



ORACLE

Oracle SBC with Local Media Optimization for Microsoft Teams Direct Routing

Technical Application Note

ORACLE

COMMUNICATIONS



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1 Revision History

Version	Date Revised	Description of Changes
1.0	3/3/2020	Initial Publication
2.0	9/1/2020	<ul style="list-style-type: none">• Replaced ACLI Config with GUI• Added Teams FQDN
3.0	11/16/2021	<ul style="list-style-type: none">• Added Caveat
4.0	07/20/2024	<ul style="list-style-type: none">• Removed reference to ping-response parameter and added notes for using tls-global config in ACLI

2 Intended Audience

This document describes how to connect the Oracle SBC to Local Media Optimization in Media Bypass mode for Microsoft Teams Direct Routing. This paper is intended for IT or telephony professionals.

This Document assumes users have an existing environment with the Oracle SBC connected to Microsoft Teams Direct Routing Interface with Media Bypass Enabled. All of the Tenant and Licensing requirements are in place and operational. Also, the information used below is for example only, and specific to Oracle's Test environment. All IP addresses, FQDN's and other information used in the example below cannot be used outside of this Oracle Communications test environment.

The initial implementation of the Oracle SBC with Microsoft Teams is outside the scope of this document. If users do not have an existing, operational setup and require information regarding the initial setup and configuration, please refer to the documentation at the link below or Reach out to your Oracle Account Team.

<https://www.oracle.com/a/otn/docs/OracleSBCwithMSFTTeamsMediaBypassEnabled.pdf>

3 Related Documentation:

3.1 Oracle SBC

<https://www.oracle.com/a/otn/docs/OracleSBCwithMSFTTeamsMediaBypassEnabled.pdf>

https://docs.oracle.com/en/industries/communications/enterprise-session-border-controller/8.4.0/configuration/esbc_scz840_configuration.pdf

https://docs.oracle.com/en/industries/communications/session-border-controller/8.4.0/security/sbc_scz840_security.pdf

3.2 Microsoft

<https://docs.microsoft.com/en-us/microsoftteams/direct-routing-media-optimization-configure>

<https://docs.microsoft.com/en-us/microsoftteams/direct-routing-media-optimization>

<https://docs.microsoft.com/en-us/microsoftteams/cloud-voice-network-settings>

4 Validated Oracle Versions

This software release SCZ840 with the configuration listed below can run on any of the following products:

- AP 1100
- AP 3900
- AP 4600
- AP 6350
- AP 6300
- VME

5 Test Bed Requirements

- Oracle SBC configured and paired with Microsoft Teams Direct Routing
- Regional Oracle SBC deployed and paired with PSTN Environment

6 Teams Tenant Configuration

Configuring your Teams Tenant for Local Media Optimization is outside the scope of this document. Please see the [related documentation](#) section of this guide for more information about how to setup your tenant to work with this feature.

7 About Teams Local Media Optimization

This feature was built jointly between Microsoft and SBC partners.

Local Media Optimization in Media Bypass mode for Direct Routing helps to better manage voice quality by letting enterprises:

- Control how the media traffic flows between the Teams clients and customer SBCs;
- Allowing media streams between the Teams clients and SBCs even if SBCs are behind the corporate firewalls with private IPs and not visible to Microsoft directly;

7.1 When call is established:

7.1.1 Microsoft provides:

- Information about which SBC must be used for the call in Request URI header;
- Information about how traffic should flow based on the configuration by tenant administrator (X-MS-MediaPath header)

7.1.2 SBC vendors:

- Based on information provided by Microsoft, the SBC supplies the correct IP address of a media termination point in SDP;
- Sends Re-Invite messages if the initially chosen media path is not optimal

8 Design

There are two design models created by Microsoft in partnership with Oracle Communications Global Business Unit which are applicable to a majority of customer implementations. They are referred to as Europe Model and Asia Model.

8.1 Europe Model

Customer centralizes all trunks in “Europe” and creates the ability of media to flow between a central Oracle SBC and the users, based on the user location. If user is internal, media flows between the internal IP of the central Oracle SBC and Teams client. If user is external, media flows between the external IP of the Oracle SBC and Teams client.

8.2 Asia Model

Customer Implements a proxy Oracle SBC which is paired to Microsoft Direct Routing, which directs media between the Direct Routing interface and the downstream Oracle SBCs. The downstream Oracle SBCs are not directly visible (but they are paired via Set-CSONlinePTNGateway command) to Direct Routing in APAC (Asia). Media always stays local when possible. External users have media between the client and the central, proxy Oracle SBC.

This document will outline how configure the Oracle SBC to be deployed in both Europe and Asia Models.

8.3 Europe Model

8.4 Network Parameters

The following information was used for configuring and testing the Oracle SBC deployed in Europe model:

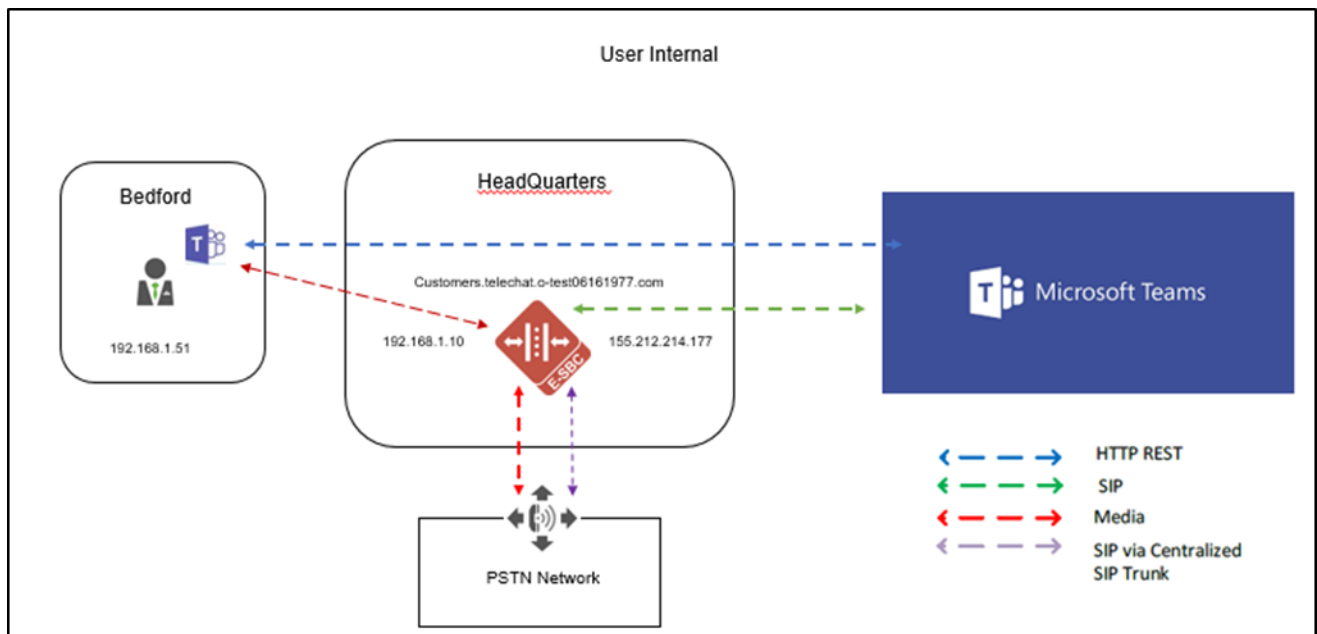
Location	Headquarters	Bedford
SBC FQDN	Customers.telechat.o-test06161977.com	N/A
Internal Subnet	N/A	192.168.1.0/24
External IP of SBC	155.212.214.177	N/A
External NAT for Internet	155.212.214.174	155.212.214.55
Internal IP of SBC	192.168.1.10	N/A

8.5 Europe scenario details

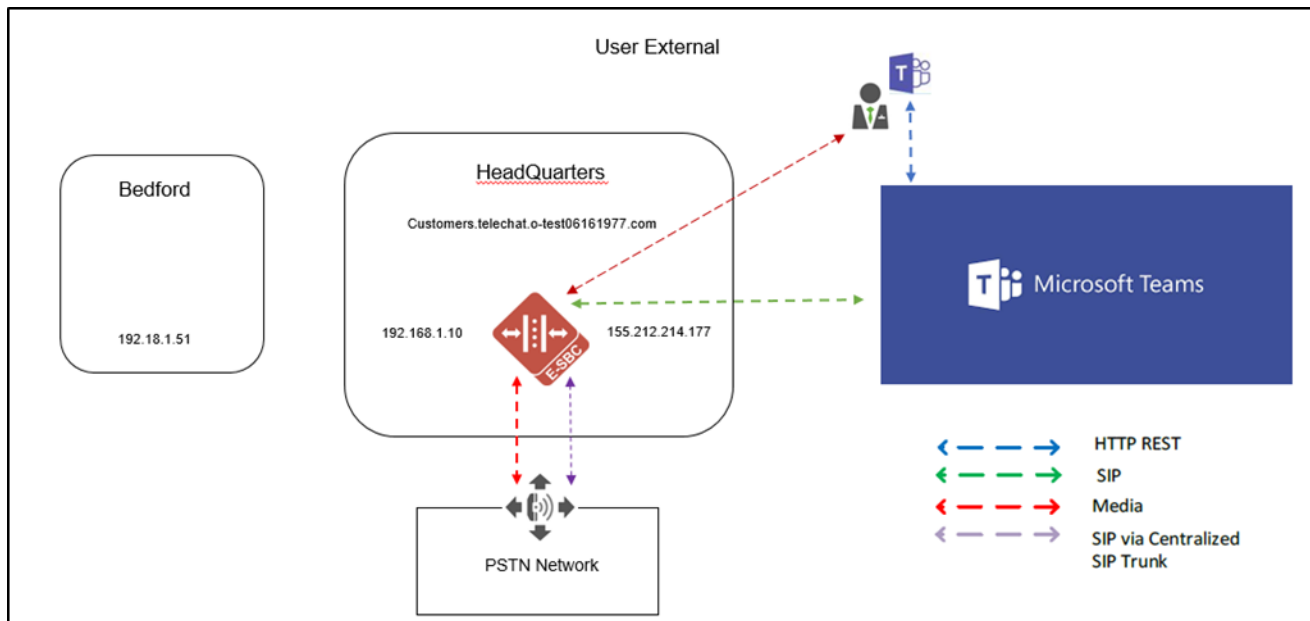
Customer administrator pairs one Oracle SBC (customers.telechat.o-test06161977.com) to Microsoft Teams Direct Routing. The SBC has a centralized trunk connected to it. When user is in internal network the Oracle SBC provides internal IP of the Oracle SBC for media. When user is outside of the corporate network, the Oracle SBC provides the external (public) IP of the Oracle SBC.

The following two diagrams depict the signaling and media flow based on the users location, internal or external:

8.5.1 Diagram 1



8.5.2 Diagram 2



9 Oracle SBC Configuration Europe Model

The following will outline the configuration changes needed on the Oracle SBC for Local Media Optimization. The software release required to allow the SBC to function properly with Microsoft Teams Local Media Optimization features enabled supports both GUI and ACLI. For the purposes of this document, all configuration additions and changes will be completed through the ORACLE SBC ACLI interface.

Any configuration parameter not specifically listed below can remain at its existing value, or, at the ORACLE SBC's default value and does not require any changes.

This configuration will consist of both new elements to connect the SBC to the corporate internal network as well as changes to the existing configuration elements.

Please note: Some or all of the information in the configuration example below will be different in your environment.

9.1 New Configuration elements

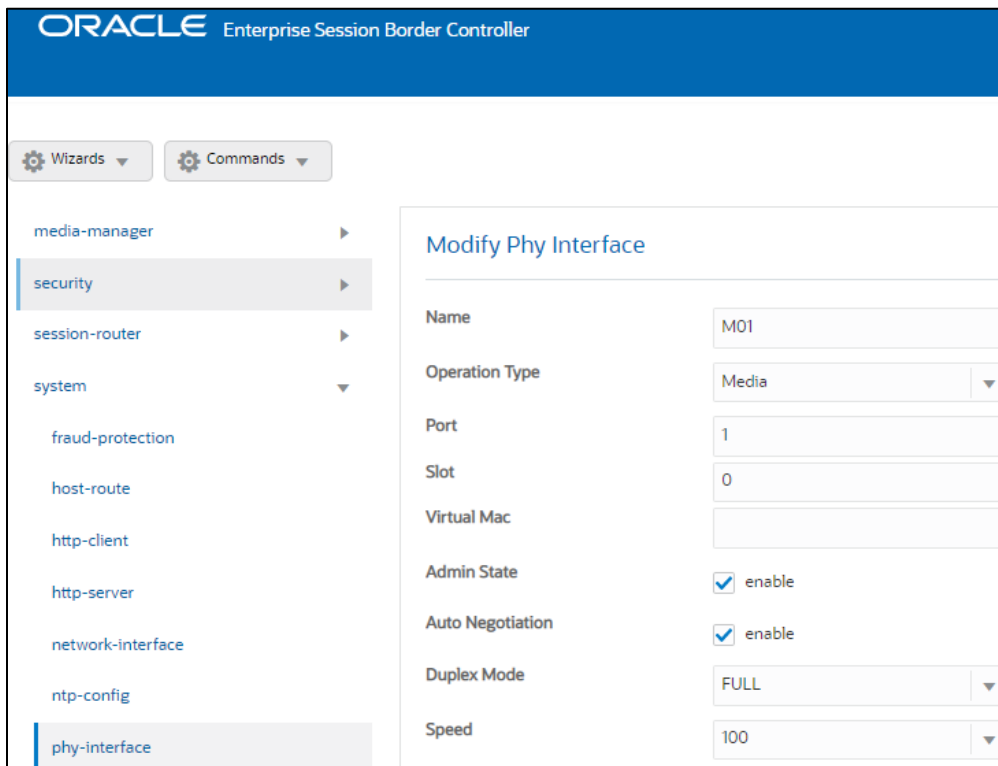
The following configuration will be added to the existing ORACLE SBC configuration. This additional configuration will be used to connect Media flows from the ORACLE SBC directly to users when located inside the Corporate or Internal network.

- Physical Interface
- Network Interface
- Realm Config
- Steering Pool

9.1.1 Phy-Interface

ACL Path: config t→system→phy-interface

- Name: M01
- Operation Type: Media
- Slot: 0
- Port: 1



The screenshot displays the ORACLE Enterprise Session Border Controller configuration interface. The left sidebar shows a navigation menu with categories like 'media-manager', 'security', 'session-router', 'system', 'fraud-protection', 'host-route', 'http-client', 'http-server', 'network-interface', 'ntp-config', and 'phy-interface'. The 'phy-interface' option is selected. The main panel is titled 'Modify Phy Interface' and contains the following configuration fields:

Name	M01
Operation Type	Media
Port	1
Slot	0
Virtual Mac	
Admin State	<input checked="" type="checkbox"/> enable
Auto Negotiation	<input checked="" type="checkbox"/> enable
Duplex Mode	FULL
Speed	100

9.1.2 Network Interface

ACL Path: config t→system→network-interface

- Name: M01
- IP-Address: 192.168.1.10
- Netmask: 255.255.255.0

- Gateway: 192.168.1.1

The screenshot shows the Oracle Enterprise Session Border Controller (ESBC) web interface. The main heading is "ORACLE Enterprise Session Border Controller". Below the heading, there are two tabs: "Wizards" and "Commands". Under "Wizards", a list of configuration categories is shown: media-manager, security, session-router, system, fraud-protection, host-route, http-client, http-server, network-interface (highlighted), ntp-config, phy-interface, redundancy-config, and snmp-community. The "network-interface" wizard is active, displaying the "Modify Network Interface" configuration page. The configuration fields are as follows:

Name	M01
Sub Port Id	0
Description	
Hostname	
IP Address	192.168.1.10
Pri Utility Addr	
Sec Utility Addr	
Netmask	255.255.255.0
Gateway	192.168.1.1

9.1.3 New Teams Internal Realm

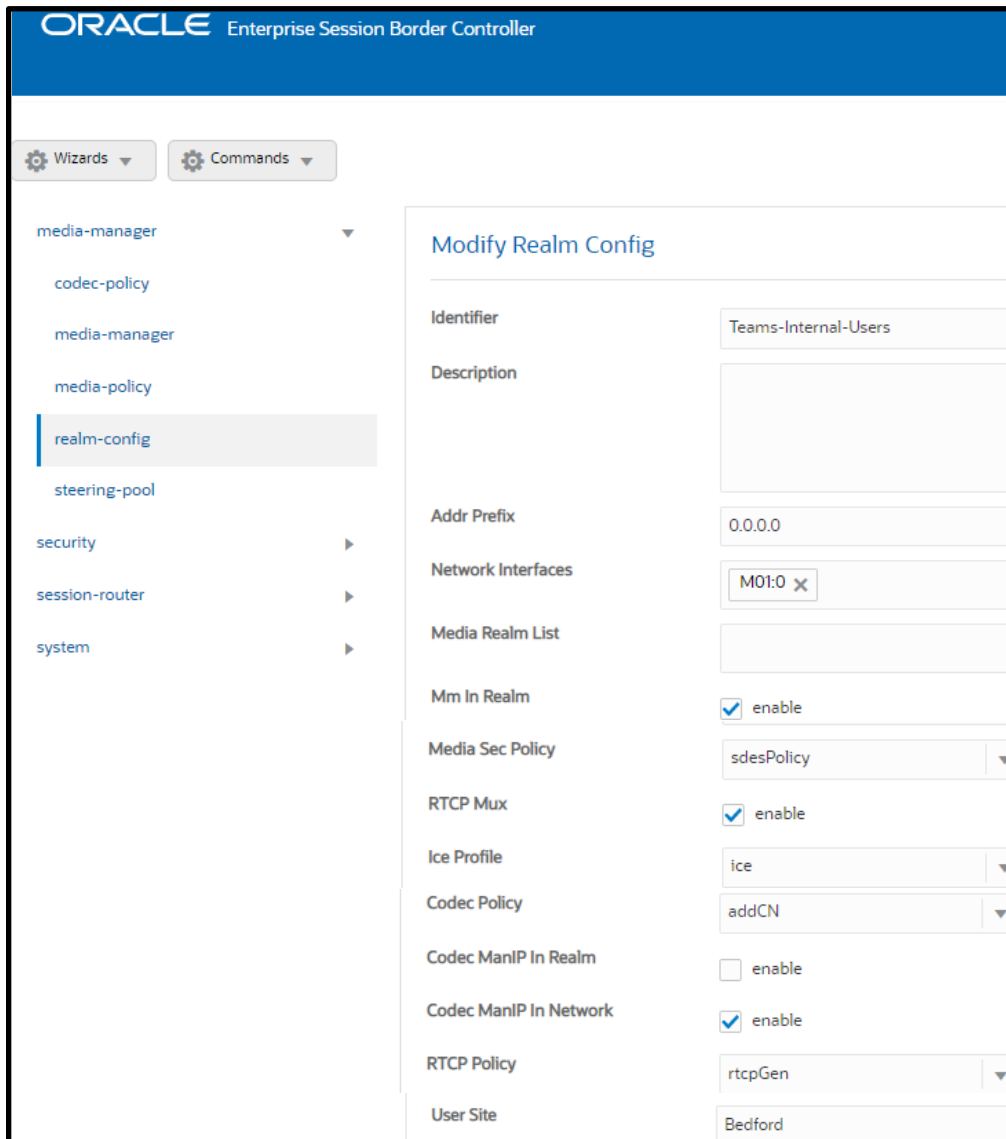
This realm should be configured as a mirror image of the existing realm facing Teams Direct Routing Interface. The only differences between this realm, and the Existing Teams Realm should be the

- Identifier
- Network-Interface
- user-site.

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

- Identifier: Teams-Internal-Users
- Network-Interface: M01:0
- mm-in-realm: enabled
- media-security-policy: sdesPolicy
- rtcp-mux: enabled
- ice-profile: ice
- codec-policy: addCN
- user-site: Bedford

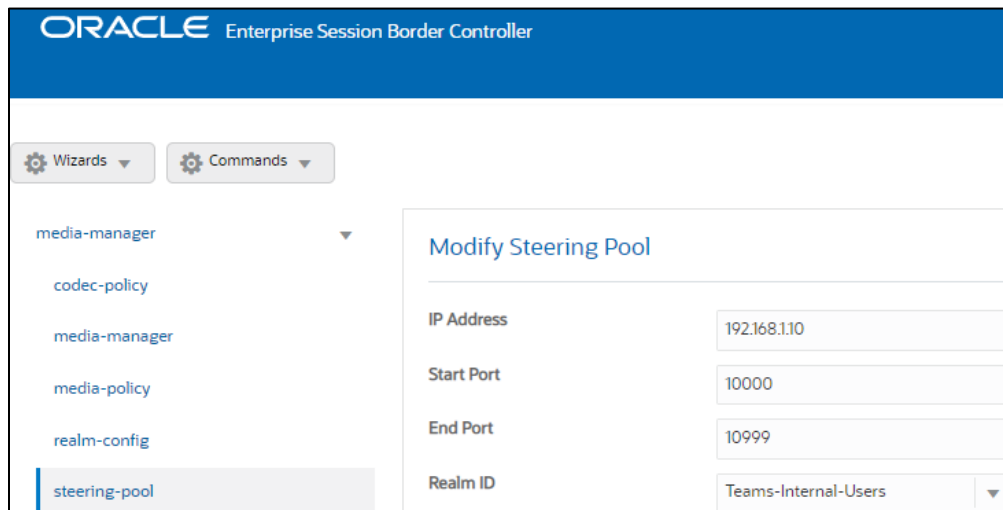
Notice the user-site is set to **Bedford**, which is matching our **NetworkSiteID** configured in Teams Tenant.



9.1.4 Steering Pool

ACLI Path: config t → media-manager → steering-pool

- Ip-address: 192.168.1.10
- Start-port: 10000
- End-port: 10999
- Realm-id: Teams-Internal-Users

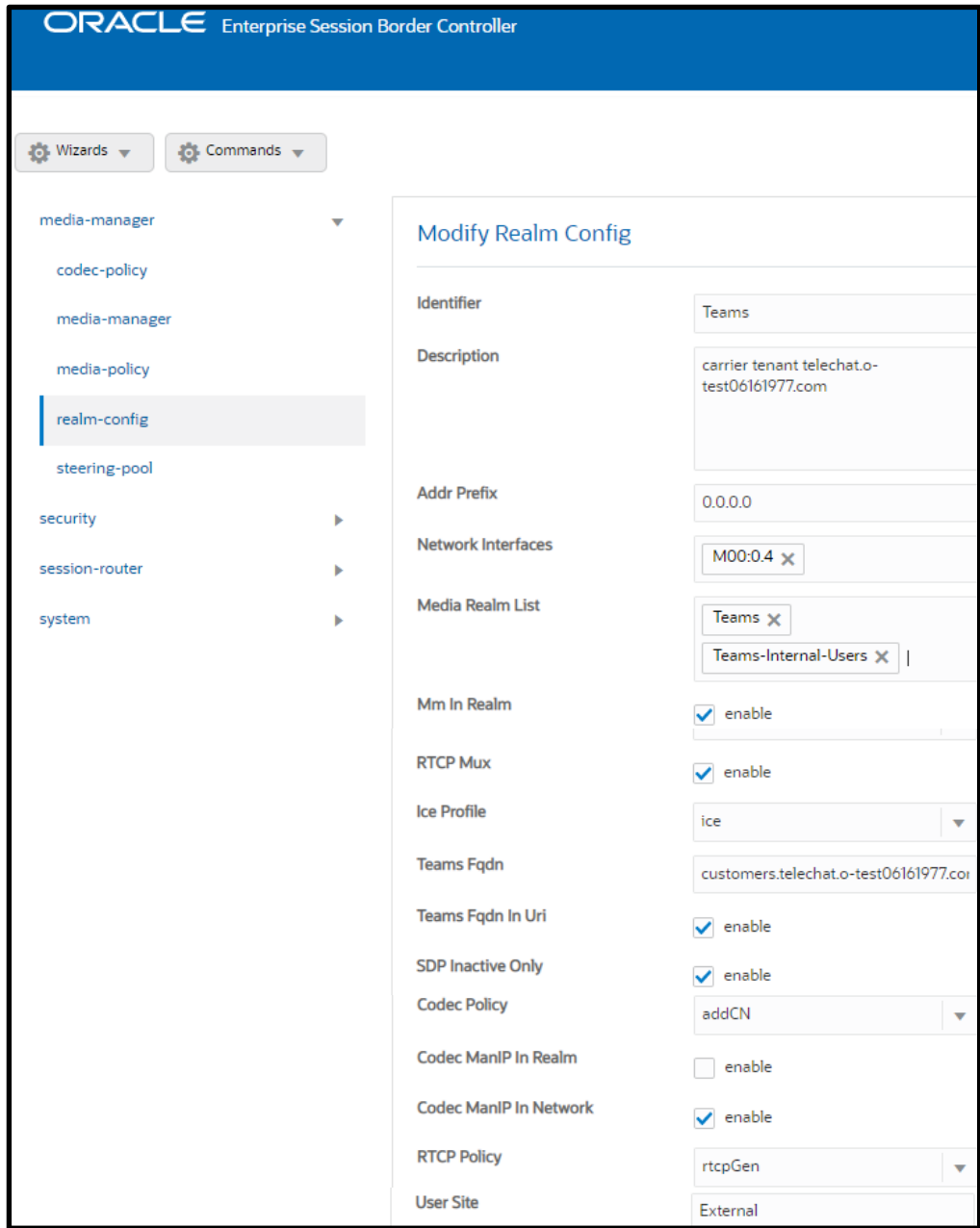


9.2 Changes to Existing Teams Realm

The following additions are required to the existing Teams Realm on the ORACLE SBC

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

- Media-Realm-List: Teams,Teams-Internal-Users
- User-Site: External
- Teams-fqdn: customers.telechat.o-test06161977.com
- Teams-fqdn-in-uri: enabled
- Sdp-inactive-only: enabled



You may notice in the realm output above, there are three additional parameters listed

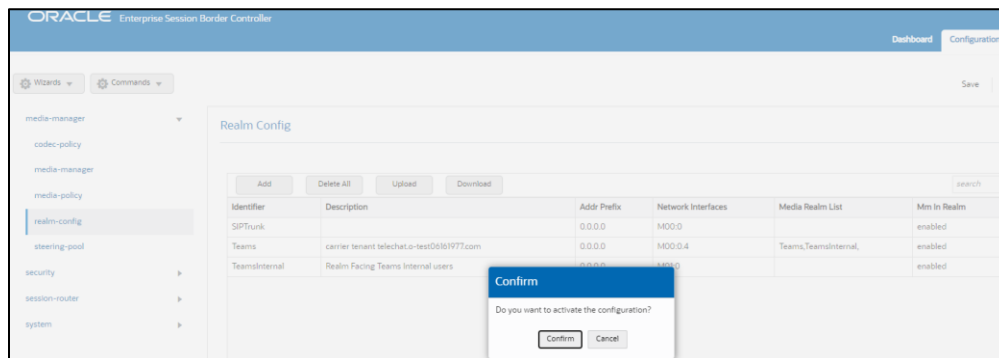
- **Teams-fqdn**
- **Teams-fqdn-in-uri**
- **Sdp-inactive-only**

All of which are set to enabled or populated. These are additional features contained in this software release (and future GA releases) that will take the place of most, if not all of the sip-manipulations that were required for the ORACLE SBC to interop with Teams direct routing. Due to some additional interop requirements with

Teams Local Media Optimization, these are required to be enabled for both Europe and Asia ORACLE SBC deployments on the realm facing Microsoft Teams direct routing or Proxy SBC. Please see [Appendix A](#) for additional information regarding these parameters, along with the configuration changes that will be needed once these parameters are enabled on the realm and session agents.

9.3 Save and Activate Configuration

- After all changes are made, back out of configuration mode and **save** and **activate** your config:



- This concludes the configuration additions and changes for the Oracle SBC to interwork with Microsoft Teams Local Media Optimization enabled, Europe Model

10 Asia Model

10.1 Network Parameters

The following information was used for configuring and testing the Oracle SBC's deployed in Asia model:

Location	Headquarters (Proxy)	Bedford (Downstream)
SBC FQDN	Customers.telechat.o-test06161977.com	Sbc5.customers.telechat.o-test06161977.com
Internal Subnet	192.168.3.0/24	192.168.1.0/24
External IP of SBC	155.212.214.177	N/A
External NAT for Internet	155.212.214.174	155.212.214.55
Internal IP of SBC	192.168.3.10	192.168.1.10

Note: The FQDN assigned to the downstream SBC does not need to be resolvable to an ip address, as it has no direct connection to Teams Direct Routing Interface.

10.2 Asia scenario details

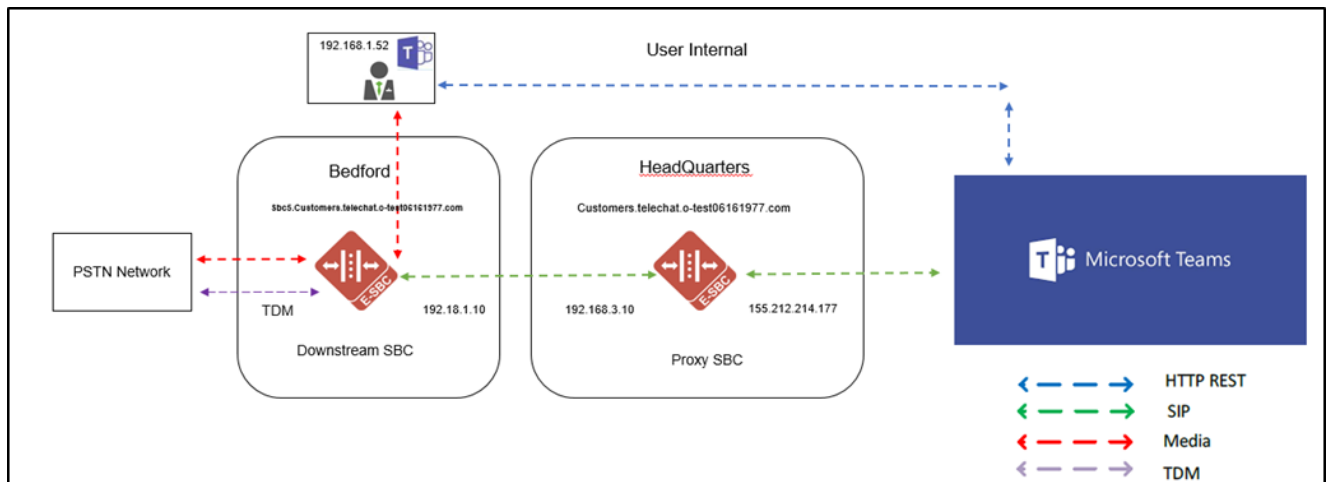
Customer administrator pairs one Oracle SBC (customers.telechat.o-test06161977.com), also called the Proxy ORACLE SBC to Microsoft Teams Direct Routing.

The administrator next added the downstream ORACLE SBC (sbc5.customers.telechat.o-test06161977.com) using PowerShell command New-CSONlinePSTNGateway, indicating that the downstream ORACLE SBC can be reached via the proxy ORACLE SBC (customer.telechat.o-test06161977.com). The downstream SBC doesn't have public IPs to connect direct to Microsoft Teams Direct Routing, however it can be assigned to voice routes.

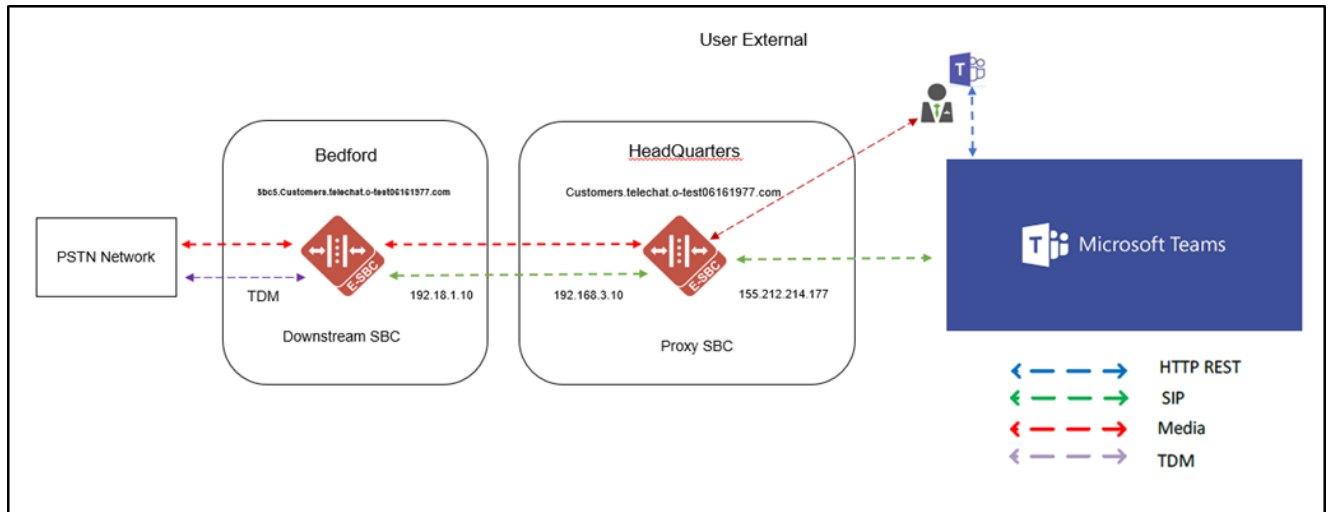
When a user is in an office where the downstream ORACLE SBC is, the media traffic flows between the user and the Downstream ORACLE SBC directly. If user is outside of the office (on a public internet or in a different office) the media flows from the user to the public IP of the Proxy ORACLE SBC, which proxies it to the downstream ORACLE SBC.

The following two diagrams depict the signaling and media flow based on the users location, internal or external:

10.2.1 Diagram 3



10.2.2 Diagram 4



11 Oracle SBC Configuration

For Asia Model, we'll be configuring two SBC's as depicted in diagram 3 and diagram 4 above. They will be referred to as Downstream SBC, and Proxy SBC.

Similar to Europe model above, we'll be using the Oracle SBC GUI to configure the SBC's. Please note that while in configuration mode, all elements need to be selected for changes to be performed...

Note: The software must be loaded on both the Downstream and Proxy Oracle SBC's to support Microsoft Teams Local Media Optimization.

11.1 Downstream SBC Configuration

This document will outline a full SBC configuration of the downstream SBC mainly focusing on the configuration elements needed for a successful connection between the Downstream SBC and the Proxy SBC. While examples will be provided for a basic setup on the PSTN side of the downstream SBC, Oracle recommends working with your PSTN provider and Oracle Consulting for proper setup and configuration.

11.2 Global Configuration Elements

Before you can configuration more granular parameters on the SBC, there are three global configuration elements that must be enabled to proceed.

- System-Config
- Media-manager-Config
- Sip-Config

11.2.1 System-Config

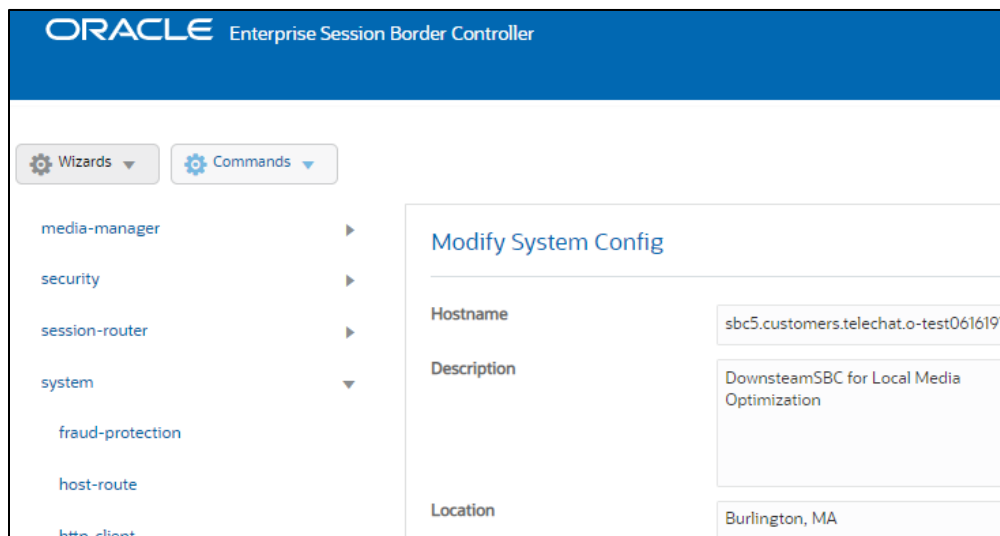
To configure system level functionality for the ORACLE SBC, you must first enable the system-config

GUI Path: system/system-config

ACL Path: config t→system→system-config

Note: The following parameters are optional but recommended for system config

- Hostname
- Description
- Location



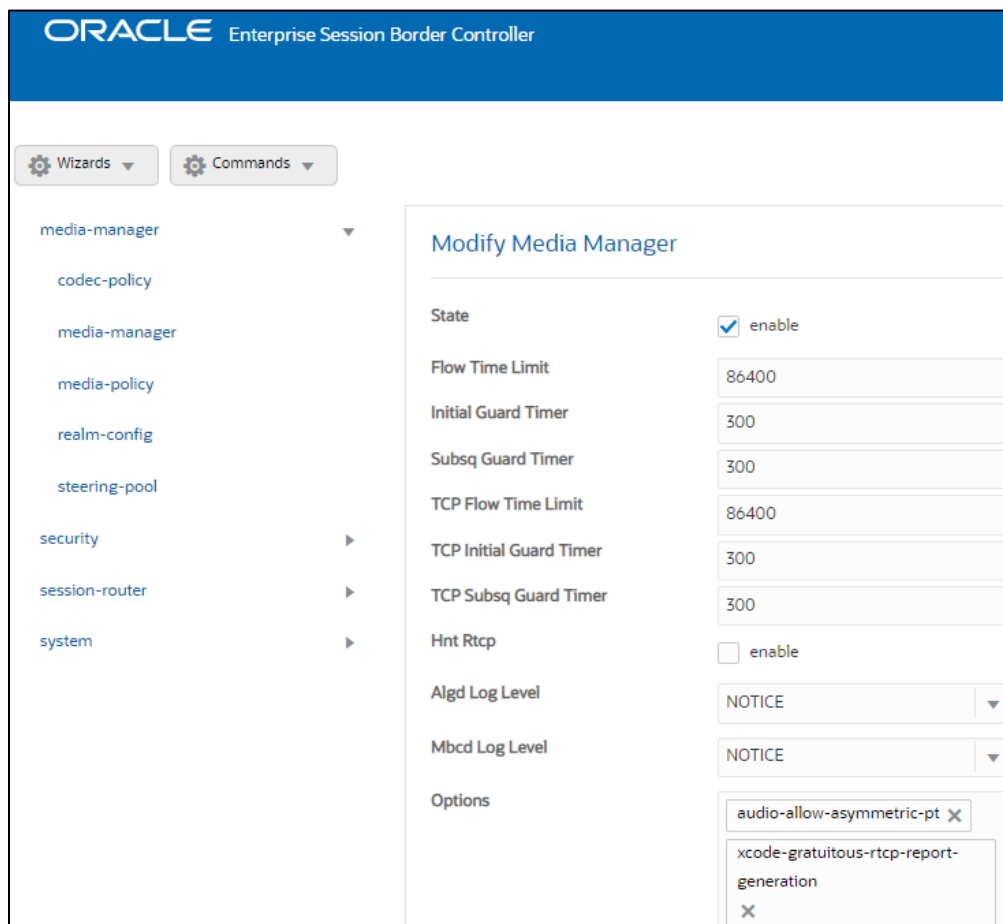
11.2.2 Media Manager

To configure media functionality on the SBC, you must first enable the global media manager. There are no required additions to the global media manager config, but it must be **selected** to be enabled, and the following options are recommended:

GUI Path: media-manger/media-manager

ACL Path: config t→media-manager→media-manager-config

- Options+audio-allow-asymmetric-pt
- Options+xcode-gratuitous-rtcp-report-generation (requires reboot to take affect)



11.2.3 Sip Config

To enable sip related objects on the ORACLE SBC, you must first configure the global Sip Config element:

GUI Path: session-router/sip-config

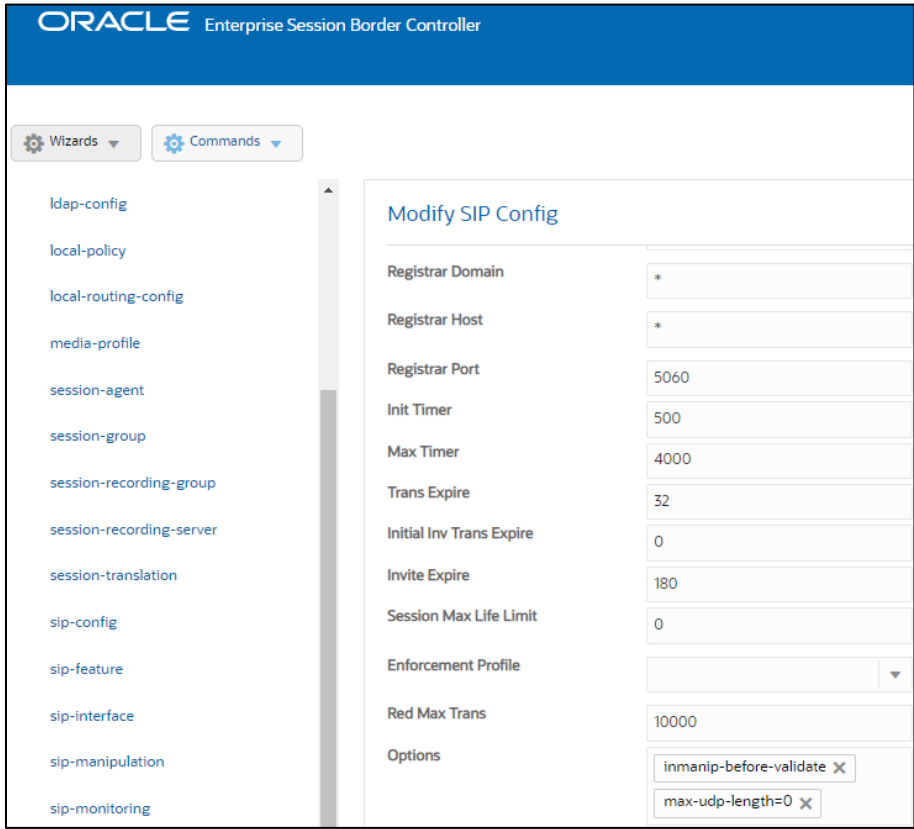
ACLI Path: config t→session-router→sip-config

The following are recommended parameters under the global sip-config:

- Options +inmanip-before-validate
- Options +max-udp-length=0
- Options +resend-reinvite-491-lmo-internal-user=5

For more information on the option “resend-reinvite-491-lmo-internal-user” please see chapter

[14.1 491 Request Pending From Microsoft](#)



11.3 Network Configuration

To connect the SBC to network elements, we must configure both physical and network interfaces. For the purposes of this example, we will configure two physical interfaces, and two network interfaces. One to communicate with the Proxy ORACLE SBC, the other to connect to PSTN Network.

11.3.1 Physical Interfaces

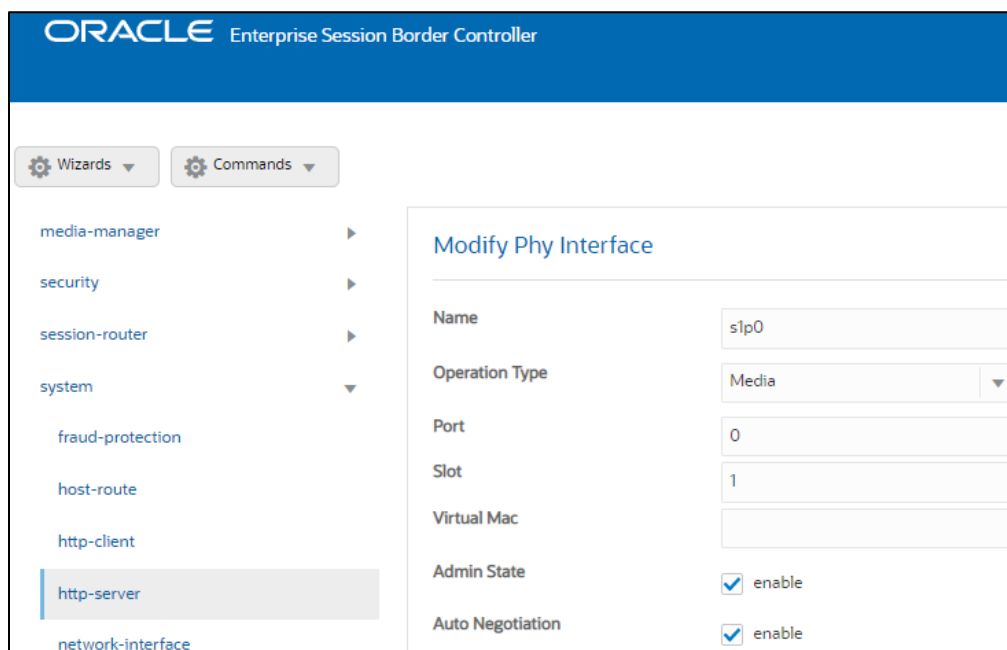
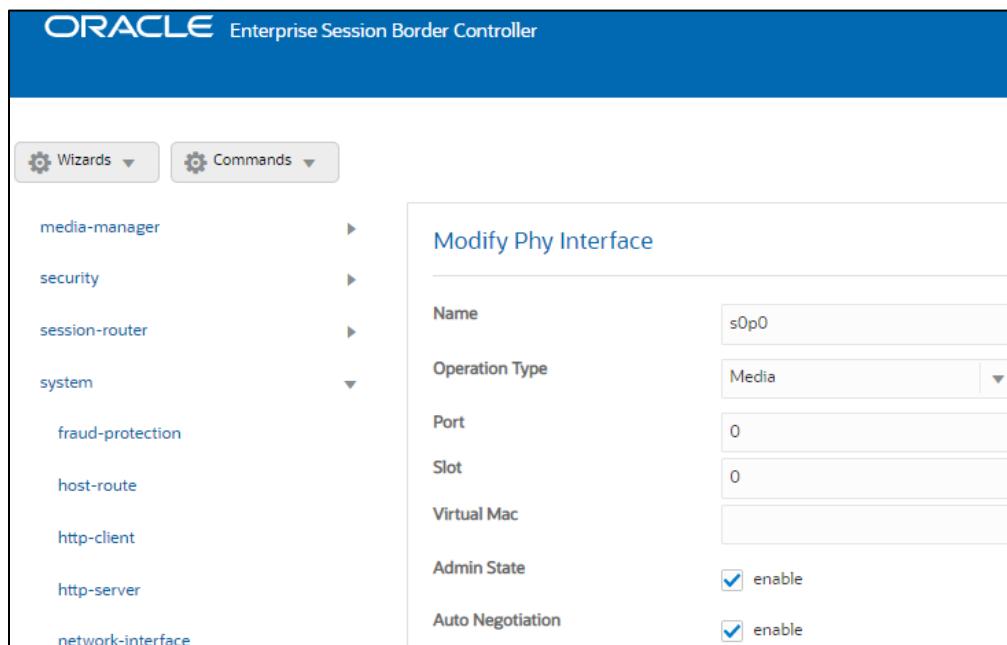
GUI Path: system/phy-interface

ACLI Path: config t→system→phy-interface

- Use the following table as a configuration example:

Config Parameter	PSTN	ToProxySBC
Name	s0p0	s1p0
Operation Type	Media	Media
Slot	0	1
Port	0	0

Note: Physical interface names, slot and port may vary depending on environment



11.3.2 Network Interfaces

GUI Path: system/network-interface

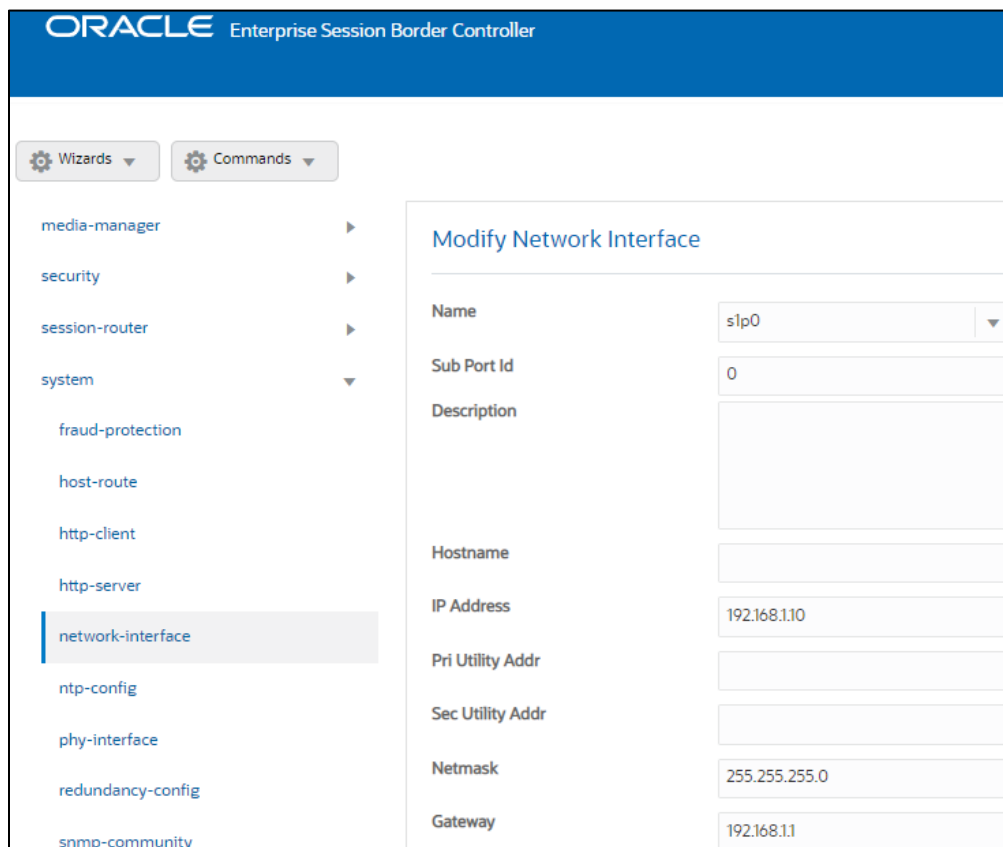
ACL Path: config t→system→network-interface

- Use the following table as a configuration example: This is only an example. The addresses used in customer environments will be completely different from what is shown below.

Configuration Parameter	PSTN	ToProxySBC
Name	s0p0	s1p0
Hostname		Sbc5.customers.telechat.o-test06161977.com
IP Address	155.212.214.174	192.168.1.10
Netmask	255.255.255.0	255.255.255.0
Gateway	155.212.214.1	192.168.1.1
DNS Primary IP		
DNS Domain		

The screenshot shows the Oracle Enterprise Session Border Controller configuration interface. The top navigation bar includes 'Wizards' and 'Commands' menus. A left sidebar lists various configuration categories, with 'network-interface' selected. The main content area is titled 'Modify Network Interface' and displays the following configuration details:

- Name: s0p0
- Sub Port Id: 0
- Description: (empty text area)
- Hostname: (empty text field)
- IP Address: 155.212.214.174
- Pri Utility Addr: (empty text field)
- Sec Utility Addr: (empty text field)
- Netmask: 255.255.255.0
- Gateway: 155.212.214.1



11.4 Media Security Configuration

This section outlines how to configure support for media security between the ORACLE SBC and the Proxy SBC

11.4.1 Sdes-profile

This is the first element to be configured for media security, where the algorithm and the crypto's to be used are configured.

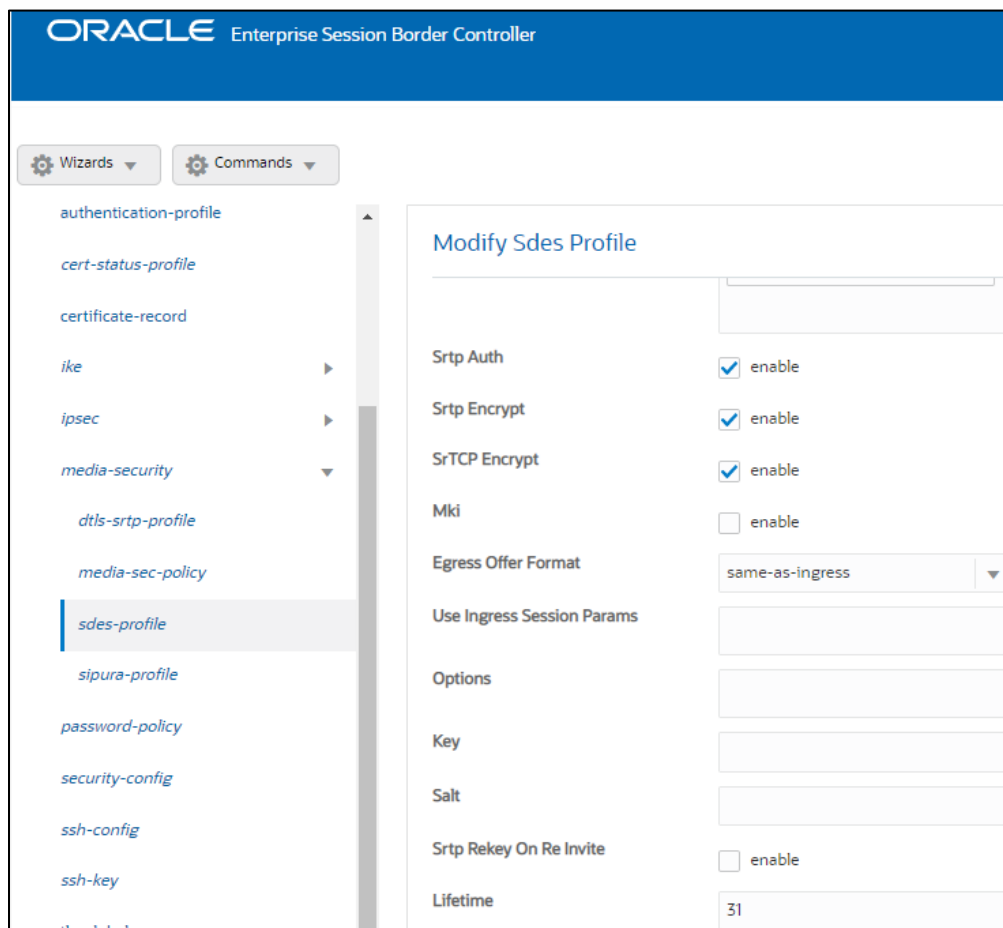
The only crypto-suite option supported by Microsoft is **AES_CM_128_HMAC_SHA1_80** and must be included in the crypto list

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

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

The following two configuration parameters are required to be changed from default:

- Name: SDES
- Lifetime: 31



Note: The lifetime parameter set to a value of 31 is required if utilizing Media Bypass on Microsoft Teams

11.4.2 Media Security Policy

Media-sec-policy instructs the SBC how to handle the SDP received/sent under a realm (RTP, SRTP or any of them) and, if SRTP needs to be used, the sdes-profile that needs to be used

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

GUI Path: security/media-security/media-sec-policy

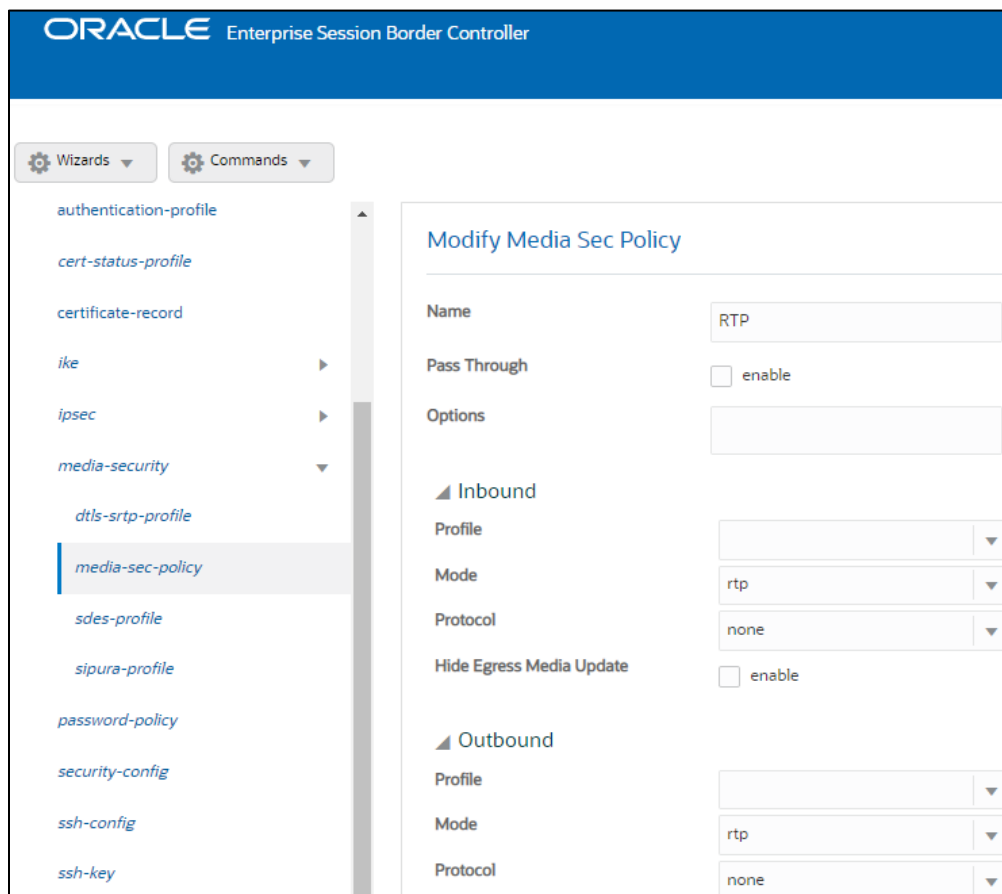
ACL I Path: config t→security→media-security→media-sec-policy

Wizards ▾ Commands ▾

- authentication-profile
- cert-status-profile
- certificate-record
- ike ▶
- ipsec ▶
- media-security ▾
 - dtls-srtp-profile
 - media-sec-policy**
 - sdes-profile
 - sipura-profile
- password-policy
- security-config
- ssh-config
- ssh-key

Modify Media Sec Policy

Name	<input type="text" value="sdesPolicy"/>
Pass Through	<input type="checkbox"/> enable
Options	<input type="text"/>
▲ Inbound	
Profile	<input type="text" value="SDES"/> ▾
Mode	<input type="text" value="srtp"/> ▾
Protocol	<input type="text" value="sdes"/> ▾
Hide Egress Media Update	<input type="checkbox"/> enable
▲ Outbound	
Profile	<input type="text" value="SDES"/> ▾
Mode	<input type="text" value="srtp"/> ▾
Protocol	<input type="text" value="sdes"/> ▾



Notice the profile under the secure media security policy with name of **sdesPolicy** above. This is where the sdes-profile configured previously is assigned.

11.5 Transcoding Configuration

Transcoding is the ability to convert between media streams that are based upon disparate codecs. The ORACLE SBC supports IP-to-IP transcoding for SIP sessions, and can connect two voice streams that use different coding algorithms with one another.

11.5.1 Media Profile

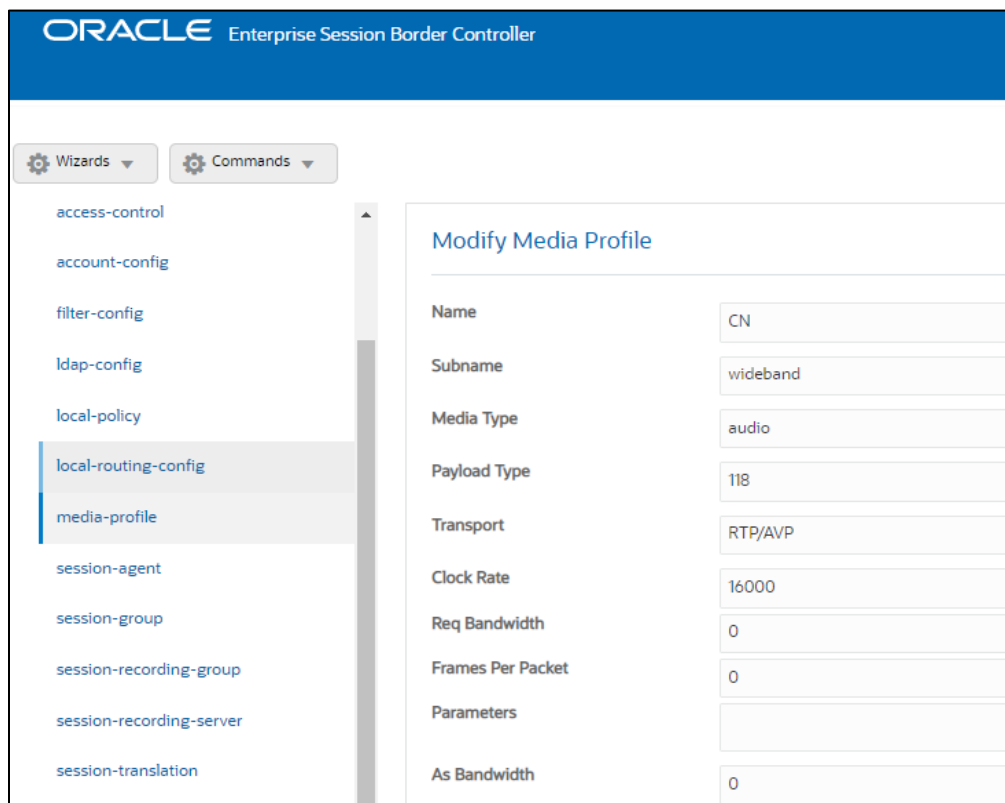
For different codecs and media types, you can setup customized media profiles that serve to police media values and define media bandwidth policies.

Since CN offered by Microsoft teams is using a payload type which is different than usual, the ORACLE SBC supports this by configuring media profile on the SBC.

GUI Path: session-router/media-profile

ACL Path: config t→session-router→media-profile

Configure the following media profile to support Comfort Noise:



11.5.2 Codec Policies

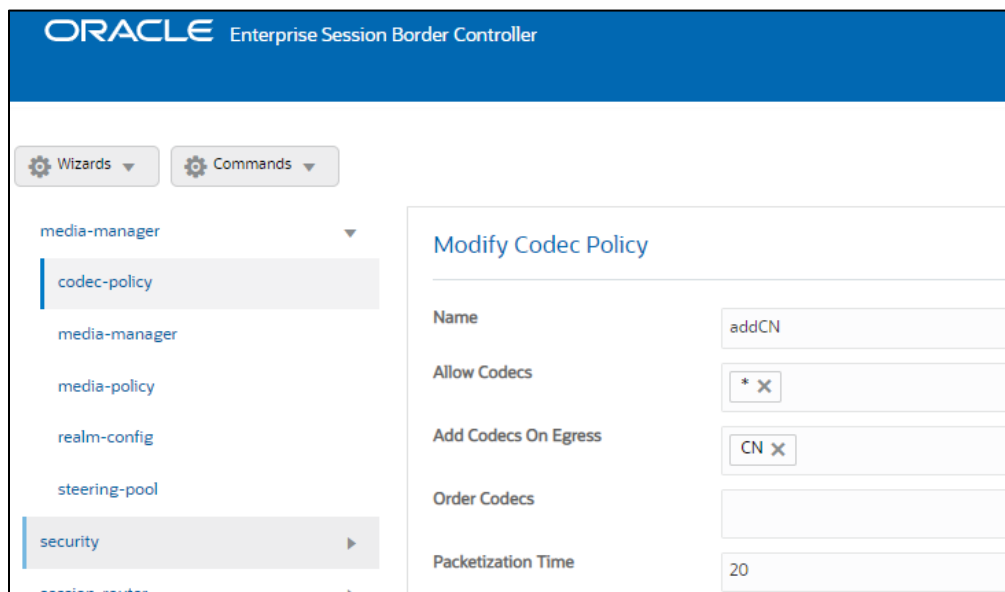
Codec policies are sets of rules that specify the manipulations to be performed on SDP offers allowing the ORACLE SBC the ability to add, strip, and reorder codecs for SIP sessions

Note: This is an optional configuration. Only configure codec policies if deemed necessary in your environment

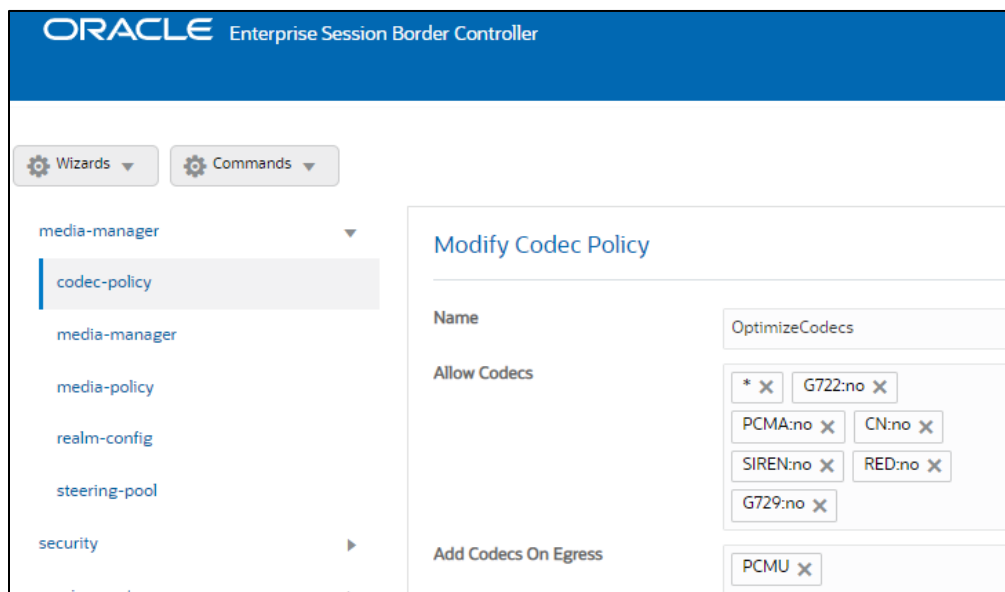
GUI Path: media-manager/codec-policy

ACLI Path: config t→media-mangaer→codec-policy

Some SIP trunks may have issues with codec being offered by Microsoft teams. For this reason, we have created a codec policy – “**OptimizeCodecs**” for the SIP trunk to remove the codecs that are not required or supported.



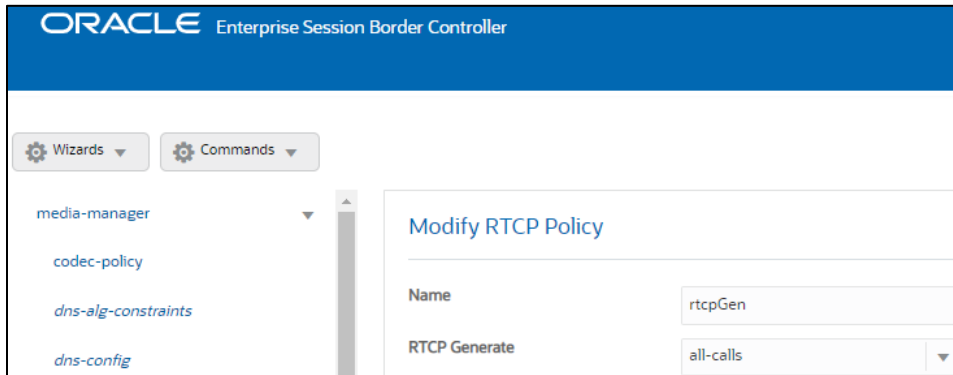
Create another codec-policy, **addCN**, to allow the SBC to generate Comfort Noise packets towards Teams



11.5.3 RTCP Policy

The following RTCP policy needs to be configured for the ORACLE SBC to generate RTCP sender reports. The [media manger](#) options config, xcode-gratuitous-rtcp-report-generation, allows the SBC to generate receiver reports

GUI Path: media-manager/rtcp-policy
 ACLI Path: config t→media-manger→rtcp-policy

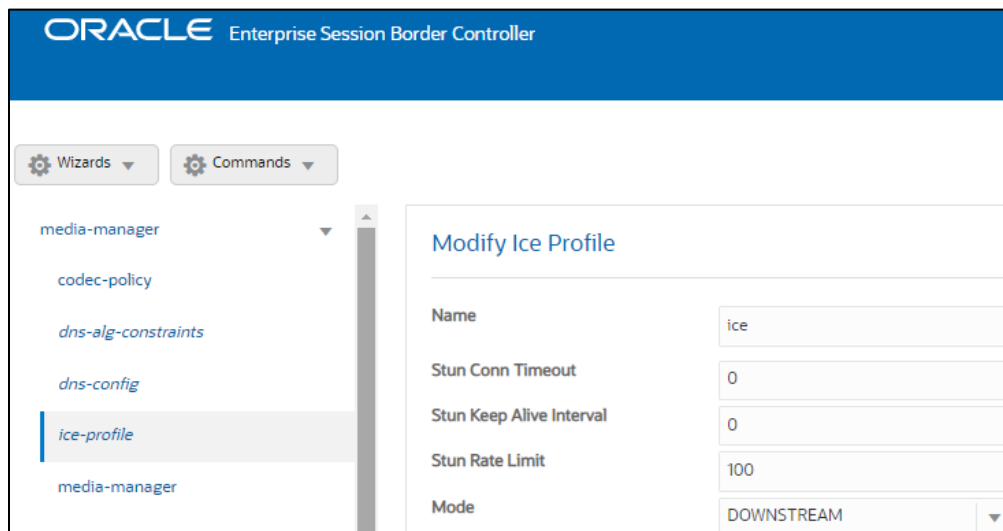


11.5.4 Ice Profile

SBC supports ICE-Lite. This configuration is required to support MSTeams media-bypass.

GUI Path: media-manager/ice-profile

ACLI Path: config t→media-manger→ice-profile



Note: The mode in the ice profile must be set to DOWNSTREAM on the Downstream SBC to support Local Media Optimization.

11.5.5 Realm Config

In this example, we are configuring two realms as listed below:

11.5.6 ToProxySBC Realm

This is a standalone realm configured on the Downstream ORACLE SBC facing the Proxy SBC.

11.5.7 PSTN Realm

This is a standalone realm facing PSTN.

GUI Path: media-manger/realm-config

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

Use the following table as a configuration example for the two realms

Config Parameter	ToProxySBC	PSTN
Identifier	Teams-Proxy-SBC	PSTN
Network-Interface	s1p0:0	s0p0:0
mm-in-realm	Enabled	Enabled
media-sec-policy	sdesPolicy	RTP
rtcp-mux	enabled	
ice-profile	ice	
Teams-fqdn	sbc5.customers.telechat.o-test06161977.com	
teams-fqdn-in-uri	enabled	
sdp-inactive-only	enabled	
codec-policy	addCN	OptimizeCodecs
rtcp-policy	rtcpGen	

Notice, the realm configuration is where we assign some of the elements configured earlier in this document, ie...

- Network interface
- Media security policy
- Ice profile (Only required with Media Bypass set to enabled in Direct Routing Interface)
- Codec policy
- Rtcp policy

Also, as mentioned previously in this guide, there are three settings on the Realm that are new with this software release (and future GA releases). They are:

- Teams-fqdn
- Teams-fqdn-in-uri
- Sdp-inactive-only

These three parameters will take the place of most, if not all of the sip manipulations that were required to be configured on the ORACLE SBC to interface properly with Microsoft Teams Direct Routing Interface. For more information regarding the changes to existing configs that may be required, please see [Appendix A](#).

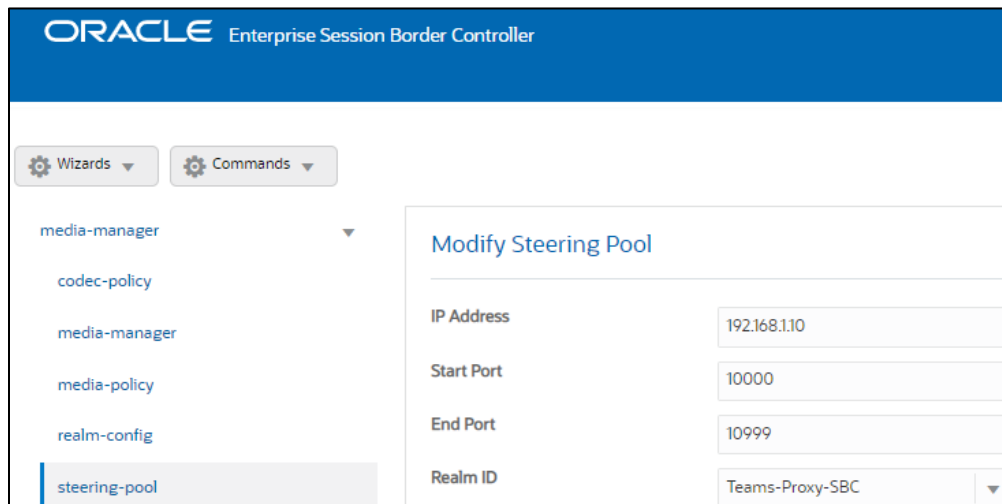
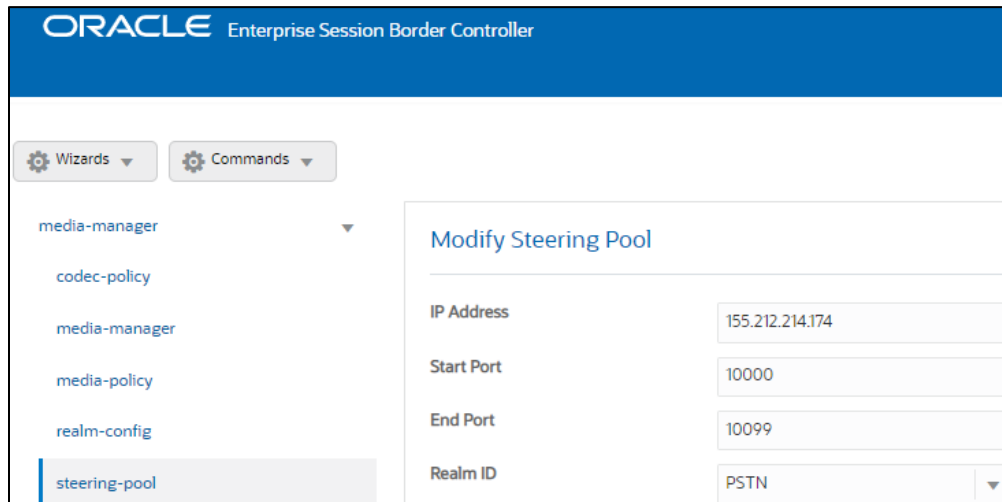
11.5.8 Steering Pools

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

We configure one steering pool for PSTN and one for ToProxySBC Realms.

GUI Path: media-manger/steering-pool

ACLI Path: config t→media-manger→steering-pool



11.6 Sip Configuration

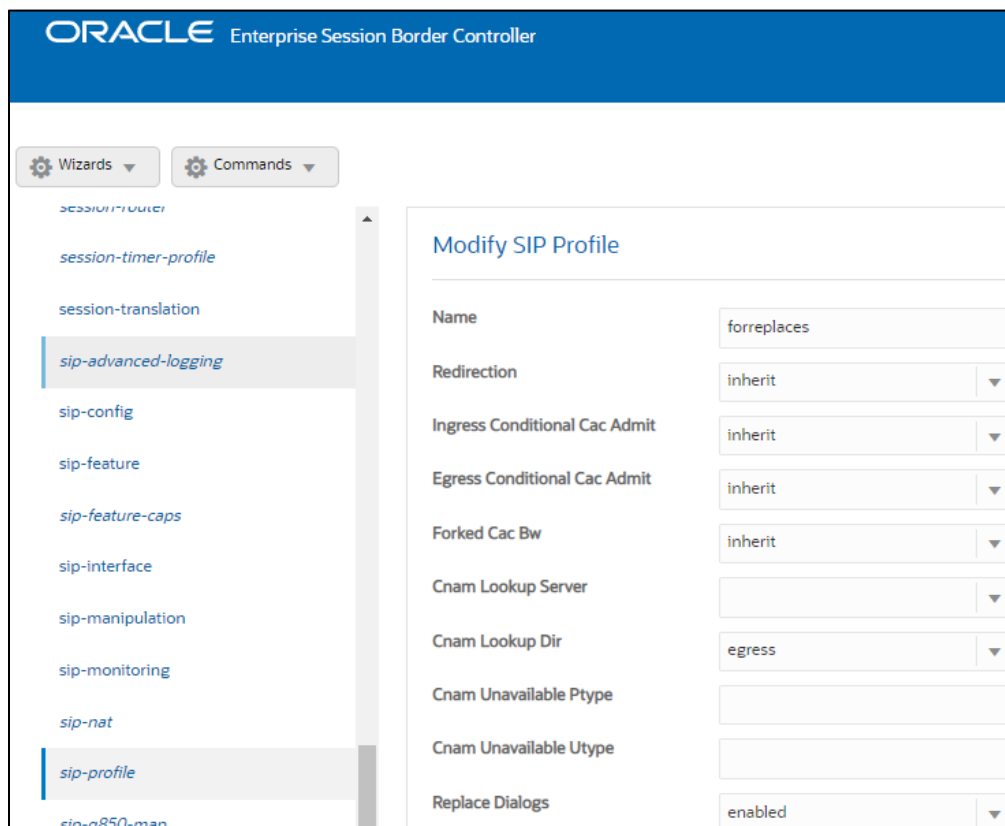
This section outlines the configuration parameters required for processing, modifying and securing sip signaling traffic.

11.6.1 SIP Profile

A sip profile needs to be configured and assigned to the ToProxySBC sip interface.

GUI Path: session-router/sip-profile

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



11.6.2 Sip Interface

The SIP interface defines the transport addresses (IP address and port) upon which the ORACLE SBC Receives and sends SIP messages

Configure two sip interfaces, one associated with PSTN Realm, and the other associated with ToProxySBC Realm

GUI Path: session-router/sip-interface

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

Use the table below as an example to Configure:

Config Parameter	ToProxySBC	PSTN
Realm ID	Teams-Proxy-SBC	PSTN
secured-network	enabled	
Sip-profile	forreplaces	
Sip Port Config Parameter	Sip Trunk	Teams
Address	192.168.1.10	155.212.214.174
Port	5060	5060
Transport protocol	TCP	UDP
Allow anonymous	agents-only	agents-only

Note: If you are not using TLS to secure the connection between the Downstream SBC and the Proxy SBC, you must enable the Secured-network parameter on the Downstream SBC Sip Interface Facing the Proxy SBC in order for the SBC's to successfully negotiate SRTP. If you are not using TLS, and this param is set to its default value of disabled, the SBC will reject request offering SRTP with a 488 Not Allowed response.

11.6.3 Session Agents

Session Agents are configuration elements which are trusted agents that can both send and receive traffic from the ORACLE SBC with direct access to the trusted data path

GUI Path: session-router/session-agent

ACL Path: config t→session-router→session-agent

We are using two Session Agents in this example configuration, One for PSTN side, the other for Proxy SBC.

Use the table below as an example to configure both:

Config parameter	Session Agent for PSTN	Session Agent for Proxy SBC
Hostname	68.68.117.67	192.168.3.10
IP Address	68.68.117.67	192.168.3.10
Port	5060	5060
Transport method	UDP+TCP	StaticTCP
Realm ID	PSTN	ToProxySBC
Ping Method	OPTIONS	OPTIONS
Ping Interval	30	30
Refer Call Transfer		enabled

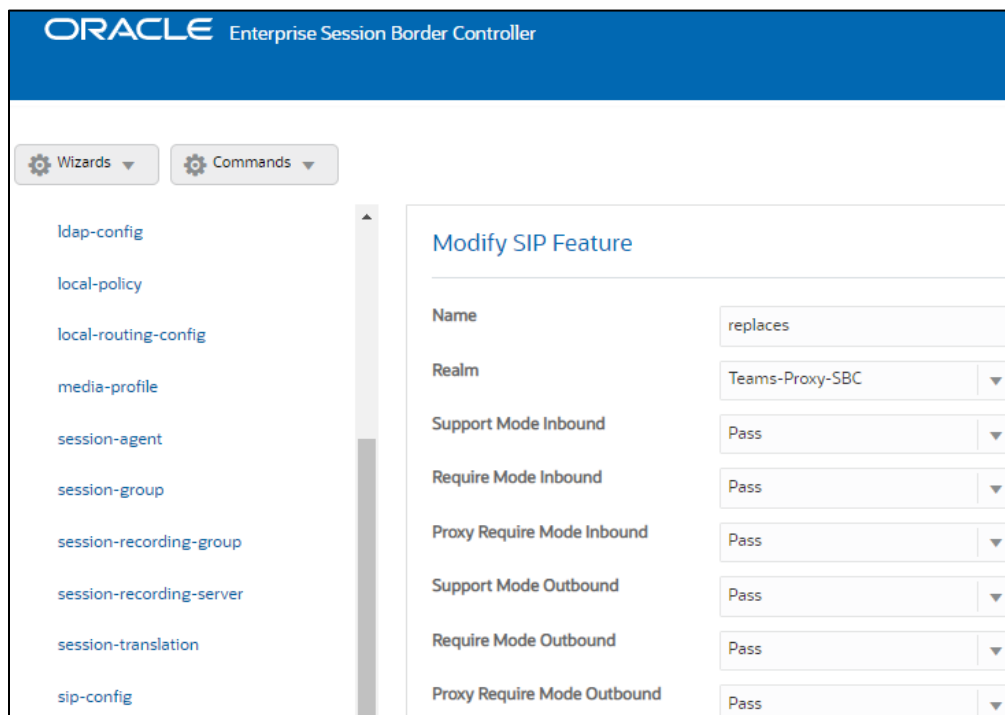
Note: Refer-Call-Transfer must be enabled on either the session agent or the realm facing the Proxy ORACLE SBC. In Asia Model, the Downstream SBC must handle all call transfers.

11.6.4 Sip Feature

The following sip feature needs to be added to the Configuration of the SBC to enable support for the replaces, allowing for successful consultative transfer:

GUI Path: session-router/sip-feature

ALCI Path: config t→session-router→sip-feature



11.7 Routing Configuration

This section outlines how to configure the ORACLE SBC to route traffic to and from The Proxy SBC which is directly interfacing with Microsoft Teams Direct Routing Interface.

11.7.1 Local Policy Configuration

Local Policy config allows for the SBC to route calls from one end of the network to the other based on routing criteria.

GUI Path: session-router/local-policy

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

In order to route traffic to and from The Proxy ORACLE SBC and PSTN, the following local-policies will need to be configured.

From PSTN to Proxy SBC:

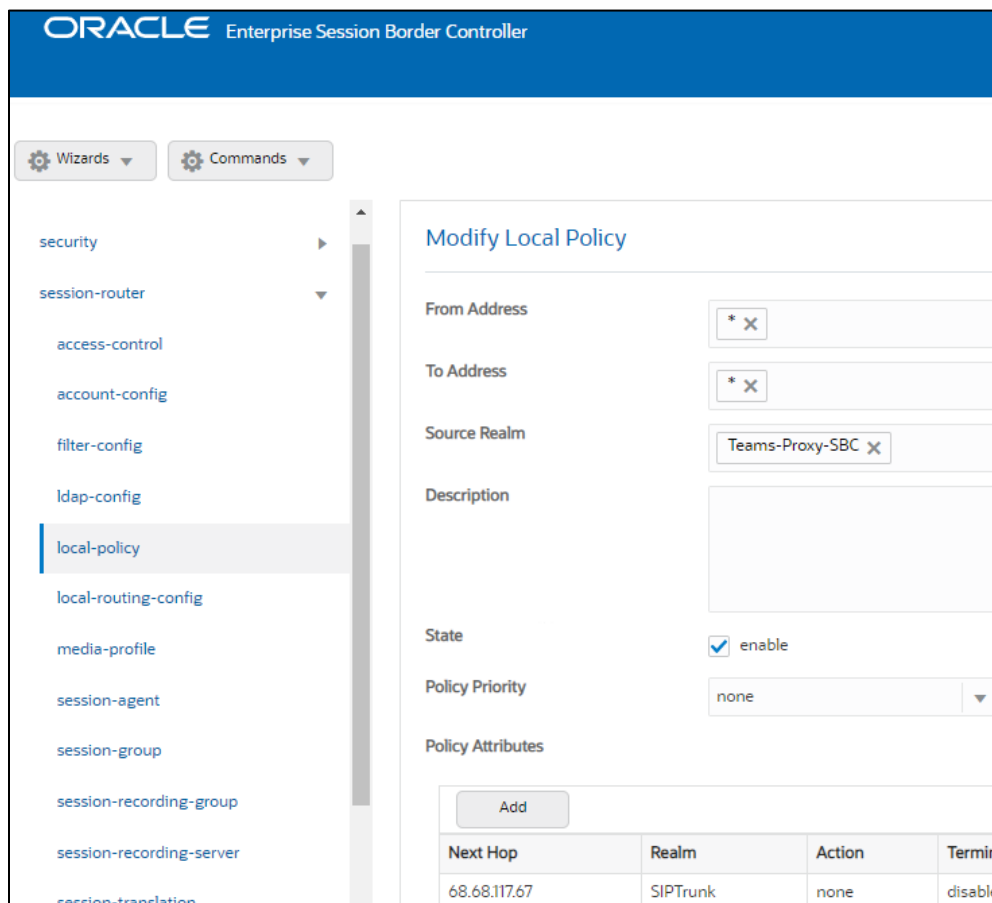
The screenshot shows the Oracle Enterprise Session Border Controller interface. The left sidebar contains a navigation menu with categories 'Wizards' and 'Commands'. Under 'Commands', the 'local-policy' option is selected. The main content area is titled 'Modify Local Policy' and contains the following fields:

- From Address: * X
- To Address: * X
- Source Realm: SIPTrunk X
- Description: (empty text area)
- State: enable
- Policy Priority: none
- Policy Attributes: (empty table)

Below the 'Policy Attributes' section is an 'Add' button and a table with the following data:

Next Hop	Realm	Action
192.168.3.10	Teams-Proxy-SBC	none

From Proxy SBC to PSTN:



This concludes the Downstream ORACLE SBC configuration. At this point, you can back out of the configuration mode and perform a [Save and Activate Configuration](#)

12 Proxy SBC Configuration

Similar to Europe model outlined above, this note assumes there is at least one ORACLE SBC that is currently interfacing with Teams Direct Routing. In Asia scenario, that SBC will become the Proxy SBC in our example. With that being said, the Proxy SBC configuration outlined below will be limited to the necessary additions and changes required for the ORACLE SBC to work properly with Teams Local Media Optimization. If you do not have an existing ORACLE SBC configured and working with Teams, please refer to the following document and reach out to your Oracle Representatives for assistance with setup if required.

<https://www.oracle.com/a/otn/docs/OracleSBCwithMSFTTeamsMediaBypassEnabled.pdf>

12.1 Configuration Changes

The following ORACLE SBC configuration elements facing Microsoft Teams Direct Routing require changes to support Local Media Optimization feature.

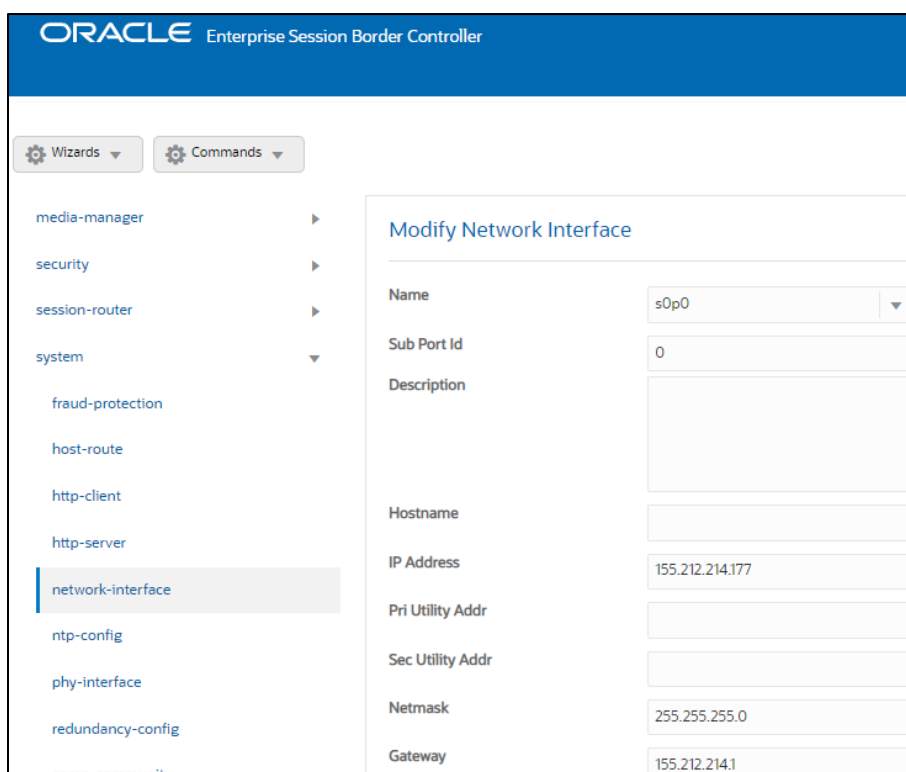
- Network-Interface
- Realm-Config
- Ice-Profile
- 3 Session Agents configured for Microsoft Teams

12.1.1 Network Interface

The Proxy SBC FQDN, (eg.customers.telechat.o-test06161977.com), needs to be added to the hostname field of the network interface assigned to the Teams facing realm if it is not already there:

GUI Path: system/network-interface

Acli Path: config t→system→network-interface



The screenshot displays the Oracle Enterprise Session Border Controller (SBC) configuration interface. The top navigation bar is blue with the Oracle logo and the text 'Enterprise Session Border Controller'. Below the navigation bar, there are two tabs: 'Wizards' and 'Commands'. A sidebar on the left lists various configuration categories, with 'network-interface' highlighted. The main content area is titled 'Modify Network Interface' and contains a form with the following fields:

Field	Value
Name	s0p0
Sub Port Id	0
Description	
Hostname	
IP Address	155.212.214.177
Pri Utility Addr	
Sec Utility Addr	
Netmask	255.255.255.0
Gateway	155.212.214.1

12.1.2 Realm Config

The following need to be enabled on the Realm configured facing Microsoft Teams:

- Teams-fqdn
- teams-fqdn-in-uri: enabled
- sdp-inactive-only: enabled

GUI Path: media-manger/realm-config

Acli Path: config t→media-manger→realm-config

The screenshot displays the Oracle Enterprise Session Border Controller interface. The top navigation bar includes 'Wizards' and 'Commands' menus. The left sidebar shows a tree view with 'realm-config' highlighted. The main panel, titled 'Modify Realm Config', contains the following settings:

Parameter	Value
QoS Enable	<input checked="" type="checkbox"/> enable
Max Bandwidth	0
Max Priority Bandwidth	0
Parent Realm	[Dropdown]
DNS Realm	[Dropdown]
Media Policy	[Dropdown]
Media Sec Policy	sdesPolicy
RTCP Mux	<input checked="" type="checkbox"/> enable
Ice Profile	ice
Teams Fqdn	customers.telechat.o-test06161977.co
Teams Fqdn In Uri	<input checked="" type="checkbox"/> enable
SDP Inactive Only	<input checked="" type="checkbox"/> enable

Note: Check to see if the field “refer-call-transfer” is enabled in the Teams Realm. If it is, that too must be disabled. In Asia Model, the Downstream SBC will handle call transfers

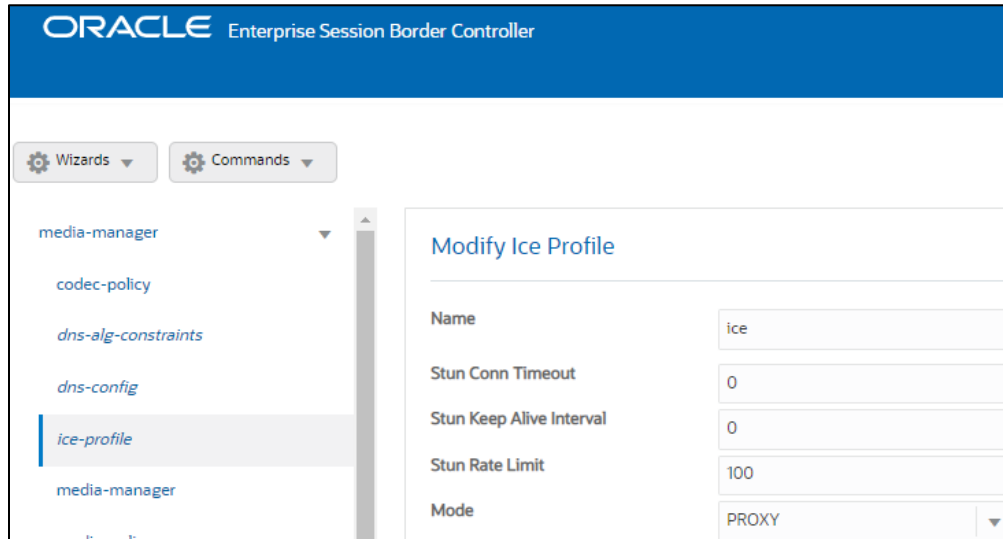
For more information on these features, please see [Appendix A](#)

12.1.3 Ice Profile

Set the mode parameter on the existing ice profile to Proxy

GUI Path: media-manger/ice-profile

ACL Path: config t→media-manger→ice-profile



12.1.4 Session Agent

In an existing ORACLE SBC configuration, there should be three session agents configured for Microsoft Teams, they are:

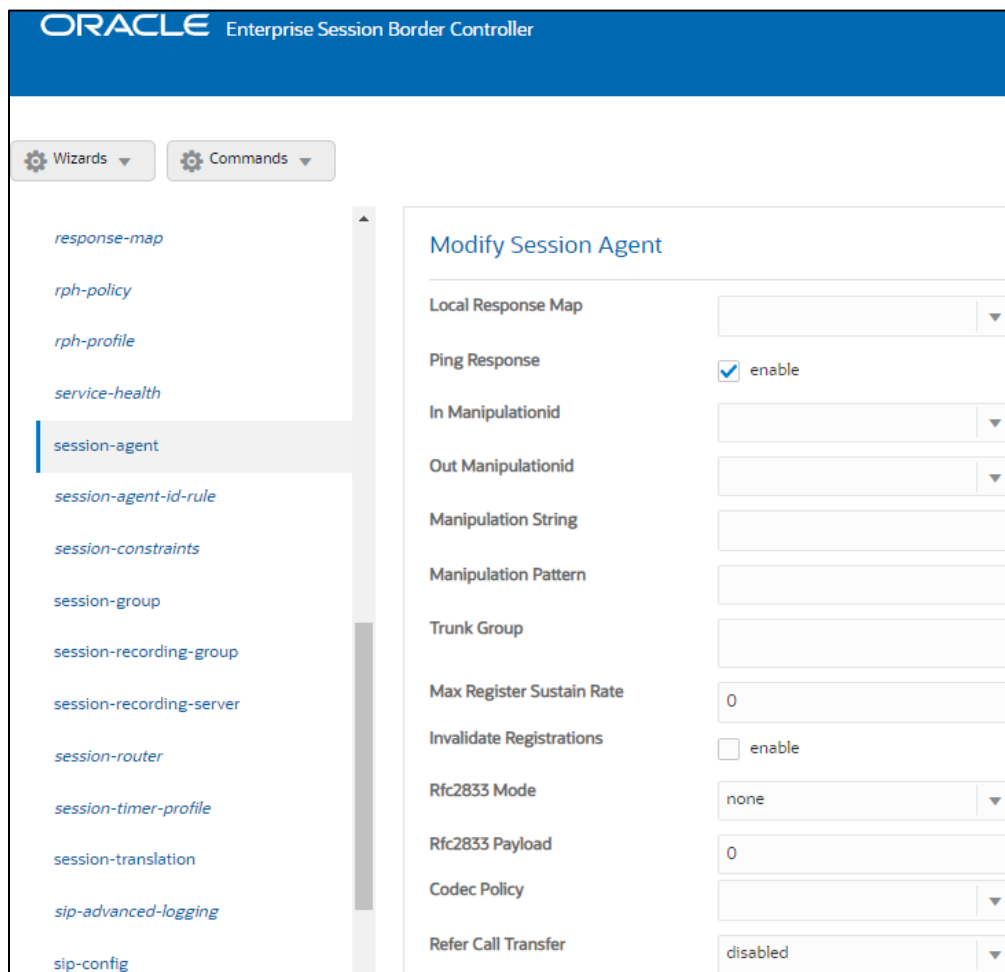
- sip.pstnhub.microsoft.com
- sip2.pstnhub.microsoft.com
- sip3.pstnhub.microsoft.com
-

Change the following on each agent

- Refer-Call-Transfer: from enabled to disabled on each of the three agents

GUI Path: session-router/session-agent

ACL Path: config t→session-router→session-agent



12.2 Proxy ORACLE SBC Configuration for Downstream ORACLE SBC

This section describes how to configure the Proxy SBC to communicate with the Downstream SBC. The following may be required:

- Physical Interface
- Network Interface
- Realm
- Steering Pool
- Sip Interface
- Session agent
- Local Policies for routing

12.2.1 Physical Interface

GUI Path: system/phy-interface

ACL Path: config t→system→phy-interface

Set the following:

- Name
- Operation Type
- Slot
- Port

phy-interface	
name	M10
operation-type	Media
slot	1
port	0

12.2.2 Network Interface

ACLI Path: config t→system→network-interface

Configure the following

- Name
- Ip-address
- Netmask
- Gateway

network-interface	
name	M10
ip-address	192.168.3.10
netmask	255.255.255.0
gateway	192.168.3.1

12.2.3 Realm Config

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

Set the following for the Realm facing Downstream SBC:

- Identifier
- Network-interface
- mm-in-realm
- media-sec-policy (this will be the same security policy assigned to your realm Facing Teams)
- codec-policy (we recommend using the same codec policy assigned to your Teams facing Realm)

realm-config

identifier	ToDownstreamSBC
network-interfaces	M10:0
mm-in-realm	enabled
media-sec-policy	sdesPolicy
codec-policy	addCN

12.2.4 Steering Pool

ACLI Path: config t→media-manger→steering-pool

Set the following in the Steering Pool Configuration

- Ip-address
- Realm-ID
- Start-port
- End-Port

steering-pool

ip-address	192.168.3.10
start-port	10000
end-port	10999
realm-id	ToDownstreamSBC

12.2.5 Sip Interface

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

Set the following Under Sip-interface Config

- Realm-id

Sip-Port:

- Address
- Port
- Transport-protocol
- Allow-anonymous

sip-interface	
realm-id	ToDownstreamSBC
sip-port	
address	192.168.3.10
port	5060
transport-protocol	TCP
allow-anonymous	agents-only

12.2.6 Session-Agent

ACLI Path: config t→session-router→session-agent

Configure the following for the Downstream SBC Session agent

- Hostname
- IP-address
- Port
- Transport-method
- Realm-ID
- Ping-method

session-agent	
hostname	sbcs5.customers.telechat.o-test06161977.com
ip-address	192.168.1.10
port	5061
transport-method	StaticTCP
realm-id	ToDownstreamSBC
ping-method	OPTIONS

12.2.7 Local Policy

For the purposes of this example configuration, we'll configure two local policies. One to route Sip Traffic from the Downstream SBC to Teams Direct Routing, the other to route SIP traffic from Teams Direct Routing to the Downstream SBC.

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

Configure the following for each local policy

- To-address
- From-address
- Source-realm

Policy-attributes

- Next-hop
- Realm

local-policy	
from-address	*
to-address	*
source-realm	Teams
policy-attribute	
next-hop	192.168.1.10
realm	TeamsLocationTesting
local-policy	
from-address	*
to-address	*
source-realm	ToDownstreamSBC
policy-attribute	
next-hop	SAG:TeamsGrp
realm	Teams

This concludes the basic configuration for the Proxy ORACLE SBC. You can now exit configuration mode and [Save and Activate Configuration](#)

13 Appendix A

As mentioned throughout this document, there are three new configuration parameters available in this software release (and future GA releases). Two are under the realm configuration element, and one under the session agent configuration element. The purpose of these configuration options is to simplify the configuration of the Oracle SBC when interfacing with Microsoft Teams Direct Routing by eliminating the need for most, if not all the sip manipulations that were required in the original phases of implementation.

The three options are as follows:

Under Realm config, you have:

- teams-fqdn-in-uri
- sdp-inactive-only

Below is an outline of the sip manipulations these config options replace taken from the original Oracle SBC recommended configuration. The names of the sip-manipulation that are being replaced can be found in the following document:

<https://www.oracle.com/webfolder/technetwork/acmepacket/Microsoft/SBC-MSFTTeams-MB.pdf>

teams-fqdn-in-uri, when enabled under the realm facing Microsoft Teams, replaces *Teamsoutmanip*, found of page 51.

Sdp-inactive-only, when enabled under the realm facing Microsoft Teams, replaces the manipulations needed to convert SDP attributes a=sendonly, a=recvonly, to and from a=inactive. This replaces the headers rules under both *Teamsoutmanip*, found on page 51 and *Teamsinmanip*, found on page 63.

Since there are additional features tied to **teams-fqdn-in-uri** directly related to Local Media Optimization, it is a requirement this be enabled on the Teams facing realm. This will require the existing sip manipulations to be unassigned from your existing configuration. Based on our documentation, the recommendation was to assign both, *Teamsinmanip* and *Teamsoutmanip* to the sip-interface for Teams...To remove them, please do the following:

```
NN3900-101# config t
NN3900-101(configure)# session-router sip-interface
NN3900-101(sip-interface)# select
<RealmID>:
1: OCOMREALM      10.232.50.50:5060
2: Teams          155.212.214.177:5061
3: TeamsLocationTesting 192.168.3.10:5061
selection: 2
NN3900-101(sip-interface)# in-manipulationid ""
NN3900-101(sip-interface)# out-manipulationid ""
NN3900-101(sip-interface)# done
**NN3900-101(sip-interface)# quit
```

[Save and Activate Configuration](#)

Prior to making this change, Oracle highly recommends you review the document at the link above, and compare the manipulations in that guide to what you currently have in your configuration. Unwanted removal of sip manipulation mime, header, or element rules could cause disruption in service.

14 Caveat

14.1 491 Request Pending From Microsoft

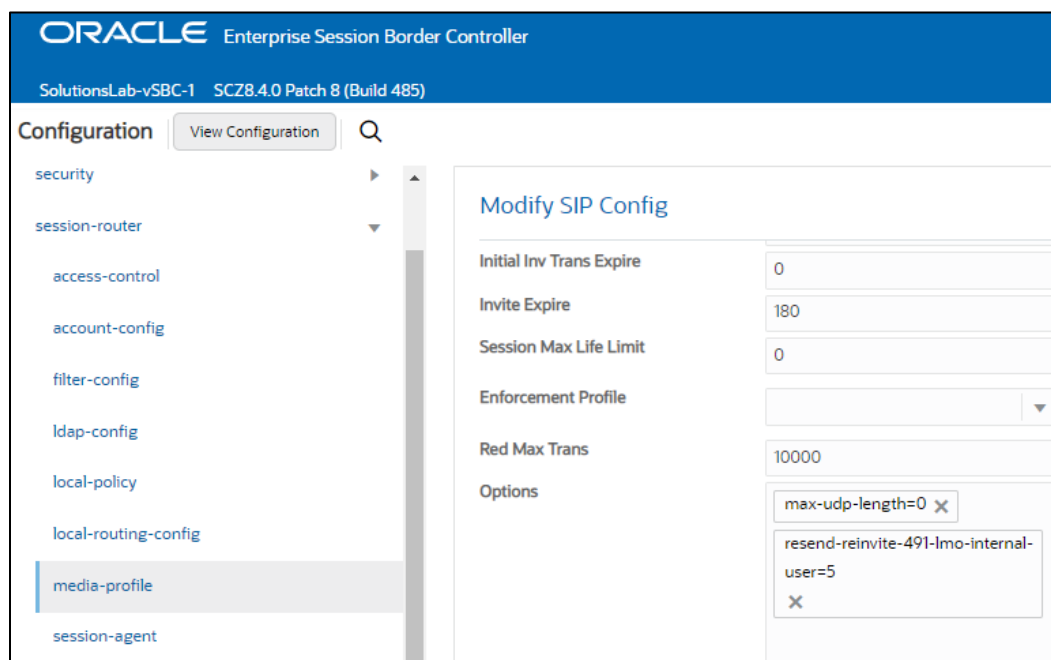
There is a new hidden option that has been added to release nnSCZ840p8, “resend-reinvite-491-lmo-internal-user”. This option has been created to address a race condition that may appear in some environments between the Oracle SBC and Microsoft Teams Direct Routing interface when a user is internal.

The purpose of this configuration option, “resend-reinvite-491-lmo-internal-user”, is to resend the Re-Invite generated by the Oracle SBC towards Microsoft Teams when Microsoft Teams sends a "491 Request Pending" response to that initial Re-Invite. The SBC only generates a Re-Invite towards Microsoft Teams on inbound calls to Teams when a user is internal.

In a single SBC deployment, i.e....[Europe Model](#), this option is applied to the global sip configuration of that SBC.

In a multiple SBC deployment, i.e....[Asia Model](#), this option will be added to the global sip config of the downstream or local SBC.

Use the example below to add this option to the Oracle SBC's configuration.



- Click OK at the bottom, then [Save and Activate Configuration](#)

15 Troubleshooting

If you experience any issues with configuration, or with service after Local Media Optimization has been enabled on both the Oracle SBC's and your Microsoft Teams Tenant, please reach out to your Oracle Sales Consultant for assistance and direction with your issue.



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