Business Services

Guide for BTIP and Business Talk SIP services Microsoft Teams Direct Routing

24 september 2019

Teams Direct Routing AudioCodes Checklist 0.11
Teams Direct Routing Ribbon Checklist 1.0
Teams Direct Routing Oracle Checklist 0.4

Contents

1 Main certified architectures

Note that neither simple nor double Media Bypass have been validated so far.

- Simple Media Bypass would be bypassing Teams cloud (actually Teams Media Processors) for media flows, but not SBC ; its certification is in progress.
- Double Media Bypass would be bypassing both Teams cloud and SBC for media flows ; there has been no plan yet for its certification because its availability is still unclear.

Concerning the fax support, Business talk and BTIP support the following usage:

- fax servers connected to the IPBX* -and sharing same dial plan-,
- fax servers as separate ecosystems -and separate dial plan-,
- analog fax machines, usually connected to specific gateways* (seen as IPBX ecosystem or not).

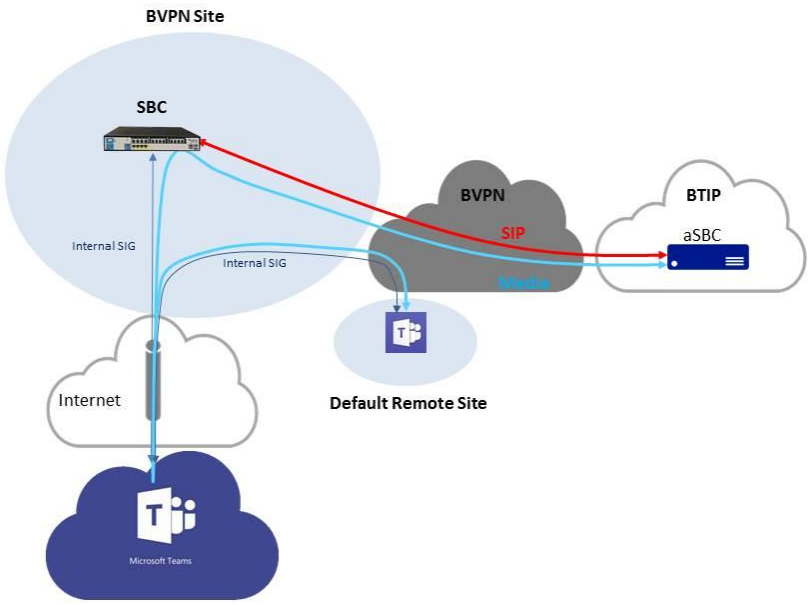
Microsoft Teams does not directly handle fax, neither analog devices. Those devices can only be interconnected with Teams through the Direct Routing SBC or ATA boxes linked to the Direct Routing SBC and would be fully managed by the Direct Routing SBC. So far, this is not standard and would require a Customer Specific study.

Fax flows are handled via T.38 transport only.

Note also that BTIP/BTalk redundancy mechanisms are not shown on the drawings. This is not the aim of this document.

1.1 Standalone mode

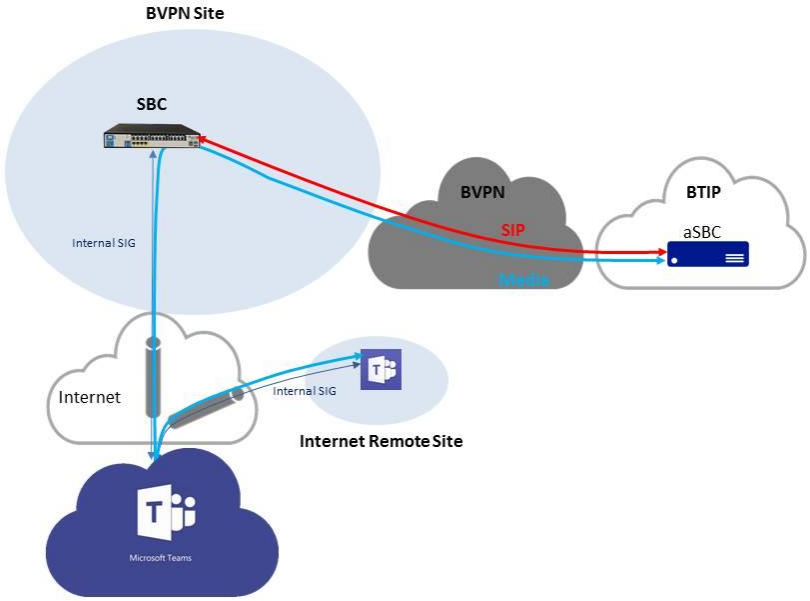
Example 1 – offnet call from a BVPN remote site



Here, the Teams user belongs to a BVPN site, as does the SBC. There is no Internet breakout within the local site, though that could be the recommended architecture.

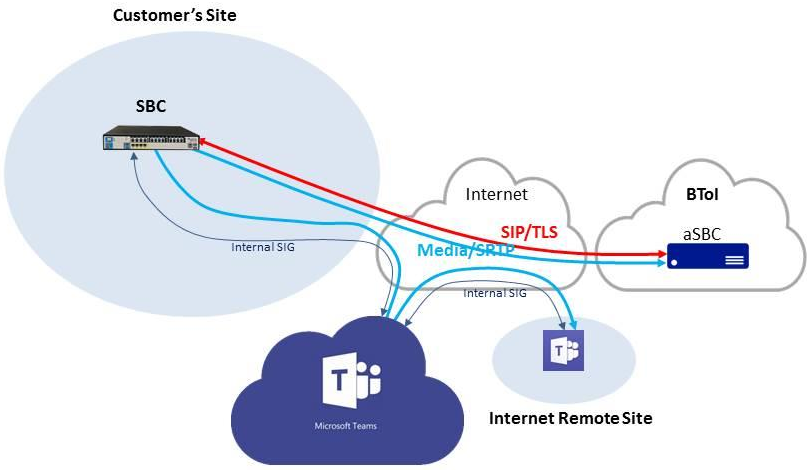
Without Media Bypass, media flows cross Internet to reach Teams media relays and SBC.

Example 2 – offnet call from an Internet remote site



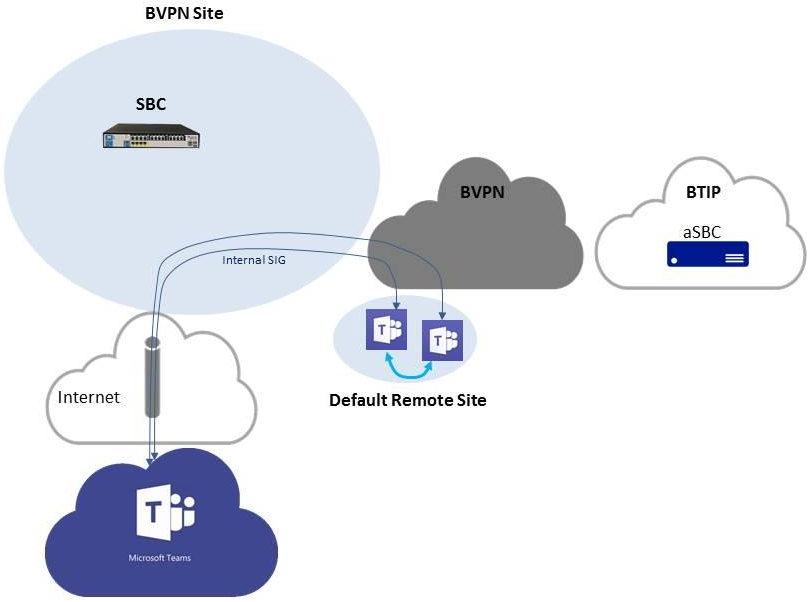
Here, the Teams user does not belong to a BVPN site and is on Internet.

Example 3 – offnet call from an Internet remote site with BToI (Business Talk over Internet)



BVPN is not mandatory in a Business Talk over Internet architecture. Here is a full Internet architecture. Note that the flows are encrypted from end to end.

Example 4 – onnet BVPN call

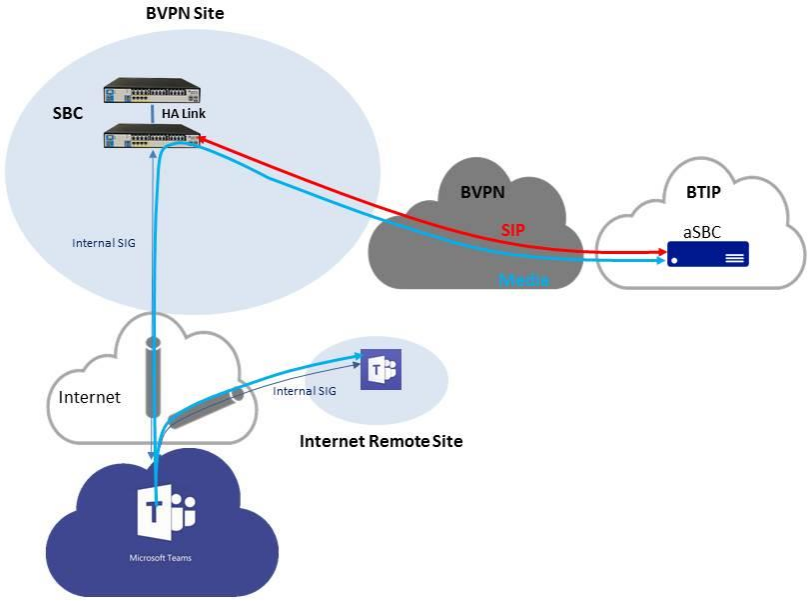


In a BVPN architecture, media flows between Teams users belonging to a single BVPN are direct, whether they are on the same site or in distinct sites.

1.2 High Availability mode

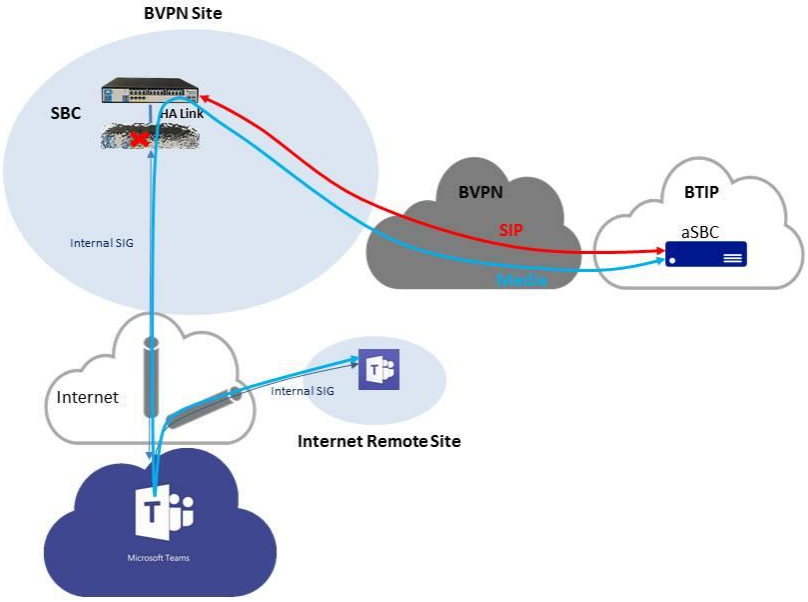
High availability is provided by SBC vendor. This is active-passive mode with a single IP address. From BTIP/BTalk perspective, this is like a single SBC.

Example 1 – offnet call in nominal mode



HA is fully managed by SBC themselves. From Teams and BTIP/BTalk points of view, the architecture behaves as if there was a single SBC.

Example 2 – offnet call in backup mode

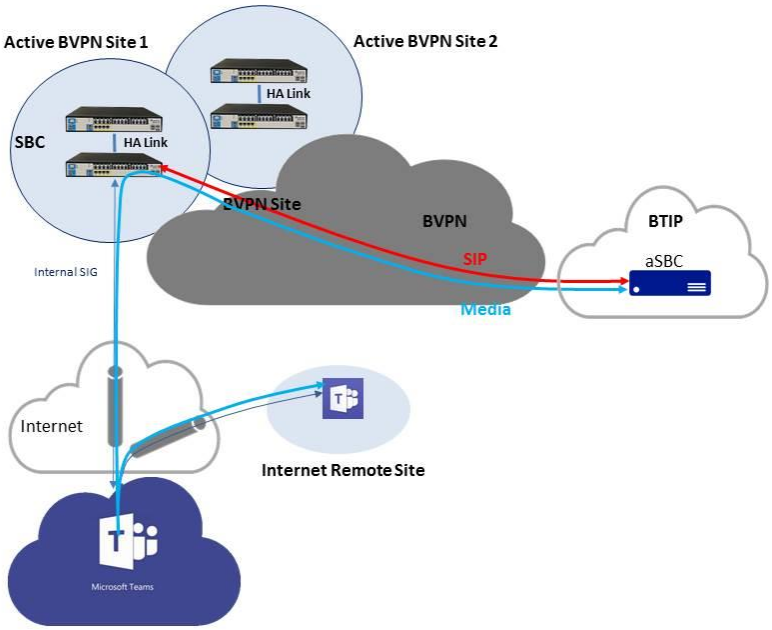


When the nominal SBC fails, the backup SBC transparently handles the service. Current calls are not cut.

1.3 Active-active mode (resiliency)

From BTIP/BTalk perspective, meaning of active-active mode for incoming offnet calls is actually round-robin mode.

Example 1 – offnet call in an architecture combining two BVPN sites in active-active mode with two SBC in High Availability mode in each



Here is an example of a somewhat highly resilient architecture that mixes spatial redundancy with load balancing and high availability on each SBC site. The two geographic SBC sites are supposed to be both located in the same region as the a-SBC pair they are trunked to.

Teams use DNS load balancing between the two geographic SBC sites for routing outbound offnet calls. On the other and, BTIP/BTalk provides round-robin between the two sites. The two sites are active-active. In addition, there is here an active-passive resilience within each site.

In the next chapter describing connections to BTIP/BTalk, this architecture would be “N SBC pairs - BTalk round robin mode over N pairs in vendor HA mode” with N=2. Of course, a simpler architecture without the High Availability part could be considered as well.

1.4 Sizing considerations

Without Media Bypass, flows between SBC and aSBC only are involved in RTVo.

Regarding codec usage in the standard architecture:

- RTP G711 is used between Direct Routing SBC and BTIP/BT,
- SRTP G711 is forced between Teams and The Direct Routing SBC so that transcoding is avoided,
- encrypted SILK or G722 is used between Teams Client and Teams Media Processors,

Therefore, a channel for an offnet call may be considered to consume 100 kbps throughout its path.

	Central site			Remote site with Internet breakout			Remote site without Internet breakout	
	CE Router		Internet router	CE Router		Internet router	CE Router	
	RTVo	D1		RTVo	D1		RTVo	D1
Offnet calls								
From/to central site	1		2					
From/to remote site with Internet breakout	1		1			1		
From/to remote site without Internet breakout	1	1	2					1
Onnet BVPN calls								
From/to a local client								
Between central site and a remote client		1						
Between remote site with Internet breakout and a remote client					1			
Between remote site without Internet breakout and a remote client								1
External calls (between BVPN & Internet clients)								
From/to central site			1					
From/to remote site with Internet breakout						1		
From/to remote site without Internet breakout		1	1					1

In this table, far end site is not considered. Note that when a call is put on hold, there is no Music On Hold played so far with Direct Routing.

2 Parameters for connection to BTIP/BTalk

Head Quarter (HQ) architecture	Level of Service	@IP used by the service
Single SBC	No redundancy	SBC IP@
SBC pair - Vendor HA mode	Local redundancy with nominal/backup behavior. No loss of calls in case of nominal's failure. Single site.	SBC pair floating IP@
	Extended local redundancy with nominal/backup behavior. No loss of calls in case of nominal's failure. Two sites linked at L2 level.	
N SBC - BTalk round robin mode - Mono region	Local redundancy and load sahring with round robin behavior. Loss of calls handled by a SBC that fails. DNS load balancing from Teams point of view. Single site.	SBC1 IP@ SBC2 IP@ … SBCN IP@
	Geographical redundancy and load sharing with round robin behavior. Loss of calls handled by a SBC that fails. DNS load balancing from Teams point of view. M sites (M <= N) in the same region (i.e. attached to the same aSBC pair withe a single T1T7).	
N SBC pairs - BTalk round robin mode over N pairs in vendor HA mode - Mono region	Local + geographical redundancy and load sharing. If a SBC fails locally, active calls not lost and handled by new active SBC. If a full site fails, active calls are lost, but all users keep the offnet service. In addition, there is a load-balancing between sites : round-robin from BTIP/BT side and DNS load balancing from Teams side.	SBC pair1 floating IP@ SBC pair2 floating IP@ … SBC pairN floating IP@

2 SBC pairs - BTalk round robin mode over 2 pairs in vendor HA mode - Multi region (Business Talk only). Limited to 2 pairs for easier understanding. May be extended to N pairs, at least one per involved region.	For users in region 1: offnet calls to/from users of the region 1 are routed through the Direct Routing SBC pair of region 1, located in site 1. For Business Talk, a T1T7 per region permits this routing. For Teams, a second route must be configured for users. If a single SBC in site 2 fails, the backup SBC handles the traffic. If a single SBC in site 1 fails, the backup SBC handles the traffic. If the full site fails, Direct Routing SBC pair of region 2 rescues the offnet service of users, assuming that RTD is acceptable for VoIP.	SBC pair1 floating IP@ SBC pair2 floating IP@
	For users in region 2: offnet calls to/from users of the region 2 are routed through the Direct Routing SBC pair of region 2, located in site 2. For Business Talk, a T1T7 per region permits this routing. For Teams, a second route must be configured for users. If a single SBC in site 2 fails, the backup SBC handles the traffic. If the full site fails, Direct Routing SBC pair of region 1 rescues the offnet service of users, , assuming that RTD is acceptable for VoIP.	

Remote Site (RS) architecture**	Level of Service
Remote site without survivability	No survivability, no trunk redundancy

3 BTIP/BTalk/BTol certified versions

3.1 Teams

There is no release numbering of Microsoft Teams. This is continuous delivery. Therefore, the compatibility of the 3 main components, i.e. certified AudioCodes w Teams and BTIP/BTalk cannot be fully committed at any time.

3.2 Certified SBC

Certified with standard architectures are:

Vendor	Model	Release	BTIP	BTalk	BTol	Media Bypass
AudioCodes	M500/800/1000/2600/4000/9000 & VE	v.7.20A, build 250.003+	√	√	√	No
Ribbon	Edge 1000/2000 & SweLite	8.0.1v181+	√	√		No
Oracle	Acme Packet 1100/3900/4600/6300/6350 & VME	S-Cz8.1.0 m1+	√	√		No

3.3 Endpoints

As far as double Media Bypass is not certified for BTIP/BTalk, all Microsoft-certified endpoints are certified with Direct Routing abd BTIP/BTalk.

4 AudioCodes SBC Configuration Checklist for BTIP/BTalk/BTol

Configuration checklist regarding **Trunk configuration on the Tenant**

```
Set-CsOnlinePSTNGateway -Identity sbc.contoso.com -ForwardCallHistory $true -
ForwardPai $false
```

Configuration checklist regarding **Mediant SBC – Standalone**

- Step 1 – IP Network configuration
- Step 2 – Teams configuration
- Step 3 – Business Talk configuration
- Step 4 – Routing configuration

Step 1 - IP Network configuration	
Ethernet Groups	
On the Mediant WebUi Interface: SETUP > IP Network > Core entities > Ethernet Groups	✓ 1 Ethernet Group for Teams (**GROUP_1**) ✓ 1 Ethernet Group for BTIP or BTol (**GROUP_2**) ✓ [Optional] 1 Ethernet Group for HA (**GROUP_3**)
Ethernet Devices	
SETUP > IP Network > Core entities > Ethernet Devices	✓ 1 Ethernet Device for Teams (**EthD_Teams**) ✓ [*Optional*] 1 Ethernet Device for HA (**EthD_HA**) If BT/BTIP: ✓ 1 Ethernet Device for BTIP (**EthD_BTIP**) If BTol: ✓ 1 Ethernet Device for BTIP (**EthD_BTol**) ✓ 1 Ethernet Device for BTIP (**EthD_LAN**)
IP Interfaces	
SETUP > IP Network > Core entities > IP Interface Devices	✓ 1 IP Interface for Teams (**IPInt_Teams**) ✓ [*Optional*] 1 IP Interface for HA (**IPInt_HA**) If BT/BTIP: ✓ 1 IP Interface for BTIP (**IPInt_BTIP**) If BTol: ✓ 1 IP Interface for BTol (**IPInt_BTol**) ✓ 1 IP Interface for LAN (**IPInt_LAN**)
NAT Translation	
SETUP > IP Network > Core entities > NAT Translation	✓ Create 1 rule for Teams signalization traffic - Source Interface : **IPInt_Teams** - Source Start Port : **5061** - Source End Port : **5061** - Target IP Address: **<SBC Teams Public IP Address>**

	- Target Start Port: - Target End Port: ✓ Create 1 rule for Teams media traffic - Source Interface : **IPInt_Teams** - Source Start Port : **49160** - Source End Port : **65529** - Target IP Address: **<SBC Teams Public IP Address>** - Target Start Port: - Target End Port: If BTol: ✓ Create 1 rule for BTol signalization traffic - Source Interface : **IPInt_BTol** - Source Start Port : **5061** - Source End Port : **5061** - Target IP Address: **<SBC BTol Public IP Address>** - Target Start Port: - Target End Port: ✓ Create 1 rule for Teams media traffic - Source Interface : **IPInt_BTol** - Source Start Port : **6000** - Source End Port : **40999** - Target IP Address: **<SBC BTol Public IP Address>** - Target Start Port: - Target End Port:
Security	
TLS Contexts	
On the Mediant WebUi Interface: SETUP > IP Network > Security > TLS Contexts	✓ Create new TLS Context for Teams traffic - Name: **Teams-TLSContext** - TLS Version: **TLSv1.2** - DTLS Version: **DTLSv1.2** - DH Key Size: **2048**
SETUP > IP Network > Security > TLS Contexts > **Teams-TLSContext** > Change Certificate	Create a new CSR for Teams SBC FQDN and send it to the public certification authority for signing. Then upload it to the Mediant.
SETUP > IP Network > Security > TLS Contexts > **Teams-TLSContext** > Trusted Root Certificates	Import Root/ Intermediate Certificates
On the Mediant WebUi Interface: SETUP > IP Network > Security > TLS Contexts	If BTol: ✓ Create new TLS Context for BTol traffic - Name: **BTol-TLSContext** - TLS Version: **TLSv1.2** - DTLS Version: **DTLSv1.2** - DH Key Size: **2048**
SETUP > IP Network > Security > TLS Contexts > **BTol-TLSContext** > Change Certificate	Create a new CSR for BTol SBC FQDN and send it to the public certification authority for signing. Then upload it to the Mediant.
SETUP > IP Network > Security > TLS Contexts > **BTol-TLSContext** > Trusted Root Certificates	Import Root/ Intermediate Certificates

DNS	
Internal SRV	
On the Mediant WebUi Interface: SETUP > IP Network > DNS > Internal SRV	✓ Create new internal SRV entry - Domain Name: **teams.local** - Transport Type: **TLS** - DNS Name 1: **sip.pstnhub.microsoft.com** - Priority 1: **1** - Weight 1: **1** - Port 1: **5061** - DNS Name 2: **sip2.pstnhub.microsoft.com** - Priority 2: **2** - Weight 2: **1** - Port 2: **5061** - DNS Name 3: **sip3.pstnhub.microsoft.com** - Priority 3: **3** - Weight 3: **1** - Port 3: **5061**

Step 2 - Teams Configuration	
Coder Groups	
On the Mediant WebUi Interface: SETUP > Signaling&Media > Coders & Profiles > Coder Groups	✓ Configure AudioCodersGroups_1 - Coder Name: **G711A-law** - Packetization Time: **20** - Rate**: 64** - Payload Type**: 8** - Silence Suppression**: Disabled**
Allowed Audio Coder Groups	
On the Mediant WebUi Interface: SETUP > Signaling&Media > Coders & Profiles > Allowed Audio Coders	✓ Create Teams_AudioCoders ✓ Select the created entry, then click on “Allowed Audio Coders 0 Items” and click on new:

Groups	- Coder Name: **G711A-law**
IP Profile	
SETUP > Signaling&Media > Coders & Profiles > IP Profiles	✓ Create new IP Profile for Teams - Name: **Teams-IPProfile** - SBC Media Security Mode: **SRTP** - SBC Enforce MKI Size: **Enforce** - Reset SRTP Upon Re-key: **Enable** - Generate SRTP Keys Mode: **Always** - Extension Coders Group**: AudioCodersGroup_1** - Allowed Audio Coder: **Teams_AudioCoders** - Allowed Coders mode: **Restriction and Preference** - ICE Mode**: Lite** - Remote Update Support**: Not Supported** - Remote re-INVITE**: Supported only with SDP** - Remote Delayed Offer Support**: Not Supported** - Remote REFER Mode**: Handle locally** - Remote 3xx Mode**: Handle locally** - Remote Hold Format**: Send Only**
Media Realm	
SETUP > Signaling&Media > Core Entities > Media Realms	✓ Create new Media Realm for Teams traffic - Name: **Teams-Media** - Topology location: **UP** - IPv4 Interface Name: **IPInt_Teams** - Port Range Start**: 49160** - Number of Media Session Legs**: 1637** - Default Media Realm**: Yes**
SIP Interface	
SETUP > Signaling&Media > Core Entities > SIP Interface	✓ Create new SIP Interface for Teams traffic - Name : **Teams-SIPInterface** - Topology Location: **UP** - Network Interface : **IPInt_Teams** - UDP Port : **0** - TCP Port: **0** - TLS Port: **5061** - Enable TCP Keep alive: **Enable** - Classification Failure response Type**: 0** - Media Realm**: Teams-Media** - TLS Context Name**: Teams-TLSContext** - TLS Mutual Authentication**: Disable**
Proxy Set	
SETUP > Signaling&Media > Core Entities > Proxy Set	✓ Create new Proxy Set for Teams traffic - Name : **Teams-Proxies** - SBC IPv4 SIP Interface : **Teams-SIPInterface** - TLS Context Name: **Teams-TLSContext** - Proxy Keep-Alive : **Using OPTIONS** - Proxy Keep-Alive Time : **600** - Proxy Hot swap**: Enable** - Proxy Load Balancing method: **Random Weights** - DNS Resolve Method: **SRV** (Proxy Address Table) : Create 1 Entry for Teams Proxy

	- Proxy Address : **teams.local** - Transport Type : **TLS**
IP Group	
SETUP > Signaling&Media > Core Entities > IP Group	✓ Create new IP Group for Teams traffic - Name : **Teams-IPGroup** - Topology Location**: UP** - Proxy Set**: Teams-Proxies** - IP Profile**: Teams-IPProfile** - Media Realm**: Teams-Media** - SIP Group Name**: <Customer Teams Public FQDN>** - Classify by Proxy Set**: Disable** - Local Host Name**: <Customer Teams Public FQDN>** - Always use src Address**: Yes** - DTLS Context**: Teams-TLSContext** - Proxy Keep-Alive using IP Group settings**: Enable**
Media Security	
SETUP > Signaling&Media > Media > IP Media Security	✓ Configure following parameters: - Media Security : **Enable**
RTP / RTCP settings	
SETUP > Signaling&Media > Media > IP RTP/RTCP Settings	✓ Configure following parameters: - RTP UDP Port Spacing : **10** - RFC2833 TX Payload Type**: 101** - FC 2833 Rx Payload Type: **101**
DSP Settings	
SETUP > Signaling&Media > Media > DSP Settings	✓ Configure following parameters: - Answer Detector Activity Delay: **512** - Answer Detector Silence Time**: 96** - Answer Detector Sensitivity**: 2** - Energy Detector Quality Factor**: 0** - Energy Detector Threshold**: 0**
Proxy & Registration	
SETUP > Signaling&Media > Message Manipulation > Proxy & Registration	✓ Configure following parameters: - Gateway Name: **<Customer Teams Public FQDN>** - Use Gateway Name for Options**: Yes**
Message Manipulation	
SETUP > Signaling&Media > Message Manipulations	✓ Create new message manipulation for SIP Options message - Name : **Option-contact-rewrite 1** - Manipulation Set ID**: 1** - Row Role**: Use Current Condition** - Match> Message Type**: Options** - Match> Condition**:** **param.message.address.dst.sipinterface==’<Teams SIP Interface INDEX>’** - Action> Action Subject**: header.contact.url.host** - Action> Action Type**: Modify** - Action> Action Value**: ‘<Customer Teams Public FQDN>’**
Message Condition	
SETUP > Signaling&Media > SIP Definitions > Message Conditions	✓ Create new message condition for incoming SIP messages - Name : **a teams contact** - Condition**: header.contact.url.host contains**

	'pstnhub.microsoft.com'
Classification	
SETUP > Signaling&Media > SBC > Classification	✓ Create new classification - Name : **From Teams-IPGroup** - Source SIP Interface**: Teams-SIPInterface** - Source IP Address**: *** - Destination Host**: <Customer Teams Public FQDN>** - Message Condition**: a teams contact** - Source IP Group**: Teams-IPGroup**
SBC General Settings	
SETUP > Signaling&Media > SBC > SBC General Settings	✓ Configure following parameters: - SBC Performance Profile: **Optimized for transcoding**

Step 3 - Business Talk Configuration	
Coder Groups	
On the Mediant WebUi Interface: SETUP > Signaling&Media > Coders & Profiles > Coder Groups	✓ Configure AudioCodersGroups_2 - Coder Name: **G711A-law** - Packetization Time: **20** - Rate**: 64** - Payload Type**: 8** - Silence Suppression**: Disabled** -
Allowed Audio Coder Groups	
On the Mediant WebUi Interface: SETUP > Signaling&Media > Coders & Profiles > Allowed Audio Coders Groups	✓ Create BTIP_AudioCoders ✓ Select the created entry, then click on "Allowed Audio Coders 0 Items" and click on new: - Coder Name: **G711A-law**
IP Profile	
SETUP > Signaling&Media > Coders & Profiles > IP Profiles	✓ Create new IP Profile for Business Talk If BT/BTIP: - Name: **BTIP-IPProfile** - SBC Media Security Mode: **RTP** If BTol: - Name: **BTol-IPProfile** - SBC Media Security Mode: **SRTP** For Both BT/BTIP and BTol: - Symmetric MKI: **Disable** - MKI Size**: 0** - Extension Coders Group**: AudioCodersGroup_2** - RFC2833 DTMF Payload Type: 101 - P-Asserted-Identity header mode**: Add** - Remote REFER Mode**: Handle locally** - Remote 3xx Mode**: Handle locally** - Remote Hold Format**: Send Only**
Media Realm	
SETUP > Signaling&Media > Core Entities > Media Realms	✓ Create new Media Realm for Business Talk If BT/BTIP: - Name: **BTIP-Media** - Topology location: **DOWN** - IPv4 Interface Name: **IPInt_BTIP** - Port Range Start**: 16400** - Number of Media Session Legs**: 1000** If BTol: - Name: **BTol-Media** - Topology location: **DOWN** - IPv4 Interface Name: **IPInt_BTol** - Port Range Start**: 6000** - Number of Media Session Legs**: 3500** For Both BT/BTIP and BTol: - Default Media Realm**: No**
SIP Interface	
SETUP > Signaling&Media > Core	✓ Create new SIP Interface for Business Talk

Entities > SIP Interface	If BT/BTIP: - Name : **BTIP-SIPInterface** - Topology location: **DOWN** - Network Interface : **IPInt_BTIP** - TCP Port: **5060** - TLS Port: **0** - Media Realm**: BTIP-Media** If BToI: - Name : **BToI-SIPInterface** - Network Interface : **IPInt_BToI** - TCP Port: **0** - TLS Port: **5061** - Media Realm**: BToI-Media** For Both BT/BTIP and BToI: - Topology Location: **DOWN** - UDP Port : **0**
Proxy Set	
SETUP > Signaling&Media > Core Entities > Proxy Set	✓ Create new Proxy Set for Business Talk If BT/BTIP: - Name : **BTIP-Proxies** - SBC IPv4 SIP Interface : **BTIP-SIPInterface** - Proxy Keep-Alive: **Using OPTIONS** - Proxy Keep-Alive Time: **600** - Redundancy Mode: **Homing** - Proxy Hot swap**: Enable** If BToI: - Name : **BTIP-Proxies** - SBC IPv4 SIP Interface : **BTIP-SIPInterface** - Proxy Keep-Alive : **Using OPTIONS** - Proxy Keep-Alive Time : **600** (Proxy Address Table) : If BT/BTIP: Create 2 Entries for Business Talk Proxy - Proxy Address 1 : **<Nominal SBC ACME>:5060** - Transport Type : **TCP** - Proxy Address 2 : **<Backup SBC ACME>:5060** - Transport Type : **TCP** If BToI: Create 2 Entries for Business Talk Proxy - Proxy Address : **< BToI Public @IP >:5061** - Transport Type: **TLS**
Message Manipulation	
SETUP > Signaling&Media > Message Manipulations	✓ Create new message manipulation for User-Agent value modification - Name : **Modify User-Agent** - Manipulation Set ID**: 2** - Row Role**: Use Current Condition** - Match> Message Type**: any** - Match> Condition**:** - Action> Action Subject**: Header.User-Agent**

	- Action> Action Type**: Modify** - Action> Action Value**: Header.User-Agent.Content + ' \ Teams'**
IP Group	
SETUP > Signaling&Media > Core Entities > IP Group	✓ Create new IP Group for Business Talk If BT/BTIP: - Name : **BTIP-IPGroup** - Proxy Set**: BTIP-Proxies** - IP Profile**: BTIP-IPProfile** - Media Realm**: BTIP-Media** - DTLS Context**: <empty>** If BTol: - Name : **BTol-IPGroup** - Proxy Set**: BTol-Proxies** - IP Profile**: BTol-IPProfile** - Media Realm**: BTol-Media** - DTLS Context**: BTol-TLSContext** For Both BT/BTIP and BTol: - Topology Location**: DOWN** - Outbound Message Manipulation Set: **2** (related to "Modify User-Agent" manipulation set id)

Step 4 – Routing configuration	
IP to IP Routing	
On the Mediant WebUi Interface: SETUP > Signaling&Media > SBC > Routing > IP-to-IP Routing	✓ Create 4 IP to IP routing rules: First one regarding OPTIONS Messages: - Name: **SIP-OPTIONS-Terminate** - Match > Source IP Group: **Any** - Match > Request Type: **OPTIONS** - Match > ReRoute IP Group: **Any** - Action > Destination Type: **Dest Address** - Action > Destination Address: **internal** Second one regarding REFER messages: - Name: **Transfers** - Match > Source IP Group: **Any** - Match > Call trigger: **REFER** - Match > Source IP Group: **Any** - Action > Destination Type: **Request URI** - Action > Destination IP Group: **Teams-IPGroup** Third one regarding Business Talk to Teams traffic: - Name: **BTIP**(or BToI) **to Teams** - Match > Source IP Group: **BTIP-IPGroup** (or BToI-IPGroup) - Match > ReRoute IP Group: **Any** - Action > Destination IP Group: **Teams-IPGroup** Fourth one regarding Teams to Business Talk traffic: - Name: **Teams to BTIP**(or BToI) - Match > Source IP Group: **Teams-IPGroup** - Match > ReRoute IP Group: **Any** - Action > Destination IP Group: **BTIP-IPGroup** (or BToI-IPGroup)

Configuration checklist regarding **Mediant SBC – HA**

- Step 1 – Configuration of the first Mediant for HA
- Step 2 – Configuration of the second Mediant for HA
- Step 3 – Initialize HA on the devices

Step 1 – Configuration of the first Mediant for HA Note: *During this stage, make sure that the second device is powered off or disconnected from network.*	
Ethernet Groups	
On the Mediant WebUi Interface: SETUP > IP Network > Core entities > Ethernet Groups	✓ Use a dedicated Ethernet Group for HA (**GROUP_3**)
Ethernet Devices	
SETUP > IP Network > Core entities > Ethernet Devices	✓ Create 1 Ethernet Device for HA - Name**: EthD_HA** - VLAN ID**: 3** - Underlying interface**: GROUP3** - Tagging**: Untagged** - MTU**: 1500**
IP Interfaces	
SETUP > IP Network > Core entities > IP Interface Devices	✓ Create 1 IP Interface for HA (**IPInt_HA**) - Name**: IPInt_HA** - Application Type**: MAINTENANCE** - Ethernet Device**: EthD_HA** - IP Address**: 192.168.0.1** - Prefix length**: 24** - Default Gateway**: 0.0.0.0**
HA Settings	
SETUP > IP Network > Core entities > HA Settings	✓ Configure following parameters: - HA Remote Address**: 192.168.0.2** - Preempt Mode**: Enable** - HA Device Name**: SBC1** - Redundant HA Device Name**: SBC2**

- Save the configuration to flash without RESET
- Power Down the first Mediant and move to next section (Step2)

Step 2 – Configuration of the second Mediant for HA Note: *During this stage, make sure that the first device is powered off or disconnected from network.*

Ethernet Groups	
On the Mediant WebUi Interface: SETUP > IP Network > Core entities > Ethernet Groups	✓ Configuration must be **identical** comparing to the first Mediant.
Ethernet Devices	
SETUP > IP Network > Core entities > Ethernet Devices	✓ Configuration must be **identical** comparing to the first Mediant.
IP Interfaces	
SETUP > IP Network > Core entities > IP Interface Devices	✓ Create 1 IP Interface for HA (**IPInt_HA**) - Name**: IPInt_HA** - Application Type**: MAINTENANCE** - Ethernet Device**: EthD_HA** - IP Address**: 192.168.0.2** - Prefix length**: 24** - Default Gateway**: 0.0.0.0**
HA Settings	
SETUP > IP Network > Core entities > HA Settings	✓ Configure following parameters: - HA Remote Address**: 192.168.0.1** - Preempt Mode**: Enable** - HA Device Name**: SBC2** - Redundant HA Device Name**: SBC1**

- Save the configuration to flash without RESET

- Power Down the second Mediant and move to next section (Step3)

Step 3 – Initialize HA on the devices

Note: *You must connect both ports (two) in the Ethernet Group of the Maintenance interface to the network (i.e., two network cables are used). This provides 1+1 Maintenance port redundancy.*

1. Cable the devices to the network.

2. Power up the devices; the redundant device synchronizes with the active device and updates its configuration according to the active device. The synchronization status is indicated as follows:

5 Ribbon SBC Configuration Checklist for BTIP/BTalk

The checklist below presents all steps of configuration required for VISIT SIP Teams offer deployment.
The configuration checklist order respects the configuration guideline chapters for more information about the order please refer to [2]

Configuration checklist regarding **Trunk configuration on the Tenant**

```
Set-CsOnlinePSTNGateway -Identity sbc.contoso.com -ForwardCallHistory $true -
ForwardPai $true
```

Configuration checklist regarding **Ribbon SBC – Standalone**

- Step 1 – Teams configuration
- Step 2 – Business Talk configuration

Step 1 - Teams Configuration	
Certificate for the SBC Direct Routing Interface	
On the SBC WebUi Interface: Settings > Security > SBC Certificates	✓ Generate SBC Edge CSR - Common name: **@hostname.domain.tld** - ISO Country code: **@Country** - Locality**: @Locality** - Organization**: @Organization** - Key Length**: 2048**
TLS Profile	
On the SBC WebUi Interface: Security > TLS Profiles	✓ Create TLS Profile Teams - Description: **TLS Profile Teams** - TLS Protocol **: TLS 1.2 Only** - Validation Client FQDN : **Disabled**
Node Leve Settings	
On the SBC WebUi Interface: System > Node-Level Settings	✓ Configure DNS and NTP with your appropriate configuration - Hostname: **@hostname** - Domain Name: **@domain.tld** - Time Zone: **GMT+1** - Use NTP: **Yes** - NTP Server: **@NTP_IPAddress** - Use Primary DNS**: Yes** - Primary Server IP: **@DNS_IPAddress** - Use Secondary DNS: **Yes** - Secondary Server IP**: @DNS_IPAddress**
Node Interface	
On the SBC WebUi Interface: Networking Interfaces > Logical Interfaces	✓ Configure the parameters - Description: **Interface-Teams** - Primary Address: **@Private-IPAddress-BTIPTeams** - Primary Netmask: **@Netmask** - Media Next Hop IP: **@Gateway**
SIP Profile	
On the SBC WebUi Interface: SIP > SIP Profiles	✓ Create SIP Profile Teams - Description : **SIP Profile Teams** - FQDN in From Header Location: **SBC Edge FQDN** - FQDN in Contact Header: **SBC FQDN**
Media SDES-SRTP Profile	
On the SBC WebUi Interface: Media > SDES-SRTP Profiles	✓ Create new Media SDES-SRTP Profile - Description: **MCP Teams** - Operation Option: **Required**
Media Profile	
On the SBC WebUi Interface: Media > Media Profiles	✓ Create Media Profile > Voice Codec Profile - Description : **Default G11A** - Codec**: G.711 A-law** ✓ Create Media Profile > Voice Codec Profile - Description : **Default G11u**

	- Codec**: G.711 u-law**
Media List	
On the SBC WebUi Interface: Media >Media List	✓ Create new Media List: - Description : **ML Teams** - Media Profil List**: Default G711A** **Default G711u** - SDES-SRTP Profile **: MCP Teams**
SIP Server Table	
On the SBC WebUi Interface: SIP > SIP Server Tables	✓ Create new SIP Server Table: - Description: **SIP Server Teams** ✓ Create SIP Server IP/FQDN Server Host - HOST FQDN/IP: **sip.pstnhub.microsoft.com** - Port**: 5061** - Protocol: **TLS** - TLS Profile**: TLS Profile Teams** Transport - Monitor**: SIP Options** ✓ Create SIP Server IP/FQDN Server Host - HOST FQDN/IP: **sip2.pstnhub.microsoft.com** - Port**: 5061** - Protocol: **TLS** - TLS Profile**: TLS Profile Teams** Transport - Monitor**: SIP Options** ✓ Create SIP Server IP/FQDN Server Host - HOST FQDN/IP: **sip3.pstnhub.microsoft.com** - Port**: 5061** - Protocol: **TLS** - TLS Profile**: TLS Profile Teams** Transport - Monitor**: SIP Options**
Voice Routing	
On the SBC WebUi Interface: SIP > Transformation Tables Call Routing > Call Routing Table	✓ Create new Transformation Table: - Description: **Teams to BTIP** ✓ Create new Call Routing Table: - Description: **CR Teams to BTIP** ✓ Update CR Teams to BTIP - Description: **Teams to BTIP** - Number/Name transformation Table: **Teams to BTIP** - Destination Signaling Group: **SG to BTIP** ** refer to BTIP Configuration*
Message Manipulation	

SIP > Message Manipulation > Condition Rules Table	✓ Create new Condition Rule: - Description: **Anonymous Call Checking** - Match Type: **from** - Operation: **Regex** - Match Regex: **^((?!anonymous).)*$**
SIP > Message Manipulation > Message Rules Table	✓ Create new SIP Message Rule Table: - Description: **Privacy-Removal** - Application message: **Selected Message** - Message Selection: **INVITE** ✓ Create new Header Rule: - Description: **Privacy Removal** - Condition expression: **Match All Condition > Anonymous Call Checking** - Header Action: **Remove** - Header Name: **Privacy**
Signaling Group	
On the SBC WebUi Interface: Signaling Groups	✓ Create new Signaling Group: - Description: **SG to Teams** SIP Channels and Routing - Call Routing Table: **CR Teams to BTIP** - SIP Profile: **SIP Profile Teams** - SIP Server Table: **SIP Server Teams** - Loadbalacing: **Priority: Register All** Media Information - Media List ID: **ML Teams** SIP IP Details - Signaling/Media Private IP**: @Private-IPAddress-TeamsInterface** *** if use NAT Outbound** - Outbound NAT Traversal**: Static NAT** - NAT Public IP**: @Public-IPAddress-TeamsInterface** Listen Port - Port: **5061** - Protocol: **TLS** - TLS Profile ID: **TLS Profile Teams** Federated IP/FQDN - IP/FQDN: **sip.pstnhub.microsoft.com** - Netmask/prefix: **255.255.255.255** - IP/FQDN: **sip2.pstnhub.microsoft.com** - Netmask/prefix: **255.255.255.255** - IP/FQDN: **sip3.pstnhub.microsoft.com** - Netmask/prefix: **255.255.255.255**

	Message Manipulation: **Enabled** Inbound Message Manipulation Message Table List: **Privacy-Removal**

Step 2 - BTIP Configuration	
Node Interface	
On the SBC WebUi Interface: Networking Interfaces > Logical Interfaces	✓ Configure the parameters - Description: **Interface-BTIP** - Primary Address: **@Private-IPAddress-BTIPInterface** - Primary Netmask: **@Netmask** - Media Next Hop IP: **@Gateway**
SIP Profile	
On the SBC WebUi Interface: SIP > SIP Profiles	✓ Create SIP Profile Teams - Description : **SIP Profile BTIP** - SBC Edge Diagnostic Header: **Disable** - UA Header **: empty**
Media Profile	
On the SBC WebUi Interface: Media > Media Profiles	✓ Create Media Profile > Voice Codec Profile - Description : **Default G11A** - Codec**: G.711 A-law** ✓ Create Media Profile > Voice Codec Profile - Description : **Default G11u** - Codec**: G.711 u-law**
Media List	
On the SBC WebUi Interface: Media >Media List	✓ Create new Media List: - Description : **ML BTIP** - Media Profil List**: Default G711A** **Default G711u** - SDES-SRTP Profile **: None**
SIP Server Table	
On the SBC WebUi Interface: SIP > SIP Server Tables	✓ Create new SIP Server Table: - Description: **SIP Server BTIP** ✓ Create SIP Server IP/FQDN Server Host - HOST FQDN/IP: **@SBC-BTIP-IPAddress** - Port**: 5060** - Protocol: **TCP** Transport - Monitor**: SIP Options** ✓ Create SIP Server IP/FQDN Server Host - HOST FQDN/IP: **@SBC-BTIP-IPAddress** - Port**: 5060** - Protocol: **TCP** Transport - Monitor**: SIP Options**
Voice Routing	
On the SBC WebUi Interface: SIP > Transformation Tables	✓ Create new Transformation Table: - Description: **BTIP to Teams**

Call Routing > Call Routing Table	✓ Create new Call Routing Table: - Description: **CR BTIP to Teams** ✓ Update CR Teams to BTIP - Description: **BTIP to Teams** - Number/Name transformation Table: **BTIP to Teams** - Destination Signaling Group: **SG to Teams*** ** refer to Teams Configuration*
Message Manipulation	
On the SBC WebUi Interface: SIP > Message Manipulation > Message Rules Table	✓ Create new SIP Message Rule Table: - Description: **User-Agent** ✓ Create new Header Rule: - Description: **User-Agent** - Header Action: **Modify** - Header Name: **User-Agent** - Header Value: **Modify** - Add/Edit: ○ Type of value: Token ○ Value: user-agent ○ Suffix: \ Teams
Signaling Group	
On the SBC WebUi Interface: Signaling Groups	✓ Create new Signaling Group: - Description: **SG to BTIP** SIP Channels and Routing - Call Routing Table: **CR BTIP to Teams** - SIP Profile: **SIP Profile BTIP** - SIP Server Table: **SIP Server BTIP** Media Information - Media List ID: **ML BTIP** SIP IP Details - Signaling/Media Private IP**: @Private-IPAddress-BTIPInterface** Listen Port - Port: **5060** - Protocol: **TCP** Federated IP/FQDN - IP/FQDN: **@SBC-BTIP-IPAddress** - Netmask/prefix: **255.255.255.255** - IP/FQDN: **@SBC-BTIP-IPAddress** - Netmask/prefix: **255.255.255.255** Message Manipulation: **Enabled** Outbound Messange Manipulation - Message Table List: **User-Agent**

6 Oracle SBC Configuration Checklist for BTIP/BTalk

6.1 Configuration Requirements

6.1.1 Tenant configuration

- Pair the SBC to the tenant:

  Command:

```
New-CsOnlinePSTNGateway
    -Fqdn <SBC FQDN>
    -SipSignallingPort 5061
    -MaxConcurrentSessions <Number>
    -Enabled $true
    -ForwardPai $true
    -MediaBypass $false
    -ForwardCallHistory $true
    -SendSipOptions $true
```

6.1.2 Firewall and used ports

Source	IP	Destination	IP	Protocol	Port	Comment
SBC	Public @IP	Any	Any	UDP	53	Public DNS
SBC	Public @IP	Teams SIP Proxy	52.114.0.0/16	TCP	5061	SIP/TLS
SBC	Public @IP	Teams Media Processor	52.112.0.0/14	UDP	49152-53247	Media traffic
Teams SIP Proxy	52.114.0.0/16	SBC	Public @IP	TCP	5061	SIP/TLS
Teams Media Processor	52.112.0.0/14	SBC	Public @IP	UDP	49152-65535	Media traffic

6.1.3 SBC network configuration (wired or virtually wired)

There are five interfaces that will need IP addresses:

- For the Internet facing LAN: 1 private IP NATed to the public IP (if NAT)
- Customer trunk LAN: 1 IP address
- [Optional] HA LAN: 1 or 2 IP address depending if HA is redounded
- Admin configuration: 1 IP address for CLI configuration

6.1.4 Certificates

Following requirements regarding Certificate configuration:

- Certificate of the certification authority, signing the Microsoft Phone System Direct Routing service (Baltimore, format X.509 Base64)
- 1 cyphered file containing both the private key and the public certificate per domain used on the SBC, signed by a trusted Certificate Authority to be known by Microsoft Phone System Direct Routing service, aka such as Digicert CA which Orange has chosen as CA provider Note: for the multi-tenant SBC solution, this should be a wildcard certificate, aka *.teams.orange.com
- Certificate of the trusted certificate authority, and of each sub-authority having signed the above certificate (format X.509 Base64)

1.1.1. License

- No license is required on Virtual Machine Edition
- **********

6.1.5 User Agent

Within VISIT SIP Teams context, User agent header must have following format:
***User-Agent: ORACLE <SBC Model>/v.8.1.0* \ Teams**

6.2 ORACLE SBC - Standalone

6.2.1 First step

6.2.1.1 Setup Entitlements

Configure SBC features:

Element	Configuration
Setup entitlements	OracleSBC1# **setup entitlements**

Example:

```
OracleSBC1# setup entitlements

-------------------------------------------------------
Entitlements for Session Border Controller
Last Modified: 2019-04-23 09:58:38
-------------------------------------------------------
 1 : Session Capacity                          : 12000
 2 :   Accounting                              : enabled
 3 :   IPv4 - IPv6 Interworking                :
 4 :   IWF (SIP-H323)                          : enabled
 5 :   Load Balancing                          : enabled
 6 :   Policy Server                           : enabled
 7 :   Quality of Service                      : enabled
 8 :   Routing                                 : enabled
 9 :   SIPREC Session Recording                : enabled
10: Admin Security                             :
11: ANSSI R226 Compliance                      :
12: IMS-AKA Endpoints                          : 0
13: IPSec Trunking Sessions                    : 0
14: MSRP B2BUA Sessions                        : 0
15: SRTP Sessions                              : 2000
16: Transcode Codec AMR Capacity               : 0
17: Transcode Codec AMRWB Capacity             : 0
```

To “unlock” SRTP feature like “media-sec-policy” you must give a number for “SRTP Sessions”.

6.2.2 IP Network configuration

6.2.2.1 Physical interface configuration

3 interfaces need to be configured:

- wancom0: admin interface (CLI)
- s0p0: media interface to Teams (media)
- s0p1: media interface to BTIP (media)

Interface	Configuration
Wancom0	Configured at first initial boot
S0p0	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **system** OracleSBC1 (system)# **phy-interface** OracleSBC1 (phy-interface)# **name s0p0** OracleSBC1 (phy-interface)# **operation-type Media** OracleSBC1 (phy-interface)# **port 0** OracleSBC1 (phy-interface)# **slot 0** OracleSBC1 (phy-interface)# **done**
S0p1	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **system** OracleSBC1 (system)# **phy-interface** OracleSBC1 (phy-interface)# **name s0p1** OracleSBC1 (phy-interface)# **operation-type Media** OracleSBC1 (phy-interface)# **port 0** OracleSBC1 (phy-interface)# **slot 1** OracleSBC1 (phy-interface)# **done**

6.2.2.2 Network interface configuration

Interface	Configuration
Wancom0	Configured at first initial boot
S0p0 **To Teams**	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **system** OracleSBC1 (system)# **network-interface** OracleSBC1 (network-interface)# **name s0p0** OracleSBC1 (network-interface)# **hostname *<SBC FQDN>*** OracleSBC1 (network-interface)# **ip-address *<SBC Public IP>*** OracleSBC1 (network-interface)# **netmask *<Netmask>*** OracleSBC1 (network-interface)# **gateway *<GW IP>*** OracleSBC1 (network-interface)# **dns-ip-primary *<Primary Public DNS>*** OracleSBC1 (network-interface)# **dns-ip-backup1 *<Backup Public DNS>*** OracleSBC1 (network-interface)# **dns-domain *<DNS Domain>*** OracleSBC1 (network-interface)# **add-hip-ip *<SBC Public IP>*** OracleSBC1 (network-interface)# **add-icmp-ip *<SBC Public IP>*** OracleSBC1 (network-interface)# **add-ssh-ip *<SBC Public IP>*** OracleSBC1 (network-interface)# **gw-heartbeat** OracleSBC1 (getway-heartbeat)# **select** OracleSBC1 (getway-heartbeat)# **state enabled** OracleSBC1 (getway-heartbeat)# **heartbeat 1** OracleSBC1 (getway-heartbeat)# **retry-count 2** OracleSBC1 (getway-heartbeat)# **retry-timeout 1** OracleSBC1 (getway-heartbeat)# **health-score 30** OracleSBC1 (getway-heartbeat)# **done** OracleSBC1 (getway-heartbeat)# **exit** OracleSBC1 (network-interface)# **done**

S0p1 **To BTIP**	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **system** OracleSBC1 (system)# **network-interface** OracleSBC1 (network-interface)# **name s0p1** OracleSBC1 (network-interface)# **ip-address *<SBC Private IP>*** OracleSBC1 (network-interface)# **netmask *<Netmask>*** OracleSBC1 (network-interface)# **gateway *<GW IP>*** OracleSBC1 (network-interface)# **add-hip-ip *<SBC Private IP>*** OracleSBC1 (network-interface)# **add-icmp-ip *<SBC Private IP>*** OracleSBC1 (network-interface)# **gw-heartbeat** OracleSBC1 (getway-heartbeat)# **select** OracleSBC1 (getway-heartbeat)# **state enabled** OracleSBC1 (getway-heartbeat)# **heartbeat 1** OracleSBC1 (getway-heartbeat)# **retry-count 2** OracleSBC1 (getway-heartbeat)# **retry-timeout 1** OracleSBC1 (getway-heartbeat)# **health-score 31** OracleSBC1 (getway-heartbeat)# **done** OracleSBC1 (getway-heartbeat)# **exit** OracleSBC1 (network-interface)# **done**

6.2.3 Teams configuration

6.2.3.1 Certificate

Microsoft Teams Direct Routing Interface only allows TLS connections from SBCs for SIP traffic with a certificate signed by one of the trusted certification authorities.
The step below describes how to request a certificate for SBC External interface and configure it based on the example of Symantec | DigiCert.
The process includes the following steps:

1. Create a certificate-record “Certificate-record” is configuration element on Oracle SBC which captures information for a TLS certificate – such as common-name, key-size, key-usage etc. Following certificate-records are required on the Oracle ESBC in order for the SBC to connect with Microsoft Teams:

- SBC 1 certificate-record assigned to SBC
- IntermediateCA 1 certificate-record for intermediateCA
- Root 1 certificate-record for root cert (Baltimore for Teams SIP proxy)

2. Generate a Certificate Signing Request (CSR) and obtain the certificate from a supported Certification Authority

3. Deploy the SBC and Root/Intermediary certificates on the SBC

Step 1 – Creating the certificate

Navigate to certificate-record config element under security and then configure a certificate record for SBC as shown below

Element	Configuration

Certificate-record **SBCCertificate**	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **security** OracleSBC1 (security)# **certificate-record** OracleSBC1 (certificate-record)# **name SBCCertificate** OracleSBC1 (certificate-record)# **country *<Country>* e.g. FR** OracleSBC1 (certificate-record)# **state *<State>* e.g. Paris** OracleSBC1 (certificate-record)# **locality *<Locality>* e.g. Paris** OracleSBC1 (certificate-record)# **organization *<Organization>* e.g. Orange** OracleSBC1 (certificate-record)# **unit *<unit>* e.g. "Orange Business Services"** OracleSBC1 (certificate-record)# **common-name *<SBC FQDN>*** OracleSBC1 (certificate-record)# **key-size 2048** OracleSBC1 (certificate-record)# **trusted enabled** OracleSBC1 (certificate-record)# **key-usage-list (digitalSignature keyEncipherment)** OracleSBC1 (certificate-record)# **extended-key-usage-list (serverAuth ClientAuth)** OracleSBC1 (certificate-record)# **key-algor rsa** OracleSBC1 (certificate-record)# **digest-algor sha256** OracleSBC1 (certificate-record)# **ecdsa-key-size p256** OracleSBC1 (certificate-record)# **done**
Certificate-record **IntermediateCA**	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **security** OracleSBC1 (security)# **certification-record** OracleSBC1 (certificate-record)# **name SBCInter** OracleSBC1 (certificate-record)# **country *<Country>* e.g. FR** OracleSBC1 (certificate-record)# **state *<State>* e.g. Paris** OracleSBC1 (certificate-record)# **locality *<Locality>* e.g. Paris** OracleSBC1 (certificate-record)# **organization *<Organization>* e.g. Orange** OracleSBC1 (certificate-record)# **unit *<unit>* e.g. "Orange Business Services"** OracleSBC1 (certificate-record)# **common-name SBCInter** OracleSBC1 (certificate-record)# **key-size 2048** OracleSBC1 (certificate-record)# **trusted enabled** OracleSBC1 (certificate-record)# **key-usage-list (digitalSignature keyEncipherment)** OracleSBC1 (certificate-record)# **extended-key-usage-list (serverAuth ClientAuth)** OracleSBC1 (certificate-record)# **key-algor rsa** OracleSBC1 (certificate-record)# **digest-algor sha256** OracleSBC1 (certificate-record)# **ecdsa-key-size p256** OracleSBC1 (certificate-record)# **done**
Certificate-record **Baltimore**	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **security** OracleSBC1 (security)# **certification-record** OracleSBC1 (certificate-record)# **name BaltimoreRoot** OracleSBC1 (certificate-record)# **country *<Country>* e.g. FR** OracleSBC1 (certificate-record)# **state *<State>* e.g. Paris** OracleSBC1 (certificate-record)# **locality *<Locality>* e.g. Paris** OracleSBC1 (certificate-record)# **organization *<Organization>* e.g. Orange** OracleSBC1 (certificate-record)# **unit *<unit>* e.g. "Orange Business Services"** OracleSBC1 (certificate-record)# **common-name "Baltimore CyberTrust Root"** OracleSBC1 (certificate-record)# **key-size 2048** OracleSBC1 (certificate-record)# **trusted enabled** OracleSBC1 (certificate-record)# **key-usage-list (digitalSignature keyEncipherment)**

	OracleSBC1 (certificate-record)# **extended-key-usage-list serverAuth** OracleSBC1 (certificate-record)# **key-algor rsa** OracleSBC1 (certificate-record)# **digest-algor sha256** OracleSBC1 (certificate-record)# **ecdsa-key-size p256** OracleSBC1 (certificate-record)# **done**

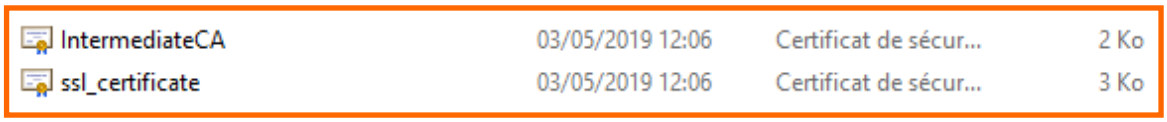
Step 2 – Generating a certificate signing request

Generate a certificate signing request only for SBCCertificate to create a certificate request and upload it to Digicert for signage:

Element	Configuration
Certificate signing request	OracleSBC1# **generate-certification-request SBCCertificate** Should return something like this : -----BEGIN CERTIFICATE REQUEST----- MIIC7zCCAdcCAQAwgYsxCzAJBgNVBAYTAkZSMQ4wDAYDVQQIEwVQYXJpczEOMAwG A1UEBxMFUGFyaXMxDzANBgNVBAoTBk9yYW5nZTEhMB8GA1UECxMYT3Jhbmdl IEJ1 c2luZXNzIFNlcnZpY2VzMSgwJgYDVQQDEx9ocTYwNmd3Lm1zdmlzaXQ2Lm9uZS5l cXVhbnQubmV0MIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEAv/NxxJUw 2JeNE3NBvYFkYC0kniJkaB3r4Y+QCPolgkL5qK9bsVTwop7mHmpon4NlgZQwfKqA UigABDIVwiSOavpLpo98FM5fCFg0J1GZXe/E9UReK9g4NV8D1yyDgZoeDWBtuq6h S/n1ob96NjuHO+wSaxWviOeQk0icB+7+o9YZ1tCSPRIFTC8jh3UGgym7WAy7UKyJ 7b6FQ7DYJifsd6hAfASx9xfnDRW9RaWr1QnlkjXeFXwJRSLALaWVn6vaFznAkXGL 5thaEi3MirbinRJQXdtmBqd5hF4wZxIQpZS4qVtVS0O+EjQ7+mxvXyBQo08mzmSy vSmWu3Yw3jZREwIDAQABoB4wHAYJKoZIhvcNAQkOMQ8wDTALBgNVHQ8EBAMCBaAw DQYJKoZIhvcNAQELBQADggEBALZliCeQjm0ovxprVjFf2NPnVEbYUcs2t8vJnCZr 1a6NxdBT5sF/lOOfss67X/X8TAIgOWX1It81xC7ydoItohpUtiII4R1zL6nJC5oP brCHHnqFRJbQxdnCFpWYDV3Rff8HsmicizHNv3cYbGyTWwbySuOpiA+RCTPSTlRg vr1hdSVuCrzRCrt51nEE5X+Vmb0RK2nJ+4CGgNGy6MLyRQOaIFxnRF/wCWdr+zjQ rDjrRknTc0tB/QaQklVgpcvZG3XJ90Q3toqXpo6F2Fq8q99/75aUg1680G8J3CMu mZ5K+yldScQuS6Dq1EJt0RZ8IUrNYcn8sB/uhGWxm4Qy79c= -----END CERTIFICATE REQUEST-----

Step 3 – Deploy SBC & root/intermediate certificates

SBCInter →
SBCCertificate →



Element	Configuration
Import-certificate	OracleSBC1# **import-certificate try-all SBCCertificate** At this point – paste the signed SBC certificate and then issue command "**;**"

6.2.3.2 TLS Profile

Create a TLS context for Teams with following parameters:

TLS configuration needs as parameters the name* of certificate records.

Element	Configuration
TLSv1.2	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **security** OracleSBC1 (security)# **tls-profile** OracleSBC1 (tls-profile)# **name TeamsTLS** OracleSBC1 (tls-profile)# **end-entity-certificate *<SBCCertificate>** OracleSBC1 (tls-profile)# **trusted-ca-certificates (*<BaltimoreRoot>* *<SBCInter>*)** OracleSBC1 (tls-profile)# **cipher-list ALL** OracleSBC1 (tls-profile)# **verify-depth 10** OracleSBC1 (tls-profile)# **mutual-authenticate enabled** OracleSBC1 (tls-profile)# **tls-version tlsv12** OracleSBC1 (tls-profile)# **cert-status-check disabled** OracleSBC1 (tls-profile)# **ignore-dead-responder disabled** OracleSBC1 (tls-profile)# **allow-self-signed-cert disabled** OracleSBC1 (tls-profile)# **done**

6.2.3.3 Enable media manager

Element	Configuration
Media-manager	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **media-manager** OracleSBC1 (media-manager)# **media-manager** OracleSBC1 (media-manager-config)# **state enabled** OracleSBC1 (media-manager-config)# **options +audio-allow-asymetric-pt** OracleSBC1 (media-manager-config)# **options +xcode-gratuitous-rtcp-report-generation** OracleSBC1 (media-manager-config)# **done**

6.2.3.4 Steering pool

Element	Configuration
Steering pool	OracleSBC1# **configure terminal**

Teams	OracleSBC1 (configure)# **media-manager** OracleSBC1 (media-manager)# **steering pool** OracleSBC1 (steering-pool)# **ip-address *<SBC Public IP>*** OracleSBC1 (steering-pool)# **start-port 49152** OracleSBC1 (steering-pool)# **end-port 65535** OracleSBC1 (steering-pool)# **realm-id ToTeams** OracleSBC1 (steering-pool)# **done**
Steering pool **BTIP**	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **media-manager** OracleSBC1 (media-manager)# **steering pool** OracleSBC1 (steering-pool)# **ip-address *<SBC Private IP>*** OracleSBC1 (steering-pool)# **start-port 6000** OracleSBC1 (steering-pool)# **end-port 65535** OracleSBC1 (steering-pool)# **realm-id ToBTIP** OracleSBC1 (steering-pool)# **done**

6.2.3.5 Session agent

Microsoft Teams use different SIP Proxy who can send/receive traffic from the SBC.

Element	Configuration
Session agent sip.pstnhub.microsoft.com	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **session-agent** OracleSBC1 (session-agent)# **hostname sip.pstnhub.microsoft .com** OracleSBC1 (session-agent)# **port 5061** OracleSBC1 (session-agent)# **transport-method StaticTLS** OracleSBC1 (session-agent)# **realm-id ToTeams** OracleSBC1 (session-agent)# **ping-method OPTIONS** OracleSBC1 (session-agent)# **ping-interval 30** OracleSBC1 (session-agent)# **refer-call-transfer enabled** OracleSBC1 (session-agent)# **done**
Session agent sip2.pstnhub.microsoft.com	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **session-agent** OracleSBC1 (session-agent)# **hostname sip2.pstnhub.microsoft .com** OracleSBC1 (session-agent)# **port 5061** OracleSBC1 (session-agent)# **transport-method StaticTLS** OracleSBC1 (session-agent)# **realm-id ToTeams** OracleSBC1 (session-agent)# **ping-method OPTIONS** OracleSBC1 (session-agent)# **ping-interval 30** OracleSBC1 (session-agent)# **refer-call-transfer enabled** OracleSBC1 (session-agent)# **done**
Session agent sip3.pstnhub.microsoft.com	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **session-agent** OracleSBC1 (session-agent)# **hostname sip3.pstnhub.microsoft .com** OracleSBC1 (session-agent)# **port 5061**

	OracleSBC1 (session-agent)# **transport-method StaticTLS** OracleSBC1 (session-agent)# **realm-id ToTeams** OracleSBC1 (session-agent)# **ping-method OPTIONS** OracleSBC1 (session-agent)# **ping-interval 30** OracleSBC1 (session-agent)# **refer-call-transfer enabled** OracleSBC1 (session-agent)# **done**
Session agent Sip-all.pstnhub.microsoft.com	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **session-agent** OracleSBC1 (session-agent)# **hostname sip-all.pstnhub.microsoft .com** OracleSBC1 (session-agent)# **port 5061** OracleSBC1 (session-agent)# **transport-method StaticTLS** OracleSBC1 (session-agent)# **realm-id ToTeams** OracleSBC1 (session-agent)# **refer-call-transfer enabled** OracleSBC1 (session-agent)# **done**

6.2.3.6 Session group

Defined session group with all session agents configured earlier to prevent connectivity issue when the active session agent became unreachable:

Element	Configuration
Session group	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **session-group** OracleSBC1 (session-group)# **group-name TeamsGrp** OracleSBC1 (session-group)# **dest (sip.pstnhub.microsoft.com sip2.pstnhub.microsoft.com sip3.pstnhub.microsoft.com)** OracleSBC1 (session-group)# **sag-recursion enabled** OracleSBC1 (session-group)# **stop-sag-recurse 300-407,409-599** OracleSBC1 (session-group)# **done**

6.2.3.7 Local policy

Create local policy to manage the traffic between different realm (BTIP to Teams / Teams to BTIP):

Element	Configuration
Local policy **From Teams to BTIP**	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **local-policy** OracleSBC1 (local-policy)# **from-address *** OracleSBC1 (local-policy)# **to-address *** OracleSBC1 (local-policy)# **source-realm ToTeams** OracleSBC1 (local-policy)# **policy-attribute** OracleSBC1 (local-policy-attribute)# **next-hop sag:BTIPGrp** OracleSBC1 (local-policy-attribute)# **realm ToBTIP** OracleSBC1 (local-policy-attribute)# **done**

	OracleSBC1 (local-policy)# **done**
Local policy **From BTIP to Teams**	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **local-policy** OracleSBC1 (local-policy)# **from-address *** OracleSBC1 (local-policy)# **to-address *** OracleSBC1 (local-policy)# **source-realm ToBTIP** OracleSBC1 (local-policy)# **policy-attribute** OracleSBC1 (policy-attribute)# **next-hop sag:TeamsGrp** OracleSBC1 (policy-attribute)# **realm ToTeams** OracleSBC1 (local-policy-attribute)# **done** OracleSBC1 (local-policy)# **done**
Local policy **From ANY to Teams** **(REFER Method)**	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **local-policy** OracleSBC1 (local-policy)# **from-address *** OracleSBC1 (local-policy)# **to-address *** OracleSBC1 (local-policy)# **source-realm *** OracleSBC1 (local-policy)# **policy-attribute** OracleSBC1 (policy-attribute)# **methods REFER** OracleSBC1 (policy-attribute)# **next-hop sag:TeamsGrp** OracleSBC1 (policy-attribute)# **realm ToTeams** OracleSBC1 (local-policy-attribute)# **done** OracleSBC1 (local-policy)# **done**

6.2.3.8 Codec policy

Element	Configuration
Codec policy	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **media-manager** OracleSBC1 (media-manager)# **codec-policy** OracleSBC1 (codec-policy)# **name CodecToTeams** OracleSBC1 (codec-policy)# **allow-codecs (PCMA telephone-event)** OracleSBC1 (codec-policy)# **done**

6.2.3.9 Sip manipulation

SIP Manipulation FixCLineNAT:

The following manipulation is configured to change SDP “c” line to change private IP address to public IP address when the SBC is placed behind NAT device.

Element	Configuration
SIP Manipulation **FixCLineNAT**	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **sip-manipulation** OracleSBC1 (sip-manipulation)# **name FixCLineNAT**
SIP Mime SDP rule	OracleSBC1 (sip-manipulation)# **mine-sdp-rules**

MSR_FixCLine	OracleSBC1 (sip-mime-sdp-rules)# **name MSR_FixCLine** OracleSBC1 (sip-mime-sdp-rules)# **msg-type any** OracleSBC1 (sip-mime-sdp-rules)# **comparison-type manipulate** OracleSBC1 (sip-mime-sdp-rules)# **sdp-session-rule** OracleSBC1 (sip-sdp-session-rules)# **name SR_FixCLine** OracleSBC1 (sip-sdp-session-rules)# **comparison-type manipulate** OracleSBC1 (sip-sdp-session-rules)# **sdp-line-rules** OracleSBC1 (sip-sdp-line-rules)# **name LR_FixCLine** OracleSBC1 (sip-sdp-line-rules)# **type c** OracleSBC1 (sip-sdp-line-rules)# **action replace** OracleSBC1 (sip-sdp-line-rules)# **new-value "IN IP4 <*Public @IP*>"** OracleSBC1 (sip-sdp-line-rules)# **done** OracleSBC1 (sip-sdp-line-rules)# **exit** OracleSBC1 (sip-sdp-session-rules)# **done** OracleSBC1 (sip-sdp-session-rules)# **exit** OracleSBC1 (sip-mime-sdp-rules)# **exit** OracleSBC1 (sip-mime-sdp-rules)# **done**
SIP Header rule **HR_FixCLine**	OracleSBC1 (sip-manipulation)# **header-rules** OracleSBC1 (sip-header-rules)# **name HR_FixCLine** OracleSBC1 (sip-header-rules)# **header-name Content-Type** OracleSBC1 (sip-header-rules)# **action manipulation** OracleSBC1 (sip-header-rules)# **element-rule** OracleSBC1 (sip-element-rules)# **name ER_FixCLine** OracleSBC1 (sip-element-rules)# **parameter application/sdp** OracleSBC1 (sip-element-rules)# **type mime** OracleSBC1 (sip-element-rules)# **action find-replace-all** OracleSBC1 (sip-element-rules)# **match-value "c=IN IP4 <*Private @IP*>"** OracleSBC1 (sip-element-rules)# **new-value "c=IN IP4 <*Public @IP*>"** OracleSBC1 (sip-element-rules)# **done** OracleSBC1 (sip-element-rules)# **exit** OracleSBC1 (sip-header-rules)# **done** OracleSBC1 (sip-header-rules)# **exit** OracleSBC1 (sip-manipulation)# **done**

SIP Manipulation: PSTNHub

Element	Configuration
Sip Manipulation **PSTNHub**	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **sip-manipulation** OracleSBC1 (sip-manipulation)# **name PSTNHub**
SIP Header rule **HR_AlterFrom**	OracleSBC1 (sip-manipulation)# **header-rules** OracleSBC1 (sip-header-rules)# **name HR_AlterFrom** OracleSBC1 (sip-header-rules)# **header-name From** OracleSBC1 (sip-header-rules)# **action manipulate** OracleSBC1 (sip-header-rules)# **element-rules** OracleSBC1 (sip-element-rules)# **name ER_AlterFrom** OracleSBC1 (sip-element-rules)# **type uri-host** OracleSBC1 (sip-element-rules)# **action find-replace-all** OracleSBC1 (sip-element-rules)# **new-value <*SBC FQDN*>** OracleSBC1 (sip-element-rules)# **done**

	OracleSBC1 (sip-element-rules)# **exit** OracleSBC1 (sip-header-rules)# **done**
SIP Header rule **HR_AlterContact**	OracleSBC1 (sip-manipulation)# **header-rules** OracleSBC1 (sip-header-rules)# **name HR_AlterContact** OracleSBC1 (sip-header-rules)# **header-name Contact** OracleSBC1 (sip-header-rules)# **action manipulate** OracleSBC1 (sip-header-rules)# **element-rules** OracleSBC1 (sip-element-rules)# **name ER_AlterContact** OracleSBC1 (sip-element-rules)# **type uri-host** OracleSBC1 (sip-element-rules)# **action find-replace-all** OracleSBC1 (sip-element-rules)# **match-value *<SBC Private @IP>*** OracleSBC1 (sip-element-rules)# **new-value *<SBC FQDN>*** OracleSBC1 (sip-element-rules)# **done** OracleSBC1 (sip-element-rules)# **exit** OracleSBC1 (sip-header-rules)# **done**
SIP Header rule **HR_AddContactOptions**	OracleSBC1 (sip-manipulation)# **header-rules** OracleSBC1 (sip-header-rules)# **name HR_AddContactOptions** OracleSBC1 (sip-header-rules)# **header-name Contact** OracleSBC1 (sip-header-rules)# **action add** OracleSBC1 (sip-header-rules)# **msg-type request** OracleSBC1 (sip-header-rules)# **methods OPTIONS** OracleSBC1 (sip-header-rules)# **new-value "sip:ping@*<SBC FQDN>*:5061;transport=tls"** OracleSBC1 (sip-element-rules)# **done** OracleSBC1 (sip-header-rules)# **exit**
SIP Header rule **HR_AddRROptions**	OracleSBC1 (sip-manipulation)# **header-rules** OracleSBC1 (sip-header-rules)# **name HR_AddRROptions** OracleSBC1 (sip-header-rules)# **header-name Record-Route** OracleSBC1 (sip-header-rules)# **action add** OracleSBC1 (sip-header-rules)# **msg-type request** OracleSBC1 (sip-header-rules)# **methods OPTIONS** OracleSBC1 (sip-header-rules)# **new-value "sip:*<SBC FQDN>*"** OracleSBC1 (sip-header-rules)# **done** OracleSBC1 (sip-header-rules)# **exit**
SIP Header rule **HR_CheckUserAgent**	OracleSBC1 (sip-manipulation)# **header-rules** OracleSBC1 (sip-header-rules)# **name HR_CheckUserAgent** OracleSBC1 (sip-header-rules)# **header-name User-Agent** OracleSBC1 (sip-header-rules)# **action manipulate** OracleSBC1 (sip-header-rules)# **msg-type request** OracleSBC1 (sip-header-rules)# **methods INVITE** OracleSBC1 (sip-header-rules)# **new-value "ORACLE SBC/v.8.1.0. \\ Teams"** OracleSBC1 (sip-header-rules)# **done** OracleSBC1 (sip-header-rules)# **exit**

SIP Manipulation RemovePrivacy:

Element	Configuration
SIP Manipulation	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router**

RemovePrivacy	OracleSBC1 (session-router)# **sip-manipulation** OracleSBC1 (sip-manipulation)# **name RemovePrivacy**
SIP Header rule **HR_RemovePrivacy**	OracleSBC1 (sip-manipulation)# **header-rules** OracleSBC1 (sip-header-rule)# **name HR_ RemovePrivacy** OracleSBC1 (sip-header-rule)# **header-name Privacy** OracleSBC1 (sip-header-rule)# **action delete** OracleSBC1 (sip-header-rule)# **comparison-type boolean** OracleSBC1 (sip-header-rule)# **msg-type out-of-dialog** OracleSBC1 (sip-header-rule)# **methods INVITE** OracleSBC1 (sip-header-rule)# **match-value $FROM_USER.$0!=anonymous** OracleSBC1 (sip-header-rule)# **done** OracleSBC1 (sip-header-rule)# **exit** OracleSBC1 (sip-manipulation)# **done**

SIP Manipulation RespondOPTIONS:

Element	Configuration
SIP Manipulation **RespondOPTIONS**	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **sip-manipulation** OracleSBC1 (sip-manipulation)# **name RespondOPTIONS**
SIP Header rule **HR_Respond2OPTIONS**	OracleSBC1 (sip-manipulation)# **header-rules** OracleSBC1 (sip-header-rule)# **name HR_RespondOPTIONS** OracleSBC1 (sip-header-rule)# **header-name From** OracleSBC1 (sip-header-rule)# **action reject** OracleSBC1 (sip-header-rule)# **methods OPTIONS** OracleSBC1 (sip-header-rule)# **new-value "200 OK"** OracleSBC1 (sip-header-rule)# **done**

SIP Manipulation ChangeSDPForHold:

Element	Configuration
SIP Manipulation **ChangeSDPForHold**	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **sip-manipulation** OracleSBC1 (sip-manipulation)# **name ChangeSDPForHold**
SIP Header rule **HR_ ChangeSDPForHold**	OracleSBC1 (sip-manipulation)# **header-rules** OracleSBC1 (sip-header-rule)# **name HR_ChangeSDPForHold** OracleSBC1 (sip-header-rule)# **header-name Content-Type** OracleSBC1 (sip-header-rule)# **action manipulate** OracleSBC1 (sip-header-rule)# **msg-type reply** OracleSBC1 (sip-header-rule)# **methods INVITE** OracleSBC1 (sip-header-rule)# **element-rules** OracleSBC1 (sip-element-rules)# **name ER_InactToRecvonly** OracleSBC1 (sip-element-rules)# **parameter-name application/sdp** OracleSBC1 (sip-element-rules)# **type mime**

	OracleSBC1 (sip-element-rules)# **action find-and-replace** OracleSBC1 (sip-element-rules)# **comparison-type pattern-rule** OracleSBC1 (sip-element-rules)# **match-value a=inactive** OracleSBC1 (sip-element-rules)# **new-value a=recvonly** OracleSBC1 (sip-header-rule)# **done**

SIP Manipulation ChangeUserAgent:

Element	Configuration
SIP Manipulation **ChangeUserAgent**	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **sip-manipulation** OracleSBC1 (sip-manipulation)# **name ChangeUserAgent**
Header rule **HR_ChangeUserAgent**	OracleSBC1 (sip-manipulation)# **header-rules** OracleSBC1 (sip-header-rules)# **name HR_ChangeUserAgent** OracleSBC1 (sip-header-rules)# **header-name User-Agent** OracleSBC1 (sip-header-rules)# **action manipulate** OracleSBC1 (sip-header-rules)# **msg-type request** OracleSBC1 (sip-header-rules)# **methods INVITE** OracleSBC1 (sip-header-rules)# **new-value "ORACLE SBC/v.8.1.0. \\ Teams"** OracleSBC1 (sip-header-rules)# **done** OracleSBC1 (sip-header-rules)# **exit** OracleSBC1 (sip-manipulation)# **done**

SIP Manipulation ChangeServer:

Element	Configuration
SIP manipulation **ChangeServer**	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **sip-manipulation** OracleSBC1 (sip-manipulation)# **name ChangeServer**
Header rule **ChangeServer**	OracleSBC1 (sip-manipulation)# **header-rules** OracleSBC1 (sip-header-rules)# **name HR_ChangeServer** OracleSBC1 (sip-header-rules)# **header-name Server** OracleSBC1 (sip-header-rules)# **action manipulate** OracleSBC1 (sip-header-rules)# **msg-type reply** OracleSBC1 (sip-header-rules)# **new-value "ORACLE SBC/v.8.1.0 \\ Teams"** OracleSBC1 (sip-header-rules)# **done** OracleSBC1 (sip-header-rules)# **exit** OracleSBC1 (sip-manipulation)# **done**

SIP Manipulation ChangePrivacy:

The following manipulation is configured to change Privacy header when PSTN send header parameters spaced by "**;**" e.g. "PRIVACY: id;user;header". Microsoft Teams doesn't support ";" inside Privacy header. ChangePrivacy change ";" to "," e.g. "PRIVACY: id,user,header".

Element	Configuration
SIP Manipulation **ChangePrivacy**	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **sip-manipulation** OracleSBC1 (sip-manipulation)# **name ChangePrivacy**
SIP Header-rule **HR_ChangePrivacy**	OracleSBC1 (sip-manipulation)# **header-rules** OracleSBC1 (sip-header-rule)# **name HR_ChangePrivacy** OracleSBC1 (sip-header-rule)# **action manipulate** OracleSBC1 (sip-header-rule)# **methods INVITE** OracleSBC1 (sip-header-rule)# **header-name Privacy** OracleSBC1 (sip-header-rule)# **element-rule** OracleSBC1 (sip-element-rules)# **name ER_ChangePrivacy** OracleSBC1 (sip-element-rules)# **type header-value** OracleSBC1 (sip-element-rules)# **action find-replace-all** OracleSBC1 (sip-element-rules)# **match-value ;** OracleSBC1 (sip-element-rules)# **new-value ,** OracleSBC1 (sip-element-rules)# **done** OracleSBC1 (sip-element-rules)# **exit** OracleSBC1 (sip-header-rule)# **done** OracleSBC1 (sip-header-rule)# **exit** OracleSBC1 (sip-manipulation)# **done**

SIP Manipulation out-teams:

Element	Configuration
SIP manipulation **out-teams**	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **sip-manipulation** OracleSBC1 (sip-manipulation)# **name out-teams**
SIP Header rule **HR_CallFixCLineNAT**	OracleSBC1 (sip-manipulation)# **header-rules** OracleSBC1 (sip-header-rules)# **name CallFixCLineNAT** OracleSBC1 (sip-header-rules)# **header-name From** OracleSBC1 (sip-header-rules)# **action sip-manip** OracleSBC1 (sip-header-rules)# **new-value FixCLineNAT** OracleSBC1 (sip-header-rules)# **done** OracleSBC1 (sip-header-rules)# **exit**
SIP Header rule **HR_CallPSTNHub**	OracleSBC1 (sip-manipulation)# **header-rules** OracleSBC1 (sip-header-rules)# **name CallPSTNHub** OracleSBC1 (sip-header-rules)# **header-name From** OracleSBC1 (sip-header-rules)# **action sip-manip** OracleSBC1 (sip-header-rules)# **new-value PSTNHub** OracleSBC1 (sip-header-rules)# **done** OracleSBC1 (sip-header-rules)# **exit**

SIP Manipulation in-teams:

Element	Configuration
SIP manipulation	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router**

in-teams	OracleSBC1 (session-router)# **sip-manipulation** OracleSBC1 (sip-manipulation)# **name in-teams**
SIP Header rule **CallRespondOPTIONS**	OracleSBC1 (sip-manipulation)# **header-rules** OracleSBC1 (sip-header-rules)# **name CallRespondOPTIONS** OracleSBC1 (sip-header-rules)# **header-name From** OracleSBC1 (sip-header-rules)# **action sip-manip** OracleSBC1 (sip-header-rules)# **new-value RespondOPTIONS** OracleSBC1 (sip-header-rules)# **done**
SIP Header rule **CallChangePrivacy**	OracleSBC1 (sip-header-rules)# **name CallChangePrivacy** OracleSBC1 (sip-header-rules)# **header-name Privacy** OracleSBC1 (sip-header-rules)# **action sip-manip** OracleSBC1 (sip-header-rules)# **new-value ChangePrivacy** OracleSBC1 (sip-header-rules)# **done** OracleSBC1 (sip-header-rules)# **exit** OracleSBC1 (sip-manipulation)# **done**
SIP Header rule **CallChangeSDPForHold**	OracleSBC1 (sip-header-rules)# **name CallChangeSDPForHold** OracleSBC1 (sip-header-rules)# **header-name From** OracleSBC1 (sip-header-rules)# **action sip-manip** OracleSBC1 (sip-header-rules)# **new-value ChangeSDPForHold** OracleSBC1 (sip-header-rules)# **done** OracleSBC1 (sip-header-rules)# **exit** OracleSBC1 (sip-manipulation)# **done**

SIP Manipulation out-btip:

Element	Configuration
SIP manipulation **out-btip**	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **sip-manipulation** OracleSBC1 (sip-manipulation)# **name out-btip**
SIP Header rule **CallChangeUserAgent**	OracleSBC1 (sip-manipulation)# **header-rules** OracleSBC1 (sip-header-rules)# **name CallChangeUserAgent** OracleSBC1 (sip-header-rules)# **header-name User-Agent** OracleSBC1 (sip-header-rules)# **action sip-manip** OracleSBC1 (sip-header-rules)# **new-value ChangeUserAgent** OracleSBC1 (sip-header-rules)# **done**
SIP Header rule **CallChangeServer**	OracleSBC1 (sip-manipulation)# **header-rules** OracleSBC1 (sip-header-rules)# **name CallChangeServer** OracleSBC1 (sip-header-rules)# **header-name From** OracleSBC1 (sip-header-rules)# **action sip-manip** OracleSBC1 (sip-header-rules)# **new-value ChangeServer** OracleSBC1 (sip-header-rules)# **done**

SIP Manipulation in-btip:

Element	Configuration
SIP manipulation	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router**

in-btip	OracleSBC1 (session-router)# **sip-manipulation** OracleSBC1 (sip-manipulation)# **name in-btip**
SIP Header rule **CallChangePrivacy**	OracleSBC1 (sip-manipulation)# **header-rules** OracleSBC1 (sip-header-rules)# **name CallChangePrivacy** OracleSBC1 (sip-header-rules)# **header-name Privacy** OracleSBC1 (sip-header-rules)# **action sip-manip** OracleSBC1 (sip-header-rules)# **new-value ChangePrivacy** OracleSBC1 (sip-header-rules)# **done**

6.2.3.10 Consultative transfer

Element	Configuration
Consultative transfer	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **sip-feature** OracleSBC1 (sip-feature)# **name replaces** OracleSBC1 (sip-feature)# **realm ToTeams** OracleSBC1 (sip-feature)# **support-mode-inbound Pass** OracleSBC1 (sip-feature)# **require-mode-inbound Pass** OracleSBC1 (sip-feature)# **proxy-require-mode-inbound Pass** OracleSBC1 (sip-feature)# **support-mode-outbound Pass** OracleSBC1 (sip-feature)# **require-mode-outbound Pass** OracleSBC1 (sip-feature)# **proxy-require-mode-outbound Pass** OracleSBC1 (sip-feature)# **done**

6.2.3.11 SIP Profle

Element	Configuration
SIP profile	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **sip-profile** OracleSBC1 (sip-profile)# **name foreplace** OracleSBC1 (sip-profile)# **redirection inherit** OracleSBC1 (sip-profile)# **ingress-conditional-cac-admit inherit** OracleSBC1 (sip-profile)# **egress-conditional-cac-admit inherit** OracleSBC1 (sip-profile)# **forked-cac-bw inherit** OracleSBC1 (sip-profile)# **cnam-lookup-dir egress** OracleSBC1 (sip-profile)# **replace-dialogs enabled** OracleSBC1 (sip-profile)# **done**

6.2.3.12 SDES profile

Element	Configuration
SDES profile	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **security** OracleSBC1 (security)# **media-security** OracleSBC1 (media-security)# **sdes-profile**

	OracleSBC1 (sdes-profile)# **name SDES** OracleSBC1 (sdes-profile)# **crypto-list AES_CM_128_HMAC_SHA1_80** OracleSBC1 (sdes-profile)# **srtp-auth enabled** OracleSBC1 (sdes-profile)# **srtp-encrypt enabled** OracleSBC1 (sdes-profile)# **srtcp-encrypt enabled** OracleSBC1 (sdes-profile)# **mki disabled** OracleSBC1 (sdes-profile)# **egress-offer-format same-as-ingress** OracleSBC1 (sdes-profile)# **srtp-rekey-on-re-invite disabled** OracleSBC1 (sdes-profile)# **done**

6.2.3.13 RTCP policy

Element	Configuration
RTCP policy	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **media-manager** OracleSBC1 (media-manager)# **rtcp-policy** OracleSBC1 (rtcp-policy)# **name rtcpGen** OracleSBC1 (rtcp-policy)# **rtcp-generate all-calls** OracleSBC1 (rtcp-policy)# **hide-cname disabled** OracleSBC1 (rtcp-policy)# **done**

6.2.3.14 Net Management Control

Element	Configuration
Net-Management-Control	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **net-management-control** OracleSBC1 (net-management-control)# **name Emergency** OracleSBC1 (net-management-control)# **type priority** OracleSBC1 (net-management-control)# **treatment apply-local-policy** OracleSBC1 (net-management-control)# **protocol-next-hop SIP** OracleSBC1 (net-management-control)# **destination-identifier (+33112 +3318 +3317 +3315 +33114)** OracleSBC1 (net-management-control)# **done**

6.2.3.15 Session constraint

Element	Configuration
Session-constraint	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **session-constraints** OracleSBC1 (session-constraints)# **name SessionConstraintEmergency**

	OracleSBC1 (session-constraints)# **max-sessions <X> e.g. 50** OracleSBC1 (session-constraints)# **done**

6.2.3.16 Media sec policy

Element	Configuration
Media sec policy	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **security** OracleSBC1 (security)# **media-security** OracleSBC1 (media-security)# **media-sec-policy** OracleSBC1 (media-sec-policy)# **name RTP** OracleSBC1 (media-sec-policy)# **pass-through disabled** OracleSBC1 (media-sec-policy)# **inbound** OracleSBC1 (inbound)# **mode rtp** OracleSBC1 (inbound)# **protocol none** OracleSBC1 (inbound)# **exit** OracleSBC1 (media-sec-policy)# **outbound** OracleSBC1 (outbound)# **mode rtp** OracleSBC1 (outbound)# **protocol none** OracleSBC1 (outbound)# **exit** OracleSBC1 (media-sec-policy)# **name SRTP** OracleSBC1 (media-sec-policy)# **pass-through disabled** OracleSBC1 (media-sec-policy)# **inbound** OracleSBC1 (inbound)# **profile SDES** OracleSBC1 (inbound)# **mode srtp** OracleSBC1 (inbound)# **protocol sdes** OracleSBC1 (inbound)# **exit** OracleSBC1 (media-sec-policy)# **outbound** OracleSBC1 (outbound)# **profile SDES** OracleSBC1 (outbound)# **mode srtp** OracleSBC1 (outbound)# **protocol sdes** OracleSBC1 (outbound)# **done**

6.2.3.17 Realm

Element	Configuration
Realm ToTeams	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **media-manager** OracleSBC1 (media-manager)# **realm-config** OracleSBC1 (realm-config)# **identifier ToTeams** OracleSBC1 (realm-config)# **network-interfaces s0p0:0** OracleSBC1 (realm-config)# **mm-in-realm enabled** OracleSBC1 (realm-config)# **qos-enable enabled** OracleSBC1 (realm-config)# **net-management-control enabled** OracleSBC1 (realm-config)# **refer-call-transfer enabled** OracleSBC1 (realm-config)# **media-sec-policy SRTP** OracleSBC1 (realm-config)# **rtcp-policy rtcpGen** OracleSBC1 (realm-config)# **codec-policy CodecToTeams** OracleSBC1 (realm-config)# **done**

6.2.3.18 SIP interface

Element	Configuration
SIP interface **ToTeams**	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **sip-interface** OracleSBC1 (sip-interface)# **state enabled** OracleSBC1 (sip-interface)# **realm-id ToTeams** OracleSBC1 (sip-interface)# **in-manipulationid in-teams** OracleSBC1 (sip-interface)# **out-manipulationid out-teams** OracleSBC1 (sip-interface)# **sip-profile foreplace** OracleSBC1 (sip-interface)# **add-sdp-invite reinvite** OracleSBC1 (sip-interface)# **sip-port** OracleSBC1 (sip-port)# **address *<SBC Public IP>*** OracleSBC1 (sip-port)# **port 5061** OracleSBC1 (sip-port)# **transport-protocol TLS** OracleSBC1 (sip-port)# **tls-profile TeamsTLS** OracleSBC1 (sip-port)# **allow-anonymous agents-only** OracleSBC1 (sip-port)# **done**

6.2.4 BTIP configuration

6.2.4.1 Enable SIP config

Element	Configuration
SIP config	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1# (session-router)# **sip-config** OracleSBC1 (sip-config)# **home-realm-id ToBTIP** OracleSBC1 (sip-config)# **registrar-domain *** OracleSBC1 (sip-config)# **registrar-host *** OracleSBC1 (sip-config)# **registrar-port 5060**

	OracleSBC1 (sip-config)# **dialog-transparency disabled** OracleSBC1 (sip-config)# **options +inmanip-before-validate** OracleSBC1 (sip-config)# **options +max-udp-length=0** OracleSBC1 (sip-config)# **options +reinvite-trying=yes**

6.2.4.2 Media profile

Element	Configuration
Media profile	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **media-profile** OracleSBC1 (media-profile)# **name PCMA** OracleSBC1 (media-profile)# **payload-type 8** OracleSBC1 (media-profile)# **clock-rate 8000** OracleSBC1 (media-profile)# **parameters silenceSupp:off** OracleSBC1 (media-profile)# **done**

6.2.4.3 Codec policy

Element	Configuration
Codec policy	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **media-manager** OracleSBC1 (media-manager)# **codec-policy** OracleSBC1 (codec-policy)# **name CodecBTIP** OracleSBC1 (codec-policy)# **allow-codecs (PCMA telephone-event)** OracleSBC1 (codec-policy)# **order-codecs PCMA** OracleSBC1 (codec-policy)# **done**

6.2.4.4 Session agent

Element	Configuration
Session router **active**	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **session-agent** OracleSBC1 (session-agent)# **hostname <*@IP aSBC 1*>** OracleSBC1 (session-agent)# **port 5060** OracleSBC1 (session-agent)# **transport-method StaticTCP** OracleSBC1 (session-agent)# **realm-id ToBTIP** OracleSBC1 (session-agent)# **refer-call-transfer enabled** OracleSBC1 (session-agent)# **done**
Session router **backup**	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **session-agent** OracleSBC1 (session-agent)# **hostname <*@IP aSBC 2*>** OracleSBC1 (session-agent)# **port 5060** OracleSBC1 (session-agent)# **transport-method StaticTCP** OracleSBC1 (session-agent)# **realm-id ToBTIP**

	OracleSBC1 (session-agent)# **refer-call-transfer enabled** OracleSBC1 (session-agent)# **done**

6.2.4.5 Session group

Element	Configuration
Session group	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **session-group** OracleSBC1 (session-group)# **group-name BTIPGrp** OracleSBC1 (session-group)# **dest (<@*IP aSBC* 1> <@*IP aSBC* 2>)** OracleSBC1 (session-group)# **sag-recursion** OracleSBC1 (session-group)# **stop-sag-recurse 300-407,409-599** OracleSBC1 (session-group)# **done**

6.2.4.6 Realm

Element	Configuration
Realm **ToBTIP**	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **media-manager** OracleSBC1 (media-manager)# **realm-config** OracleSBC1 (realm-config)# **identifier ToBTIP** OracleSBC1 (realm-config)# **network-interfaces s0p1:0** OracleSBC1 (realm-config)# **mm-in-realm enabled** OracleSBC1 (realm-config)# **qos-enabled enabled** OracleSBC1 (realm-config)# **refer-call-transfer enabled** OracleSBC1 (realm-config)# **media-sec-policy RTP** OracleSBC1 (realm-config)# **rtcp-policy rtcpGen** OracleSBC1 (realm-config)# **codec-policy CodecBTIP** OracleSBC1 (realm-config)# **done**

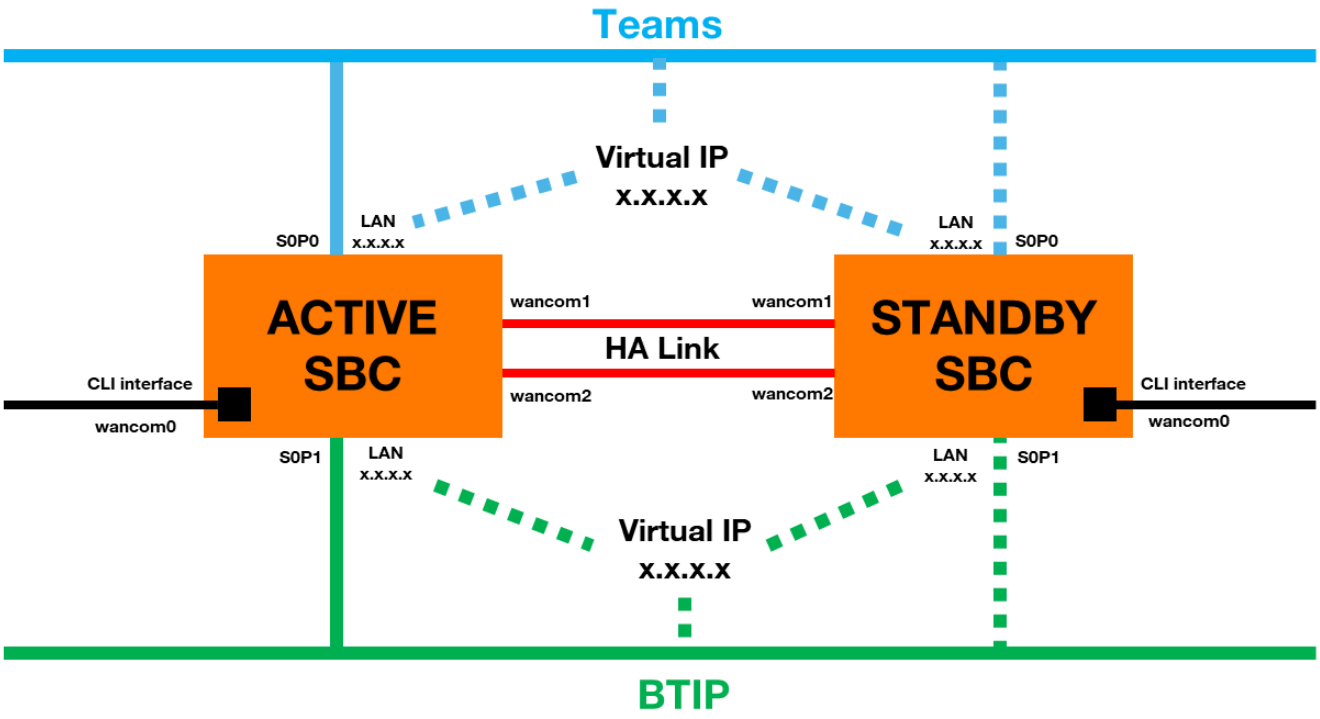
6.2.4.7 SIP interface

Element	Configuration

SIP interface	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **session-router** OracleSBC1 (session-router)# **sip-interface** OracleSBC1 (sip-interface)# **state enabled** OracleSBC1 (sip-interface)# **realm-id ToBTIP** OracleSBC1 (sip-interface)# **options +update-interworking** OracleSBC1 (sip-interface)# **initial-inv-trans-expire 6** OracleSBC1 (sip-interface)# **out-manipulationid out-btip** OracleSBC1 (sip-interface)# **in-manipulationid in-btip** OracleSBC1 (sip-interface)# **sip-port** OracleSBC1 (sip-port)# **address *<Private @IP>*** OracleSBC1 (sip-port)# **port 5060** OracleSBC1 (sip-port)# **transport-protocol TCP** OracleSBC1 (sip-port)# **allow-anonymous agents-only** OracleSBC1 (sip-port)# **done**

6.3 ORACLE SBC - HA configuration

This section describes the Oracle SBC configuration in HA mode (Two SBC in a high availability mode). The HA topology validated within VISIT Teams offer is displayed in the figure below:



Only the Active SBC is used, while the second SBC is considered as a backup device (standby).

Following steps have to be performed to ensure correct integration within VISIT Teams offer:

- First SBC configuration
  - NTP synchronization
  - Virtual MAC address
  - Primary & Secondary utility address
  - Wancom1 & Wancom2 physical configuration
  - Wancom1 & Wancom2 network configuration
  - Redundancy
- Secondary SBC configuration

6.3.1 First SBC configuration

6.3.1.1 NTP synchronization

Element	Configuration
NTP sync	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **ntp-sync** OracleSBC1 (ntp-config)# **add-server *<NTP @IP>*** OracleSBC1 (ntp-config)# **done**

6.3.1.2 Virtual MAC address

Element	Configuration
Virtual MAC address	OracleSBC1# **show interfaces**

Identify “Ethernet address is 00:08:25:XX:YY:ZN”, 00:08:25 refers to Acme Packet, XX:YY:Z refers to the specific SBC. N is a 0-f hexadecimal value available for Oracle SBC. To create a virtual MAC address replace the “N” value with unused hexadecimal values for Oracle SBC: 8,9,e or f. Example:

Ethernet address s0p0: 00:08:25:A2:45:BF
- ➔ Virtual MAC 1: 00:08:25:A2:45:B8
- ➔ Virtual MAC 2: 00:08:25:A2:45:B9

Element	Configuration
Virtual MAC address	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **system** OracleSBC1 (system)# **phy-interface** OracleSBC1 (phy-interface)# **select** <name>: 1: s0p0 2: s0p1 Selection: **1** OracleSBC1 (phy-interface)# **virtual-mac *<Virtual MAC 1>*** OracleSBC1 (phy-interface)# **done** OracleSBC1 (phy-interface)# **select** <name>: 1: s0p0 2: s0p1 Selection: **2** OracleSBC1 (phy-interface)# **virtual-mac *<Virtual MAC 2>*** OracleSBC1 (phy-interface)# **done**

6.3.1.3 Primary & Secondary utility address

Primary and Secondary utility addresses have to be in the same subnet than Public @IP (to teams) and Private @IP (to BTIP):

Element	Configuration
Primary & Secondary utility address	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **system** OracleSBC1 (system)# **network-interface** OracleSBC1 (network-interface)# **select** <name>:<sub-port-id>: 1: s0p0:0 ip=Public @IP gw= GW @IP 2: s0p1:0 ip=Private @IP gw= GW @IP Selection: **1** OracleSBC1 (network-interface)# **pri-utility-addr <@*IP*>** OracleSBC1 (network-interface)# **sec-utility-addr <@*IP*>** OracleSBC1 (network-interface)# **done** OracleSBC1 (network-interface)# **select** <name>:<sub-port-id>: 1: s0p0:0 ip=Public @IP gw= GW @IP 2: s0p1:0 ip=Private @IP gw= GW @IP Selection: **2** OracleSBC1 (network-interface)# **pri-utility-addr <@*IP*>** OracleSBC1 (network-interface)# **sec-utility-addr <@*IP*>** OracleSBC1 (network-interface)# **done**

6.3.1.4 Wancom1 & Wancom2 physical configuration

Element	Configuration
Wancom1 physical configuration	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **system** OracleSBC1 (system)# **phy-interface** OracleSBC1 (phy-interface)# **name wancom1** OracleSBC1 (phy-interface)# **operation-type Control** OracleSBC1 (phy-interface)# **port 1** OracleSBC1 (phy-interface)# **slot 0** OracleSBC1 (phy-interface)# **wancom-health-score 7**
Wancom2 physical configuration	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **system** OracleSBC1 (system)# **phy-interface** OracleSBC1 (phy-interface)# **name wancom2** OracleSBC1 (phy-interface)# **operation-type Control** OracleSBC1 (phy-interface)# **port 2** OracleSBC1 (phy-interface)# **slot 0** OracleSBC1 (phy-interface)# **wancom-health-score 8**

6.3.1.5 Wancom1 & Wancom2 network configuration

Element	Configuration
Wancom1 network configuration	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **system** OracleSBC1 (system)# **network-interface** OracleSBC1 (network-interface)# **name wancom1** OracleSBC1 (network-interface)# **pri-utility-addr 169.254.1.1** OracleSBC1 (network-interface)# **sec-utility-addr 169.254.1.2** OracleSBC1 (network-interface)# **netmask 255.255.255.252** OracleSBC1 (network-interface)# **done**
Wancom2 network configuration	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **system** OracleSBC1 (system)# **network-interface** OracleSBC1 (network-interface)# **name wancom2** OracleSBC1 (network-interface)# **pri-utility-addr 169.254.2.1** OracleSBC1 (network-interface)# **sec-utility-addr 169.254.2.2** OracleSBC1 (network-interface)# **netmask 255.255.255.252** OracleSBC1 (network-interface)# **done**

6.3.1.6 Redundancy

Element	Configuration
Redundancy	OracleSBC1# **configure terminal** OracleSBC1 (configure)# **system** OracleSBC1 (system)# **redundancy** OracleSBC1 (redundancy)# **peers** OracleSBC1 (rdncy-peer)# **name OracleSBC1** OracleSBC1 (rdncy-peer)# **type Primary** OracleSBC1 (rdncy-peer)# **destinations** OracleSBC1 (rdncy-peer-dest)# **address 169.254.1.1:9090** OracleSBC1 (rdncy-peer-dest)# **network-interface wancom1:0** OracleSBC1 (rdncy-peer-dest)# **done** OracleSBC1 (rdncy-peer-dest)# **address 169.254.2.1:9090** OracleSBC1 (rdncy-peer-dest)# **network-interface wancom2:0** OracleSBC1 (rdncy-peer-dest)# **done** OracleSBC1 (rdncy-peer-dest)# **exit** OracleSBC1 (rdncy-peer)# **done** OracleSBC1 (rdncy-peer)# **name <Target name SBC2> e.g. OracleSBC2** OracleSBC1 (rdncy-peer)# **type Secondary** OracleSBC1 (rdncy-peer)# **destinations** OracleSBC1 (rdncy-peer-dest)# **address 169.254.1.2:9090** OracleSBC1 (rdncy-peer-dest)# **network-interface wancom1:0** OracleSBC1 (rdncy-peer-dest)# **done** OracleSBC1 (rdncy-peer-dest)# **address 169.254.2.2:9090** OracleSBC1 (rdncy-peer-dest)# **network-interface wancom2:0** OracleSBC1 (rdncy-peer-dest)# **done** OracleSBC1 (rdncy-peer-dest)# **exit**

	OracleSBC1 (rdncy-peer)# **done** OracleSBC1 (rdncy-peer)# **exit** OracleSBC1 (rdncy)# **done**

Reboot primary SBC, redundancy configuration require reboot to take effect:

Element	Configuration
Reboot	OracleSBC1 # **save-config** OracleSBC1 # **activate-config** OracleSBC1 # **reboot**

6.3.2 Secondary SBC configuration

Get the wancom0 IP address for the SBC1, try to ping this address on the secondary SBC and acquire its configuration:

Element	Configuration
Acquire config	OracleSBC2# **ping *<Wancom0 SBC1 @IP>*** OracleSBC2# **acquire-config *<Wancom0 SBC1 @IP>*** OracleSBC2# **reboot force activate**

Issuing “show health” and “display-current-cfg-version” commands to display the state of redundancy. The same numbers of current configuration version indicate that both SBCs are synchronized.

Element	Configuration
SBC state	OracleSBC1# **show health** OracleSBC1# **display-current-cfg-version** OracleSBC2# **show health** OracleSBC2# **display-current-cfg-version**

```
Redundancy Protocol Process (v3):
        State                            Active
        Health                           100
        Lowest Local Address             169.254.1.1:9090
        1 peer(s) on 2 socket(s):
        OracleSBC2: v3, Standby, health=100, max silence=1050
                    last received from 169.254.1.2 on wancom1:0

        Switchover log:
```

```
Redundancy Protocol Process (v3):
        State                            Standby
        Health                           100
        Lowest Local Address             169.254.1.2:9090
        1 peer(s) on 2 socket(s):
        OracleSBC1: v3, Active, health=100, max silence=1050
                    last received from 169.254.2.1 on wancom2:0

        Switchover log:
```

```
OracleSBC1# display-current-cfg-version
Current configuration version is 57
```

```
OracleSBC2# display-current-cfg-version
Current configuration version is 57
```