

Oracle Private Cloud Appliance Installation Guide for Release 3.0.2



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Preface

This publication is part of the customer documentation set for Oracle Private Cloud Appliance Release 3.0.2. Note that the documentation follows the release numbering scheme of the appliance software, not the hardware on which it is installed. All Oracle Private Cloud Appliance product documentation is available at <https://docs.oracle.com/en/engineered-systems/private-cloud-appliance/index.html>.

Oracle Private Cloud Appliance Release 3.x is a flexible general purpose Infrastructure as a Service solution, engineered for optimal performance and compatibility with Oracle Cloud Infrastructure. It allows customers to consume the core cloud services from the safety of their own network, behind their own firewall.

Audience

This documentation is intended for owners, administrators and operators of Oracle Private Cloud Appliance. It provides architectural and technical background information about the engineered system components and services, as well as instructions for installation, administration, monitoring and usage.

Oracle Private Cloud Appliance has two strictly separated operating areas, known as enclaves. The Compute Enclave offers a practically identical experience to Oracle Cloud Infrastructure: It allows users to build, configure and manage cloud workloads using compute instances and their associated cloud resources. The Service Enclave is where privileged administrators configure and manage the appliance infrastructure that provides the foundation for the cloud environment. The target audiences of these enclaves are distinct groups of users and administrators. Each enclave also provides its own separate interfaces.

It is assumed that readers have experience with system administration, network and storage configuration, and are familiar with virtualization technologies. Depending on the types of workloads deployed on the system, it is advisable to have a general understanding of container orchestration, and UNIX and Microsoft Windows operating systems.

Feedback

Provide feedback about this documentation at <https://www.oracle.com/goto/docfeedback>.

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
monospace	Monospace type indicates commands within a paragraph, code in examples, text that appears on the screen, or text that you enter.
\$ prompt	The dollar sign (\$) prompt indicates a command run as a non-root user.
# prompt	The pound sign (#) prompt indicates a command run as the <code>root</code> user.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at <https://www.oracle.com/corporate/accessibility/>.

For information about the accessibility of the Oracle Help Center, see the Oracle Accessibility Conformance Report at <https://www.oracle.com/corporate/accessibility/templates/t2-11535.html>.

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Diversity and Inclusion

Oracle is fully committed to diversity and inclusion. Oracle respects and values having a diverse workforce that increases thought leadership and innovation. As part of our initiative to build a more inclusive culture that positively impacts our employees, customers, and partners, we are working to remove insensitive terms from our products and documentation. We are also mindful of the necessity to maintain compatibility with our customers' existing technologies and the need to ensure continuity of service as Oracle's offerings and industry standards evolve. Because of these technical constraints, our effort to remove insensitive terms is ongoing and will take time and external cooperation.

1

Oracle Private Cloud Appliance Installation Overview

This document provides information about the Oracle Private Cloud Appliance installation at your site, and describes the pre-installation preparation required for your site. This chapter provides an overview of the Oracle Private Cloud Appliance system installation process.

For a comprehensive overview of the Oracle Private Cloud Appliance system, see the [Oracle Private Cloud Appliance Concepts Guide](#).

The following table lists the procedures you need to complete to install Oracle Private Cloud Appliance at your site.

Step	Description	Links
1	Review the product notes for any late-breaking information about Oracle Private Cloud Appliance.	Oracle Private Cloud Appliance Release Notes
2	Review important safety information.	Before performing the installation, refer to the following documents: <ul style="list-style-type: none">• Oracle Private Cloud Appliance Safety and Compliance Guide• Important Safety Information for Oracle's Hardware Systems
3	Review information about Oracle Private Cloud Appliance features and hardware components.	Architecture and Design
4	Complete the site preparation procedures.	Site Requirements
5	Complete the site network preparation procedures.	Network Requirements
6	Complete the initial interview checklist.	Initial Installation Checklist
7	Install Oracle Private Cloud Appliance at your site.	Installing the Oracle Private Cloud Appliance Rack
8	Power on Oracle Private Cloud Appliance.	Power On for the First Time
9	Perform the initial configuration of the system.	Configuring Oracle Private Cloud Appliance

2

Site Requirements

This chapter describes the site requirements for the Oracle Private Cloud Appliance.



Note:

For site checklists, refer to [Site Checklists](#).

Space Requirements

Oracle Private Cloud Appliance racks have the following space requirements:

- Height: 42U - 2000 mm (78.74 inches)
- Width: 600 mm with side panels (23.62 inches)
- Depth (front door handle to rear door handle): 1197 mm (47.12 inches)
- Depth (doors removed): 1112 mm (43.78 inches)
- Weight (base rack, fully populated): 1000 kg (2204 lbs)

The minimum ceiling height for the cabinet is 2914 mm (114.72 inches), measured from the true floor or raised floor, whichever is higher. This includes an additional 914 mm (36 inches) of space required above the rack height for maintenance access. The space surrounding the cabinet must not restrict the movement of cool air between the air conditioner and the front of the systems within the cabinet, or the movement of hot air coming out of the rear of the cabinet.

Receiving and Unpacking Requirements

Before your Oracle Private Cloud Appliance arrives, ensure that the receiving area is large enough for the package. The following are the package dimensions and weights for an Oracle Private Cloud Appliance system:

- Shipping height: 2159 mm (85 inches)
- Shipping width: 1118 mm (44 inches)
- Shipping depth: 1543 mm (60.75 inches)
- Shipping weight (base rack, fully populated): 1118 kg (2465 lbs)

If your loading dock meets the height and ramp requirements for a standard freight carrier truck, then you can use a pallet jack to unload the rack. If the loading dock does not meet the requirements, then you must provide a standard forklift or other means to unload the rack. You can also request that the rack be shipped in a truck with a lift gate.

When your Oracle Private Cloud Appliance arrives, leave the rack in its shipping packaging until it arrives at its installation site. Use a conditioned space to remove the packaging

material to reduce particles before entering the data center. The entire access route to the installation site should be free of raised-pattern flooring that can cause vibration.

Allow enough space for unpacking the system from its shipping cartons. Ensure that there is enough clearance and clear pathways for moving the Oracle Private Cloud Appliance from the unpacking location to the installation location. The following table lists the access route requirements for the Oracle Private Cloud Appliance.

Access Route Item	With Shipping Pallet	Without Shipping Pallet
Minimum door height	2159 mm (85 inches)	2000 mm (78.74 inches)
Minimum door width	1118 mm (44 inches)	600 mm (23.62 inches)
Minimum elevator depth	1543 mm (60.75 inches)	1058.2 mm (41.66 inches)
Maximum incline	6 degrees	6 degrees
Maximum elevator, pallet jack, and floor loading capacity	1145 kg (2520 lbs)	1145 kg (2520 lbs)

Maintenance Access Requirements

The maintenance area must be large enough for Oracle Private Cloud Appliance, and have the required access space. For example, the required space to remove the side panels is 675.64 mm (26.6 inches). The following table lists the maintenance access requirements for the Oracle Private Cloud Appliance.

Location	Maintenance Access Requirement
Rear maintenance	914 mm (36 inches)
Front maintenance	1232 mm (48.5 inches)
Top maintenance	914 mm (36 inches)

Flooring Requirements

Oracle recommends that the Oracle Private Cloud Appliance be installed on raised flooring. The site floor and the raised flooring must be able to support the total weight of the system as specified in [Space Requirements](#).

The following table lists the floor load requirements.

Description	Requirement
Maximum allowable weight of installed rack equipment	952.54 kg (2100 lbs)
Maximum allowable weight of installed power distribution units	52.16 kg (115 lbs)
Maximum dynamic load (maximum allowable weight of installed equipment including power distribution units)	1004.71 kg (2215 lbs)

Electrical Power Requirements

The Oracle Private Cloud Appliance can operate effectively over a wide range of voltages and frequencies. However, it must have a reliable power source. Damage might occur if the ranges are exceeded. Electrical disturbances such as the following might damage the system:

- Fluctuations caused by brownouts
- Wide and rapid variations in input voltage levels or in input power frequency
- Electrical storms
- Faults in the distribution system, such as defective wiring

To protect your system from such disturbances, you should have a dedicated power distribution system, power-conditioning equipment, as well as lightning arresters or power cables to protect from electrical storms.

Each rack has two pre-installed power distribution units (PDUs). The PDUs accept different power sources. You must specify the type of PDU that is correct for your data center.

The following table lists the PDU low-voltage requirements.

Item	15kVA - type 6440A	15kVA - type 6441A	15kVA - type 6442A	22kVA - type 7100873	22kVA - type 7100874	24kVA - type 6444A	24kVA - type 6445A
Region	North and South America, Japan and Taiwan	EMEA and APAC (except Japan and Taiwan)	North and South America, Japan and Taiwan	North and South America, Japan and Taiwan	EMEA and APAC (except Japan and Taiwan)	North and South America, Japan and Taiwan	EMEA and APAC (except Japan and Taiwan)
Number of inputs	1	1	3	3	3	2	2
Source voltage	200-220V	220/380 - 240/415VAC	200-240V	200-240V	200-240V	200-220V	220/380 - 240/415VAC
Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Max. line current	40A	21A	24A	36.8A	32A	34.6A	16A
Phase current	23A	21A	N/A	N/A	32A	20A	16A
Recommended circuit breaker	50A	25A	30A	50A	30A	50A	25A
Outlets	42 x C13 6 x C19	42 x C13 6 x C19	42 x C13 6 x C19	42 x C13 6 x C19	42 x C13 6 x C19	42 x C13 6 x C19	42 x C13 6 x C19
Outlet groups	6	6	6	6	6	6	6
Max. group current	20A	20A	20A	20A	20A	20A	18A

Item	15kVA - type 6440A	15kVA - type 6441A	15kVA - type 6442A	22kVA - type 7100873	22kVA - type 7100874	24kVA - type 6444A	24kVA - type 6445A
Output voltage	200-240V	220-240V	200-240V	200-240V	200-240V	220-240V	200-240V
Data center receptacle	3ph 3W + ground 60A IEC60309	3ph 4W + ground 32A IEC60309 5P 6h 400V	1ph 2W + ground 30A NEMA L6-30	1ph 2W + ground 50A Hubbell CS8265C	1ph 2W + ground 32A IEC60309 3P 6H 230V	3ph 3W + ground 60A IEC60309	3ph 4W + ground 32A IEC60309 5P 6h 400V

Facility Power Requirements

Electrical work and installations must comply with applicable local, state, or national electrical codes. Contact your facilities manager or qualified electrician to determine what type of power is supplied to the building.

To prevent catastrophic failures, design the input power sources to ensure adequate power is provided to the power distribution units (PDUs). Use dedicated AC breaker panels for all power circuits that supply power to the PDU. When planning for power distribution requirements, balance the power load between available AC supply branch circuits. In the United States and Canada, ensure that the overall system AC input current load does not exceed 80 percent of the branch circuit AC current rating.

PDU power cords are 4 meters (13.12 feet) long, and 1 to 1.5 meters (3.3 to 4.9 feet) of the cord will be routed within the rack cabinet. The installation site AC power receptacle must be within 2 meters (6.6 feet) of the rack.

Circuit Breaker Requirements

To prevent catastrophic failures, the design of your power system must ensure that adequate power is provided to all of the compute nodes. Use dedicated AC breaker panels for all power circuits that supply power to the compute nodes. Electrical work and installations must comply with applicable local, state, or national electrical codes. Compute nodes require electrical circuits to be grounded to the Earth.

In addition to circuit breakers, provide a stable power source, such as an uninterruptible power supply (UPS) to reduce the possibility of component failures. If computer equipment is subjected to repeated power interruptions and fluctuations, then it is susceptible to a higher rate of component failure.



Note:

Circuit breakers are supplied by the customer. One circuit breaker is required for each power cord.

Grounding Guidelines

The cabinets for the Oracle Private Cloud Appliance are shipped with grounding-type power cords (three-wire). Always connect the cords to grounded power outlets. Because different grounding methods are used, depending on location, check the grounding type, and refer to documentation, such as IEC documents, for the correct grounding method. Ensure that the facility administrator or qualified electrical engineer verifies the grounding method for the building, and performs the grounding work.

Temperature and Humidity Requirements

Airflow through the Oracle Private Cloud Appliance is from front to back. For information, see [Ventilation and Cooling Requirements](#).

Studies have shown that temperature increases of 10 degrees Celsius (18 degrees Fahrenheit) above 20 degrees Celsius (68 degrees Fahrenheit) reduce long-term electronics reliability by 50 percent. Excessive internal temperatures might result in full or partial shutdown of the Oracle Private Cloud Appliance.

The following table lists the temperature, humidity, and altitude requirements for operating and non-operating systems.

Condition	Operating Requirement	Non-operating Requirement	Optimum
Temperature	5 ° to 32 ° Celsius (41 ° to 89.6 ° Fahrenheit)	-40 ° to 68 ° Celsius (-40 ° to 154 ° Fahrenheit)	For optimal rack cooling, data center temperatures from 21 ° to 23 ° Celsius (69.8 ° to 73.4 ° Fahrenheit)
Relative humidity	10 to 90 percent relative humidity, non-condensing	Up to 93 percent relative humidity	For optimal data center rack cooling, 45 to 50 percent non-condensing
Altitude	3,000 meters (9,840 feet) maximum	12,000 meters (39,370 feet)	Ambient temperature is reduced by 1 ° Celsius per 300 meters above 900 meters altitude above sea level

Set conditions to the optimal temperature and humidity ranges to minimize the chance of downtime due to component failure. Operating an Oracle Private Cloud Appliance for extended periods at or near the operating range limits, or installing it in an environment when it remains at or near non-operating range limits could significantly increase hardware component failure.

The ambient temperature range of 21 ° to 23 ° Celsius (69.8 ° to 73.4 ° Fahrenheit) is optimal for server reliability and operator comfort. Most computer equipment can operate in a wide temperature range, but near 22 ° Celsius (71.6 ° Fahrenheit) is desirable because it is easier to maintain safe humidity levels. Operating in this temperature range provides a safety buffer in the event that the air conditioning system goes down for a period of time.

The ambient relative humidity range of 45 to 50 percent is suitable for safe data processing operations. Most computer equipment can operate in a wide range (20 to 80 percent), but the range of 45 to 50 percent is recommended for the following reasons:

- Optimal range helps protect computer systems from corrosion problems associated with high humidity levels.
- Optimal range provides the greatest operating time buffer in the event of air conditioner control failure.
- This range helps to avoid failures or temporary malfunctions caused by intermittent interference from static discharges that may occur when relative humidity is too low.

 **Note:**

Electrostatic discharge (ESD) is easily generated, and hard to dissipate in areas of low relative humidity, such as below 35 percent. ESD becomes critical when humidity drops below 30 percent. It is not difficult to maintain humidity in a data center because of the high-efficiency vapor barrier and low rate of air changes normally present.

Ventilation and Cooling Requirements

Always provide adequate space in front of and behind the rack to allow for proper ventilation. Do not obstruct the front or rear of the rack with equipment or objects that might prevent air from flowing through the rack. Rack-mountable servers and equipment typically draw cool air in through the front of the rack and let warm air out the rear of the rack. There is no airflow requirement for the left and right sides due to front-to-back cooling.

If the rack is not completely filled with components, then cover the empty sections with filler panels. Gaps between components can adversely affect airflow and cooling within the rack.

Relative humidity is the percentage of the total water vapor that can exist in the air without condensing, and is inversely proportional to air temperature. Humidity goes down when the temperature rises, and goes up when the temperature drops. For example, air with a relative humidity of 45 percent at a temperature of 24 ° Celsius (75.2 ° Fahrenheit) has a relative humidity of 65 percent at a temperature of 18 ° Celsius (64.4 ° Fahrenheit). As the temperature drops, the relative humidity rises to more than 65 percent, and water droplets are formed.

Air conditioning facilities usually do not precisely monitor or control temperature and humidity throughout an entire computer room. Generally, monitoring is done at individual points corresponding to multiple exhaust vents in the main unit, and other units in the room. Special consideration should be paid to humidity when using underfloor ventilation. When underfloor ventilation is used, monitoring is done at each point close to an exhaust vent. Distribution of the temperature and humidity across the entire room is uneven.

The Oracle Private Cloud Appliance has been designed to function while installed in a natural convection air flow. The following requirements must be followed to meet the environmental specification:

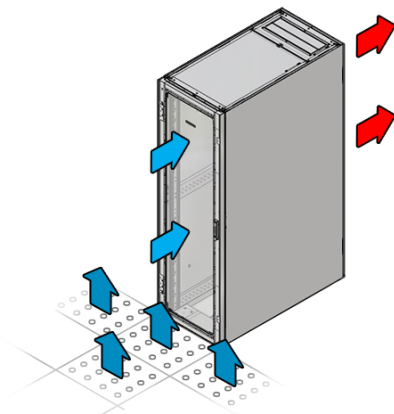
- Ensure that there is adequate airflow through the system.
- Ensure that the system has front-to-back cooling. The air intake is at the front of the system, and the air outlet is at the rear of the system.
- Allow a minimum clearance of 1219.2 mm (48 inches) at the front of the system, and 914 mm (36 inches) at the rear of the system for ventilation.

Use perforated tiles, approximately 400 CFM/tile, in front of the rack for cold air intake. The tiles can be arranged in any order in front of the rack, as long as cold air from the tiles can flow into the rack. Inadequate cold airflow could result in a higher intake temperature in the system due to exhaust air recirculation. The following is the recommended number of floor tiles:

- Four floor tiles for an Oracle Private Cloud Appliance with up to 20 compute nodes (fully loaded)
- Three floor tiles for an Oracle Private Cloud Appliance with up to 16 compute nodes (half loaded)
- One floor tile for an Oracle Private Cloud Appliance with 8 compute nodes (quarter loaded)

Figure 2-1 shows a typical installation of the floor tiles in a data center for Oracle Private Cloud Appliance with more than 16 compute nodes.

Figure 2-1 Typical Data Center Configuration for Perforated Floor Tiles



3

Network Requirements

Oracle Private Cloud Appliance network architecture relies on physical high speed Ethernet connectivity.

The networking infrastructure in Oracle Private Cloud Appliance is integral to the appliance and shall not be altered. The networking does not integrate into any data center management or provisioning frameworks such as Cisco ACI, Network Director, or the like, with the exception of the ability to query the switches using SNMP in read-only mode. However, Oracle Private Cloud Appliance can communicate with the Cisco ACI fabric in your datacenter using the L3Out functionality (static routes or eBGP) provided by Cisco ACI. For more information about this Cisco feature, see the [Cisco ACI Fabric L3Out Guide](#).

▲ Caution:

No changes to the networking switches in Oracle Private Cloud Appliance are supported unless directed to do so by a KM note or Oracle Support.

Network Connection Requirements

These sections describe the network connection requirements and data center network requirements to connect the Oracle Private Cloud Appliance to your existing network infrastructure.

Network Overview

For overview information regarding network infrastructure, see the following sections in the [Hardware Overview](#) chapter of the Oracle Private Cloud Appliance Concepts Guide.

Device Management Network

The device management network provides internal access to the management interfaces of all appliance components.

Data Network

The appliance data connectivity is built on redundant 100Gbit switches in two-layer design similar to a leaf-spine topology. An Oracle Private Cloud Appliance rack contains two leaf and two spine switches. The leaf switches interconnect the rack hardware components, while the spine switches form the backbone of the network and provide a path for external traffic.

Uplinks

Uplinks are the connections between the Oracle Private Cloud Appliance and the customer data center. For external connectivity, 5 ports are reserved on each spine switch. Four ports

are available to establish the uplinks between the appliance and the data center network; one port is reserved to optionally segregate the administration network from the data traffic. Use this section to plan your network topology and logical connection options.

Administration Network

You can optionally segregate administrative appliance access from the data traffic.

Reserved Network Resources

Oracle Private Cloud Appliance requires a large number of IP addresses and several VLANs for internal operation. See "Reserved Network Resources" in the [Hardware Overview](#) section for the IP address ranges reserved for internal use by Oracle Private Cloud Appliance.

Network Configuration Requirements

On each spine switch, ports 1-4 can be used for uplinks to the data center network. For speeds of 10Gbps or 25Gbps, the spine switch port must be split using a 4-way splitter or breakout cable. For higher speeds of 40Gbps or 100Gbps each switch port uses a single direct cable connection. For detailed information about choosing the appropriate configuration, refer to "Uplinks" in the Network Infrastructure section of the [Hardware Overview](#).

The uplinks are configured during system initialization, based on information you provide as part of the [Initial Installation Checklist](#). Unused spine switch uplink ports, including unused breakout ports, are disabled for security reasons.

It is critical that **both** spine switches have the same connections to each to a pair of next-level data center switches. This configuration provides redundancy and load splitting at the level of the spine switches, the ports and the data center switches. This outbound cabling depends on the network topology you deploy. The cabling pattern plays a key role in the continuation of service during failover scenarios. For more information about the available topologies (Triangle, Square, and Mesh) refer to "Uplinks" in the Network Infrastructure section of the [Hardware Overview](#).

- Before installation, you must run network cables from your existing network infrastructure to the Oracle Private Cloud Appliance installation site. For instructions see [Connect the Appliance to Your Network](#).
- Plan to connect at least 1 high-speed Ethernet port on each *spine* switch to your data center public Ethernet network.
- Configuring the optional Administration network requires 2 additional cable connections (one each from port 5 on the two spine switches) to a pair of next-level data center switches.
- Uplink connectivity is based on layer 3 of the OSI model.

DNS Configuration for Oracle Private Cloud Appliance

To integrate the data of the Oracle Private Cloud Appliance's dedicated DNS zone into the data center DNS configuration, two options are supported: zone delegation or

manual configuration. The preferred approach is to configure zone delegation, as described below.

However, if you select manual configuration, it is good practice to register network host names and IP addresses for the management network, client network, and additional public networks in the data center Domain Name System (DNS) prior to initial configuration. In particular, all public addresses, VIP addresses and infrastructure services endpoints should be registered in DNS prior to installation.

All addresses registered in DNS must be configured for forward resolution; reverse resolution is not supported in the Oracle Private Cloud Appliance services zone.

Zone Delegation (preferred)

For zone delegation to work, it is required that the data center's recursive caches are able to reach TCP/UDP port 53 on the virtual IP address shared by the appliance management nodes. It may be necessary to change your firewall configuration.

Configure the data center DNS server so that it operates as the parent zone of the appliance DNS zone. Thus, all DNS requests for the child zone are delegated to the appliance internal DNS server. In the data center DNS configuration, add a name server record for the child zone and an address record for the authoritative server of that zone.

In the example it is assumed that the data center DNS domain is `example.com`, that the appliance is named `mypca`, and that the management node cluster virtual IP address is `192.0.2.102`. The appliance internal DNS server host name is `ns1`.

```
$ORIGIN example.com.  
[...]  
mypca      IN      NS      ns1.mypca.example.com.  
ns1.mypca  IN      A       192.0.2.102
```


Manual Configuration

Manually add DNS records for all labels or host names required by the appliance.

In the examples it is assumed that the data center DNS domain is `example.com`, that the appliance is named `mypca`, and that the management node cluster virtual IP address is `192.0.2.102`.

Note:

For object storage you must point the DNS label to the Object Storage Public IP. This is the public IP address you assign specifically for this purpose when setting up the data center public IP ranges during Initial Setup. Refer to the *Public IPs* step near the end of the section "[Complete the Initial Setup](#)".

Appliance Infrastructure Service	Appliance DNS Label and Data Center DNS Records
Admin service	<p><i>admin.mypca.example.com</i></p> <p>admin A 192.0.2.102</p>
Networking, Compute, Block Storage, Work Requests services	<p><i>iaas.mypca.example.com</i></p> <p>iaas A 192.0.2.102</p>
Identity and Access Management service	<p><i>identity.mypca.example.com</i></p> <p>identity A 192.0.2.102</p>
DNS service	<p><i>dns.mypca.example.com</i></p> <p>dns A 192.0.2.102</p>
Object storage	<p><i>objectstorage.mypca.example.com</i></p> <p>objectstorage A 198.51.100.33</p>
	<div style="border-left: 2px solid #0070C0; border-right: 2px solid #0070C0; border-bottom: 2px solid #0070C0; padding: 10px; background-color: #E6F2FF;"> <p> Note:</p> <p>Use the Object Storage Public IP from the Appliance Initial Setup.</p> </div>
File storage	<p><i>filestorage.mypca.example.com</i></p> <p>filestorage A 192.0.2.102</p>
Alert manager	<p><i>alertmanager.mypca.example.com</i></p> <p>alertmanager A 192.0.2.102</p>
Container manager	<p><i>containermanager.mypca.example.com</i></p> <p>containermanager A 192.0.2.102</p>
API	<p><i>api.mypca.example.com</i></p> <p>api A 192.0.2.102</p>

Appliance Infrastructure Service	Appliance DNS Label and Data Center DNS Records
Grafana	<code>grafana.mypca.example.com</code> <code>grafana A 192.0.2.102</code>
Prometheus	<code>prometheus.mypca.example.com</code> <code>prometheus A 192.0.2.102</code>
Prometheus-gw	<code>prometheus-gw.mypca.example.com</code> <code>prometheus-gw A 192.0.2.102</code>
Service Web UI	<code>adminconsole.mypca.example.com</code> <code>adminconsole A 192.0.2.102</code>
Compute Web UI	<code>console.mypca.example.com</code> <code>console A 192.0.2.102</code>

Data Center Switch Configuration Notes

When configuring the data center switches to accept incoming Oracle Private Cloud Appliance uplinks – the default uplinks as well as any custom uplinks you define – take these notes into account.

- All uplinks, default and customer, are configured to use link aggregation (LACP). All switch ports included in an uplink configuration must belong to the same link aggregation group (LAG). The switch ports on the data center side of the uplinks must be configured accordingly.
- The spine switches operate with the Virtual Port Channel (vPC) feature enabled in static routing configurations. For more information about configuration rules, see "Uplinks" in the Network Infrastructure section of the [Hardware Overview](#).
- Oracle Private Cloud Appliance supports layer 3 based uplink connectivity to the customer datacenter. Static routing and BGP4-based dynamic routing are supported in layer 3.
- Auto-negotiation is not available for uplink ports. Transfer speed must be specified on the customer switches' end. For the supported uplink ports speeds, see "Uplinks" in the Network Infrastructure section of the [Hardware Overview](#).

Default System IP Addresses

The management IP address represents a component's connection to the internal administration network.

▲ Caution:

For hardware management, Oracle Private Cloud Appliance uses a network internal to the system. It is not recommended to connect the management ports or the internal administration network switches to the data center network infrastructure.

The table in this section lists the default management IP addresses assigned to servers and other hardware components in an Oracle Private Cloud Appliance base configuration rack.

Rack Unit	Rack Component	Management IP Address Assigned During Manufacturing
32	Spine Switch	100.96.2.21
31	Spine Switch	100.96.2.20
26	Management Switch	100.96.2.1 100.96.0.1
25	Leaf/Data Switch	100.96.2.23
24	Leaf/Data Switch	100.96.2.22
	Management Node VIP	100.96.2.32 ILOM: 100.96.0.32
7	Management Node	100.96.2.35 ILOM: 100.96.0.35
6	Management Node	100.96.2.34 ILOM: 100.96.0.34
5	Management Node	100.96.2.33 ILOM: 100.96.0.33
	Storage VIPs	Performance pool 100.96.2.5 Capacity pool 100.96.2.4
3-4	Oracle ZFS Storage Appliance ZS9-2 Controller Server (2 rack units)	100.96.2.3 ILOM: 100.96.0.3
1-2	Oracle ZFS Storage Appliance ZS9-2 Controller Server (2 rack units)	100.96.2.2 ILOM: 100.96.0.2
B	PDU	100.96.3.242
A	PDU	100.96.3.241

Compute nodes are assigned an IP address in the internal administration network during the provisioning process. The system IP address is DHCP-based; the ILOM is assigned the system IP, where the third octet is changed from 2 to 0. For example: if a compute node receives IP 100.96.2.64, then its ILOM has IP 100.96.0.64. Once

assigned to a host, these IP addresses are stored and persisted in the DHCP database.

4

Installing the Oracle Private Cloud Appliance Rack

This chapter explains how to prepare for the installation of your Oracle Private Cloud Appliance and how to install the system at your site.

Prepare to Install Oracle Private Cloud Appliance

This section describes the preparation steps to perform before your Oracle Private Cloud Appliance arrives.

Review Safety Guidelines

Before your Oracle Private Cloud Appliance arrives, review the following safety precautions to ensure that the site is safe, as well as ready for delivery. Failure to observe these precautions can result in personal injury, equipment damage, or malfunction.

- Do not block ventilation openings.
- Do not install the system in a location that is exposed to direct sunlight or near a device that may become hot.
- Do not install the system in a location that is exposed to excessive dust, corrosive gases, or air with high salt concentrations.
- Do not install the system in a location that is exposed to frequent vibrations. Install the system on a flat, level surface.
- Use a power outlet that uses proper grounding. When using shared grounding, the grounding resistance must not be greater than 10 ohms. Ensure that your facility administrator or a qualified electrical engineer verifies the grounding method for the building, and performs the grounding work.
- Ensure that each grounding wire used for the system is used exclusively for the Oracle Private Cloud Appliance. Also observe the precautions, warnings, and notes about handling that appear on labels on the equipment.
- Do not place cables under the equipment or stretch the cables too tightly.
- Do not disconnect power cords from the equipment while its power is on.
- Do not place anything on top of the system or perform any work directly above it.
- If you cannot reach the connector lock when disconnecting LAN cables, then press the connector lock with a flathead screwdriver to disconnect the cable. You could damage the system board if you force your fingers into the gap rather than using a flathead screwdriver.
- Do not let the room temperature rise sharply, especially in winter. Sudden temperature changes can cause condensation to form inside the system. Allow for a sufficient warm-up period prior to server operation.

- Do not install the system near a photocopy machine, air conditioner, welding machine, or any other equipment that generates loud, electronic noises.
- Avoid static electricity at the installation location. Static electricity transferred to the system can cause malfunctions. Static electricity is often generated on carpets.
- Confirm that the supply voltage and frequency match the electrical ratings indicated on your Oracle Private Cloud Appliance.
- Do not insert anything into any Oracle Private Cloud Appliance opening, unless doing so is part of a documented procedure. The system contains high-voltage parts. If a metal object or other electrically conductive object enters an opening in the system, then it could cause a short circuit. This could result in personal injury, fire, electric shock, and equipment damage.

See also:

- Important Safety Information for Sun Hardware Systems (816-7190) included with the rack
- [Oracle Rack Cabinet 1242 Safety and Compliance Guide](#)
- [Oracle Rack Cabinet 1242 Power Distribution Units User's Guide](#)
- [Oracle Engineered System Safety and Compliance Guide \(non-Nordic\)](#)
- [Oracle Engineered System Safety and Compliance Guide \(Nordic\)](#)

Prepare the Installation Site

The following procedure describes how to prepare the site prior to unpacking and situating your Oracle Private Cloud Appliance.

1. Thoroughly clean and vacuum the area in preparation for the installation.
2. Note problems or peculiarities at the site that require special equipment.
3. Verify that the installation site flooring has a strength rating to withstand the combined weight of the Oracle Private Cloud Appliance and any other installed equipment.

For more information, see [Flooring Requirements](#).

4. Install all necessary electrical equipment and ensure that sufficient power is provided.

See also the [Oracle Rack Cabinet 1242 Power Distribution Units User's Guide](#) for the system Power Distribution Unit (PDU) power requirements.

5. Ensure that the installation site provides adequate air conditioning.

For details, see [Ventilation and Cooling Requirements](#).

6. Operate the air conditioning system for 48 hours to bring the room temperature to the appropriate level.

Unpack the Oracle Private Cloud Appliance

The unpacking location should be determined during the site planning process.

Tools Required for Installation

The following tools and equipment are required for installation and service:

- Unpacking tools (provided in rack ship kit)
 - 17mm and 13mm open-ended double-sided wrench
 - Allen L-key 6mm hex wrench, 5-3/4 inches in length
 - Allen L-key 8mm hex wrench, 6-3/8 inches in length
- Rack setup tools and accessories (provided in rack ship kit)
 - 32 M6 cage nuts and washers
 - 32 M6 pan head screws
 - 8 M5 screws
 - 8 self-tapping Torx screws
 - 4 PDU brackets
 - 4 M5 cage nuts
 - 4 grounded power cables
 - 18mm and 16mm open-ended double-sided wrench
 - T-40 Torx screwdriver
 - T-25 Torx screwdriver
 - T-15 Torx screwdriver
 - 8mm and 6mm Allen wrench
 - Cage nut tool
 - Keys to the front door, rear door, and side panel locks
 - 17mm and 13mm open-ended double-sided wrench
- Customer-supplied tools (not provided in rack ship kit)
 - No. 2 Phillips screwdriver
 - Diagonal cutter
 - Antistatic wrist strap

Unpack the System

Before unpacking the rack from the shipping carton, refer to the labels on the carton and to the instructions that they provide. After unpacking the rack, follow local laws and guidelines to recycle the packaging properly.

▲ Caution:

Carefully unpack the rack from the packaging and shipping pallet. Rocking or tilting the rack can cause it to fall over and cause serious injury or death. You should always use professional movers when unpacking and installing this rack.

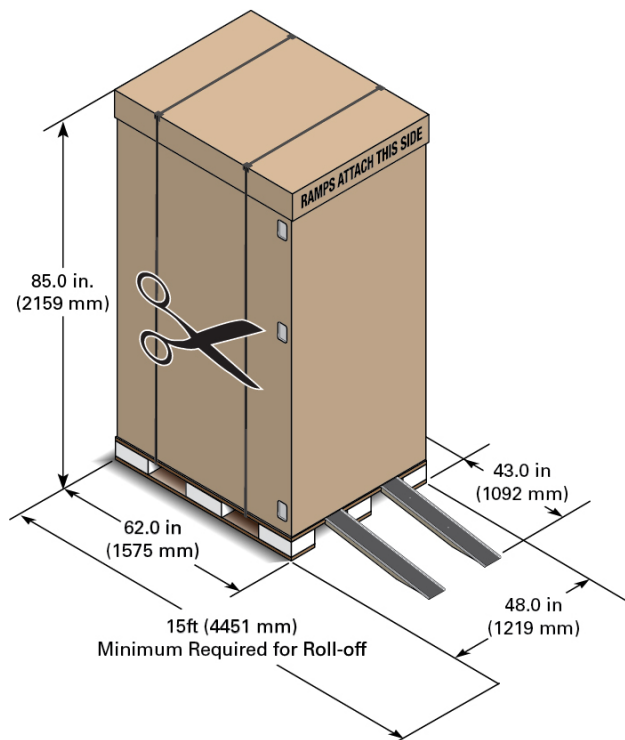
✎ Note:

After unpacking the rack from the packaging, save the shipping brackets used to secure the rack to the shipping pallet. You can use these shipping brackets to secure the rack permanently to the installation site floor. Do not dispose of these brackets, because you cannot order replacement brackets.

▲ Caution:

Shipping brackets are not for use for bracing or anchoring the rack during seismic events.

Figure 4-1 Unpack the Oracle Private Cloud Appliance From the Packaging



Install Oracle Private Cloud Appliance in Its Allocated Space

This section describes each phase of the hardware installation procedure for the Oracle Private Cloud Appliance.

Move the System

The following procedure describes how to move the Oracle Private Cloud Appliance:

1. Ensure that the rack doors are closed and secured.
2. Ensure that the leveling and stabilizing feet on the rack are raised and out of the way.
3. Push the system from the back of the rack to the installation site.

NOT_SUPPORTED:

Never attempt to move an Oracle Private Cloud Appliance by pushing on the rack side panels. Pushing on the rack side panels can tip over the rack. This action can cause serious personal injury or death, as well as damage to the equipment.

The front casters of the rack are fixed; they do not pivot. When moving your Oracle Private Cloud Appliance to the installation site, you must steer the unit using the rear casters. You can safely maneuver the system by carefully pushing it from behind. See the figure below.

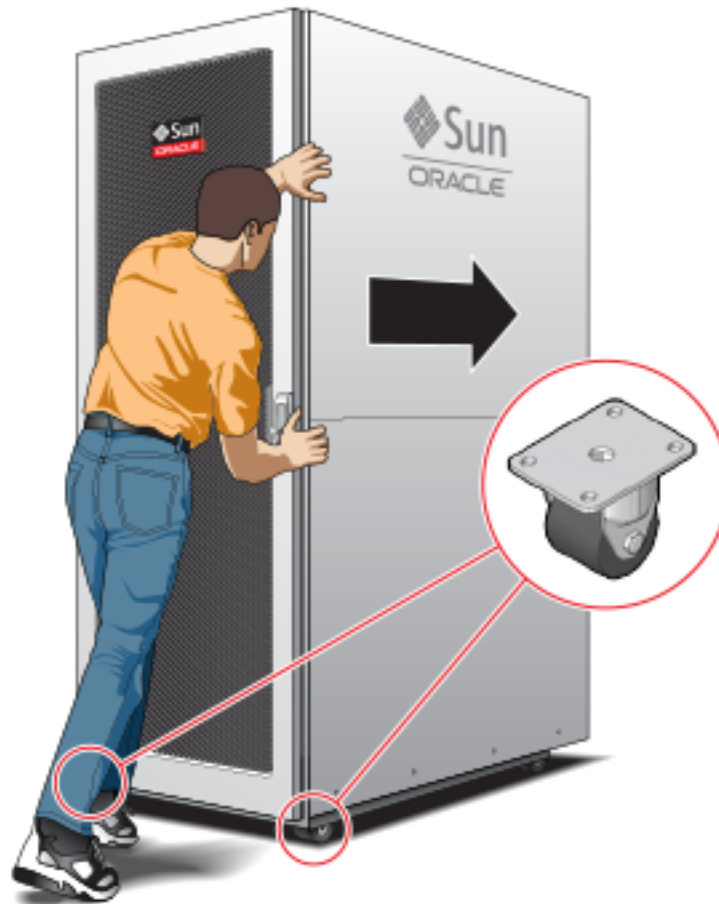
It is preferred that at least three people push and guide the rack: one person in front and two persons in back to help guide the rack and keep people out of the path of the moving rack. When transporting configured racks from one location to another, take care to move them slowly, 0.65 meters per second (2.13 feet per second) or slower.

Carefully examine the transportation path. Avoid obstacles such as doorways or elevator thresholds that can cause abrupt stops or shocks. Go around obstacles by using ramps or lifts to enable smooth transport.

▲ Caution:

Never tip or rock the Oracle Private Cloud Appliance because the rack can fall over.

Figure 4-2 Carefully Push the Oracle Private Cloud Appliance From the Back of the Rack



4. When the rack is at the installation site, verify that no components or connections have become dislodged or disconnected during transport. If necessary, re-attach components and cables properly.

Stabilize the Appliance Rack

After moving the Oracle Private Cloud Appliance to the installation site, stabilize the rack to ensure that it does not move or tip over. You can stabilize the rack permanently by extending the rack leveling feet, and optionally using the shipping brackets to secure the rack permanently to the floor.

▲ Caution:

Shipping brackets are not for use for bracing or anchoring the rack during seismic events.

To secure the rack to the installation floor using the shipping brackets, you must drill the appropriate holes in the floor, re-attach the shipping brackets to the rack, position the rack over the mounting holes, and attach the shipping brackets to the floor firmly

with bolts and washers that suit the specific environment. Oracle does not provide mounting bolts and washers for the shipping brackets, because different floors require different bolt types and strengths.

(Optional) If you plan to route data or power distribution unit (PDU) power cords down through the bottom of the rack, you will need to cut a hole in the installation site floor. Cut a rectangular hole below the rear portion of the rack, between the two rear casters and behind the RETMA (Radio Electronics Television Manufacturers Association) rails.

▲ Caution:

Do not create a hole where the rack casters or leveling feet brackets will be placed.

When the rack is in position, the leveling feet must be deployed. The rack contains four leveling feet that can be lowered to share the load with the casters. This increases the footprint of the rack, which improves stability and helps prevent rack movement. The leveling feet must be used even when the rack is permanently secured to the floor. To adjust the leveling feet, do the following:

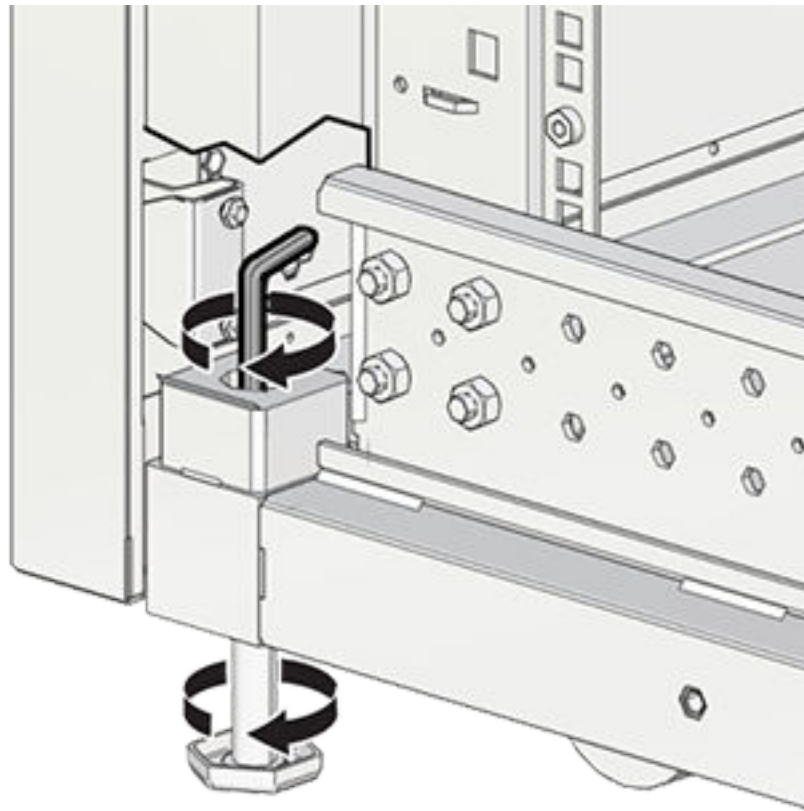
1. Locate the four leveling feet at the bottom four corners of the rack.

Figure 4-3 Location of Leveling Feet on Rack



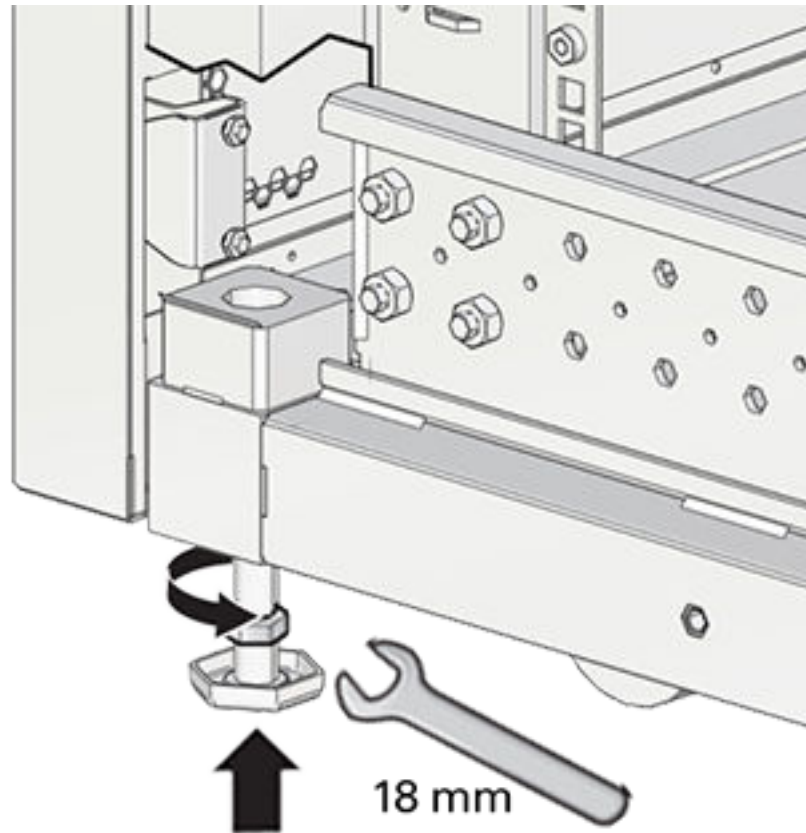
2. Using a 6mm hex wrench, lower the leveling feet to the floor.

Figure 4-4 Lowering the Leveling Feet



3. Lock the four leveling feet using an 18mm open wrench.

Figure 4-5 Locking the Leveling Feet



When lowered correctly, the four leveling feet share the load with the casters to increase footprint, improve stability, and help support the full weight of the Oracle Private Cloud Appliance.

▲ Caution:

When the rack needs to be moved to a different location, including repacking, verify that the leveling feet have been retracted before moving the rack. Otherwise the leveling feet may become bent, or the rack could tip over.

Attach a Ground Cable (Optional)

Oracle Private Cloud Appliance power distribution units (PDUs) achieve earth ground through their power cords. Final chassis ground is achieved by way of the ground prong when you connect the power cord to a socket. For additional grounding, attach a chassis earth ground cable to the system. The additional ground point enables electrical current leakage to dissipate more efficiently.

⚠ Caution:

The PDU power input lead cords and the ground cable must reference a common earth ground. If they do not, then a difference in ground potential can be introduced. If you are unsure of your facility's PDU receptacle grounding, then do not install a ground cable until you confirm that there is a proper PDU receptacle grounding. If a difference in ground potential is apparent, then you must take corrective action.

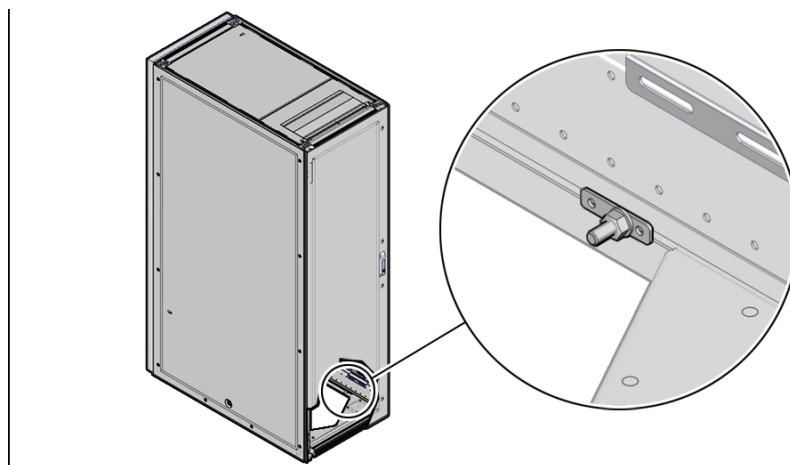
✎ Note:

A grounding cable is not shipped with the Oracle Private Cloud Appliance.

1. Ensure that the installation site has a properly grounded power source in the data center. The facility PDU must have earth ground.
2. Ensure that all grounding points, such as raised floors and power receptacles, reference the facility ground.
3. Ensure that direct, metal-to-metal contact is made for this installation. During manufacturing, the ground cable attachment area might have been painted or coated.
4. Attach the ground cable to one of the attachment points located at the bottom rear of the system frame. See [Figure 4-6](#).

The attachment point is an adjustable bolt that is inside the rear of the system cabinet on the right side.

Figure 4-6 Earth Ground Attachment Bolt Location



Connect the Appliance to Your Network

Before you power on the Oracle Private Cloud Appliance for the first time, ensure that you make the necessary external network connections.

For external connectivity, 5 ports are reserved on each spine switch. Four ports are available to establish the uplinks between the appliance and the data center network; one port is reserved to optionally segregate the administration network from the data traffic.

On each spine switch, ports 1-4 can be used for uplinks to the data center network. For speeds of 10Gbps or 25Gbps, the spine switch port must be split using a 4-way splitter or breakout cable. For higher speeds of 40Gbps or 100Gbps each switch port uses a single direct cable connection. For overview information, see "Uplinks" in the Network Infrastructure section of the [Hardware Overview](#).

At a minimum, you must connect 1 port on each spine switch, which provides a single high bandwidth, high availability network for the administration and data traffic.

 **Note:**

The administration network and the data network can be configured at different speeds. For example, you can configure your administration network to operate at 10Gbit, and your data network to operate at 40Gbit.

1. Connect 1-4 high-speed Ethernet ports on each *spine* switch to your data center public Ethernet network.

Use the following table to determine the correct configuration for your environment.

 **Caution:**

It is critical that **both** spine switches have a connection to a pair of next-level data center switches. This configuration provides redundancy and load splitting at the level of the spine switches and the data center switches. The cabling pattern plays a key role in the continuation of service during failover scenarios.

Use Case	Network Speed	Cables Required	Ports	Administration Network Port
Minimum Configuration	10Gbit or 25Gbit	2 splitter cables	Port 1 on each spine switch	Not Used
Minimum Configuration	40Gbit or 100Gbit	2 direct cables	Port 1 on each spine switch	Not Used
Minimum Configuration with Administration Network	10Gbit or 25Gbit	4 splitter cables	Port 1 on each spine switch	Port 5 on each spine switch
Minimum Configuration with Administration Network	40Gbit or 100Gbit	4 direct cables	Port 1 on each spine switch	Port 5 on each spine switch
Maximum Configuration	10Gbit or 25Gbit	8 splitter cables	Ports 1-4 on each spine switch	Not Used

Use Case	Network Speed	Cables Required	Ports	Administration Network Port
Maximum Configuration	40Gbit or 100Gbit	8 direct cables	Ports 1-4 on each spine switch	Not Used
Maximum Configuration with Administration Network	10Gbit or 25Gbit	10 splitter cables	Ports 1-4 on each spine switch	Port 5 on each spine switch
Maximum Configuration with Administration Network	40Gbit or 100Gbit	10 direct cables	Ports 1-4 on each spine switch	Port 5 on each spine switch

Power On for the First Time

This section provides instructions for each phase of the initial power-on sequence.

Ensure to read [Review Safety Guidelines](#) before you begin.

Inspect the Appliance

The following procedure describes how to visually inspect your Oracle Private Cloud Appliance after it is physically installed at your site, and prior to power being applied to the system.

1. Check for rack damage.
2. Check the rack for loose or missing screws.
3. Check your Oracle Private Cloud Appliance for the ordered configuration. Refer to the Customer Information Sheet (CIS) on the side of the packaging. Retain this information so you can confirm all of the components are discovered during system initialization.

Note:

Oracle Private Cloud Appliance is preconfigured by Oracle as a self-contained system. You should not move any equipment or add any unsupported hardware to the system.

4. Check that all cable connections are secure and firmly in place as follows:
 - a. Check the power cables. Ensure that the correct connectors have been supplied for the data center facility power source.
 - b. Check the network data cables.
5. Check the site location tile arrangement for cable access and airflow.
6. Check the data center airflow that leads in to the front of the system.

For more information, see [Ventilation and Cooling Requirements](#).

Connect the Power Cords

The following procedure describes how to connect power cords to your Oracle Private Cloud Appliance.

1. Open the rear cabinet door.
2. Ensure that the correct power connectors have been supplied.
3. Unfasten the power cord cable ties.

The ties are for shipping only and are no longer needed.

4. Route the power cords to the facility receptacles either above the rack or below the flooring. See the following figures.
5. Secure the power cords in bundles.

Figure 4-7 Power Cord Routing From the Bottom of the Rack

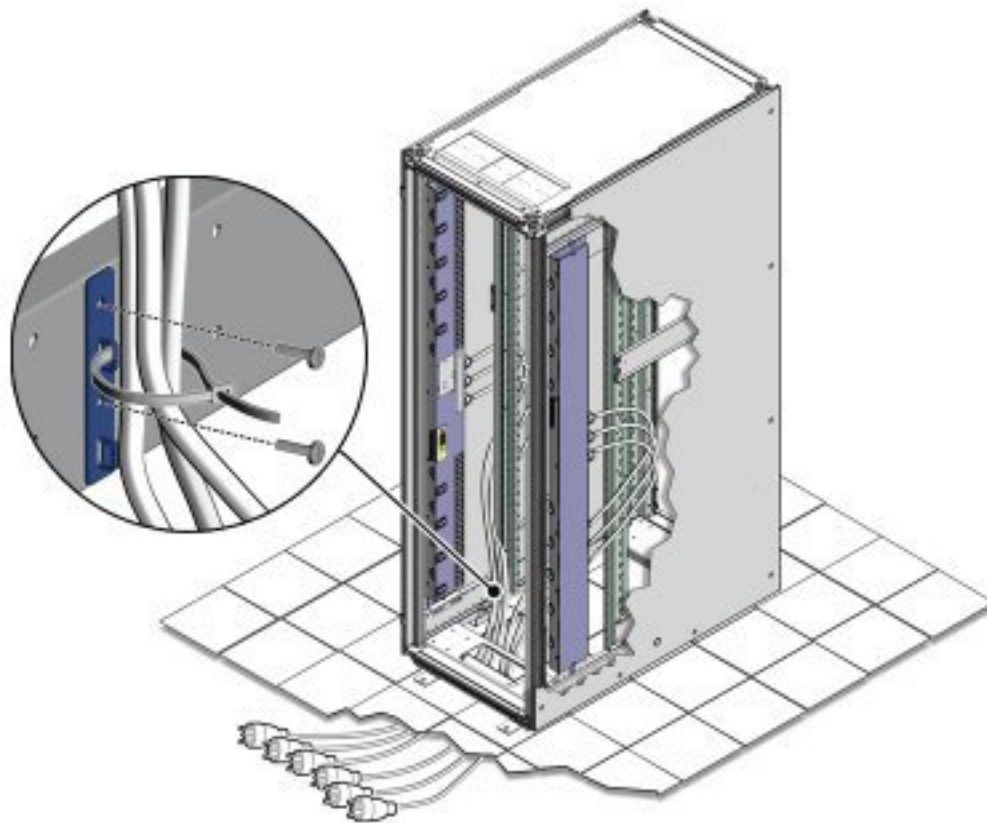
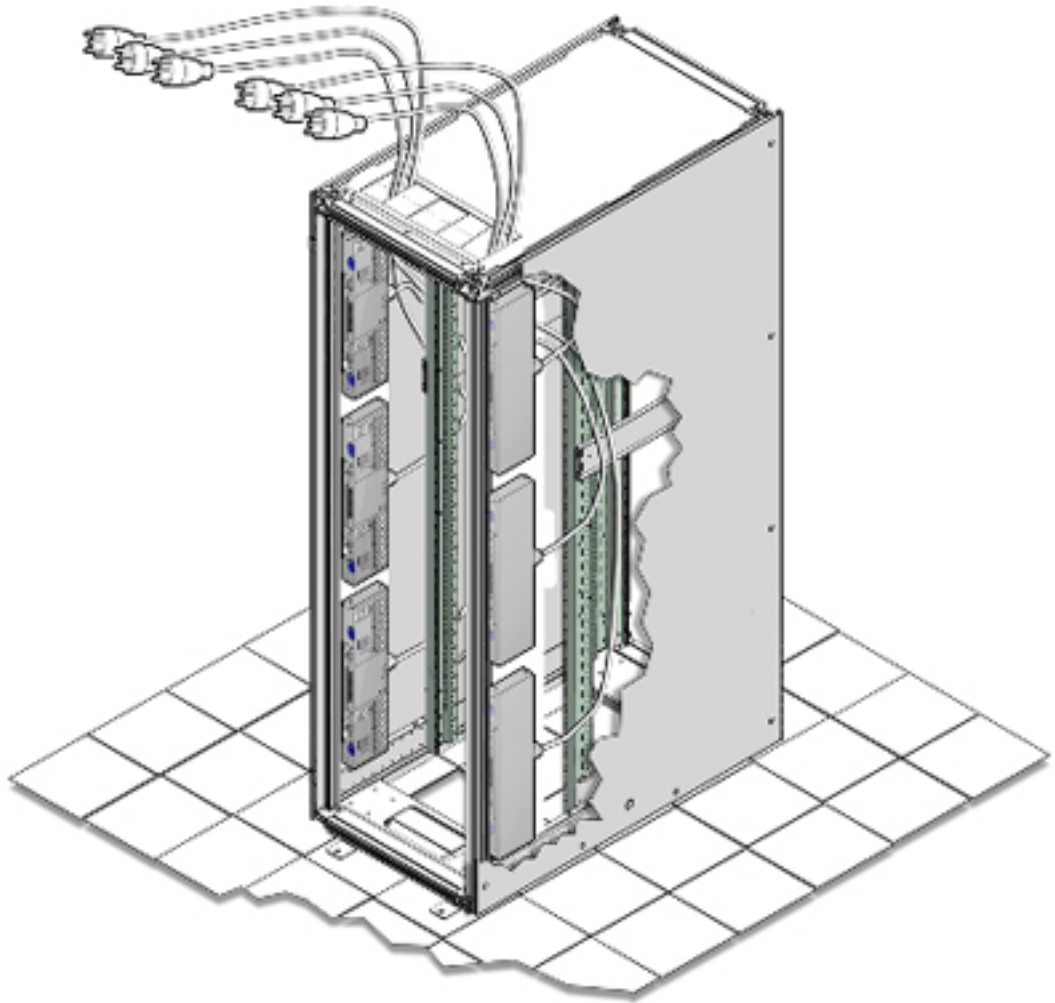


Figure 4-8 Power Cord Routing From the Top of the Rack



6. Plug the power distribution unit (PDU) power cord connectors into the facility receptacles. Ensure the breaker switches are in the OFF position before connecting the power cables.

Power On the Appliance

The following procedure describes how to power on your Oracle Private Cloud Appliance.

 **Note:**

You can connect to your Oracle Private Cloud Appliance using a network connection to monitor the system power-on procedure. For instructions, see [Connect a Workstation to the Appliance](#).

1. Make sure that the power switches located on the rear left and right side power supplies of the Oracle Storage Drive Enclosure DE3-24C and Oracle Storage Drive Enclosure DE3-24P are in the ON (I) position.

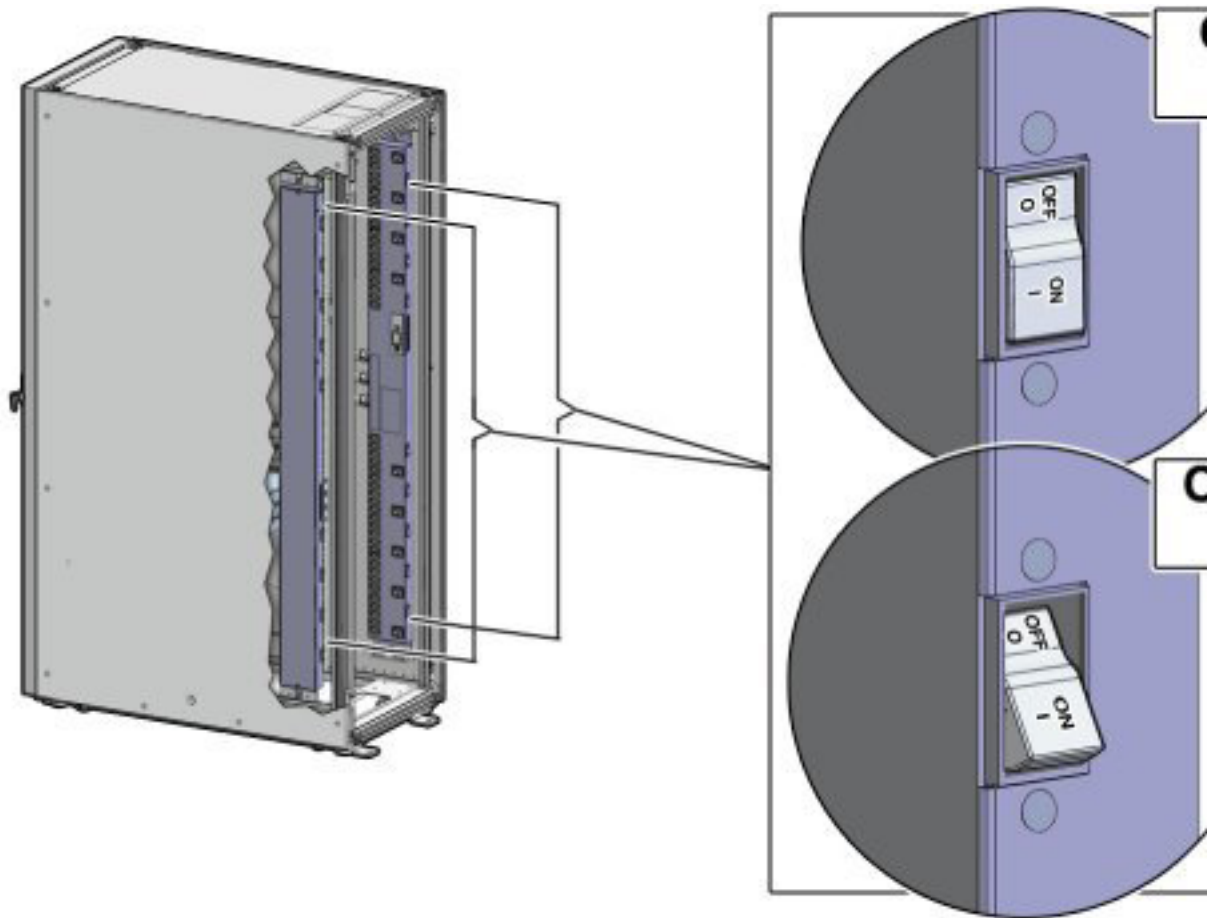
Oracle Storage Drive Enclosure DE3-24P and Oracle Storage Drive Enclosure DE3-24C
Power Switches



2. Switch on the power distribution unit (PDU) circuit breakers located on the rear of PDU A and B inside the Oracle Private Cloud Appliance.

The circuit breakers are on the rear of the system cabinet as shown below. Press the ON (I) side of the toggle switch.

PDU Switch Locations



After power is applied, the LEDs on all of the compute nodes and storage server heads will start to blink after approximately two minutes. From the rear of the rack, you can see the green LEDs on the power supply units (PSUs) on the compute nodes turn on instantly after power is applied. In addition, from the rear of the rack, you can see the display on the power distribution units (PDUs) illuminate once power is available.

 **Note:**

Allow 20 minutes for the storage controllers to come online before powering on each management node.

3. Press the Power button located on the front of each management node.

The first management node is located in rack unit 5 (U5). The second management node is located in rack unit 6 (U6), and the third management node is located in rack unit 7 (U7).

A management node takes approximately five to ten minutes to power on completely. Once complete, the Power/OK LED illuminates and remains a steady green.

The management nodes will verify all components within the system. The management nodes ensure that the correct networking switches and storage devices are installed in the system, and search for compute nodes to power on and add to the compute fabric.

Depending on your system configuration, powering on the compute nodes and bringing them to the ready-to-provision state should take approximately 10 minutes *per compute node*. Do not power cycle the management nodes during the discovery period. Proceed to configuring the appliance.

 **Caution:**

Once powered on, do not power down the management nodes until you have completed the initial configuration process described in [Complete the Initial Setup](#).

Emergency Procedures for Oracle Private Cloud Appliance

This section provides important operational instructions to help you minimize the risk of injury or damage.

Emergency Power-off Considerations

If there is an emergency, then power to Oracle Private Cloud Appliance should be halted immediately. The following emergencies might require powering off the system:

- Natural disasters such as an earthquake, flood, hurricane, tornado or cyclone
- Abnormal noise, smell or smoke coming from the system
- Threat to human safety

 **Note:**

If you use the compute instance high availability feature, disable this feature before a system shutdown:

```
PCA-ADMIN> disableVmHighAvailability
```

Remember to enable this feature once the system and compute nodes are restarted.

```
PCA-ADMIN> enableVmHighAvailability
```

Emergency Power-off Procedure

To perform an emergency power-off procedure for Oracle Private Cloud Appliance, turn off power at the circuit breaker or pull the emergency power-off switch in the computer room.

Emergency Power-off Switch

Emergency power-off (EPO) switches are required in a computer room when computer equipment contains batteries capable of supplying more than 750 volt-amperes for more than five minutes. Systems that have these batteries include internal EPO hardware for connection to a site EPO switch or relay. Use of the EPO switch will remove power from the Oracle Private Cloud Appliance.

Cautions and Warnings

The following cautions and warnings apply to Oracle Private Cloud Appliance:

- Do not touch the parts of this product that use high-voltage power. Touching them might result in serious personal injury.
- Do not power off Oracle Private Cloud Appliance unless there is an emergency. In that case, follow the [Emergency Power-off Procedure](#).
- Keep the front and rear cabinet doors closed. Failure to do so might cause system failure or result in damage to hardware components.
- Keep the top, front, and back of cabinets clear to allow proper airflow and prevent overheating of components.
- Use only the supplied hardware.

Restart the Appliance After Power Outage

In the case that your data center or Oracle Private Cloud Appliance experiences an unexpected power outage, restart the appliance components in this order, after power has been reapplied to the system power distribution units:

1. Power on the switches.
2. The Oracle ZFS Storage Appliance should power on automatically once power is restored to the PDUs.

Wait for the storage appliance to fully boot before continuing.

3. Power on the management nodes from Oracle ILOM, using the `start /SYS` command, or by pressing the power button on the front of the node.

Wait until the management nodes are in the ready state, running, and Kubernetes micro services PODs are running on all 3 management nodes before you proceed.

4. Power on the compute nodes from Oracle ILOM, using the `start /SYS` command.

Wait until the compute nodes are in the ready state, running, and Kubernetes micro services PODs are running on all compute nodes before you proceed.

5. If you use the VM High Availability feature, you must re-enable this feature when restarting your Oracle Private Cloud Appliance.

```
PCA-ADMIN> enableVmHighAvailability
```

6. Restart any virtual machines on the compute nodes.

Use the following command, or perform the task from the GUI.

```
oci compute instance action --instance-id <Instance-ID> --action START
```


For GUI instructions, see the *Managing the Lifecycle of an Instance* section in [Compute Instance Deployment](#).

5

Configuring Oracle Private Cloud Appliance

This chapter explains how to complete the initial configuration of your Oracle Private Cloud Appliance.

First, gather the information you need for the configuration process by completing the [Initial Installation Checklist](#).

Before you connect to the Oracle Private Cloud Appliance for the first time, ensure that you have made the necessary preparations for external network connections. Refer to [Network Requirements](#).

Connect a Workstation to the Appliance

Connect a laptop or workstation to the appliance in order to start system configuration with the initial installation process.



Note:

You access the initial configuration wizard through the Service Web UI using a web browser. For support information, please refer to the [Oracle software web browser support policy](#).

1. Connect a workstation with a web browser directly to the management network using an Ethernet cable connected to port 2 in the management switch.
2. Configure the wired network connection of the workstation to use the static IP address 100.96.3.254/23. You can also add 100.96.1.254/23 as another IP address if needed.
3. Using the web browser on the workstation, connect to the Oracle Private Cloud Appliance initial configuration interface on the active management node at `https://100.96.2.32:30099`.

100.96.2.32 is the predefined virtual IP address of the management node cluster for configuring Oracle Private Cloud Appliance.
4. Configure the Appliance using the the [UI](#) or the [Service CLI](#).

Complete the Initial Setup

The initial configuration wizard creates an administrator account, binds your system to your Oracle Cloud Infrastructure environment, and configures network connections for your appliance. Once you have completed the initial interview, network and compute services come online, and you can begin to build your cloud.

Complete the [Initial Installation Checklist](#), if you have not already done so and ensure the web browser on your workstation is connected to the Oracle Private Cloud Appliance initial configuration interface on the active management node at `https://100.96.2.32:30099`.

 **Caution:**

Do not power down the management nodes during the initial configuration process.

1. From the Private Cloud Appliance First Boot page, create the primary administrative account for your appliance, which is used for initial configuration and will persist after the first boot process. Additional accounts can be added later.
 - a. Enter an Administrative Username.
 - b. Enter and confirm the Administrative Password.

 **Note:**

Passwords must contain a minimum of 12 characters with at least one of each: uppercase character, lowercase character, digit, and any punctuation character (except for double quote ("") characters, which are not allowed).

- c. Click Create Account & Login.

 **Important:**

At the Service Enclave Sign In page, **Do not sign in and do not refresh your browser.**

2. Open a terminal to access the Service CLI and unlock the system.
 - a. Log into one of the management nodes using the primary administrative account details you just created.

 **Note:**

Management nodes are named `pcamn01`, `pcamn02` and `pcamn03` by default. You change these names later in the configuration process.

```
$ ssh new-admin-account@pcamn01 -p 30006
Password authentication
Password:
PCA-ADMIN>
```

- b. At the `PCA-ADMIN>` prompt, enter `systemStateunlock`.
 - c. Verify the system is unlocked.

```
PCA-ADMIN> show pcaSystem
Command: show pcaSystem
Status: Success
Time: 2022-09-16 12:24:28,232 UTC
Data:
  Id = 5709f72b-c439-4c3a-8959-758df94eff25
  Type = PcaSystem
  System Config State = Config System Params
  system state locked = false
```


- d. Close the terminal or type `exit`.
3. Refresh your web browser to return to the Service Enclave Sign In page and sign in to the system with the primary administrative account.

 **Note:**

You might need to accept the self-signed SSL certificate again before signing in.

4. Provide the following appliance details. Required entries are marked with an asterisk.
 - System Name*
 - Domain*
 - Rack Name
 - Description

One Time Setup of Appliance Details

 **Important**
Once System Name and Domain are set, they CANNOT BE CHANGED.
Please enter and check these details carefully

Availability Domain

System Name *

Required

Domain *


Required

Rack Name

Description

Save Changes

5. **Confirm the parameters you just entered are correct. Once System Name and Domain are set, they cannot be changed.** Click Save Changes when you are ready to proceed.
6. Refresh your web browser and sign in to the system with the primary administrative account.

 **Note:**
You might need to accept the self-signed SSL certificate again before signing in.

The Configure Network Params wizard displays.

7. Refer to the information you gathered in the [Initial Installation Checklist](#) to complete the system configuration. It is helpful to enter all this information in a text file.
8. Select either static or dynamic routing.

For static routing configurations

Enter the following data center information, then click Next.

- Routing Type: Static*

- Uplink gateway IP Address*
- Spine virtual IP* (comma-separated values if using the 4 port dynamic mesh topology)
- Uplink VLAN
- Uplink HSRP Group

Configure Network Params

1 — 2 — 3 — 4 — 5 — 6 — 7
Routing Management... Uplink NTP Admin Net... DNS Servers Public IPs

Routing Type *
Static

Uplink Gateway *

Enter a value.

Spine virtual IP *

Enter a value.

Uplink VLAN

Uplink HSRP Group

Previous Next Cancel Save Changes

For dynamic configurations

Enter the following data center information, then click Next.

- Routing Type: Dynamic*
- Peer1 IP and ASN*
- Peer2 IP and ASN
- Uplink Gateway
- Oracle ASN
- BGP Topology (square, mesh, triangle), KeepAlive Timer and HoldDown Timer
- MD5 Authentication: enable or disable

Configure Network Params

1 — 2 — 3 — 4 — 5 — 6 — 7
Routing — Manageme... — Uplink — NTP — Admin Net... — DNS Servers — Public IPs

Routing Type *
Dynamic

Peer1 IP *
Required

Peer1 ASN *
Required

Peer2 IP

Peer2 ASN

Uplink Gateway

Oracle ASN
136025

BGP Topology
MESH

BGP KeepAlive Timer
60

BGP HoldDown Timer
180

Enable MD5 Authentication
Disable

Previous Next Save Changes

9. Enter a shared virtual IP and associated host name for the management node cluster; add an IP address and host name for each of the three individual management nodes; and then click Next.

Configure Network Params

Progress: 1 (checked) — 2 (current) — 3 — 4 — 5 — 6 — 7

Routing Manageme... Uplink NTP Admin Net... DNS Servers Public IPs

Management Node Virtual IP *	Management Node VIP Hostname *
<input type="text"/>	<input type="text"/>
Management Node 1 IP	Management Node 1 Hostname
<input type="text"/>	<input type="text"/>
Management Node 2 IP	Management Node 2 Hostname
<input type="text"/>	<input type="text"/>
Management Node 3 IP	Management Node 3 Hostname
<input type="text"/>	<input type="text"/>

10. Enter the following data center uplink information and then click Next.

- IP Address for Spine Switch 1 and 2*
- Uplink Port Speed and Port Count*
- Uplink VLAN MTU and Netmask*
- Uplink Port FEC

Configure Network Params

Routing Manageme... Uplink NTP Admin Net... DNS Servers Public IPs

Spine1 IP [comma-separated list, no spaces] *

Spine2 IP [comma-separated list, no spaces] *

Uplink Port Speed *

Uplink Port Count *

Uplink VLAN MTU *

Uplink Netmask [comma-separated list, no spaces] *

Uplink Port FEC

11. Enter the NTP configuration details and then click Next.

To specify multiple NTP servers, enter a comma separated list of IP addresses or fully qualified host names.

Configure Network Params

Routing Manageme... Uplink NTP Admin Net... DNS Servers Public IPs

NTP Servers (Enter up to 7 comma separated IP addresses or Fully Qualified Hostname) *

12. If you elected to segregate administrative appliance access from the data traffic, configure the administration network by entering the following information and then click Next.

- Enable Admin Networking
- Admin Management VIP, IPs 1, 2, and 3
- Admin Management VIP hostname, hostnames 1, 2 and 3
- At least one Admin DNS server
- Admin Port Speed, Port Count, and HSRP Group
- Admin VLAN, MTU, Port FEC, and Gateway IP
- Admin Netmask and CIDR
- Admin IP Address for Spine Switch 1 and 2, and a shared Virtual IP

Configure Network Params



Admin Network

Admin Networking
Enable

Admin Management VIP * <input type="text"/> <small>Required</small>	Admin Management VIP Hostname * <input type="text"/> <small>Required</small>
Admin Management 1 IP * <input type="text"/> <small>Required</small>	Admin Management 1 Hostname * <input type="text"/> <small>Required</small>
Admin Management 2 IP * <input type="text"/> <small>Required</small>	Admin Management 2 Hostname * <input type="text"/> <small>Required</small>
Admin DNS Server 1 * <input type="text"/> <small>Required</small>	Admin DNS Server 2 <input type="text"/>
Admin DNS Server 3 <input type="text"/>	Admin Port Speed Admin Port Speed
Admin Port Count Admin Port Count	Admin HSRP Group <input type="text"/>
Admin VLAN <input type="text"/>	Admin Vlan MTU <input type="text"/>
Admin Port FEC Admin Port FEC	Admin Gateway IP * <input type="text"/> <small>Required</small>
Admin Netmask * <input type="text"/> <small>Required</small>	Admin CIDR * <input type="text"/> <small>Required</small>
Admin Spine1 IP * <input type="text"/> <small>Required</small>	Admin Spine2 IP * <input type="text"/> <small>Required</small>
Admin Spine Virtual IP * <input type="text"/> <small>Required</small>	

Previous | Next | Save Changes | Cancel

13. Enter up to three DNS servers in the respective fields and then click Next.

Configure Network Params



DNS Server 1

DNS Server 2

DNS Server 3

14. Enter the data center IP addresses that the appliance can assign to resources as public IPs.

- Public IP list of CIDRs in a comma-separated list
- Object Storage Public IP (must be outside the public IP range)

Configure Network Params



Public IP Ranges [no spaces]

A comma-separated [no spaces], list of CIDRs, e.g. 10.10.0.0/16,192.168.8.0/24. These are the customer datacenter IPs ("Public IPs") that the PCA uses for OCI components that require Public IPs, for example OCI Gateways, Compute instances in Public subsets, etc. Note that they are not "Public" but instead represent IP addresses that have access in on premise networks.

Object Storage Public IP

15. Use the Previous/Next buttons to recheck that the information you entered is correct and then click Save Changes.
Your network configuration information does not persist until you commit your changes in the following step. If you need to change any parameters after testing begins, you must re-enter all information.

 **Caution:**

Once you click Save Changes, network configuration and testing begins and can take up to 15 minutes. **Do not** close the browser window during this time.

If a problem is encountered, the Configure Network Params wizard reopens and the error is displayed.

16. At the Testing Network Parameters page, you can re-enter network configuration information or commit the changes.
 - Click Re-enter Network Configuration. You are returned to a blank Configure Network Params wizard where you must enter all your information again.
 - Click Commit Changes. The network parameters are locked. Once locked, the routing type and public IPs cannot be changed.

 **Caution:**

Once you click Commit Changes, system initialization begins and can take up to 15 minutes. **Do not** close the browser window during this time.

If a problem is encountered, the Configure Network Params wizard reopens and the error is displayed. Otherwise, a Configuration Complete message displays.

17. Click Sign Out. You are returned to the Service Enclave.
18. To continue configuration, connect to the Service Web UI at the new virtual IP address of the management node cluster: `https://<virtual_ip>:30099`.

 **Note:**

You might need to accept the self-signed SSL certificate again before signing in.

19. Verify your system configuration.
 - From the Dashboard, click Appliance to view the system details and click Network Environment to view the network configuration.
 - Alternatively, you can log in to the Service CLI as an administrator and run the following commands to confirm your entries.

```
# ssh 100.96.2.32 -l admin -p 30006
Password:
PCA-ADMIN> show pcaSystem
```

```
[...]
PCA-ADMIN> show networkConfig
[...]
```

For details about the software configuration process, and for advanced configuration and update options, refer to [What Next](#) and the [Oracle Private Cloud Appliance Administrator Guide](#).

Configure the Appliance Using the CLI

Using the GUI is the preferred method to perform the initial installation of the Appliance, however, if there is a need to configure the Appliance using the CLI, use the following procedure.

1. Connect a workstation directly to the management network using an Ethernet cable connected to port 2 in the management switch.
2. Configure the wired network connection of the workstation to use the static IP address 100.96.3.254/23.
3. Log in to the Oracle Private Cloud Appliance management node cluster for initial configuration. When prompted for a password, press enter.

```
# ssh 100.96.2.32 -l "" -p 30006
Password authentication
Password:
```

100.96.2.32 is the predefined virtual IP address of the management node cluster for configuring Oracle Private Cloud Appliance.

4. Confirm you are logged in as the initial user, where System Config State = Config User.

```
PCA-ADMIN> show pcaSystem
Command: show pcasystem
Status: Success
Time: 2022-01-20 14:20:01,069 UTC
Data:
  Id = o780c522-fk15-43b1-8g30-eea90263f2e9
  Type = PcaSystem
  System Config State = Config User
```

5. Create the primary administrative account for the appliance.

Passwords must contain at least 12 characters with at least one of each: uppercase character, lowercase character, digit, punctuation character, and no doublequote ("").

```
PCA-ADMIN> createadminaccount name=admin password=password confirmpassword=password
Command: createadminaccount name=admin password=***** confirmpassword=*****
Status: Success
Time: 2022-01-20 14:23:01,069 UTC
JobId: 302a6h99-fh7y-41sd-8i30-ea28581dcw9e
```

6. Log out of the CLI.
7. Unlock the system.
 - a. Log into one of the management nodes using the primary administrative account details you just created.

 **Note:**

Management nodes are named `mn01`, `mn02` and `mn03` unless you change these names later in the configuration process.

```
$ ssh new-admin-account@mn01 -p 30006
Password authentication
Password:
PCA-ADMIN>
```

b. Enter `systemStateunlock`.

c. Verify the system is unlocked.

```
PCA-ADMIN> show pcaSystem
Command: show pcaSystem
Status: Success
Time: 2022-09-16 12:24:28,232 UTC
Data:
  Id = 5709f72b-c439-4c3a-8959-758df94eff25
  Type = PcaSystem
  system state locked = false
```

8. Log out, then log back in with the new credentials you just created.

```
PCA-ADMIN> exit
# ssh new-admin-account@100.96.2.32 -p 30006
Password authentication
Password:
PCA-ADMIN>
```

9. Confirm the system is ready for configuration, when the `System Config State = Config System Params`.

```
PCA-ADMIN> show pcaSystem
Command: show pcasystem
Status: Success
Time: 2022-01-20 14:26:01,069 UTC
Data:
  Id = o780c522-fk15-43b1-8g30-eea90263f2e9
  Type = PcaSystem
  System Config State = Config System Params
[...]
```

10. Configure the system name and domain name, then confirm the settings.

Refer to the information you gathered in the [Initial Installation Checklist](#) to complete the system configuration.

```
PCA-ADMIN> setDay0SystemParameters systemName=name domainName=us.example.com
```

```
PCA-ADMIN> show pcasystem
Command: show pcasystem
Status: Success
Time: 2022-01-20 14:26:01,069 UTC
Data:
  Id = o780c522-fk15-43b1-8g30-eea90263f2e9
  Type = PcaSystem
[...]
```

System Name = `name`

```
Domain Name = us.example.com
Availability Domain = ad1
```

11. Configure the network parameters. Once you enter these details, network initialization begins and can take up to 15 minutes.

- For a dynamic network configuration, enter the parameters on a single line.

```
PCA-ADMIN> setDay0DynamicRoutingParameters \
uplinkPortSpeed=100 \
uplinkPortCount=2 \
uplinkVlanMtu=9216 \
spine1Ip=10.nn.nn.17 \
spine2Ip=10.nn.nn.25 \
uplinkNetmask=255.255.255.252 \
mgmtVipHostname=apac01-vip \
mgmtVip=10.nn.nn.8 \
ntpIps=10.nn.nn.1 \
peer1Asn=50000 \
peer1Ip=10.nn.nn.18 \
peer2ASN=50000 \
peer2Ip=10.nn.nn.22 \
objectStorageIp=10.nn.nn.1
```

- For a static network configuration, enter the parameters on a single line.

```
PCA-ADMIN> setDay0StaticRoutingParameters \
mgmtVip=10.nn.nn.22 \
spine1Ip=10.nn.nn.18 \
spine2Ip=10.nn.nn.19 \
spineVip=10.nn.nn.20 \
uplinkVlan=318\
uplinkNetmask=255.255.252.0 \
uplinkGateway=10.nn.nn.1 \
mgmtVipHostname=plvca5vip \
ntpIps=10.nn.nn.1,10.nn.nn.1 \
objectStorageIp=10.nn.nn.41 \
uplinkHsrpGroup=55 uplinkPortSpeed=100
```

12. Confirm the network parameters are configured. You can monitor the process using the `show NetworkConfig` command. When the process is complete, the Network Config Lifecycle State = ACTIVE.

```
PCA-ADMIN> show NetworkConfig
Command: Success
Time: 2022-01-15 14:28:47,781 UTC
Data:
  uplinkPortSpeed=100
  uplinkPortCount=2
  [...]
  BGP Holddown Timer = 180
  Netowrk Config Lifecycle State = ACTIVE
```

When this process is complete, the System Config State changes from Wait for Networking Service to Config_Network_ Params.

```
PCA-ADMIN> show pcsystem
Command: show pcsystem
Status: Success
Time: 2022-01-20 14:29:07,069 UTC
Data:
  Id = o780c522-fk15-43b1-8g30-eea90263f2e9
  Type = PcaSystem
```



```
System Config State = Config Network Params  
[...]
```

13. Lock the network parameters.

```
PCA-ADMIN> lockDay0NetworkParameters
```

14. Configure the management nodes and DNS servers.

```
PCA-ADMIN> edit NetworkConfig \  
mgmt01Ip=10.nn.nn.9 \  
mgmt02Ip=10.nn.nn.10 \  
mgmt03Ip=10.nn.nn.11 \  
mgmt01Hostname=apac01-mn1 \  
mgmt02Hostname=apac01-mn2 \  
mgmt03Hostname=apac01-mn3 \  
dnsIp1=206.nn.nn.1 \  
dnsIp2=206.nn.nn.2 \  
dnsIp3=10.nn.nn.197
```

15. Enter the list of public IPs the appliance can access from your datacenter, in a comma-separated list on one line.

```
edit NetworkConfig publicIps=10.nn.nn.2/31,10.nn.nn.4/30,10.nn.nn.8/29, \  
10.nn.nn.16/28,10.nn.nn.32/27,10.nn.nn.64/26,10.nn.nn.128/26,10.nn.nn.192/27, \  
\  
10.nn.nn.224/28,10.nn.nn.240/29,10.nn.nn.248/30,10.nn.nn.252/31,10.nn.nn.254/32
```

Optional Bastion Host Uplink

In addition to the public Ethernet connection, you may connect the management switch to a management or machine administration network at your installation site. If you choose to use such an uplink, consider it as a long-term alternative to the temporary workstation connection described in [Connect a Workstation to the Appliance](#). Configure the administration uplink *after* the initialization of the appliance, when the appliance network settings have been applied.

A connection to the appliance internal management network, either directly into the management switch or through an additional Ethernet switch in the data center, is **not required** to access the appliance management functionality of the Oracle Private Cloud Appliance user interfaces. The primary role of the appliance internal management network is to allow the controller software on the management nodes to interact with the compute nodes and other rack components. Connecting to this network from outside the appliance allows you to gain direct administrator access to each component, for example to control the ILOMs.

▲ Caution:

Do not make any changes to anything on this network unless directed to do so by Oracle Support.

Bastion Host Configuration

Follow these guidelines when configuring a bastion host.

▲ Caution:

Connect **port 2** on the management switch.

Make sure that the data center Ethernet switch used in this connection is configured to prevent DHCP leakage to the 100.96.0.0/22 subnet used by Oracle Private Cloud Appliance. Do not connect to any network with any kind of broadcast services in addition to DHCP.

For the *bastion host*, which is the name used to describe the machine that is permanently connected to the data center administration network, use the IP address 100.96.3.254/23 and assign it statically to its network interface. Make sure there is no other machine on the same subnet using the same IP address and causing IP conflicts.

Both the ILOM and internal management network are configured on the same management switch. In order to communicate with both networks, you must configure the bastion host with two paths to the switch. You can choose one of two configuration options:

- Configure two IP addresses on the bastion host.
For example, add 100.96.1.254/23 as a second IP address.

```
# cat ifcfg-eth1
NAME=eth1
DEVICE=eth1
BOOTPROTO=static
ONBOOT=yes
NM_CONTROLLED=no
USERCTL=no
DEFROUTE=no
IPV6INIT=no
IPADDR1=100.96.3.254
PREFIX1=23
IPADDR2=100.96.1.254
PREFIX2=23
```

- Or, add a route to the existing networks.
On the 100.96.0.0/23 network, if the bastion host is configured with the IP 100.96.3.254 for subnet 100.96.2.0/23, add this route:

```
ip route add 100.96.0.0/23 via 100.96.2.1 dev eth1
```

and on the 100.96.2.0/23 network, if the bastion host is configured with the IP 100.96.1.254 for subnet 100.96.0.0/23, add this route:

```
ip route add 100.96.2.0/23 via 100.96.0.1 dev eth1
```

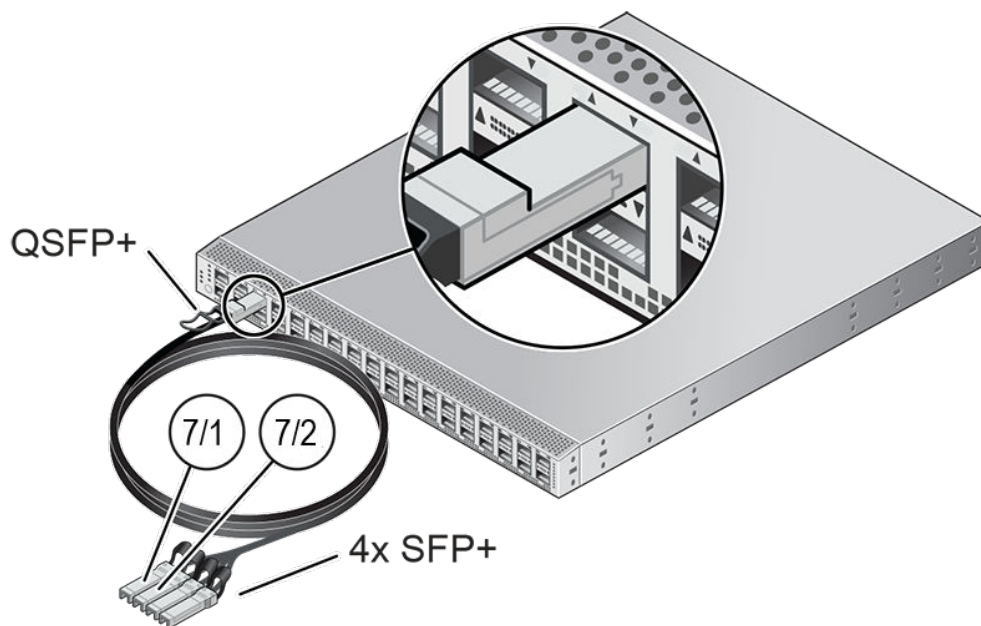
Optional Connection to Exadata

Optionally, Oracle Private Cloud Appliance can be integrated with Oracle Exadata for a high-performance combination of compute capacity and database optimization. In this configuration, database nodes are directly connected to reserved ports on the spine switches of Oracle Private Cloud Appliance. Four 100Gbit ports per spine switch are reserved and split into 4x25Gbit breakout ports, providing a maximum of 32 total cable connections. Each database node is cabled directly to both spine switches, meaning up to 16 database nodes can be connected to the appliance. It is allowed to connect database nodes from different

Exadata racks. For more information, see "Exadata Integration" in the Network Infrastructure section of [Hardware Overview](#).

To cable the Oracle Private Cloud Appliance to the Exadata rack use breakout cables, with a QSFP28 transceiver on the spine switch end and four SFP28 transceivers on the other end, to connect from ports 7 - 10 on the Oracle Private Cloud Appliance spine switches to the Exadata database servers.

Reserved Breakout Ports on Spine Switch for Exadata Connection



Once the cable connections are in place, you must configure an *Exadata network*, which enables traffic between the connected database nodes and a set of compute instances. Refer to [Creating and Managing Exadata Networks in Hardware Administration](#).

What Next

Once the initial installation of your Oracle Private Cloud Appliance is complete, you can begin to customize the appliance for use.

Note:

Ensure you provision the compute nodes before you hand off a newly created tenancy to the tenancy administrator. Unprovisioned compute nodes can cause VCN creation to fail.

Task	Directions	Background Information
Configuring ASR	See "Using Auto Service Requests" in the Status and Health Monitoring section of the Oracle Private Cloud Appliance Administrator Guide .	See "Using Auto Service Requests" in the Status and Health Monitoring section of the Oracle Private Cloud Appliance Administrator Guide .
Creating a new administrator account	See "Administrator Account Management" in the Oracle Private Cloud Appliance Administrator Guide	See "Administrator Access" in Appliance Administration Overview
Provision compute nodes	See "Performing Compute Node Operations" in Hardware Administration	See "Servers" in Hardware Administration
Create tenancies	See "Tenancy Management" in the Oracle Private Cloud Appliance Administrator Guide	See "Enclaves and Interfaces" in Architecture and Design
Install the Oracle Cloud Infrastructure CLI in the Compute Enclave	See "Using the Oracle Cloud Infrastructure CLI" in Working in the Compute Enclave	See "Enclaves and Interfaces" in Architecture and Design
Create an Internal-Only VNIC and Subnet	See "Managing VCNs and Subnets" in Networking	See Virtual Networking Overview
Create a Network-Accessible VNIC and Subnet	See "Managing VCNs and Subnets" and "Configuring VCN Gateways" in Networking	See "Virtual Networking Overview" in Networking
Import a compute image	See "Managing Compute Images" in Compute Instance Deployment	See "Compute Images" in Compute Instance Concepts
Launch a compute instance	See "Tutorial – Launching Your First Linux Instance" in Compute Instance Deployment	See Compute Instance Concepts
Connect to a compute instance	See the <i>Connect to Your Instance</i> section of the "Tutorial – Launching Your First Linux Instance" in Compute Instance Deployment	See "Compute Images" in Compute Instance Concepts
Get the status of a submitted job	PCA-ADMIN> show Job id=<jobid>	See Working in the Service Enclave

6

Cabling Reference

This section provides a reference for the cabling between components of Oracle Private Cloud Appliance.

Management Switch Ethernet Connections

This section lists the cabling connections for the management switch. They are Ethernet connections intended for the internal administration network.

From Rack Unit	From Component and Port	To Management Switch Rack Unit and Port
--	bastion	U26: port 2
U41*	compute node: NET0	U26: port 42
U40*	compute node: NET0	U26: port 41
U39*	compute node: NET0	U26: port 40
U38*	compute node: NET0	U26: port 39
U37*	compute node: NET0	U26: port 38
U36*	compute node: NET0	U26: port 37
U35*	compute node: NET0	U26: port 36
U34*	compute node: NET0	U26: port 35
U32	leaf switch: NET MGMT	U26: port 14
U31	leaf switch: NET MGMT	U26: port 13
U25	spine switch: NET MGMT	U26: port 34
U24	spine switch: NET MGMT	U26: port 33
U23*	compute node: NET0	U26: port 23
U22*	compute node: NET0	U26: port 22
U21*	compute node: NET0	U26: port 21
U20*	compute node: NET0	U26: port 20
U19*	compute node: NET0	U26: port 19
U18*	compute node: NET0	U26: port 18
U17*	compute node: NET0	U26: port 17
U16*	compute node: NET0	U26: port 16
U15	compute node: NET0	U26: port 15
U14	compute node: NET0	U26: port 12
U13	compute node: NET0	U26: port 11
U12	compute node: NET0	U26: port 10
U11	compute node: NET0	U26: port 9
U10	compute node: NET0	U26: port 8

From Rack Unit	From Component and Port	To Management Switch Rack Unit and Port
U09	compute node: NET0	U26: port 7
U08	compute node: NET0	U26: port 6
U07	management node: NET0	U26: port 5
U06	management node: NET0	U26: port 32
U05	management node: NET0	U26: port 31
U03	ZFS storage appliance controller: NET0	U26: port 28
U03	ZFS storage appliance controller: PCIe 6-2	U26: port 29
U01	ZFS storage appliance controller: NET0	U26: port 25
U01	ZFS storage appliance controller: PCIe 6-2	U26: port 26
N/A	PDU-A	U26: port 24
N/A	PDU-B	U26: port 43
N/A	Oracle Support	U26: port 1

* Indicates a rack unit designated as a flex bay. These rack units can contain compute nodes or storage nodes. The rack unit and port numbers assigned to flex bays only apply when a compute node is installed in that location.

Spine and Leaf Switch Data Network Connections

This section lists the cabling connections for the spine and leaf switches. They are high speed Ethernet connections up to 100Gbit, intended for the internal data network.

From Rack Unit	From Component and Port	To Spine or Leaf Switch Rack Unit and Port
U41	compute node: port 1	U24: port 31
U41	compute node: port 2	U25: port 31
U40	compute node: port 1	U24: port 30
U40	compute node: port 2	U25: port 30
U39	compute node: port 1	U24: port 29
U39	compute node: port 2	U25: port 29
U38	compute node: port 1	U24: port 28
U38	compute node: port 2	U25: port 28
U37	compute node: port 1	U24: port 27
U37	compute node: port 2	U25: port 27
U36	compute node: port 1	U24: port 26
U36	compute node: port 2	U25: port 26
U35	compute node: port 1	U24: port 25

From Rack Unit	From Component and Port	To Spine or Leaf Switch Rack Unit and Port
U35	compute node: port 2	U25: port 25
U34	compute node: port 1	U24: port 24
U34	compute node: port 2	U25: port 24
U23	compute node: port 1	U24: port 23
U23	compute node: port 2	U25: port 23
U22	compute node: port 1	U24: port 22
U22	compute node: port 2	U25: port 22
U21	compute node: port 1	U24: port 21
U21	compute node: port 2	U25: port 21
U20	compute node: port 1	U24: port 20
U20	compute node: port 2	U25: port 20
U19	compute node: port 1	U24: port 19
U19	compute node: port 2	U25: port 19
U18	compute node: port 1	U24: port 18
U18	compute node: port 2	U25: port 18
U17	compute node: port 1	U24: port 17
U17	compute node: port 2	U25: port 17
U16	compute node: port 1	U24: port 16
U16	compute node: port 2	U25: port 16
U15	compute node: port 1	U24: port 15
U15	compute node: port 2	U25: port 15
U14	compute node: port 1	U24: port 14
U14	compute node: port 2	U25: port 14
U13	compute node: port 1	U24: port 13
U13	compute node: port 2	U25: port 13
U12	compute node: port 1	U24: port 12
U12	compute node: port 2	U25: port 12
U11	compute node: port 1	U24: port 11
U11	compute node: port 2	U25: port 11
U10	compute node: port 1	U24: port 10
U10	compute node: port 2	U25: port 10
U09	compute node: port 1	U24: port 9
U09	compute node: port 2	U25: port 9
U08	compute node: port 1	U24: port 8
U08	compute node: port 2	U25: port 8
U07	management node: port 1	U24: port 7
U07	management node: port 2	U25: port 7
U06	management node: port 1	U24: port 6
U06	management node: port 2	U25: port 6

From Rack Unit	From Component and Port	To Spine or Leaf Switch Rack Unit and Port
U05	management node: port 1	U24: port 5
U05	management node: port 2	U25: port 5
U03	Oracle ZFS Storage Appliance ZS9-2 controller: PCIE3 port 1	U31: port 35
U03	Oracle ZFS Storage Appliance ZS9-2 controller: PCIE10 port 1	U32: port 35
U01	Oracle ZFS Storage Appliance ZS9-2 controller: PCIE3 port 1	U31: port 33
U01	Oracle ZFS Storage Appliance ZS9-2 controller: PCIE10 port 1	U32: port 33

Data and Spine Switch Interconnects

This section lists the cabling connections between the data and spine switches. They are 100GbE Ethernet connections intended for high bandwidth traffic between the data and spine switches.

Spine Switch to Data Switch Connections

This section lists the cabling connections between the data switches and spine switches.

From Rack Unit	From Component and Port	To Rack Unit	To Component and Port
U31	spine switch: port 23	U24	data switch: port 33
U31	spine switch: port 24	U24	data switch: port 34
U31	spine switch: port 25	U25	data switch: port 35
U31	spine switch: port 26	U25	data switch: port 36
U32	spine switch: port 23	U25	data switch: port 33
U32	spine switch: port 24	U25	data switch: port 34
U32	spine switch: port 25	U24	data switch: port 35
U32	spine switch: port 26	U24	data switch: port 36

Data Switch to Data Switch Connections

This section lists the cabling connections between the data switches.

From Rack Unit	From Component and Port	To Rack Unit	To Component and Port
U24	data switch: port 3	U25	data switch: port 3

From Rack Unit	From Component and Port	To Rack Unit	To Component and Port
U24	data switch: port 4	U25	data switch: port 4

Spine Switch to Spine Switch Connections

This section lists the cabling connections between the spine switches.

From Rack Unit	From Component and Port	To Rack Unit	To Component and Port
U31	spine switch: port 28	U32	spine switch: port 28
U31	spine switch: port 29	U32	spine switch: port 29
U31	spine switch: port 30	U32	spine switch: port 30
U31	spine switch: port 31	U32	spine switch: port 31
U31	spine switch: port 32	U32	spine switch: port 32

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Site Checklists

This section contains site checklists to help you ensure that your site is prepared for installing the Oracle Private Cloud Appliance.

System Components Checklist

Complete the following checklist to ensure that the systems component considerations have been addressed.

System Components Considerations	Yes	No	N/A	Comment
Will more than one base rack be installed?				
Is the rack installation a new system or an addition to an existing system?				
Are all machine racks adjacent to each other?				
If the connecting racks are not within the specified proximity, then has the following been done:				
<ul style="list-style-type: none">• Asked Oracle Support Services to provide and schedule the custom multi-rack cabling service with the installation?				

Data Center Room Checklist

Complete the following checklist to ensure that the data center room requirements are met. For information about the data center requirements, see [Flooring Requirements](#).

Data Center Room Considerations	Yes	No	N/A	Comment
Has the Oracle Private Cloud Appliance location been allocated?				
Is there a vacant location for the new equipment?				
Does the floor layout meet the equipment maintenance access requirements?				
Is there adequate space available for maintenance?				
Will the equipment be positioned so that the exhaust air of one rack does not enter the air inlet of another rack?				
Have cabinet stabilization measures been considered?				
Does the raised floor satisfy the weight requirements for the new hardware?				
Can floor tiles be removed without permission to accommodate service?				
Are there cable routing channels or cutouts?				
Are you providing any additional hardware?				

Data Center Room Considerations	Yes	No	N/A	Comment
Is the hardware you are providing fully compatible with the Oracle Private Cloud Appliance?				
Will the new hardware location require any non-standard cable lengths?				
Is the floor to ceiling height a minimum of 3214 mm or 3.2 m (10.5 feet)?				
Is the depth of the raised floor a minimum of 46 cm (18 inches)?				

Data Center Environmental Checklist

Complete the following checklist to ensure that the data center environment requirements are met. For information, see [Ventilation and Cooling Requirements](#).

Data Center Environmental Considerations	Yes	No	N/A	Comment
Does the computer room air handling meet temperature and humidity requirements?				
Does the installation floor layout satisfy the ventilation requirements?				

Data Center Environmental Considerations	Yes	No	N/A	Comment
Will the equipment be positioned so the exhaust air of one rack does not enter the air intake of another rack?				
Are the perforated floor tiles each rated at 400 CFM or greater?				
Do the data center air conditioners provide sufficient front to back airflow?				
Is airflow adequate to prevent hot spots?				
Can the data center continuously satisfy environmental requirements?				
Can more vented floor tiles be obtained if required?				

Access Route Checklist

Complete the following checklist to ensure that the access route requirements are met. For information about preparing your data center access route, see [Prepare to Install Oracle Private Cloud Appliance](#).

Access Route Considerations	Yes	No	N/A	Comment
Has the access route been checked for clearances of the packaged equipment?				

Access Route Considerations	Yes	No	N/A	Comment
Do all the doors and entry ways conform to the width and height requirements for transportation, including the width of the unpacked unit?				
Do all the doors meet the height requirement of minimum 218 cm (86 inches) for packaged delivery?				
Does the access route provide sufficient space for transport of the packed devices?				
Are there any ramps or thresholds that are of concern? If yes, then provide details.				
Are there any stairs or ramps in the path when moving the new hardware?				
Have you confirmed that all route incline angles are within the permitted range?				
Have you confirmed that the access route is free of any obstacles that would expose the device to shock?				

Access Route Considerations	Yes	No	N/A	Comment
<p>Are all the surfaces acceptable for rolling the new unpacked and packed equipment?</p> <p>If a pallet jack is to be used, then have you confirmed the following:</p> <ul style="list-style-type: none"> • The pallet jack supports the device weight? • The pallet jack tines are compatible with the shipping pallet? <p>If there are stairs, then is a loading elevator accessible for the equipment?</p>				

Access Route Considerations	Yes	No	N/A	Comment
If an elevator is to be used, then have you confirmed the following:				
<ul style="list-style-type: none"><li data-bbox="370 453 565 646">• The elevator car is wide enough for the device to be carried into it?<li data-bbox="370 657 565 850">• The elevator car is high enough for the device to be carried into it?<li data-bbox="370 861 565 1033">• The load limit of the elevator is greater than the device weight?<li data-bbox="370 1043 565 1291">• Are elevators available to handle up to 996 kg (2197 lbs) fully-loaded rack capacity?<li data-bbox="370 1302 565 1642">• The elevator door meets the minimum height requirement of 218 cm (86 inches) for packaged rack delivery?				

Access Route Considerations	Yes	No	N/A	Comment
<p>Does the path from the receiving location to the designated data center area support the weight of the unpacked equipment?</p> <p>Is the path onto the raised floor rated for dynamic loading of the server? Refer to Flooring Requirements.</p>				

Facility Power Checklist

Complete the following checklist to ensure that the facility power requirements are met. For information about power requirements, see [Electrical Power Requirements](#).

Facility Power Considerations	Yes	No	N/A	Comment
<p>Do you know the required operating voltage and electric current level of the device and peripherals?</p> <p>Will you be using single-phase (low-voltage or high-voltage) or 3-phase (low-voltage or high-voltage) power?</p> <p>Are enough power outlets provided within 2 meters (6.5 feet) for each rack?</p>				

Facility Power Considerations	Yes	No	N/A	Comment
<p>Do the power outlets have appropriate socket receptacles for the PDU option ordered? Options are low voltage or high voltage, single-phase or 3-phase.</p>				
<p>Will optional ground cables be attached to the rack?</p>				
<p>Are the circuit breakers for the equipment suitable in terms of voltage and current-carrying capacities?</p>				
<p>Does the power frequency meet the equipment specifications?</p>				
<p>Are power outlets available for the new equipment at the designated location?</p>				
<p>Will system power be delivered from two separate grids?</p>				
<p>Is there a UPS to power the equipment?</p>				

Facility Power Considerations	Yes	No	N/A	Comment
Do you have the minimum required power sources to support the power load for the new hardware? Use kilowatt (kW) / kilovolt (kVA) to express power load.				

Safety Checklist

Complete the following checklist to ensure that the safety requirements are met. For information about safety, see [Emergency Procedures for Oracle Private Cloud Appliance](#) and [Ventilation and Cooling Requirements](#).

Safety Checklist Considerations	Yes	No	N/A	Comment
Is there an emergency power shut off?				
Is there a fire protection system in the data center room?				
Is the computer room adequately equipped to extinguish a fire?				
Is antistatic flooring installed?				
Is the floor below the raised floor free of obstacles and blockages?				

Logistics Checklist

Complete the following checklist to ensure that the logistics requirements are met. For information about unpacking and space requirements, see [Space Requirements](#).

Logistics Checklist Considerations	Yes	No	N/A	Comment
Do you have contact information for the data center personnel?				
Is there security or access control for the data center?				
Are there any security background checks or security clearances required for vendor personnel to access the data center? If yes, then do you have a recommended agency?				
How many days in advance must background checks be completed?				
Are there any additional security access issues?				
Is computer room access available for installation personnel?				
Are laptops, cell phones, and cameras allowed in the data center?				
Does the building have a delivery dock?				
Is there a delivery/unpacking/staging area?				
Is the delivery inside?				

Logistics Checklist Considerations	Yes	No	N/A	Comment
If the delivery is not inside, then is the site prepared for uncrating?				
Is the unpacking/staging area protected from the elements?				
Does the building have adequate receiving space?				
Is the unpacking area air-conditioned to avoid thermal shock for various hardware components?				
Will sufficient moving personnel be available to install the hardware?				
Is union labor required for any part of the delivery or installation?				
Are you prepared for uncrating and trash removal?				
Is uncrating of cabinet and cabinet trash removal required?				
Are there any restrictions on delivery truck length, width, or height?				

Logistics Checklist Considerations	Yes	No	N/A	Comment
Does the customer allow cardboard boxes and other packing material in the computer room? If no, then do ground level deliveries require a truck with a side rail lift?				
Is there a time constraint on dock access? If yes, then provide time constraints.				
Is tail lift required on delivery carrier to unload the equipment at the delivery dock?				
Will any of the following be required to place equipment in computer room?				
<ul style="list-style-type: none"> • Stair walkers • Lifters • Ramps • Steel plates • Floor covers 				
Does the delivery carrier require any special equipment, such as non-floor damaging rollers, transport dollies, pallet jacks, or fork lifts?				

Network Specification Checklist

Complete the following checklist to ensure that the network specification requirements are met. For information about IP addresses, see [Network Requirements](#).

Network Specification Considerations	Yes	No	N/A	Comment
Did you complete the networking worksheet, which is included in Initial Installation Checklist?				
Have you received the site-specific installation template from your Oracle technical representative?				
Did you review the installation template and consult with your Oracle technical representative regarding any site-specific changes, if any?				
Did you verify that IP addresses in the installation template are currently not in use?				
Have you performed the required configuration within your network infrastructure to allow the Oracle Private Cloud Appliance to use the IP addresses specified in the template?				
Have you registered IP addresses in the installation template with DNS?				

Network Specification Considerations	Yes	No	N/A	Comment
Did you run the required network cables from your network equipment to the location where the Oracle Private Cloud Appliance will be installed?				
Did you label the network cables that will connect to the Oracle Private Cloud Appliance?				

Initial Installation Checklist

This section contains a checklist to help you plan for the initial installation wizard, which walks you through first boot on your Oracle Private Cloud Appliance. Work with your network and site administrators to plan the integration of the appliance into your data center. For initial configuration you can choose either a dynamic network or static network configuration. This checklist contains information for both options, but you only need data for the implementation you choose.

Items noted in the table with an asterisk (*) are required fields for all configurations. Fields marked with a (†) are required for static network configuration, and fields marked with a (‡) are required for dynamic network configuration.

Item	Your Configuration	Description and Example
Administrator user name and password		<p>The appliance does not ship with a default administrative user account. You create an administrator account during the initial installation.</p> <p>User names and passwords have a maximum length of 100 characters. Passwords must contain at least 12 characters with at least one of each: uppercase character, lowercase character, digit, and any punctuation character (except for double quote (") characters, which are not allowed).</p>

Appliance Details

Item	Your Configuration	Description and Example
Availability Domain*	ad1	Your on site Oracle Private Cloud Appliance is considered an availability domain and is assigned the value ad1.
System Name*		Name for your Oracle Private Cloud Appliance that will also be used as the Realm. This attribute has a maximum length of 24 characters. Acceptable characters are "a" → "z", "A" → "Z", "0" → "9", and "-". Once set this parameter cannot be changed.
Domain*		Domain name for your system which is used as the base domain for the internal network, and by Oracle Private Cloud Appliance public facing services. This attribute has a maximum length of 190 characters. Acceptable characters are "a" → "z", "A" → "Z", "0" → "9", "-" Example: us.example.com Once set this parameter cannot be changed.
Rack Name		Identify the appliance type, for example pca.
Description		Free text field with a 256 character limit to optionally provide a description of your appliance.
Static Routing Network Details		
Routing Type*		Choose static or dynamic routing based on your network topology.
Uplink Gateway†		IP address for the uplink switch to the default gateway in your data center. Chose a valid IP address in customer data center subnet that the Oracle Private Cloud Appliance uplink switches are attached to. Example: 10.68.48.86
Spine switch virtual IP†		Virtual IP address which acts as the public VIP for the spine switches in your company network. Chose a valid IP address in the data center subnet that the Oracle Private Cloud Appliance uplink switches are attached to. Example: 10.68.49.103

Item	Your Configuration	Description and Example
Uplink VLAN		VLAN used to connect to an uplink switch. Chose a VLAN value between 2 and 3899. VLANs 3900 to 4095 are reserved. Example: 322
Uplink HSRP Group		Assign an HSRP group number to your appliance. Acceptable values are 0 to 255, and the default value is 151. If there are multiple Oracle Private Cloud Appliance racks connected to the same data center infrastructure switches, ensure they use <i>different</i> HSRP groups.
Management node 1 IP addresses and host name*	10/25/40/100G*: 1G: host name:	Static IP addresses for management node 1 in your company network. Provide a valid host name. An appended domain name is used if you don't provide a host name.
Management node 2 IP addresses and host name*	10/25/40/100G*: 1G: host name:	Static IP addresses for management node 2 in your company network. Provide a valid host name. An appended domain name is used if you don't provide a host name.
Management node 3 IP addresses and host name*	10/25/40/100G*: 1G: host name:	Static IP addresses for management node 3 in your company network. Provide a valid host name. An appended domain name is used if you don't provide a host name.
Management virtual IP address and host name*	10/25/40/100G*: 1G: host name*:	Virtual IP addresses of the management node cluster in your company network. This is the IP used to DNAT to the internal management node VIP. Oracle Private Cloud Appliance DNS will resolve Oracle Private Cloud Appliance endpoints to this IP. Chose a valid IP address in the data center CIDR. Example: 10.68.49.170 Provide a valid host name. An appended domain name is used if you don't provide a host name.
Spine switch 1 IP address*		IP address for the spine switch 1 in your company network. Chose a valid IP address in the data center subnet that the Oracle Private Cloud Appliance uplink switches are attached to. Example: 10.68.49.101

Item	Your Configuration	Description and Example
Spine switch 2 IP address*		IP address for the spine switch 2 in your company network. Chose a valid IP address in the data center subnet that the Oracle Private Cloud Appliance uplink switches are attached to. Example: 10.68.49.102
Dynamic Routing Network Details		
Peer 1 IP [‡]		Neighbor BGP IP - IP address of customer datacenter router-1 that the Oracle Private Cloud Appliance uplink switches are attached to. Example: 10.68.48.86
Peer 1 ASN [‡]		BGP ASN of customer datacenter router-1. Example: 64512-65533 or 4200000000-4294967294 (Note: Oracle Spine switch default ASN is 136025.)
Peer 2 IP [‡]		Neighbor BGP IP - IP address of customer datacenter router-2 that the Oracle Private Cloud Appliance uplink switches are attached to. Example: 10.68.48.88
Peer 2 ASN [‡]		BGP ASN of customer datacenter router-2 Example: 64512-65533 or 4200000000-4294967294 (Note: Oracle Spine switch default ASN is 136025.)
Uplink Gateway*		IP address for the uplink switch to the default gateway in your data center. Chose a valid IP address in customer data center subnet that the Oracle Private Cloud Appliance uplink switches are attached to. Example: 10.68.48.86
Oracle ASN		The default is 136025.
BGP Topology		Options are triangle, square, or mesh. The default is mesh.
BGP Authentication		Enter the BGP credentials for your network.
BGP Password		Enter the BGP password for your network.
BGP KeepAlive Timer		The default is 60.
BGP Holddown Timer		The default is 180.
Enable MDA Authentication		The default is false.

Item	Your Configuration	Description and Example
Uplink Details		
Uplink Port Speed*		All uplink ports must have the identical speed. The options are 10, 25, 40, 100. The default is 100.
Uplink Port Count*		The number of uplink ports per spine switch. Connectivity must be identical on both spine switches to provide redundancy and load-splitting. For 100G and 40G speeds, valid values are 1, 2 and 4. For 10G and 25G ports, valid values are 1, 2, 4, 8 and 16. The default for both is 4.
Uplink VLAN MTU*		MTU size determines the maximum packet size that can be transmitted over your uplink connection. The valid range is 68 to 9216. The default is 9216.
Uplink Netmask*		Netmask of the subnet Oracle Private Cloud Appliance is connected to in your data center. Example: 255.255.252.0
Uplink Port FEC		Configure Forward Error Correct (FEC) for the uplink port. The default option is auto, with on and off as other valid options.
NTP Server Details		
NTP servers*		At least one valid IP address for an NTP server in your data center. You can enter multiple IP addresses in a comma-separated list. Example: 10.147.24.1, 10.211.17.1
Optional Administration Network Details		
Admin Networking		Enable or disable a separate Administration network to transport administrative traffic.

Item	Your Configuration	Description and Example
Management virtual IP address and host name	10/25/40/100G: 1G: host name:	Virtual IP address of the management node cluster in the administration network. This is the IP used to DNAT to the internal management node VIP. Oracle Private Cloud Appliance DNS will resolve Oracle Private Cloud Appliance endpoints to this IP. Chose a valid IP address in the administration network CIDR. Example: 10.168.141.170 Provide a valid host name. An appended domain name is used if you don't provide a host name.
Management node 1 IP addresses and host name	10/25/40/100G: 1G: host name:	Static IP addresses for management node 1 in the administration network. Provide a valid host name. An appended domain name is used if you don't provide a host name.
Management node 2 IP addresses and host name	10/25/40/100G: 1G: host name:	Static IP addresses for management node 2 in the administration network. Provide a valid host name. An appended domain name is used if you don't provide a host name.
Management node 3 IP addresses and host name	10/25/40/100G: 1G: host name:	Static IP addresses for management node 3 in the administration network. Provide a valid host name. An appended domain name is used if you don't provide a host name.
Admin DNS servers		IP addresses for 1-3 DNS servers providing name resolution in the administration network. Example: 10.168.20.31, 10.168.20.32, 10.147.36.60
Admin Port Speed		Port speed options are 10, 25, 40, 100. The port speed of your administration port can be different from the data port speed.
Admin Port Count		For 100G and 40G speeds, valid value is 1. For 10G and 25G ports, valid values are 1 to 4.

Item	Your Configuration	Description and Example
Admin HSRP Group		Assign an HSRP group number to your Administration network. Acceptable values are 0 to 255, and the default value is 152. If there are multiple Oracle Private Cloud Appliance racks connected to the same data center infrastructure switches, ensure they use <i>different</i> HSRP groups.
Admin VLAN		VLAN used to connect to the Administration network (only access mode supported). The valid range for users to select is 2 to 3899. The default is 3915, in the Oracle-reserved range.
Admin VLAN MTU		MTU size determines the maximum packet size that can be transmitted over your administration connection. The valid range is 68 to 9216. The default is 9216.
Admin Port FEC		Configure Forward Error Correct (FEC) for the administration port. The default option is auto, with on and off as other valid options.
Admin Gateway IP		IP address of the default gateway in your Administration network. Example: 10.168.141.1
Admin Netmask		Netmask of the subnet the Administration network is connected to.
Admin CIDR		CIDR range for which the default route is the Administration gateway IP.
Admin Spine 1 IP		Public IP address of spine switch 1. Needed for HSRP configuration or the spine virtual IP.
Admin Spine 2 IP		Public IP address of spine switch 2. Needed for HSRP configuration or the spine virtual IP.
Admin Spine VIP		Public virtual IP of the spine switches.
DNS Server Details		
DNS server 1		IP address for primary DNS server. Example: 10.68.50.60
DNS server 2		IP address for secondary DNS server. Example: 10.147.36.60
DNS server 3		IP address for tertiary DNS server. Example: 206.233.27.1

Item	Your Configuration	Description and Example
Appliance Public IP Addresses	Public IP Addresses	<p>A range of customer data center IP addresses can be used for Oracle Private Cloud Appliance components that require public IP addresses. Note: In this context, public IP addresses refer to IP addresses that have access to the data center network from the Oracle Private Cloud Appliance subnet.</p> <p>You must specify IP addresses or ranges that are routed to the Oracle Private Cloud Appliance from the data center. Route tables must be correct and consistent.</p> <p>Enter a string containing a comma separated list of valid CIDRs.</p> <p>Example: "10.68.49.249", "10.68.50.32/32", "10.68.51.4/31"</p> <p>Partial CIDR deletion is not supported.</p>
Object Storage IP address		Valid IP address for an <code>objectstorage</code> endpoint that is outside the public IP range.