



ORACLE

Deploying Oracle Session Border
Controller (SBC) in VMware TCI 2.2
Cloud Director Edition

Technical Application Note

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COMMUNICATIONS

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Revision History

Version	Description of Changes	Date Revision Completed
1.0	Deploying Oracle SBC in VMware TCI 2.2 Cloud Director Edition	30 th March 2023

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1. Intended Audience

This document is intended for use by Oracle Systems Engineers, third party Systems Integrators, Oracle customers and partners and end users of the Oracle Session Border Controller (SBC). It is assumed that the reader is familiar with basic operations of the Oracle Session Border Controller platform along with VMware TCI 2.2. Cloud Director Edition.

2. Document Overview

This Oracle technical application note outlines how to configure the following Oracle Session delivery products in the VMware TCI 2.2 cloud Director Infrastructure. The products include

- Oracle SBC or Service Provider SBC
- Enterprise SBC.
- Session Router and
- Subscriber Aware Load Balancer

In this app note document, we deploy the Oracle Session Border Controller (Oracle SBC) in either standalone or High Availability (HA) mode as an example and the other product installation will also be similar to the current installation. The solution contained within this document has been tested using Oracle Communication SBC with software version **OS910p4 (SCZ9.1.0 Patch 4)**

Please find the related documentation links below:





- [Oracle® Session Border Controller Platform Preparation and Installation Guide](#)
- [Oracle® Session Border Controller Configuration Guide](#)
- [Oracle® Session Border Controller Release Notes](#)

Please note that the IP Addresses, FQDN and configuration names and details given in this document are used for reference purposes only. These same details cannot be used in customer configurations. End users of this document can use the configuration details according to their network requirements. There are some public facing IPs (externally routable IPs) that we use for our testing are masked in this document for security reasons. The customers can configure any publicly routable IPs for these sections as per their network architecture needs.

3. Requirements

3.1. Package used for Certification

When we download the build from MOS and unzip them, we will be seeing the following package in which we will be using only the nnSCZ910p4-img-vm_vmware.ova file for our installation. The image will be same for all the products listed above.

 nnSCZ910p4.boot	1/4/2023 12:21 PM	BOOT File	17,067 KB
 nnSCZ910p4.bz	1/4/2023 12:22 PM	BZ File	161,039 KB
 nnSCZ910p4-img-vm_vmware.ova	1/4/2023 12:21 PM	OVA File	193,125 KB
 readme-BuildNotes910CZ	1/4/2023 12:22 PM	HTML Document	382 KB

3.2. Profile to be used in Vmware TCI 2.2 Director:

VNF Component(s)	Resource allocation	Reservations
SBC (Active- Standby)	<ul style="list-style-type: none"> • vCPUs: 4, vRAM: 8 GB • vDisks: Disk#1 20 GB • vNICs (VMXNET3): <ul style="list-style-type: none"> ○ vNIC#1 (MGMT) ○ vNIC#2 (HA) ○ vNIC#3 (Media01) ○ vNIC#4 (Media02) 	<ul style="list-style-type: none"> • Total CPU Reservation • Total Memory Reservation

- Oracle SBC running 9.1.0 version.

3.3. VMware Ready for Telco Cloud Infrastructure 2.2

Oracle SBC was certified with the following components from VMware Ready for Telco Cloud Infrastructure 2.2 Cloud Director Edition Platform:

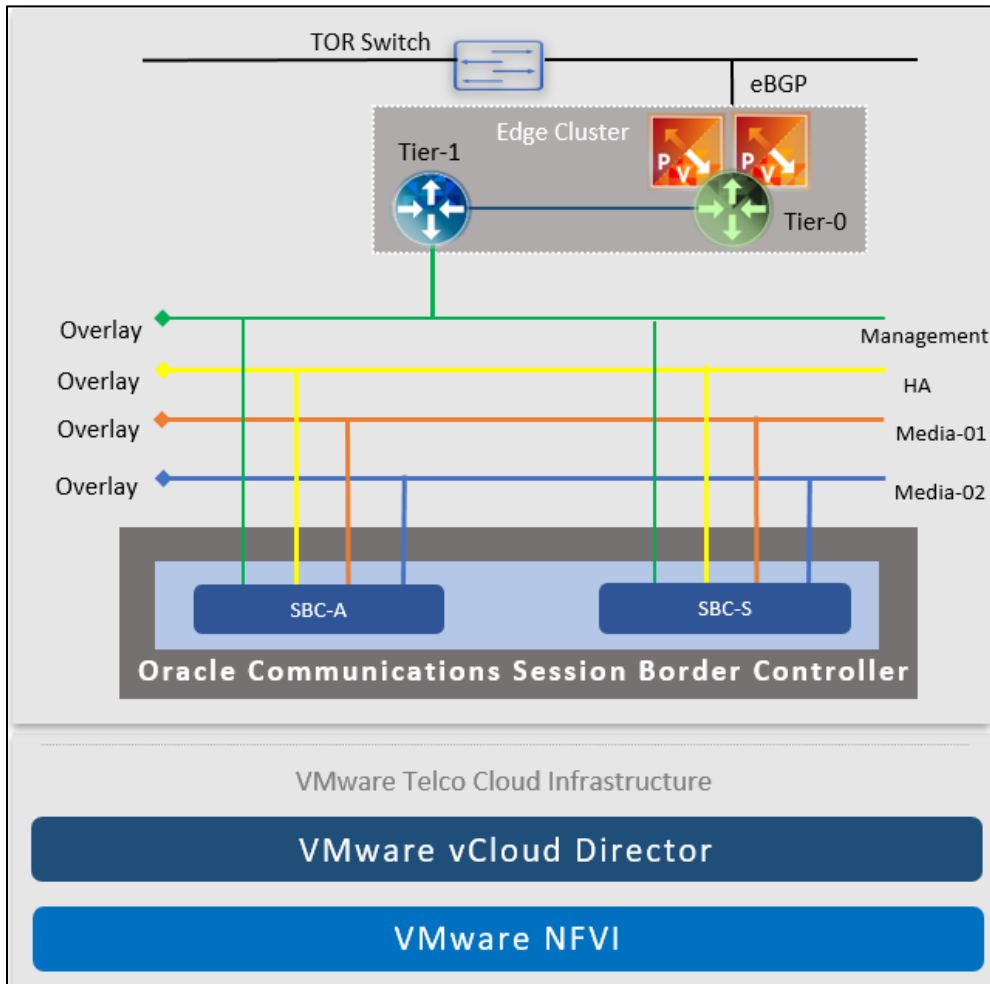
- VMware ESXi 7.0 U3c
- VMware vCenter Server Appliance 7.0 U3c
- VMware Virtual SAN 7.0 U3c
- VMware NSX-T 3.2.0.1
- VMware vCloud Director for Service Providers 10.3.2a
- VMware vRealize Log Insight 8.6.

The below revision table explains the versions of the software used for each component: This table is Revision 1 as of now:

Software Used	SBC Version
Revision 1	9.1.0

3.4. Network Architecture

Below is the network architecture for the deployment of the Oracle SBC in the VMware cloud infrastructure. The network architecture remains the same for VMware part and the changes happens only in SBC Active and Standby (given as SBC-A and SBC-S in the network diagram) component which can be replaced with appropriate network products that is planned to be deployed (ESBC-A and ESBC-S or OCSR-A and OCSR-S etc.)



4. Create and Deploy on VMware TCI 2.2 Cloud Director

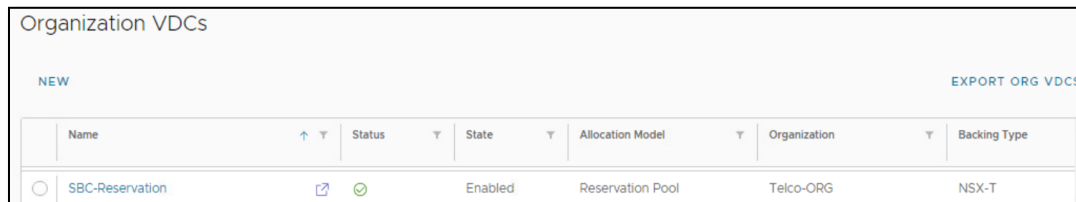
4.1. Prerequisites

- Oracle recommends the virtual datacenter used for the deployment of Oracle SBC must have the allocation model as Reservation.
- The assumption here is that vCloud Director Provider VDC, Organization and Organization VDC should be available and configured in vCloud environment.
- Organization should have the below network available.
NSX-T backed imported OrgVDC Networks (Standard Overlay, Standard VLAN, Enhanced Overlay) must be available as per VNF requirement.
- For more details on VCD specifics, refer to [VMware vCloud Director user guide](#).

4.2. SBC Deployment Steps on VMware

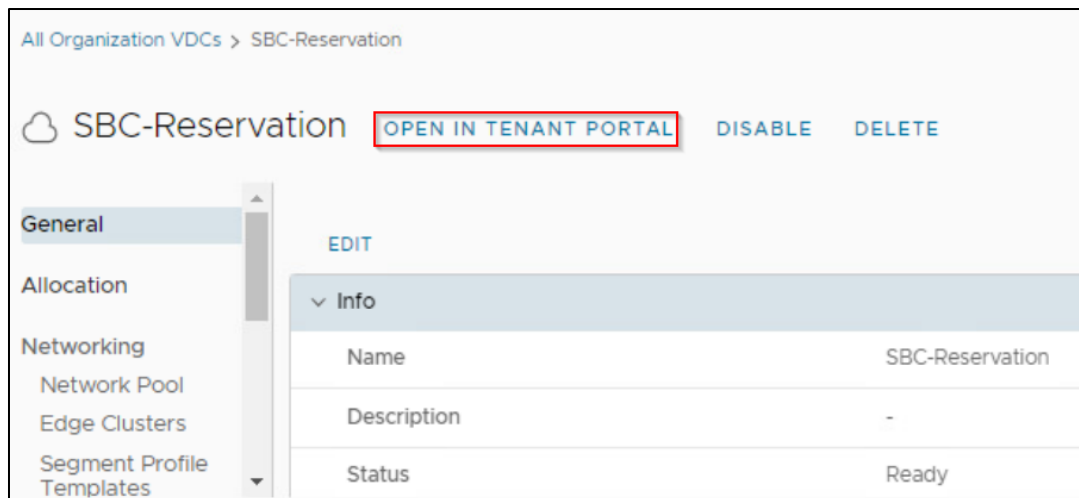
Follow the below steps to deploy Oracle SBC on Cloud Director Edition Platform:

1. Login to vCloud Director service provider admin portal (<https://VCD-IP/provider>) as an organization administrator and Click on the organization with networking backed by NSX-T.



Name	Status	State	Allocation Model	Organization	Backing Type
SBC-Reservation	Enabled	Reservation Pool	Telco-ORG	NSX-T	

2. Click OPEN IN TENANT PORTAL



All Organization VDCs > SBC-Reservation

SBC-Reservation **OPEN IN TENANT PORTAL** DISABLE DELETE

EDIT

General

Allocation

Networking

Network Pool

Edge Clusters

Segment Profile

Templates

Info

Name	SBC-Reservation
Description	-
Status	Ready

3. Go to Libraries -> Select Catalogs under content Libraries -> Click New and create Catalog for Oracle SBC templates.



4. Click on SBC under the catalogs and in vApp Templates upload OVA images of VNF.



5. Browse/Upload the image -> Click NEXT.

Create vApp template from OVF



- 1 Select Source
- 2 Review Details
- 3 Select vApp Template Name
- 4 Ready to Complete

Select Source

Enter a URL from which to upload directly an OVF file.

URL

Browse to a location accessible from your computer, such as a local hard drive, a network share or a CD/DVD drive and select an OVF/OVA and all related files.

Browse  

File(s):

- nnSCZ910p4-img-vm_vmware.ova

[CANCEL](#) [NEXT](#)

6. Provide vApp Template Name -> Select Catalog -> Click NEXT -> Click FINISH

Create vApp template from OVF

- 1 Select Source
- 2 Review Details
- 3 Select vApp Template Name
- 4 Ready to Complete

Review Details

Verify the OVF template details.

Product	NNOSVM
Version	9.1.0.0.4
Vendor	Oracle
Download size	188.47 MB
Size on disks	205.81 MB (thin provisioned) 20 GB (thick provisioned)
Description	Net-Net Operating System Virtual Machine

[CANCEL](#) [PREVIOUS](#) [NEXT](#)

Create vApp template from OVF

- 1 Select Source
- 2 Review Details
- 3 Select vApp Template Name
- 4 Ready to Complete

Select vApp Template Name

data. These templates ensure that virtual machines are consistently configured across an entire organization.

Name *

Description

Catalog *

Create vApp template from OVF

- Select Source
- Review Details
- Select vApp Template Name
- Ready to Complete

Ready to Complete

You are about to create a vApp template with these specifications. Review the settings and click finish.

OVF file	nnSCZ910p4-img-vm_vmware.ovf, nnSCZ910p4-img-vm_vmware.mf, nnSCZ910p4-img-vm_vmware-disk1.vmdk
Name	NNOSVM
Description	Net-Net Operating System Virtual Machine
Catalog	SBC

CANCEL PREVIOUS FINISH

7. Ensure that VNF images must be available in “vApp Templates”.

vApp Templates

Media & Other

Metadata

NEW IMPORT FROM VCENTER

Name ↑ ↓	Description
<input type="radio"/> NNOSVM	Net-Net Operating System Virtual Machine

8. Select vApp Template -> Create vApp for SBC.

SBC

SHARE PUBLISH SETTINGS SYNC DELETE ALL ACT

General

vApp Templates

Media & Other

Metadata

NEW IMPORT FROM VCENTER CREATE VAPP TAG

Name ↑ ↓	Description
<input checked="" type="radio"/> NNOSVM	Net-Net Operating System Virtual Machine

9. Provide the required details on page “Create vApp from Template” (e.g., Name, Configure Resources, Networking details) and Click FINISH.

10. Ensure that vApp is Created.

The screenshot shows the vApps management interface. At the top, there is a search bar labeled "Find by: Name" and a link for "ADVANCED FILTERING". Below this, it indicates "1 Virtual Applications" with a filter "Expired: No" and a "Clear all filters" button. A "NEW" button is also visible. The main content is a table with the following columns: Name, VMs, State, Runtime lease, Storage lease, CPUs, Memory, and Storage. The table contains one row for "SBC" with 1 VM, Powered off state, a runtime lease of "-", a storage lease of "89 day...", 4 CPUs, 8 GB of memory, and 28 GB of storage.

Name	VMs	State	Runtime lease	Storage lease	CPUs	Memory	Storage
SBC	1	Powered off	-	89 day...	4	8 GB	28 GB

11. Ensure that VM has created and Add standby VM from vApp template.

The screenshot shows the Virtual Machines management interface. At the top, there is a search bar labeled "Find by: Name" and a link for "ADVANCED FILTERING". Below this, it indicates "1 Virtual Machines" with a filter "Expired: No" and a "Clear all filters" button. A "NEW VM" button is also visible. The main content is a table with the following columns: Name, Console, State, Runtime lease, and Storage lease. The table contains one row for "SBC-A" with a console icon, Powered off state, a runtime lease of "-", and a storage lease of "89 day...".

Name	Console	State	Runtime lease	Storage lease
SBC-A		Powered off	-	89 day...

New VM

Name *

Computer Name *

Description

Type New From Template

Power on

Templates

Scroll down to review the EULAs for this template

All VM templates

	Name	vApp Name	Catalog
<input checked="" type="radio"/>	NNOSVM	NNOSVM	SBC

New VM

Memory 8 GB

NICs

Primary NIC	NIC	Connected	Network Adapter Type	Network	IP Mode	IP Address	MAC Address	
<input checked="" type="radio"/>	0	<input checked="" type="checkbox"/>	<input type="text" value=""/>	MGMT	Static - IP Po	<input type="text" value=""/>	00:50:56:01:0C	<input type="text" value=""/>
<input type="radio"/>	1	<input checked="" type="checkbox"/>	<input type="text" value=""/>	HA	Static - IP Po	<input type="text" value=""/>	00:50:56:01:0C	<input type="text" value=""/>
<input type="radio"/>	2	<input checked="" type="checkbox"/>	<input type="text" value=""/>	MEDIA01	Static - IP Po	<input type="text" value=""/>	00:50:56:01:0C	<input type="text" value=""/>
<input type="radio"/>	3	<input checked="" type="checkbox"/>	<input type="text" value=""/>	MEDIA02	Static - IP Po	<input type="text" value=""/>	00:50:56:01:0C	<input type="text" value=""/>

New VM

Bootloader parameters

Boot File	<input type="text" value="/boot/bzImage"/>
IP Address	<input type="text"/>
VLAN	<input type="text" value="0"/>
Netmask	<input type="text"/>
Gateway	<input type="text"/>
Host server IP	<input type="text"/>
	(enables FTP/TFTP network boot)
FTP username	<input type="text"/>
FTP password	<input type="text"/>
Flags	<input type="text"/>
	(0x40=DHCP, 0x80=TFTP)
Target name	<input type="text"/>
Console Device	<input type="text" value="VGA"/>
	(VGA, COM1, COM2)
Console Baudrate	<input type="text" value="115200"/>

User-Password

Admin-Password

Li-Password

End User License Agreements

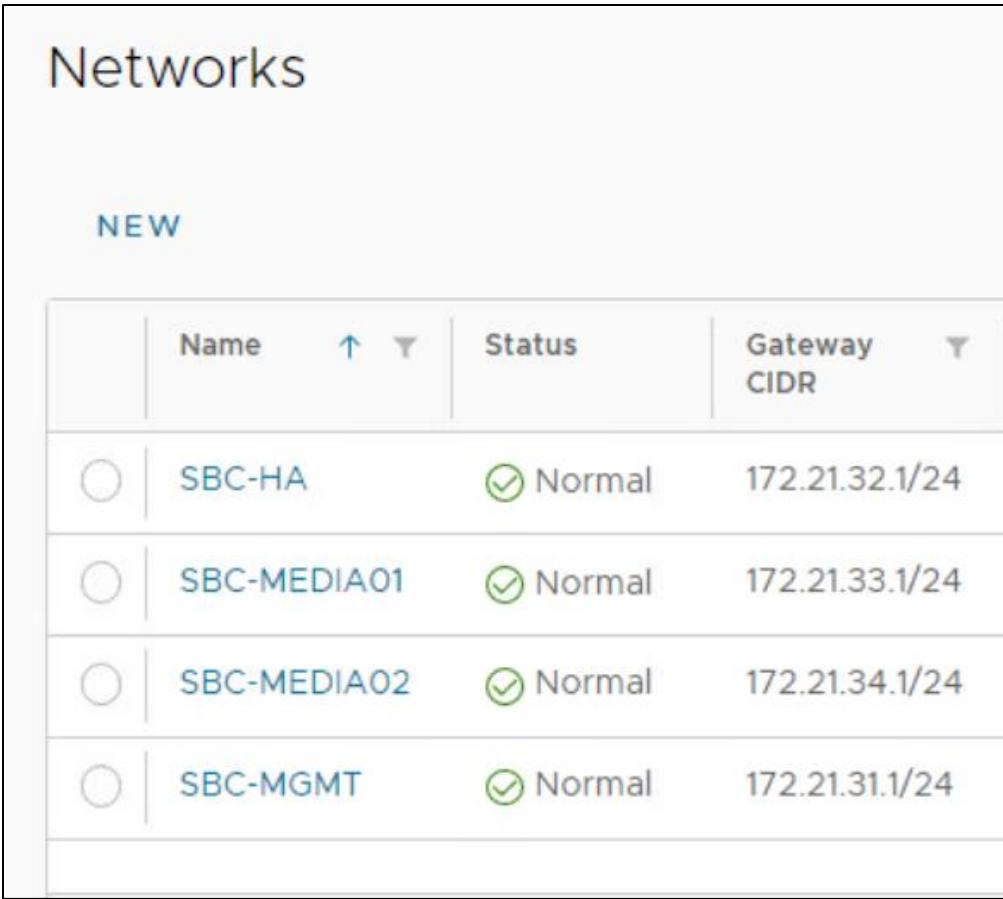
End User License Agreements (1/1)

All EULAs have been accepted.

[START OVER](#)

Note: - Do not provide any password for USER and Admin on above screen.

12. Ensure that all networks as per VNF requirements are available in the vApp.



	Name ↑ ▼	Status	Gateway CIDR ▼
<input type="radio"/>	SBC-HA	✓ Normal	172.21.32.1/24
<input type="radio"/>	SBC-MEDIA01	✓ Normal	172.21.33.1/24
<input type="radio"/>	SBC-MEDIA02	✓ Normal	172.21.34.1/24
<input type="radio"/>	SBC-MGMT	✓ Normal	172.21.31.1/24

13. Power on the vApp and the Status must be Running.

4.3. Initial Access To SBC

Set the User and Administrative Passwords on VMware deployed ORACLE SBC

Once the Oracle SBC is deployed on VMware, perform the password procedures which are required before any further ORACLE SBC operations. For HA deployments, perform these procedures on both ORACLE SBCs.

- 1) Open the VDU-console and use the password as "acme" for user login which is the initial login of SBC. After this, the SBC asks to set a new password and we can set the user password as per our needs.
- 2) Set the administrative password by typing enable at the command prompt. (The initial enable password is "packet".)
- 3) Reboot the virtual machine.
reboot

The screenshot for the password change screen is given below for reference:

```
Password:
%
% Only alphabetic (upper or lower case), numeric and punctuation
% characters are allowed in the password.
% Password must be 8 - 64 characters,
% and have 3 of the 4 following character classes :
%   - lower case alpha
%   - upper case alpha
%   - numerals
%   - punctuation
%
Enter New Password:
Confirm New Password:

Password is acceptable.

Password changed successfully
```

4.4. Interface Mapping

– Switch to the administrative user.

> enable

– Use the “show interfaces mapping” command to verify the network interfaces have expected MAC addresses.

```
# show interfaces mapping
Interface Mapping Info
Eth-IF MAC-Addr Label
wancom0 06:DF:71:BA:D8:77 #generic
wancom1 06:A6:08:58:92:C9 #generic
s0p0 06:D4:E6:E8:B8:FB #generic
s1p0 06:EA:08:51:4D:DF #generic
wancom2 FF:FF:FF:FF:FF:FF #dummy
spare FF:FF:FF:FF:FF:FF #dummy
s0p1 FF:FF:FF:FF:FF:FF #dummy
s1p1 FF:FF:FF:FF:FF:FF #dummy
s0p2 FF:FF:FF:FF:FF:FF #dummy
s1p2 FF:FF:FF:FF:FF:FF #dummy
s0p3 FF:FF:FF:FF:FF:FF #dummy
s1p3 FF:FF:FF:FF:FF:FF #dummy
```

Execute the “interfaces-mapping swap” command, if necessary, in order to correct any issues with your interface to MAC address mapping.

See below for example command

```
# interface-mapping swap s0p0 wancom1
```

4.5. Setting up the product

After the above step, please type “setup product” command to select the product that you want to setup by selecting the option 1 to modify the product and the appropriate choice. The list of choices is given in the screen below and we can select the choice based on the deployment of the product that we do. For this app note document, as we are deploying the Oracle SBC and so, we need to select the option 1.

```
Product not initialized, please use setup product (dir: 327729, file: 3432)
ESBC-P# setup product

-----
WARNING:
Alteration of product alone or in conjunction with entitlement
changes will not be complete until system reboot

Last Modified
-----
 1 : Product      : Uninitialized

Enter 1 to modify, d' to display, 's' to save, 'q' to exit. [s]: 1

 1 : Product      : Uninitialized

Enter 1 to modify, d' to display, 's' to save, 'q' to exit. [s]: 1

Product
 1 - Session Border Controller
 2 - Session Router - Session Stateful
 3 - Session Router - Transaction Stateful
 4 - Subscriber-Aware Load Balancer
 5 - Enterprise Session Border Controller
 6 - Peering Session Border Controller
Enter choice      : 5

Enter 1 to modify, d' to display, 's' to save, 'q' to exit. [s]: _
```

Refer to [Oracle Sessions Border Controller Configuration Guide](#) for the deployment for administrative and service configuration, including entitlement setup and HA configuration.

5. Appendix A

5.1. Deploying SBC behind the NAT

The SPL configuration is a must for ORACLE SBC deployed in Cloud Environments.

The Oracle Communication once deployed VMware cloud environment, you need to configure SPL NAT plugin in order for proper signaling and voice path between deployed ORACLE SBC and PSTN.

The plug-in modifies the information in SIP messages to hide the end point located inside the private network of AWS deployed ORACLE SBC. Configure the Support for SBC behind the NAT SPL plugin for each SIP interface on the SBC. Here there are two interfaces, one on the side facing VMware and

the other on the PSTN side. One public-private address pair required for each SIP interface that uses the SPL plug-in as follows.

- The private IP address must be the same as the SIP interface IP address.
- The public IP address must be the IP address configured in VMware for particular network interface.

Here is an example configuration with SBC behind NAT SPL config. The SPL is applied to M00 interface. To configure SBC behind NAT SPL plug-in using the GUI,

Go to session-router -> sip-interface -> spl- options and input the following value, save and activate>

HeaderNatPublicSiplflp=<Reserved Public IP of the s0p0 interface>,HeaderNatPrivate Iflflp=<Private IP of the s0p0 interface>

eg: HeaderNatPublicSiplflp=1.1.1.1,HeaderNatPrivateSiplflp=2.2.2.2
Here the HeaderNatPublicSiplflp is the reserved public interface IP and HeaderNatPrivateSiplflp is the private IP

5.2. Test Results

<p>The Solution is fully certified with these components from VMware Ready for Telco Cloud Infrastructure 2.2 Cloud Director Edition Platform</p> <p>VMware ESXi 7.0 U3c</p> <p>VMware vCenter Server Appliance 7.0 U3c</p> <p>VMware NSX-T 3.2.0.1</p> <p>VMware Virtual SAN 7.0 U3c</p> <p>VMware vCloud Director for Service Providers 10.3.2a</p> <p>VMware vRealize Log Insight 8.6.2</p>	
Level 1 - Test Results	SBC
Total Test Cases	74
Total Applicable Test Cases	41
Not Applicable	33
Pass	41
Fail	0
Blocked	0
In Progress	0
Not Run	0
Completion %	100%
Success Rate	100%



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Integrated Cloud Applications & Platform Services

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