

SAPC PNF Deployment Instruction

Ericsson Service-Aware Policy Controller

Installation Instructions

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1 SAPC PNF Deployment Introduction

Document Purpose and Scope

The scope of this document is to install a SAPC covering operating system (OS), platform software Component Based Architecture (CBA), and application software products.

Geographical Redundancy requires the deployment of two SAPC nodes to guarantee the data replication between them. This document is followed to install each of these nodes and configure them for providing this function.

Intended Audience

The intended audience of this document is software installation technicians. The installer needs the following:

- Linux system administrator knowledge
- General networking knowledge
- User root privileges
- General virtualization knowledge (KVM, QEMU, Open vSwitch)
- Administration user identities and default passwords for the SAPC. This information can be found in [SAPC Users and Passwords](#).

2 SAPC PNF Deployment Overview

This section describes what is required and what **must** be prepared before the installation procedure can begin.

2.1 SAPC PNF Installation Steps

Virtual Machine: A Virtual Machine is an operating system or application environment that is installed on software which imitates dedicated hardware (the HOST system). The operating system is LDEwS 4.4 CPxx.

Blade Hosting SC-1: Blade of the system that hosts Virtual Machine acting as SC-1. It uses SLES12 SP2 as operating system.

Blade Hosting SC-2: Blade of the system that hosts Virtual Machine acting as SC-2. It uses SLES12 SP2 as operating system.

Installation Server: External machine used for the installation of the HOST operating system. It uses SLES11 SP3/SP4 as operating system.

Installation elements needed to install the SAPC are shown in [Figure 1](#). These are an external device or installation server and several hardware machines which host the application.

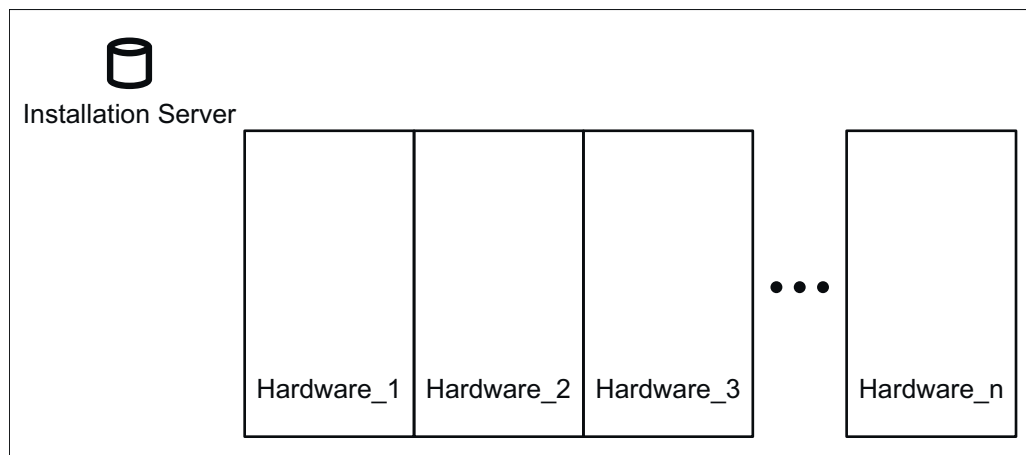


Figure 1 Installation Elements

Connect the installation server to the different hardware machines and proceed to install the HOST operating system SLES12 SP2 in the blade hosting SC-1 and the blade hosting SC-2.

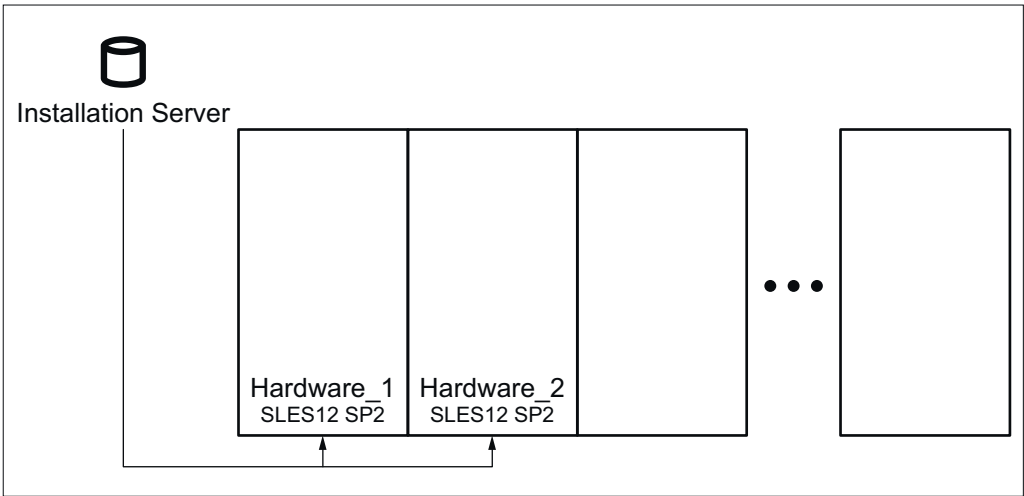


Figure 2 HOST Machines Installation

After the SLES12 SP2 installation, to install the System Controllers, the software is copied to the blade hosting SC-1. Because the System Controllers are virtualized, the installation is done using images. Once the software is unpacked, create the Virtual Machines for **SC-1** and **SC-2**. **SC-1** is created based on the related qcow2 image, while the **SC-2** is synchronized from the **SC-1**.

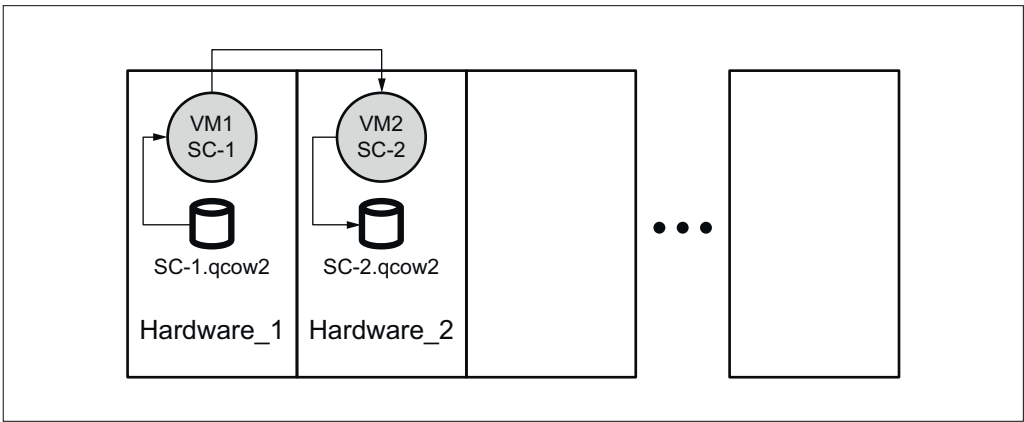


Figure 3 Virtual Machines Initialization

Scale out the rest of the blades. In each of them, depending on the network configuration, VIP Front Ends Elements (FEE) are created automatically to fulfill the different scenarios (GeoRed, external database, or traffic).

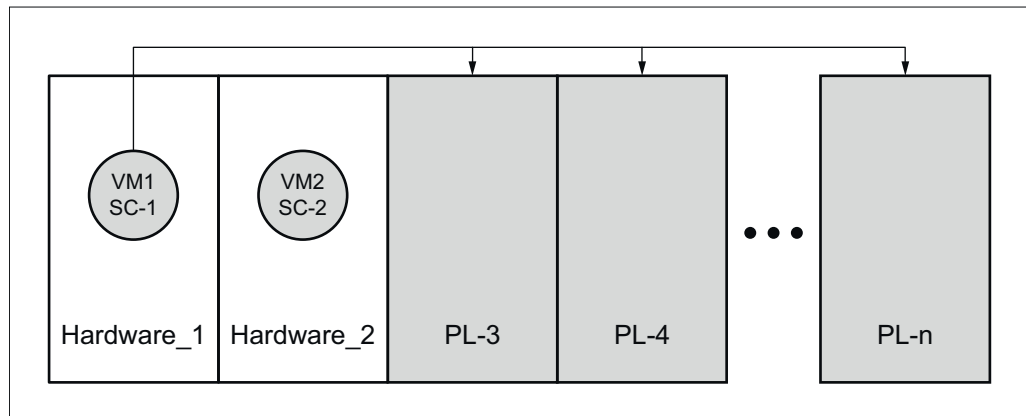


Figure 4 CBA Platform and SAPC Installation

2.2 SAPC PNF Deployment Prerequisites

2.2.1 PNF Deployment Requirements

SAPC supports BSP 8100 and NSP 6.1 hardware. For any other hardware, modifications need to be done during the hardware installation to achieve the same purposes.

- Software Gateway access is necessary for operating system and additional software installation. The software repositories are available in the Software Gateway.
- BIOS Power-saving options are disabled.
- System is correctly powered and cabled.
- Serial or Management (MGMT) access to the hardware. For details on how to connect using a serial or MGMT connection, consult your hardware provider documentation.
- Network interface for Host management.
- Secure Shell (SSH) client: once the operating system is installed and configured, installation can continue remotely. An SSH connection is used for this purpose for which an SSH client needs to be installed in the remote PC to be used.
- TSP software version TSP6833 or higher. Otherwise the availability of the commands to install DMX is not guaranteed.



Caution!

If the hardware used is NSP 6.1 with GEP3 blades, the validated and mandatory GEP3 firmware version to ensure a successful installation is R11A or later.

Do!

The GEP3 firmware upgrade to R11A (validated version) or later is mandatory for the blades hosting the SCs and PLs. This procedure is complex and needs special knowledge, therefore it is recommended to be performed by Ericsson personnel. Do not perform the upgrade in a blade in service, as it implies powering off the blades. Follow the [BIOS Upgrade Instruction](#) document to perform the upgrade. Contact GEP support in case there is any problem.

2.2.2

PNF Deployment Network Requirements

If the hardware used is BSP 8100, use as reference the [BSP 8100 Network Configuration Guide](#) to complete all the variables needed.

If the hardware used is NSP 6.1, use as reference the [NSP 6.1 Network Configuration Guide](#).

For any other non-Ericsson hardware use equal reference network configuration documents.

2.3

SAPC PNF Deployment Deliverables

The required software is listed in [Table 1](#) and can be downloaded from Ericsson Software Gateway under a unique SAPC ticket number. Refer to Release Notes document to check the version of each product and the ticket number. The SAPC software includes a tar.gz file with all the tools needed for the installation.

Table 1 Products and Deliverables

Product	Deliverables
sles12_sp2_cxp9031686_<revision>.tar.gz	SLES SP2 operating system and updates
sles12_sp2_patches_cxp9031686_<revision>.tar.gz	SLES12 SP2 Vulnerability updates
vdp_sapc_qcow2_cxp9032851_<revision>.tar.gz	SAPC Virtual Delivery Package
DMX.tar	DMX Software for NSP 6.1 installations



Once uncompressed the following files are available which are needed for the PNF Installation.

Table 2 Files

Filename	Description
BSP_templates_ipv4.tar.gz	BSP templates needed to configure the BSP Software with IPv4.
BSP_templates_ipv6.tar.gz	BSP templates needed to configure the BSP Software with IPv6.
NSP_templates.tar.gz	NSP templates needed to configure the DMX Software.
shares.tar.gz	Tools needed to install SLES operating system in blade hosting SC-1 and blade hosting SC-2.
sapc_sc-1_cxp9032851_<revision>.qcow2	Image with the SAPC installation.
host-config.tar.gz	Tools needed to install SAPC.
adapt_cluster_PNF_BSP.cfg	Basic configuration template for the PNF BSP environment customization with IPv4.
adapt_cluster_PNF_BSP_IPv6.cfg	Basic configuration template for the PNF BSP environment customization with IPv6.
adapt_cluster_PNF_NSP.cfg	Basic configuration template for the PNF NSP environment customization with IPv4.
adapt_cluster_PNF_NSP_IPv6.cfg	Basic configuration template for the PNF NSP environment customization with IPv6.

For specific version information, see the release notes.



3 Installation for Standalone Deployment

This section describes all the installation steps. Once completed this section the system is installed and ready.

3.1 Standalone Deployment Prerequisites

This section describes the prerequisites which must be fulfilled before the SAPC can be installed.

3.1.1 Hardware Requirements

- **Installation server**

An installation server is **mandatory** for the installation. This server is always attached to the system, as it provides a DHCP service which is needed for the HOST to start.

- **Serial console access**

Serial console access to the serial ports of the machines in the system. This can be achieved in different ways, for example by using a terminal server with serial communication ports.

- **All blades connectivity**

Check that blades with external connectivity are correctly wiring.

3.1.2 Installation Server Requirements

Warning!

This document considers that the installation server uses SLES11 SP3/SP4 distribution. It is suggested to use that distribution.

To fulfill the installation, use a SUSE Linux PC as an installation server with at least one Ethernet interface and the following services installed on it.

advanced Trivial File Transfer Protocol (aTFTP)

Dynamic Host Configuration Protocol (DHCP)

Network Time Protocol (NTP)

Network File System (NFS)



Bash 4.2 or higher

How to install and configure an installation server is explained in this section using a SUSE distribution (other Linux distributions have similar commands).

Steps

1. Check that the `atftp`, `dhcp-server`, `ntp`, `syslinux`, and `nfs-kernel-server` packages are installed.

```
<InstallationServer>:# rpm -q atftp dhcp-server ntp syslinux  
nfs-kernel-server
```

```
atftp-0.7.0-135.21.27  
dhcp-server-4.2.4.P2-0.16.15  
ntp-4.2.4p8-1.22.1  
syslinux-3.82-8.10.23  
nfs-kernel-server-1.2.3-18.29.1
```

If not, install them with `zypper`.

```
<InstallationServer>:# zypper install atftp dhcp-server ntp  
syslinux nfs-kernel-server
```

2. Make sure that the bash version you have in your installation server is 4.2 or higher.

The bash version included in SLES11 SP3/SP4 is lower than the one requested, so it must be updated.

```
<InstallationServer>:# bash --version
```

```
GNU bash, version 3.2.51(1)-release (x86_64-suse-linux-gnu)  
Copyright (C) 2007 Free Software Foundation, Inc.
```

To update it to the 4.4 version, download, configure, compile, and install it from sources.

```
<InstallationServer>:# pushd /home/
```

```
<InstallationServer>:# wget http://ftp.gnu.org/gnu/bash/  
bash-4.4.tar.gz
```

```
<InstallationServer>:# tar xvf bash-4.4.tar.gz
```

```
<InstallationServer>:# pushd bash-4.4/
```

```
<InstallationServer>:# ./configure
```

```
<InstallationServer>:# make && make install
```

```
<InstallationServer>:# popd
```



Once the installation ends, the old bash binary is replaced with the new one.

```
<InstallationServer>:# pushd /bin/
```

```
<InstallationServer>:# ln -fs /usr/local/bin/bash bash
```

```
<InstallationServer>:# popd
```

```
<InstallationServer>:# popd
```

Check again the bash version to ensure that the new version is the installed one.

```
<InstallationServer>:# bash --version
```

```
GNU bash, version 4.4.0(1)-release (x86_64-unknown-linux-gnu)
Copyright (C) 2016 Free Software Foundation, Inc.
[...]
```

3.2 Software Download

Steps

1. Download `sles12_sp2_cxp9031686_<revision>.tar.gz`, `sles12_sp2_patches_cxp9031686_<revision>.tar.gz`, and the `vdp_sapc_qcow2_cxp9032851_<revision>.tar.gz` delivery package in the InstallationServer.
2. The compressed file `vdp_sapc_qcow2_cxp9032851_<revision>.tar.gz` downloaded from the software gateway **must** be decompressed into a directory of the installation server, for example `/home/SAPCInstallation/`.

```
<InstallationServer>:# mkdir -p /home/SAPCInstallation
```

```
<InstallationServer>:# tar xvfz
vdp_sapc_qcow2_cxp9032851_<revision>.tar.gz -C /home/
SAPCInstallation/
```

3. Extract the delivery package, the `sles12_sp2_cxp9031686_<revision>.tar.gz`, and the `sles12_sp2_patches_cxp9031686_<revision>.tar.gz`. Prepare the files needed for the installation.

```
<InstallationServer>:# mkdir -p /home/SAPCInstallation/
SLES12_SP2/Updates/
```

```
<InstallationServer>:# tar xvfz
sles12_sp2_cxp9031686_<revision>.tar.gz -C /home/
SAPCInstallation/
```



```
<InstallationServer>:# tar xvfz
sles12_sp2_patches_cxp9031686_<revision>.tar.gz -C /home/
SAPCInstallation/SLES12_SP2/Updates/

<InstallationServer>:# mkdir -p /home/SAPCInstallation/
shares/PNF

<InstallationServer>:# mkdir -p /home/SAPCInstallation/
BSP_templates

<InstallationServer>:# mkdir -p /home/SAPCInstallation/
NSP_templates

<InstallationServer>:# tar xvfz /home/SAPCInstallation/
vdp_sapc_qcow2_cxp9032851_<revision>/shares.tar.gz -C /home/
SAPCInstallation/shares/PNF/

<InstallationServer>:# tar xvfz /home/SAPCInstallation/
vdp_sapc_qcow2_cxp9032851_<revision>/
BSP_templates_<ipversion>.tar.gz -C /home/SAPCInstallation/
BSP_templates/

<InstallationServer>:# tar xvfz /home/SAPCInstallation/
vdp_sapc_qcow2_cxp9032851_<revision>/NSP_templates.tar.gz -C /
home/SAPCInstallation/NSP_templates/

<InstallationServer>:# chown -R root:root /home/
SAPCInstallation/shares/PNF/*
```

3.3 DMX Installation and Configuration

DMX configuration differs from BSP 8100 to NSP 6.1.

This document considers that the installation server uses SLES11 SP3/SP4 distribution for installing DMX.

Attention!

This section is exclusive for BSP 8100 and NSP 6.1 installations. For any other hardware, do the router configuration and the networking manually depending on the customer needs.

3.3.1 BSP 8100 Installation and Configuration

Install both the hardware of the BSP 8100 system and the software version BSP R12.0.1 following [BSP Installation](#). Do the BSP 8100 initial platform configuration explained in [BSP Initial Configuration](#). For detailed information



about how to configure the BSP Northbound Interface (NBI), see the provided BSP templates.

Do the BSP 8100 external connectivity configuration explained in [BSP External Network Connectivity](#). All these documents are available in the BSP 8100 library.

This step describes how to create a working BSP tenant configuration using BSP 8100 documentation and providing specific configuration templates that must be used. The different templates are prepared to do the configuration of a BSP blade system depending on the customer needs.

- The basic configuration is needed for all the deployments. Follow the template included in `/home/SAPCInstallation/BSP_templates/common`.
 - For the first subrack, follow the template included in `BSP_PNF_config_template_1st_subr_base`.
 - If a second subrack is needed, follow the template included in `BSP_PNF_config_template_2nd_subr`.
 - If a third subrack is needed, follow the template included in `BSP_PNF_config_template_3rd_subr`.
- For Standalone deployments, add the following templates included in `/home/SAPCInstallation/BSP_templates/standalone`.
 - For the basic configuration, follow the templates included in `BSP_PNF_config_template_oam` and `BSP_PNF_config_template_signaling`.
 - If traffic separation is needed, follow the template included in `BSP_PNF_config_template_signaling2`.
 - If an external database is needed, follow the template included in `BSP_PNF_config_template_extDB`.
- For Active-Standby Geographical Redundancy deployments, add the following templates included in `/home/SAPCInstallation/BSP_templates/geored`.
 - For the basic configuration, follow the templates included in `BSP_PNF_config_template_oam`, `BSP_PNF_config_template_signaling` and `BSP_PNF_config_template_replication`.
 - If traffic separation is needed, follow the template included in `BSP_PNF_config_template_signaling2`.
 - If an external database is needed, follow the template included in `BSP_PNF_config_template_extDB`.
- For Active-Active Geographical Redundancy deployments, add the following templates included in `/home/SAPCInstallation/BSP_templates/geored-active-active`.



- For the basic configuration, follow the templates included in **BSP_PNF_config_template_oam**, **BSP_PNF_config_template_signaling** and **BSP_PNF_config_template_replication**.
- If traffic separation is needed, follow the template included in **BSP_PNF_config_template_signaling2**.
- If an external database is needed, follow the template included in **BSP_PNF_config_template_extDB**.

3.3.2 NSP 6.1 Installation and Configuration

Caution!

All blades **must** be powered off before starting the DMX installation process.

Install both the hardware of the NSP 6.1 system and the software version DMX 3.1 CP8 following [DMX Installation Instruction](#). Do the NSP 6.1 initial platform configuration explained in [DMX Initial Start](#) according to the network configuration defined in [NSP 6.1 Network Configuration Guide](#). All these documents are available in the DMX library.

Although the DMX installation documents refer to different operating system and mention different paths, filenames, and applications, it is possible, with minor deviations, to use the same installation server with SLES11 SP3/SP4 described in this document for the SAPC installation.

The file **DMX.tar**, downloaded from the software gateway, contains DMX software required for NSP 6.1 system.

This step describes how to create a working configuration using the DMX documentation and providing specific configuration templates that must be used. The different templates are prepared to do an automatic configuration of a NSP 6.1 blade system depending on the customer needs.

- The basic configuration is needed for all the deployments. Follow the template included in **/home/SAPCInstallation/NSP_templates**.
 - For the first subrack, follow the template included in **NSP_PNF_config_template_1st_subr_base**.

Attention!

During the addition of the extra subracks, the port **SCX-0-25:GE1** is blocked. Thus, it is recommended to use console connection for setting up the initial DMX configuration.



- If a second subrack is needed, follow the template included in **NSP_PNF_config_template_2nd_subr**.
- If a third subrack is needed, follow the template included in **NSP_PNF_config_template_3rd_subr**.

3.4 Installation Server Preparation

Attention!

If the hardware used is NSP 6.1, use as reference the NSP 6.1 Network Configuration Guide instead of the BSP 8100 Network Configuration Guide specified in this section.

Steps

1. Modify the **install_server.cfg** file adding a line for the NTP servers explained in the BSP 8100 Network Configuration Guide. Also modify if needed the interface for the local one in the installation server from which you are going to proceed with the installation. To do so, modify **DHCPD_SERVER_IFACE**.

```
<InstallationServer>:# vi /home/SAPCInstallation/shares/PNF/
install_server/install_server.cfg
```

```
DHCPD_SERVER_IFACE=<eth1>
```

```
NTP_SERVER=<NTP_SERVER_IP_ADDRESS1> <NTP_SERVER_IP_ADDRESS2>
```

For example:

```
NTP_SERVER=10.221.17.38 10.221.17.150 10.221.17.182
10.221.17.14
```

2. Modify the **system_common.cfg** assigning the VRRP IP address of the Hypervisor network, the DNS server, and the NTP server as explained in the BSP 8100 Network Configuration Guide.

```
<InstallationServer>:# vi /home/SAPCInstallation/shares/PNF/
config/system_common.cfg
```

```
DEFAULT_GATEWAY=<Hypervisor VRRP IP address>
```

```
DNS_SERVER=<DNS_SERVER_IP_ADDRESS1> <DNS_SERVER_IP_ADDRESS2>
```

```
NTP_SERVER=<NTP_SERVER_IP_ADDRESS1> <NTP_SERVER_IP_ADDRESS2>
```

Note: The Hypervisor VRRP IP address has the same value as the **sapc_om2_sp_gw** that is explained in the BSP 8100 Network Configuration Guide.



3. Modify the **networking_template.cfg** with the values explained in the BSP 8100 Network Configuration Guide.

```
<InstallationServer>:# cp -p /home/SAPCInstallation/shares/PNF/  
config/networking_template.cfg /home/SAPCInstallation/  
shares/PNF/config/networking_Host_1.cfg
```

```
<InstallationServer>:# cp -p /home/SAPCInstallation/shares/PNF/  
config/networking_template.cfg /home/SAPCInstallation/  
shares/PNF/config/networking_Host_2.cfg
```

Attention!

At this stage, the procedure depends on the hardware.

a. BSP 8100

The following lines are modified in the **networking_Host_1.cfg** file (default BSP values are explained, change accordingly if they are different).

VLAN_MGMT0=<137>

VLAN_MGMT1=<138>

VLAN_MGMT2=<>

IP_MGMT0=<Hypervisor Management Network IP address for this blade>

IP_MGMT1=<Internal Management Network IP address for this blade>

IP_MGMT2=

BOOT_MAC_ADDR=<Initial MAC Address for booting for this blade>

Note: The default value for IP_MGMT1 is <192.168.100.1/24> .

Same changes apply for the **networking_Host_2.cfg** file with the specific values for that blade.

VLAN_MGMT0=<137>

VLAN_MGMT1=<138>

VLAN_MGMT2=<>

IP_MGMT0=<Hypervisor Management Network IP address for this blade>



IP_MGMT1=<Internal Management Network IP address for this blade>

IP_MGMT2=

BOOT_MAC_ADDR=<Initial MAC Address for booting for this blade>

Note: The default value for IP_MGMT1 is <192.168.100.2/24> .

To obtain the **BOOT_MAC_ADDR** variable, access the DMX for the blade hosting SC-1 and blade hosting SC-2.

<InstallationServer>:# **ssh -p 2024 advanced@<DMX>**

<DMX>:> **show-table**

ManagedElement=1,DmxcFunction=1,Eqm=1,VirtualEquipment=SAPC -m Blade -p userLabel,firstMacAddr -c ((userLabel=="SC-1")||(userLabel=="SC-2"))

```
=====
| userLabel | firstMacAddr      |
=====
| SC-1      | A4:A1:C2:E9:E7:ED |
| SC-2      | A4:A1:C2:E9:E7:A7 |
=====
```

b. NSP 6.1

The following lines are modified in the **networking_Host_1.cfg** file (default NSP values are explained, change accordingly if they are different).

VLAN_MGMT0=<137>

VLAN_MGMT1=<138>

VLAN_MGMT2=<138>

IP_MGMT0=<Hypervisor Management Network IP address for this blade>

IP_MGMT1=<Primary Internal Management Network IP address for this blade>

IP_MGMT2=<Secondary Internal Management Network IP address for this blade>

BOOT_MAC_ADDR=<Initial MAC Address for booting for this blade>

Same changes apply for the **networking_Host_2.cfg** file with the specific values for that blade.



VLAN_MGMT0=<137>

VLAN_MGMT1=<138>

VLAN_MGMT2=<138>

IP_MGMT0=<Hypervisor Management Network IP address for this blade>

IP_MGMT1=<Primary Internal Management Network IP address for this blade>

IP_MGMT2=<Secondary Internal Management Network IP address for this blade>

BOOT_MAC_ADDR=<Initial MAC Address for booting for this blade>

To obtain the **BOOT_MAC_ADDR** variable, access the DMX for the blade hosting SC-1 and blade hosting SC-2.

```
<InstallationServer>:# ssh -p 2024 expert@<DMX>
```

```
<DMX>:> show table ManagedElement 1 DmxFunctions 1
BladeGroupManagement 1 Group SAPC ShelfSlot Blade 1
userLabel | select Blade firstMacAddress | match "SC-
[12]"
```

```
0-9      1      SC-1    a4:a1:c2:e9:e7:ed
0-11     1      SC-2    a4:a1:c2:e9:e7:a7
```

- c. The procedure to obtain the **BOOT_MAC_ADDR** applies for BSP and NSP hardware

In this example, the values obtained for the `firstMacAddr` are A4:A1:C2:E9:E7:ED and A4:A1:C2:E9:E7:A7. The **BOOT_MAC_ADDR** are the next ones for each of them, ie, increasing one unit. In this example, they are as follows.

```
A4:A1:C2:E9:E7:EE
A4:A1:C2:E9:E7:A8
```

4. Create the directory tree for the SLES12 SP2 DVD and mount the ISO file there.

```
<InstallationServer>:# mkdir -p /home/SAPCInstallation/
shares/PNF/SLES12_SP2/DVD1
```

```
<InstallationServer>:# mount -o ro,loop /home/SAPCInstallation/
SLES12_SP2/SLE-12-SP2-Server-DVD-x86_64-GM-DVD1.iso /home/
SAPCInstallation/shares/PNF/SLES12_SP2/DVD1
```

```
<InstallationServer>:# mkdir -p /srv/tftpboot/sles12_sp2/
```



5. Copy files to the `/srv/tftpboot/sles12_sp2/` directory.

```
<InstallationServer>:# pushd /home/SAPCInstallation/shares/PNF/
SLES12_SP2/DVD1/boot/x86_64/loader
```

```
<InstallationServer>:# cp -a linux initrd message memtest /srv/
tftpboot/sles12_sp2
```

```
<InstallationServer>:# cp -a /usr/share/syslinux/pxelinux.
0 /srv/tftpboot/sles12_sp2
```

```
<InstallationServer>:# popd
```

6. Execute the script.

```
<InstallationServer>:# /home/SAPCInstallation/shares/PNF/
install_configuration.sh install "/home/SAPCInstallation/
shares/PNF/install_server/install_server.cfg" "/home/
SAPCInstallation/shares/PNF"
```

```
BEGIN
```

```
Execution: install_configuration.sh install "/home/SAPCInstallation/s
hares/PNF/install_server/install_server.cfg" "/home/SAPCInstallation/
shares/PNF"
```

```
Checking required packages
```

```
atftp - installed
```

```
dhcp-server - installed
```

```
ntp - installed
```

```
syslinux - installed
```

```
nfs-kernel-server - installed
```

```
Parsing 'install_server.cfg' configuration file
```

```
Customizing DHCP server
```

```
Customizing NIC 'eth1' connected to blades
```

```
Customizing NTP server
```

```
Customizing NFS
```

```
Customizing PXE kernel boot line
```

```
Customizing autoinstallation profiles
```

```
Restarting 'DHCPD' service
```

```
Restarting 'ATFTPD' service
```

```
Restarting 'NTP' service
```

```
Restarting 'NFSSERVER' service
```

```
Exporting configured NFS path
```

```
END
```

The **dhcpd.conf** file has been created successfully, modifying the **eth1** interface.

```
<InstallationServer>:# ifconfig
```

```
[...]
```

```
eth1 Link encap:Ethernet HWaddr 00:50:56:A1:15:F1
```



```
inet addr:192.168.101.1 Bcast:192.168.101.255 Mask:255.255.254.0  
[...]
```

7. Check the status of installation port and enable it if necessary. The SLES12 SP2 installation uses this port to access the blade.

Attention!

At this stage, the procedure depends on the hardware.

a. BSP 8100

The default installation port is **SCX-0-0:GE1**.

```
<InstallationServer>:# ssh -p 2024 advanced@<DMX>
```

```
<DMX>:> show
```

```
ManagedElement=1,DmxcFunction=1,Trm=1,VirtualBridge=BSP  
,BridgePort=0-0:GE1
```

```
BridgePort=0-0:GE1  
adminState=DISABLED
```

Use the configure mode and enable it.

```
<DMX>:> configure
```

```
<DMX>:(config)>
```

```
ManagedElement=1,DmxcFunction=1,Trm=1,VirtualBridge=SAP  
C,tenantInstallMode=UNTAGGED
```

```
<DMX>:(config)> commit
```

Check now that the status is enabled as before.

b. NSP 6.1

The default installation port is **SCX-0-0:GE2**.

```
<InstallationServer>:# ssh -p 2024 expert@<DMX>
```

Use the configure mode to check the **SCX-0-0:GE2** port configuration.

```
<DMX>:> configure
```

```
<DMX>:(config)% show ManagedElement 1 DmxFunctions 1  
Transport 1 Bridge 0-0 Port GE2 | select defaultVlan |  
select adminState
```

```
defaultVlan 4001;  
adminState enabled;
```



Check that the **SCX-0-0:GE2** port belongs to the **untaggedMemberPorts** group from the VLAN ID **4001**.

```
<DMX>:(config)% show ManagedElement 1 DmxFunctions 1
Transport 1 Bridge 0-0 Vlan 4001 untaggedMemberPorts
```

```
untaggedMemberPorts [ BP1 BP3 BP5 BP7 BP9 BP11 BP13
BP15 BP17 BP19 BP21 BP23 GE2 ];
```

Exit the configure mode.

```
<DMX>:(config)% exit
```

Exit from the CLI.

```
<DMX>:> exit
```

8. Before starting the operating system installation procedure, the boot device **must** be set up for all blades.
 - For blades hosting **SCs**, the permanent boot device **must** be the hard disk drive.
 - a. For BSP 8100, select "18 - SATA-0 Internal Slim-SATA SSD" in boot menu.
 - b. For NSP 6.1, select "10 - Hard drive GMB SAS ID09" in boot menu.
 - Note:** The first boot is performed from the left backplane network interface (00 - Ethernet Backplane Left) to fetch configuration from the installation server.
 - For blades hosting **PLs**, the boot devices **must** be the backplane network interfaces (00 - Ethernet Backplane Left and 01 - Ethernet Backplane Right).

Access the DMX from the installation server and do the following procedure for each blade. Power on the blade.

Attention!

At this stage, the procedure depends on the hardware.

a. BSP 8100

```
<InstallationServer>:# ssh -p 2024 advanced@<DMX>
```

```
<DMX>:> configure
```



```
<DMX>:(config)>  
ManagedElement=1,DmxcFunction=1,Eqm=1,VirtualEquipment=  
SAPC,<Blade=0-1>,administrativeState=UNLOCKED
```

b. NSP 6.1

```
<InstallationServer>:# ssh -p 2024 expert@<DMX>
```

```
<DMX>:> configure
```

```
<DMX>:(config)% set ManagedElement 1 DmxFunctions 1  
BladeGroupManagement 1 Group SAPC ShelfSlot <0-1> Blade  
1 administrativeState unlocked
```

```
<DMX>:(config)> commit
```

In this example, **Blade=0-1** means blade 1 from subrack 0.

Exit from the CLI.

```
<DMX>:> exit
```

To set the boot device configuration, the message shown in [Figure 5](#) is displayed on the blade booting process.



Figure 5 Message to Enter Boot Menu

9. Press **F3** to enter the boot menu shown in [Figure 6](#).

In the boot menu, choose the option 40 - UEFI Shell (PBIST) to enter the BIOS shell.

Enter boot device in hex: **40**



```
Press F3 for GEP PopUp
Enter boot device in hex:
```

Some Examples:

```
00 - Ethernet Backplane Left
01 - Ethernet Backplane Right
02 - Ethernet Front ETH-0
03 - Ethernet Front ETH-1
06 - Ethernet Front ETH-2 Debug
10 - Hard drive GMB SAS ID09
18 - Hard drive internal SSD
21 - (X80) USB mini A
22 - (X81) USB type A
23 - (X60) Densishield USB
32 - DVD connected to USB
40 - UEFI Shell (PBIST)
```

```
Enter: Save and exit
ESC: Exit without save
```

Figure 6 Boot Menu

10. After pressing **Enter** to save the chosen option, the message in [Figure 7](#) is shown. Press **any** key to enter the BIOS shell.

Note: This may change depending on the HW.

```
Press ANY key to remain in Shell. Will quit in 2 seconds...
```

Figure 7 Message to Enter the BIOS Shell

11. Once in the BIOS shell, set the boot devices according to the type of blade is being configured (SC or PL). Do this following the hardware-specific BIOS configuration guide and save the configuration.

— GEP3

- Remove the current boot order:

```
GEP3> ipmi -o erase
```

- Set to boot from the hard disk:

```
GEP3> ipmi -o push 10
```

- Show the current boot order:

```
GEP3> ipmi -o display
```

- Reboot the board (keeps the current configuration):

```
GEP3> pbist -r
```

— GEP 5

- Show the current boot order:

```
GEP5> ipmi bo display
```



- Remove the current boot device in position 1:
GEP5> ipmi bo remove 1
- Set to boot from Hard Disk SATA-0 Internal Slim-SATA SSD:
GEP5> ipmi bo insert 1 18
- Reboot the board (keeps the current configuration):
GEP5> pbist -r

— GEP 7

- Show the current boot order:
GEP7> ipmi oem bcs r
- Set to boot from Hard Disk SATA-0 Internal Slim-SATA SSD:
GEP7> ipmi oem bcs b 0 0x18
- Reboot the board (keeps the current configuration):
GEP7> reset

After configuring the boot devices, the blades are rebooted to start up with the new configuration.

12. For the blades hosting the SCs, enter the boot menu shown in [Figure 6](#), choosing the option 00 - Ethernet Backplane Left to launch the SLES12 SP2 automated installation process.

Enter boot device in hex: **00**

After pressing **Enter**, the blade will boot from the installation server, and the operating system installation starts.

During the installation process, the blades are rebooted once. Wait until the process is finished and the Linux prompt shown.

<Host_1> login:

<Host_2> login:

13. At this point, the **SLES12 SP2** is installed. Log on as root and reboot both blades.

<Host_1> login: **root**

<Host_1>:# **reboot**

<Host_2> login: **root**



```
<Host_2>: # reboot
```

14. After SLES12 SP2 installation in NSP 6.1 blades, it is necessary to remove in DMX the port used for SLES12 SP2 installation, **GE2**.

Attention!

At this stage, the procedure depends on the hardware.

- a. **BSP 8100**

Skip this step.

- b. **NSP 6.1**

```
<InstallationServer>: # ssh -p 2024 expert@<DMX>
```

```
<DMX>: > configure
```

```
<DMX>: (config)% delete ManagedElement 1 DmxFunctions 1  
Transport 1 Bridge 0-0 Vlan 4001 memberPorts GE2  
untaggedMemberPorts GE2
```

```
<DMX>: > commit
```

Exit from the CLI.

```
<DMX>: > exit
```

15. Once access is available to blade hosting SC-1 and blade hosting SC-2, copy the Updates directory and update the operating system.

If SSH access is not available at this moment because client network is not fully prepared, some additional steps are needed to be able to transfer Updates directory to the blades hosting SC-1 and SC-2 respectively. If SSH access is already available, skip the following preparations:

Temporarily, configure the front port interface in the same network of your installation server in both blades, for instance:

```
<Host_1>: # ifconfig br_mgmt 192.168.101.11 netmask  
255.255.254.0 up
```

```
<Host_2>: # ifconfig br_mgmt 192.168.101.12 netmask  
255.255.254.0 up
```

Check interface is up with ping from the blades:

```
<Host_1>: # ping 192.168.101.11
```

```
<Host_2>: # ping 192.168.101.12
```



At this point, Host_1 has assigned the IP 192.168.101.11 and Host_2 has assigned IP 192.168.101.12

Create directory structure in blades.

```
<Host_1>:# mkdir -p /mnt/images/SAPCDeployment/SLES12_SP2/  
Updates
```

```
<Host_1>:# mkdir -p /mnt/images/originalImage
```

```
<Host_1>:# mkdir -p /mnt/images/interfaces
```

```
<Host_1>:# mkdir -p /mnt/store/SAPC
```

```
<Host_2>:# mkdir -p /mnt/images/SAPCDeployment/SLES12_SP2/  
Updates
```

```
<Host_2>:# mkdir -p /mnt/images/originalImage
```

```
<Host_2>:# mkdir -p /mnt/images/interfaces
```

```
<Host_2>:# mkdir -p /mnt/store/SAPC
```

Copy directories from Installation Server to blades:

```
<InstallationServer>:# scp -r /home/SAPCInstallation/SLES12_SP2/  
Updates root@<Host_1_IP>:/mnt/images/SAPCDeployment/SLES12_SP2/
```

```
<InstallationServer>:# scp -r /home/SAPCInstallation/SLES12_SP2/  
Updates root@<Host_2_IP>:/mnt/images/SAPCDeployment/SLES12_SP2/
```

SLES12 SP2 Updates installation:

```
<Host_1>:# /mnt/images/SAPCDeployment/SLES12_SP2/Updates/  
installation-server/shares/repositoriesUpdater.sh -p /mnt/  
images/SAPCDeployment/SLES12_SP2/Updates/
```

```
<Host_2>:# /mnt/images/SAPCDeployment/SLES12_SP2/Updates/  
installation-server/shares/repositoriesUpdater.sh -p /mnt/  
images/SAPCDeployment/SLES12_SP2/Updates/
```

If temporary IP addresses were needed to be created, remove them in both blades, otherwise skip this step:

```
<Host_1>:# ip addr flush dev br_mgmt
```

```
<Host_2>:# ip addr flush dev br_mgmt.
```

16. Reboot both blades.

```
<Host_1>:# reboot
```

```
<Host_2>:# reboot
```

17. After reboot, SSH access to both blades is available.



```
<InstallationServer>:# ssh root@<Host_1>
```

```
<InstallationServer>:# ssh root@<Host_2>
```

3.5 Host Configuration

3.5.1 Remote Trust Connection

Establish a remote trust relation between the blade hosting SC-1 and the blade hosting SC-2. This avoids asking for the password every time an SSH connection is needed.

Steps

1. Access the first host and generate the private and public key pair.

```
<InstallationServer>:# ssh root@<Host_1_IP>
```

```
<Host_1>:# ssh-keygen -t rsa
```

Note: Press Enter for every question requested.

```
Generating public/private rsa key pair.
Enter file in which to save the key (/root/.ssh/id_rsa):
Created directory '/root/.ssh'.
Enter passphrase (empty for no passphrase):
Your identification has been saved in /root/.ssh/id_rsa.
Your public key has been saved in /root/.ssh/id_rsa.pub.
The key fingerprint is:
```

2. Execute the following command.

```
<Host_1>:# ssh-copy-id -i root@<Host_1>
```

```
<Host_1>:# ssh-copy-id -i root@<Host_2>
```

3. Repeat the previous steps for the second host machine.

```
<InstallationServer>:# ssh root@<Host_2_IP>
```

```
<Host_2>:# ssh-keygen -t rsa
```

Note: Press Enter for every question requested.

```
Generating public/private rsa key pair.
Enter file in which to save the key (/root/.ssh/id_rsa):
Created directory '/root/.ssh'.
Enter passphrase (empty for no passphrase):
Your identification has been saved in /root/.ssh/id_rsa.
```



Your public key has been saved in /root/.ssh/id_rsa.pub.
The key fingerprint is:

4. Execute the following command.

```
<Host_2>:# ssh-copy-id -i root@<Host_1>
```

```
<Host_2>:# ssh-copy-id -i root@<Host_2>
```

3.6 SAPC Deployment

Steps

1. Access the DMX from the installation server and make sure that all the blades in the system are powered off (LOCKED), except the blade hosting SC-1 and the blade hosting SC-2.

Attention!

At this stage, the procedure depends on the hardware.

a. BSP 8100

```
InstallationServer:# ssh -p 2024 advanced@<DMX>
```

```
DMX:> show-table
```

```
ManagedElement=1,DmxcFunction=1,Eqm=1,VirtualEquipment=
SAPC -m Blade -p userLabel,bladeId,administrativeState
```

```
=====
| bladeId | userLabel | administrativeState |
=====
| 0-1     | SC-1     | UNLOCKED           |
| 0-11    | PL-6     | UNLOCKED           |
| 0-13    | PL-7     | UNLOCKED           |
| 0-15    | PL-8     | UNLOCKED           |
| 0-17    | PL-9     | UNLOCKED           |
| 0-19    | PL-10    | UNLOCKED           |
| 0-21    | PL-11    | UNLOCKED           |
| 0-23    | PL-12    | LOCKED              |
| 0-3     | SC-2     | UNLOCKED           |
| 0-5     | PL-3     | UNLOCKED           |
| 0-7     | PL-4     | UNLOCKED           |
| 0-9     | PL-5     | UNLOCKED           |
=====
```

b. NSP 6.1



```
InstallationServer:# ssh -p 2024 expert@<DMX>
```

```
DMX:> show table ManagedElement 1 DmxFunctions 1
BladeGroupManagement 1 Group SAPC ShelfSlot Blade 1
userLabel | select Blade administrativeState
```

If there is any blade other than the ones hosting SC-1 and SC-2 powered on (UNLOCKED), power it off (LOCKED).

```
DMX:> configure
```

a. **BSP 8100**

```
DMX:(config)>
ManagedElement=1,DmxcFunction=1,Eqm=1,VirtualEquipment=
SAPC,<Blade=0-23>,administrativeState=LOCKED
```

b. **NSP 6.1**

```
DMX:(config)% set ManagedElement 1 DmxFunctions 1
BladeGroupManagement 1 Group SAPC ShelfSlot <0-23> Blade
1 administrativeState locked
```

```
DMX:(config)> commit
```

In this example, **Blade=0–23** means blade 12 from subrack 0. Exit from the CLI.

```
DMX:> exit
```

2. From the installation server, copy and rename the necessary files to the blade hosting SC-1.

```
InstallationServer:# scp /home/SAPCInstallation/
vdp_sapc_qcow2_cxp9032851_<revision>/host-config.tar.gz
root@<Host_1>:/mnt/store/SAPC/
```

```
InstallationServer:# scp /home/SAPCInstallation/
vdp_sapc_qcow2_cxp9032851_<revision>/
sapc_sc-1_cxp9032851_<revision>.qcow2 root@<Host_1>:/mnt/images/
originalImage/sapc_sc-1_cxp9030138.qcow2
```

```
InstallationServer:# scp /home/SAPCInstallation/
vdp_sapc_qcow2_cxp9032851_<revision>/adapt_cluster_PNF*.cfg
root@<Host_1>:/mnt/images
```

```
InstallationServer:# ssh root@<Host_1>
```

```
Host_1:# cd /mnt/store/SAPC/
```

```
Host_1:# tar xvfz /mnt/store/SAPC/host-config.tar.gz
```

3. Resize the QCOW2 image file.



```
InstallationServer:# ssh root@<Host_1>
```

```
Host_1:# qemu-img resize /mnt/images/originalImage/  
sapc_sc-1_cxp9030138.qcow2 100G
```

4. Create a file <mac_base_file> under /mnt/images/interfaces with the base MAC addresses for PL-3 and PL-4.

Attention!

At this stage, the procedure depends on the hardware.

a. BSP 8100

```
InstallationServer:# ssh -p 2024 advanced@<DMX>
```

```
DMX:> show-table  
ManagedElement=1,DmxcFunction=1,Eqm=1,VirtualEquipment=  
SAPC -m Blade -p userLabel,firstMacAddr -c  
((userLabel=="PL-3")||(userLabel=="PL-4"))
```

```
=====
| userLabel | firstMacAddr      |
=====
| PL-3      | A4:A1:C2:E9:E7:ED |
| PL-4      | A4:A1:C2:E9:E7:A7 |
=====
```

b. NSP 6.1

```
InstallationServer:# ssh -p 2024 expert@<DMX>
```

```
DMX:> show table ManagedElement 1 DmxFunctions 1  
BladeGroupManagement 1 Group SAPC ShelfSlot Blade 1  
userLabel | select Blade firstMacAddress | match "PL-3|  
PL-4"
```

```
0-1      1      PL-3      a4:a1:c2:e9:e7:ed  
0-3      1      PL-4      a4:a1:c2:e9:e7:a7
```

Exit from the CLI.

```
DMX:> exit
```

In this example, the file /mnt/images/interfaces/<mac_base_file> is created with the following content.



```
A4:A1:C2:E9:E7:ED
A4:A1:C2:E9:E7:A7
```

5. To create the `/mnt/images/ PL_interfaces` file for the **PL-3** and **PL-4**, execute:

```
Host_1:# pushd /mnt/images
```

Attention!

At this stage, the procedure depends on the hardware.

a. BSP 8100

i. GEP5 Boards

```
Host_1:# /mnt/store/SAPC/host-config/scripts/management/ →
build_PLinterfaces.sh 2 BSP /mnt/images/interfaces/<mac_ →
base_file>
```

ii. GEP7 Boards

```
Host_1:# /mnt/store/SAPC/host-config/scripts/management/ →
build_PLinterfaces.sh 2 BSP_GEP7 /mnt/images/interfaces/ →
<mac_base_file>
```

b. NSP 6.1

```
Host_1:# /mnt/store/SAPC/host-config/scripts/
management/build_PLinterfaces.sh 2 NSP /mnt/images/
interfaces/<mac_base_file>
```

File `PL_interfaces` created successfully

This is an example of the output.

```
# PL-3
interface 3 eth0 ethernet a4:a1:c2:e9:e7:f2
interface 3 eth1 ethernet a4:a1:c2:e9:e7:f3
interface 3 eth2 ethernet a4:a1:c2:e9:e7:ee
interface 3 eth3 ethernet a4:a1:c2:e9:e7:ef
# PL-4
interface 4 eth0 ethernet a4:a1:c2:e9:e7:ac
interface 4 eth1 ethernet a4:a1:c2:e9:e7:ad
interface 4 eth2 ethernet a4:a1:c2:e9:e7:a8
interface 4 eth3 ethernet a4:a1:c2:e9:e7:a9
```



```
Host_1:# popd
```

6. Create the `/mnt/images/adapt_cluster.cfg` and the `adapt_cluster.iso` specific files for this deployment. To create those files, refer to [Adapt Cluster Tool](#).
7. Copy the following files from the blade hosting SC-1 to the blade hosting SC-2 so there is a backup in case the blade is lost at any moment.

```
Host_1:# scp /mnt/images/adapt_cluster.cfg root@<Host_2>:/mnt/images/
```

```
Host_1:# scp /mnt/images/adapt_cluster.iso root@<Host_2>:/mnt/images/
```

```
Host_1:# scp /mnt/images/PL_interfaces root@<Host_2>:/mnt/images/
```

8. Perform a cleanup.

Attention!

This is a preventive step. The first time you do the installation it is not needed but in case you need to repeat it, previous installations could affect it and this step cleans everything.

```
Host_1:# /mnt/store/SAPC/host-config/scripts/management/sapc_vm-manager_cxp9030138.sh -c cleanup -x
```

9. To define the Virtual Machines, create the `sapc_vm_CXP9030138.conf` configuration file as explained in [Creating sapc_vm_CXP9030138.conf File](#) on page 38. Once created, execute:

Attention!

At this stage, the procedure depends on the hardware.

- a. **BSP 8100**

```
Host_1:# /mnt/store/SAPC/host-config/scripts/management/sapc_vm-generator_cxp9030138.sh -c /mnt/store/SAPC/host-config/config/sapc_vm_CXP9030138.conf -d /mnt/store/SAPC/host-config/VM/vms $(cat /mnt/store/SAPC/host-config/config/PNF/BSP/2SC-2LBTP/sapc_vm-generator_extra-args)
```

- b. **NSP 6.1**

```
Host_1:# /mnt/store/SAPC/host-config/scripts/management/sapc_vm-generator_cxp9030138.sh -c /mnt/
```



```
store/SAPC/host-config/config/sapc_vm_CXP9030138.conf -
d /mnt/store/SAPC/host-config/VM/vms $(cat /mnt/store/
SAPC/host-config/config/PNF/NSP/2SC-2LBTP/sapc_vm-
generator_extra-args)
```

```
-----
| VM Generator |
-----
Generating XML from 'sapc_vm_CXP9030138.conf' ...
Generating 'SCs' ...
Building 'diskManager.cfg' ['SC' block] from 'sapc_vm_CXP9030138.co →
nf' ...
Generating 'TPs' ...
No nodes for TP node type
XML successfully created under '/mnt/store/SAPC/host-config/VM/vms'
```

10. Create and boot the Virtual Machine for the SC-1.

```
Host_1:# /mnt/store/SAPC/host-config/scripts/management/
sapc_vm-manager_cxp9030138.sh -c reset -i /mnt/images/
originalImage -s 1 -x
```

```
-----
| VM Manager |
-----

Remote preconfiguration ...
Preconfiguring [<Host_1>]: '<Host_1>' -> '<Host_1>'
No public key found Generating private key ('/mnt/store/SAPC/host-c →
onfig/keys/id_rsa')...
Installing public key on '<Host_1>'...
Password:

Executing 'reset' on 'SC-1' [<Host_1>]...
```

11. Check the running state of the Virtual Machine.

```
Host_1:# virsh list --all
```

Id	Name	State
<id>	SC-1.<Host_1>	running

12. Check the **adapt_cluster** script finishes correctly as explained in Adapt Cluster Tool.

13. Create and boot the Virtual Machine for the SC-2.

```
Host_1:# /mnt/store/SAPC/host-config/scripts/management/
sapc_vm-manager_cxp9030138.sh -c reset -i /mnt/images/ -s 2 -x
```



Wait for the SC-2 to synchronize.

```
Host_1:# ssh root@192.168.100.126
```

```
SC-1:# drbd-overview
```

The output must have the following line **Connected(2*) Primar/Second UpToDa/UpToDa** like in the example:

```
0:drbd0/0 Connected(2*) Primar/Second UpToDa/UpToDa lvm-pv:
lde-cluster-vg 95.87g 48.07g
```

14. Power on PL-3 and PL-4.

Attention!

At this stage, the procedure depends on the hardware.

a. BSP 8100

```
InstallationServer:# ssh -p 2024 advanced@<DMX>
```

```
DMX:> configure
```

```
DMX:(config)>
```

```
ManagedElement=1,DmxcFunction=1,Eqm=1,VirtualEquipment=
SAPC,Blade=0-5,administrativeState=UNLOCKED
```

```
DMX:(config)>
```

```
ManagedElement=1,DmxcFunction=1,Eqm=1,VirtualEquipment=
SAPC,Blade=0-7,administrativeState=UNLOCKED
```

b. NSP 6.1

```
InstallationServer:# ssh -p 2024 expert@<DMX>
```

```
DMX:> configure
```

```
DMX:(config)% set ManagedElement 1 DmxFunctions 1
BladeGroupManagement 1 Group SAPC ShelfSlot 0-1 Blade 1
administrativeState unlocked
```

```
DMX:(config)% set ManagedElement 1 DmxFunctions 1
BladeGroupManagement 1 Group SAPC ShelfSlot 0-3 Blade 1
administrativeState unlocked
```

Commit the changes and exit from the CLI.

```
DMX:(config)> commit
```

```
DMX:> exit
```



15. Change the Key exchange algorithm in SSH configuration in NSP 6.1.

Attention!

At this stage, the procedure depends on the hardware.

- a. **BSP 8100**

Skip this step.

- b. **NSP 6.1**

```
Host_1:# echo "KexAlgorithms +diffie-hellman-group1-sha1" >> /root/.ssh/config
```

```
Host_2:# echo "KexAlgorithms +diffie-hellman-group1-sha1" >> /root/.ssh/config
```

16. Expand the rest of the blades as explained in the SAPC PNF Scale Out.
17. In case IPv6-only is configured, an additional step is required to get alarms raised when the connection with an essential router is lost. To configure these supervised gateways, refer to Configuration of supervised gateways for IPv6-only with OSPF.

3.6.1 SAPC Status Verification

For that purpose, the deployment includes a health-check script called **sapcHealthCheck**. Execute after the deployment has finished, but it is always available. For more details, refer to SAPC Advanced Troubleshooting Guideline document.

3.7 SAPC Configuration

3.7.1 Performance Management

As a result of the installation all the SAPC counters are active.

For further information on Performance Management, refer to Measurements.

3.7.2 Hardening during the Installation

Refer to Security Hardening Guide.



3.7.3 Fault Management Configuration

To be able to send alarms, configure the SNMP.

For further information on Fault Management Configuration, refer to [Fault Management](#).

For security reasons, it is highly recommended to use [CreateSNMPv3 Target](#) for Fault Management.

Also legacy versions can be used, refer to [Create SNMPv2C Target](#), [Create SNMPv1 Target](#).

3.7.4 End-User Notifications Configuration

Previous to install End-User Notification module, connectivity between SAPC and the servers (SMS Center or HTTP server) must be checked.

Besides the default value of environment variables, must be changed according to the specific deployment on-site.

For further information about these variables, refer to the [System Administrator Guide](#).

3.7.5 Licenses Configuration

Steps

1. Set the fingerprint with the value given during license ordering. Read [License Fingerprinting](#) section in [LM User Guide](#) for ELIM.
2. Install license key file following [Install License Key File](#).
3. Check the license information following [View License Information](#).

3.8 Final Backups

3.8.1 System Data Backup

To create a system data backup, follow the instructions specified in the [Backup and Restore](#).



3.8.2 Emergency Recovery Backup

The emergency recovery backup is used as part of the SAPC Emergency Recovery Procedure document.

Steps

1. From the installation server, access the blade hosting SC-1.

```
<InstallationServer>:# ssh root@<Host_1>
```

2. Bring down all guests.

```
<Host_1>:# /mnt/store/SAPC/host-config/scripts/management/
sapc_vm-manager_cxp9030138.sh -c stop
```

3. Shrink the images.

```
<Host_1>:# mkdir /mnt/images/tmp_sparsify
```

```
<Host_1>:# export TMPDIR=/mnt/images/tmp_sparsify
```

```
<Host_1>:# virt-sparsify --check-tmpdir continue /mnt/images/
sapc_sc-1_cxp9030138.qcow2 /mnt/images/
sapc_sc-1_cxp9030138.qcow2.SHRUNK
```

```
<Host_1>:# mv /mnt/images/
sapc_sc-1_cxp9030138.qcow2.SHRUNK /mnt/images/
sapc_sc-1_cxp9030138.qcow2
```

```
<Host_1>:# ssh root@<Host_2>
```

```
<Host_2>:# mkdir /mnt/images/tmp_sparsify
```

```
<Host_2>:# export TMPDIR=/mnt/images/tmp_sparsify
```

```
<Host_2>:# virt-sparsify --check-tmpdir continue /mnt/images/
sapc_sc-2_cxp9030138.qcow2 /mnt/images/
sapc_sc-2_cxp9030138.qcow2.SHRUNK
```

```
<Host_2>:# mv /mnt/images/
sapc_sc-2_cxp9030138.qcow2.SHRUNK /mnt/images/
sapc_sc-2_cxp9030138.qcow2
```

```
<Host_2>:# exit
```

4. Copy all the qcow2 files to the external device. Access one by one all the host machines and copy the following from each of them.

```
<Host_1>:# scp /mnt/images/*.qcow2 <user>@<EXTERNAL_DEVICE>:/
<EXTERNAL_BACKUP_DIRECTORY>
```

5. Bring up all guests.



```
<Host_1>: # /mnt/store/SAPC/host-config/scripts/management/  
sapc_vm-manager_cxp9030138.sh -c restart
```




4 Installation for Geographical Redundancy Deployment

To perform the SAPC installation on Geographical Redundancy, install SAPC1 and SAPC2 clusters as stated in [Installation for Standalone Deployment](#) on page 7, also create the **adapt_cluster.cfg** file according to the desired Geographical Redundancy (Active-Active or Active-Standby). To create those files, refer to Adapt Cluster Tool.

- SAPC1 Cluster: Configure this cluster as Preferred.

Note: For Active-Standby Geographical Redundancy the Preferred SAPC is the recommended to be the Active SAPC.

- SAPC2 Cluster: Configure this cluster as Non-Preferred.

Note: For Active-Standby Geographical Redundancy the Non-Preferred SAPC is the recommended to be the Standby SAPC.



5 SAPC PNF Deployment Annex

5.1 Creating sapc_vm_CXP9030138.conf File

Steps

1. From the InstallationServer access <Host_1> .

```
<InstallationServer>:# ssh root@<Host_1>
```



```
<Host_1>:# cd /mnt/store/SAPC/host-config/config/
```
2. There is one directory per hardware:

PNF/BSP/2SC-2LBTP for BSP 8100.

PNF/NSP/2SC-2LBTP for NSP 6.1.
3. There you can find the sapc_vm_CXP9030138.conf file. Execute the following command for the file chosen:

Attention!

At this stage, the procedure depends on the hardware.

a. BSP 8100

```
<Host_1>:# cp /mnt/store/SAPC/host-config/  
config/PNF/BSP/2SC-2LBTP/  
sapc_vm_CXP9030138_BSP_2SC-2LBTP.conf /mnt/store/SAPC/  
host-config/config/sapc_vm_CXP9030138.conf
```

b. NSP 6.1

```
<Host_1>:# cp /mnt/store/SAPC/host-config/  
config/PNF/NSP/2SC-2LBTP/  
sapc_vm_CXP9030138_NSP_2SC-2LBTP.conf /mnt/store/SAPC/  
host-config/config/sapc_vm_CXP9030138.conf
```

4. Next step is to modify the file /mnt/store/SAPC/host-config/config/sapc_vm_CXP9030138.conf with the specific parameters of the installation.



Do!

For both BSP 8100 and NSP 6.1 installations, the only parameter to be modified is **DestinationNode_sc** with the hostname of the blades hosting the SC-1 (<Host_1>) and the SC-2 (<Host_2>). The rest of the parameters are already customized to the desired values in the files delivered as part of the software. For other hardware, use adequate values depending on the resources.

5.1.1 Modifying the File

The parameters included in the file are explained here.

Table 3 Configuration Parameters

Parameter	Description
Count_sc	Number of system controllers. Always 2. No need to change.
Cpus_sc	Number of virtual CPU per system controller. Use the Dimensioning Guidelines to assign this value.
Mem_sc	Memory used for each system controller Virtual Machine. Use the Dimensioning Guidelines to assign this value.
Disk_sc	Disk free space for each system controller Virtual Machine. Use the Dimensioning Guidelines to assign this value.
Pinning_sc	Pinning virtual CPU assignment for each system controller Virtual Machine. Use the Dimensioning Guidelines to assign this value.
VMname_sc	Names given to the system controller Virtual Machines. No change needed.
Networks_sc	Virtual Switches to which the system controller Virtual Machines are attached. No change needed.
MACs_sc	MAC addresses used for the system controllers. No need to change.
DestinationNode_sc	Hostname of the blades where the system controllers are running.