

# **Oracle® Communications Session Router**

Installation and Platform Preparation Guide

Release 8.0

December 2017

## Notices

Copyright© 2017, 2004, Oracle and/or its affiliates. All rights reserved.

This software and related documentation are provided under a license agreement containing restrictions on use and disclosure and are protected by intellectual property laws. Except as expressly permitted in your license agreement or allowed by law, you may not use, copy, reproduce, translate, broadcast, modify, license, transmit, distribute, exhibit, perform, publish, or display any part, in any form, or by any means. Reverse engineering, disassembly, or decompilation of this software, unless required by law for interoperability, is prohibited.

The information contained herein is subject to change without notice and is not warranted to be error-free. If you find any errors, please report them to us in writing.

If this is software or related documentation that is delivered to the U.S. Government or anyone licensing it on behalf of the U.S. Government, then the following notice is applicable:

U.S. GOVERNMENT END USERS: Oracle programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, delivered to U.S. Government end users are "commercial computer software" pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, use, duplication, disclosure, modification, and adaptation of the programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, shall be subject to license terms and license restrictions applicable to the programs. No other rights are granted to the U.S. Government.

This software or hardware is developed for general use in a variety of information management applications. It is not developed or intended for use in any inherently dangerous applications, including applications that may create a risk of personal injury. If you use this software or hardware in dangerous applications, then you shall be responsible to take all appropriate fail-safe, backup, redundancy, and other measures to ensure its safe use. Oracle Corporation and its affiliates disclaim any liability for any damages caused by use of this software or hardware in dangerous applications.

Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

Intel and Intel Xeon are trademarks or registered trademarks of Intel Corporation. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. AMD, Opteron, the AMD logo, and the AMD Opteron logo are trademarks or registered trademarks of Advanced Micro Devices. UNIX is a registered trademark of The Open Group.

This software or hardware and documentation may provide access to or information about content, products, and services from third parties. Oracle Corporation and its affiliates are not responsible for and expressly disclaim all warranties of any kind with respect to third-party content, products, and services unless otherwise set forth in an applicable agreement between you and Oracle. Oracle Corporation and its affiliates will not be responsible for any loss, costs, or damages incurred due to your access to or use of third-party content, products, or services, except as set forth in an applicable agreement between you and Oracle.

# Contents

<b>1 Introduction to Platform Preparation and Software Deployment.....</b>	<b>7</b>
Acme Packet Engineered Platforms.....	7
Virtual Machines.....	7
Netra and COTS.....	8
<b>2 Netra X5-2 for Communications Software Installation.....</b>	<b>9</b>
Cable the Netra X5-2 for Communications.....	10
Available Connections.....	11
Cable the Local Console.....	12
Connect ILOM to the Netra X5 for Communications.....	13
Software Installation - Netra and Server-based Platforms.....	14
Known Issues.....	15
<b>3 The Oracle Communications OCSR as a Virtual Machine.....</b>	<b>17</b>
Hyper-threading and CPU Affinity.....	17
Host Hypervisor CPU Pinning.....	17
Configuration Overview.....	18
VLAN Support.....	19
Provisioning Entitlements.....	19
<b>4 Virtual Machine Platforms.....</b>	<b>21</b>
Create and Deploy on Amazon Elastic Compute Cloud (EC2).....	21
Performance Tuning for EC2 Instances.....	26
Create and Deploy on Oracle VM Manager.....	26
Create and Deploy on KVM.....	28
Create and Deploy on VMware®.....	29
<b>5 Boot Management.....</b>	<b>33</b>
Boot Loader Overview.....	33
Boot Parameters.....	34
Boot Parameter Definitions.....	35
Boot Flags.....	36
Changing Boot Parameters.....	36
Change Boot Parameters from the ACLI.....	36
Change Boot Parameters by Interrupting a Boot in Progress.....	37
<b>6 Formatting the Disk Volume.....</b>	<b>39</b>
40GB or Less Format Plan.....	39
40GB or More Default Format Plan.....	39
40GB or More Custom Format Plan.....	40
Formatting Procedure.....	40
Software Downgrades and Disk format on the Acme Packet 4500.....	42
<b>7 Interface Considerations for VM Platforms.....</b>	<b>43</b>

---

Software Adaptations for Physical Interfaces.....	43
COTS Interfaces.....	43
COTS Network Interfaces.....	44
The interface-mapping Branch.....	44
Working with the interface-mapping branch.....	45
interface-mapping.....	45
Serial Interfaces.....	46
 <b>8 Flash Drive Installation via Boot Media Creator .....</b>	<b>47</b>
Creating a Build Image.....	47
 <b>9 Software Upgrade.....</b>	<b>53</b>
Upgrade Checklist.....	53
Stand-alone Upgrade.....	53
Check /boot for free space.....	53
Upload the Stage 3 Boot Loader and System Image.....	54
Software Upgrade Procedure.....	54
HA Upgrade.....	55
HA Upgrade Procedure.....	55
HA Backout Procedure.....	57
 <b>A— Physical Interfaces on Acme Packet Platforms.....</b>	<b>59</b>
Acme Packet 4600 Physical Interfaces.....	60
Acme Packet 6100 Physical Interfaces.....	61
Acme Packet 6300/6350 Physical Interfaces.....	62

---

# About This Guide

This Installation and Platform Preparation Guide addresses platform preparation of platforms that support Oracle Communications Session Router version S-CZ8.0.0. This content bridges the information between physical installation and initial power on procedures. The guide takes into account the fact that a variety of platforms are supported, each one posing its own operational considerations, and presents information specific to each platform that enables proper product operation.

Whereas platform documentation for physical installation is provided by Oracle and the respective vendors, this guide addresses those details in between physical installation and service configuration. For service configuration, see the applicable Configuration Guide for your product. In addition, the information herein can help users after product deployment to, for example, identify physical interfaces.

## Related Documentation

The following table describes the documentation set for this release.

Document Name	Document Description
Acme Packet 4600 Hardware Installation Guide	Contains information about the components and installation of the Acme Packet 4600.
Acme Packet 6100 Hardware Installation Guide	Contains information about the components and installation of the Acme Packet 6100.
Acme Packet 6300 Hardware Installation Guide	Contains information about the components and installation of the Acme Packet 6300.
Acme Packet 6350 Hardware Installation Guide	Contains information about the components and installation of the Acme Packet 6350.
Release Notes	Contains information about the current documentation set release, including new features and management changes.
ACLI Configuration Guide	Contains information about the administration and software configuration of the Service Provider Oracle Communications Session Router.
ACLI Reference Guide	Contains explanations of how to use the ACLI, as an alphabetical listings and descriptions of all ACLI commands and configuration parameters.
Maintenance and Troubleshooting Guide	Contains information about Oracle Communications Session Router logs, performance announcements, system management, inventory management, upgrades, working with configurations, and managing backups and archives.
MIB Reference Guide	Contains information about Management Information Base (MIBs), Oracle Communication's enterprise MIBs, general trap information, including specific details about standard traps and enterprise traps, Simple Network Management Protocol (SNMP) GET query information (including standard and enterprise SNMP GET query names, object identifier names and numbers, and descriptions), examples of scalar and table objects.
Accounting Guide	Contains information about the Oracle Communications Session Router's accounting support, including details about RADIUS and Diameter accounting.

## About This Guide

Document Name	Document Description
HDR Resource Guide	Contains information about the Oracle Communications Session Router's Historical Data Recording (HDR) feature. This guide includes HDR configuration and system-wide statistical information.
Administrative Security Essentials	Contains information about the Oracle Communications Session Router's support for its Administrative Security license.
Security Guide	Contains information about security considerations and best practices from a network and application security perspective for the Oracle Communications Session Router family of products.
Installation and Platform Preparation Guide	Contains information about upgrading system images and any pre-boot system provisioning.
Call Traffic Monitoring Guide	Contains information about traffic monitoring and packet traces as collected on the system. This guide also includes WebGUI configuration used for the SIP Monitor and Trace application.
Header Manipulation Rule Guide	Contains information about configuring and using Header Manipulation Rules to manage service traffic.

## Revision History

Date	Description
November, 2017	<ul style="list-style-type: none"><li>Initial release</li></ul>
December, 2017	<ul style="list-style-type: none"><li>Removes stale Netra platform versioning</li></ul>

---

# Introduction to Platform Preparation and Software Deployment

This documentation explains platform preparation, power-on and software deployment to the point where the user is ready to perform service configuration. Refer to Hardware Installation documentation for rack and stack procedures.

Platform support by Oracle Communications session delivery software extends to generic platforms. As such, preparation of these platforms requires that the user perform tasks independent of their session delivery product. Although the user needs to use platform documentation for this platform-specific information, Oracle distributes this documentation to provide the user with:

- Settings required by the session delivery software.
- Guidance to procedures that apply to session delivery software.

---

## Acme Packet Engineered Platforms

Acme Packet engineered platforms are shipped with software pre-loaded on the system. When you power up the hardware for the first time, it will boot with a product image ready for configuration.

To install a newer patch release, or different version of software all together, continue to the Boot Management and Software Upgrade chapters in this guide for all considerations and procedures required to a system update.

---

## Virtual Machines

Virtual Machines (VMs) supported by Oracle Communications Session Delivery software varies across software version. Find specific version support within the context of your version's documentation.

Operation over VMs is roughly equivalent to deployment over COTS/Server hardware. Platform preparation, however, differs greatly. In addition, platform preparation differs greatly between VM platforms.

Preparation procedures that apply to all VM platforms include the following steps:

1. Make the VM template available to the VM manager.
2. Configure the VM manager to apply the template correctly for Oracle Communications Session Delivery software.

3. Power-on the VM. If the deployment is using a VM template, the system uses that template to automatically install onto the virtual drive, after which the server reboots. Deployments using raw images do not perform an installation process.

VM deployment requires extensive knowledge about the specific platform that is not documented herein. The intent of this documentation is to provide information that helps the user navigate the deployment and perform tasks that are specifically related to Oracle Communications Session Delivery software.

## Netra and COTS

---

You must provision Netra (and COTS) hardware before installing software. This includes platform-specific configuration, such as BIOS, and platform management access. Once a version of the Oracle Communications Session Router is running on a Netra or COTS platform, you simply install new software using the instructions provided in the Boot Management and Software Upgrade chapters herein.



---

## Netra X5-2 for Communications Software Installation

Oracle Communications produces a variety of software products that run on the Netra X5-2 for Communications platform, including Oracle session delivery applications.

Use the following steps to prepare the Netra X5-2 for Communications for session delivery software installation.

1. Confirm applicable firmware on the server.
  - To check the firmware versions installed in the server, go to the Oracle Integrated Lights Out Manager (ILOM) web interface, and navigate to **System Information > Firmware**.
  - Review your session delivery product Release Notes for qualified software and firmware versions.
2. Upgrade or downgrade the firmware on the server as necessary. Go to [https://docs.oracle.com/cd/E37444\\_01/index.html](https://docs.oracle.com/cd/E37444_01/index.html) for ILOM upgrade instructions.
3. Configure the BIOS settings. (Settings navigation may differ based on the BIOS version.)
  - a. Observe the boot procedure and use the documented key sequence to interrupt the boot and display the BIOS configuration dialogs. For example, pressing the F2 key is a common way to enter BIOS configuration from a terminal application that supports function keys.
  - b. Navigate to the Boot menu and, depending on the software distribution you are using, set the USB or CD as the first device followed by the disk controller.
  - c. Disable Hyper-Threading.
  - d. Disable CPU power limit.
  - e. Disable C6 Reporting.
  - f. Disable the UEFI Stack.
  - g. Change Energy Performance to Performance. (For example, set "ENERGY\_PERF\_BIAS\_CFG" mode to "PERF".)
  - h. To decrease boot up time, Oracle recommends disabling Intel PXE Boot Agent for both onboard and NIC ethernet ports. To disable the Boot Agent for the onboard ethernet ports, navigate to the OpROM option for NET0, NET1, NET2, and NET3 interfaces (for example, IO > Internal Devices) and set it to disabled.
  - i. To disable Boot Agent for NIC ethernet ports, note the blue PCIe slot number label at the back of the Netra server where the NICs are installed, then disable the OpROM option for those slots. (Note that you may be able to identify slot number through the ILOM System Information > PCI Devices menu.)
  - j. Reboot the server.

## Netra X5-2 for Communications Software Installation

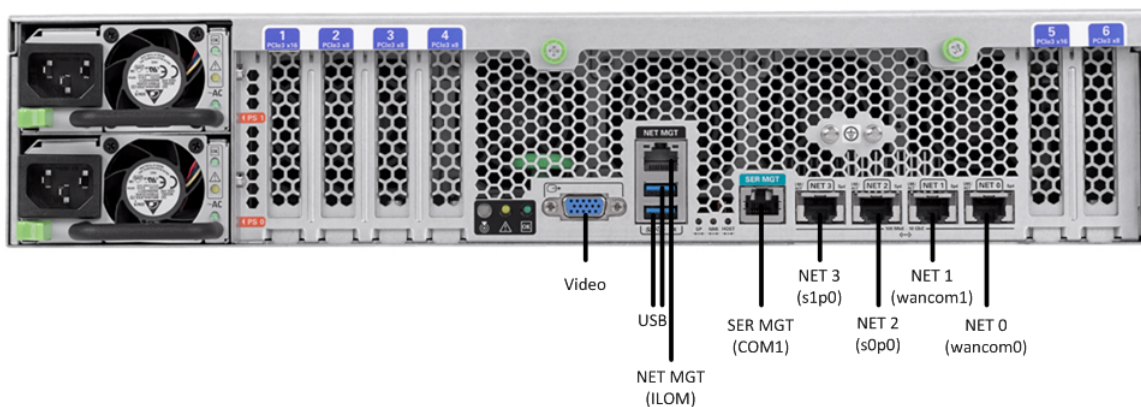
4. Initialize the HDD.
  - a. Open the ILOM remote system console to observe the system's boot cycle, and interrupt the boot cycle to enter the LSI MegaRAID status display. For example, pressing the Ctrl-R key is a common way to enter LSI MegaRAID BIOS Configuration Utility.
  - b. Navigate the utility to establish the elements of your virtual drive, typically consisting of a New Configuration with two entire HDDs.
  - c. Access the menu from which you create a virtual drive.
  - d. Set the RAID level to RAID-1.
  - e. Select all of the drives that you want.
  - f. From the Virtual Drive Management dialog, select the new drive and initialize it. For example, pressing F2 and selecting Fast Init from the command menu is a common way to execute initialization.
  - g. After initialization is complete, Escape from the LSI MegaRAID Configuration Utility and reboot the system.
5. Perform a cold shutdown by removing all system power.

## Cable the Netra X5-2 for Communications

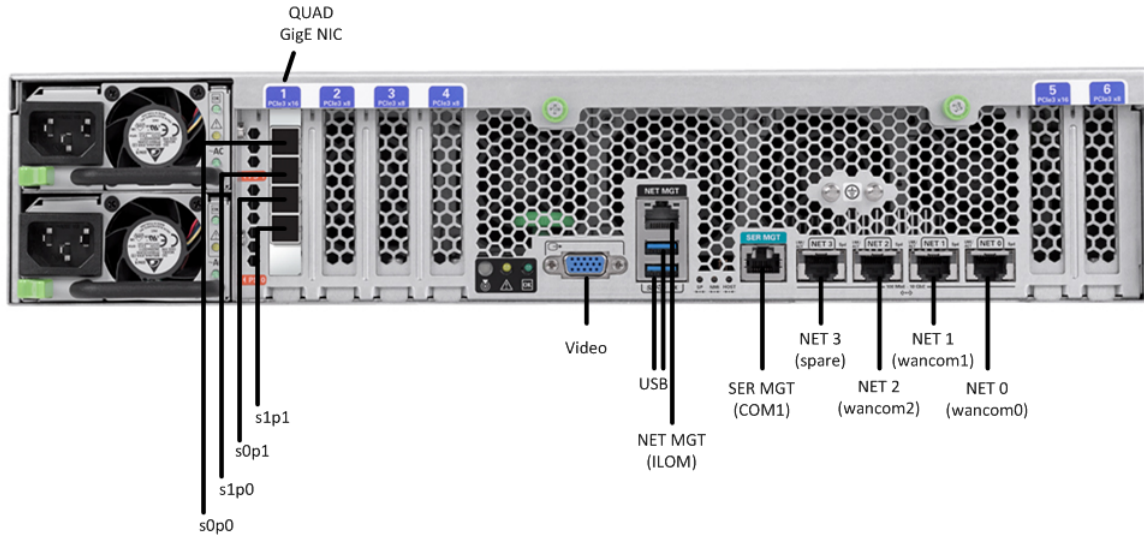
After mounting the Netra X5-2 for Communications in an equipment rack and installing all components, use the following instructions to connect all appropriate data cables to the ports before powering the system up and beginning the configuration.

Oracle supports the following configurations of the Netra X5-2 for Communications (the onboard 10 GigE ports are configured for 1G operation):

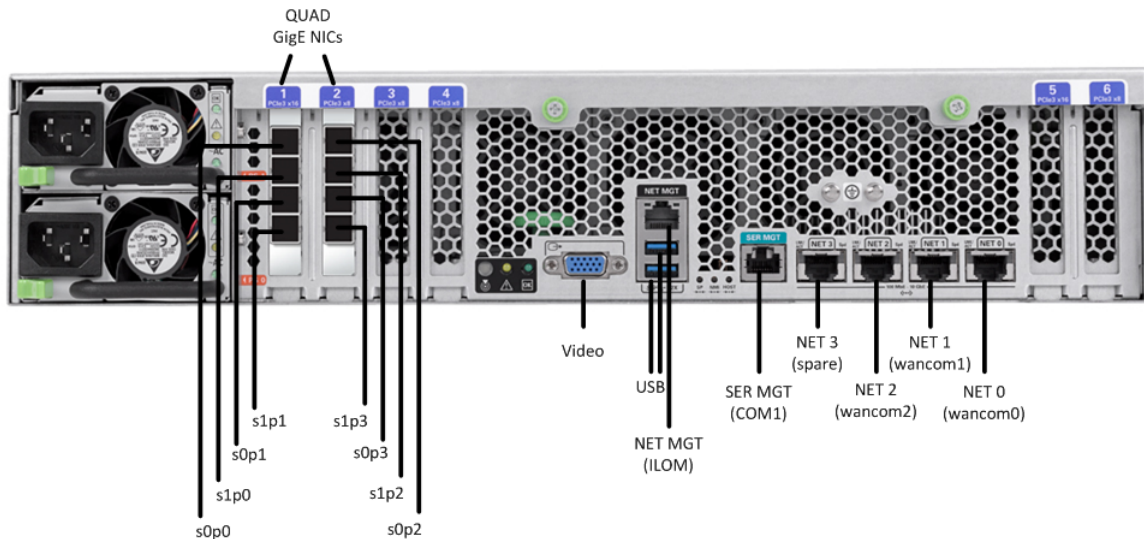
- Configuration A: Four onboard 10 GigE ports and no Quad GigE NIC
- Configuration B: Four onboard 10 GigE ports and 1 Quad GigE NIC
- Configuration C: Four onboard 10 GigE ports and 2 Quad GigE NICs



Netra X5-2 for Communications Configuration A (4 Onboard 10 GigE Ports)



Netra X5-2 for Communications Configuration B (4 Onboard 10 GigE Ports & 1 Quad GigE NIC)



Netra 5-2 for Communications Configuration C (4 Onboard 10 GigE Ports & 2 Quad GigE NICs)

Oracle recommends using Category 6 (or better) for all Ethernet connections.

You do not need to use every port for proper operation.

You can install and remove Ethernet and 1000BASE-T cables while the Netra X5-2 for Communication runs, but when you disconnect a cable the link is lost and the system generates an alarm.

## Available Connections

Please read all of the information for each of the available connections prior to cabling the Netra X5-2 for Communications.

Port	Description	You Need:
NET (0-3)	10 GigE ports - labeled Net 3, Net 2, Net 1 and Net 0 (left to right). Enables you to connect the Netra X5-2 to your network.	A Category 6 (or better) Ethernet cable to connect to the NET 0 port to your network

## Netra X5-2 for Communications Software Installation

Port	Description	You Need:
		Network parameters such as an IP address (can be provided by DHCP services or assigned a static address in the OS)  Additional Category 6 (or better) Ethernet cables and Ethernet addresses as needed for additional connections to NET 1 - 3
NET MGT	Provides a 10/100BASE-T Ethernet connection to the Service Processor (SP) through an RJ-45 connector. The NET MGT port provides support connections to the SP using the Oracle Integrated Lights Out Manager (ILOM) CLI and Web interface. By default, the NET MGT port is configured to use DHCP to automatically obtain an IP address. Alternatively, you can assign a static IP address to the NET MGT port. To use the NET MGT port, you must configure its network settings. Once configured, use the NET MGT port IP address to log on to the device using a browser or secure shell.	Category 6 (or better) Ethernet cable to connect the NET MGT port to your network  IP address for this port (required from DHCP or a static address)
SER MGT (COM1)	Provides a TIA/EIA-232 serial Oracle/Cisco standard connection to the SP through an RJ-45 connector. Default settings:  8N1: eight data bits, no parity, one stop bit  115200 baud  Disable hardware flow control (CTS/RTS)  Disable software flow control (XON/XOFF)	A terminal device (e.g., terminal, connection to a terminal server, or computer such as a laptop running terminal emulation software)  A cable to connect the terminal device to the SER MGT (COM1) port
USB	Provides USB connections to the SP. The USB ports are hot pluggable, so you can connect and disconnect USB cables from these ports and peripheral devices without affecting server operations.	USB keyboard  USB mouse  Note: Maximum USB cable length: 5 meters
VIDEO	Provides a temporary video connection to the SP.	VGA monitor  HDB-15 video cable with a maximum cable length of 6 meters (19.7 feet)

### Cable the Local Console

You can connect the Administration console to either the Oracle Integrated Lights Out Manager (ILOM) (NET MGT), the local VGA+USB console ports, or the local SER MGT (COM1) serial console port.

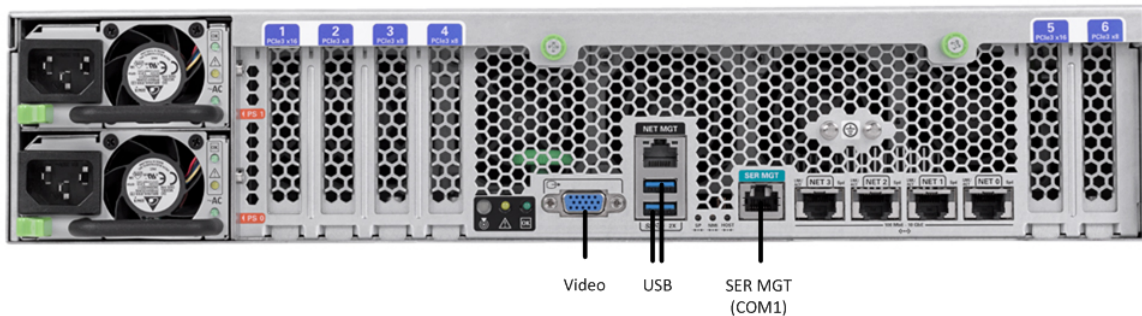
- To cable a serial console connection:
  - Serial console cable with an RJ-45 connector
- To cable a USB and Video Connection:
  - DB-15 video cable with a maximum cable length of 6 meters (19.7 feet)
  - USB cable with a maximum cable length of 6 meters (19.7 feet)
  - USB keyboard

In the following procedure, you have the option to either cable a serial connection or to cable a USB/Video connection.


 **Note:** Do not configure COM2 in the bootparams menu.

When configuring boot loader parameters, set the console to VGA when you use ILOM or VGA+USB, or to COM1 when you use SER MGT. The boot loader is accessible on all console ports, but only input from the active console port can be recognized by the Netra X5-2 for Communications.

1. Locate the appropriate cables to connect to the Netra X5-2 for Communications.
2. To cable a serial connection, insert the serial console cable into the SER MGT (COM1) port.




Connecting to USB, VGA and SER MGT (COM1) Ports

 **Note:** Refer to the Netra X5-2 for Communications hardware documentation for information on how to configure the terminal application to connect to the console, and how to establish communications with the Netra X5-2 for Communications.

3. To cable a USB/Video connection, do the following:
  - a) Insert the 15-pin connector end of the video cable into the Video port.
  - b) Insert the USB cable from the mouse and keyboard into the USB ports.
4. Lead the cables neatly away from the rear panel.
5. Plug in the cables to their respective destination components.

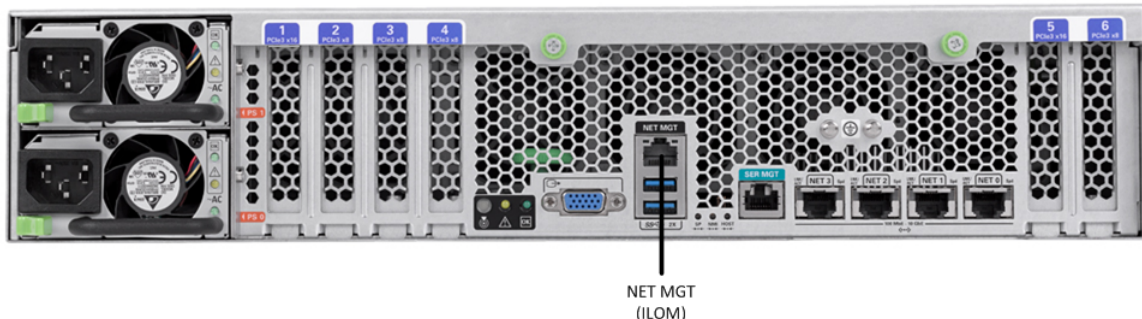
### Connect ILOM to the Netra X5 for Communications

Use the following procedure to make a connection to the Netra X5-2 for Communications Oracle Integrated Lights Out Manager (ILOM) port. For a remote permanent connection to the Service Processor over the ILOM connection, use the rear panel NET MGT port.

 **Note:** Keep Ethernet cables separated from power cables by at least 60mm where possible and never run them in the same channel of the rack without segregation.

- Category 6 (or better) Ethernet cable with RJ-45 jacks

1. Locate the cable to connect to the Netra X5-2 for Communications.
2. Plug the RJ-45 connector into the ILOM port.



3. Lead the cable neatly away from the rear panel.



4. Connect the other end of the cable to the LAN.
- Refer to the Netra X5-2 for Communications hardware documentation for information on how to configure the Web browser application to connect to the console, and how to establish communications with the Netra X5-2 for Communications.

## Software Installation - Netra and Server-based Platforms

---

Oracle Communications Session Delivery software requires software installation when deployed on Netra and Server-based.

### Install Procedure

Software installation to Netra and server-based platforms includes the following high-level steps:

1. Ensure your device is set to boot from your boot media. This may be via USB or CD.
2. Insert your installation media in any USB slot or CD drive.
3. Power up the device, observing the boot cycle.
4. When power-up is complete, the device loads the Oracle Communications Session Router software. Wait for this to complete.
5. When notified, remove the boot media and allow the device to boot to the newly installed Oracle Communications Session Router software.

(This step may not be required as some platforms support a boot priority mechanism that knows to boot from your hard drive after the installation is complete.)



**Note:** Note that the Oracle Communications Session Router boots by default to VGA (or as configured by BMC) during the installation. The user can change this to serial "temporarily" during install. Within the boot parameters and after installation, however, the user can set the boot option to VGA or serial. This setting is "permanent", meaning that any device set to boot to VGA appears "dead" at serial (and vice-versa).

### Logging Into the System

Anytime the runtime image has loaded, including the first time, the ACLI login prompt appears in your terminal application as follows:

```
User Access Verification
Password:
```

If the Oracle Communications Session Router completed booting before you connected to the console port, press the <Enter> key on the console keyboard a few times to activate the console connection.

System access in the following procedure uses the default User and Superuser passwords.

1. At the ACLI Password prompt, enter the default system User password and press <return>. Your entries are not echoed on the screen.

```
User Access Verification
Password:
ORACLE>
```

From the User prompt you can view various configuration states and operating statistic, but you can not perform configuration tasks.

2. Type enable and press <return> to enter Superuser mode. The prompt to enter the superuser password appears.

```
ORACLE> enable
Password:
```

3. Enter the Superuser password and press <return>. The system prompt will ends with a pound sign instead of a closed-angle-bracket to let you know are in Superuser mode.

Password:  
ORACLE#

From this point, you format your disk and set your boot parameters.

Disk format is required the first time you power on. Refer to the Oracle Communications Session Router's Configuration Guide to learn about further configuration procedures.

### First Steps after Software Installation

Oracle recommends the following steps after installation on COTS/Server-based platforms.

1. Execute the Oracle Communications Session Router's **format hard-disk** command, per your requirements.
2. Go to the boot parameters to set your "Target Name" to your preferred Oracle Communications Session Router name.
3. Go to the boot parameters to set your "Console Device" to com1 (serial).



**Note:** Note at the boot parameters that the default system is named `"/boot/bzImage"`. Be aware that upgrading code includes obtaining images with, for example, an SCz prefix and the .bz file extension.

4. Go to the boot parameters to set the "IP Address" to your preferred management port IP address.
5. By default, the system recognizes the first on-board interface as wancom interfaces and any subsequent interfaces as media interfaces. Configure your interfaces via ACLI explicitly, as desired.
6. Turn off the Oracle Communications Session Router using the **halt** command. This provides you with a graceful software shutdown, after which the hardware is still powered on.
7. Power down the hardware using the power switch.

## Known Issues

---

### Netra X5-2 for Communications

The **interface-mapping locate** command does not work with the Netra X5-2 for Communications onboard interfaces. The command does work with PCI interfaces installed on the platform.

The Onboard Ethernet ports of the Oracle X-series servers (X3-2, X5-2, and so on.) run natively at 10GBASE-T, which requires the use of Category 6a cabling. These ports negotiate down to 1000BASE-T or 100BASE-T, but the negotiation might not succeed when you use incompatible cables. For example, do not use Cat5/5e cables or Cat6 cables not rated for 500MHz operation.





---

## The Oracle Communications OCSR as a Virtual Machine

You can deploy version S-CZ8.0.0 of the OCSR as a Virtual Machine (VM).

Support for the OCSBC and OCSR as VMs is the same. This document refers to the OCSBC, but the reader can assume that the information applies equally to the OCSR.

VM deployment types include:

- A standalone (not orchestrated) instance Oracle Communications Session Router operating as a virtual machine running on a hypervisor, and
- Virtual Machine(s) deployed within an Orchestrated Network Functions Virtualization (NFV) environment.

Standalone OCSR VM deployment instances are always supported. Support within an orchestrated environment is dependent on orchestrator and OCSR version. High Availability configurations are supported by both deployment types.

Hypervisor platform and resource requirements are version-specific. Refer to your *Release Notes* for applicable requirements, recommendations, caveats for qualified platforms.

---

### Hyper-threading and CPU Affinity

Due to the polling operation of DPDK, using Hyper-threaded cores can degrade the OCSR's performance. Oracle recommends the user disable Hyper-threading in the host system if possible, or configure CPU affinities on the hypervisor to ensure mapping from only one virtual CPU to each physical CPU core.

The user can learn how to configure CPU affinity via their hypervisor documentation.

---

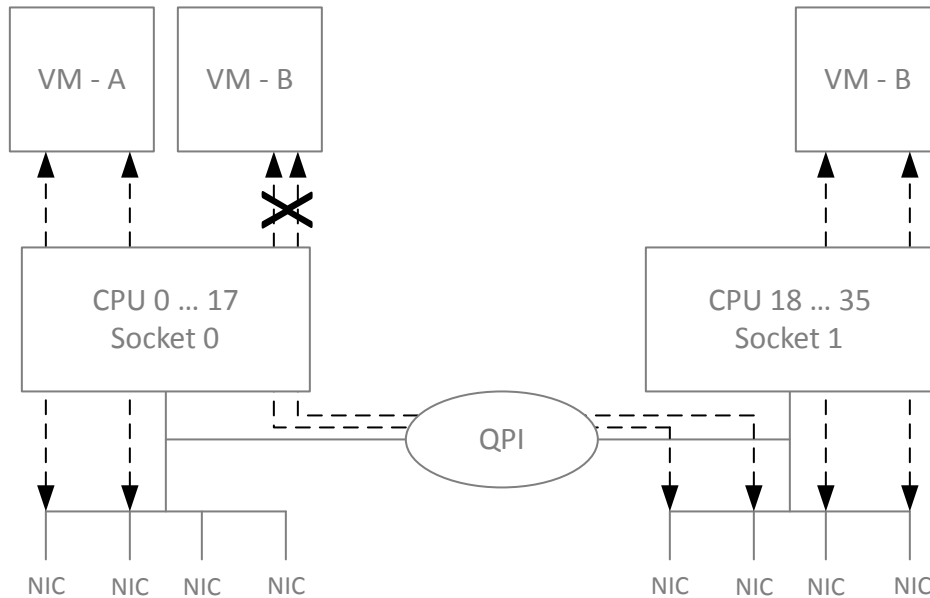
### Host Hypervisor CPU Pinning

Many hardware platforms have built in optimizations related to VM placement. For example, some CPU sockets may have faster local access to Peripheral Component Interconnect (PCI) resources than other CPU sockets. Users should ensure that VMs requiring high media throughput are optimally placed by the hypervisor, so that traversal of cross-domain bridges, such as QuickPath Interconnect (QPI), is avoided or minimized.

## The Oracle Communications OCSR as a Virtual Machine

Some hypervisors implement Non-Uniform Memory Access (NUMA) topology rules to automatically enforce such placements. All hypervisors provide manual methods to perform CPU pinning, achieving the same result.

The diagram below displays two paths between the system's NICs and VM-B. Without configuring pinning, VM-B runs on Socket 0, and has to traverse the QPI to access Socket 1's NICs. The preferred path pins VM-B to Socket 1, for direct access to the local NICs, avoiding the QPI.



The user can learn how to pin CPUs via their hypervisor documentation.

## Configuration Overview

Oracle Communications Session Router Virtual Machine (VM) deployments require configuration of the VM environment and, separately, configuration of the OCSR itself. VM-specific configuration on the OCSR includes boot parameter configuration, enabling functionality and performance tuning.

During VM installation, you can configure operational information within the system's boot parameters, including:

- IP address
- Host name

Refer to the instructions on installing the OCSR on each supported hypervisor to see how and when you do this during installation. Refer to the *ACLI Configuration Guide* for instruction on changing these settings after installation.

During VM installation, the OCSR sets default functionality, assigning cores to signaling and media forwarding. If you need DoS and/or transcoding functionality, configure the applicable cores after installation and before performing service. See the *ACLI Configuration Guide* for core configuration instructions.

Applicable performance tuning configuration after deployment includes:

- Media manager traffic/bandwidth utilization tuning
- Datapath-related CPU core allocation

See the *ACLI Configuration Guide* for instructions on VM tuning configuration.



**Note:** For Xen-based hypervisors, including EC2, the default boot mode uses DHCP to obtain an IP address for the first management interface (wancom0) unless a static IP is provisioned. Note that

DHCP on wancom0 does not support lease expiry, so the hypervisor must provide persistent IP address mapping. If persistent IP address mapping is not provided, the user must manually restart the VM whenever the wancom0 IP address changes due to a manual change or DHCP lease expiry.

Beyond installation, VM-related functional support, and VM-related tuning, you perform basic OCSR configuration procedures after installation, including:

- Setting Passwords
- Setup Product
- Setup Entitlements
- Service configuration

Refer to the *ACLI Configuration Guide* for instructions on these procedures.

Refer to the documentation listed in the *About This Guide* section of this document for other OCSR-related configuration.

## VLAN Support

---

Version S-CZ8.0.0 supports VLANs within all supported virtual machine environments and interface architectures. Refer to the *ACLI Configuration Guide* for instructions on configuring VLANs on the OCSR. Note that when you configure a VLAN, the OCSR requires VLAN tags to be included in the packets delivered to and from the VM.

Oracle recommends that you evaluate the VLAN support of your deployment's hypervisor and interface I/O mode before implementation to ensure secure support for the transmission and receiving of VLAN-tagged traffic. Please consult your hypervisor's vendor documentation for details.

## Provisioning Entitlements

---

VNF products licensing follows the standard C-series self-entitlements licensing model. Refer to the *ACLI Configuration Guide* for instructions on setting entitlements.



---

## Virtual Machine Platforms

Oracle distributes virtual machine templates, each containing a virtual disk image and default configuration for the supported profile of each VM platform. VM platform support is dependent on your Oracle product version.

This section addresses requirements associated with running applicable software as virtual machines. It also provides basic instructions on loading and starting machine templates.

VM distributors maintain extensive documentation sites. You must use those vendors' documentation for full explanations and instructions on VM deployment and operation.

---

### Create and Deploy on Amazon Elastic Compute Cloud (EC2)

The Oracle Communications Session Border Controller can be deployed on Amazon's EC2 infrastructure.

This procedure assumes the following tasks have already been completed:

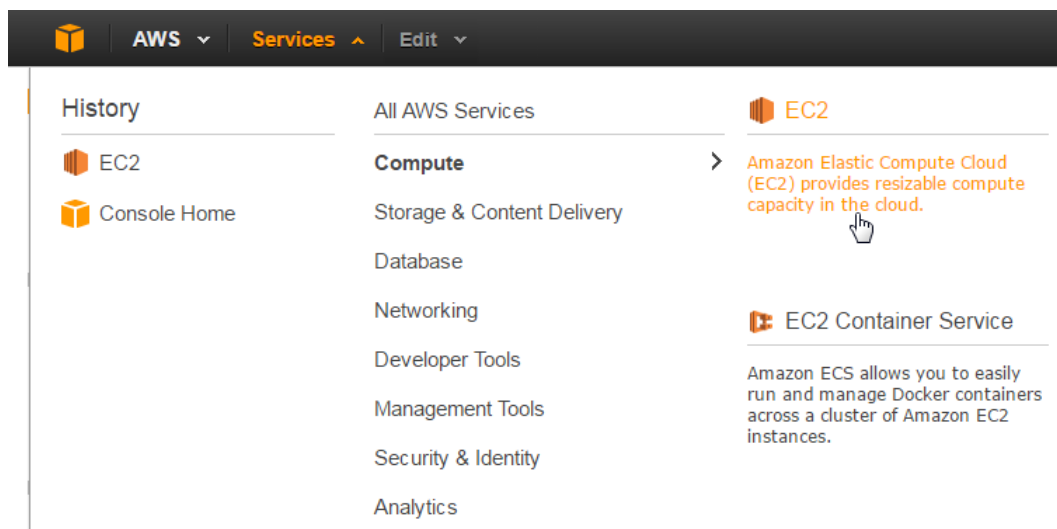
- An Amazon Virtual Private Cloud (VPC) has been configured.
- A subnet has been configured.
- A security group has configured.

Technicians must understand the environment's IP infrastructure, including the private and public addressing scheme implicit in Amazon's service infrastructure. The environment uses a complex series of translation components that protect the service's management environment from direct exposure to the service's delivery environment.

This procedure presents a deployment that uses DHCP to provide management addressing and flat networking across both management and service traffic. Your EC2 workspace may display different screens, depending on the deployment.

For information, see the [Amazon EC2 documentation](#).

1. After signing in to your AWS account, click **Services > Compute > EC2**.



2. Under Images in the left column, click **AMIs**.

3. Make sure the nnSCZ739 software is selected and click **Launch**.



**Note:** If the nnSCZ739 image is not visible, contact your Oracle Support or Sales Engineer and provide your AWS ID, so that the AMI can be shared to your account.

4. Select an instance type and click **Next**.

Oracle recommends the **c4.2xlarge** instance type, which includes 8 cores. The **c4.xlarge** instance type, which uses 4 cores, is the minimum selection. Refer to the section on Virtual Machine Resources for additional minimum platform requirements.

5. Configure the network details and click **Next**.

- Select the network to which the wancom0 management interface will connect.
- Select the subnet.

**Step 3: Configure Instance Details**  
Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances to take

**Number of instances** ⓘ 1 [Launch into Auto Scaling Group](#) ⓘ

**Purchasing option** ⓘ ☐ Request Spot instances

**Network** ⓘ vpc-9b233bff (172.31.0.0/16) (default) [Create new VPC](#)

**Subnet** ⓘ subnet-4cd0f571(172.31.128.0/20) | Sean - 172.31.4084 IP Addresses available [Create new subnet](#)

**Auto-assign Public IP** ⓘ Use subnet setting (Disable) [Create new VPC](#)

**Placement group** ⓘ No placement group [Create new subnet](#)

**IAM role** ⓘ None [Create new IAM role](#)

**Shutdown behavior** ⓘ Stop

**Enable termination protection** ⓘ ☐ Protect against accidental termination

**Monitoring** ⓘ ☐ Enable CloudWatch detailed monitoring  
[Additional charges apply.](#)

**EBS-optimized instance** ⓘ ☒ Launch as EBS-optimized instance

**Tenancy** ⓘ Shared - Run a shared hardware instance  
[Additional charges will apply for dedicated tenancy.](#)

6. Add a hard drive and click **Next**.

Select the hard drive size with the following expectations:

- 2GB for the boot partition
- 2GB for Oracle's code
- 2x the amount of RAM for swap space

With the minimum 8GB RAM required, the hard drive should be no smaller than 20GB.

7. Skip the Tags Instance section.

8. Assign a set of security forwarding rules and click **Review and Launch**.

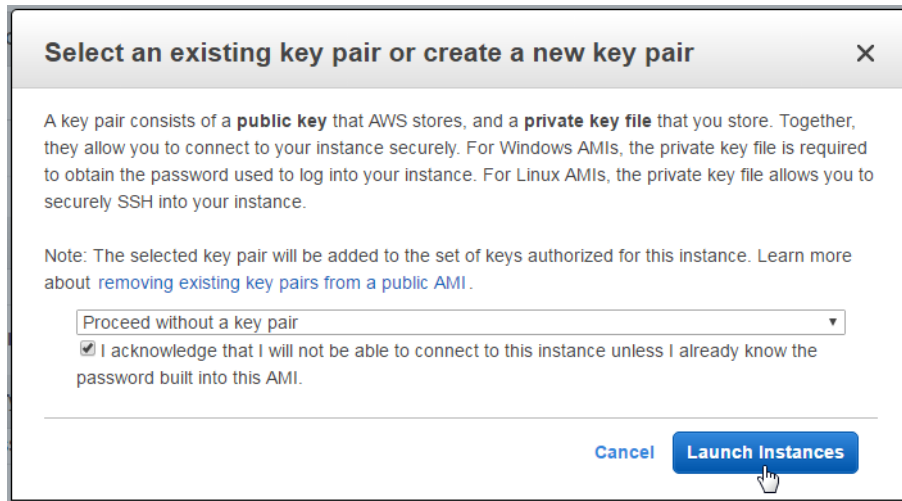
At a minimum, the virtual machine's security rules must allow inbound access on port 22.



**Warning:** To protect your management network ports, Oracle recommends limiting inbound access to the IP address range of trusted nodes (e.g. the public IP addresses of your internet proxy).

9. Launch the new virtual machine.

- Click **Launch**.
- In the key pair window, select "Proceed without a key pair."
- Check the acknowledgement box.
- Click **Launch Instances**.



10. From the Launch Status page, click **View Instances**.

In the Name column, click on the pencil icon and provide a descriptive name (e.g., nnSCZ729m1-test)

11. Configure an Elastic IP address.

- Under Network & Security in the left column, click **Elastic IPs**.
- Click **Allocate New Address** > **Yes, Allocate** > **Close**.
- Select the newly allocated IP address and click **Actions** > **Associate Address**.
- Click on the text box next to **Instance** and select your instance from the drop-down menu.
- Click **Associate**.

12. Set the user and administrative passwords.

- Under Instances in the left column, click **Instances** and click the newly created SBC.
- Under the Description tab, note the Public DNS address.
- When the virtual machine has finished initializing, SSH to the public DNS address; the username is "user" and the initial SSH password is "acme".
- Set the user password by logging in for the first time.

```
$ ssh user@ec2-54-210-129-188.compute-1.amazonaws.com
user@ec2-54-210-129-188.compute-1.amazonaws.com's password:

*ALERT*
*****
user password has not been set. Please set password now.
*****
** 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:

Notifications:
- No Valid License Present! (aid: 327702, tid: 3)
>
```

- Set the administrative password by typing **ena** at the command prompt. (The initial enable password is "packet".)



```

> ena
Password:
*ALERT*
*****
admin password has not been set. Please set password now.
*****
** 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:

Notifications:
- No Valid License Present! (aid: 327702, tid: 3)
#

```

13. Create a second management interface (wancom1) and two media interfaces (s0p0, s1p0), in that order.

- Under Network & Security in the left column, click **Network Interfaces**.
- Click **Create Network Interface**.
- Enter a name for the interface in **Description** (e.g., wancom1, s0p0, s1p0).
- Select the security group which will apply to this interface.
- Click **Yes, Create**.
- Select the newly created network interface and click **Attach**.
- In the Instance ID drop-down menu, select your virtual machine instance and click **Attach**.



**Note:** You may wish to reboot after adding each interface to ensure that they are bound in the correct order of wancom1, s0p0, s1p0.

14. Reboot the virtual machine.

```
# reboot
```

15. Verify the network interfaces have MAC addresses.

- After a reboot, SSH to the virtual machine.
- Switch to the administrative user.

```
> ena
```

- Use the **show interfaces mapping** command to verify the network interfaces have 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

```

### Performance Tuning for EC2 Instances

This section provides configuration recommendations for S-Cz739 deployments over EC2, based on Oracle session capacity testing. See the sections on *Datapath Configuration* for further explanation on the applicable configuration.

SC729m1 NFV instances deployed on EC2 operate on hosts with hyper-threading (HT) enabled. Forwarding and DOS cores should be assigned to cores based on HT CPU affinity so they do not conflict with Signaling cores. This means Forwarding and DoS cores should not share the same physical CPU on the host as a Signaling core.

#### Recommended Configuration

Oracle recommends VNF deployment using **c4.xlarge** instances, which provide 8 virtual CPUs (vCPUs). These vCPUs map to 4 physical CPUs on the host, as follows:

- Cores 0 and 4 are on the first CPU
- Cores 1 and 5 are on the second CPU
- Cores 2 and 6 are on the third CPU
- Cores 3 and 7 are on the fourth CPU

To avoid CPU contention when using the **c4.xlarge** instance, Oracle recommends the user assign cores as S-F-S-S-s-s-s-s.

The command below assign cores to S-F-S-S-s-s-s-s.

```
ORACLE(system-config) # forwarding-cores 1
```

Similarly, a deployment with DDoS uses a S-D-F-S-?-?-?-? core assignment.

The commands below assign cores to S-D-F-S-?-?-?-?.

```
ORACLE(system-config) # forwarding-cores 1
ORACLE(system-config) # dos-cores 1
```

#### Minimum Configuration

The minimum instance size is **c4.xlarge**, which provides 4 virtual CPU cores (vCPU), which maps to 2 physical CPUs on the host. Core allocation includes cores 0,2 on the first CPU, and 1,3 on the second CPU. To avoid CPU contention when using the **c4.xlarge** instance, Oracle recommends the user assign cores as S-F-s-s.

## Create and Deploy on Oracle VM Manager

---

This section provides detail on deploying Oracle Communications Session Delivery products in an Oracle Virtual Machine environment and assumes Oracle VM Manager 3.4.2. The section also assumes the user understands deployment in these environments and that the majority of deployment tasks, from hardware installation and startup to VM resource and management setup, is complete.

For information on Oracle OVM, including server and manager documentation, refer to the following links. The bottom link opens the page specifically to Oracle OVM version 3.4.2.

<http://www.oracle.com/technetwork/documentation/vm-096300.html>

[http://docs.oracle.com/cd/E64076\\_01/](http://docs.oracle.com/cd/E64076_01/)

Once hardware, VM resources and VM management are in place, the user prepares the VM management environment. High level steps include:

- Discover Oracle VM Servers
- Discover Storage (File Server or SAN)
- Create a Virtual Machine Network

- Create a Server Pool
- Create a Storage Repository



**Note:** The following procedure describes a typical deployment. The system may display different screens, depending on the deployment.

Oracle Communications Session Delivery product-specific setup steps include the following.

- Add Resources to Storage Repository
  - Import an assembly
  - Import a virtual machine template (from the assembly)
- Create a virtual machine from a template
- Configure processing resources
- Assign Networks
- Specify Boot Order
- Connect to the console
- Start your virtual machine

Use the Oracle VM Manager to deploy your VMs. Browsing the manager displays the management application, with tabs across the top for VM Manager configuration and display, and two panes providing access to controls and components for specific VM management.

Follow the steps below to deploy your VM(s):

1. From the Oracle VM Manager application Home page, navigate to the **Repositories** tab.
2. Click the **Virtual Appliances** folder on the left pane, then click the download icon from the center pane. Oracle VM Manager displays the **Import Virtual Appliance** dialog.
3. Type the URL, either the HTTP or the FTP server, of your .ova appliance into the **Virtual Appliance download location** text box.
4. Check the **Create VM** checkbox.
5. Select the server pool to which your new machine belongs from the **Server Pool** dropdown.
6. Click OK.  
Oracle VM manager creates your Virtual Machine.
7. Select **VM Files** folder on the left pane and verify the file is present.
8. Select the **Servers and VMs** tab and select the server pool.
9. Click on the **Perspective** drop down menu and select **Virtual Machines**.
10. Right click on the Virtual Machine and select **Edit**.
11. Edit your VM to configure the desired CPU, memory and core resources. Consider the following settings:
  - Operating System - Oracle Linux 7
  - Domain Type - XEN HVM PV Drivers
  - Memory - Set according to your deployment (defaults to 8G)
  - Processors - Set according to your deployment (defaults to 4)
12. Open the **Networks** tab to manage your networks using the **Network** drop-down selection box. OVM does not display MAC addresses until the user applies the configuration.  
The OCSR enumerates and binds network interfaces in the order presented by the hypervisor to the virtual machine. If it presents 3 or less interfaces, the bind order is wancom0, s0p0, s1p0. If it presents more than 3 interfaces, the bind order is:
  1. wancom0
  2. wancom1
  3. wancom2
  4. spare
  5. s0p0

6. slp0
7. s0p1
8. slp1

If your hypervisor randomly allocates addresses for network interfaces, the interface order at the hypervisor does not necessarily match that at the OCSR. You can use the **interface-mapping show** command to determine the MAC address to interface order, and if necessary, adjust it using the **interface-mapping swap** command.

13. If you want to increase the default disk size, click the **Disks** tab and the pencil icon to set a larger disk size.  
Do not decrease disk size.
14. Click the **Boot Order** tab and ensure that Disk is the first (or only) option in the boot order list.
15. Click OK.  
The system applies your settings to your VM.
16. Click the **Console** icon from the menu bar.  
Oracle VM Manager displays a terminal screen with the serial CLI operational.
17. Highlight the target and click the **Start** button.  
Oracle VM Manager starts your VM, displaying the startup sequence and, ultimately, providing ACLI access in the console.

## Create and Deploy on KVM

---

For complete KVM documentation, refer to <http://www.linux-kvm.org/page/Documents>.

1. Install the Virtualization Host group and virt-install.

```
# yum groupinstall "Virtualization Host"
# yum install virt-install
```

2. Extract the image.


```
# tar xvf nnSCZ739.64-img-vm_kvm.tar
nnSCZ739.64-img-vm_kvm.ovf
nnSCZ739.64-img-vm_kvm.qcow2
legal.txt
```

3. Use virt-manager to create the management and media network interfaces.

- Create a virtual bridged network for management interfaces.
- Create virtual networks for media interfaces.


4. Provision a new virtual machine.

```
# virt-install \
  --name SBC739 \
  --description "nnSCZ739 KVM" \
  --os-type=Linux \
  --os-variant=rhel7 \
  --ram=8192 \
  --vcpus=4 \
  --disk path=/opt/nnSCZ739.64-img-vm_kvm.qcow2,bus=virtio,size=10,format=qcow2 \
  --network bridge=br-Mgmt \
  --network bridge=br-Mgmt \
  --network bridge=br-Mgmt \
  --network bridge=br-Mgmt \
  --network network=media1 \
  --network network=media2 \
  --import \
  --cpu host
```

 **Note:** Use interface-mapping to pin the four br-Mgmt network interfaces to wancom0, wancom1, wancom2, and spare.

- name** Identify a unique name for the virtual machine on this hypervisor.
- description** Describe this virtual machine.
- os-type** Specify the operating system type.
- os-variant** Optimize the configuration for a specific operating system.
- ram** Allocate a specific amount of RAM to this virtual machine.
- vcpus** Allocate a specific number of virtual CPUs to this virtual machine.
- disk** Specify the path to the disk image.
- network** Connect the virtual machine to a host network.
- import** Skip the operating system installation process and build a guest around the disk image specified with **--disk**.
- cpu** Configure the CPU model and CPU features exposed to the virtual machine.

See `man virt-install` for more information.

 **Note:** The **--cpuset** and **--numatune** options may be used to establish CPU affinity and socket pinning.

## Create and Deploy on VMware®


This section provides detail on deploying Oracle Communications Session Delivery products over the ESXI hypervisor and assumes VMware 6. The section also assumes the user understands deployment in these environments and that the majority of deployment tasks, from hardware installation and startup to VM resource and management setup, is complete.

For information on VMware 6, which is also supported, refer to the following link.

<https://www.vmware.com/support/pubs/vsphere-esxi-vcenter-server-6-pubs.html>

Before You Begin:

- Confirm that the VMware version 6 Hypervisor is installed on an appropriate network server.
- Confirm that the server has 40GB of space for this installation.

 **Note:** The following procedure describes a typical deployment. The system may display different screens, depending on the deployment.

Detail on Oracle Communications Session Delivery product-specific setup steps is shown below.

1. On the vSphere Client application Home page, go to File > Deploy OVF Template File.
2. On the Source screen, browse to the target .ova file, and click Next.
3. On the End User License Agreement screen, click Accept and click Next.
4. On the Name and Location screen, do the following and click Next.
  - Name. Enter a name for the template.
  - Inventory Location. Select the location where you want to deploy the template.
5. On the Host / Cluster screen, select the host or cluster where you want to run the deployed template, and click Next.
6. If applicable to your deployment, select the resource, from the Resource Pool screen, in which you want to deploy this template, and click Next.
7. On the Storage screen, select the destination storage for the virtual machine files, and click Next.
8. On the Disk Format screen, select Thick Provisioned Lazy Zeroed, and click Next.

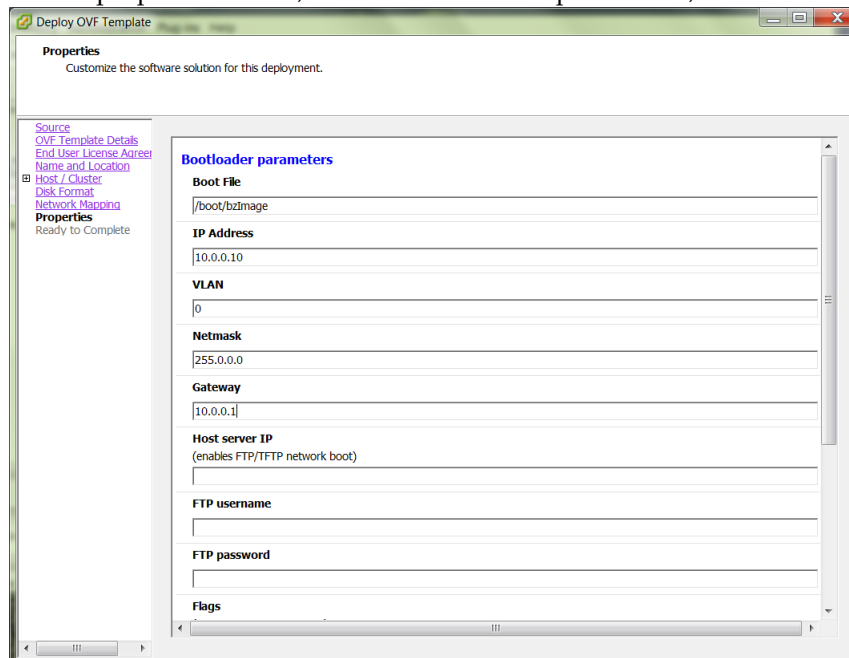
9. On the Network Mapping screen, map the networks used in this template to networks in your inventory, and click Next.

The OCSR enumerates and binds network interfaces in the order presented by the hypervisor to the virtual machine. If 3 or less interfaces are presented, the bind order is wancom0, s0p0, s1p0. If more than 3 interfaces are presented, the bind order is:

1. wancom0
2. wancom1
3. wancom2
4. spare
5. s0p0
6. s1p0
7. s0p1
8. s1p1

If your hypervisor randomly allocates addresses for network interfaces, the interface order at the hypervisor does not necessarily match that at the OCSR. You can use the **interface-mapping show** command to determine the MAC address to interface order, and if necessary, adjust it using the **interface-mapping swap** command.

10. On the properties screen, enter the bootloader parameters, and click Next.



**Note:** Do not enter plaintext values in the password fields.

11. On the Ready to Complete screen, review the selections, and do one of the following:

- Edit a previous screen by way of the Back button.
- When the edits are completed, or if no edits are required, click Finish

The system displays the Deploying screen.



When the Deploying screen closes, VM creation and deployment is completed.





---

## Boot Management

Boot Management includes the tasks needed to ensure the system is operating according to the users requirements as it starts up. Requirements met by properly managing system boot include defining management access IP, specifying the load to boot and specifying a system name. The user may set this information manually or configure the operational environment to provide it.

Boot management consists of tasks working with the following:

- **Boot Loaders**—The user needs to perform file management tasks to ensure that the software used to boot the system is compatible with the application system software itself. This typically includes verifying boot loader and application system software version for compatibility and placing the correct boot loader software in the correct location.
- **Boot Parameters**—The user sets boot parameters to specify their requirements for boot, including defining management access IP, specifying the load to boot and specifying a system name.
- **Boot Flags**—The user can, optionally, set special boot parameters called boot flags to further define how the system boots. The user may also set boot flags for diagnostic purposes under the guidance of Oracle support personnel.

---

## Boot Loader Overview

Boot loader software loads the application to run on a platform. As such, boot loader software must be correct before system startup. Oracle Communications Session Delivery product distributions include and install the correct boot loader during application installation, meaning you need not consider boot loader version during first installation procedures. Application software upgrades do not update boot loaders. For this reason, you need to verify this compatibility manually. The following topics provide information about identifying the need and performing the updates.

### Stage1 and Stage2 Boot Loaders

Stage1 and Stage2 are only used with the Acme Packet 4500 platform.

### Stage3 Boot Loader

Every new software release includes a system software image and a Stage3 boot loader. Oracle recommends you update this boot loader with every software upgrade, as described in the Software Upgrade section. Be sure to perform this update before booting the new system image.

The Stage3 boot loader is generally backward compatible with previous releases, but Oracle recommends that the Stage3 boot loader be installed from the same Major.Minor version as the system image. It is not

## Boot Management

---

normally necessary to update the boot loader when installing a maintenance or patch release when the Major.Minor release is the same.

For example, the same nnSCZ720.boot can be used with S-CZ720, S-CZ720m1, and so forth system software. But it should be upgraded when installing S-CZ730 system software to match that Major.Minor release.

The boot loader file name corresponds to the software image filename. For example, if the software image filename is nnECZ720.64.bz, the corresponding Stage3 boot loader filename is nnECZ720.boot. The Stage3 boot loader is compatible with previous releases.

Stage 3 boot loader upgrade procedure can be found in the [Update the Stage 3 Bootloader](#) section of this guide.



**Note:** The OCSR does not support uploading the boot loader by way of the Web GUI.

## Boot Parameters

---

Boot parameters specify the information that your device uses at boot time when it prepares to run applications.

This section explains how to view, edit, and implement device's boot parameters, and boot flags. Boot parameters:

- Allow you to set the IP address for the management interface (wancom0).
- Allow you to set a system prompt. The target name parameter also specifies the title name displayed in your web browser and SNMP device name parameters.
- Specify the software image to boot and from where the system boots that image.

Boot flags are arguments to a specific boot parameter, and allow functional settings, such as the use of DHCP for acquiring a management port address, as well as various diagnostic startup configurations.

Configuring boot parameters has repercussions on your system's physical and network interface configurations. When you configure these interfaces, you can set values that might override the boot parameters.

The bootparam configuration list is shown below.

```
[Acme Boot]: p
Boot File      : /boot/bzImage
IP Address     : 172.44.12.89
VLAN           :
Netmask        : 255.255.0.0
Gateway        : 172.44.0.1
IPv6 Address   :
IPv6 Gateway   :
Host IP        :
FTP username    :
FTP password    :
Flags          : 0x00000040
Target Name     : ORACLE
Console Device  : COM1
Console Baudrate : 115200
Other           :

[Acme Boot]: ?
?              - print this list
@              - boot (load and go)
p              - print boot params
c              - change boot params
v              - print boot logo with version
```

r	- reboot
s	- show license information

## Boot Parameter Definitions

The system displays all boot parameters when the user configures them after a boot interrupt. The system hides some boot parameters from the ACLI because the user should not configure them. If changed improperly, these parameters can cause the system to fail.

The following table defines each of the parameters that are visible when the user configures after a boot interrupt.

Boot Parameter	Description
Boot File	The name and path of the software image you are booting. Include the absolute path for a local boot from the local /boot volume and for a net boot when a path on the FTP server is needed.
IP Address	IP address of wancom0.
VLAN	VLAN of management network over which this address is accessed. Note: VLANs over management interfaces are not supported on the Acme Packet 4600 And Acme Packet 6xxx.
Netmask	Netmask portion of the wancom0 IP Address.
Gateway	Network gateway that this wancom0 interface uses.
IPv6 address	Version 6 IP address/mask of wancom0. Configure the mask as a forslash (/) after the address followed by the mask in number of bits.
IPv6 Gateway	Version 6 network gateway that this wancom0 interface uses.
Host IP	IP Address of FTP server from which to download and execute a software image.
FTP Username	FTP server username
FTP password	FTP server password
Flags	Codes that signal the system from where to boot. Also signals the system about which file to use in the booting process. This sequence always starts with 0x (these flags are hexadecimal).
Target Name	Name of the Oracle Communications Session Router as it appears in the system prompt. For example, ORACLE> or ORACLE#. You need to know the target name if you are setting up an HA node.  This name is required to be unique among Oracle Communications Session Routers in your network. This name can be 63 characters or less.
Console Device	Serial output device type, dependent on platform. COM1 applies to virtual serial consoles, VGA to virtual video console. VGA is the default on VMware and KVM. COM1 is the default on OVM and EC2.
Console Baud Rate	The speed in bits per second which the console port operates at. It operates at 115200 BPS, 8 data bits, no stop bit, parity NONE.
Other	Allows miscellaneous and deployment-specific boot settings.

### Boot Flags

Boot flags enable system boot behavior(s). The user can set a single flag, or add hex digits to set multiple flags.

- 0x00000008 Bootloader ~7 seconds countdown
- 0x00000040 Autoconfigure wancom0 via DHCP enable - VM platforms only
- 0x00000080 Use TFTP protocol (instead of FTP) enable - VM platforms only
- 0x00000100 Bootloader ~1 seconds quick countdown - VM platforms only

The following boot flags should only be used as directed by Oracle support:

- 0x00000001 acme.ko network module security override
- 0x00000002 Kernel debug enable
- 0x00000004 Crashdump disable
- 0x00000010 Debug sshd enable
- 0x00000020 Debug console enable getty
- 0x00001000 Userspace debug enable
- 0x00100000 Uniprocessor enable (SMP disable)
- 0x20000000 Fail-safe boot enable
- 0x40000000 Process startup disable (flatspin mode)

Never enter any other values without the direction of Oracle support. Some diagnostic flags are not intended for normal system operation.

## Changing Boot Parameters

---

You can access and edit boot parameters by using either the ACLI or by interrupting the system boot process.



**Note:** Changes to boot parameters do not go into effect until you reboot the system.

### Change Boot Parameters from the ACLI

To access and change boot parameters from the ACLI:

1. In Superuser mode, type `configure terminal`, and press Enter.

```
ORACLE# configure terminal
```

2. Type `bootparam`, and press Enter. The boot device parameters display.

```
ORACLE(configure)# bootparam  
'.' = clear field; '-' = go to previous field; q = quit  
Boot File      : /boot/nnSczl00.bz
```

To navigate through the boot parameters, press Enter and the next parameter appears on the following line.

You can navigate through the entire list this way. To go back to a previous line, type a hyphen (-) and press Enter. Any value that you enter entirely overwrites the existing value and does not append to it.

3. To change a boot parameter, type the new value that you want to use next to the old value. For example, if you want to change the image you are using, type the new filename next to the old one. You can clear the contents of a parameter by typing a period and then pressing Enter.

```
ORACLE(configure)# bootparam  
'.' = clear field; '-' = go to previous field; q = quit  
Boot File      : /boot/nnSCzl00.bz /boot/nnSCz200.bz
```

When you have scrolled through all of the boot parameters, the system prompt for the configure terminal branch displays.

NOTE: These changed parameters will not go into effect until reboot. Also, be aware that some boot parameters may also be changed through PHY and Network Interface Configurations.

```
ORACLE(configure)#
```

4. Exit the configure terminal branch.
5. Reboot the system for the changes to take effect.

The ACLI **reboot** and **reboot force** commands initiate a reboot. With the **reboot** command, you must confirm that you want to reboot. With the **reboot force** command, you do not have to make this confirmation.

```
ORACLE# reboot force
```

The system completes the full booting sequence. If necessary, you can stop the auto-boot at countdown to fix any boot parameters.

If you configured boot parameters correctly, the system prompt displays and you can go ahead with configuration, management, or monitoring tasks.



**Note:** If you configured the boot parameters incorrectly, the system goes into a booting loop and displays an error message. Press the space bar to stop the loop. Correct the error in the boot parameter, and reboot the system.

## Change Boot Parameters by Interrupting a Boot in Progress

To access and change boot parameters by interrupting a boot in progress:

1. When the system is in the process of booting, you can press the space bar on your keyboard to interrupt when you see the following message appear:

```
Press the space bar to stop auto-boot...
```

2. After you stop the booting process, you can enter the letter p to display the current parameters, the letter c to change the boot parameters or the @ (at-sign) to continue booting.

```
[Boot]: c
'.' = clear field; '-' = go to previous field; q = quit
Boot File      : /boot/nnScz100.bz
```

To navigate through the boot parameters, press Enter and the next parameter appears on the following line.

You can navigate through the entire list this way. To go back to a previous line, type a hyphen (-) and press Enter. Any value that you enter entirely overwrites the existing value and does not append to it.

3. To change a boot parameter, type the new value that you want to use next to the old value. For example, if you want to change the image you are using, type the new filename next to the old one.

```
'.' = clear field; '-' = go to previous field; q = quit
Boot File      : /boot/nnSCz100.bz /boot/nnSCz200.bz
```

4. After you have scrolled through the complete list of boot parameters, you return to the boot prompt. To reboot with your changes taking effect, type @ (the at-sign), and press Enter.

```
[Acme Packet Boot]: @
```

The system completes the full booting sequence, unless there is an error in the boot parameters.

If you have configured boot parameters correctly, the system prompt displays and you can go ahead with configuration, management, or monitoring tasks.

## Boot Management

---



**Note:** If you have configured the boot parameters incorrectly, the system goes into a booting loop and displays an error message. Press the space bar to stop the loop. Correct the error, and reboot your system.

## Formatting the Disk Volume

After the system has booted the Oracle Communications product for the first time, the hard disk must be formatted from the application. Remember that, at the chassis level, the disk system must be presented as a single logical drive.



**Note:** For systems without a separate boot flash, the **format system-disk** command combines the **/opt** and **/opt/crash** into a single system partition. This includes all systems other than the Acme Packet 4500, 4600, 6100 and 6300.

### 40GB or Less Format Plan

When formatting a 40 GB or smaller storage device, no data partitions are created. The default partitioning scheme is as follows:

**Table 1: System Default Format Plan (40 GB max):**

Location	Volume Name	Volume Size
system partition	/opt	8 GB
system partition	/opt/crash	32 GB

### 40GB or More Default Format Plan

When formatting a storage device larger than 40 GB, /mnt/sys and /mnt/app volumes are created in the data partition. Their relative sizes are based on the drive's size.

**Table 2: System Format Plan (40 GB +):**

Volume Number	Volume Name	Volume Size
system partition	/opt	8 GB
system partition	/opt/crash	2 x RAM size (not less than 8 GB)
data partition	/mnt/sys	20% remaining space
data partition	/mnt/app	80% remaining space

### 40GB or More Custom Format Plan

You can customize the format plan when a storage device larger than 40 GB is installed in your system. Before formatting the storage device, plan the number of volumes, volume names, and relative percentage of storage device disk space. A maximum of 4 volumes in the data partition are allowed.

**Table 3: Custom System Format Plan (40 GB +):**

Volume Number	Volume Name	Volume Size
systempartition	/opt	8 GB
system partition	/opt/crash	2 x RAM size (not less than 8 GB)
data partitions 1-4	/mnt/<user-label>	user-defined percentage of remaining space


### Formatting Procedure

The **format** command requires one of the following arguments:

- **system-disk** — formats and creates the 2 system partitions: /opt and /opt/crash
- **data-disk** — formats and creates 1 or more data partitions with the default (/mnt/sys and /mnt/app) or user-defined volumes
- **hard-disk** — formats and creates both the system partition and data partition

After the drive(s) are formatted, the system mounts the newly created partitions.

Use the **format hard-disk** command and argument after first system start up to fully initialize the media. The command's other arguments are applicable any other time.

 **Note:** The format command may only be executed if certain tasks like local CDR and HDR generation are not active. Remove any boot time configuration for these features and reboot the system before attempting to format the hard-disk. In addition, ensure that your device is not passing traffic while you format any partition.

The following example shows the format command process.

```
ORACLE# format hard-disk
WARNING: Please ensure device is not currently in use by any applications
before proceeding
Continue [y/n]?: y
The following system partitions will now be created:
1: /opt                8000000 bytes
2: /crash              16218284032 bytes
Create the system partitions and filesystems as configured above [y/n]?: y
*****
WARNING: All system logs and data on the disk will be
permanently erased and unrecoverable.
Are you sure [y/n]?: y
The format process will take a few minutes. Once
the format process begins, it cannot be stopped.
Please do not power down or reboot the system until
the format process is complete.
Continue [y/n]?: y
Suspending logging to hard disk
Stopping tLogCleaner task
Relocating logging onto RAM drive
Initializing /opt/ Cleaner
Starting tLogCleaner task
```



```
*** Removing previous system partitions - please wait ***
*** Creating new system partitions - please wait ***
*** Formatting partition /opt. Please wait... ***
[....]
This filesystem will be automatically checked every 23 mounts or
180 days, whichever comes first. Use tune2fs -c or -i to override.
*** Formatting completed successfully ***
*** Formatting partition /crash. Please wait... ***
[....]
This filesystem will be automatically checked every 31 mounts or
180 days, whichever comes first. Use tune2fs -c or -i to override.
*** Formatting completed successfully ***
e2fsck 1.41.14 (22-Dec-2010)
opt: clean, 11/1960 files, 1323/7812 blocks
e2fsck 1.41.14 (22-Dec-2010)
crash: clean, 11/991232 files, 104681/3959542 blocks
```

This section of the format hard-drive walk-through shows the data partition creation. The following system output shows that the user has chosen to define a custom data partition scheme by typing "n" at the following prompt.

**Use factory default data partitions [y/n]?:n**

In this case, the user creates three partitions.

```
Suspending logging to RAM drive
Stopping tLogCleaner task
Relocating logging onto hard disk
Initializing /opt/ Cleaner
Starting tLogCleaner task
Disk space used by system:
    16226317824 bytes
Use factory default data partitions [y/n]?: n
Enter the number of data partitions to create: 3
Total unallocated space = 100 %
Enter the name of volume 1 (or 'q' to quit): VOLUME1
Enter the size of the volume (in %): 20
Total unallocated space = 80 %
Enter the name of volume 2 (or 'q' to quit): VOLUME2
Enter the size of the volume (in %): 40
Total unallocated space = 40 %
Enter the name of volume 3 (or 'q' to quit): VOLUME3
Enter the size of the volume (in %): 40
The following data partitions will now be created:
/VOLUME1 96776308838 bytes
/VOLUME2 193552617676 bytes
/VOLUME3 193552617676 bytes
Create the data partitions and filesystems as configured above [y/n]?: y
*****
WARNING: All non-system data on the disk will be
permanently erased and unrecoverable.
Are you sure [y/n]?: y
The format process will take a few minutes. Once
the format process begins, it cannot be stopped.
Please do not power down or reboot the system until
the format process is complete.
Continue [y/n]?: y
*** Beginning format process ***
*** Removing previous data partitions - please wait ***
*** Creating new data partitions - please wait ***
*** Formatting partition /VOLUME1. Please wait... ***
mke2fs 1.41.14 (22-Dec-2010)
[....]
Writing inode tables: done
Creating journal (32768 blocks): done
```

## Formatting the Disk Volume

---

```
Writing superblocks and filesystem accounting information: done
This filesystem will be automatically checked every 37 mounts or
180 days, whichever comes first. Use tune2fs -c or -i to override.
*** Formatting completed successfully ***
*** Formatting partition /VOLUME2. Please wait... ***
mke2fs 1.41.14 (22-Dec-2010)
[...]
Writing inode tables: done
Creating journal (32768 blocks): done
Writing superblocks and filesystem accounting information: done
This filesystem will be automatically checked every 23 mounts or
180 days, whichever comes first. Use tune2fs -c or -i to override.
*** Formatting completed successfully ***
*** Formatting partition /VOLUME3. Please wait... ***
mke2fs 1.41.14 (22-Dec-2010)
[...]
Writing inode tables: done
Creating journal (32768 blocks): done
Writing superblocks and filesystem accounting information: done
This filesystem will be automatically checked every 31 mounts or
180 days, whichever comes first. Use tune2fs -c or -i to override.
*** Formatting completed successfully ***
*** Format finished successfully
New partitions have been created ***
*** Mounting partitions ***
e2fsck 1.41.14 (22-Dec-2010)
VOLUME1: clean, 11/5914624 files, 418265/23626953 blocks
/VOLUME1 mounted
e2fsck 1.41.14 (22-Dec-2010)
VOLUME2: clean, 11/11821056 files, 789884/47254150 blocks
/VOLUME2 mounted
e2fsck 1.41.14 (22-Dec-2010)
VOLUME3: clean, 11/11821056 files, 789884/47253628 blocks
/VOLUME3 mounted
```

Power cycle the system after format is complete. You can re-enable any tasks that may have conflicted with the format, including local CDR and HDR generation, after the power cycle is complete.



**Note:** If you find that, after the first reboot, the system has not created new partitions, perform another reboot to resolve this issue, which is created by an incorrect dynamic partition table refresh.

## Software Downgrades and Disk format on the Acme Packet 4500

---

Disk format is not always backwards compatible on the Acme Packet 4500. Users who downgrade from Oracle Session Delivery software version 7 and above to lower versions need to prepare their systems for those downgrades.

Users need to format their hard disks from the Oracle Session Delivery software on first boot after the downgrade. The format executed by version 7 software can cause issues, such as failed diagnostics functions, when downgrading to earlier version software. If you downgrade, as described, run the **format hard-disk** command from the lower version software before returning the system to service.



**Note:** Disk format erases disk data. Be sure to backup files, such as configuration and log files that you need after the format. A second format may be required to create new partitions.

---

## Interface Considerations for VM Platforms

Oracle Communications Session Router management and media traffic use separate network interfaces to connect to networks. The user configures these interfaces' properties, and then adapts other configuration elements to those interfaces. This configuration requires an understanding of the platform's mechanisms for using interfaces as well as the properties they can configure, as presented in this section.

---

### Software Adaptations for Physical Interfaces

Having been installed on a virtual machine, Oracle Communications Session Router physical interface configuration elements provide for the applicable properties and same statistics measurements as are available for Acme Packet platform interfaces. With the exception of the MACTAB file, the abstraction of these elements from those physical ports is transparent to the user.

The user must independently understand the bus or virtual network paths used by their hardware to access physical ports. Refer to your hardware or virtual machine documentation for information about proper configuration and operation related to, for example, physical port location and speed. The user must consider these system and physical details when configuring Oracle Communications Session Router **phy-interface** elements, which is documented in the *ACLI Configuration Guide*.

#### Management vs. Media Interfaces

The template Oracle provides for VM deployment selects the correct interface detail for both management and media interfaces during deployment. If you are using a manual deployment approach or you wish to change interface selection after deployment, follow these guidelines for management and media interface selection:

- Always use emulated NICs for management interfaces
- Use either Paravirtual, PCI-pt or SR-IOV I/O mode for media interfaces

---

### COTS Interfaces

Physical interfaces on COTS platforms are defined by the platform, with bussing and driver access fully independent of the Oracle Communications Session Router. Utilization of COTS interfaces by the Oracle Communications Session Router is the same as with VM interfaces. The Oracle Communications Session Router extracts physical interface MAC addressing from the platform and maps it to Oracle Communications Session Router configuration naming syntax to direct network traffic to physical interfaces based on the type of service they support.

### COTS Network Interfaces

---

The Oracle Communications Session Router maps interfaces upon first startup, based on the hardware's NIC configuration. The software looks to configure 2 management and 2 service ports for the common 4 on-board NIC configuration. The presence of additional NIC cards maps an additional management interface to the on-board NICs, leaving only a single service interface on the on-board NIC. The Oracle Communications Session Router provides a means of testing and changing physical interface assignment.

The Oracle Communications Session Router instantiates the first management port, eth0/wancom0, when it boots. The boot parameters define this addressing to enable initial management access via IP for purposes including network boot. The user does not need to configure physical (or network) interfaces for wancom0.

### The interface-mapping Branch

---

The **interface-mapping** branch resides at the root level of the Oracle Communications Session Router's ACLI. It contains a group of commands used for mapping physical interfaces on virtual machines or COTS platforms to the Oracle Communications Session Router application's configuration. The system accomplishes this using physical interface MAC addresses and ACLI configuration interface naming.

Sample default Oracle Communications Session Router interface mapping is presented below, using the **interface-mapping > show** command:

```
ORACLE(interface mapping)# show
Interface Mapping Info-----
Eth-IF  MAC-Addr                Label
wancom0 00:50:88:BC:11:12        #generic
wancom1 00:50:88:BC:61:6C        #generic
wancom2 00:50:88:BC:11:C7        #generic
spare    00:50:88:BC:61:12        #generic
s0p0     00:50:88:BC:71:79          #generic
s1p0     00:50:88:BC:21:FF        #generic
s0p1     00:50:88:BC:41:A2        #generic
s1p1     00:50:88:BC:31:AC        #generic
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
```

You can check or change **phy-interface** to MAC address configurations using the names shown under the **Eth-IF** column. You can identify the two types of physical interfaces that apply to the Oracle Communications Session Router, by the naming conventions:

- Management interfaces, shown above as wancom0, wancom1 and wancom2
- Media interfaces, shown above as s0p0, s0p1, s1p0 and s1p1

It is recommended that the user configure physical interfaces using the naming in the **Eth-IF** column above on COTS and VM platforms. These conventions, which simply use 's' for slot and 'p' for port, are visible in the **interface-mapping > show** output.

The default interface mapping assignment assumes four interfaces on the VM. If deployed with less than four, the user may need to re-assign the resulting interface mapping, which they can verify using the **interface-mapping > show** command after system start-up. If the mapping is wrong, the **interface-mapping > swap** command allows the user to correct it. The most likely change would be to swap the wancom1 mapping with a viable media interface.

## Working with the interface-mapping branch

Interface identification on the Oracle Communications Session Router is based on a system-level file called MACTAB that maps interface MAC addresses to interface naming that can be applied within Oracle Communications Session Router configuration. In most cases, users retain the default mapping. The **interface-mapping > show** command provide access to commands that allow the user see, change and even locate each interface based on this mapping. The MACTAB file is stored in the `/boot` folder. The MACTAB file ensures that interface mapping is persistent, and therefore usable, by your configuration regardless of changes to the system.

The **interface-mapping > show** command displays the current mapping. An example of a MACTAB file that a user has configured is provided below.


```
ORACLE (interface-mapping) #show
Interface Mapping Info
=====
Eth-IF      MAC-Addr      Label
wancom0     00:16:3E:30:00:2A  # ctrl port, onboard MAC
wancom1     00:16:3E:30:00:2B  # 2nd ctrl port, onboard MAC
s0p0       00:16:3E:30:00:2C  # First media interface
s1p0       00:16:3E:30:00:2D  # Second media interface
=====
```

## interface-mapping

The following table lists the **interface-mapping** commands along with their descriptions.

Command	Description
interface-mapping show	Display the existing content of <code>/boot/mactab</code> file, with the mapping information of all the available Ethernet Interface Names versus Physical Interface MAC addresses, along with any customer provided label information.
interface-mapping locate <ethernet if name> <seconds>	Lets you visually locate the Ethernet media interface. One way to achieve this is to flash the LED of the physical interface when its device name is located. This parameter indicates, in seconds, when the flashing occurs on the LED.
interface-mapping label <ethernet if name> labeling text	Lets you label the Ethernet interface identified by <eth-if-name> with a text string you define. For example, you can use a label that is meaningful for your network layout. This label is stored and then displayed as # string after the MAC address for the Ethernet interface in the <code>/boot/mactab</code> file.
interface-mapping delete <ethernet if name>	Delete an unused Ethernet interface. The unused Ethernet interface could be result of changing network configuration. For example, if you replace an old NIC with a new one, the system writes the new one into mactab file, but does not delete the old one. A confirmation step appears with warning message. When you confirm the action, this entry is deleted from <code>/boot/mactab</code> file.
interface-mapping swap <ethernet if name1> <ethernet if name2>	Swap the mapping of Ethernet interface names against the available MAC physical interfaces. For


Command	Description
	<p>example, you can first execute the interface-mapping show command to display the current information.</p> <pre>interface-mapping show</pre> <p>wancom0 00:16:3E:30:00:2A # control port, onboard MAC</p> <p>wancom1 00:16:3E:30:00:2B # 2nd control port, onboard MAC</p> <p>s0p0 00:16:3E:30:00:2C # PCI left side</p> <p>s1p0 00:16:3E:30:00:2D # PCI right side</p> <p>Then you can execute the interface-mapping swap command.</p> <pre>interface-mapping swap s0p0 s1p0</pre> <p>wancom0 00:16:3E:30:00:2A # control port, onboard MAC</p> <p>wancom1 00:16:3E:30:00:2B # 2nd control port, onboard MAC</p> <p>s0p0 00:16:3E:30:00:2D # PCI right side</p> <p>s1p0 00:16:3E:30:00:2C # PCI left side</p> <p>A warning message appears. Once you confirm the action, the MAC addresses and their corresponding labels are swapped in the /boot/mactab/file.</p>

 **Note:** The **delete** and **swap** commands require a reboot to activate the new MACTAB.

## Serial Interfaces

In lieu of IP management access, serial access provides the user with direct access to the Oracle Communications Session Router ACLI. The user must identify how their system allows for serial access. The serial interface can be a critical component of VM interface configuration as the user can make MACTAB changes via the serial interface without interrupting their own access during that management procedure.

Access to the Oracle Communications Session Router serial interface is dependent on platform. Familiarity with the platform is required to understand serial configuration.

 **Note:** Serial access is not supported on AWS.

Virtual machine management software provides a simulated serial port service from which the user gets direct serial access to each system. See your virtual machine manager's documentation for instructions on accessing these serial ports.

Serial port configuration, via boot parameters, is the same across all platforms.

---

## Flash Drive Installation via Boot Media Creator

The Boot Media Creator (BMC), is provided within Oracle Session Delivery software distributions. BMC is an application that allows the user to create a USB drive from which they can install software.

Users identify the distribution that includes BMC by filename. These filenames start with the software version, appended with the text `-img-usb.exe`.

For example, `nnSCZ725.64-img-usb.exe` is the BMC distribution of software version S-CZ7.2.5.

Run this executable on a Windows systems to create USB installation media. The provisioned USB flash drive will then be used for software installation via Netra/ COTS USB interfaces.

---

### Creating a Build Image

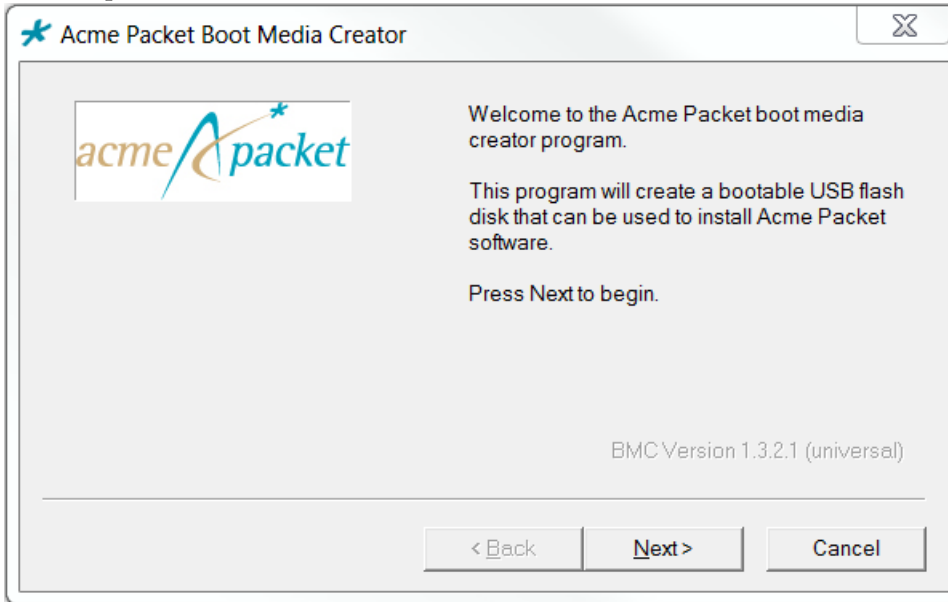
Use the Boot Media Creator (BMC) to write a bootable software image to a USB flashdrive.

Use the following procedure to create a USB stick containing a build image.

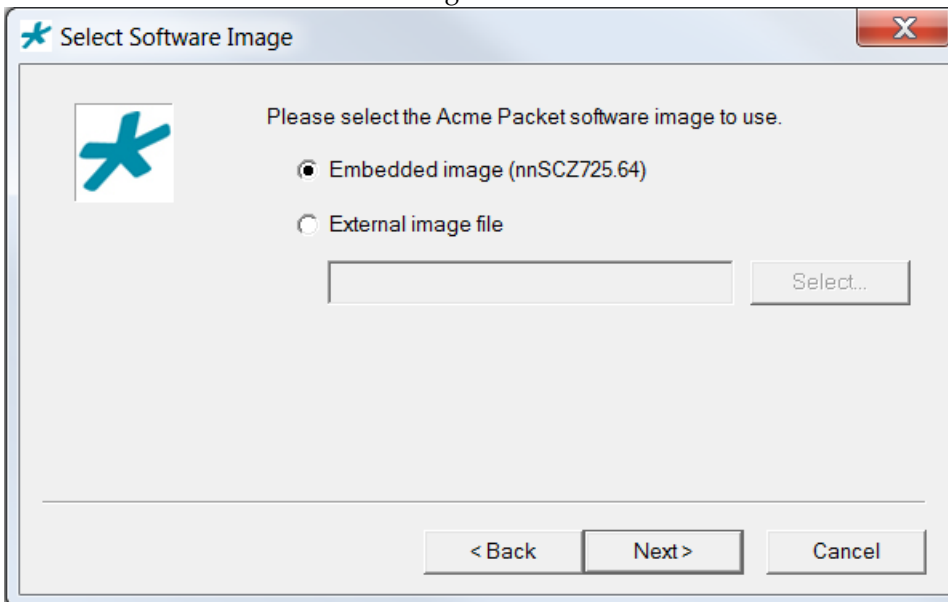
1. Download the BMC version you need to use. This filename begins with the software version and appended with the suffix **-img-usb.exe**.
2. Insert your USB stick. Note that BMC erases all data from this stick during the creation procedure.

## Flash Drive Installation via Boot Media Creator

3. Start the BMC application. The image below displays BMC version 1.3.2.1. Your version may differ, but the user procedure is intuitive and similar across versions.

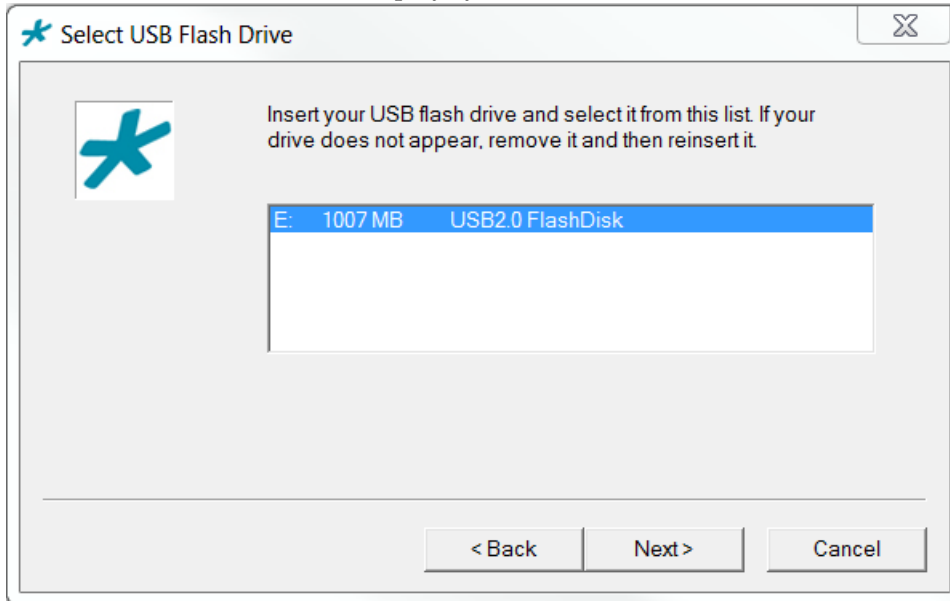


4. Click **Next**. Select the embedded image.

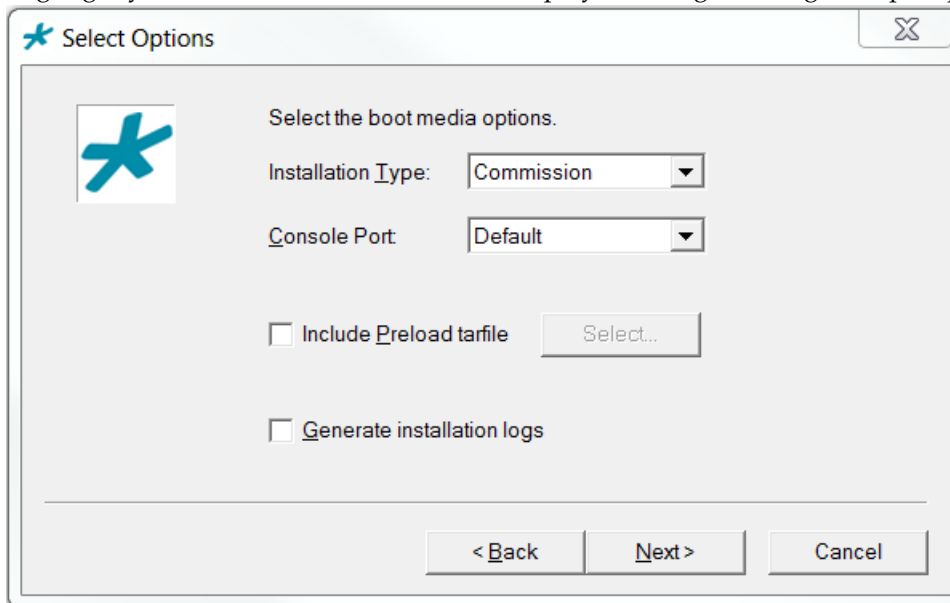




5. Click **Next**. BMC detects and displays your USB stick. You can insert and reinsert your stick, if needed.



6. Highlight your stick and click **Next**. BMC displays a dialog allowing multiple options.

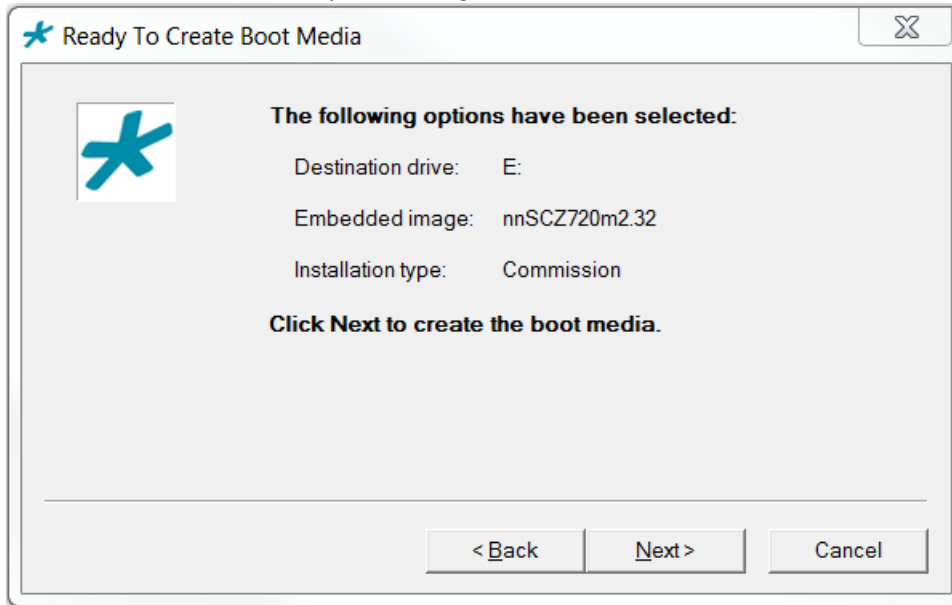


Note that the **Include Preload tarfile** and **Generate installation logs** options are typically used in a manufacturing or staging environment. User settings should be:

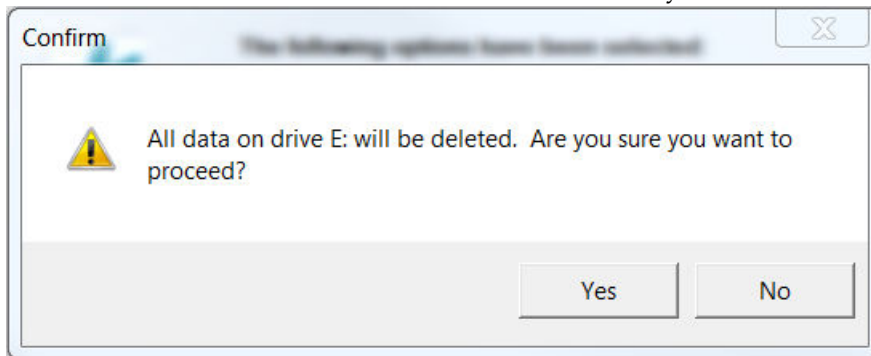
- Installation Type: Commission
- Console Port: Default
- Include Preload tarfile: unchecked
- Generate installation logs: unchecked

## Flash Drive Installation via Boot Media Creator

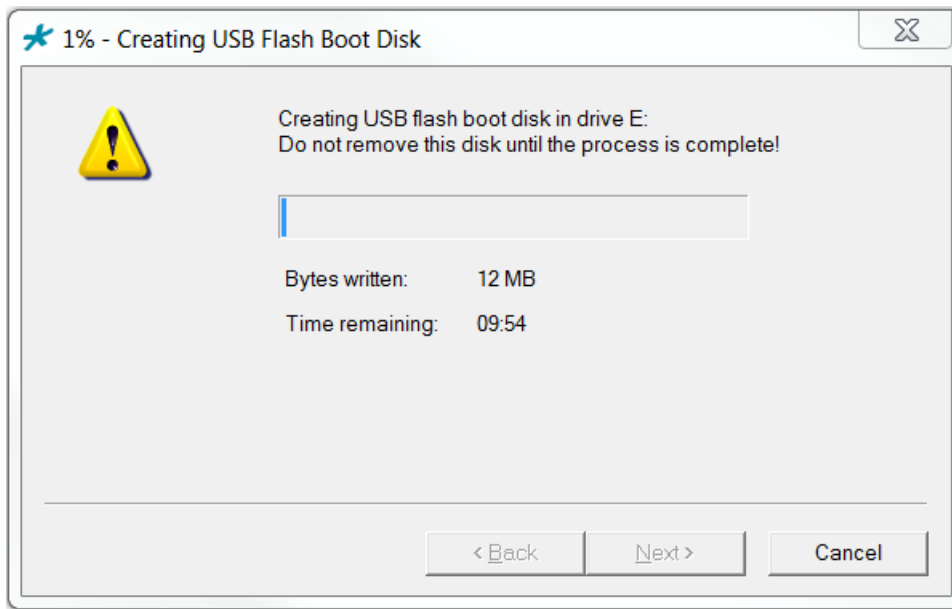
7. Click **Next**. BMC confirms your settings.

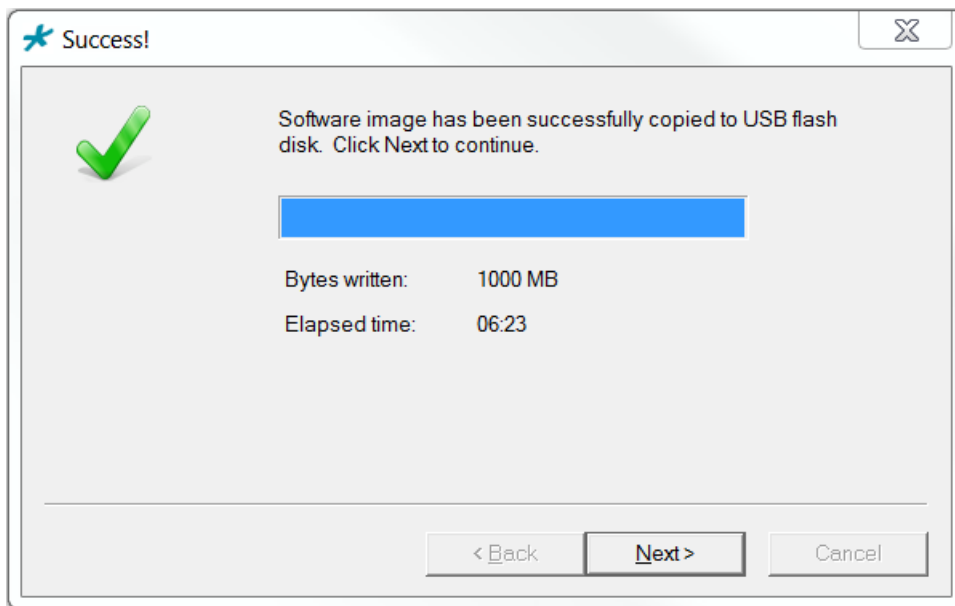


8. Click **Next**. BMC confirms that it will delete all data on your USB.

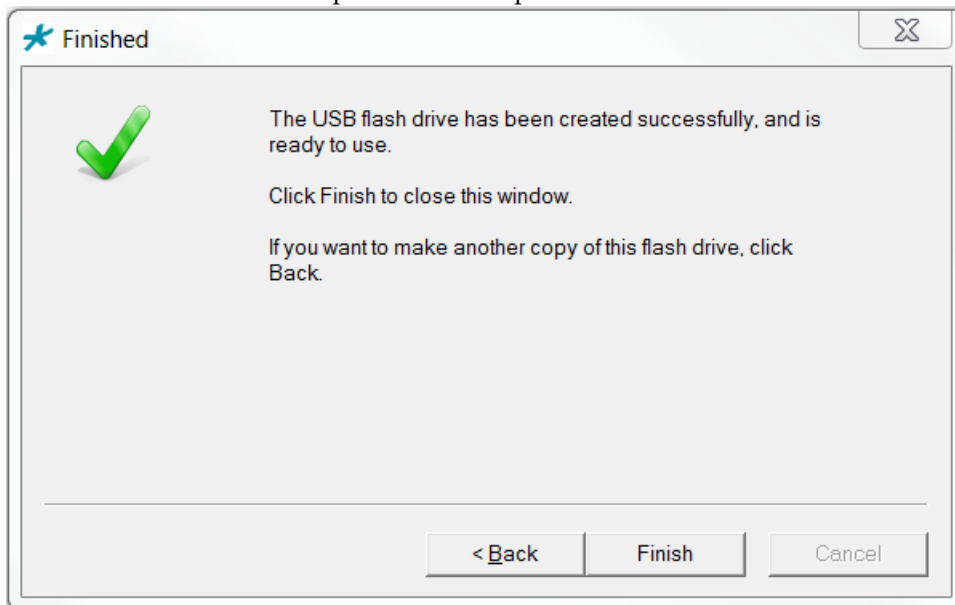


9. Click **Yes**. BMC writes to the USB stick and indicates when it is finished.





10. Click **Next** after the write operation is complete.



11. Click **Back** to make another copy, or **Finish** to exit BMC.

Remove the USB flash drive when complete to ensure that the computer does not attempt to install your software during the next boot cycle.



---

## Software Upgrade

This section provides information about how to upgrade your Oracle Communications Session Router software image. Note that proprietary Acme Packet hardware is normally delivered with an operational image ready to run. Your deployment, however, may require a different version than what was delivered, making software upgrade a required step in platform preparation.

---

### Upgrade Checklist

Before upgrading the Oracle Communications Session Router software:

1. Obtain the name and location of the target software image file from either Oracle Software Delivery Cloud, <https://edelivery.oracle.com/>, or My Oracle Support, <https://support.oracle.com>, as applicable.
2. Provision platforms with the 64-bit Oracle Communications Session Router image file in the boot parameters. 64-bit image files are recognized by the "64" between the image revision and file extension. e.g., nnSCZ720.64.bz .
3. Verify the integrity of your configuration using the ACLI **verify-config** command.
4. Back up a well-working configuration. Name the file descriptively so you can fall back to this configuration easily.
5. Refer to the Oracle Communications Session Router Release Notes for any caveats involving software upgrades.

---

### Stand-alone Upgrade

This process incurs system downtime; your Oracle Communications Session Router stops passing traffic for a period of time. Please plan for your standalone upgrade accordingly.

#### Check /boot for free space

On the OCSR, check for adequate space in the `/boot` volume to upload the new boot image and bootloader. Use the **show space boot** command.

```
OCSR# show space boot
boot: 24759488/25760512 bytes (99%) remaining
```

You may delete files from an SFTP client if you need to free space.

The command **check-space-remaining boot** performs the same function as **show space boot**.

### Upload the Stage 3 Boot Loader and System Image

Whenever you upgrade the software image, upload the stage 3 boot loader and the new system image file to the system. The stage 3 boot loader is backward compatible with application software.

The Stage3 boot loader is generally backward compatible with previous releases, but Oracle recommends that the Stage3 boot loader be installed from the same Major.Minor version as the system image. It is not normally necessary to update the boot loader when installing a maintenance or patch release when the Major.Minor release is the same.

System upgrades typically consist of transferring the new system image and stage3 boot loader to the system and setting boot parameters to the new system software. To ensure compatibility, copy the stage 3 boot loader to `/boot/bootloader` before you update the boot parameters to use the new software image file. The boot loader file must be renamed to `/boot/bootloader` on the target system with no file extension. When upgrading an HA pair, you must perform the upgrade procedure on each HA node.

Follow the steps below to upload the Stage3 boot loader and system image.

1. Obtain the stage 3 boot loader image file (\*.boot).
2. Upload the stage 3 boot loader image file (\*.boot) as `/boot/bootloader` to your system using an SSH File Transfer Protocol (SFTP) client.
3. Upload the new system software image (\*.bz) to `/boot/`.

```
[Downloads]$ ls -la
total 148820
drwxr-xr-x  2 bob src      4096 Jun 17 15:16 .
drwxr-xr-x 28 bob src      4096 May 21 14:17 ..
-rw-r--r--  1 bob src 10164527 Jun 17 15:15 nnSCZ720.64.boot
-rw-r--r--  1 bob src 73849839 Jun 17 15:15 nnSCZ720.64.bz
[Downloads]$ sftp admin@172.30.46.20
admin@172.30.46.20's password:
Connected to 172.30.46.20.
sftp> cd /boot
sftp> put nnSCZ720.64.boot
Uploading nnSCZ720.64.boot to /boot/nnSCZ720.64.boot
nnSCZ720.64.boot          100% 9926KB   9.7MB/
s   00:01
sftp> rm /boot/bootloader
sftp> rename nnSCZ720.64.boot /boot/bootloader
sftp> put nnSCZ720.64.bz
Uploading nnSCZ720.64.bz to /boot/nnSCZ720.64.bz
nnSCZ720.64.bz           100%   70MB  14.1MB/
s   00:05
sftp> bye
Received disconnect from 172.30.46.20: 11: Logged out.
[Downloads]$
```

The Stage3 boot loader is ready for operation after upload and filename change.

### Software Upgrade Procedure

The following procedure describes how to upgrade a Oracle Communications Session Router with a new software image. In this procedure, the image file is located on the Oracle Communications Session Router's local file system in `/boot`.

To upgrade a software image on a stand-alone system:

1. Change the boot configuration parameters to use the new image.

In the ACLI configure terminal menu, type **bootparam** and press <Enter> to display the list of boot parameters. Scroll through the boot parameters by pressing Enter. Stop when you reach the **file name** boot parameter and type the appropriate file name next to the previous file name. Press <Enter> to continue scrolling through the boot parameters.

The following example uses the filenames `/boot/nnSCZ720m5.64.bz` and `/boot/nnSCZ730.64.bz`.



```
OCSR1# configure terminal
OCSR1(configure)# bootparam
'.' = clear field; '-' = go to previous field; ^D = quit
boot device           : eth0
processor number      : 0
host name             : boothost
file name             : /boot/nnSCZ720m5.64.bz /boot/nnSCZ730.64.bz
```

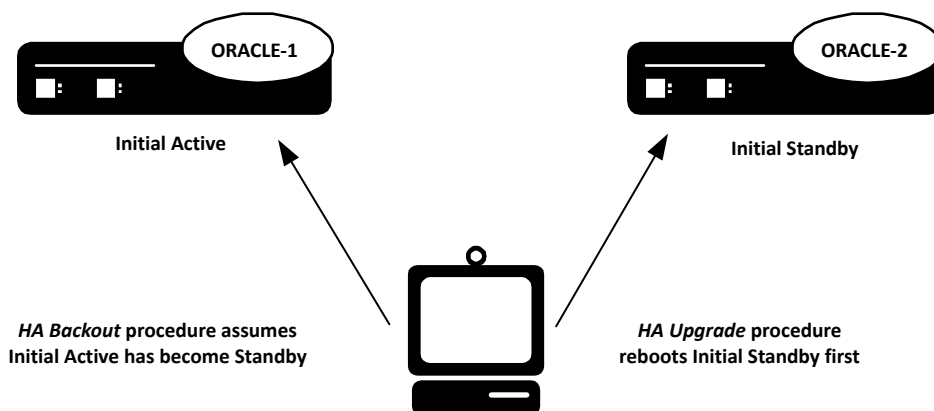
2. Reboot the Oracle Communications Session Router using the **reboot** command.

The Oracle Communications Session Router should now be successfully running the new release.

## HA Upgrade


In the descriptions and processes outlined below, ORACLE-1 is initially the active system and ORACLE-2 is initially the standby system. Please read the following procedures carefully before beginning the upgrade. If necessary, you can back out of the upgrade once during the upgrade procedure and once after you have completed the upgrade procedure.

-  **Note:** If you plan to upgrade from a release prior to S-CZ7.2.0 to S-CZ7.2.0 or later and you use CDR for Accounting, you must set the **cdr-output-redundancy** parameter to **enabled** for the Standby to upgrade and sync properly. You can then change the parameter to **disabled** afterwards, if needed.
-  **Note:** See the diagram below, which addresses how the HA Upgrade procedures' sequence includes rebooting the standby system first to avoid service interruption.



## HA Upgrade Procedure

This procedure upgrades HA deployments.

-  **Note:** In the procedure below, ORACLE-1 is the active system and ORACLE-2 is the standby system. The standby system should be rebooted first.

1. Confirm that ORACLE-1 and ORACLE-2 start up and are synchronized.

Ensure that the running and current configurations on ORACLE-1 and ORACLE-2 have the same number. In the following examples, all of the configuration versions are 5.

On ORACLE-1 and ORACLE-2, use the **show health** command to ensure all processes are synchronized.

On ORACLE-1, show the current configuration version by using the ACLI **display-current-cfg-version** command. Then use the same command on ORACLE-2 and be sure that its current configuration version is the same as the one on ORACLE-1.

```
ORACLE-1# display-current-cfg-version
Current configuration version is 5
ORACLE-1#
ORACLE-2# display-current-cfg-version
Current configuration version is 5
ORACLE-2#
```

On ORACLE-1, show the running configuration version by using the ACLI **display-running-cfg-version** command. Then use the same command on ORACLE-2 and be sure that its running configuration version is the same as the one on ORACLE-1.

```
ORACLE-1# display-running-cfg-version
Running configuration version is 5
ORACLE-1#
ORACLE-2# display-running-cfg-version
Running configuration version is 5
ORACLE-2#
```

2. On ORACLE-2, before loading the software image to the flash, check the remaining space in the /boot directory using the ACLI **show space boot** command.

```
ORACLE-2# show space boot
boot: 24759488/25760512 bytes (99%) remaining
ORACLE-2#
```

If you see less than 50% of the space remaining, delete older stored firmware images to make space.

At a minimum, we recommend that you leave the `diags.gz` file and the currently running release on the flash memory (in the event that a rollback is required).

3. Upload the OCSR software image file and stage three bootloader to the /boot directory using an SFTP client. (See the instructions on updating the Stage 3 Bootloader.)
4. Change the boot configuration parameters on ORACLE-2 to use the appropriate new release software image.



**Note:** From the point that you upgrade the image file, do not make any configuration changes. Likewise, do not use the **save-config** or **activate-config** commands. Once you execute the **save-config** command, the configuration can not be guaranteed to be backward compatible should you have to back out of the upgrade.

Access the boot parameters on ORACLE-2:

- In the ACLI configure terminal menu, type **bootparam** and press <Enter> to begin displaying the list of boot parameters.

Scroll through the boot parameters by pressing <Enter>. Stop when you reach the file name boot parameter.

The following example uses the filenames `/boot/nnSCZ720m5.64.bz` and `/boot/nnSCZ730.64.bz`.

```
ORACLE-2# configure terminal
ORACLE-2(configure)# bootparam
'.' = clear field; '-' = go to previous field; ^D = quit
boot device      : eth0
processor number  : 0
host name        : boothost
file name        : /boot/nnSCZ720m5.64.bz /boot/nnSCZ730.64.bz
```



As shown above, type the new Release file name next to the previous one, including the path. Press <Enter> to continue scrolling through the boot parameters.

Reboot ORACLE-2.

- After ORACLE-2 has completed the boot process, use the **verify-config** command to confirm that the configuration has been upgraded properly.

```
ORACLE-2# verify-config
```

- Confirm the ORACLE-2 is running the new boot image using the **show version** command.

```
ORACLE-2# show version
Acme Packet 4600 SCZ7.3.0
Build Date=09/09/15
```

- Use the **show health** command to confirm that ORACLE-2 is the standby system.
- As you did for ORACLE-2, upload the OCSR software image file and stage three bootloader to the /boot directory using an SFTP client. (See the instructions on updating the Stage 3 Bootloader.)
- As you did for ORACLE-2, configure the boot parameters on ORACLE-1 to boot from the new software image. Then reboot ORACLE-1.


```
ORACLE-1# reboot
```

```
-----
WARNING: you are about to reboot this SD!
-----
```

```
Reboot this SD [y/n]?: y
```


Rebooting ORACLE-1 causes ORACLE-2 to become the active system in the HA node.

- When ORACLE-1 is finished rebooting, use the **show health** command to confirm that it is in the standby state.

 **Note:** If you need to revert to the older image, use the HA Backout Procedure.

## HA Backout Procedure

If you reach the point in your upgrade procedure where you have upgraded both Oracle Communications Session Routers in the HA pair to a later release that you decide you no longer want to use, you can fall back to a previous release. This section shows you how to fall back to an older image with both systems in your HA node upgraded.

 **Note:** In the procedure below, ORACLE-2 is the active system and ORACLE-1 is the standby system. The procedure uses these designations because the prior procedure results in ORACLE-2 as the active system. The standby system should be rebooted first.

To backout to a previous (older) release with the both OCSRs in the HA node upgraded:

- Change the boot parameters on ORACLE-1 to use the appropriate Release S-CZ7.2.0 software image.

Using one of these methods, access the boot parameters on ORACLE-1:

- Reboot ORACLE-1 using any of the ACLI **reboot** commands. Stop the booting process by hitting the Space bar on your keyboard to halt boot-up when you see this message: Press any key to stop auto-boot.... Type a **c** and press Enter to begin displaying the boot parameters.
- In the ACLI configure terminal menu, type **bootparam** and press Enter to begin displaying the list of boot parameters.

Scroll through the boot parameters by pressing Enter. Stop when you reach the file name boot parameter.

The following example uses the filenames /boot/nnSCZ730.64.bz and /boot/nnSCZ720.64.bz.

```
ORACLE-1# configure terminal
OCSR1(configure)# bootparam
```

## Software Upgrade

---

```
'.' = clear field; '-' = go to previous field; ^D = quit
boot device      : eth0
processor number  : 0
host name        : boothost
file name        : /boot/nnSCZ730.64.bz /boot/nnSCZ720.64.bz
```

In the example above, type the appropriate Release S-CZ7.2.0 file name next to the Release S-CZ7.3.0 file name. Press <Enter> to continue scrolling through the boot parameters.

Exit to the main Superuser prompt.

```
ORACLE-1 (configure) # exit
```

2. Reboot ORACLE-1.
3. Using the ACLI **show version** command to confirm that you are using the appropriate release.

```
ORACLE-1# show version
Acme Packet 4600 SCZ7.2.0
Build Date=01/09/15
```

4. Initiate a switchover on ORACLE-1.

```
ORACLE-1# notify berpd force
```

At this point, ORACLE-1 becomes the active system running Release S-CZ7.2.0. ORACLE-2 is now the standby system running Release S-CZ7.3.0.

5. On ORACLE-2, change the boot parameters as you did in Step 1 of this procedure.
6. Reboot ORACLE-2.

---

## Physical Interfaces on Acme Packet Platforms

Acme Packet platforms are prepared for operation, including having the software pre-installed, prior to shipment. Refer to each product's hardware installation document for physical chassis installation. The following sections provide technicians with physical interface information that is useful for post-installation cabling.

The Network Interface Units (NIUs) installed on Acme Packet proprietary hardware define the number of interfaces, hardware protocol, and connection speed available for media and signaling traffic. Global operational information on this information is presented immediately below. Platform-specific physical information is presented in the subsequent sections. Use this information to understand these interfaces at a high level and to physically identify them for verification and troubleshooting procedures.

There are two types of physical interfaces on Acme Packet hardware NIUs:

- Media interfaces are on the network interface unit (NIU); they are also referred to as network media ports.
- Management interfaces are also on the NIU; they are also referred to as network management ports.

The first management interface, referred to as wancom0 or eth0, handles device management traffic including:

- SNMP
- SSH
- SFTP
- ACP/XML
- Logs sent from the Oracle Communications Session Router
- The boot file used to boot the Oracle Communications Session Router from a remote file server

The wancom0 interface does not require that the user perform physical or network interface branch configuration procedures within the ACLI. Instead, users configure its address and mask in the platform's boot parameters. Note that wancom0 uses the boot parameter's default gateway setting unless the system-config's default gateway is configured.

Users configure the wancom1 and wancom2 management interfaces for high availability (HA) state replication. For HA, these interfaces are often directly connected by a crossover cable.

Media interfaces handle session signaling and/or session media traffic. Users must perform all media, wancom1 and wancom2 interface configuration at the ACLI.

The table below summarizes the physical interface configuration parameters, which interface they are applicable to, and whether they are required.

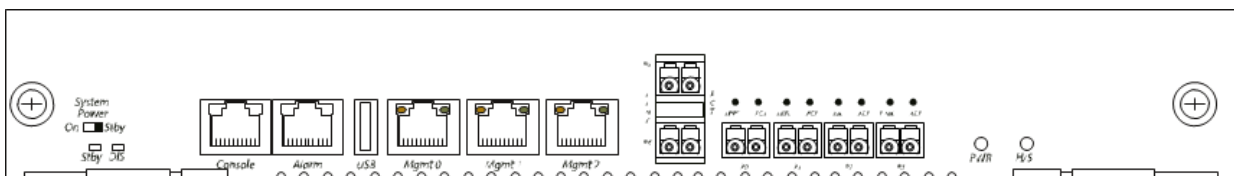
## Physical Interfaces on Acme Packet Platforms

Parameter	Network Media Interface	Wancom1 and wancom2 Network Management Interfaces
name	R	R
operation-type	R	R
port	R	R
slot	R	R
virtual-mac	O	I
admin-state	R	I
auto-negotiation	R	I
duplex-mode	R	I
speed	R	I
wancom-health-score	I	O
R = Required, O = Optional, I = Invalid		

## Acme Packet 4600 Physical Interfaces

The Acme Packet 4600 supports a single network interface unit (NIU) that contains all external interfaces, including console, alarm, network management and media interfaces. There is currently one type of NIU available, which defines the supported cabling and speed.

The graphic below shows the Acme Packet 4600 NIU ports with labeling. This labeling is an important point of reference when you set up the **phy-interface** configuration element.



The Acme Packet 4600 NIU includes the following ports (from left to right).

- Console—Provides serial access for administrative and maintenance purposes.
- Alarm—Dry contact alarm port.
- USB—The USB port is reserved for use by Oracle support employees only.
- Mgmt 0–Mgmt 2—The system uses these 10/100/1000 Base-T Ethernet ports are used for device management functions. The first interface, Mgmt 0, is for ssh access to the ACLI. The other two interfaces are used for state replication for High Availability (HA). For HA, connect these interfaces directly using a crossover cable.
- P4–P5—The system uses these 2 x 10GbE ports for signaling and media traffic.
- P0–P3—The system uses these 4 x GbE ports for signaling and media traffic.



**Warning:** Customers may use either the 2 x 10GbE ports or the 4 x GbE media ports. Using both P4–P5 and P0–P3 is not supported.

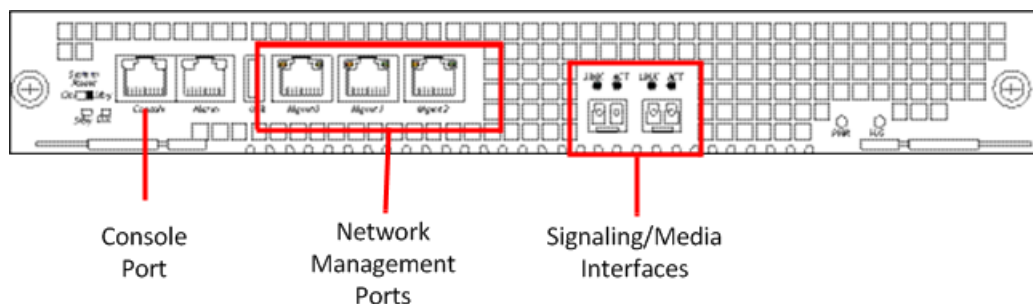
The table below lists the labeling of each interface on the NIU, as well as the applicable **operation-type** and **port** parameters in the **phy-interface** configuration element. The **slot** parameter for this platform is always set to 0. The operation-type parameter distinguishes between otherwise overlapping slot/port configuration.

NIU Label	operation-type	slot	port
Mgmt 0	maintenance	0	0
Mgmt 1	maintenance	0	1
Mgmt 2	maintenance	0	2
P0	media	0	0
P1	media	0	1
P2	media	0	2
P3	media	0	3
P4	media	0	4
P5	media	0	5

## Acme Packet 6100 Physical Interfaces

The Acme Packet 6100 supports a single network interface unit (NIU) that contains all external interfaces, including console, alarm, network management and media interfaces. There is currently one type of NIU available, which defines the supported cabling and speed.

The graphic below shows the NIU front panel, which includes all ports and their labeling. This labeling is an important point of reference when you set up the **phy-interface** configuration element.



The Acme Packet 6100 NIU includes the following ports (from left to right).

- Console—Provides serial access for administrative and maintenance purposes.
- Alarm—Dry contact alarm port.
- USB—For use only by Oracle personnel.
- Mgmt0 to Mgmt2—The system uses these 10/100/1000 Base-T Ethernet ports for device management functions. The first interface, Mgmt 0, is for ssh access to the ACLI. The other two interfaces are used for state replication for High Availability (HA). For HA, connect these interfaces directly using a crossover cable.
- SFP+ ports—The system uses these 2 x 10GbE ports for signaling and media traffic.

The table below lists the labeling of each interface on the NIU, as well as the applicable **operation-type** and **port** parameters in the **phy-interface** configuration element. Note that the media interfaces are not uniquely labeled with the chassis silkscreen. The table distinguishes between these using "left" and "right", with the perspective being the user looking at the NIU panel.

NIU Label	operation-type	slot	port
Mgmt 0	maintenance	0	0
Mgmt 1	maintenance	0	1

## Physical Interfaces on Acme Packet Platforms

NIU Label	operation-type	slot	port
Mgmt 2	maintenance	0	2
USB	NA	NA	NA
NA (left)	media	0	0
NA (right)	media	0	1

## Acme Packet 6300/6350 Physical Interfaces

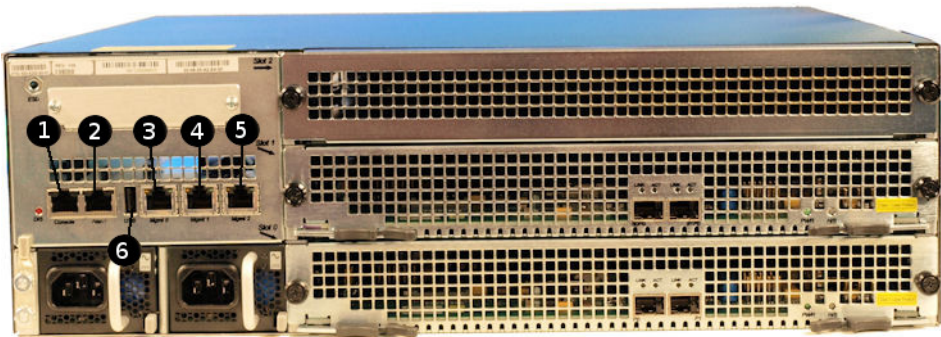
The Acme Packet 6300/6350 comes with management interfaces, including console, alarm, USB and network management integrated into the rear of the chassis, above the power supplies. It also supports a two network interface units (NIUs) that contain media interfaces. There is currently one type of media NIU available, which defines the supported cabling and speed.

### Acme Packet 6300/6350 Management Interfaces

Management interfaces include 3 x 10/100/1000 Ethernet interfaces and are labeled Mgmt 0, 1 and 2. (These interfaces are often referred to as wancom0, 1 and 2.) The first interface, Mgmt 0, is for ssh access to the ACLI. The other two interfaces are used for state replication for High Availability (HA). For HA, connect these interfaces directly using a crossover cable.

The console port is serial and the alarm is "dry contact".

The USB port is reserved for use by Oracle personnel only. There is no front facing console port. The graphic below uses numbers to label the ports.



The table below maps the graphic's reference numbers and the labeling on the management interfaces. It also, when applicable, lists the **operation-type**, **slot** and **port** parameters in the **phy-interface** configuration element for the management interfaces.

Graphic Label	Port Label	operation-type	slot	port
1	Console	NA	NA	NA
2	Alarm	NA	NA	NA
3	Mgmt 0	maintenance	0	0
4	Mgmt 1	maintenance	0	1
5	Mgmt 2	maintenance	0	2
6	USB	NA	NA	NA

## Acme Packet 6300/6350 Media Interfaces

The Acme Packet 6300/6350 has 3 PHY card slots. The bottom slot, slot0, and the middle slot, slot1, support network-facing media interface cards. The top slot, slot2, supports feature-based hardware, such as transcoding, and is referred to as the “resource” slot. Standard Acme Packet 6300/6350 PHY cards contain 2 x 10-gigabit Ethernet ports.

Ensure that the first 2x10Gig NIU in your system populates slot0. If you are use a second 2x10Gig NIU, insert it into slot1.

 **Note:** Do not insert any 2x10Gig NIU in the resource slot (slot2).

The Acme Packet 6300/6350 supports up to 4 x 10 gigabit media ports each running at full duplex line rate for all packet sizes. The graphic below labels the media ports using numbers.



The table below maps the graphic's reference numbers and the labeling on the media interfaces. It also lists the **operation-type**, **slot** and **port** parameters in the **phy-interface** configuration element for the applicable interfaces. Note that the media interfaces are not uniquely labeled with the NIU silkscreen. The table distinguishes between these using "left" and "right", with the perspective being the user looking at the NIU panel.

Graphic Label	Port Label	operation-type	slot	port
1	NA (left)	media	0	0
2	NA (right)	media	0	1
3	NA (left)	media	1	0
4	NA (right)	media	1	1

