



Hewlett Packard
Enterprise

HPE Apollo d6500 Chassis

Setup and Installation Guide

Abstract

This document contains setup, installation, and configuration information for the HPE Apollo d6500 Chassis. This document is for the person who installs, administers, and troubleshoots the system. Hewlett Packard Enterprise assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

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Planning the installation

Safety and regulatory compliance

For important safety, environmental, and regulatory information, see *Safety and Compliance Information for Server, Storage, Power, Networking, and Rack Products*, available at the Hewlett Packard Enterprise website (<http://www.hpe.com/support/Safety-Compliance-EnterpriseProducts>).

Product QuickSpecs

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the Hewlett Packard Enterprise website (<http://www.hpe.com/info/qs>).

Configuration guidelines

To meet the thermal requirements, always do the following:

- Populate the empty bays with a blank.
- Install the fans in fan bays 1, 2, 3 and 4, if a server is installed in the chassis bottom server bay.
- Install the fans in fan bays 5, 6, 7 and 8, if a server is installed in the chassis top server bay.

For more information, see "Fan assembly bay numbering (on page 11)."

Determine power and cooling configurations

Validate power and cooling requirements based on location and installed components.

For more information, see the server-specific user and maintenance guides on the Hewlett Packard Enterprise website (<http://www.hpe.com/support/Apollo6500-docs>).

Power requirements

Installation of this equipment must comply with local and regional electrical regulations governing the installation of IT equipment by licensed electricians. This equipment is designed to operate in installations covered by NFPA 70, 1999 Edition (National Electric Code) and NFPA-75, 1992 (code for Protection of Electronic Computer/Data Processing Equipment). For electrical power ratings on options, refer to the product rating label or the user documentation supplied with that option.



WARNING: To reduce the risk of personal injury, fire, or damage to the equipment, do not overload the AC supply branch circuit that provides power to the rack. Consult the electrical authority having jurisdiction over wiring and installation requirements of your facility.



CAUTION: Protect the server from power fluctuations and temporary interruptions with a regulating UPS. This device protects the hardware from damage caused by power surges and voltage spikes and keeps the server in operation during a power failure.

HPE Apollo Platform Manager

HPE Apollo Platform Manager (formerly named HPE Advanced Power Manager) is a point of contact for system administration.

To install, configure, and access HPE APM, see the *HPE Apollo Platform Manager User Guide* on the Hewlett Packard Enterprise website (http://www.hpe.com/support/APM_UG_en).

Hot-plug power supply calculations

For more information on the hot-plug power supply and calculators to determine server power consumption in various system configurations, see the Hewlett Packard Enterprise Power Advisor website (<http://www.hpe.com/info/poweradvisor/online>).

Compiling the documentation

The documentation, while delivered individually and in various formats, works as a system. Consult these documents before attempting installation. These documents provide the required important safety information and decision-making steps for the configuration. To access these documents, see the Hewlett Packard Enterprise website (<http://www.hpe.com/support/Apollo6500-docs>).

Warnings and cautions



WARNING: To reduce the risk of personal injury or damage to equipment, heed all warnings and cautions throughout the installation instructions.



WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- The rack is bolted to the floor using the concrete anchor kit.
- The leveling feet extend to the floor.
- The full weight of the rack rests on the leveling feet.
- The racks are coupled together in multiple rack installations.
- Only one component is extended at a time. If more than one component is extended, a rack might become unstable.



WARNING: The chassis is very heavy. To reduce the risk of personal injury or damage to the equipment, do the following:

- Observe local occupational health and safety requirements and guidelines for manual material handling.
- Get help to lift and stabilize the product during installation or removal, especially when the product is not fastened to the rails. A fully-loaded chassis weighs up to 73.22 kg (161.42 lb), so at least four people must lift the chassis into the rack together. An additional person may be required to help align the chassis if the chassis is installed higher than chest level.



WARNING: To reduce the risk of personal injury or damage to the equipment, you must adequately support the chassis during installation and removal.



WARNING: Be sure to install the chassis starting from the bottom of the rack, and then work your way up the rack.



WARNING: To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

-
- ⚠ **WARNING:** To reduce the risk of electric shock or damage to the equipment:
- Never reach inside the chassis while the system is powered up.
 - Perform service on system components only as instructed in the user documentation.
-

- ⚠ **CAUTION:** Always be sure that equipment is properly grounded and that you follow proper grounding procedures before beginning any installation procedure. Improper grounding can result in ESD damage to electronic components. For more information, refer to "Electrostatic discharge (on page 43)."
-

- ⚠ **CAUTION:** When performing non-hot-plug operations, you must power down the server and/or the system. However, it may be necessary to leave the server powered up when performing other operations, such as hot-plug installations or troubleshooting.
-

Space and airflow requirements

To allow for servicing and adequate airflow, observe the following space and airflow requirements when deciding where to install a rack:

- Leave a minimum clearance of 63.5 cm (25 in) in front of the rack.
- Leave a minimum clearance of 76.2 cm (30 in) behind the rack.
- Leave a minimum clearance of 121.9 cm (48 in) from the back of the rack to the back of another rack or row of racks.

Hewlett Packard Enterprise servers draw in cool air through the front door and expel warm air through the rear door. Therefore, the front and rear rack doors must be adequately ventilated to allow ambient room air to enter the cabinet, and the rear door must be adequately ventilated to allow the warm air to escape from the cabinet.

-
- ⚠ **CAUTION:** To prevent improper cooling and damage to the equipment, do not block the ventilation openings.
-

When vertical space in the rack is not filled by a server or rack component, the gaps between the components cause changes in airflow through the rack and across the servers. Cover all gaps with blanking panels to maintain proper airflow.

-
- ⚠ **CAUTION:** Always use blanking panels to fill empty vertical spaces in the rack. This arrangement ensures proper airflow. Using a rack without blanking panels results in improper cooling that can lead to thermal damage.
-

The 9000 and 10000 Series Racks provide proper server cooling from flow-through perforations in the front and rear doors that provide 64 percent open area for ventilation.

-
- ⚠ **CAUTION:** When using a Compaq branded 7000 series rack, install the high airflow rack door insert (PN 327281-B21 for 42U rack, PN 157847-B21 for 22U rack) to provide proper front-to-back airflow and cooling.
-

-
- ⚠ **CAUTION:** If a third-party rack is used, observe the following additional requirements to ensure adequate airflow and to prevent damage to the equipment:
- Front and rear doors—If the 42U rack includes closing front and rear doors, you must allow 5,350 sq cm (830 sq in) of holes evenly distributed from top to bottom to permit adequate airflow (equivalent to the required 64 percent open area for ventilation).
 - Side—The clearance between the installed rack component and the side panels of the rack must be a minimum of 7 cm (2.75 in).
-

Temperature requirements

To ensure continued safe and reliable equipment operation, install or position the rack in a well-ventilated, climate-controlled environment.

The operating temperature inside the rack is always higher than the room temperature and is dependent on the configuration of equipment in the rack. Check the TMRA for each piece of equipment before installation.



CAUTION: To reduce the risk of damage to the equipment when installing third-party options:

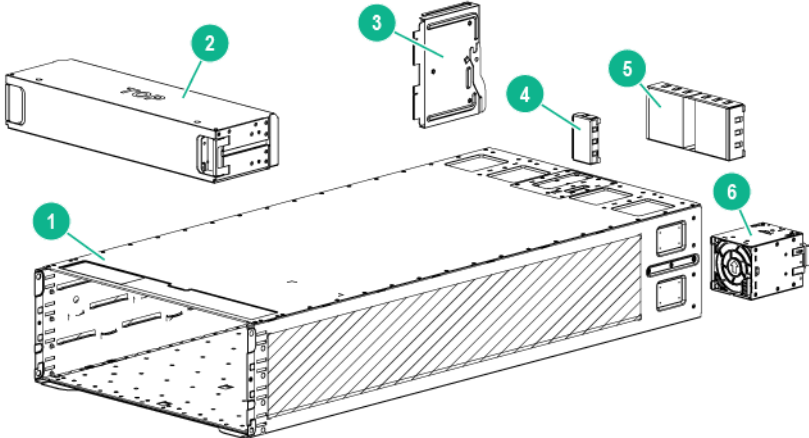
- Do not permit optional equipment to impede airflow around the server or to increase the internal rack temperature beyond the maximum allowable limits.
 - Do not exceed the manufacturer's TMRA.
-

Grounding requirements

- The building installation must provide a means of connection to protective earth.
- The equipment must be connected to that means of connection.
- A service person must check whether the socket-outlet from which the equipment is to be powered provides a connection to the building protective earth. If the outlet does not provide a connection, the service person must arrange for the installation of a protective earthing conductor from the separate protective earthing terminal to the protective earth wire in the building.

Identifying components and LEDs

System components

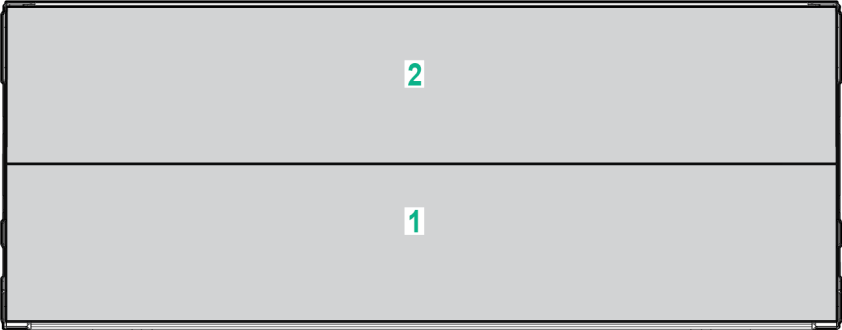


Item	Description
1	HPE Apollo d6500 Chassis
2	Server bay blank
3	Chassis management module
4	Power cable bay blank*
5	Fan bay blank*
6	Fan assembly*
7	Server tray**

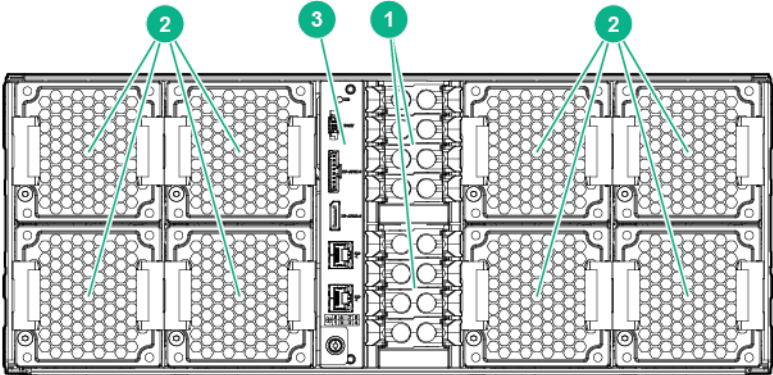
* The quantity depends on the configuration ordered.

** Not shown.

Server tray bay numbering



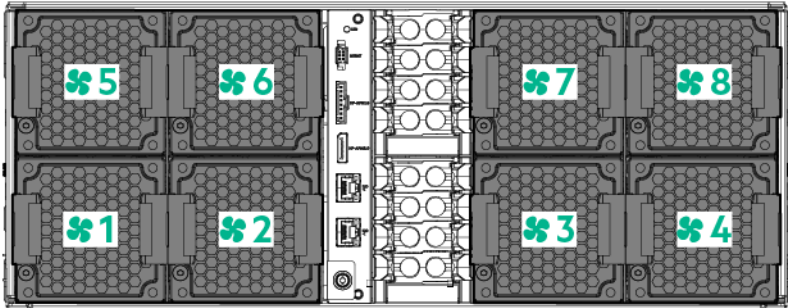
Rear panel components



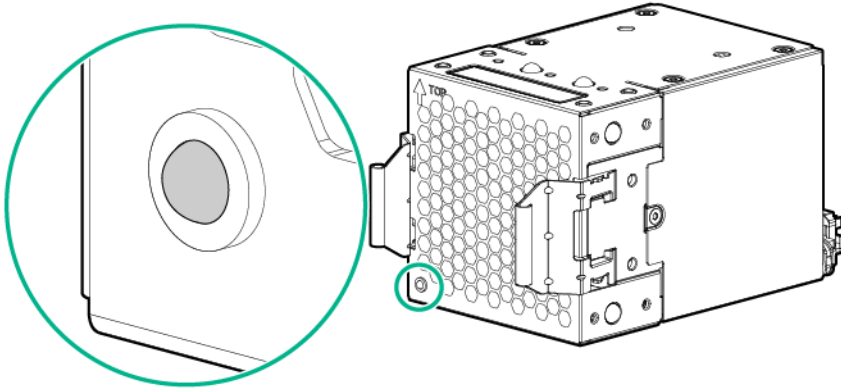
Item	Description
1	Server power cable bays
2	Fan assemblies
3	Chassis management module

Fan assembly bay numbering

The chassis supports eight fan assemblies. The following figure identifies the fan assemblies by device number.

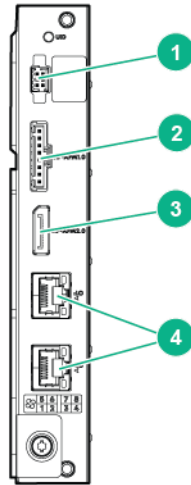


Fan LED



Status	Description
Off	The fan is working or the power is off.
Solid amber	The fan has failed.

Chassis management module components



Item	Description
1	Management cable connector
2	HPE APM 1.0 connector
3	HPE APM 2.0 connector
4	iLO connectors



IMPORTANT: Do not connect both iLO ports to the network at the same time. Only one iLO port can be connected to the network, while the other iLO port can be used only as a connection to a second enclosure. Having both ports connected at the same time results in a loopback condition.

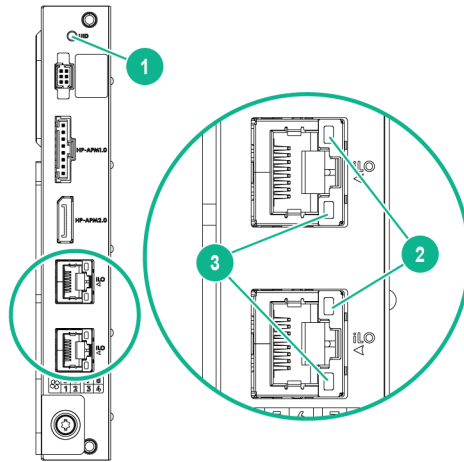


IMPORTANT: If using the chassis management module iLO ports to connect multiple chassis to a network, the network must operate at a speed of 1 Gb/s. The servers installed in the chassis cannot connect to the network if the network is operating at a speed of 10/100 Mb/s or 10 Gb/s.



IMPORTANT: If a dedicated iLO management port module is installed in the server, the server can only connect to a network through the dedicated iLO management port module. For more information, see the server user guide.

Management module LEDs



Item	Description	Status
1	UID LED ¹	<p>Solid blue = Activated or server installed with no power</p> <ul style="list-style-type: none"> • 1 flash per second = Remote management or firmware upgrade in progress • 4 flashes per second = iLO manual soft reboot sequence initiated • 8 flashes per second = iLO manual hard reboot sequence in progress <p>Off = Deactivated</p>
2	iLO activity LED	<p>Green or flashing green = Network activity</p> <p>Off = No network activity</p>
3	iLO link LED	<p>Green = Linked to network</p> <p>Off = No network connection</p>

¹ When the LEDs described in this table flash simultaneously, a power fault has occurred. For more information, see "Power fault LEDs (on page 14)."



IMPORTANT: Do not connect both iLO ports to the network at the same time. Only one iLO port can be connected to the network, while the other iLO port can be used only as a connection to a second enclosure. Having both ports connected at the same time results in a loopback condition.



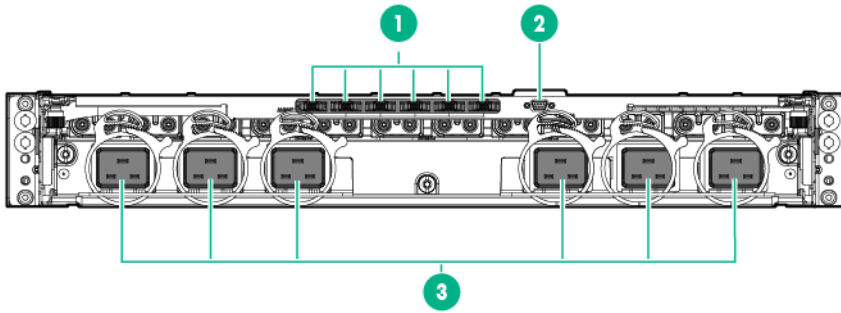
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IMPORTANT: If a dedicated iLO management port module is installed in the server, the server can only connect to a network through the dedicated iLO management port module. For more information, see the server user guide.

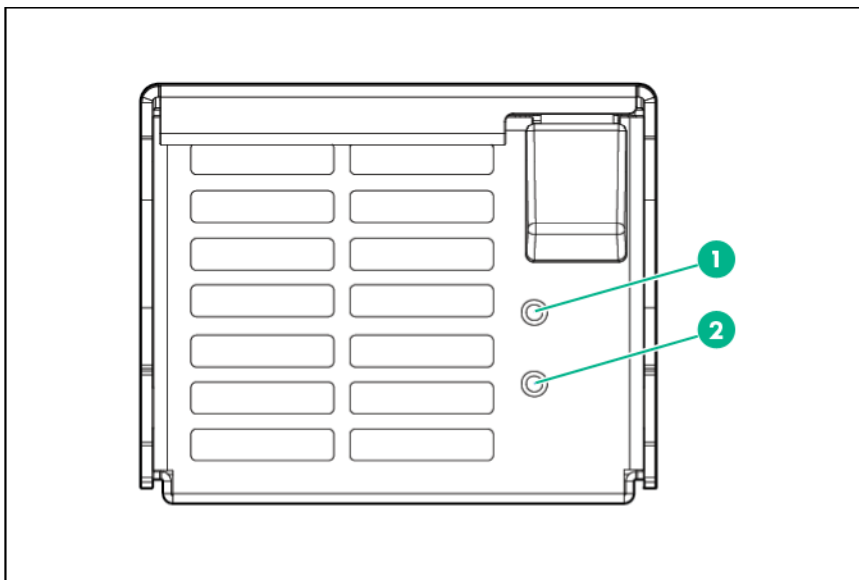
Power shelf rear panel components

NOTE: The single-phase power shelf is shown below. A three-phase power shelf is also available.



Item	Description
1	Power management connectors (6)
2	APM module connector (PDM)
3	AC input module power connectors (6)

Power supply LEDs



Power LED 1 (green)	Fault LED 2 (amber)	Condition
Off	Off	No AC power to the power supply
On	Off	Normal
Off	On	Power supply failure

Power fault LEDs

The following table provides a list of power fault LEDs, and the subsystems that are affected. Not all power faults are used by all servers.

Subsystem	LED behavior
System board	1 flash
Processor	2 flashes
Memory	3 flashes
Riser board PCIe slots	4 flashes
FlexibleLOM	5 flashes
Removable HPE Flexible Smart Array controller/Smart SAS HBA controller	6 flashes
System board PCIe slots	7 flashes
Power backplane or storage backplane	8 flashes
Power supply	9 flashes

Installing the chassis

Setting up and installing the chassis

To set up and install the chassis:

1. Unpack the system.
2. Determine the chassis rack spacing.
3. Install the rack rails and chassis into the rack ("[Rack options](#)" on page 18).
4. Install the system components ("[Installing the system components](#)" on page 25).
5. Install the power shelf ("[Installing the power shelf](#)" on page 28).

Unpacking the system

Unpack the following hardware and prepare for installation:

- HPE Apollo 6500 System
- HPE 4U Chassis Rack Rail Kit or HPE 4U Third Party Rail Kit
- HPE Chassis Handles Kit
- HPE Apollo 6000 Power Shelf Rack Rail Kit
- HPE Apollo 6000 Power Shelf

Determining the chassis rack spacing

When planning rack spacing, allow enough space for the 4U chassis and the 1.5U power shelf. For more information, see the documentation that ships with the rail kit.

Chassis installation warnings and cautions



WARNING: The chassis is very heavy. To reduce the risk of personal injury or damage to the equipment, do the following:

- Observe local occupational health and safety requirements and guidelines for manual material handling.
- Get help to lift and stabilize the product during installation or removal, especially when the product is not fastened to the rails. A fully-loaded chassis weighs up to 73.22 kg (161.42 lb), so at least four people must lift the chassis into the rack together. An additional person may be required to help align the chassis if the chassis is installed higher than chest level.



WARNING: To avoid risk of personal injury or damage to the equipment, do not stack anything on top of rail-mounted equipment or use it as a work surface when extended from the rack.



WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- The rack is bolted to the floor using the concrete anchor kit.
 - The leveling feet extend to the floor.
 - The full weight of the rack rests on the leveling feet.
 - The racks are coupled together in multiple rack installations.
 - Only one component is extended at a time. If more than one component is extended, a rack might become unstable.
-



CAUTION: Always plan the rack installation so that the heaviest item is on the bottom of the rack. Install the heaviest item first, and continue to populate the rack from the bottom to the top.



CAUTION: Be sure to keep the product parallel to the floor when installing the chassis. Tilting the product up or down could result in damage to the slides.



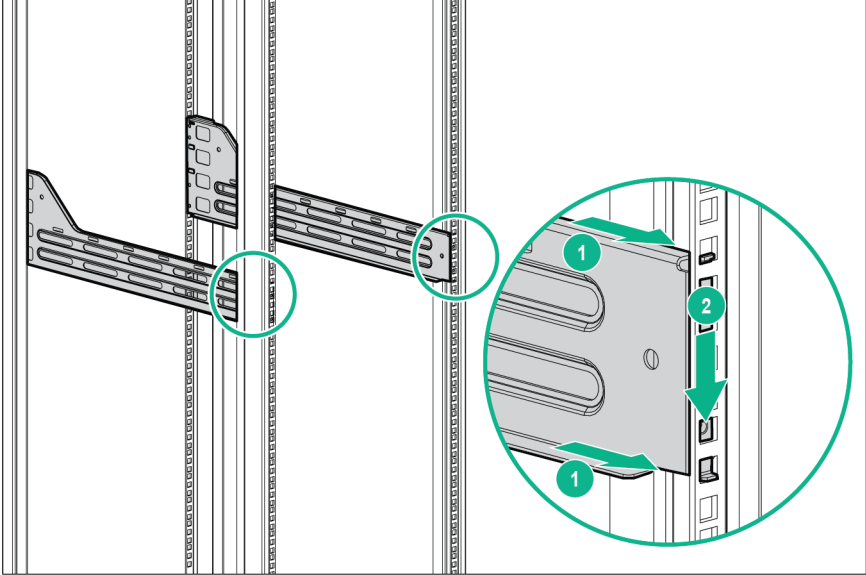
CAUTION: Hewlett Packard Enterprise has not tested or validated the HPE Apollo d6500 Chassis with any third-party racks. Before installing the HPE Apollo d6500 Chassis in a third-party rack, be sure to properly scope the limitations of the rack. Before proceeding with the installation, consider the following:

- You must fully understand the static and dynamic load carrying capacity of the rack and be sure that it can accommodate the weight of the HPE Apollo d6500 Chassis.
 - Be sure sufficient clearance exists for cabling, installation and removal of the chassis, and actuation of the rack doors.
-

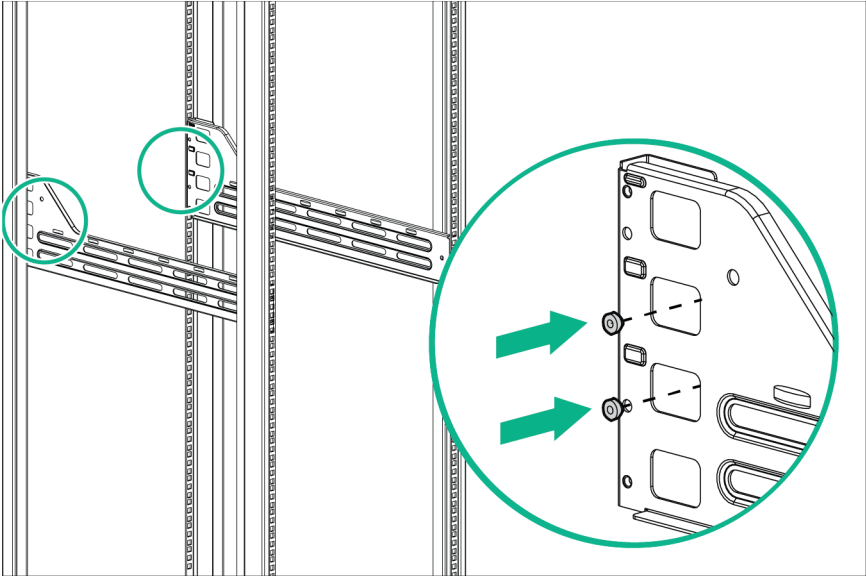
Rack options

Installing the 4U chassis rack rail kit

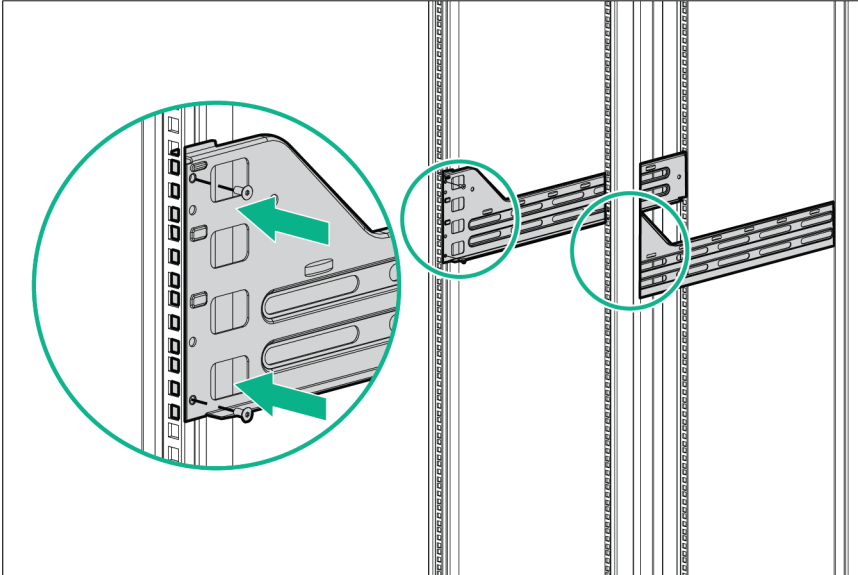
- 1. Insert the rack rail in the column.



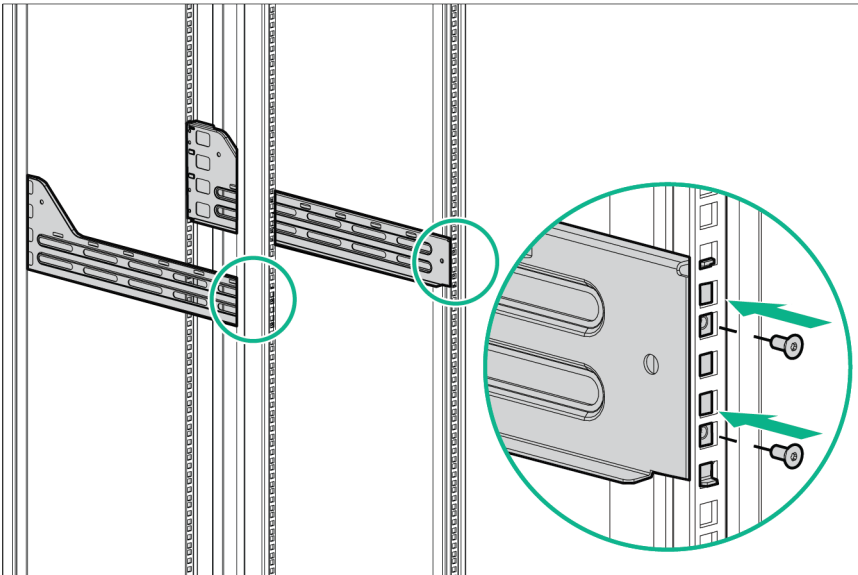
- 2. Install the T-15 Torx alignment pins into the holes on the front rack column.



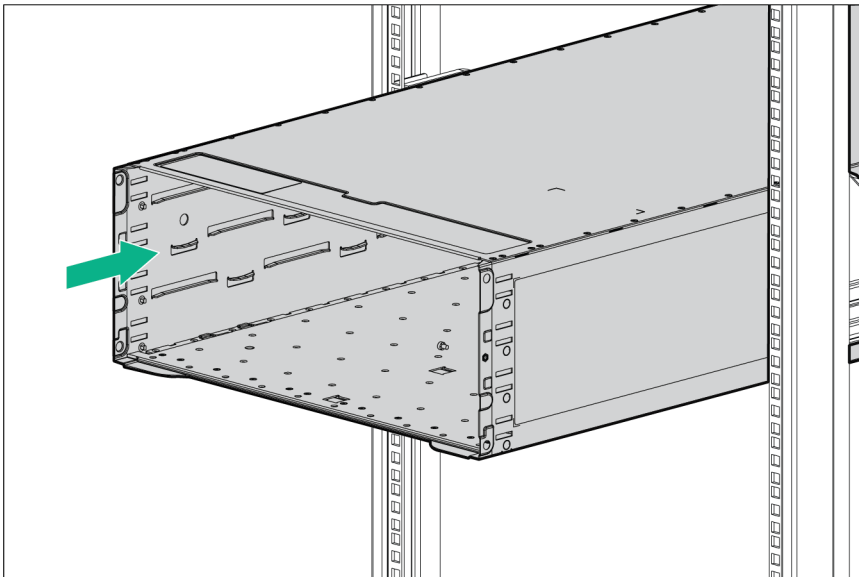
3. Secure the front of the rail to the rack column with the T-25 Torx panhead screws.



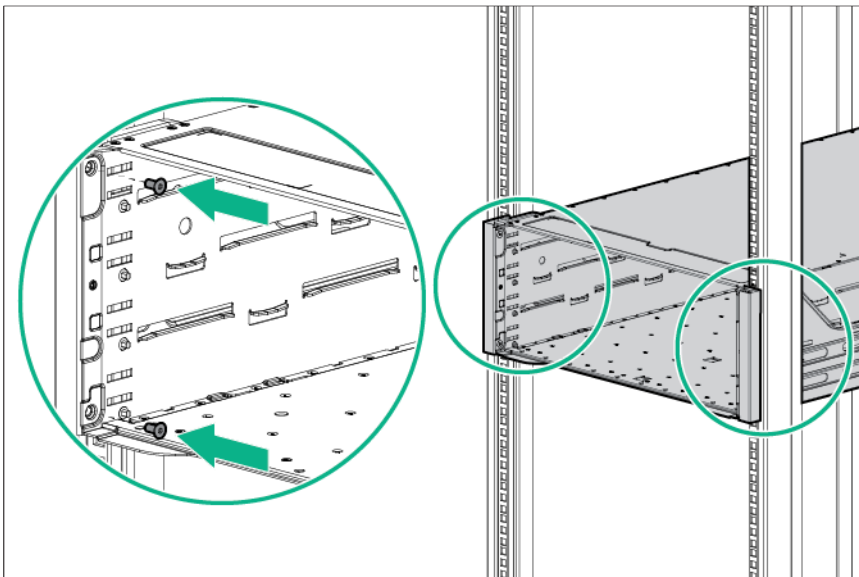
4. Secure the rail to the rear rack column with the T-25 Torx panhead screws.



5. Install the chassis into the rack.

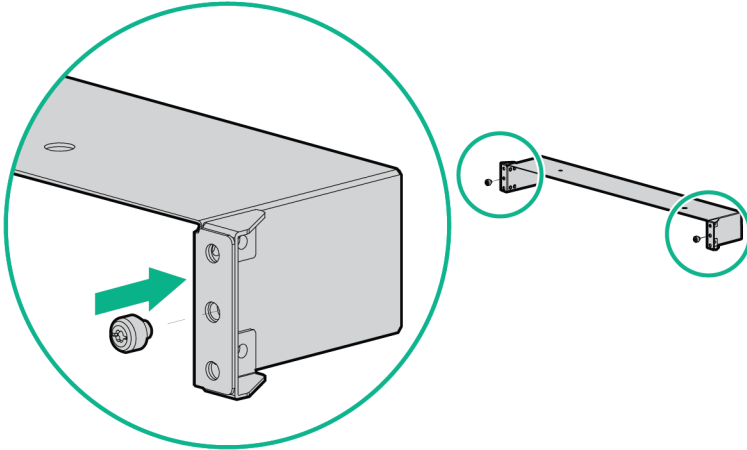


6. Secure the chassis to the rack with the T-15 Torx flathead screws.

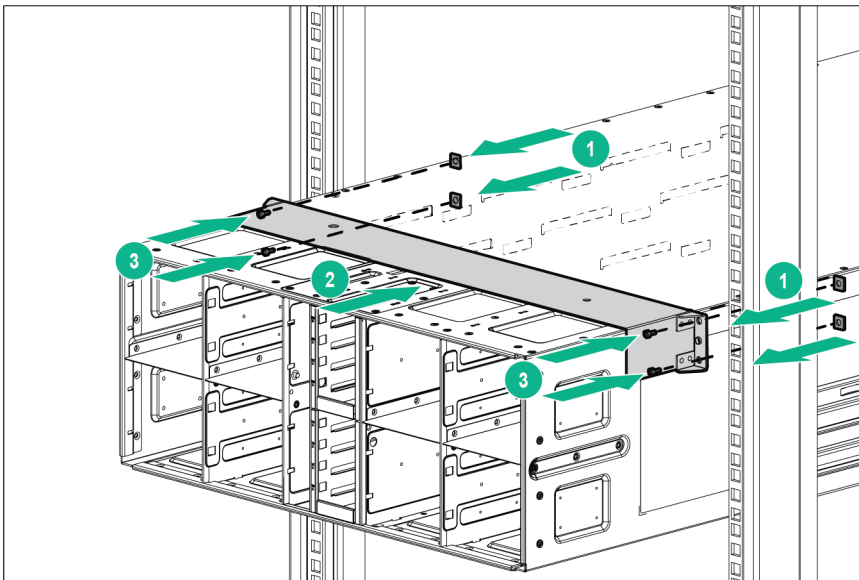


7. To install the shipping bracket:

- a. Secure the T-15 Torx alignment pins to the shipping bracket.



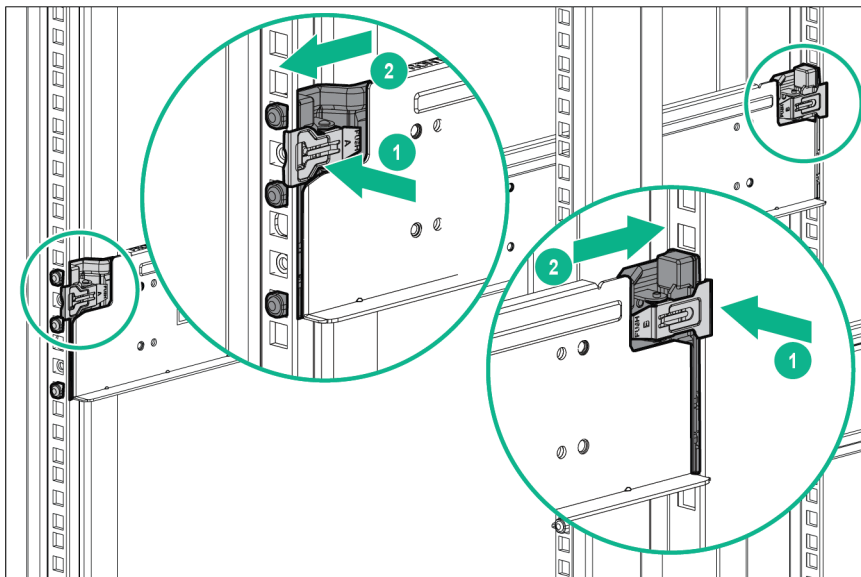
- b. Install the square-hole cage nuts, and then align the shipping bracket with the rack column. To secure the shipping bracket to the rack column, fasten the T-25 Torx screws.



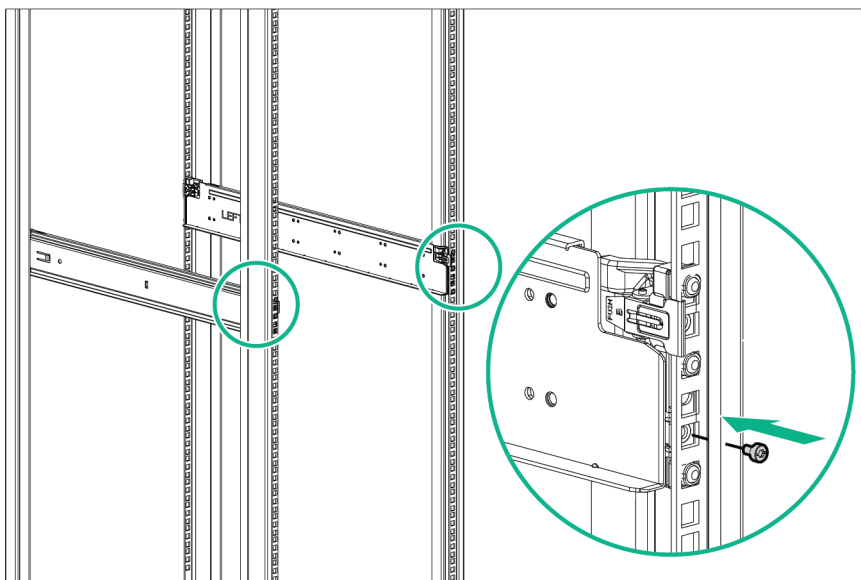
Installing the 4U third-party rack rail kit

1. To insert the rack rail into the rack column, press the latches and slide the rail into place.

2. To secure the rail to the rack column, release the latches.

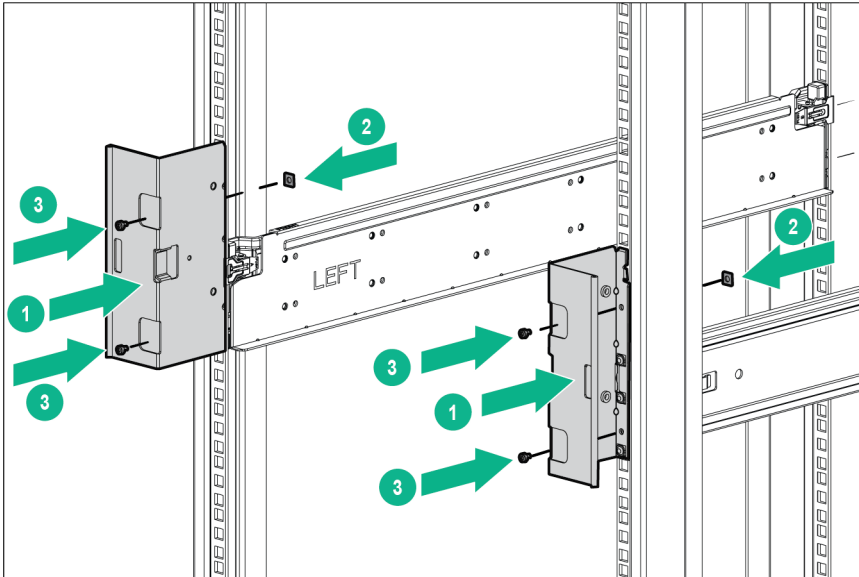


3. Secure the rail to the rear rack column with one T-25 Torx panhead screw.

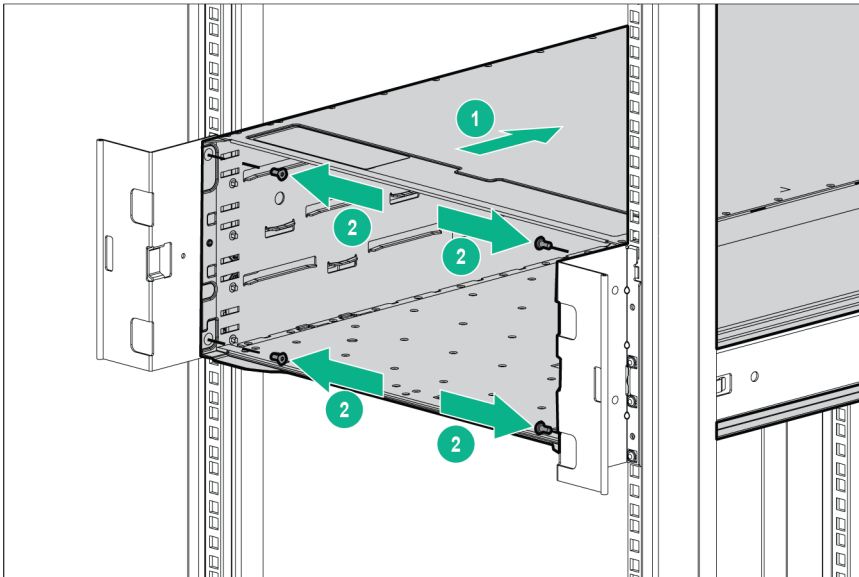


4. Install the bracket:
a. Align the bracket with the rack column and rail, and then install one cage nut.

- b. To secure the bracket to the rack column, fasten the T-25 Torx slotted screws.

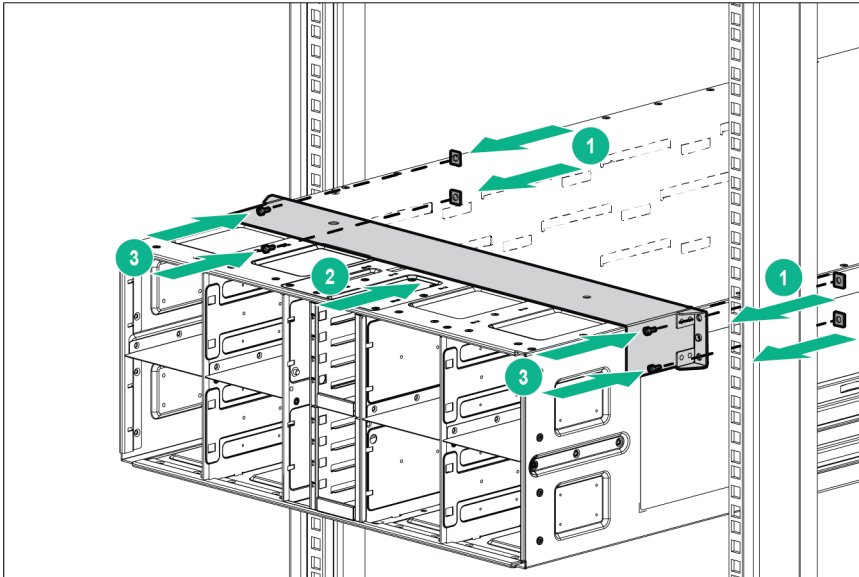


5. Install the chassis into the rack and secure it with four T-15 Torx flathead screws.



6. To install the shipping bracket:
- Install the square-hole cage nuts.
 - Align the shipping bracket with the rack column.

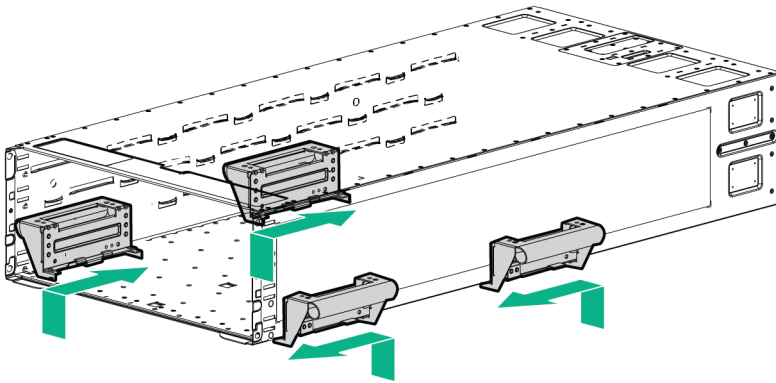
- c. To secure the shipping bracket to the rack column, fasten the T-25 Torx slotted screws.



Installing the chassis handles

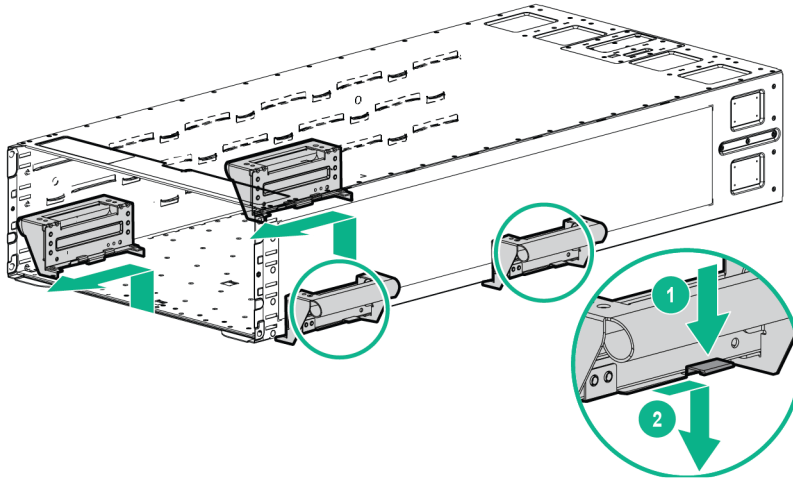
The HPE Apollo d6500 Chassis facilitate lifting the chassis up to the rails. Remove the handles when sliding the chassis into the rack.

1. Insert the handles into the slot openings on the bottom of the chassis, and then slide them until they are in locked position.



NOTE: The chassis handles facilitate lifting the chassis up to the rails. Remove the handles when sliding the chassis into the rack.

2. To remove the chassis handles, press the latches and then slide the handles off the chassis.



Installing the system components

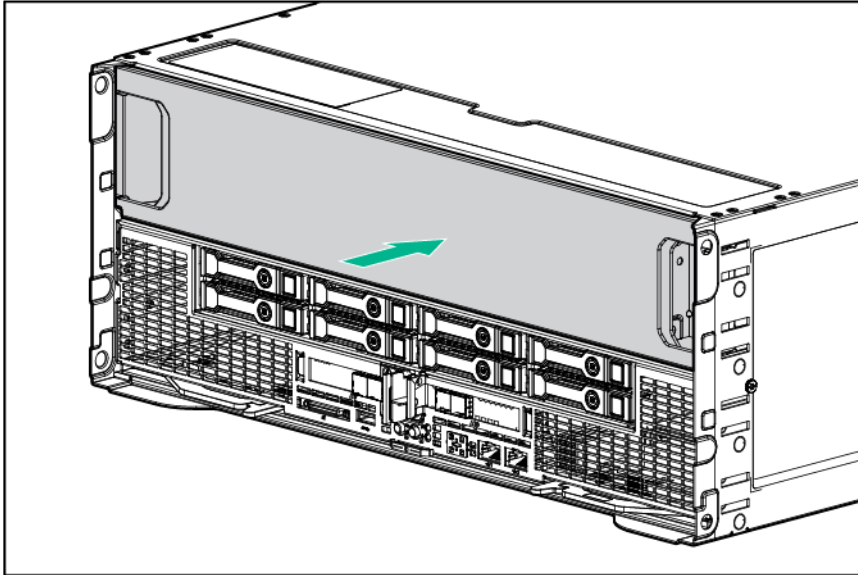
If components were removed during the chassis installation or additional components were ordered, install each device using the procedures in this section.

If you perform any of the procedures in this section after powering on the system, ensure proper airflow by ensuring that each bay inside the chassis and at the rear of the chassis is populated with either a component or a blank. For component-specific replacement information, see the *HPE Apollo d6500 Chassis Maintenance and Service Guide* or the server-specific user and maintenance guides on the Hewlett Packard Enterprise website (<http://www.hpe.com/support/Apollo6500-docs>).

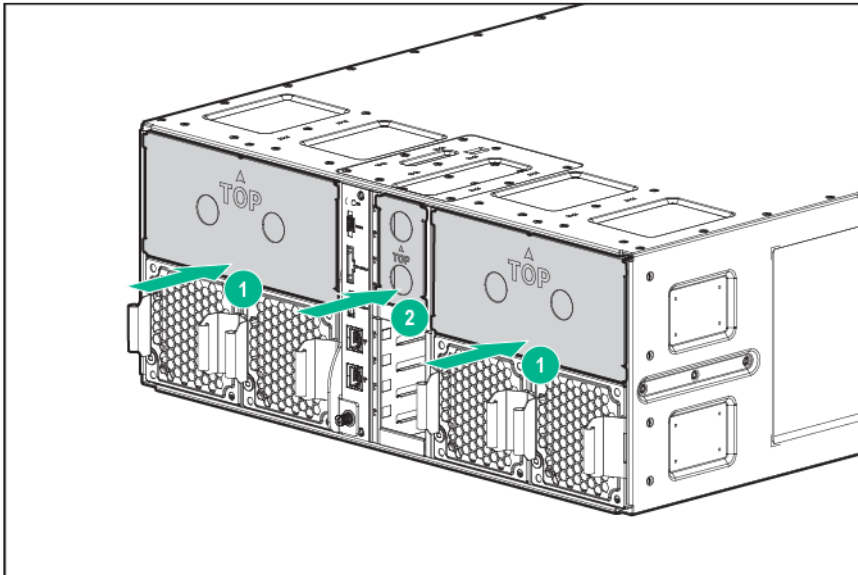
Installing the accelerator tray blank kit

△ **CAUTION:** To prevent improper cooling and thermal damage, do not operate the chassis unless all bays are populated with a component or a blank.

1. Install the server bay blank.



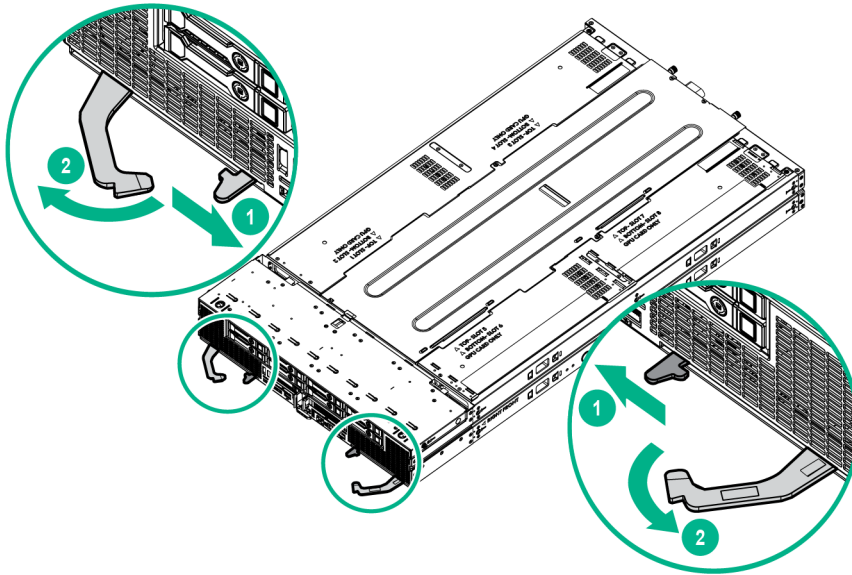
2. Install the fan blanks and the power cable bay blank.



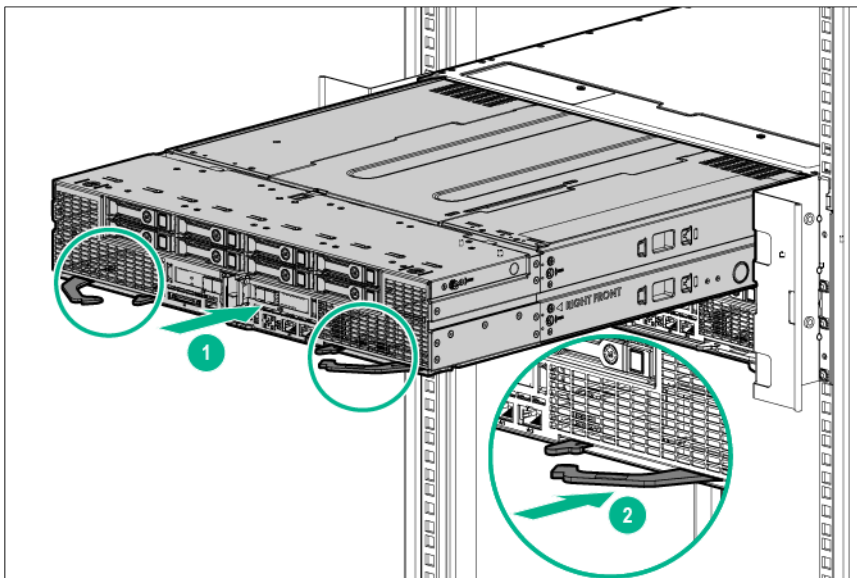
Installing a server

1. Prepare the server:
 - a. Release the safety latches.

b. Pull back the handles.

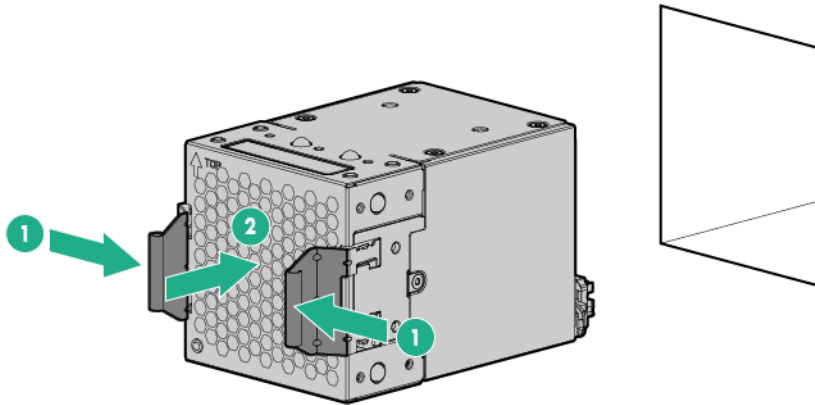


2. Install the server into the chassis:
 - a. Slide the server into the chassis.
 - b. Secure the handles in the safety latches.



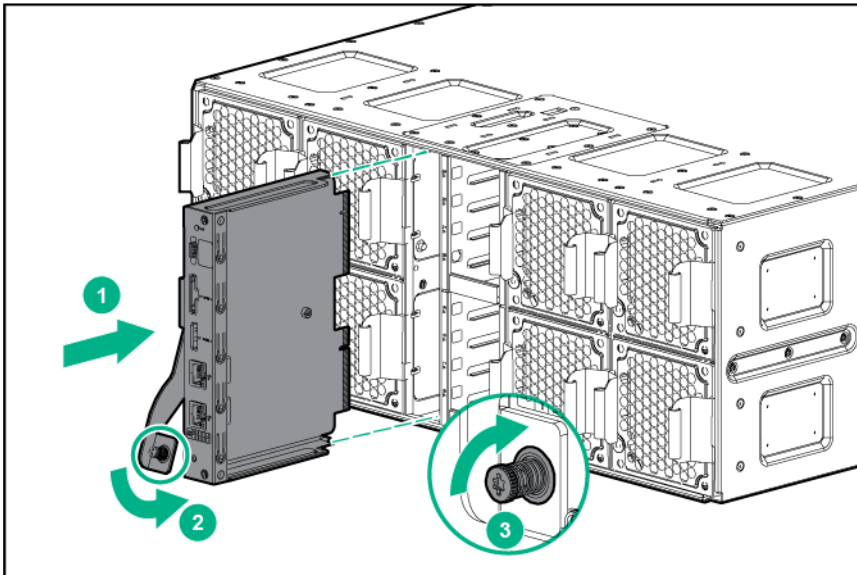
Installing the fans

Install the component as indicated.



Installing the chassis management module

Install the component as indicated.



Installing the power shelf

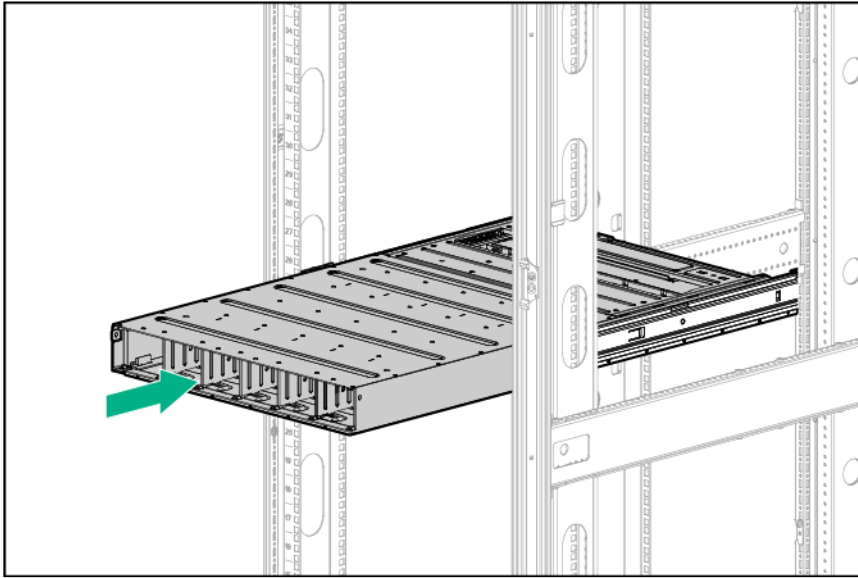
CAUTION: To prevent damage to the component, power down the chassis and disconnect all power cords before removing or installing the component.

To install the component:

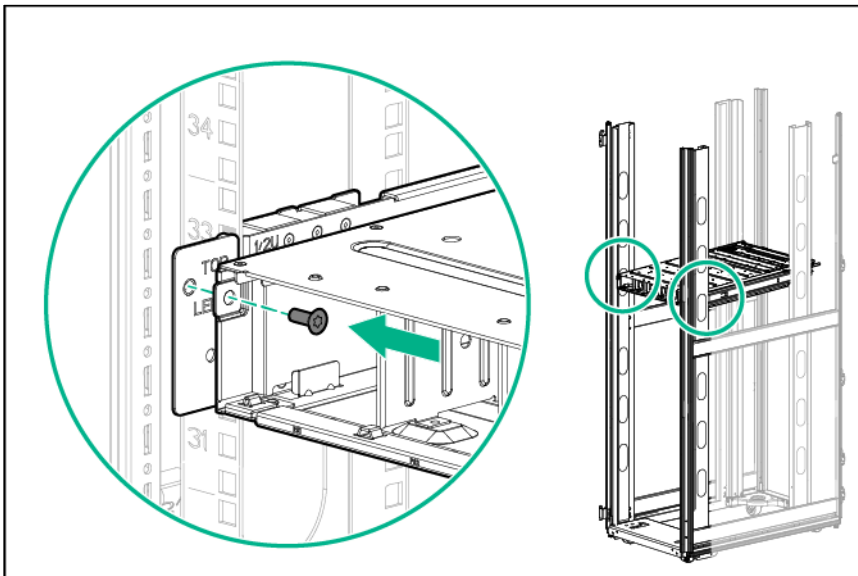
1. Install the power shelf rack rails into the rack. For more information, see the *HPE Power Shelf Rail Kit for Hewlett Packard Enterprise and Third Party Rack Installation Instructions*. This document

ships with the rail kit and is also available on the Hewlett Packard Enterprise website (<http://www.hpe.com/support/Apollo-PowerShelf-rail-ii-en>).

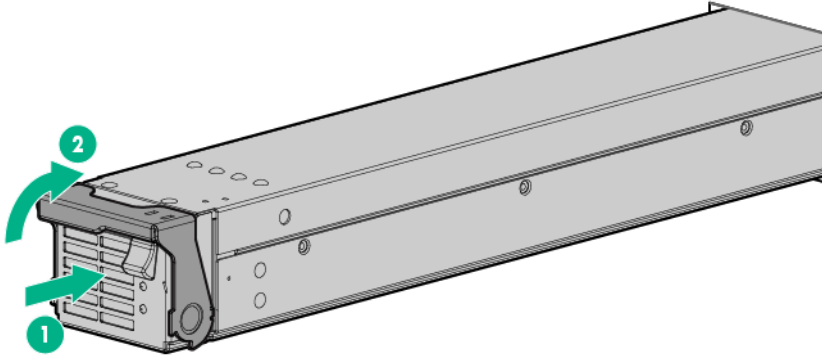
2. Install the power shelf.



3. Secure the power shelf to the rack.

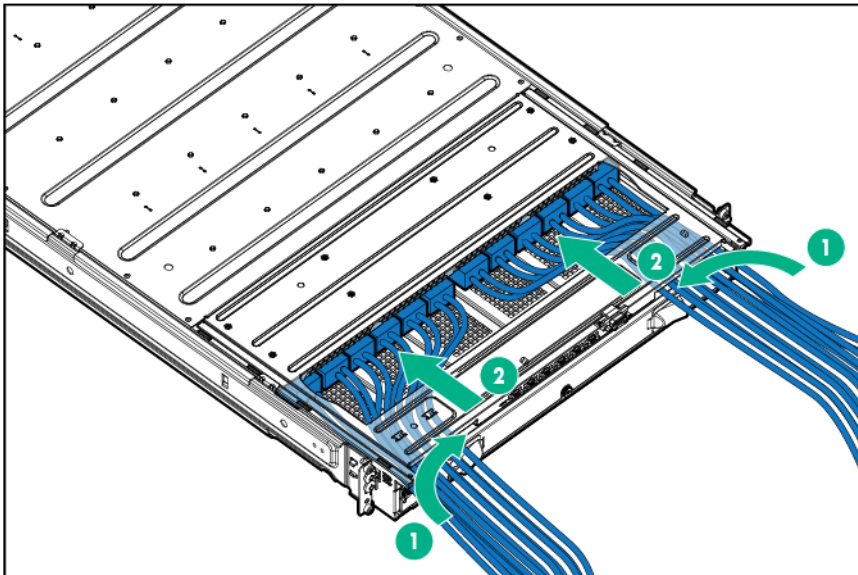


4. Install the power supplies into the power shelf, if needed.

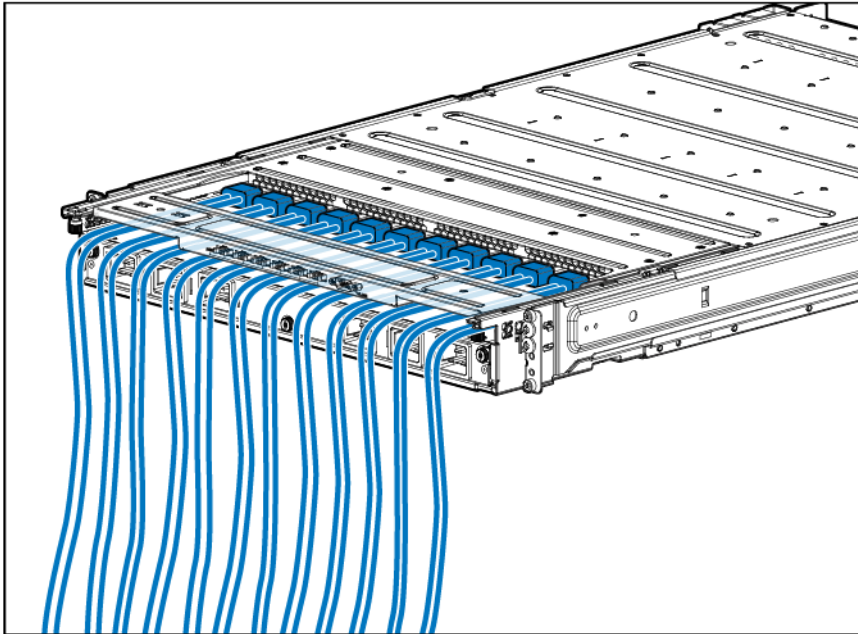


NOTE: If additional clearance is required to install power cables, loosen the thumb screw on either side of the shelf and slide the shelf out while installing the cables. Use caution to avoid bending the shelf.

5. Remove the power supply vent cover.
Cable quantity and length are determined by the configuration of components. For more information, see the Hewlett Packard Enterprise Power Advisor website (<http://www.hpe.com/info/hpepoweradvisor>).
6. Install the 12V DC power cables.
 - a. Insert the cable through the wide opening on either end of the power shelf, and then connect it to the appropriate connector.

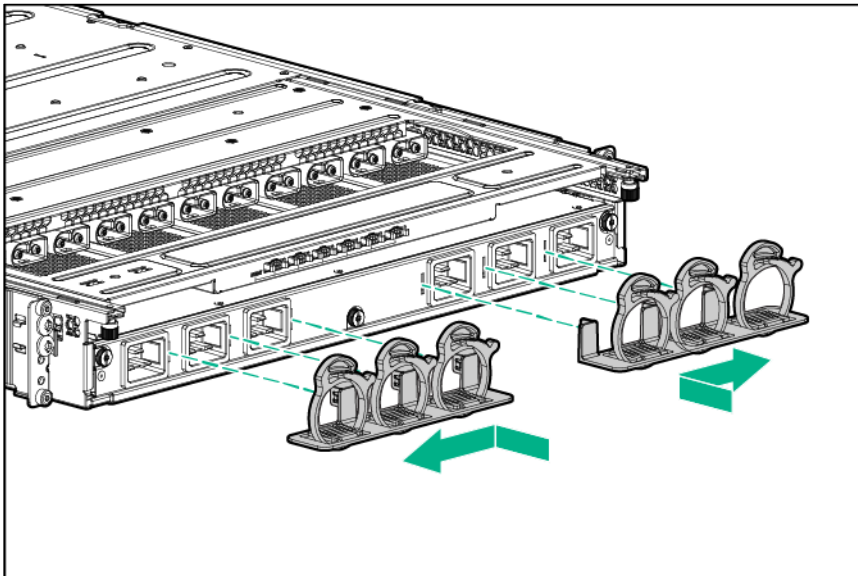


- b. Slide the cables toward the center, allowing them to straighten and hang from the rear of the power shelf.

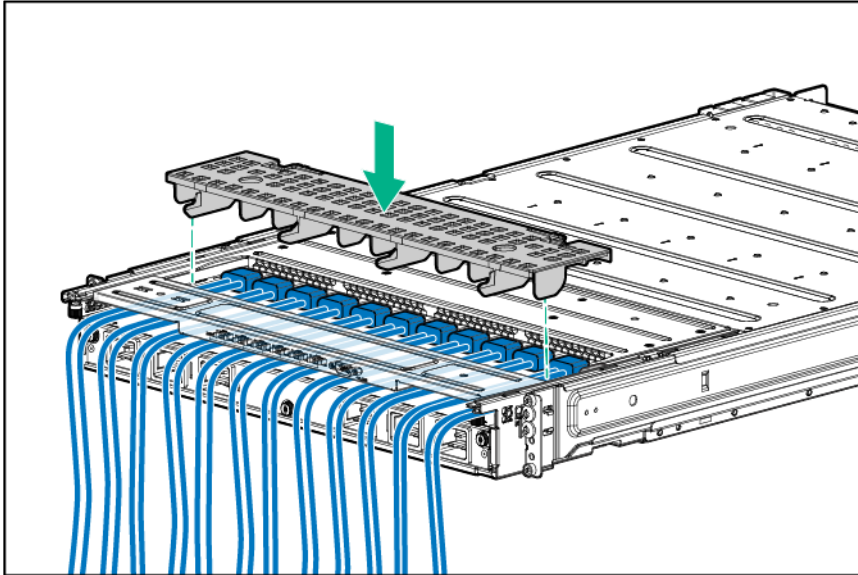


- 7. Install the cable guard.

NOTE: Cables are removed for clarity.





8. Install the power supply vent cover to protect the power supply vents.




Cabling

Cabling overview

-
-  **WARNING:** Be sure that all circuit breakers are locked in the off position before connecting any power components.

 -  **CAUTION:** To avoid damaging the fiber cables, do not drape cables from one side of the rack to the other and do not run cables over a hard corner or edge.

 -  **CAUTION:** To avoid damaging the cable, squeeze the thermal boot on the cable before disconnecting from the connector.
-


Cabling procedures


After the hardware is installed, complete the following cabling procedures:

1. Connecting the chassis to a power shelf (on page [33](#)).
2. Connecting the chassis to the network:
 - o Connecting the optional HPE APM module (on page [36](#))
 - o Connecting multiple chassis to the network with the chassis management module iLO ports (on page [38](#))
3. Connecting power cables and applying power to the chassis (on page [38](#))

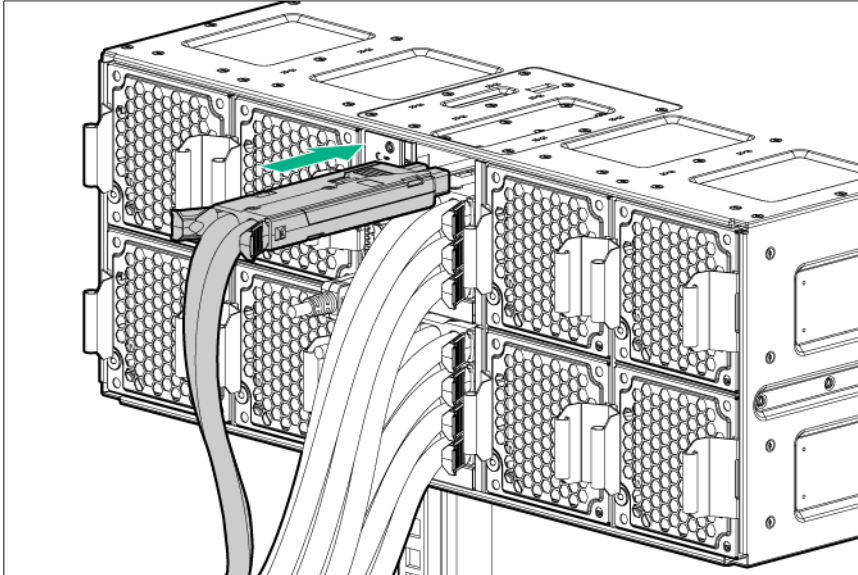
Connecting the chassis to a power shelf

1. Employ best practices to route and manage the power cords and other cables in the server rear panel.

-
-  **CAUTION:** To prevent improper cooling and damage to the equipment, do not block the ventilation openings.

 -  **CAUTION:** Do not connect cables from the chassis to two different power shelves. The chassis can only be connected to one power shelf.
-

2. Install the power cables into the chassis.



3. To complete this procedure, locate the power management cable (part number 867755-001).



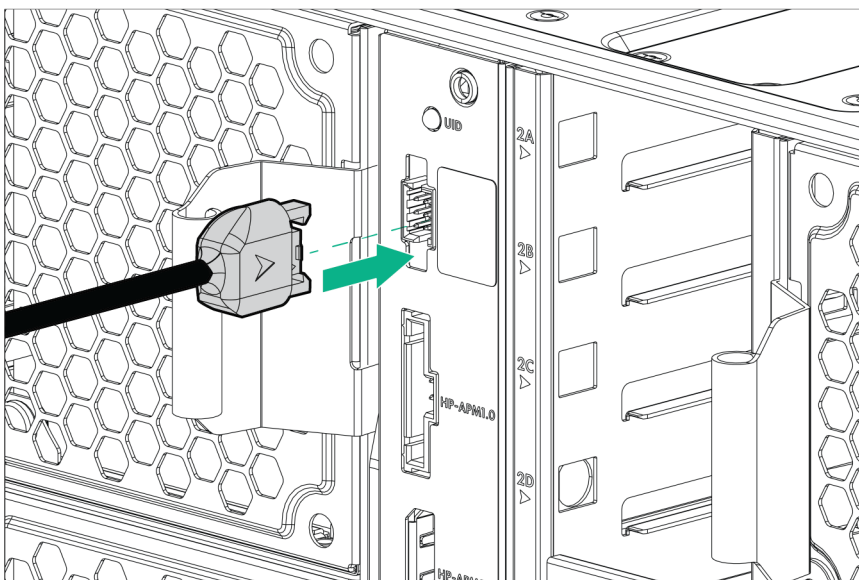
CAUTION: To prevent damage to the power management cable, release the cable by pressing the latches when disconnecting, instead of pulling directly.



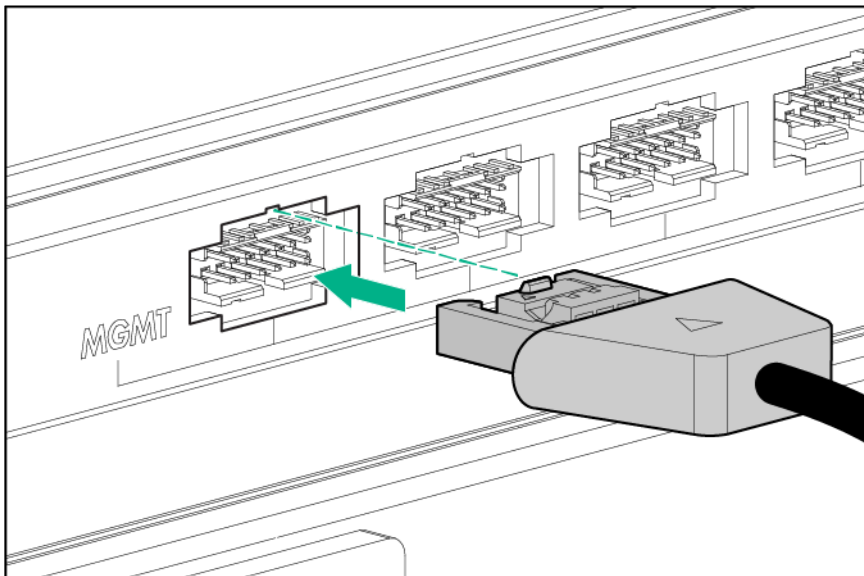
IMPORTANT: When connecting the power management cable to the chassis management module and the power shelf, be sure to install the cable with the plastic tab on the top of the connector. Failure to install the cable properly can result in performance and reporting issues.

4. Connect the power management cable to the chassis management module with the cable's plastic tab facing right.

NOTE: Cables are removed for clarity.

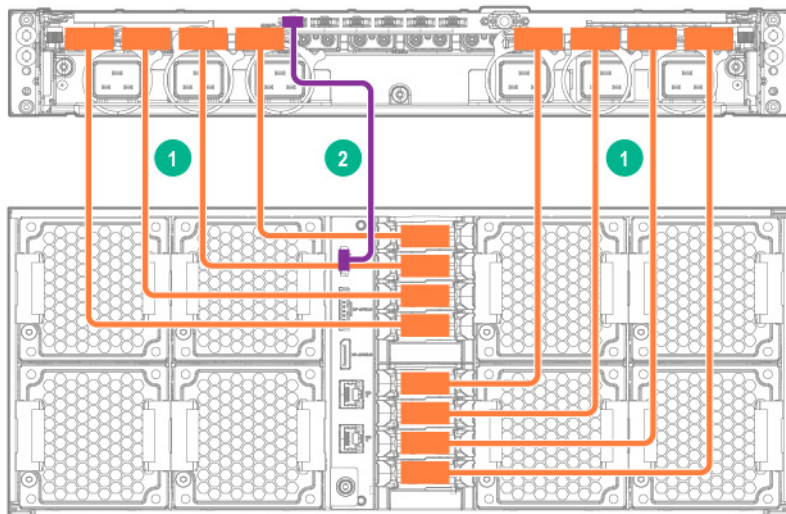


5. Connect the power management cable to the power shelf with the cable's plastic tab facing up.

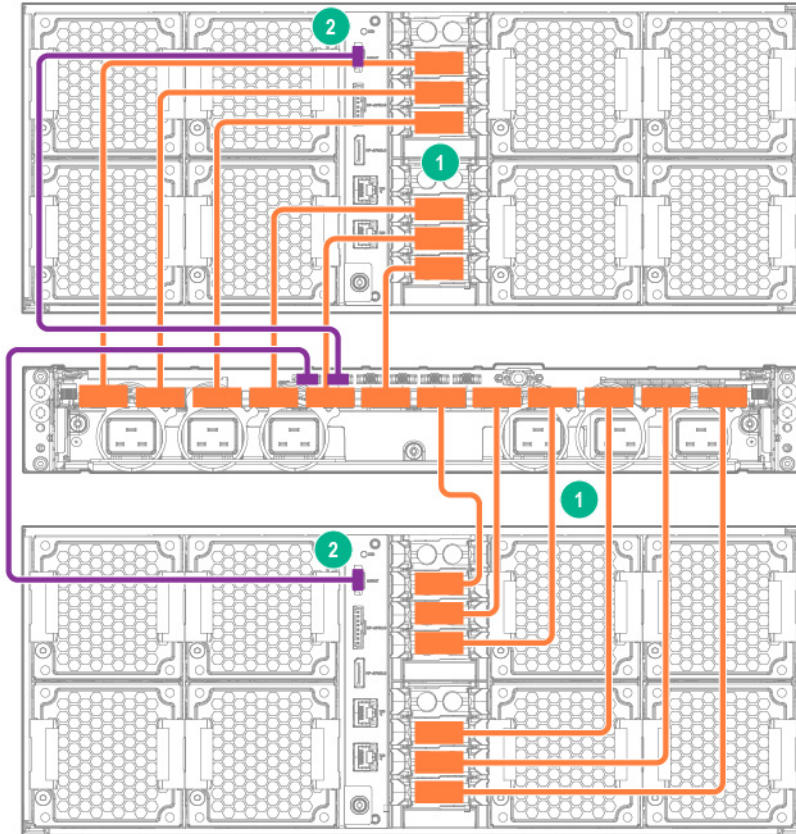


The examples below represent possible configurations for cabling the system.

- o Connecting one chassis to one power shelf



- o Connecting two chassis to one power shelf



Item	Description
1	12V DC power cables
2	Power management cables

Cable quantity and length are determined by the configuration of components. For more information, see the Hewlett Packard Enterprise Power Advisor website (<http://www.hpe.com/info/hpepoweradvisor>).

Example configurations

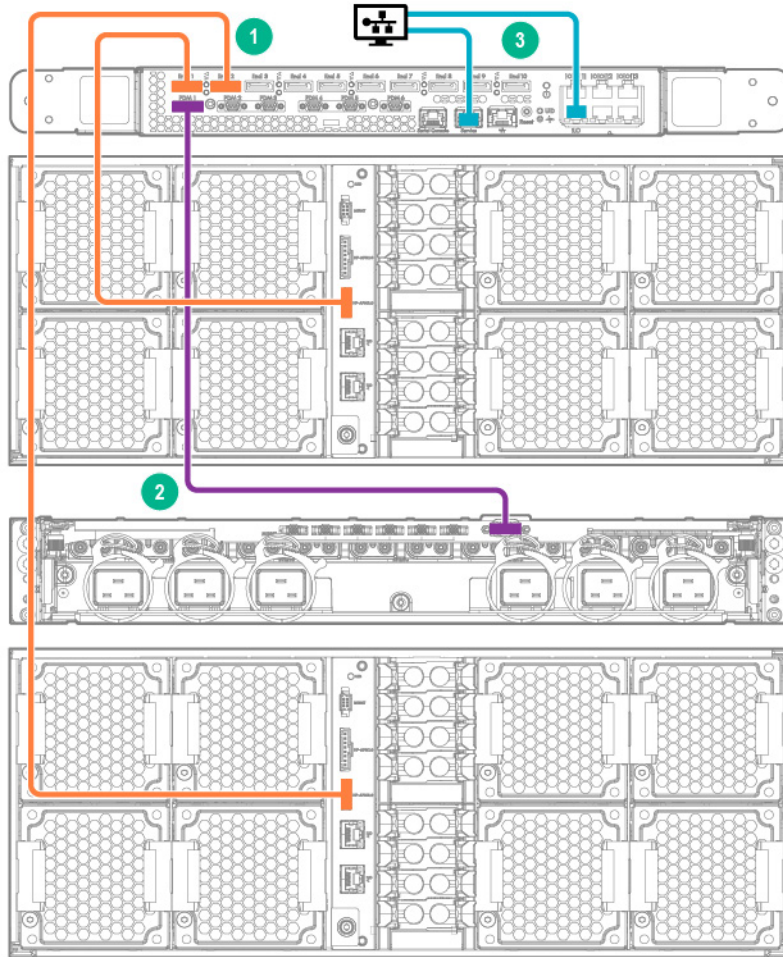
Configuration examples can be calculated using the HPE Power Advisor Tool (<http://www.hpe.com/info/poweradvisor/online>). This tool is designed for facilities planning purposes only. Values obtained from the tool are based on worst case loads. Whenever possible, Hewlett Packard Enterprise recommends using actual measurements in configuration planning. Measurements must be made with the intended configuration, application loading, and ambient environment.

Actual power usage will vary, depending on application loading, ambient temperature, and other factors.

Connecting the optional HPE APM module

1. Connect the HPE APM to the chassis.
2. Connect the HPE APM to the power shelf.

3. Connect the HPE APM to the network.



Item	Description
1	Cables connecting the HPE APM to the chassis
2	Cable connecting the HPE APM to the power shelf
3	Cables connecting the HPE APM to the network



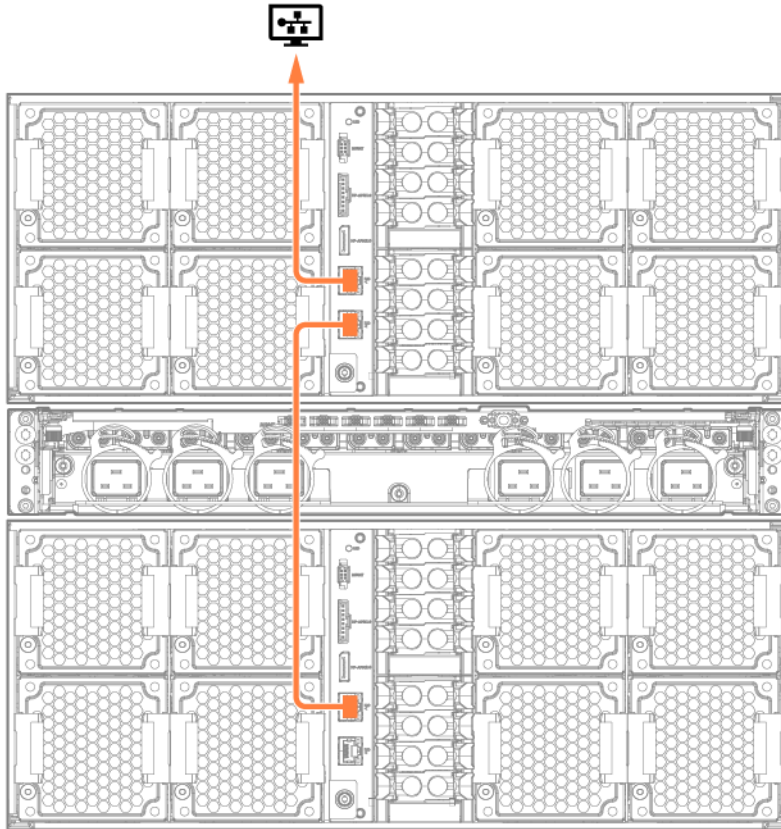
IMPORTANT: If you have an HPE APM connected to an Apollo d6500 Chassis, do not connect the iLO port of the HPE APM and the iLO port of the enclosure to the network at the same time. Having both ports connected at the same time results in a loopback condition.



IMPORTANT: If a dedicated iLO management port module is installed in the server, the server can only connect to a network through the dedicated iLO management port module. For more information, see the server user guide.

Connecting multiple chassis to the network with the chassis management module iLO ports

1. Connect all cables to the chassis management modules and the network. Multiple chassis can be connected to the same network.



IMPORTANT: If using the chassis management module iLO ports to connect multiple chassis to a network, the network must operate at a speed of 1 Gb/s. The servers installed in the chassis cannot connect to the network if the network is operating at a speed of 10/100 Mb/s or 10 Gb/s.



IMPORTANT: If a dedicated iLO management port module is installed in the server, the server can only connect to a network through the dedicated iLO management port module. For more information, see the server user guide.

NOTE: Arrow indicates connection to the network.

Connecting power cables and applying power to the chassis

Connect the AC power cables to the power source (UPS or wall outlet) or to an installed PDU.

Configuring the system

Power capping

The HPE ProLiant XL family of products provides a power capping feature that operates at the server enclosure level. The capping feature can be activated with PPIC.EXE, a stand-alone utility that runs in the environment of one of the resident servers in the chassis to be power capped. After a power cap is set for the enclosure, all the resident servers in the enclosure will have the same uniform power cap applied to them until the cap is either modified or canceled.

With APM, the enclosure-level power capping feature can be expanded without the need to use the PPIC.EXE utility. A global power cap can be applied to all enclosures with one APM command, or different caps can be applied to user-defined groups by using flexible zones within the same rack.

Power capping modes

The following Power Management modes are standard and are configurable in the power management controller:

- **Mode 0: No Redundancy**
All power-capping is disabled. This mode can be used to minimize any possible performance impact of power-capping logic.
- **Mode 1: Max Performance with Redundancy**
This is the default power capping mode. This mode allows the maximum number of nodes to run by engaging power-capping if the power draw from the chassis attempts to exceed the load supported by the active power supplies. In this mode, the system is expected to survive (with degraded performance) an unexpected power loss to one or more of the power supplies.
- **Mode 2: Full AC/DC Redundancy Mode**
Power-capping is enforced such that system has N+1 power redundancy. In this mode, the system will throttle the nodes allowing for one of the available power supplies to be held in reserve. If only one power supply is available, the system will throttle the nodes as to allow the full use of that power supply's capacity.
- **Mode 3: User Configurable Mode**
The user can specify a valid power cap value from a pre-defined range. A cap cannot be set below a minimum or above a maximum. The cap includes all server nodes, fans, and drives. User configurable mode requires an iLO Scale Out or iLO Advanced license.
- **Mode 4: Rack Level Dynamic Power Capping Mode**
In conjunction with APM, the user can specify a maximum power capacity for the entire rack. The APM dynamically allocates power to the applicable chassis within the rack to maximize performance given the available power. For more information, see the *HPE Apollo Platform Manager User Guide* on the Hewlett Packard Enterprise website (http://www.hpe.com/support/APM_UG_en).
- **Mode 5: Power Feed Redundancy Mode**
When used with an A+B power feed configuration, Power Feed Redundancy Mode throttles the system 100%, bringing the nodes to a complete stop if a power feed loss is deduced. Full throttling continues until the power feed is brought back online. In this mode, the system is expected to survive an unexpected loss of an entire power feed to half of the power supplies.

Configuring a power cap

To configure power capping, you can use the following utilities:

- HPE ProLiant Power Interface Control Utility
PPIC is a standalone utility that runs on a single server within the enclosure. For more information, see the *ProLiant Power Interface Control (PPIC) Utility User Guide* on the Hewlett Packard Enterprise website (http://www.hpe.com/support/PPIC_UG_en).
- HPE Apollo Platform Manager
APM is a rack level device that can control power caps for all enclosures in the rack. For more information, see the *HPE Apollo Platform Manager User Guide* on the Hewlett Packard Enterprise website (http://www.hpe.com/support/APM_UG_en).

Setting the chassis power cap mode with the PPIC utility

1. Download and install the ProLiant Power Interface Control Utility from the Hewlett Packard Enterprise website (<http://www.hpe.com/info/hpesc>).
2. Log in to the server, and then run the PPIC utility.
3. To set the power capacity mode, perform one of the following steps:
 - o To set mode 0, 1, and 2, enter the following command at the prompt:

```
-s -mmode
```

The following example sets the power capacity to mode 0:

```
-s -m0
```
 - o To set mode 3, enter the following command at the prompt:

```
-s -mmode -lpower
```

The following example sets the power capacity to mode 3 with a 1500W maximum power limit:

```
-s -m3 -l1500
```

Power capping modes show the valid values for `mode`. `Power` is required when setting Power Control Configuration to User Configurable.

For more information, see the *ProLiant Power Interface Control (PPIC) Utility User Guide* on the Hewlett Packard Enterprise website (http://www.hpe.com/support/PPIC_UG_en).

Setting the chassis power cap mode with HPE APM

1. Log in to APM:
 - a. When the system boots, a Login prompt appears.
 - b. At the prompt, enter `Administrator`.
2. Before setting the power cap, enter the following command to review the power baseline:

```
>show power baseline
```

The information displayed provides the minimum cap value, the maximum cap value, and the chassis that meet the requirements for power capping.
3. To set the power cap for eligible chassis connected to the APM, enter the following command at the prompt:

```
>SET POWER CAP<wattage>|NONE[zone_name]
```

The `wattage` value, if provided, represents the total wattage to be allocated among all the chassis that are part of the baseline or partial baseline of a zone, if specified. This value is divided by the total maximum wattage established by the baseline to calculate a percentage cap value. This percentage is then multiplied against each chassis maximum wattage value to arrive at an appropriate cap value for that individual chassis.

If `NONE` is specified instead of a cap wattage value, then APM removes all (or the specified zone) of the power caps.

To remove baseline data from the EEPROM and to remove the power cap setting, enter the following command:

```
>SET POWER BASELINE NONE
```

After this command is issued, the only way to re-establish a power baseline is to issue the `SET POWER BASELINE` command. The system returns to the default power cap mode (mode 1).

Troubleshooting

Troubleshooting resources

The *HPE ProLiant Gen9 Troubleshooting Guide, Volume I: Troubleshooting* provides procedures for resolving common problems and comprehensive courses of action for fault isolation and identification, issue resolution, and software maintenance on ProLiant servers and server blades. To view the guide, select a language:

- English (http://www.hpe.com/support/Gen9_TSG_en)
- French (http://www.hpe.com/support/Gen9_TSG_fr)
- Spanish (http://www.hpe.com/support/Gen9_TSG_es)
- German (http://www.hpe.com/support/Gen9_TSG_de)
- Japanese (http://www.hpe.com/support/Gen9_TSG_ja)
- Simplified Chinese (http://www.hpe.com/support/Gen9_TSG_zh_cn)

The *HPE ProLiant Gen9 Troubleshooting Guide, Volume II: Error Messages* provides a list of error messages and information to assist with interpreting and resolving error messages on ProLiant servers and server blades. To view the guide, select a language:

- English (http://www.hpe.com/support/Gen9_EMG_en)
- French (http://www.hpe.com/support/Gen9_EMG_fr)
- Spanish (http://www.hpe.com/support/Gen9_EMG_es)
- German (http://www.hpe.com/support/Gen9_EMG_de)
- Japanese (http://www.hpe.com/support/Gen9_EMG_ja)
- Simplified Chinese (http://www.hpe.com/support/Gen9_EMG_zh_cn)

Electrostatic discharge

Preventing electrostatic discharge

To prevent damaging the system, be aware of the precautions you must follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

Grounding methods to prevent electrostatic discharge

Several methods are used for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm \pm 10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an authorized reseller install the part.

For more information on static electricity or assistance with product installation, contact an authorized reseller.

Warranty and regulatory information

Warranty information

HPE ProLiant and x86 Servers and Options

(<http://www.hpe.com/support/ProLiantServers-Warranties>)

HPE Enterprise Servers (<http://www.hpe.com/support/EnterpriseServers-Warranties>)

HPE Storage Products (<http://www.hpe.com/support/Storage-Warranties>)

HPE Networking Products (<http://www.hpe.com/support/Networking-Warranties>)

Regulatory information

Safety and regulatory compliance

For important safety, environmental, and regulatory information, see *Safety and Compliance Information for Server, Storage, Power, Networking, and Rack Products*, available at the Hewlett Packard Enterprise website (<http://www.hpe.com/support/Safety-Compliance-EnterpriseProducts>).

Belarus Kazakhstan Russia marking



Manufacturer and Local Representative Information

Manufacturer information:

Hewlett Packard Enterprise Company, 3000 Hanover Street, Palo Alto, CA 94304 U.S.

Local representative information Russian:

- **Russia:**

ООО «Хьюлетт Паккард Энтерпрайз», Российская Федерация, 125171, г. Москва, Ленинградское шоссе, 16А, стр.3, Телефон/факс: +7 495 797 35 00

- **Belarus:**

ИООО «Хьюлетт-Паккард Бел», Республика Беларусь, 220030, г. Минск, ул. Интернациональная, 36-1, Телефон/факс: +375 17 392 28 18

- **Kazakhstan:**

ТОО «Хьюлетт-Паккард (К)», Республика Казахстан, 050040, г. Алматы, Бостандыкский район, проспект Аль-Фараби, 77/7, Телефон/факс: + 7 727 355 35 50

Local representative information Kazakh:

- **Russia:**

ЖШС "Хьюлетт Паккард Энтерпрайз" Ресей Федерациясы, 125171,
Мәскеу, Ленинград тас жолы, 16А блок 3, Телефон/факс: +7 495 797 35 00

- **Belarus:**

«HEWLETT-PACKARD Bel» ЖШС, Беларусь Республикасы, 220030, Минск қ.,
Интернациональная көшесі, 36/1, Телефон/факс: +375 17 392 28 18

- **Kazakhstan:**

ЖШС «Хьюлетт-Паккард (К)», Қазақстан Республикасы, 050040, Алматы қ.,
Бостандық ауданы, Әл-Фараби даңғылы, 77/7, Телефон/факс: +7 727 355 35 50

Manufacturing date:

The manufacturing date is defined by the serial number.

CCSYWWZZZZ (serial number format for this product)

Valid date formats include:

- YWW, where Y indicates the year counting from within each new decade, with 2000 as the starting point; for example, 238: 2 for 2002 and 38 for the week of September 9. In addition, 2010 is indicated by 0, 2011 by 1, 2012 by 2, 2013 by 3, and so forth.
- YYWW, where YY indicates the year, using a base year of 2000; for example, 0238: 02 for 2002 and 38 for the week of September 9.

Turkey RoHS material content declaration

Türkiye Cumhuriyeti: EEE Yönetmeliğine Uygundur

Ukraine RoHS material content declaration

Обладнання відповідає вимогам Технічного регламенту щодо обмеження використання деяких небезпечних речовин в електричному та електронному обладнанні, затвердженого постановою Кабінету Міністрів України від 3 грудня 2008 № 1057

Specifications

Chassis environmental specifications

Specification	Value
Temperature range¹	—
Operating ^{2,3}	10°C to 35°C (50°F to 95°F)
Nonoperating	-30°C to 60°C (-22°F to 140°F)
Maximum wet bulb temperature	—
Operating	28°C (82.4°F)
Nonoperating	38.7°C (101.7°F)
Relative humidity (non condensing)⁴	—
Operating	10% to 90%
Nonoperating	5% to 95%

¹ All temperature ratings shown are for sea level. An altitude derating of 1°C per 304.8 m (1.8°F per 1000 ft) to 3048 m (10,000 ft) is applicable. No direct sunlight allowed. Upper operating limit is 3,048 m (10,000 ft) or 70 kPa/10.1 psia. Upper nonoperating limit is 9,144 m (30,000 ft).

² If three or more NVIDIA Tesla K80 GPUs are installed on one side of the HPE ProLiant XL270d Gen9 Accelerator Tray, the inlet ambient temperature must be maintained at or below 30°C (86°F).

³ If three or more NVIDIA Tesla P100 GPUs are installed on one side of the HPE ProLiant XL270d Gen9 Accelerator Tray, the inlet ambient temperature must be maintained at or below 25°C (77°F).

⁴ Storage maximum humidity of 95% is based on a maximum temperature of 45°C (113°F). Altitude maximum for storage corresponds to a pressure minimum of 70 kPa (10.1 psia).

Chassis mechanical specifications

Specification	Value
Height	17.70 cm (6.97 in)
Depth	96.00 cm (37.79 in)
Width	44.80 cm (17.64 in)
Weight, fully-loaded	73.22 kg (161.42 lb)
Weight, lightly-loaded server with accelerator tray blank kit installed	39.12 kg (86.24 lb)

Power shelf specifications

Specification	Value
Height	6.47 cm (2.55 in)
Depth	78.44 cm (30.88 in)
Width	44.81 cm (17.64 in)
Weight, fully loaded	27.22 kg (60.00 lb)
Weight, empty	9.07 kg (20.00 lb)

Power specifications

The power requirements for the HPE Apollo d6500 Chassis are met by the following components:

- HPE 2650W Platinum Hot Plug Redundant Power Supply
- HPE Apollo 6000 Power Shelf
- AC Input Module
- Chassis Management Module

DC power

Specification	Value
Output	12V from power supplies to system chassis
Minimum (V)	+11.907
Nom (V)	+12.25
Maximum (V)	+12.593
% Reg	+2.8%/-2.8%

Single-phase power

Specification	HPE 2650W Platinum Hot Plug Redundant Power Supply
Power cord	IEC-320 C19-C20 2 m (6.5 ft)
Output	2650 W per power supply
Input requirements	
Rated input voltage	200 VAC to 240 VAC
Rated input frequency	50 Hz to 60 Hz
Rated input current per power supply (maximum)	14.4 A at 200 VAC 13.8 A at 208 VAC 13.1 A at 220 VAC
Rated input power per power supply (maximum)	2880 VA

Three-phase power (North America/Japan)

Specification	2650W Platinum Hot Plug Redundant Power Supply
Power cord	NEMA L15-30p 3.05 m (10 ft)
Output	2650 W per phase
Input requirements	
Rated input voltage	200 VAC to 208 VAC line to line 3-phase delta
Rated input frequency	50 Hz to 60 Hz
Maximum input current per line cord	25 A at 200 VAC 24 A at 208 VAC
Maximum input power per line cord	8640 VA

Three-phase power (International)

Specification	HPE 2650W Platinum Hot Plug Redundant Power Supply
Power cords (2)	IEC-309 200/380-V to 240/415-V, 5-pin, 16-A 3.05 m (10 ft)
Output	2650 W
Input requirements	
Rated input voltage	380 VAC to 415 VAC line-to-line* 220 VAC to 240 VAC line-to-neutral 3-phase WYE
Rated input frequency	50 Hz to 60 Hz
Maximum input current per line cord	13.1 A at 220/380 VAC 12 A at 240/415 VAC
Maximum input power per line cord	8646 VA

*Rated 220 VAC to 240 VAC line-to-neutral. The enclosure does not operate from higher line-to-line voltage with the WYE wall plug configuration. Input AC modules are configured to provide 220 VAC to 240 VAC to the power supplies in this system.

Hot-plug power supply calculations

For hot-plug power supply specifications and calculators to determine electrical and heat loading for the server, see the Hewlett Packard Enterprise Power Advisor website (<http://www.hpe.com/info/poweradvisor/online>).

Support and other resources

Accessing Hewlett Packard Enterprise Support

- For live assistance, go to the Contact Hewlett Packard Enterprise Worldwide website (<http://www.hpe.com/assistance>).
- To access documentation and support services, go to the Hewlett Packard Enterprise Support Center website (<http://www.hpe.com/support/hpesc>).

Information to collect

- Technical support registration number (if applicable)
- Product name, model or version, and serial number
- Operating system name and version
- Firmware version
- Error messages
- Product-specific reports and logs
- Add-on products or components
- Third-party products or components

Accessing updates

- Some software products provide a mechanism for accessing software updates through the product interface. Review your product documentation to identify the recommended software update method.
- To download product updates, go to either of the following:
 - Hewlett Packard Enterprise Support Center Get connected with updates page (<http://www.hpe.com/support/e-updates>)
 - Software Depot website (<http://www.hpe.com/support/softwaredepot>)
- To view and update your entitlements, and to link your contracts and warranties with your profile, go to the Hewlett Packard Enterprise Support Center More Information on Access to Support Materials page (<http://www.hpe.com/support/AccessToSupportMaterials>).



IMPORTANT: Access to some updates might require product entitlement when accessed through the Hewlett Packard Enterprise Support Center. You must have an HP Passport set up with relevant entitlements.

Websites

- Hewlett Packard Enterprise Information Library (<http://www.hpe.com/info/enterprise/docs>)
- Hewlett Packard Enterprise Support Center (<http://www.hpe.com/support/hpesc>)
- Contact Hewlett Packard Enterprise Worldwide (<http://www.hpe.com/assistance>)

- Subscription Service/Support Alerts (<http://www.hpe.com/support/e-updates>)
- Software Depot (<http://www.hpe.com/support/softwaredepot>)
- Customer Self Repair (<http://www.hpe.com/support/selfrepair>)
- Insight Remote Support (<http://www.hpe.com/info/insightremotesupport/docs>)
- Serviceguard Solutions for HP-UX (<http://www.hpe.com/info/hpux-serviceguard-docs>)
- Single Point of Connectivity Knowledge (SPOCK) Storage compatibility matrix (<http://www.hpe.com/storage/spock>)
- Storage white papers and analyst reports (<http://www.hpe.com/storage/whitepapers>)

Customer self repair

Hewlett Packard Enterprise customer self repair (CSR) programs allow you to repair your product.

If a CSR part needs to be replaced, it will be shipped directly to you so that you can install it at your convenience. Some parts do not qualify for CSR. Your Hewlett Packard Enterprise authorized service provider will determine whether a repair can be accomplished by CSR.

For more information about CSR, contact your local service provider or go to the CSR website (<http://www.hpe.com/support/selfrepair>).

Remote support

Remote support is available with supported devices as part of your warranty or contractual support agreement. It provides intelligent event diagnosis, and automatic, secure submission of hardware event notifications to Hewlett Packard Enterprise, which will initiate a fast and accurate resolution based on your product's service level. Hewlett Packard Enterprise strongly recommends that you register your device for remote support.

For more information and device support details, go to the Insight Remote Support website (<http://www.hpe.com/info/insightremotesupport/docs>).

Acronyms and abbreviations

EEPROM

electrical erasable programmable read only memory

ESD

electrostatic discharge

HPE APM

HPE Apollo Platform Manager (formerly named HPE Advanced Power Manager)

iLO

Integrated Lights-Out

PDU

power distribution unit

PPIC

HP ProLiant Power Interface Control Utility

TMRA

recommended ambient operating temperature

UID

unit identification

UPS

uninterruptible power system

Documentation feedback

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