-value                     oracle.tekvizionlabs.local

header-rule
    name                         To
    header-name                   To
    action                        manipulate
    methods                       INVITE
    element-rule
        name                        toEr
        type                          uri-host
        action                        find-replace-all
        new-value                     med1.lynclabsram.local

header-rule
    name                         ruri
    header-name                   request-uri
    action                        manipulate
    methods                       INVITE
    element-rule
        name                        ruriEr
        type                          uri-host
        action                        find-replace-all
        new-value                     med1.lynclabsram.local

header-rule
    name                         alterReferredBy
    header-name                   Referred-By
    action                        manipulate
    msg-type                      request
    methods                       INVITE
    element-rule
        name                        alterRB
        type                          uri-host
        action                        find-replace-all
        new-value                     oracle.tekvizionlabs.local

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                                inactosendonly
    header-name                         From
    action                               sip-manip
    msg-type                            request
    new-value                           Changeinactosendonly

sip-manipulation
    name                                alter4xxOPTIONS
    header-rule
        name                                alterRURI
        header-name                        Request-URI
        action                               manipulate
        msg-type                            reply
        methods                            OPTIONS
        element-rule
            name                                alterRURIStatusCode
            type                                 status-code
            action                               find-replace-all
            match-value                        483 || 404
            new-value                           200
        element-rule
            name                                alterRURIReasonPhrase
            type                                 reason-phrase
            action                               find-replace-all
            match-value                        Too Many Hops || Not Found
            new-value                           OK

```

```

sip-manipulation
    name                               delReqNatIp
    header-rule
        name                           delRequire
        header-name                    Require
        action                         delete
        msg-type                      reply
        methods                        INVITE
    header-rule
        name                           nat
        header-name                    From
        action                         sip-manip
        new-value                      NAT_IP
sip-manipulation
    name                               alterreferby
    header-rule
        name                           checkReferBy
        header-name                    REFERRED-BY
        action                         manipulate
        element-rule
            name                      checkReferBy
            type                       uri-host
            action                     find-replace-all
            new-value                  oracle.tekvizionlabs.local
sip-manipulation
    name                               stripRR
    join-headers                     Record-Route
    header-rule
        name                           delRR
        header-name                    Record-Route
        action                         delete

```

SIP Monitoring

Path: **configure terminal > session-router > sip-monitoring > select**

sip-monitoring	
match-any-filter	enabled
monitoring-filters	all

Steering Pools

Path: **configure terminal > media-manager > steering-pool**

steering-pool	
ip-address	10.64.4.145
start-port	49600
end-port	65535
realm-id	PSTN
steering-pool	
ip-address	10.64.4.147
start-port	49600
end-port	65535
realm-id	outside-rtp
steering-pool	

ip-address	10.64.4.149
start-port	49600
end-port	65535
realm-id	outside
steering-pool	
ip-address	10.70.50.20
start-port	49562
end-port	65535
realm-id	inside
steering-pool	
ip-address	10.70.50.21
start-port	49600
end-port	65535
realm-id	AvayaRealm
steering-pool	
ip-address	10.70.50.22
start-port	49600
end-port	65535
realm-id	CUCMRealm
steering-pool	
ip-address	10.70.50.23
start-port	49562
end-port	65535
realm-id	toSFB

Certificate record

Path: **configure terminal > security > certificate-record**

certificate-record	
name	LyncMed
state	TX
locality	Plano
common-name	medserver1.lynclabsram.local
digest-algor	sha1
certificate-record	
name	LyncRoot
state	TX
locality	Plano
common-name	lynclabsram-DC-CA
digest-algor	sha1
certificate-record	
name	SBCCCE2
state	TX
locality	Plano
common-name	oracle.tekvizionlabs.local
digest-algor	sha1
certificate-record	
name	SBCCert
state	TX
locality	Plano
common-name	oracle.tekvizionlabs.local
digest-algor	sha1
certificate-record	
name	SBCCertCCE

```

state TX
locality Plano
common-name oracle.tekvizionlabs.local
digest-algor sha1
certificate-record
  name cceRoot
  state TX
  locality Plano
  common-name SfB CCE Root
  digest-algor sha1
certificate-record
  name newCCERoot
  state TX
  locality Plano
  common-name SfB CCE Root
  digest-algor sha1
certificate-record
  name rootcert
  state TX
  locality Plano
  common-name lynclabsram-DC-CA
  digest-algor sha1

```

TLS profile

Path: **configure terminal > security > tls-profile**

Following two tls-profiles are required - one towards CCE while the other towards Lync 2013 - as both CCE & Lync 2013 use different root certs

```

tls-profile
  name CCETLS
  end-entity-certificate SBCCCE2
  trusted-ca-certificates newCCERoot
  mutual-authenticate enabled
  tls-version tlsv12
tls-profile
  name LyncTLS
  end-entity-certificate SBCCert
  trusted-ca-certificates rootcert
  mutual-authenticate LyncRoot
  enabled
  tls-version tlsv1

```

Tls Global config

Path: **configure terminal > security > tls-global**

The following config element needs to be enabled in order for the SBC to cache TLS connections

```

tls-global
  session-caching enabled

```

Sdes Profile

Path: **configure terminal > security > media-security >sdes-profile**

sdes-profile	
name	SRTP
use-ingress-session-params	srtcp-encrypt

Media-sec-policy

Path: **configure terminal > security > media-security > media-sec-policy**

media-sec-policy	
name	RTP
media-sec-policy	
name	SRTP
inbound	
profile	SRTP
mode	srtp
protocol	sdes
outbound	
profile	SRTP
mode	srtp
protocol	sdes

RTCP Policy

Path: **configure terminal > media-manager > rtcp-policy**

rtcp-policy	
name	rtcpGen
rtcp-generate	all-calls

Response Map

Path: **configure terminal > session-router > sip-response-map**

response-map	
name	change183to180
entries	
recv-code	183
xmit-code	180
reason	Ringing

LDAP Config

Path: **configure terminal > session-router > ldap-config**

```
ldap-config
    name                               ldapCfg
    ldap-servers
    realm
    username
    password
    *****

    ldap-search-base
    ldap-transactions
        route-mode
            attribute-order-only
        ldap-cfg-attributes
            name
            next-hop
            realm
            extraction-regex
            value-format
                msRTCSIP-Line
                med1.lynclabsram.local
                inside
                (.*)
                tel:$0

            ldap-cfg-attributes
                name
                next-hop
                msRTCSIP-Line
                med1.lynclabsram.local
                inside
                (.*)
                telephoneNumber

    mediationserver.tekvizionlabs.local
        realm
        extraction-regex
        value-format
            outside
            (.*)
            tel:$0
```

Codec-policy

Path: **configure terminal > media-manager > codec-policy**

Codec-policy	Purpose
G711Only	Allow only G711 & telephone-event, remove G729
G729only	Allow G729 but remove G711 codecs
Xcode	Allow all codecs, but add comfort noise (payload 13)
toSFB	Allow all codecs, but add comfort noise (payload 13)

```
codec-policy
    name
    allow-codecs
    add-codecs-on-egress
        G711Only
        * G729:no
        PCMU PCMA telephone-event

codec-policy
    name
    allow-codecs
    add-codecs-on-egress
        G729only
        * PCMA:no PCMU:no
        G729

codec-policy
    name
    allow-codecs
    add-codecs-on-egress
        Xcode
        *
        CN
```

```

codec-policy
  name                      toSFB
  allow-codecs               *
  add-codecs-on-egress       CN

```

System Config

Path: **configure terminal > system > system-config > select**

```

system-config
  process-log-level          WARNING
  default-gateway            192.65.79.97

```

Translation Rules

Path: **configure terminal > session-router > translation-rule**

```

translation-rules
  id                         addPlus1
  type                       add
  add-string                 +1
translation-rules
  id                         delPlus1
  type                       delete
  delete-string              +1

```

Web Server Config

Path: **configure terminal > system > web-server-config > select**

```

web-server-config
  state                     enabled
  inactivity-timeout        5
  http-state                enabled
  http-port                 80
  https-state               disabled
  https-port                443
  tls-profile

```

Save, Activate, and Reboot

You will now save your configuration with the **save-config** command. This will make it persistent through reboots, but it will not take effect until after you issue the **activate-config** command. Some config elements are not Real-Time Configuration (RTC) supported, so a reboot is required after the initial configuration.

```

oraclesbc1# save-config
checking configuration
Save-Config received, processing.
waiting 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# activate-config
Activate-Config received, processing.
waiting for request to finish
Setting phy0 on Slot=0, Port=0, MAC=00:08:25:03:FC:43, VMAC=00:08:25:03:FC:43
Setting phyl on Slot=1, Port=0, MAC=00:08:25:03:FC:45, VMAC=00:08:25:03:FC:45
Request to 'ACTIVATE-CONFIG' has Finished,
Activate Complete
oraclesbc1# reboot force
```

The E-SBC configuration is now complete.

Sections below will walk thru configuring all of the 3rd party products and how they need to be configured in order for them to communicate with Oracle ESBC.

- Lync 2013
- Avaya Session Manager
- Cisco UCM
- Microsoft CCE

Lync 2013(10.70.50.20)

Topology builder with PSTN gateway

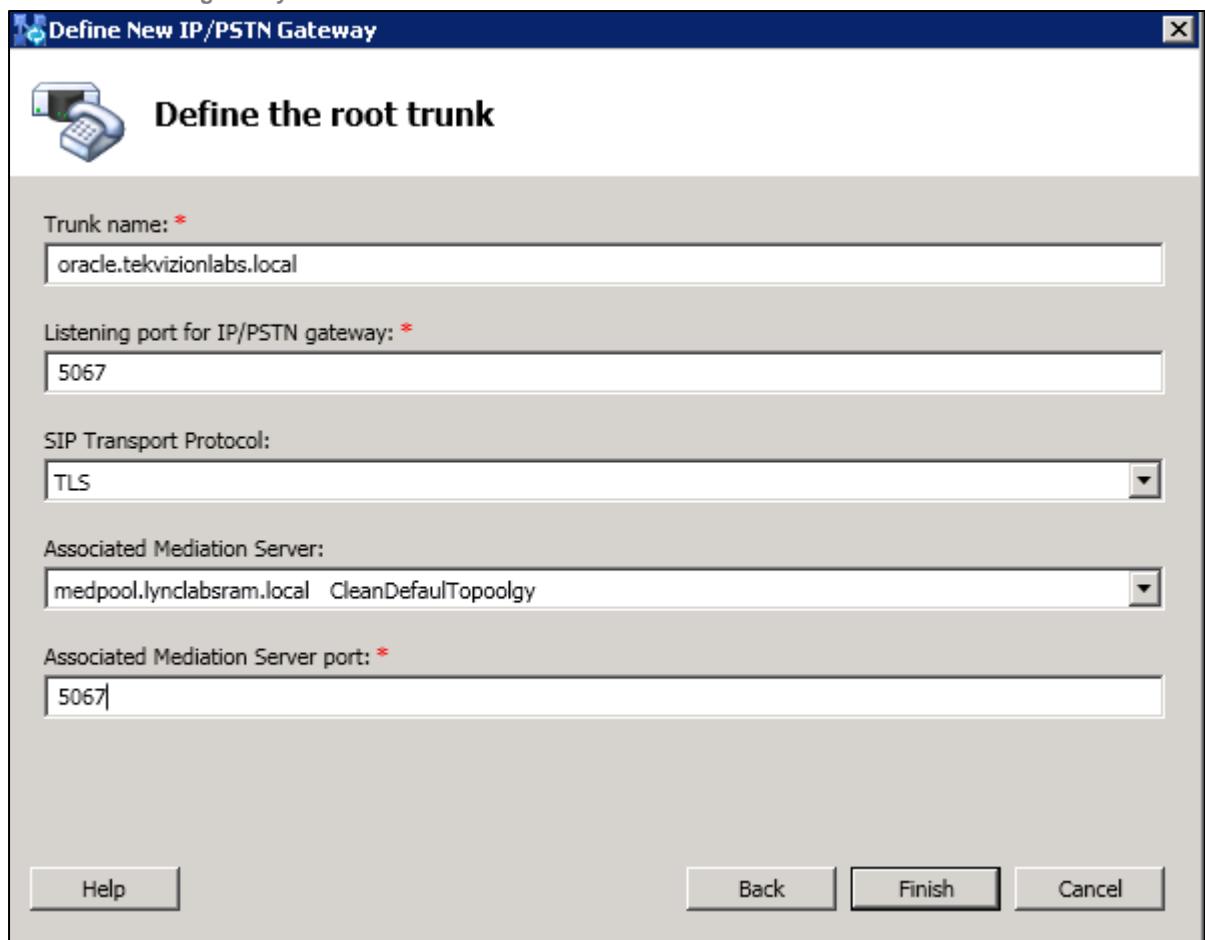


Figure 1: Defining the Root Trunk Details

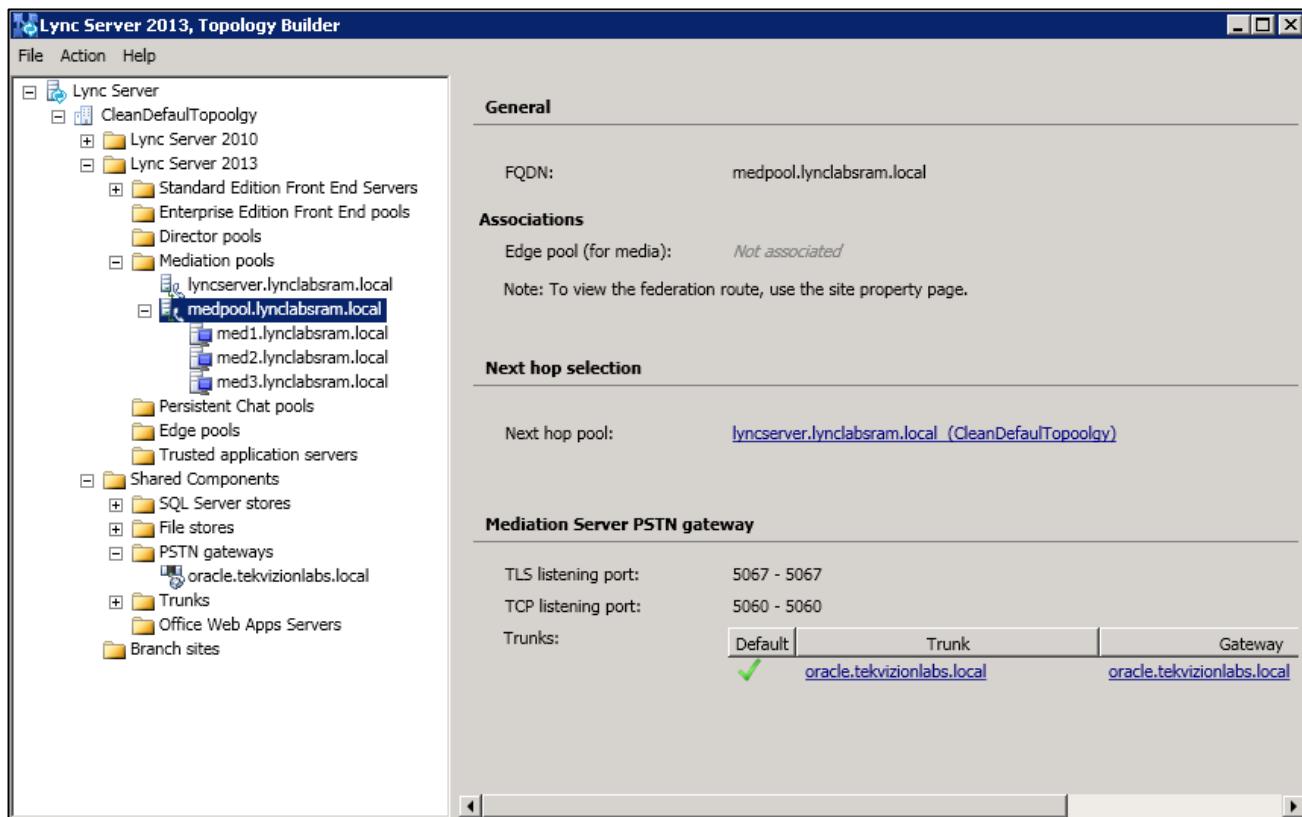


Figure 2: Mediation server with Associated PSTN gateway

Lync 2013 Control panel with “Associated PSTN gateway”

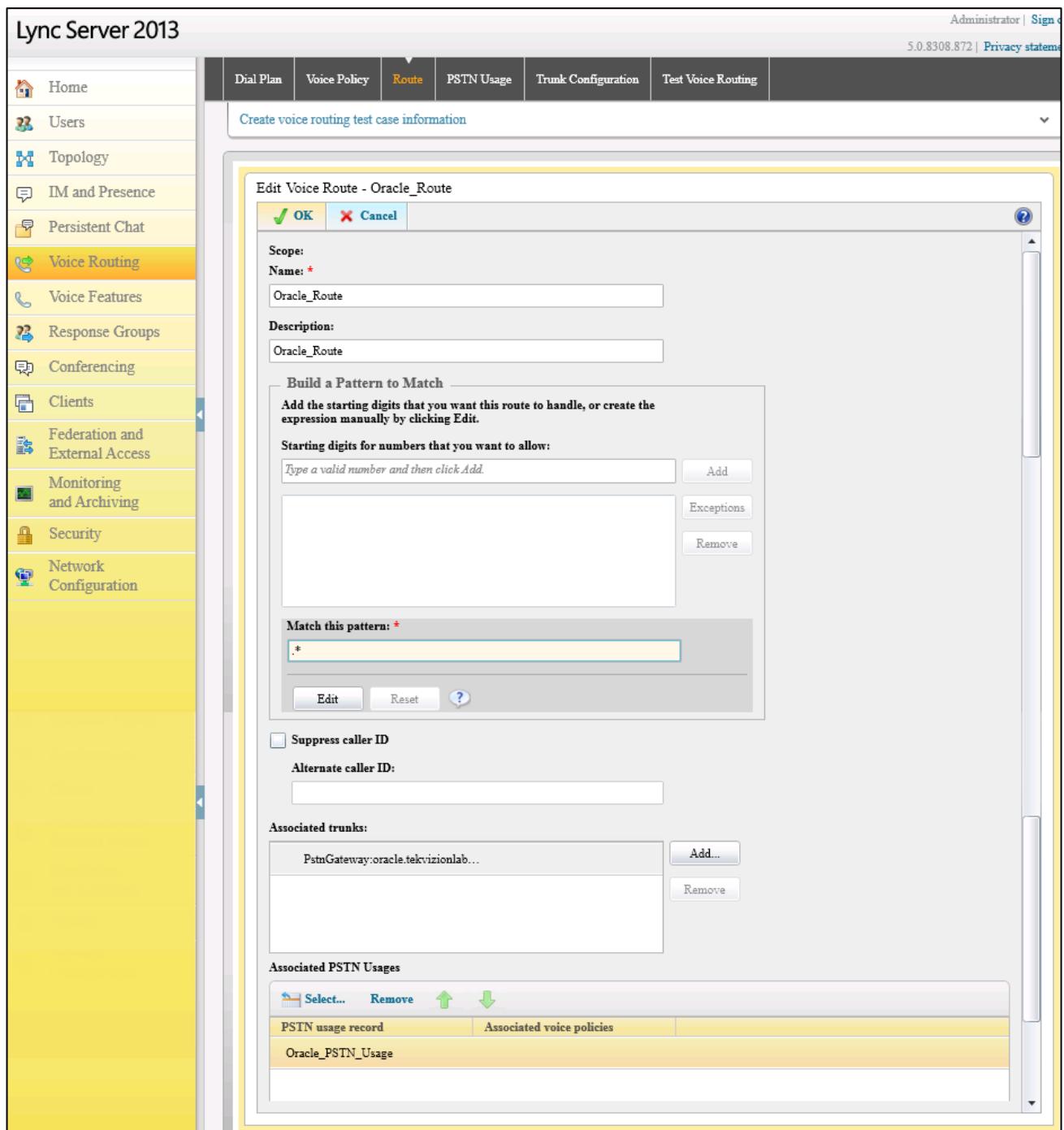


Figure 3: Associating PSTN Gateway to newly created Route

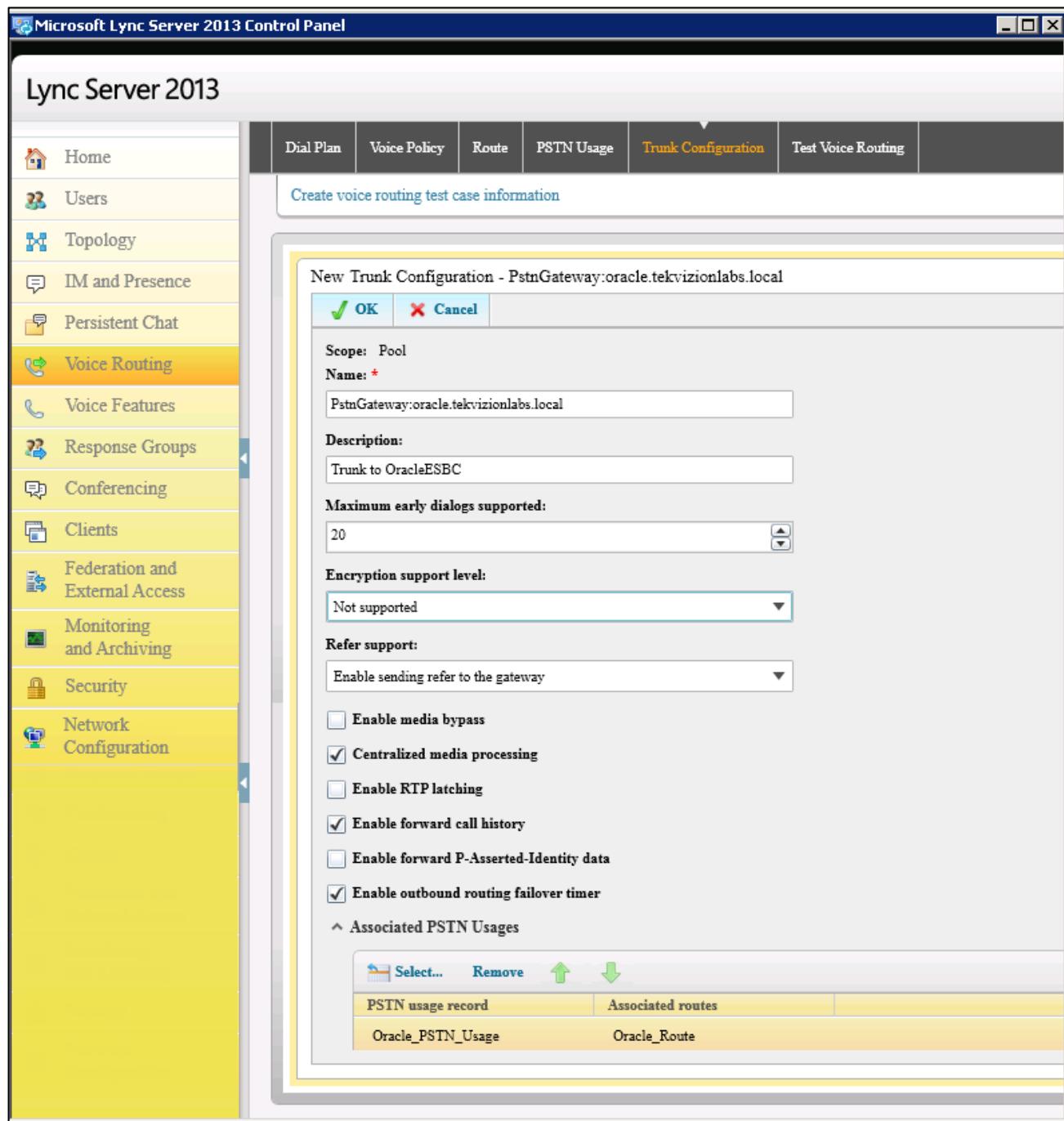


Figure 4: Trunk Configuration

Avaya (10.70.50.21)

SBC Configured on Session Manager

SIP Entity Configured on Session Manager for Oracle ESBC

The screenshot shows the Avaya Aura System Manager 7.0 interface. The left sidebar has a 'Routing' section with various sub-options like Domains, Locations, Adaptations, SIP Entities, Entity Links, Time Ranges, Routing Policies, Dial Patterns, Regular Expressions, and Defaults. The 'SIP Entities' option is selected. The main panel title is 'SIP Entity Details'. Under the 'General' tab, the 'Name' is set to 'OracleEsbc', 'FQDN or IP Address' is '10.70.50.21', 'Type' is 'Other', and 'Notes' is empty. 'Adaptation' is set to 'CallsToOracleSBC', 'Location' is 'Plano', 'Time Zone' is 'America/Fortaleza', and 'SIP Timer B/F (in seconds)' is '4'. 'Credential name' is empty, and 'Securable' is unchecked. 'Call Detail Recording' is set to 'none', and 'CommProfile Type Preference' is empty. Under the 'Loop Detection' tab, 'Loop Detection Mode' is 'On', 'Loop Count Threshold' is '5', and 'Loop Detection Interval (in msec)' is '200'. Under the 'SIP Link Monitoring' tab, 'SIP Link Monitoring' is 'Link Monitoring Enabled', 'Proactive Monitoring Interval (in seconds)' is '120', 'Reactive Monitoring Interval (in seconds)' is '60', 'Number of Tries' is '1', and 'Supports Call Admission Control' is unchecked. 'Shared Bandwidth Manager' is checked. 'Primary Session Manager Bandwidth Association' and 'Backup Session Manager Bandwidth Association' dropdown menus are present.

Figure 5: SIP Entity for OracleESBC

Entity Link configured on Session Manager for Oracle ESBC

Name	SIP Entity 1	Protocol	Port	SIP Entity 2
* AA SM7.0_OracleEsbc_50	* AA SM7.0	TCP	5060	* OracleEsbc

Figure 6: Entity Link to Oracle ESBC

Routing Policy

Name	FQDN or IP Address	Type	Notes
OracleEsbc	10.70.50.21	Other	

Figure 7: Routing Policy for Oracle ESBC

Dial Pattern

The screenshot shows the 'Dial Pattern Details' configuration page. In the 'General' section, the 'Pattern' is set to '52', 'Min' to '10', and 'Max' to '10'. There is an option for 'Emergency Call' which is unchecked. Below that, 'Emergency Priority' is set to '1', 'Emergency Type' is empty, and 'SIP Domain' is set to 'lab.tekvizion.com'. A notes field is also present. The 'Originating Locations and Routing Policies' section shows one item: 'Plano' with 'Avaya Aura 7.0' as the originating location, 'to_Oracle SBC' as the routing policy, and '0' as the rank.

Originating Location Name	Originating Location Notes	Routing Policy Name	Rank	Routing Policy Disabled	Routing Policy Destination	Routing Policy Notes
Plano	Avaya Aura 7.0	to_Oracle SBC	0	<input type="checkbox"/>	OracleEsb	

Figure 8: Dial Pattern for 10 Digit dialing

The screenshot shows the 'Dial Pattern Details' configuration page. In the 'General' section, the 'Pattern' is set to '2', 'Min' to '4', and 'Max' to '4'. There is an option for 'Emergency Call' which is unchecked. Below that, 'Emergency Priority' is set to '1', 'Emergency Type' is empty, and 'SIP Domain' is set to 'lab.tekvizion.com'. A notes field is also present. The 'Originating Locations and Routing Policies' section shows one item: 'Plano' with 'Avaya Aura 7.0' as the originating location, 'to_Oracle SBC' as the routing policy, and '0' as the rank.

Originating Location Name	Originating Location Notes	Routing Policy Name	Rank	Routing Policy Disabled	Routing Policy Destination	Routing Policy Notes
Plano	Avaya Aura 7.0	to_Oracle SBC	0	<input type="checkbox"/>	OracleEsb	

Figure 9: Dial Pattern for Extension dialing

Cisco UCM (10.70.50.22)

SIP Trunk List

Trunks (1 - 2 of 2)												Rows per Page	50		
Find Trunks where Device Name begins with												Find	Clear Filter	Add	Print
Select item or enter search text															
		Name	Description	Calling Search Space	Device Pool	Route Pattern	Partition	Route Group	Priority	Trunk Type	SIP Trunk Status	SIP Trunk Duration	SIP Trunk Security Profile		
<input type="checkbox"/>	 Trunk_to_OracleSBC	Trunk_to_OracleSBC		Oracle Device Pool	2.XXXX					SIP Trunk	Full Service	Time In Full Service: 1 day 14 hours 7 minutes	Oracle Non Secure SIP Trunk Profile		
<input type="checkbox"/>	 Trunk_to_OracleSBC	Trunk_to_OracleSBC		Oracle Device Pool	3.XXXXXXXXXX					SIP Trunk	Full Service	Time In Full Service: 1 day 14 hours 7 minutes	Oracle Non Secure SIP Trunk Profile		
Add New Select All Clear All Delete Selected Reset Selected															

Figure 10: SIP Trunk List

SIP Trunk Configuration

-SIP Trunk Status-	
Service Status: Full Service	
Duration: Time In Full Service: 1 day 14 hours 24 minutes	
-Device Information-	
Product:	SIP Trunk
Device Protocol:	SIP
Trunk Service Type	None(Default)
Device Name*	Trunk_to_OracleSBC
Description	Trunk_to_OracleSBC
Device Pool*	Oracle Device Pool ▾
Common Device Configuration	< None > ▾
Call Classification*	Use System Default ▾
Media Resource Group List	MRGL_Default ▾
Location*	Hub_None ▾
AAR Group	< None > ▾
Tunneled Protocol*	None ▾
QSIG Variant*	No Changes ▾
ASN.1 ROSE OID Encoding*	No Changes ▾
Packet Capture Mode*	None ▾
Packet Capture Duration	0

Figure 11 : SIP Trunk to OracleESBC

<input type="checkbox"/> Media Termination Point Required				
<input checked="" type="checkbox"/> Retry Video Call as Audio				
<input type="checkbox"/> Path Replacement Support				
<input type="checkbox"/> Transmit UTF-8 for Calling Party Name				
<input type="checkbox"/> Transmit UTF-8 Names in QSIG APDU				
<input type="checkbox"/> Unattended Port				
<input type="checkbox"/> SRTP Allowed - When this flag is checked, Encrypted TLS needs to be configured in the network to provide end to end security. Failure to do so will expose keys and other information.				
Consider Traffic on This Trunk Secure*	When using both sRTP and TLS			
Route Class Signaling Enabled*	Default			
Use Trusted Relay Point*	Default			
<input checked="" type="checkbox"/> PSTN Access				
<input type="checkbox"/> Run On All Active Unified CM Nodes				
- Intercompany Media Engine (IME)				
E.164 Transformation Profile	< None >			
- MLPP and Confidential Access Level Information				
MLPP Domain	< None >			
Confidential Access Mode	< None >			
Confidential Access Level	< None >			
- Call Routing Information				
<input type="checkbox"/> Remote-Party-Id				
<input checked="" type="checkbox"/> Asserted-Identity				
Asserted-Type*	Default			
SIP Privacy*	Default			
- Inbound Calls				
Significant Digits*	4			
Connected Line ID Presentation*	Default			
Connected Name Presentation*	Default			
Calling Search Space	< None >			
AAR Calling Search Space	< None >			
Prefix DN				
<input type="checkbox"/> Redirecting Diversion Header Delivery - Inbound				
- Incoming Calling Party Settings				
If the administrator sets the prefix to Default this indicates call processing will use prefix at the next level setting (DevicePool/Service Parameter). Otherwise, the value configured is used as the prefix unless the field is empty in which case there is no prefix assigned.				
<input type="button" value="Clear Prefix Settings"/> <input type="button" value="Default Prefix Settings"/>				
Number Type	Prefix	Strip Digits	Calling Search Space	Use Device Pool CSS
Incoming Number	Default	0	< None >	<input checked="" type="checkbox"/>
- Incoming Called Party Settings				
If the administrator sets the prefix to Default this indicates call processing will use prefix at the next level setting (DevicePool/Service Parameter). Otherwise, the value configured is used as the prefix unless the field is empty in which case there is no prefix assigned.				
<input type="button" value="Clear Prefix Settings"/> <input type="button" value="Default Prefix Settings"/>				
Number Type	Prefix	Strip Digits	Calling Search Space	Use Device Pool CSS
Incoming Number	Default	0	< None >	<input checked="" type="checkbox"/>

Figure 12: SIP Trunk to OracleESBC (Cont.)

Connected Party Settings

Connected Party Transformation CSS < None >
 Use Device Pool Connected Party Transformation CSS

Outbound Calls

Called Party Transformation CSS < None >
 Use Device Pool Called Party Transformation CSS
 Calling Party Transformation CSS < None >
 Use Device Pool Calling Party Transformation CSS
 Calling Party Selection* Originator
 Calling Line ID Presentation* Default
 Calling Name Presentation* Default
 Calling and Connected Party Info Format* Deliver DN only in connected party
 Redirecting Diversion Header Delivery - Outbound
 Redirecting Party Transformation CSS < None >
 Use Device Pool Redirecting Party Transformation CSS

Caller Information

Caller ID DN
 Caller Name
 Maintain Original Caller ID DN and Caller Name in Identity Headers

SIP Information

Destination

Destination Address is an SRV

Destination Address	Destination Address IPv6	Destination Port
1 * 10.70.50.22		5060

MTP Preferred Originating Codec* 711ulaw
 BLF Presence Group* Standard Presence group
 SIP Trunk Security Profile* Oracle Non Secure SIP Trunk Profile
 Rerouting Calling Search Space < None >
 Out-Of-Dialog Refer Calling Search Space < None >
 SUBSCRIBE Calling Search Space < None >
 SIP Profile* Oracle_Standard SIP Profile [View Details](#)
 DTMF Signaling Method* No Preference

Normalization Script

Normalization Script < None >
 Enable Trace

Parameter Name	Parameter Value
1	

Recording Information

None
 This trunk connects to a recording-enabled gateway
 This trunk connects to other clusters with recording-enabled gateways

Geolocation Configuration

Geolocation < None >
 Geolocation Filter < None >
 Send Geolocation Information

Action Buttons

Save Delete Reset Add New

Figure 13 : SIP Trunk to OracleESBC (Cont.)

Route Pattern

Route Patterns (1 - 2 of 2)							Rows per Page 50 ▾
Find Route Patterns where <input type="text" value="Pattern"/> ▾ begins with <input type="text"/>				Find	Clear Filter	<input type="button" value="+"/>	<input type="button" value="-"/>
<input type="checkbox"/>	Pattern ^	Description	Partition	Route Filter	Associated Device	Copy	
<input type="checkbox"/>	3.XXXXXXXXXXX	Oracle 10 Digit Dialing			Trunk_to_OracleSBC	<input type="button" value="Copy"/>	<input type="button" value="Edit"/>
<input type="checkbox"/>	2.XXXX	Oracle Extension Dialing			Trunk_to_OracleSBC	<input type="button" value="Copy"/>	<input type="button" value="Edit"/>

Figure 14: Route Patterns List

Route Pattern for 10 Digit Dialing

Pattern Definition			
Route Pattern*	3.XXXXXXXXXXX		
Route Partition	< None >		
Description	Oracle 10 Digit Dialing		
Numbering Plan	-- Not Selected --		
Route Filter	< None >		
MLPP Precedence*	Default		
<input type="checkbox"/> Apply Call Blocking Percentage			
Resource Priority Namespace Network Domain	< None >		
Route Class*	Default		
Gateway/Route List*	Trunk_to_OracleSBC		
(Edit)			
Route Option	<input checked="" type="radio"/> Route this pattern <input type="radio"/> Block this pattern No Error		
Call Classification*	OffNet		
External Call Control Profile	< None >		
<input type="checkbox"/> Allow Device Override	<input checked="" type="checkbox"/> Provide Outside Dial Tone	<input type="checkbox"/> Allow Overlap Sending	<input type="checkbox"/> Urgent Priority
<input type="checkbox"/> Require Forced Authorization Code			
Authorization Level*	0		
<input type="checkbox"/> Require Client Matter Code			
Calling Party Transformations			
<input checked="" type="checkbox"/> Use Calling Party's External Phone Number Mask			
Calling Party Transform Mask			
Prefix Digits (Outgoing Calls)			
Calling Line ID Presentation*	Default		
Calling Name Presentation*	Default		
Calling Party Number Type*	Cisco CallManager		
Calling Party Numbering Plan*	Cisco CallManager		
Connected Party Transformations			
Connected Line ID Presentation*	Default		
Connected Name Presentation*	Default		
Called Party Transformations			
Discard Digits	PreDot		
Called Party Transform Mask			
Prefix Digits (Outgoing Calls)			
Called Party Number Type*	Cisco CallManager		
Called Party Numbering Plan*	Cisco CallManager		
ISDN Network-Specific Facilities Information Element			
Network Service Protocol	-- Not Selected --		
Carrier Identification Code			
Network Service	Service Parameter Name	Service Parameter Value	
-- Not Selected --	< Not Exist >		
<input type="button" value="Save"/> <input type="button" value="Delete"/> <input type="button" value="Copy"/> <input type="button" value="Add New"/>			

Figure 15: Route Pattern for 10 Digit Dialing

Route Pattern for Extension Dialing

Pattern Definition		
Route Pattern*	2.XXXX	
Route Partition	< None >	
Description	Oracle Extension Dialing	
Numbering Plan	-- Not Selected --	
Route Filter	< None >	
MLPP Precedence*	Default	
<input type="checkbox"/> Apply Call Blocking Percentage		
Resource Priority Namespace Network Domain	< None >	
Route Class*	Default	
Gateway/Route List*	Trunk_to_OracleSBC	
Route Option	<input checked="" type="radio"/> Route this pattern <input type="radio"/> Block this pattern [No Error]	
Call Classification*	OffNet	
External Call Control Profile	< None >	
<input type="checkbox"/> Allow Device Override <input checked="" type="checkbox"/> Provide Outside Dial Tone <input type="checkbox"/> Allow Overlap Sending <input type="checkbox"/> Urgent Priority <input type="checkbox"/> Require Forced Authorization Code Authorization Level* 0 <input type="checkbox"/> Require Client Matter Code		
Calling Party Transformations		
<input type="checkbox"/> Use Calling Party's External Phone Number Mask		
Calling Party Transform Mask		
Prefix Digits (Outgoing Calls)		
Calling Line ID Presentation*	Default	
Calling Name Presentation*	Default	
Calling Party Number Type*	Cisco CallManager	
Calling Party Numbering Plan*	Cisco CallManager	
Connected Party Transformations		
Connected Line ID Presentation*	Default	
Connected Name Presentation*	Default	
Called Party Transformations		
Discard Digits	PreDot	
Called Party Transform Mask		
Prefix Digits (Outgoing Calls)		
Called Party Number Type*	Cisco CallManager	
Called Party Numbering Plan*	Cisco CallManager	
ISDN Network-Specific Facilities Information Element		
Network Service Protocol	-- Not Selected --	
Carrier Identification Code		
Network Service	Service Parameter Name	Service Parameter Value
-- Not Selected --	< Not Exist >	
<input type="button" value="Save"/> <input type="button" value="Delete"/> <input type="button" value="Copy"/> <input type="button" value="Add New"/>		

Figure 16: Route Pattern for Extension Dialing

Cloud Connector Edition (10.64.4.149)

Cloud Connector first setup requires providing parameters such as SIP domains, IP addresses of virtual machines, configuration of REFER, and some other parameters in the INI file. The INI file is the main source of configuration information for Cloud Connector. During the install process, Cloud Connector installs the fresh set of Virtual machines and applies configuration settings from the INI file. Any parameters that are not present in INI are set to the default values.

Below is the snippet from INI file for Gateway Configuration.

```
;Parameters for gateway
;If only one Gateway is needed, remove entire [GateWay2] section. Don't keep it but leave
values empty.
;If Gateway FQDN uses O365 Sip Domain in name for TLS purposes, be sure to set
InternetDNSIPAddress to allow Edge to resolve these records
[Gateway1]
; Gateway FQDN
FQDN=oracle.tekvizionlabs.local
;Gateway IP address
IP=10.64.4.149
;Gateway Port
Port=5061
;Protocol for SIP traffic (TCP or TLS)
Protocol=TLS
;List of voice routes used by this gateway.
;Routes are defined in the next section.
VoiceRoutes=LocalRoute

;::::::::::::: Parameters for hybrid voice routing ;::::::::::
[HybridVoiceRoutes]
;Named voice route to be used by one or more gateways
LocalRoute=.*

;::::::::::::: Parameters for TrunkConfiguration ;::::::::::
[TrunkConfiguration]
;Whether Gateways support Refer. It is used for Call Transfer scenario.
;The value can be "true" or "false". Default value is "true".
;EnableReferSupport set to "true" means the Gateway(s) support Refer which can handle all
the call transfer stuffs.
;EnableReferSupport set to "false" means the Gateway(s) don't support Refer. Then Mediation
Server will handle all the call transfer stuffs.
EnableReferSupport=true

;Whether forward PAI from Mediation Server to Gateways
;The value can be "true" or "false". Default value is "true".
ForwardPAI=false
```

Test Plan & Results

Test Plan

The testing was done with varied permutations/combinations and was performed by tekVizion.

The test plan consisted of the following test cases. All tests passed.

External ID	Title	Status	Comments
Inbound / Outbound / Extension Dialing			
1	Avaya 7.0 calls Cisco UCM 11.5 via Extension	Pass	
2	Avaya 7.0 calls Cisco UCM 11.5 using 10 digit calling	Pass	
3	Avaya 7.0 calls Microsoft Lync 2013 via Extension	Pass	
4	Avaya 7.0 calls Microsoft Lync 2013 using 10 digit calling	Pass	
5	Avaya 7.0 calls Skype for Business Online using 10 digit calling	Pass	Early media is disabled at ESBC to fix the RBT issue.
6	Cisco UCM 11.5 calls Avaya 7.0 via Extension	Pass	
7	Cisco UCM 11.5 calls Avaya 7.0 using 10 digit calling	Pass	
8	Cisco UCM 11.5 calls Microsoft Lync 2013 via Extension	Pass	
9	Cisco UCM 11.5 calls Microsoft Lync 2013 using 10 digit calling	Pass	
10	Cisco UCM 11.5 calls Skype for Business Online using 10 digit calling	Pass	
11	Microsoft Lync 2013 calls Avaya 7.0 via Extension	Pass	
12	Microsoft Lync 2013 calls Avaya 7.0 using 10 digit calling	Pass	
13	Microsoft Lync 2013 calls Cisco UCM 11.5 via Extension	Pass	
14	Microsoft Lync 2013 calls Cisco UCM 11.5 using 10 digit calling	Pass	
15	Microsoft Lync 2013 calls Skype for Business Online using 10 digit calling	Pass	
16	Skype for Business Online calls Avaya 7.0 via Extension	Pass	

17	Skype for Business Online calls Avaya 7.0 using 10 digit calling	Pass	
18	Skype for Business Online calls Cisco UCM 11.5 via Extension	Pass	
19	Skype for Business Online calls Cisco UCM 11.5 using 10 digit calling	Pass	
20	Skype for Business Online calls Microsoft Lync 2013 via Extension	Pass	
21	Skype for Business Online calls Microsoft Lync 2013 using 10 digit calling	Pass	
Transfer Functionality			
Each Transfer test case is executed in the following ways:			
Semi-Attended & Consultative transfer, based on re-INVITE & REFER methods			
22	PSTN calls into Avaya 7.0 and transfers to Cisco 11.5 using 10 digit calling	Pass	
23	PSTN calls into Avaya 7.0 and transfers to Microsoft Lync 2013 using 10 digit calling	Pass	Executed transfer scenarios based on re-INVITE method.
24	PSTN calls into Avaya 7.0 and transfers to Cisco 11.5 via Extension	Pass	
25	PSTN calls into Avaya 7.0 and transfers to Microsoft Lync 2013 via Extension	Pass	Executed transfer scenarios based on re-INVITE method.
26	PSTN calls into Cisco UCM 11.5 and transfers to Avaya 7.0 using 10 digit calling	Pass	Executed transfer scenarios based on re-INVITE method.
27	PSTN calls into Avaya 7.0 and transfers to Skype for Business Online using 10 digit calling	Pass	Early media is disabled at ESBC to fix the RBT issue.
28	PSTN calls into Cisco UCM 11.5 and transfers to Avaya 7.0 via Extension	Pass	Same as TC 27
29	PSTN calls into Cisco UCM 11.5 and transfers to Microsoft Lync 2013 using 10 digit calling	Pass	Same as TC 27
30	PSTN calls into Cisco UCM 11.5 and transfers to Microsoft Lync 2013 via Extension	Pass	Same as TC 27

31	PSTN calls into Cisco UCM 11.5 and transfers to Skype for Business Online using 10 digit calling	Pass	Same as TC 27
32	PSTN calls into Cisco UCM 11.5 and transfers to Skype for Business Online via Extension	N/A	Inbound calls to SFB Online user with Extension is Not Applicable since SFB Online user cannot have both Tel URI and Extension configured at the same time.
33	PSTN calls into Microsoft Lync 2013 and transfers to Avaya 7.0 using 10 digit calling	Conditional Pass	Conditional Pass. Transfer functionality works fine. However, when Lync user initiates Semi-attended transfer based on REFER method, call originator (PSTN User) does not hear the Ring back Tone when the transfer is completed.*****
34	PSTN calls into Microsoft Lync 2013 and transfers to Avaya 7.0 via Extension	Conditional Pass	Same as TC 33
35	PSTN calls into Microsoft Lync 2013 and transfers to Cisco 11.5 using 10 digit calling	Conditional Pass	Same as TC 33
36	PSTN calls into Microsoft Lync 2013 and transfers to Skype for Business Online using 10 digit calling	Pass	Executed transfer scenarios based on re-INVITE method.
37	PSTN calls into Microsoft Lync 2013 and transfers to Cisco 11.5 via Extension	Conditional Pass	Same as TC 33
Call Hold / Resume			
38	Avaya 7.0 calls Cisco 11.5 via Extension and places the call on hold & reconnects	Pass	
39	Avaya 7.0 calls Skype for Business Online via Extension and places the call on hold & reconnects	Pass	This test case is executed by dialing 10 Digits of the SFB Online user, since SFB Online cannot user have 'Tel URI and Extension Configured at the same time'.
40	Avaya 7.0 calls Microsoft Lync 2013 via Extension and places the call on hold & reconnects	Pass	
41	Cisco UCM 11.5 calls Avaya 7.0 via Extension and places the call on hold & reconnects	Pass	
42	Cisco UCM 11.5 calls Microsoft Lync 2013 via Extension and places the call on hold & reconnects	Pass	
43	Cisco UCM 11.5 calls Skype for Business Online via Extension and places the call on hold & reconnects	Pass	This test case is executed by dialing 10 Digits of the SFB Online user, since SFB Online user cannot have 'Tel URI and Extension Configured at the same time'.

44	Microsoft Lync 2013 calls Avaya 7.0 via Extension and places the call on hold & reconnects	Pass	
45	Microsoft Lync 2013 calls Cisco UCM 11.5 via Extension and places the call on hold & reconnects	Pass	
46	Microsoft Lync 2013 calls Skype for Business Online via Extension and places the call on hold & reconnects	Pass	
47	Skype for Business Online calls Avaya 7.0 via Extension and places the call on hold & reconnects	Pass	
48	Skype for Business Online calls Cisco UCM 11.5 via Extension and places the call on hold & reconnects	Pass	
Serial Forking w/ LDAP Integration			
49	Avaya 7.0 calls a user (via 10 digit dial) which is configured on both Lync 2013 and SFB. Both Lync 2013 and SFB instances should ring in serially and either can be answered.	Pass	
50	Avaya 7.0 calls a user (via extension dial) which is configured on both Lync 2013 and SFB. Both Lync 2013 and SFB instances should ring in serially and either can be answered.	Pass	Extension dial for SFB Online user is NA, hence this test case is executed by converting Extension to 10 Digit DID for SFB Online user at E-SBC.
51	Cisco UCM 11.5 calls a user (via 10 digit dial) which is configured on both Lync 2013 and SFB. Both Lync 2013 and SFB instances should ring in serially and either can be answered.	Pass	
52	Cisco UCM 11.5 calls a user (via extension dial) which is configured on both Lync 2013 and SFB. Both Lync 2013 and SFB instances should ring in serially and either can be answered.	Pass	Extension dial for SFB Online user is NA, hence this test case is executed by converting Extension to 10 Digit DID for SFB Online user at E-SBC.
CCE Specific Test Cases			

53	Call forward always from online user to PSTN	Pass	Executed this test case by originating the call from Cisco UCM
54	Call forward always from online user to early media number	Pass	
55	Call Forward no answer from Online user to PSTN	Pass	
56	Call Forward no answer from Online user to Voicemail	Pass	
57	Simultaneous ring setup with Online user with another Online user	Pass	
58	Simultaneous ring setup on Online with PSTN	Pass	
59	Call from CCE user Early Media IVR number and test DTMF before 200 OK	Pass	
60	Call from CCE user to toll free number and test DTMF	Pass	
61	Anonymous call from Online user to PSTN	Pass	

Appendix A

Full SBC configuration

```
show running-config short
certificate-record
    name                      LyncMed
    state                     TX
    locality                  Plano
    common-name               medserver1.lynclabsram.local
    digest-algor              sha1
certificate-record
    name                      LyncRoot
    state                     TX
    locality                  Plano
    common-name               lynclabsram-DC-CA
    digest-algor              sha1
certificate-record
    name                      SBCCCE2
    state                     TX
    locality                  Plano
    common-name               oracle.tekvizionlabs.local
    digest-algor              sha1
certificate-record
    name                      SBCCert
    state                     TX
    locality                  Plano
    common-name               oracle.tekvizionlabs.local
    digest-algor              sha1
certificate-record
    name                      SBCCertCCE
    state                     TX
    locality                  Plano
    common-name               oracle.tekvizionlabs.local
    digest-algor              sha1
certificate-record
    name                      cceRoot
    state                     TX
    locality                  Plano
    common-name               SfB CCE Root
    digest-algor              sha1
certificate-record
    name                      newCCERoot
    state                     TX
    locality                  Plano
    common-name               SfB CCE Root
    digest-algor              sha1
certificate-record
    name                      rootcert
    state                     TX
    locality                  Plano
    common-name               lynclabsram-DC-CA
    digest-algor              sha1
codec-policy
    name                      G711Only
    allow-codecs              * G729:no
```

add-codecs-on-egress	PCMU PCMA telephone-event
codec-policy	
name	G729only
allow-codecs	* PCMA:no PCMU:no
add-codecs-on-egress	G729
codec-policy	
name	Xcode
allow-codecs	*
add-codecs-on-egress	CN
codec-policy	
name	toSFB
allow-codecs	*
add-codecs-on-egress	CN
filter-config	
name	all
host-route	
dest-network	155.212.214.199
netmask	255.255.255.0
gateway	192.65.79.97
ldap-config	
name	ldapCfg
ldap-servers	172.16.31.91:389
realm	inside
username	administrator@lynclabsram.local
password	*****
ldap-search-base	CN=Users,DC=lynclabsram,DC=local
ldap-transactions	
route-mode	attribute-order-only
ldap-cfg-attributes	
name	msRTCSIP-Line
next-hop	med1.lynclabsram.local
realm	inside
extraction-regex	(.*)
value-format	tel:\$0
ldap-cfg-attributes	
name	telephoneNumber
next-hop	
mediationserver.tekvizionlabs.local	
realm	outside
extraction-regex	(.*)
value-format	tel:\$0
local-policy	
from-address	*
to-address	25
	52600025
source-realm	*
policy-attribute	
next-hop	10.89.17.7
realm	AvayaRealm
local-policy	
from-address	*
to-address	26
	52700026
source-realm	*
policy-attribute	
next-hop	10.80.18.3

realm local-policy from-address to-address source-realm policy-attribute next-hop realm local-policy from-address to-address source-realm policy-attribute next-hop realm local-policy from-address to-address source-realm state policy-attribute next-hop realm local-policy from-address to-address source-realm description policy-attribute next-hop realm local-policy from-address to-address source-realm policy-attribute next-hop realm local-policy from-address to-address source-realm policy-attribute next-hop realm local-policy from-address to-address 	CUCMRealm * 27 52800027 * med1.lynclabsram.local inside * 28 52900028 * mediationserver.tekvizionlabs.local outside * * AvayaRealm CUCMRealm inside disabled 10.64.4.59 outside * 2142425 800 9725 * topstn 10.64.1.72 PSTN * 2432 2601 5270002601 * ldap:ldapCfg inside * med1.lynclabsram.local * med1.lynclabsram.local inside *
---	--

source-realm	*
policy-attribute	
next-hop	mediationserver.tekvizionlabs.local
realm	outside
local-policy	
from-address	*
to-address	9876543210
source-realm	*
policy-attribute	
next-hop	172.16.29.71
realm	toSFB
local-policy	
from-address	*
to-address	*
source-realm	outside
policy-attribute	
next-hop	med1.lynclabsram.local
realm	inside
methods	OPTIONS
media-manager	
initial-guard-timer	86400
options	xcode-gratuitous-rtcp-report-generation
media-sec-policy	
name	RTP
media-sec-policy	
name	SRTP
inbound	
profile	SRTP
mode	srtp
protocol	sdes
outbound	
profile	SRTP
mode	srtp
protocol	sdes
network-interface	
name	s0p0
description	WAN
ip-address	10.64.4.149
netmask	255.255.0.0
gateway	10.64.1.1
gw-heartbeat	
state	enabled
dns-ip-primary	10.64.4.61
dns-domain	tekvizionlabs.local
hip-ip-list	
10.64.4.149	
10.64.4.145	
10.64.4.147	
icmp-address	
10.64.4.149	
10.64.4.145	
10.64.4.147	
network-interface	
name	s0p1
description	LAN
ip-address	10.70.50.20
netmask	255.255.255.0
gateway	10.70.50.1

dns-ip-primary	172.16.31.91
dns-domain	lynclabsram.local
hip-ip-list	10.70.50.20 10.70.50.21 10.70.50.22 10.70.50.23
icmp-address	10.70.50.20 10.70.50.21 10.70.50.22 10.70.50.23
phy-interface	
name	s0p0
operation-type	Media
phy-interface	
name	s0p1
operation-type	Media
port	1
playback-config	
name	transferrbt
entry	
encoding	PCMU
filename	US_ringbackPCMU.raw
realm-config	
identifier	AvayaRealm
network-interfaces	s0p1:0
media-sec-policy	RTP
early-media-allow	none
codec-policy	Xcode
rtcp-policy	rtcpGen
realm-config	
identifier	CUCMRealm
network-interfaces	s0p1:0
media-sec-policy	RTP
codec-policy	G729only
codec-manip-in-realm	enabled
rtcp-policy	rtcpGen
realm-config	
identifier	PSTN
network-interfaces	s0p0:0
media-sec-policy	RTP
codec-policy	G711Only
rtcp-policy	rtcpGen
realm-config	
identifier	inside
network-interfaces	s0p1:0
media-sec-policy	RTP
spl-options	comfort-noise-generate
codec-policy	G711Only
rtcp-policy	rtcpGen
realm-config	
identifier	outside
network-interfaces	s0p0:0
media-sec-policy	SRTP
spl-options	comfort-noise-generate
codec-policy	G711Only
rtcp-policy	rtcpGen

```

realm-config
    identifier                               outside-rtp
    network-interfaces                       s0p0:0
realm-config
    identifier                               toSFB
    network-interfaces                      s0p1:0
    media-sec-policy                         RTP
    codec-policy                             Xcode
    rtcp-policy                            rtcpGen
response-map
    name                                     change183to180
    entries
        recv-code                           183
        xmit-code                           180
        reason                                Ringing
rtcp-policy
    name                                     rtcpGen
    rtcp-generate                          all-calls
sdes-profile
    name                                     SRTP
    use-ingress-session-params             srtcp-encrypt
session-agent
    hostname                                10.64.1.72
    ip-address                             10.64.1.72
    transport-method                       StaticTCP
    realm-id                                PSTN
    description                            PSTN
    ping-method                           OPTIONS;hops=0
    ping-interval                         30
session-agent
    hostname                                10.80.18.3
    ip-address                             10.80.18.3
    transport-method                       StaticTCP
    realm-id                                CUCMRealm
    description                            CUCM
    ping-method                           OPTIONS;hops=0
    ping-interval                         30
session-agent
    hostname                                10.89.17.7
    ip-address                             10.89.17.7
    transport-method                       StaticTCP
    realm-id                                AvayaRealm
    description                            Avaya
    ping-method                           OPTIONS;hops=0
    ping-interval                         30
session-agent
    hostname                                172.16.29.71
    ip-address                             172.16.29.71
    transport-method                       StaticTCP
    realm-id                                toSFB
    ping-method                           OPTIONS
    ping-interval                         30
session-agent
    hostname                                med1.lynclabsram.local
    ip-address                            172.16.31.97
    port                                    5067

```

transport-method	StaticTLS
realm-id	inside
ping-method	OPTIONS;hops=0
ping-interval	30
refer-call-transfer	enabled
session-agent	
hostname	mediationserver.tekvizionlabs.local
ip-address	10.64.4.59
port	5067
transport-method	StaticTLS
realm-id	outside
ping-method	OPTIONS;hops=0
ping-interval	30
in-translationid	delplus1
refer-call-transfer	enabled
session-translation	
id	addPlus
rules-calling	addPlus1
rules-called	addPlus1
session-translation	
id	delplus1
rules-calling	delPlus1
rules-called	delPlus1
sip-config	
home-realm-id	inside
registrar-domain	*
registrar-host	*
registrar-port	5060
options	max-udp-length=0
sip-interface	
realm-id	AvayaRealm
sip-port	
address	10.70.50.21
transport-protocol	TCP
allow-anonymous	agents-only
out-manipulationid	NAT_IP_Avaya
response-map	change183to180
sip-interface	
realm-id	CUCMRealm
sip-port	
address	10.70.50.22
transport-protocol	TCP
allow-anonymous	agents-only
secured-network	enabled
out-manipulationid	NAT_IP
sip-interface	
realm-id	PSTN
sip-port	
address	10.64.4.145
transport-protocol	TCP
allow-anonymous	agents-only
spl-options	playback-on-refer="transferrbt"
out-manipulationid	NAT_IP
sip-interface	
realm-id	inside
sip-port	

address	10.70.50.20
transport-protocol	TCP
allow-anonymous	agents-only
sip-port	
address	10.70.50.20
port	5061
transport-protocol	TLS
tls-profile	LyncTLS
allow-anonymous	agents-only
secured-network	enabled
spl-options	playback-on-refer="transferrbt"
in-manipulationid	Stripsdp183
out-manipulationid	NatIpLync
sip-interface	
realm-id	outside
sip-port	
address	10.64.4.149
transport-protocol	TCP
allow-anonymous	agents-only
sip-port	
address	10.64.4.149
port	5061
transport-protocol	TLS
tls-profile	CCETLS
allow-anonymous	agents-only
in-manipulationid	Stripsdp183
out-manipulationid	NatIpCce
sip-interface	
realm-id	outside-rtp
sip-port	
address	10.64.4.147
transport-protocol	TCP
sip-interface	
realm-id	toSFB
sip-port	
address	10.70.50.23
transport-protocol	TCP
allow-anonymous	agents-only
sip-manipulation	
name	Changeinacttosendonly
description	Change inactive to sendonly for pstn tran
header-rule	
name	changeSDP
header-name	Content-Type
action	manipulate
msg-type	request
methods	INVITE
element-rule	
name	inacttosendonly
parameter-name	application/sdp
type	mime
action	find-replace-all
comparison-type	pattern-rule
match-value	a=inactive
new-value	a=sendonly
sip-manipulation	

```

name                                NAT_IP
header-rule
    name                               From
    header-name                         From
    action                             manipulate
    msg-type                           request
    element-rule
        name                            fromEr
        type                            uri-host
        action                           find-replace-all
        new-value                        oracle.tekvisionlabs.local
header-rule
    name                               To
    header-name                         To
    action                            manipulate
    msg-type                           request
    element-rule
        name                            ToEr
        type                            uri-host
        action                           find-replace-all
        new-value                        $REMOTE_IP
header-rule
    name                               RequestURI
    header-name                         request-uri
    action                            manipulate
    methods                           INVITE
    element-rule
        name                            ruriEr
        type                            uri-host
        action                           find-replace-all
        new-value                        $REMOTE_IP
header-rule
    name                               alterPAI
    header-name                         P-Asserted-Identity
    action                            manipulate
    element-rule
        name                            alterPAIEr
        type                            uri-host
        action                           find-replace-all
        new-value                        $LOCAL_IP
header-rule
    name                               msSource
    header-name                         ms-call-source
    action                            delete
    methods                           INVITE
sip-manipulation
    name                                NAT_IP_Avaya
header-rule
    name                               From
    header-name                         From
    action                            manipulate
    msg-type                           request
    element-rule
        name                            fromEr
        type                            uri-host
        action                           find-replace-all

```

<pre> new-value element-rule name type action header-rule name header-name action msg-type element-rule name type action new-value header-rule name header-name action methods element-rule name type action new-value header-rule name header-name action msg-type methods header-rule name header-name action methods header-rule name header-name action msg-type methods match-value element-rule name type action new-value header-rule name header-name action comparison-type msg-type methods header-rule </pre>	<pre> oracle.tekvizionlabs.local store_user uri-user store To To manipulate request ToEr uri-host find-replace-all \$REMOTE_IP RequestURI request-uri manipulate INVITE ruriEr uri-host find-replace-all \$REMOTE_IP delPAI P-Asserted-Identity delete request INVITE msSource ms-call-source delete INVITE createPAI Contact manipulate request INVITE updateContact uri-user find-replace-all \$From.\$store_user.\$0 storeContact Contact store pattern-rule request INVITE </pre>
--	---

```

        name                                addPAI
        header-name                         P-Asserted-Identity
        action                               add
        comparison-type                     boolean
        msg-type                            request
        methods                             INVITE
        match-value                         $delPAI
        new-value                           $storeContact.$0

sip-manipulation
    name                                NatIpCce
    header-rule
        name                                From
        header-name                         From
        action                               manipulate
        methods                            INVITE
        element-rule
            name                               fromEr
            type                                uri-host
            action                             find-replace-all
            new-value                          oracle.tekvizionlabs.local

    header-rule
        name                                To
        header-name                         To
        action                               manipulate
        methods                            INVITE
        element-rule
            name                               ToEr
            type                                uri-host
            action                             find-replace-all
            new-value                         

mediationserver.tekvizionlabs.local
    header-rule
        name                                RequestURI
        header-name                         request-uri
        action                               manipulate
        methods                            INVITE
        element-rule
            name                               ruriEr
            type                                uri-host
            action                             find-replace-all
            new-value                         

mediationserver.tekvizionlabs.local
    header-rule
        name                                alterPAI
        header-name                         P-Asserted-Identity
        action                               manipulate
        element-rule
            name                               alterPAIEr
            type                                uri-host
            action                             find-replace-all
            new-value                          $LOCAL_IP

    header-rule
        name                                Contact
        header-name                         Contact
        action                               manipulate
        methods                            INVITE

```

```

element-rule
    name
    type
    action
    new-value
        contactEr
        uri-host
        find-replace-all
        oracle.tekvizionlabs.local

header-rule
    name
    header-name
    action
    element-rule
        name
        type
        action
        new-value
            AddPlus1
            referred-by
            manipulate
            addplus1
            uri-user
            find-replace-all
            "+1" +$ORIGINAL

header-rule
    name
    header-name
    action
    msg-type
    new-value
        alterreferby
        From
        sip-manip
        request
        alterreferby

header-rule
    name
    header-name
    action
    methods
    element-rule
        name
        parameter-name
        type
        action
            removePC
            From
            manipulate
            INVITE
            removePCEr
            phone-context
            uri-user-param
            delete-element

header-rule
    name
    header-name
    action
    methods
    element-rule
        name
        type
        action
        match-value
        new-value
            from_user
            from
            manipulate
            INVITE
            fromEr
            uri-user
            find-replace-all
            ^(\d{10})
            "+1" +$ORIGINAL

header-rule
    name
    header-name
    action
    element-rule
        name
        type
        action
        match-value
        new-value
            Plus1URI
            Request-URI
            manipulate
            PlusURIER
            uri-user
            find-replace-all
            ^(\d{10})
            "+1" +$ORIGINAL

header-rule
    name
    type
    action
        PlusURI_store
        uri-user
        store

header-rule

```

```

        name                      Plus1To
        header-name
        action                   manipulate

        element-rule
            name                  PlusToEr
            type
            action
            match-value
            new-value              uri-user
                                    find-replace-all
                                    ^(\d{10})
                                    "+1"+$ORIGINAL

        element-rule
            name                  copyRURI
            type
            action
            match-value
            new-value              uri-user
                                    find-replace-all
                                    ^(\d{4})

$Plus1RURI.$PlusRURI_store.$0

sip-manipulation
    name                      NatIpLync

    header-rule
        name                  from
        header-name
        action
        new-value              From
                                sip-manip
                                NAT_IP

    header-rule
        name                  alterPAI
        header-name
        action
        methods
        element-rule
            name                  P-Asserted-Identity
            type
            action
            new-value              manipulate
                                INVITE
            name                  alterPAIER
            type
            action
            new-value              uri-host
                                find-replace-all
                                oracle.tekzionlabs.local

    header-rule
        name                  alterContact
        header-name
        action
        methods
        element-rule
            name                  Contact
            type
            action
            new-value              manipulate
                                INVITE
            name                  alterContactEr
            type
            action
            new-value              uri-host
                                find-replace-all
                                oracle.tekzionlabs.local

    header-rule
        name                  To
        header-name
        action
        methods
        element-rule
            name                  To
            type
            action
            new-value              manipulate
                                INVITE
            name                  toEr
            type
            action
            new-value              uri-host
                                find-replace-all
                                med1.lynclabsram.local

    header-rule
        name                  ruri
        header-name

```

```

        action                         manipulate
        methods                        INVITE
        element-rule
            name                           ruriEr
            type                            uri-host
            action                           find-replace-all
            new-value                      med1.lynclabsram.local

        header-rule
            name                           alterReferredBy
            header-name                     Referred-By
            action                           manipulate
            msg-type                        request
            methods                          INVITE
            element-rule
                name                           alterRB
                type                            uri-host
                action                           find-replace-all
                new-value                      oracle.tekvizionlabs.local

    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	inactosendonly
header-name	From
action	sip-manip
msg-type	request
new-value	Changeinactosendonly
sip-manipulation	
name	alter4xxOPTIONS
header-rule	
name	alterURI
header-name	Request-URI
action	manipulate
msg-type	reply
methods	OPTIONS
element-rule	
name	alterURI_statusCode
type	status-code
action	find-replace-all
match-value	483 404
new-value	200
element-rule	
name	alterURI_ReasonPhrase
type	reason-phrase
action	find-replace-all
match-value	Too Many Hops Not Found
new-value	OK
sip-manipulation	
name	delReqNatIp
header-rule	
name	delRequire
header-name	Require
action	delete
msg-type	reply
methods	INVITE
header-rule	
name	nat
header-name	From
action	sip-manip
new-value	NAT_IP
sip-manipulation	
name	alterreferby
header-rule	
name	checkReferBy
header-name	REFERRED-BY
action	manipulate
element-rule	
name	checkReferBy
type	uri-host
action	find-replace-all
new-value	oracle.tekvizionlabs.local
sip-manipulation	
name	stripRR
join-headers	Record-Route
header-rule	
name	delRR
header-name	Record-Route
action	delete

sip-monitoring	
match-any-filter	enabled
monitoring-filters	all
steering-pool	
ip-address	10.64.4.145
start-port	49600
end-port	65535
realm-id	PSTN
steering-pool	
ip-address	10.64.4.147
start-port	49600
end-port	65535
realm-id	outside-rtp
steering-pool	
ip-address	10.64.4.149
start-port	49600
end-port	65535
realm-id	outside
steering-pool	
ip-address	10.70.50.20
start-port	49562
end-port	65535
realm-id	inside
steering-pool	
ip-address	10.70.50.21
start-port	49600
end-port	65535
realm-id	AvayaRealm
steering-pool	
ip-address	10.70.50.22
start-port	49600
end-port	65535
realm-id	CUCMRealm
steering-pool	
ip-address	10.70.50.23
start-port	49562
end-port	65535
realm-id	toSFB
system-config	
process-log-level	DEBUG
default-gateway	192.65.79.97
tls-global	
session-caching	enabled
tls-profile	
name	CCETLS
end-entity-certificate	SBCCCE2
trusted-ca-certificates	newCCERoot
mutual-authenticate	enabled
tls-version	tlsv12
tls-profile	
name	LyncTLS
end-entity-certificate	SBCCert
trusted-ca-certificates	rootcert
mutual-authenticate	LyncRoot
tls-version	enabled
	tlsv1

```
translation-rules
    id                      addPlus1
    type                   add
    add-string              +1
translation-rules
    id                      delPlus1
    type                   delete
    delete-string           +1
web-server-config
office365#
```

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, Lync/SFB Server, and the Oracle ECB and 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.

Microsoft Network Monitor (NetMon)

NetMon is a network protocol analyzer which is freely downloadable from Microsoft. It can be found at www.microsoft.com/downloads. NetMon could be installed on the Lync Server mediation server, the Lync Server Standard Edition server, or Enterprise Edition front end server.

Wireshark

Wireshark is also a network protocol analyzer which is freely downloadable from www.wireshark.org. Wireshark could be installed on the Lync/SFB Server mediation server, the Lync/SFB Server Standard Edition server, or MCS Enterprise Edition front end server.

Eventviewer

There are several locations in the event viewer where you can find valuable information to aid in troubleshooting issues with your deployment.

With the requirement that there is a completely functioning Lync and/or SFB Server with Enterprise Voice deployment in place, there are only a few areas in which one would use the Event Viewer for troubleshooting:

- The Enterprise Voice client;
- The Lync/SFB Server Front End server;
- A Lync/SFB Server Standard Edition Server; and
- A Lync/SFB Server Mediation Server.

On the Oracle ECB and E-SBC

The Oracle SBC and ECB provide a rich set of statistical counters available from the CLI, 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 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 ECB or 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 E-SBC and ECB, and provide traces in a common log format for local viewing or for exporting to your PC. Please check the “Monitor and Trace SIP Messages” section (page 140) of the E-SBC Web GUI User Guide available at http://docs.oracle.com/cd/E56581_01/index.htm. For the ECB, see the “Monitor and Trace” section (page 95) of the User’s Guide available at http://docs.oracle.com/cd/E55725_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 there is nothing blocking them such as firewalls. Ensure that you have a TELNET client available on a workstation.

All devices tested in this document will listen on TCP port 5060 for SIP signaling. In our example we are listening on 5060 on the PSTN facing NIC. Tests may include:

- Client to pool server: `telnet <servername> 5060`
- Pool server to Mediation Server: `telnet <servername> 5060`

Cisco Real-Time Monitoring Tool (RTMT)

The Cisco Real-Time Monitoring Tool (RTMT) is a tool that can be downloaded from CUCM to a Windows or Linux computer. See <https://supportforums.cisco.com/document/93281/using-rtmt-monitor-cisco-unity-connection-and-cucm> for details.

Appendix B

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.

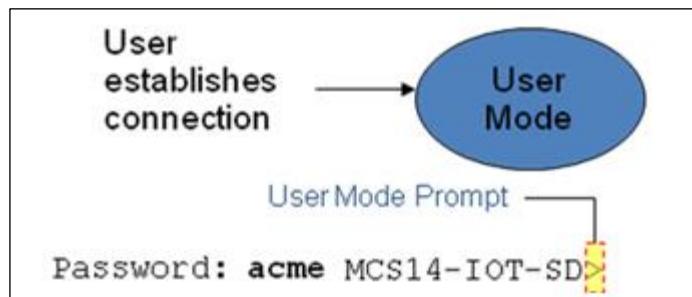
Initial connectivity will be through the serial console port. At a minimum, this is how to configure the management (eth0) interface on the SBC.

ACLI Basics

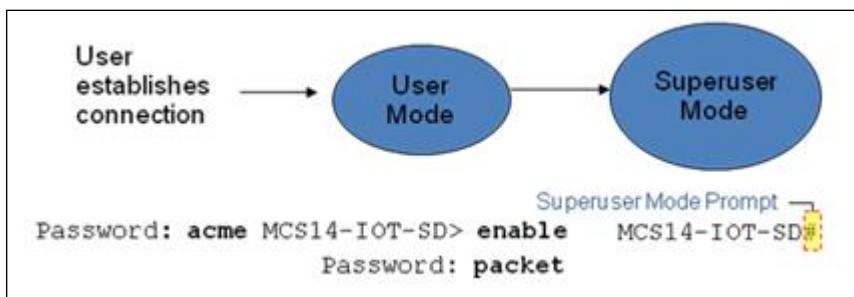
There are two password protected modes of operation within the ACLI, User mode and Superuser mode.

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.



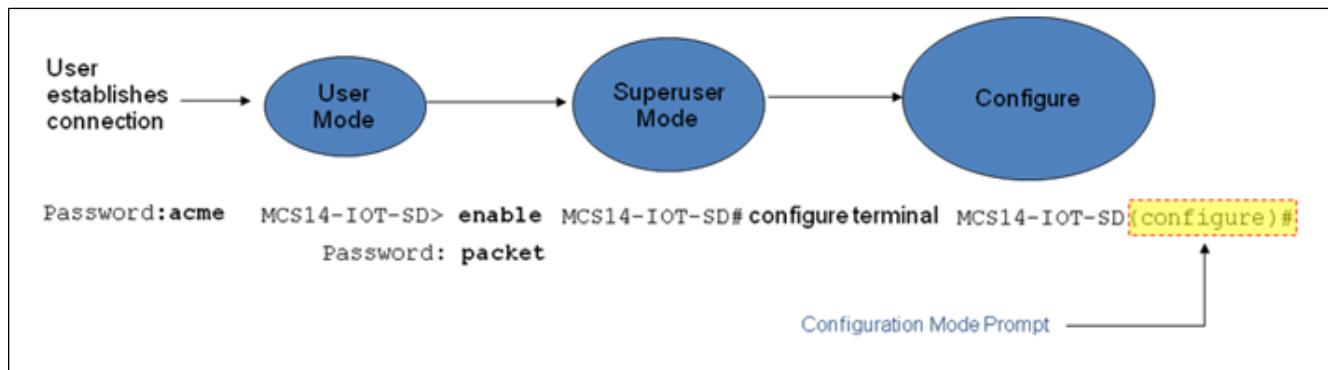
The Superuser mode allows for access to all system commands for operation, maintenance, and administration. This mode is identified by the pound sign (#) in the prompt after the target name. To enter the Superuser mode, issue the enable command in the User mode.



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.

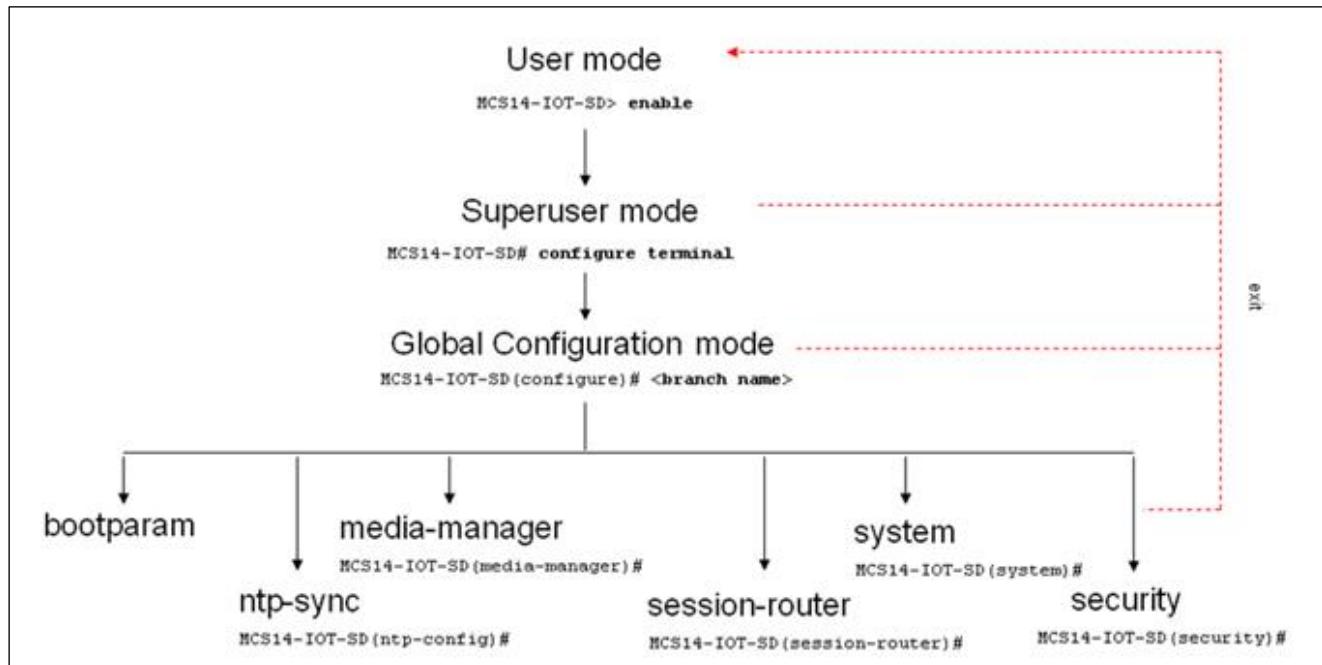
You must enter the Configuration mode to configure elements. For example, you can access the configuration branches and configuration elements for signaling and media configurations. To enter the Configuration mode, issue the `configure terminal` command in the Superuser mode.

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.



The ntp-sync and bootparams branches are flat branches (i.e., they do not have elements inside the branches). The rest of the branches have several elements under each of the branches.

The bootparam branch provides access to SBC boot parameters.

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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Integrated Cloud Applications & Platform Services

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