Hewlett Packard Enterprise

HPE ProLiant ML350 Gen10 Server User Guide

Abstract

This document is for the person who installs, administers, and troubleshoots servers and storage systems. Hewlett Packard Enterprise assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

Contents

Component identification

This chapter describes the external and internal server features and components.

Front panel components
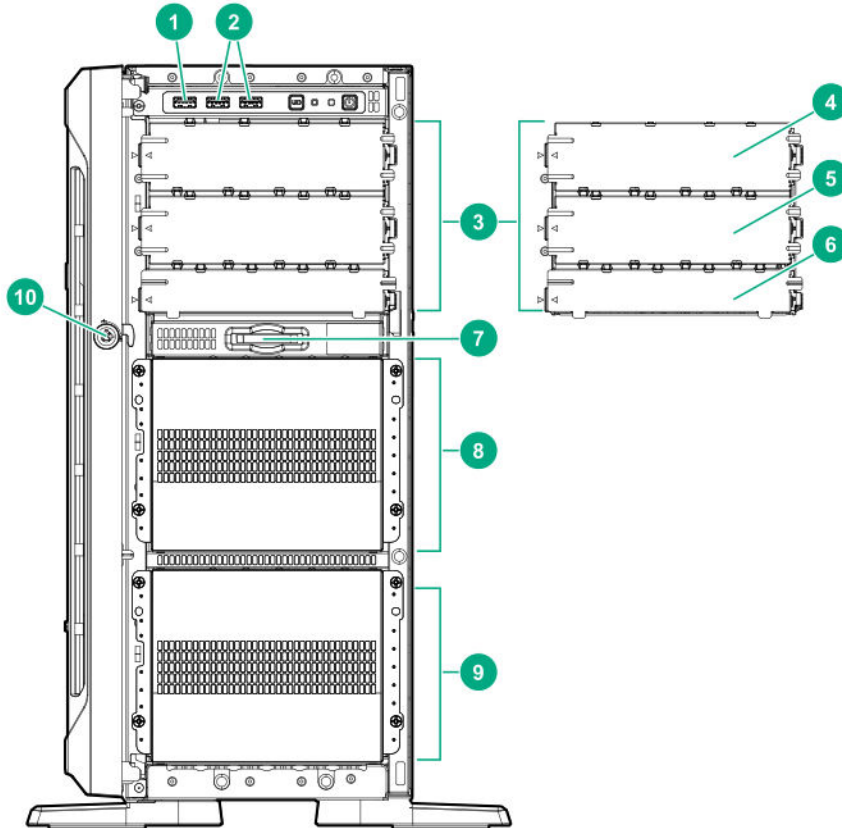
Item	Description
1	iLO Service Port
2	USB 3.0 ports (2)
3	Box 1[1]
4	Half-height media bay 1 (for SAS LTO tape drive option or USB RDX drive option)[2]
5	Half-height media bay 2 (for USB RDX drive option)[2]
6	Optical drive bay (for slim-type SATA optical drive option)[2]
7	**Serial number/iLO information pull tab**

Table Continued

Item	Description
8	Box 2[1], [3]
9	Box 3[1]
10	Front bezel lock

[1] All three boxes support LFF and SFF drive cage options. This server supports mixed LFF + SFF hot-plug drive configurations.

[2] The media drive options are only supported in box 1.

[3] In SFF models, box 2 supports the 8 NVMe SSD Express Bay enablement option.

Serial number/iLO information pull tab

The serial number/iLO information pull tab is double-sided. One side shows the server serial number and the customer asset tag label. The other side shows the default iLO account information and QR code label.

Use a mobile device to scan the QR code label to display the server mobile product page (**https://www.hpe.com/qref/ml350gen10**). This page contains links to server setup information, spare part numbers, QuickSpecs, troubleshooting resources, and other useful product links.

Front panel LEDs and buttons
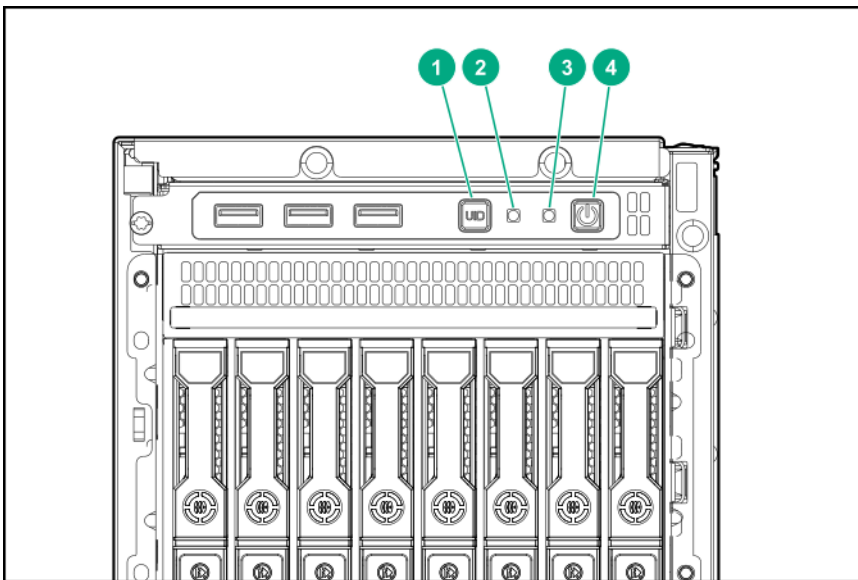
Item	Description	Status	Definition
1	UID button/LED[1]	Solid blue	**Activated**
		Flashing blue	• 1 flash per sec = Remote management or firmware upgrade in progress • 4 flashes per sec = iLO manual reboot sequence initiated • 8 flashes per sec = iLO manual reboot sequence in progress
		Off	Deactivated
2	NIC status LED[1]	Solid green	Linked to network
		Flashing green	Network active
		Off	No network activity
3	Health LED[1]	Solid green	Normal
		Flashing green	iLO is rebooting
		Flashing amber	System degraded[2]
		Flashing red	System critical[2]
4	Power On/Standby button and system power LED[1]	Solid green	System on
		Flashing green	Performing power-on sequence
		Solid amber	System in standby
		Off	No power present[3]

[1] When all four LEDs described in this table flash simultaneously, a power fault has occurred. For more information, see **Front panel LED power fault codes**.

[2] If the health LED indicates a degraded or critical state, review the system IML or use iLO to review the system health status.

[3] Facility power is not present, power cord is not attached, no power supplies are installed, power supply failure has occurred, or the front I/O cable is disconnected.

Server UID LED

The UID LED is used to locate a particular server when it is deployed in a dense rack with other equipment. Activating the UID LED helps an onsite technician to quickly identify a server for maintenance tasks.

Toggling the UID LED on and off locally

Procedure

1. **Remove the front bezel**.

2. Do one of the following:

- To turn on the UID LED, press the UID button.

  This action illuminates both the front and rear UID LEDs blue.

- To turn off the UID LED, press the UID button again.

The procedure is complete.

Toggling the UID LED on and off remotely

Procedure

1. Log in to the iLO web interface.

2. Do one of the following:

   - To turn on the UID LED, click the UID icon 🔵.

     This action illuminates both the front and rear UID LEDs blue.

   - To turn off the UID LED, click the UID icon 🔵 again.

   The iLO control icons are available from any iLO page. For more information, see the iLO user guide on the Hewlett Packard Enterprise website (**https://www.hpe.com/support/ilo-docs**).

The procedure is complete.

UID button functionality

The UID button can be used to display the Server Health Summary when the server will not power on. For more information, see the latest *HPE iLO 5 User Guide* on the **Hewlett Packard Enterprise website**.

Front panel LED power fault codes

The following table provides a list of power fault codes, 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
Storage controllers	6 flashes
System board PCIe slots	7 flashes
Power backplane or storage backplane	8 flashes
Power supply	9 flashes

Rear panel components
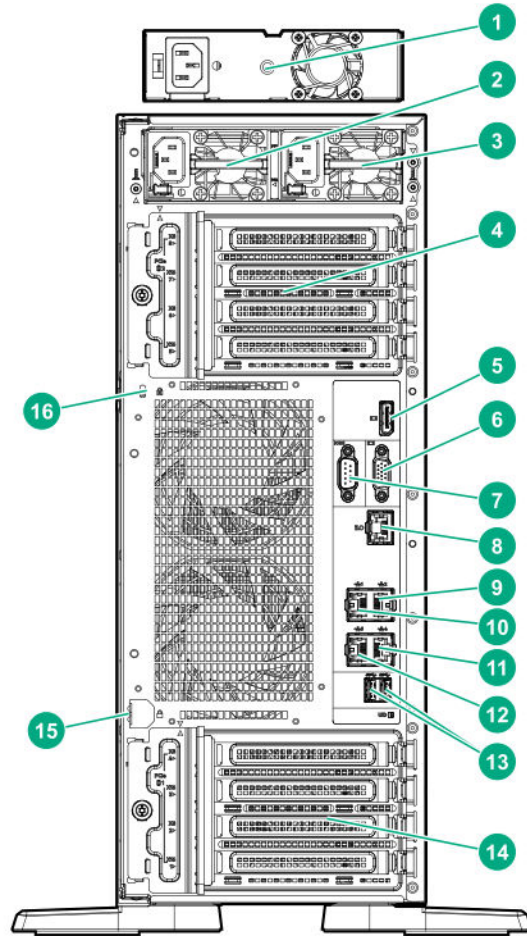
Item	Description
1	Standard power supply (non-hot-plug)[1]
2	Flexible Slot power supply 2 (hot-plug)
3	Flexible Slot power supply 1 (hot-plug)
4	PCIe expansion slots 5-8 (bottom to top)
5	Display port
6	VGA port
7	Serial port
8	iLO management port

Table Continued

Item	Description
9	NIC port 2 (1Gb)[2]
10	NIC port 1 (1Gb)[2]
11	NIC port 4 (1Gb)[2]
12	NIC port 3 (1Gb)[2]
13	USB 3.0 ports (2)
14	PCIe expansion slots 1-4 (bottom to top)
15	Padlock eye
16	Kensington security slot

[1] The non-hot-plug power supply is only supported in LFF non-hot-plug drive configurations.

[2] These NIC ports do not support the 100 Mb/s and 10 Mb/s speeds.

Rear panel LEDs
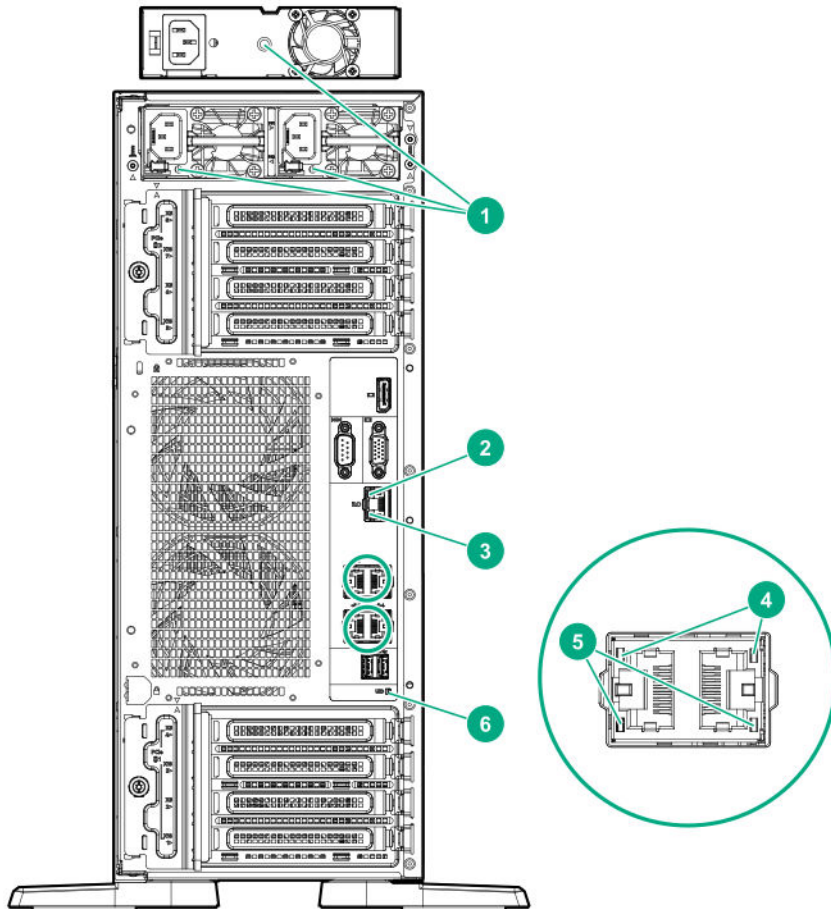
Item	LED	Status	Definition
1	Power supply	Solid green	Normal
		Off	System is off or power supply has failed.
2	iLO status	Solid green	Linked to network
		Flashing green	Network active
		Off	No network activity
3	iLO link	Solid green	Network link
		Off	No network link
4	NIC status	Solid green	Linked to network
		Flashing green	Network active
		Off	No network activity
5	NIC link	Solid green	Network link
		Off	No network link
6	UID	Solid blue	**Activated**
		Flashing blue	• 1 flash per sec = Remote management or firmware upgrade in progress • 4 flashes per sec = iLO manual reboot sequence • 8 flashes per sec = iLO manual reboot sequence in progress
		Off	Deactivated

System board components
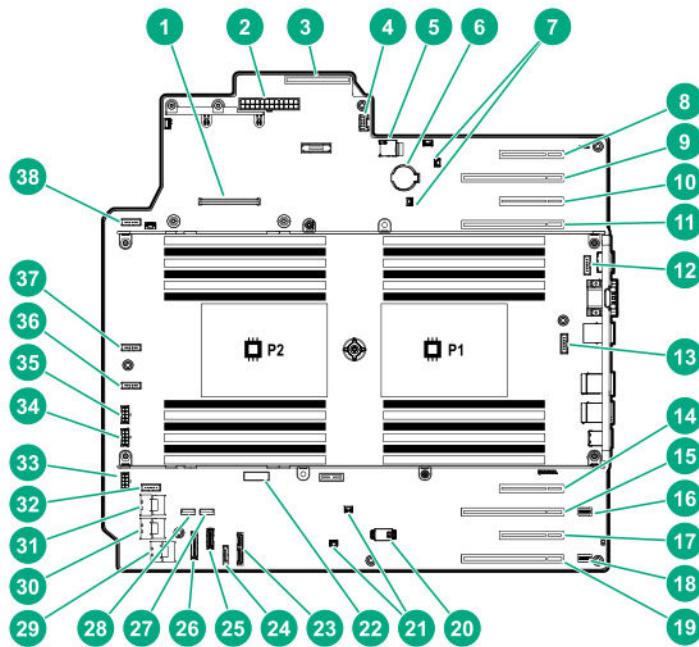
Item	Description
1	Smart Array modular controller connector (AROC)
2	Standard power supply connector
3	Power distribution board connector
4	Energy pack connector
5	microSD card slot
6	System battery
7	Storage controller backup power connectors (2)
8	Slot 8 PCIe3 x8 (8, 4, 1)[1]
9	Slot 7 PCIe3 x16 (16, 8, 4, 1)[1]
10	Slot 6 PCIe3 x8 (8, 4, 1)[1]
11	Slot 5 PCIe3 x16 (16, 8, 4, 1)[1]
12	Fan connector 5

Table Continued

Item	Description
13	Fan connector 6
14	Slot 4 PCIe3 x8 (4, 1)[2]
15	Slot 3 PCIe3 x16 (16, 8, 4, 1)[2]
16	NVMe riser sideband connector for PCIe slot 3
17	Slot 2 PCIe3 x8 (4, 1)[2]
18	NVMe riser sideband connector for PCIe slot 1
19	Slot 1 PCIe3 x16 (16, 8, 4, 1)[2]
20	TPM connector
21	Storage controller backup power connectors (2)
22	**System maintenance switch**
23	Power and x1 SATA port 5
24	x1 SATA port 4
25	Front USB cable connector
26	Front I/O cable connector
27	Internal USB 2.0 port
28	Internal USB 3.0 port
29	x4 SATA port 2
30	x4 SATA port 1
31	x4 SATA port 3
32	Fan connector 4
33	Box 3 drive power connector
34	Box 2 drive power connector
35	Box 1 drive power connector

Table Continued

Item	Description
36	Fan connector 3
37	Fan connector 2
38	Fan connector 1

[1] The PCIe3 expansion slots 5–8 are associated with processor 2.

[2] The PCIe3 expansion slots 1–4 are associated with processor 1.

System maintenance switch descriptions

Position	Default	Function
S1[1]	Off	Off = iLO 5 security is enabled. On = iLO 5 security is disabled.
S2	Off	Reserved
S3	Off	Reserved
S4	Off	Reserved
S5[1]	Off	Off = Power-on password is enabled. On = Power-on password is disabled.
S6[1, 2, 3]	Off	Off = No function On = Restore default manufacturing settings
S7	Off	Reserved
S8	—	Reserved
S9	—	Reserved
S10	—	Reserved
S11	—	Reserved
S12	—	Reserved

[1] To access the redundant ROM, set S1, S5, and S6 to On.

[2] When the system maintenance switch position 6 is set to the On position, the system is prepared to restore all configuration settings to their manufacturing defaults.

[3] When the system maintenance switch position 6 is set to the On position and Secure Boot is enabled, some configurations cannot be restored. For more information, see **Secure Boot**.

DIMM label identification

To determine DIMM characteristics, see the label attached to the DIMM. The information in this section helps you to use the label to locate specific information about the DIMM.

8GB 1Rx4 DDR4-2666P-R
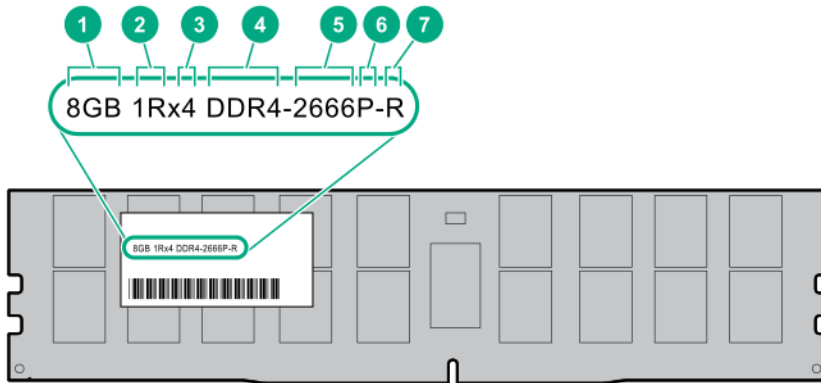
Item	Description	Example
1	Capacity	8 GB
		16 GB
		32 GB
		64 GB
		128 GB
2	Rank	1R = Single rank
		2R = Dual rank
		4R = Quad rank
		8R = Octal rank
3	Data width on DRAM	x4 = 4-bit
		x8 = 8-bit
		x16 = 16-bit
4	Memory generation	PC4 = DDR4
5	Maximum memory speed	2133 MT/s
		2400 MT/s
		2666 MT/s
		2933 MT/s

Table Continued

Item	Description	Example
6	CAS latency	P = CAS 15-15-15
		T = CAS 17-17-17
		U = CAS 20-18-18
		V = CAS 19-19-19 (for RDIMM, LRDIMM)
		V = CAS 22-19-19 (for 3DS TSV LRDIMM)
		Y = CAS 21-21-21 (for RDIMM, LRDIMM)
		Y = CAS 24-21-21 (for 3DS TSV LRDIMM)
7	DIMM type	R = RDIMM (registered)
		L = LRDIMM (load reduced)
		E = Unbuffered ECC (UDIMM)

For more information about product features, specifications, options, configurations, and compatibility, see the HPE DDR4 SmartMemory QuickSpecs on the Hewlett Packard Enterprise website (**https://www.hpe.com/support/DDR4SmartMemoryQS**).

PCIe slot description
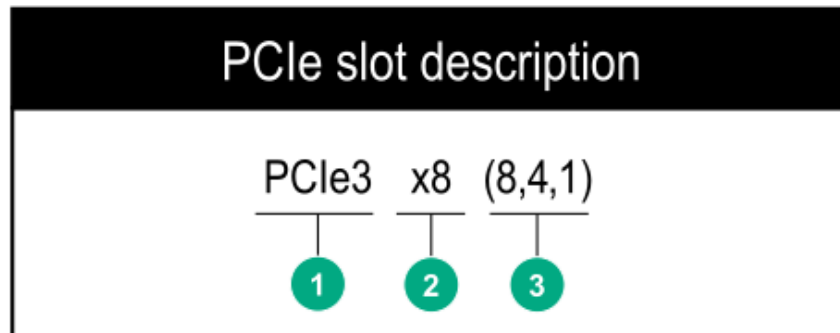
Item	Description	Definition
1	PCI Express version	Each PCIe version corresponds to a specific data transfer rate between the processor and peripheral devices. Generally, a version update corresponds to an increase in transfer rate. • PCIe 1.x • PCIe 2.x • PCIe 3.x The PCIe technology is under constant development. For the latest information, see the **PCI-SIG website**.
2	Physical connector link width	PCIe devices communicate through a logical connection called an interconnect or link. At the physical level, a link is composed of one or more lanes. The number of lanes is written with an "x" prefix with x16 being the largest size in common use. • x1 • x2 • x4 • x8 • x16
3	Negotiable link width	These numbers correspond to the maximum link bandwidth supported by the slot.

Processor, heatsink, and socket components
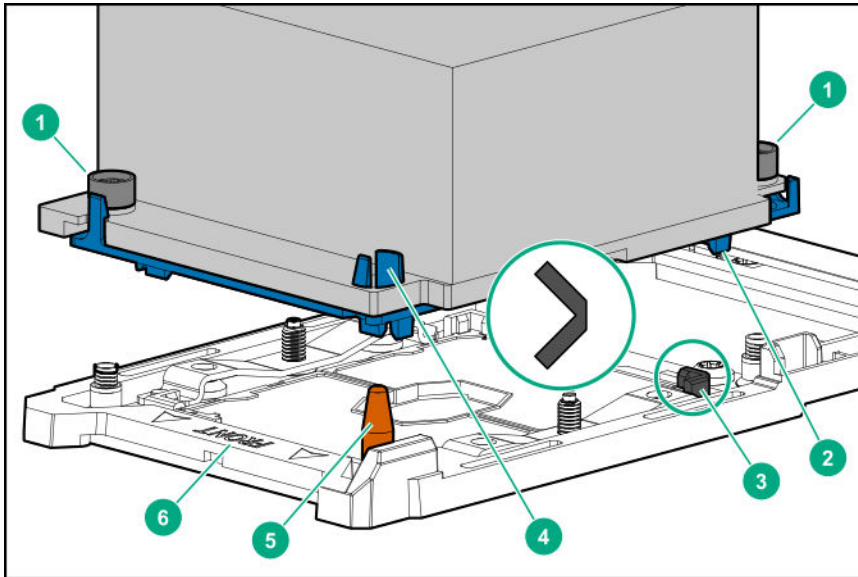
Item	Description
1	Heatsink nuts
2	Processor carrier
3	Pin 1 indicator [1]
4	Heatsink guide/keying feature
5	Alignment post
6	Heatsink keying frame

[1] Symbol also on the processor and frame.

Drive LEDs and buttons

Low-profile LFF drive LED definitions
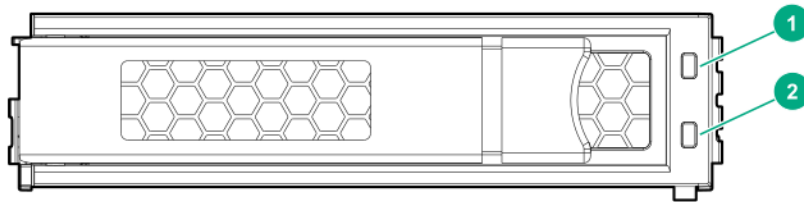
Item	LED	Status	Definition
1	Fault \Locate	Solid amber	The drive has failed.
		Solid blue	The drive is operating normally and being identified by a management application.
		Flashing amber/blue (1 flash per second)	The drive has failed, or a predictive failure alert has been received for this drive; it also has been identified by a management application.
		Flashing amber (1 flash per second)	A predictive failure alert has been received for this drive. Replace the drive as soon as possible.
2	Online \Activity	Solid green	The drive is online and has no activity.
		Flashing green (4 flashes per second)	The drive is operating normally and has activity.

Table Continued

Item	LED	Status	Definition
		Flashing green (1 flash per second)	The drive is doing one of the following: • Rebuilding • Performing a RAID migration • Performing a strip size migration • Performing a capacity expansion • Performing a logical drive extension • Erasing • Spare part activation
		Off	The drive is not configured by a RAID controller or a spare drive.

Smart Carrier (SC) drive LED definitions

Item	LED	Status	Definition
1	Locate	Solid blue	The drive is being identified by a host application.
		Flashing blue	The drive carrier firmware is being updated or requires an update.
2	Activity ring	Rotating green	Drive activity
		Off	No drive activity
3	Do not remove	Solid white	Do not remove the drive. Removing the drive causes one or more of the logical drives to fail.
		Off	Removing the drive does not cause a logical drive to fail.
4	Drive status	Solid green	The drive is a member of one or more logical drives.

Table Continued

Item	LED	Status	Definition
		Flashing green	The drive is doing one of the following: • Rebuilding • Performing a RAID migration • Performing a strip size migration • Performing a capacity expansion • Performing a logical drive extension • Erasing • Spare part activation
		Flashing amber/green	The drive is a member of one or more logical drives and predicts the drive will fail.
		Flashing amber	The drive is not configured and predicts the drive will fail.
		Solid amber	The drive has failed.
		Off	The drive is not configured by a RAID controller or a spare drive.

Smart Carrier NVMe (SCN) drive LED definitions

The NVMe drive is a PCIe bus device. A device attached to a PCIe bus cannot be removed without allowing the device and bus to complete and cease the signal/traffic flow.

⚠️ **CAUTION:** Do not remove an NVMe drive from the drive bay while the Do not remove LED is flashing. The Do not remove LED flashes to indicate that the device is still in use. Removing the NVMe drive before the device has completed and ceased signal/traffic flow can cause loss of data.
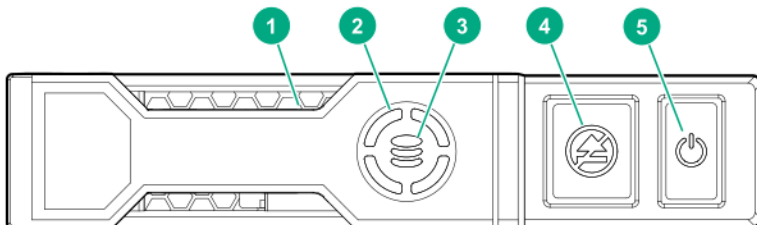
Item	LED	Status	Definition
1	Locate	Solid blue	The drive is being identified by a host application.
		Flashing blue	The drive carrier firmware is being updated or requires an update.
2	Activity ring	Rotating green	Drive activity
		Off	No drive activity
3	Drive status	Solid green	The drive is a member of one or more logical drives.

Table Continued

Item	LED	Status	Definition
		Flashing green	The drive is doing one of the following: • Rebuilding • Performing a RAID migration • Performing a stripe size migration • Performing a capacity expansion • Performing a logical drive extension • Erasing
		Flashing amber/ green	The drive is a member of one or more logical drives and predicts the drive will fail.
		Flashing amber	The drive is not configured and predicts the drive will fail.
		Solid amber	The drive has failed.
		Off	The drive is not configured by a RAID controller.
4	Do not remove	Solid white	Do not remove the drive. The drive must be ejected from the PCIe bus prior to removal.
		Flashing white	The drive ejection request is pending.
		Off	The drive has been ejected.
5	Power	Solid green	Do not remove the drive. The drive must be ejected from the PCIe bus prior to removal.
		Flashing green	The drive ejection request is pending.
		Off	The drive has been ejected.

Drive bay numbering

Drive bay numbering depends on how the drive backplane is connected. In this server, the backplane can be connected to the:

• Embedded Smart Array controller through the onboard SATA ports

• Smart Array type-a modular (AROC) and type-p standup plug-in storage controllers

• SAS expander card

When the backplane is connected to a storage controller, the drive bay numbering for each drive box starts at 1.

When the backplane is connected to a SAS expander, all drive boxes are treated as a single box 1. This means the drive bay numbering is continuous.

SFF drive bay numbering: Smart Array controller
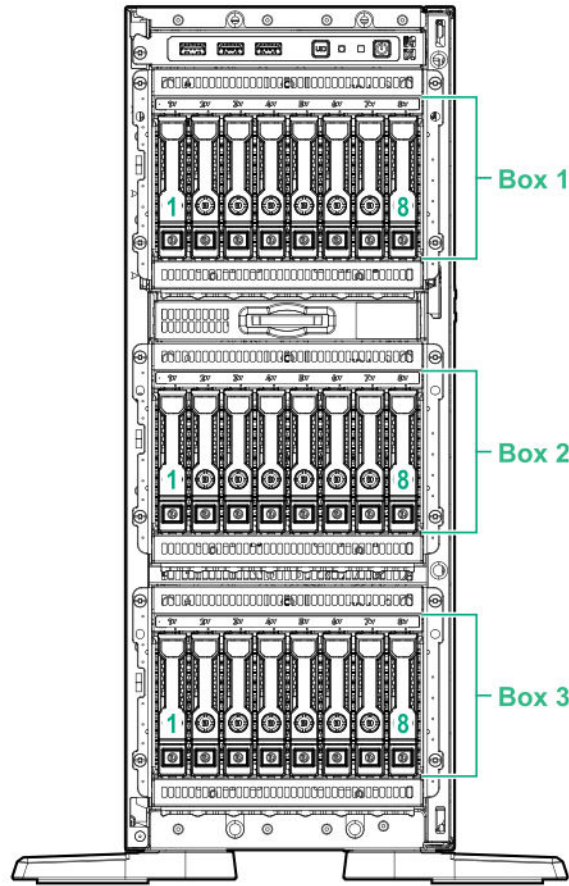
Tower orientation
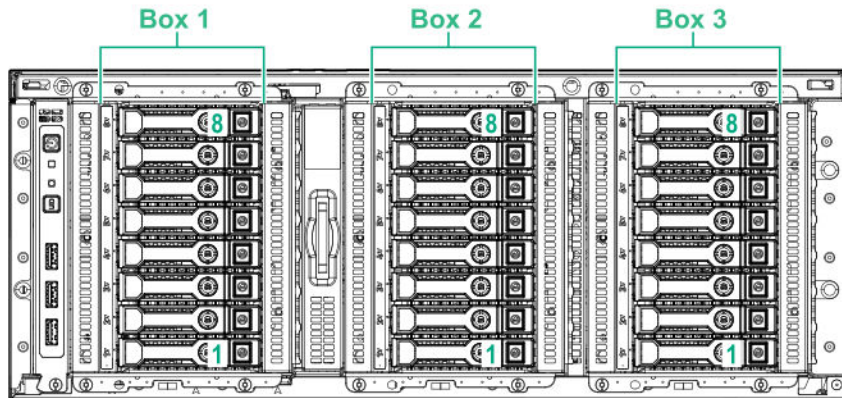
Rack orientation

SFF drive bay numbering: SAS expander

Tower orientation
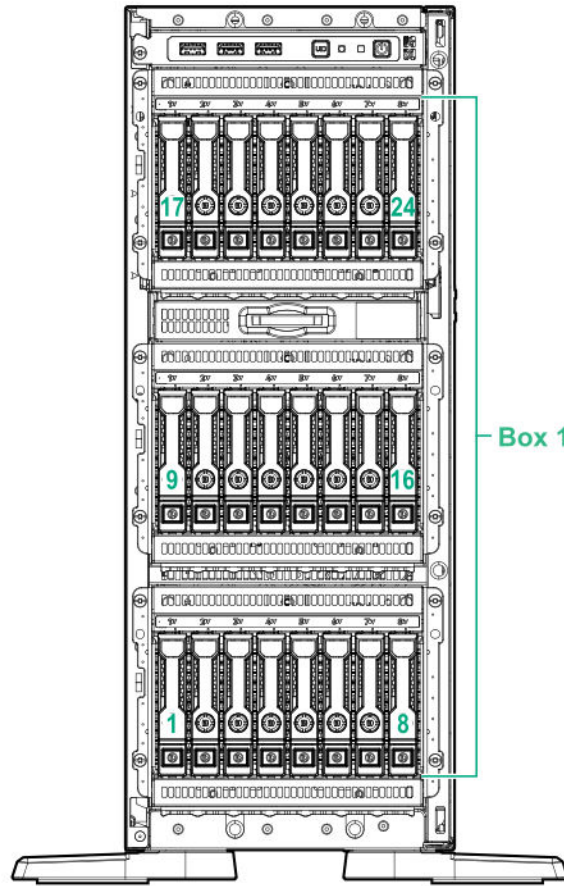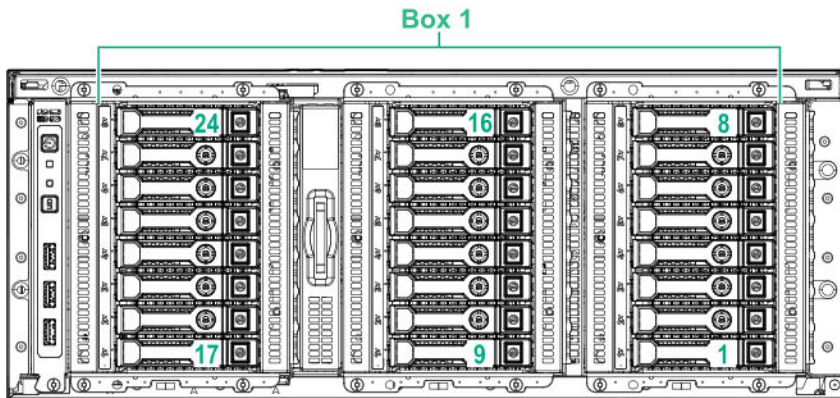
Rack orientation

NVMe drive bay numbering

Tower orientation
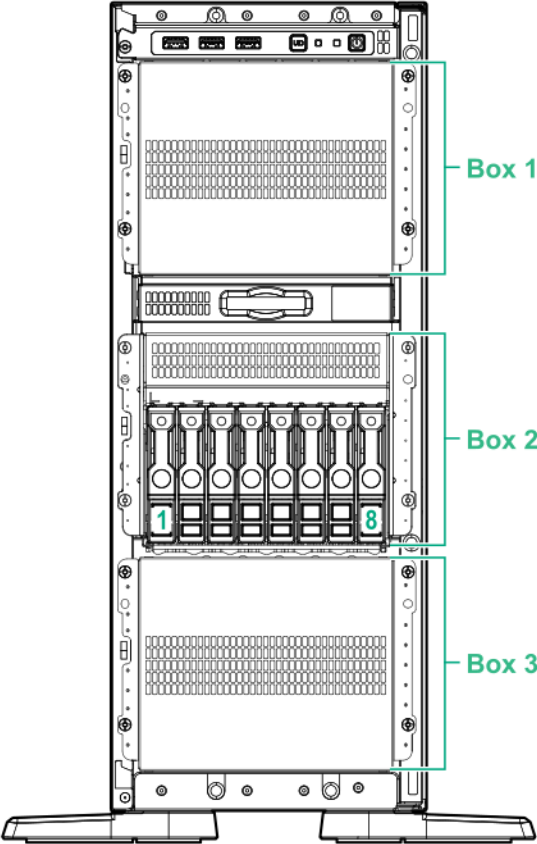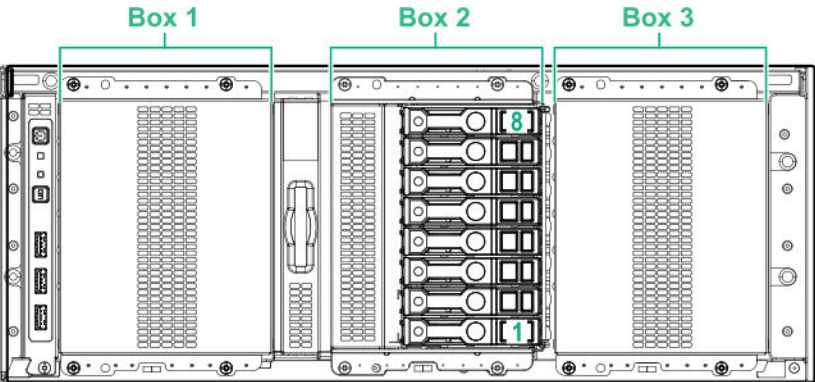
Rack orientation

LFF drive bay numbering: Smart Array controller
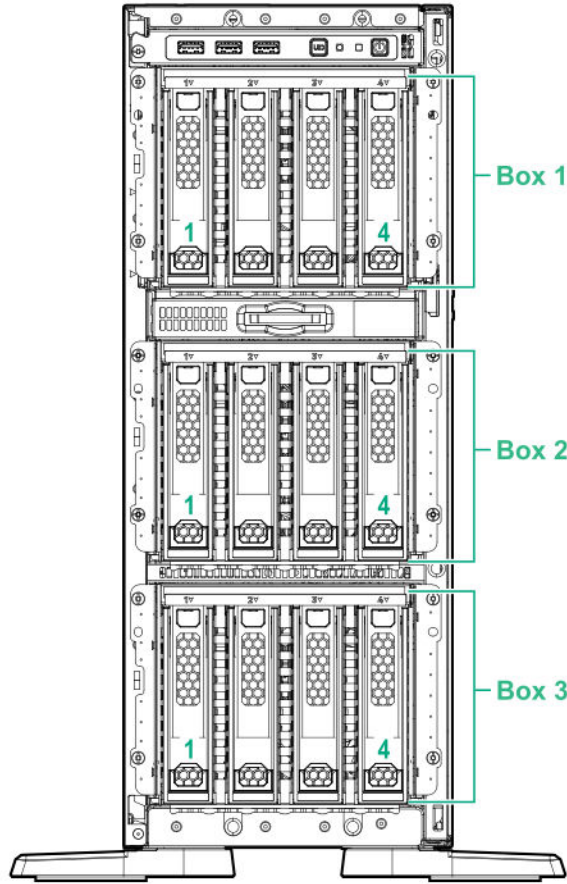
Tower orientation

Rack orientation
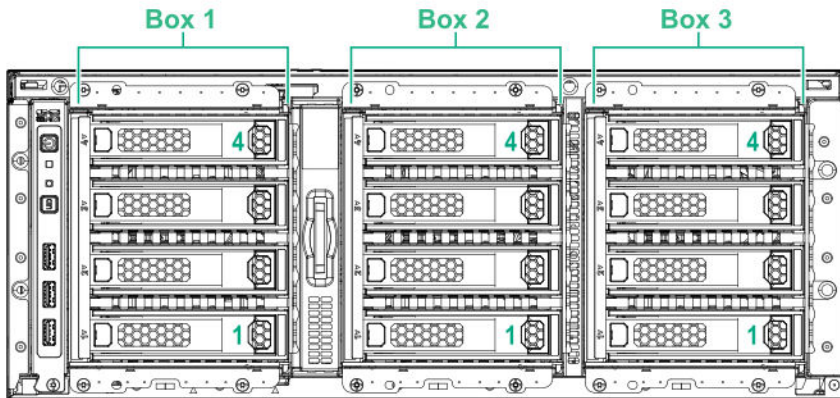
HPE NS204i-p NVMe OS Boot Device components
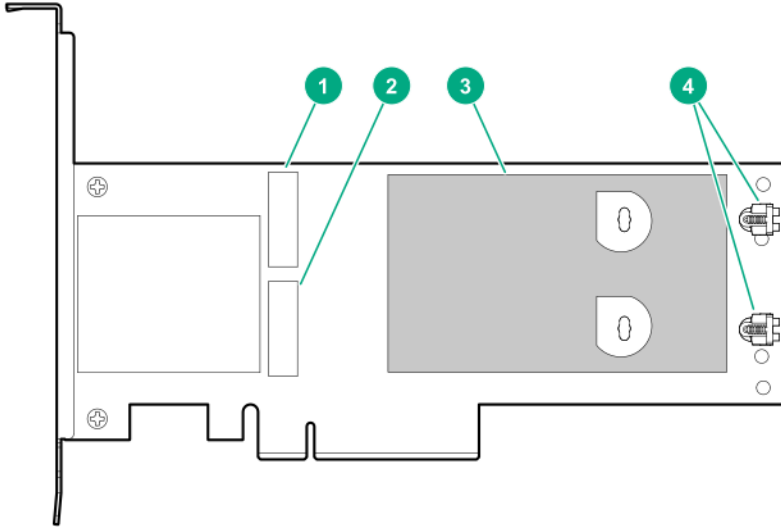
Item	Description
1	Drive bay 1
2	Drive bay 2
3	Thermal interface pad with removable liner
4	M.2 drive retaining latches

HPE NS204i-p NVMe OS Boot Device LED definitions
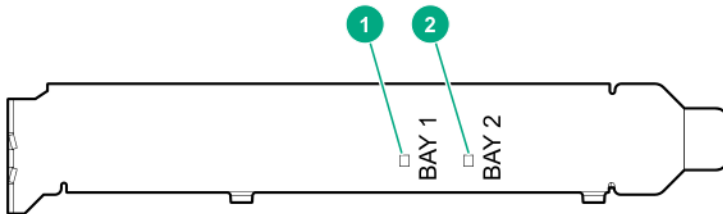
Item	Description	Fault LED status
1	Bay 1 LED	Off: Normal
2	Bay 2 LED	Flashing 1Hz: Drive predictive failure
		Amber: Drive failure

Fan bay numbering

Fans 5 and 6 are preinstalled in the chassis while fans 1–4 are preinstalled in the fan cage option.
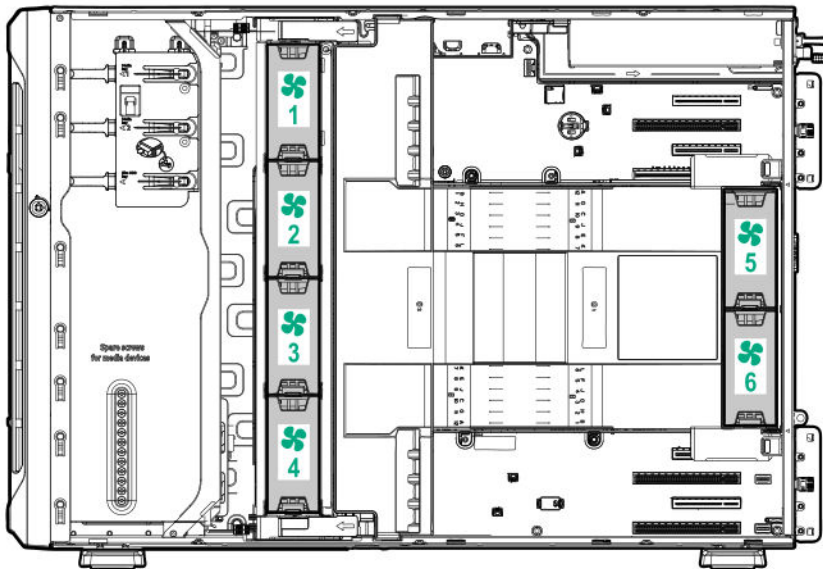
Media device screws

There are 12 T-15 Torx screws on the server chassis. These screws are provided as spare screws for installing media devices.
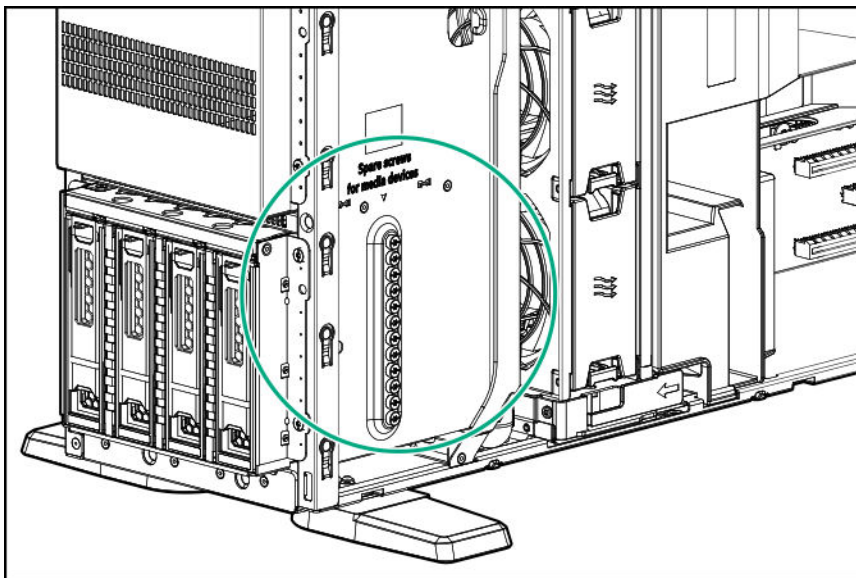
Expansion board screws

There are T-15 Torx screws located on the underside of the PCI blank retainer. These are screws for installing PCIe standup plug-in expansion board options.
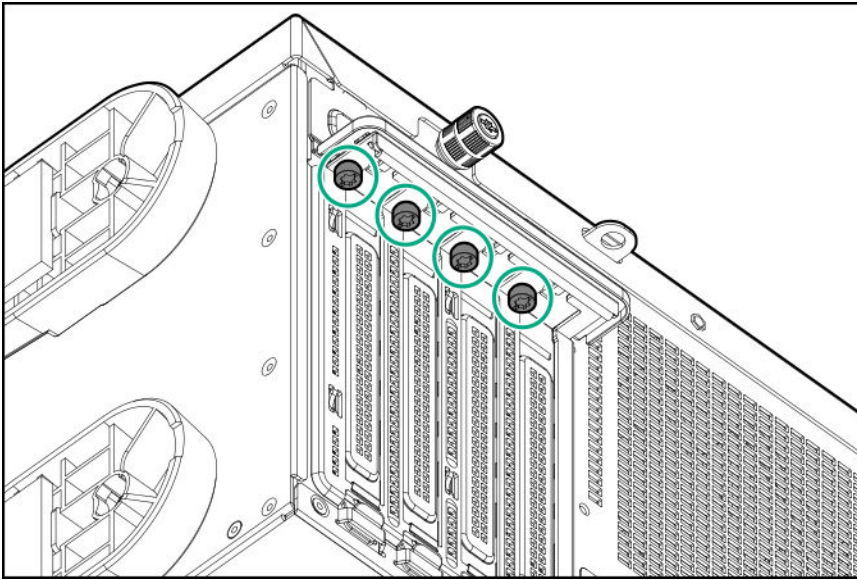
Operations

This chapter describes the hardware operations carried out prior to and after installing or removing a hardware option, or performing a server maintenance or troubleshooting procedure.

Before performing these hardware operations, review and observe the server warnings and cautions.

Power up the server

To power up the server, use one of the following methods:

- Press the Power On/Standby button.

- Use the virtual power button through iLO.

Power down the server

Before powering down the server for any upgrade or maintenance procedures, perform a backup of critical server data and programs.

（ⓘ） **IMPORTANT:** When the server is in standby mode, auxiliary power is still being provided to the system.

To power down the server, use one of the following methods:

- Press and release the Power On/Standby button.

  This method initiates a controlled shutdown of applications and the OS before the server enters standby mode.

- Press and hold the Power On/Standby button for more than 4 seconds to force the server to enter standby mode.

  This method forces the server to enter standby mode without properly exiting applications and the OS. If an application stops responding, you can use this method to force a shutdown.

- Use a virtual power button selection through iLO 5.

  This method initiates a controlled remote shutdown of applications and the OS before the server enters standby mode.

Before proceeding, verify that the server is in standby mode by observing that the system power LED is amber.

Unlock the front bezel

While pressing the key against the lock, rotate the key to the unlock position.
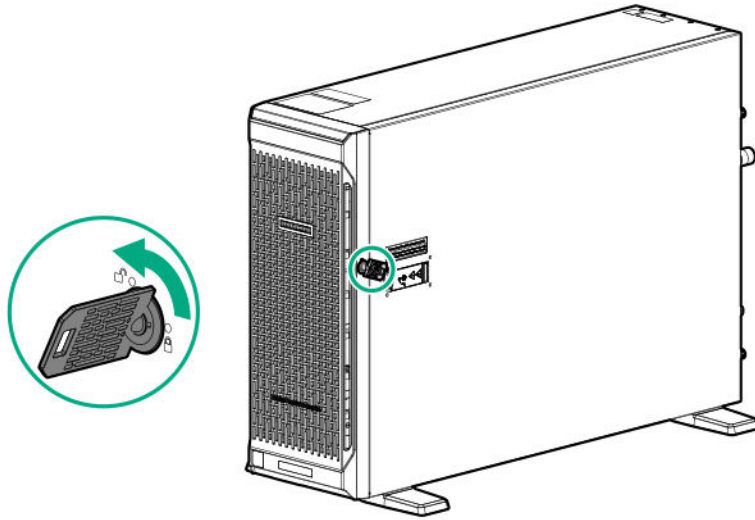
Open the front bezel

Procedure

1. **Unlock the front bezel**.

2. Open the front bezel.
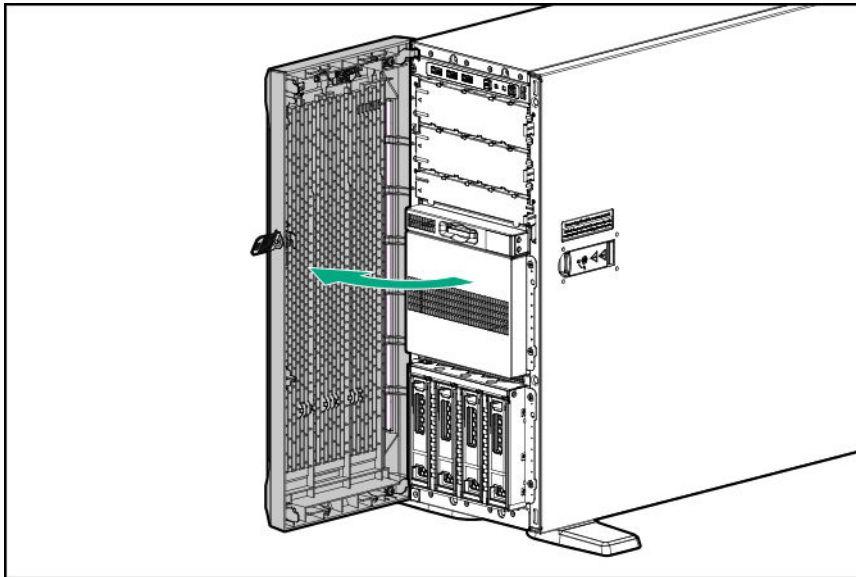
Remove the front bezel

Procedure

1. **<u>Unlock the front bezel</u>**.

2. **<u>Open the front bezel</u>**.

3. Release the bezel hinges from the chassis.
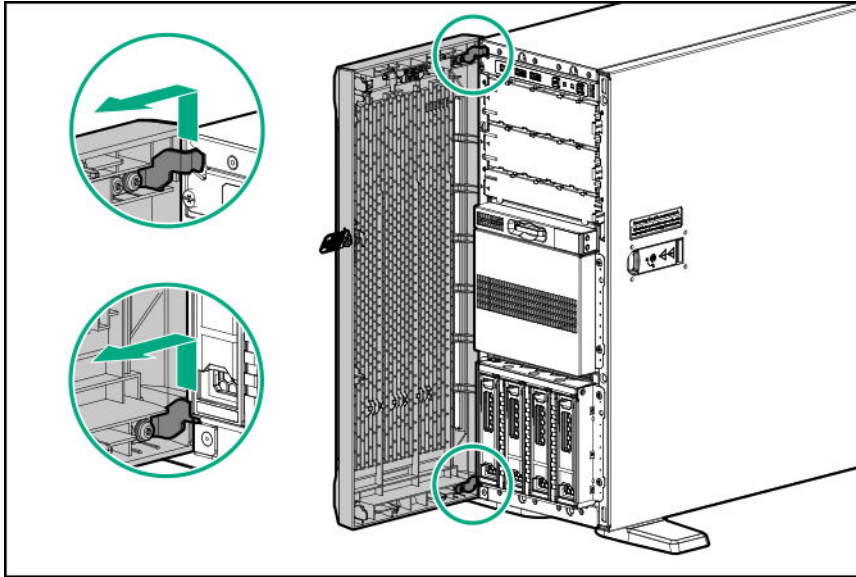
Install the front bezel

Procedure

1. Attach the front bezel hinges to the chassis.

2. Close the front bezel.

3. While pressing the key against the lock, rotate the key to the lock position.
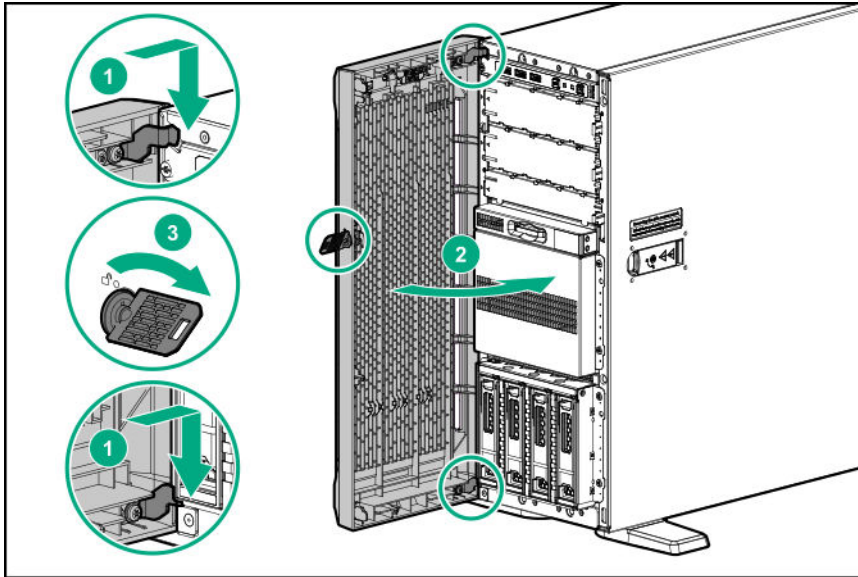
Store the front bezel keys

Two front bezel keys shipped with the server. You can keep these keys in either of these locations:

Procedure

- Store the front bezel key inside the front bezel.
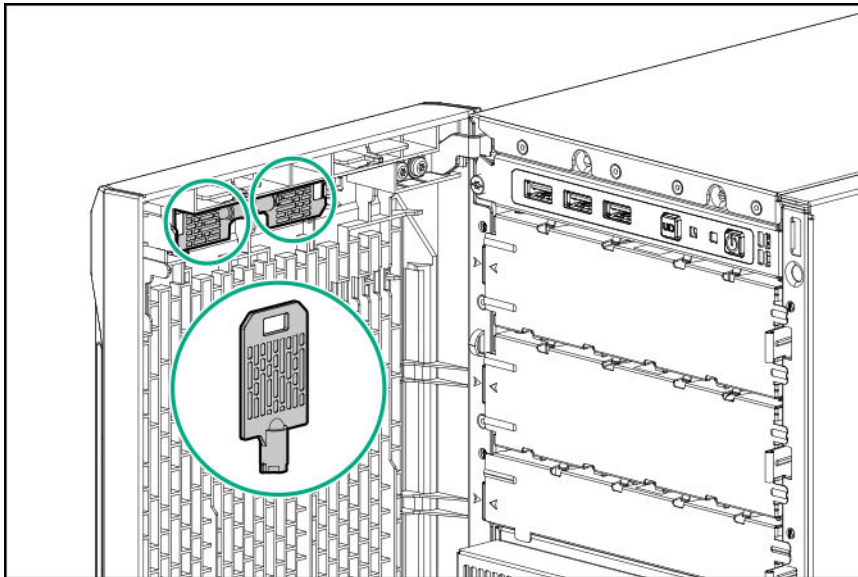
- Hang the front bezel key from the padlock eye on the rear panel.
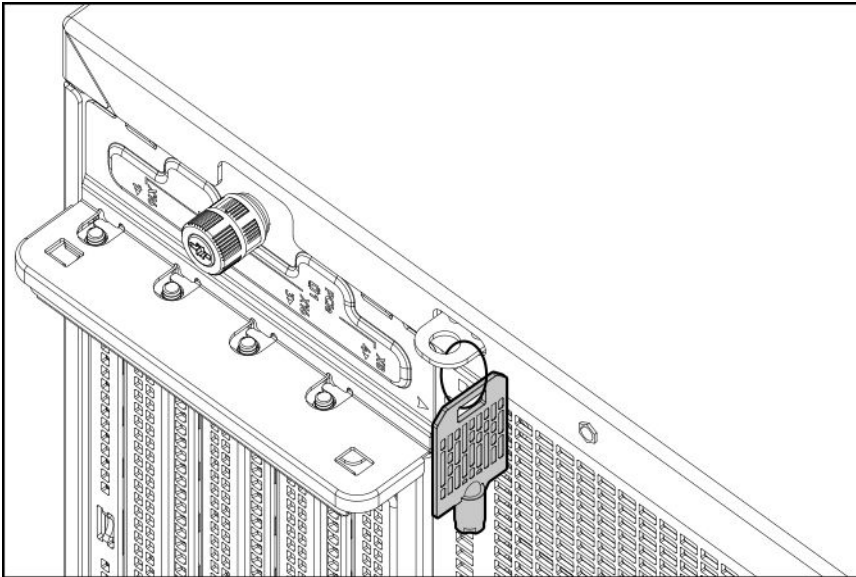
Position the tower server for hardware configuration

Procedure

1. Rotate the chassis feet inward.
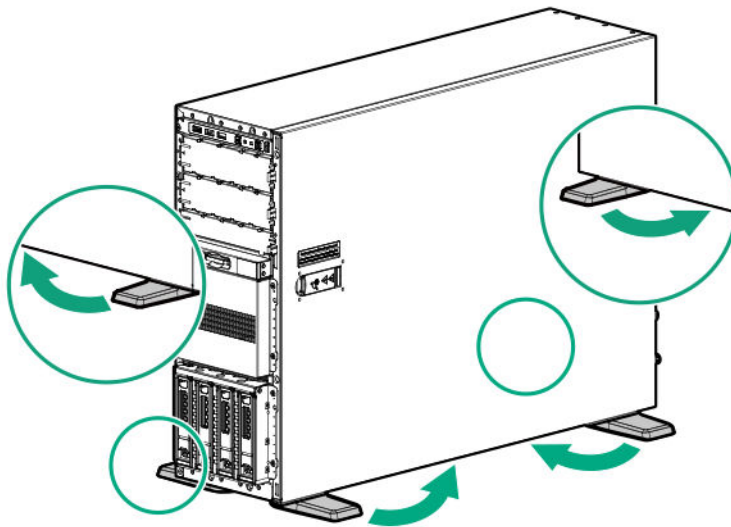
2. Place the server on a flat, level surface with the access panel facing up.
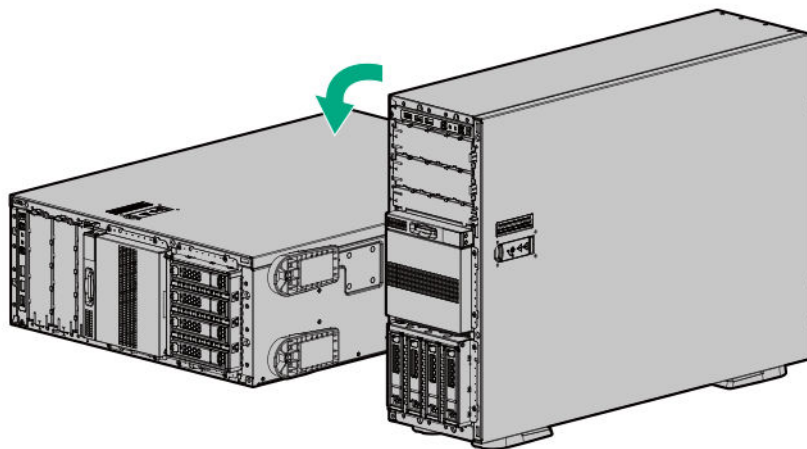
Position the tower server for operation

Procedure

1. Return the server to an upright position.

2. Rotate the chassis feet outward to stabilize the server.
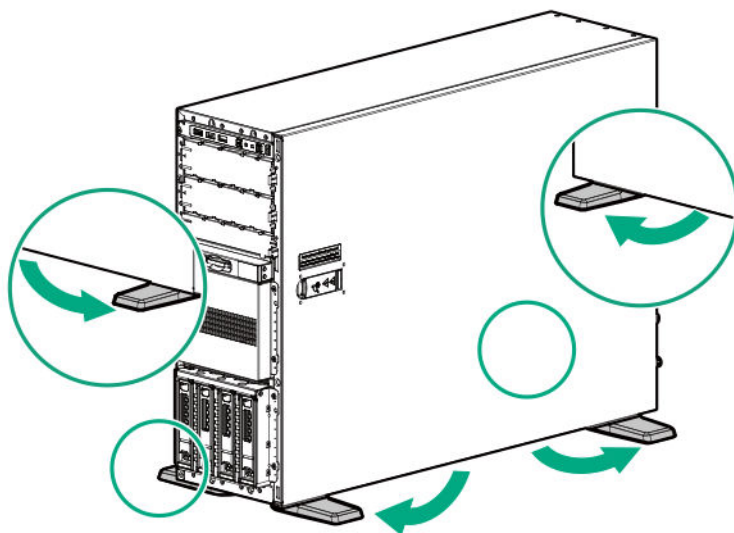
Extend the server from the rack

Procedure

1. If the rear panel cables are not secured by a cable management arm, do the following:

    a. **Power down the server**.

If you are physically powering down the server, **open the front bezel to access the power button**. Close the bezel after the server is powered down.

   b. Disconnect all peripheral cables from the server.

   c. Disconnect each power cord from the server.

> ⚠ **WARNING:** To reduce the risk of personal injury or equipment damage, be sure that the rack is adequately stabilized before extending a component from the rack.

2. Slide the server tray out of the rack:

   a. Loosen the server tray thumbscrews.

   b. Grasp the tray notch to slide the server out of the rack.
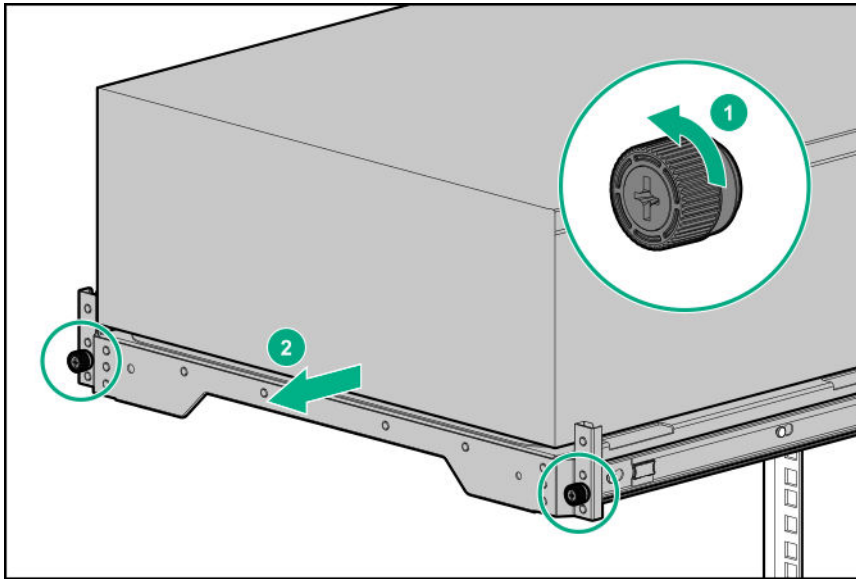
> ⚠ **WARNING:** To reduce the risk of personal injury, be careful when pressing the server rail-release latches and sliding the server into the rack. The sliding rails could pinch your fingers.

3. After performing the installation or maintenance procedure, slide the server tray into the rack:

   a. Press and hold the blue release latches on both rails, and then slide the server tray back into the rack.
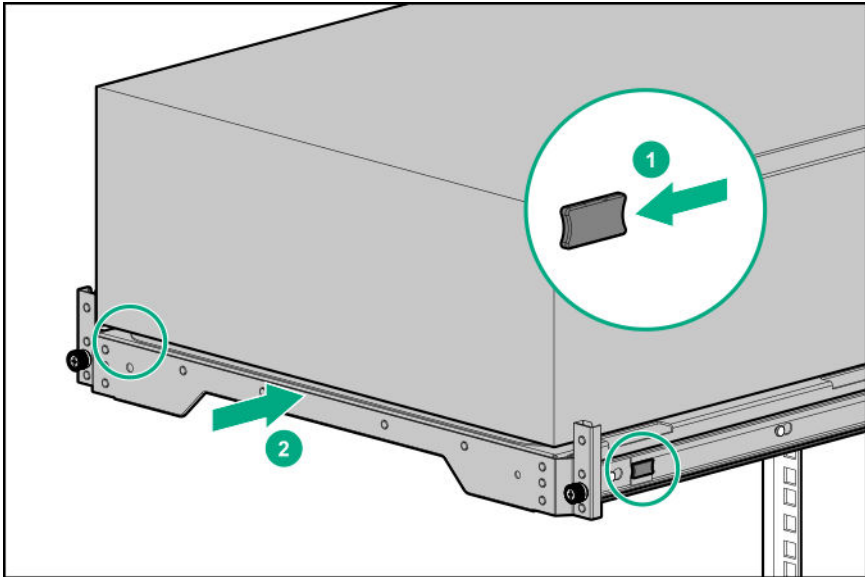
b. Tighten the server tray thumbscrews.
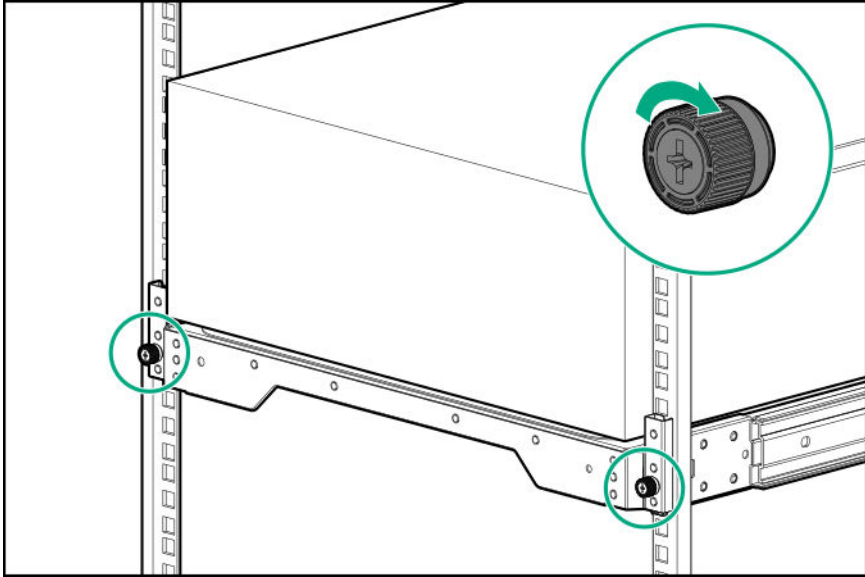
4. If the rear panel cables were disconnected because a cable management arm is not in use, do the following:

    a. Connect each power cord to the server.

    b. Connect all peripheral cables to the server.

    c. **Power up the server**.

Remove the server from the rack

⚠️ **WARNING:** This server is heavy. To reduce the risk of personal injury or damage to the equipment:

- 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. Hewlett Packard Enterprise recommends that a minimum of two people are required for all rack server installations. A third person may be required to help align the server if the server is installed higher than chest level.

- Use caution when installing the server in or removing the server from the rack; it is unstable when not fastened to the rails.

Prerequisites

Before you perform this procedure, make sure that you have a T-15 Torx screwdriver available.

Procedure

1. **Power down the server**.

2. Remove all power:

   a. Disconnect each power cord from the power source.

   b. Disconnect each power cord from the server.

3. Disconnect all peripheral cables from the server.

4. If installed, unlock and remove the security padlock and/or the Kensington security lock.

   For more information, see the lock documentation.

5. Slide the server tray out of the rack:

   a. Loosen the server tray thumbscrews.

   b. Grasp the tray notch to slide the server out of the rack.
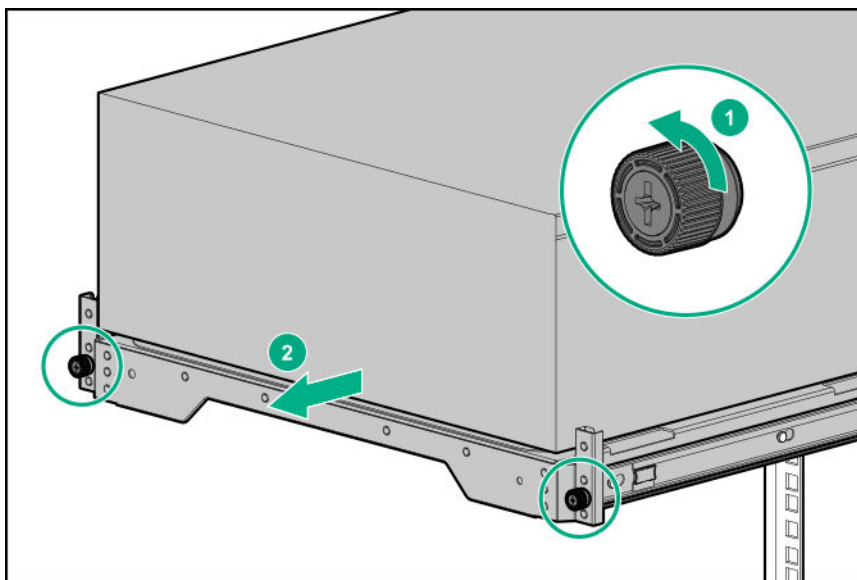
6. Remove the chassis rear bracket screws.
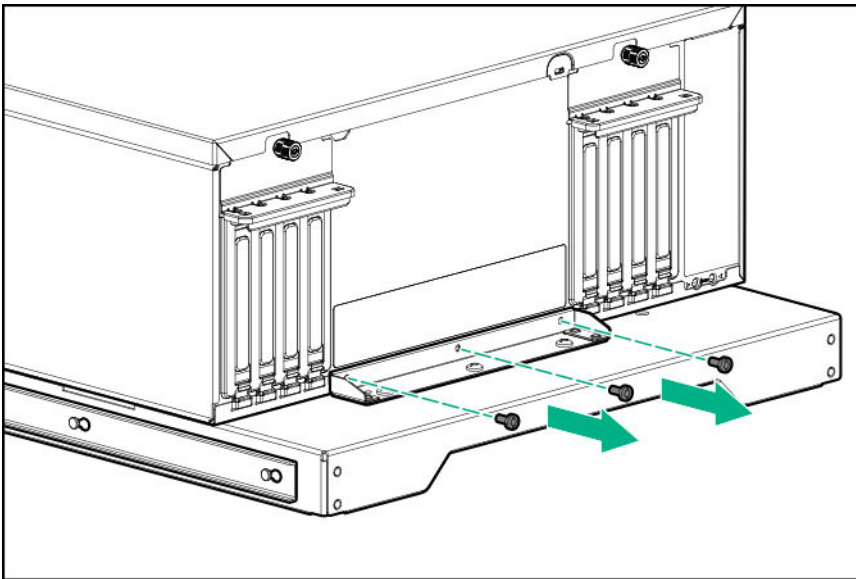
7. Remove the server from the tray.
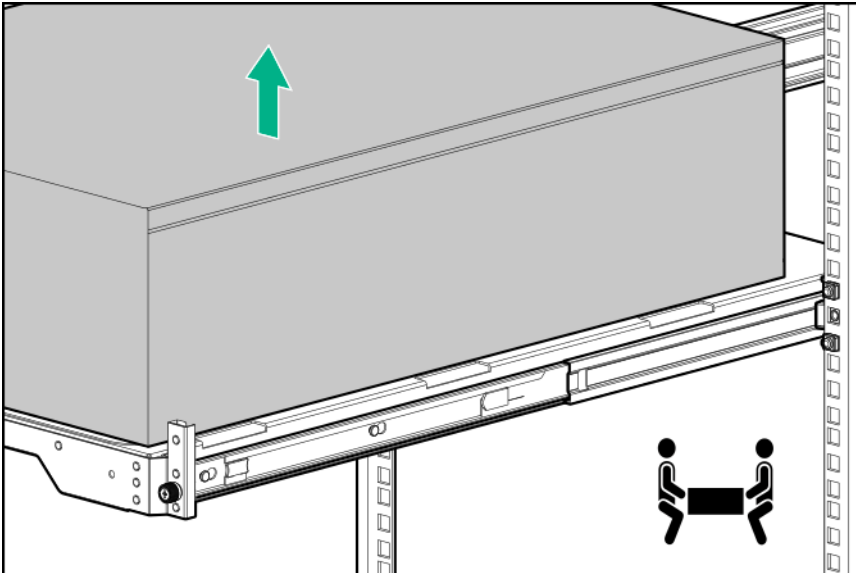
8. Place the server on a flat, level surface with access panel facing up.

Slide the server into the rack

Procedure

1. Press and hold the blue release latches on both rails, and then slide the server tray back into the rack.
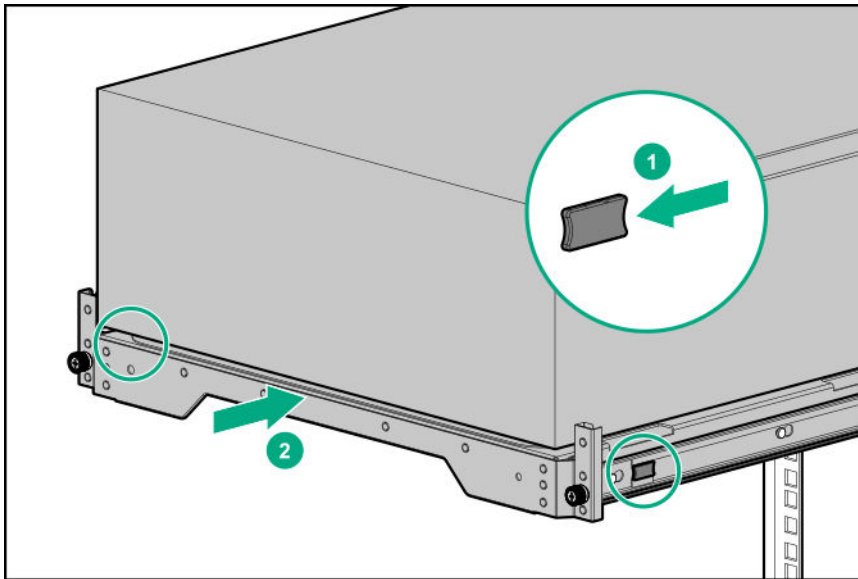
2. Tighten the server tray thumbscrews.
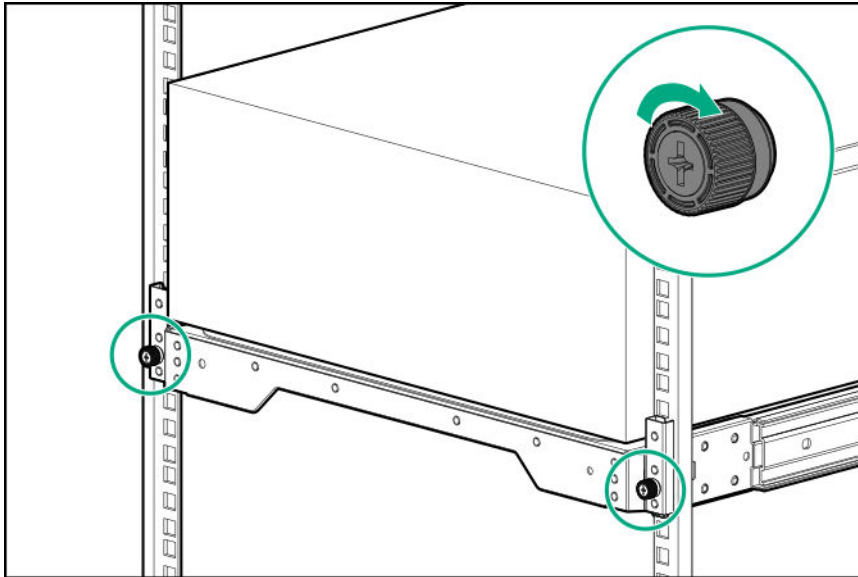
Remove the access panel

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

⚠️ **CAUTION:** To prevent damage to electrical components, take the appropriate anti-static precautions before beginning any installation, removal, or replacement procedure. Improper grounding can cause electrostatic discharge.

⚠️ **CAUTION:** Do not operate the server for long periods with the access panel open or removed. Operating the server in this manner results in improper airflow and improper cooling that can lead to thermal damage.

Prerequisites

Before you perform this procedure, make sure that you have a T-15 Torx screwdriver available.

Procedure

1. **Remove the front bezel**.

2. **Power down the server**.

3. If you are removing the access panel as part of a non-hot-plug installation or maintenance procedure, remove all power from the server:

   a. Disconnect each power cord from the power source.

   b. Disconnect each power cord from the server.

   c. Disconnect all peripheral cables from the server.

4. If installed, unlock and remove the security padlock and/or the Kensington security lock.

   For more information, see the lock documentation.

5. If the front bezel key is hanging from the padlock eye, remove the key.

6. Do one of the following:

   • Server in tower mode: **Position the tower server for hardware configuration**.

   • Server in rack mode: **Extend the server from the rack**.

7. Remove the access panel:

   a. If necessary, unlock the access panel latch.

   b. Press the release button and pull up the latch to disengage the access panel from the chassis.

   c. Lift up the rear side of the access panel to remove the panel from the chassis.
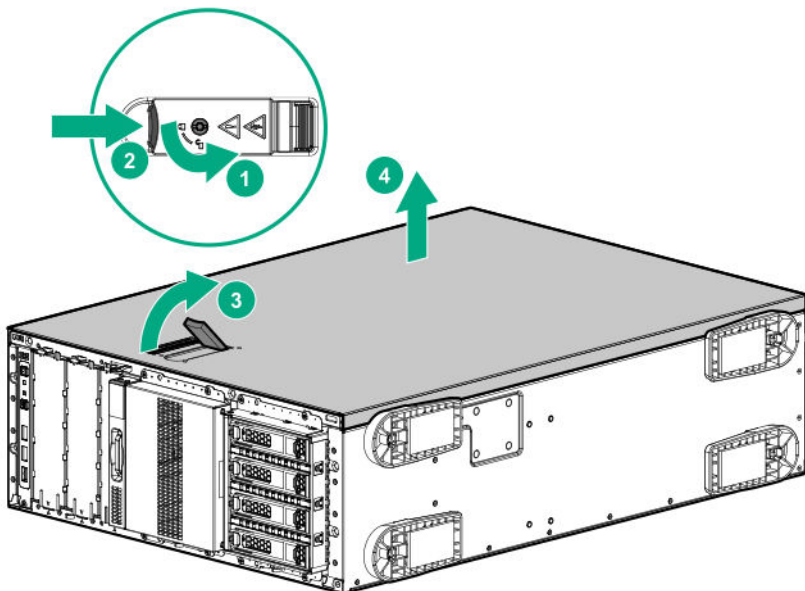
Install the access panel

Prerequisites

Before you perform this procedure, make sure that you have a T-15 Torx screwdriver available.

Procedure

1. With the access panel latch open, insert the guide pin on the chassis through the hole on the latch.

2. Close the access panel latch.

   The access panel slides to a closed position.

3. Lock the access panel latch.
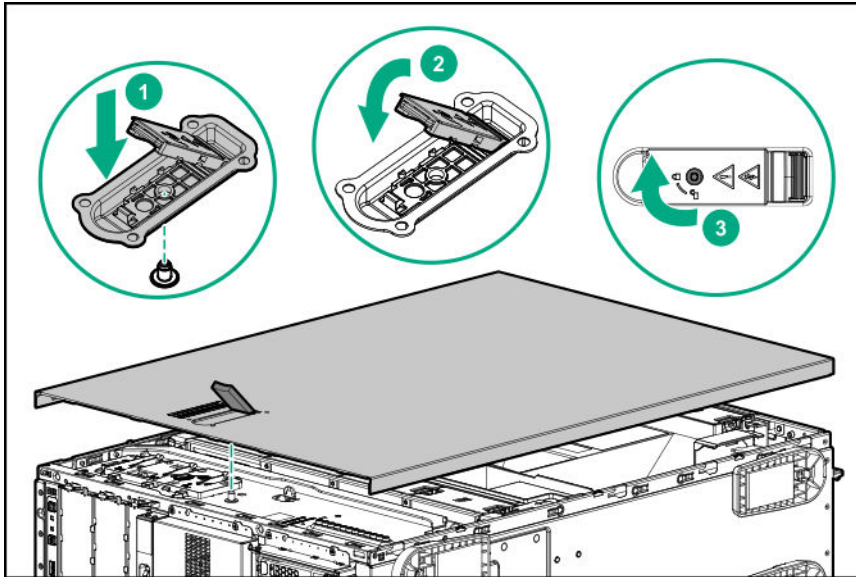
4. Perform the post-installation or maintenance steps required by the procedure that required the removal of the access panel.

Remove the air baffle

⚠ **CAUTION:** For proper cooling, do not operate the server without the access panel, baffles, expansion slot covers, or blanks installed. If the server supports hot-plug components, minimize the amount of time the access panel is open.

Procedure

1. **Remove the front bezel**.

2. **Power down the server**.

3. Remove all power:

   a. Disconnect each power cord from the power source.

   b. Disconnect each power cord from the server.

4. Disconnect all peripheral cables from the server.

5. Do one of the following:

- Server in tower mode: **Position the tower server for hardware configuration**.

- Server in rack mode: **Extend the server from the rack**.

6. **Remove the access panel**.

7. While pressing the blue air baffle latches, lift up the baffle from the chassis.
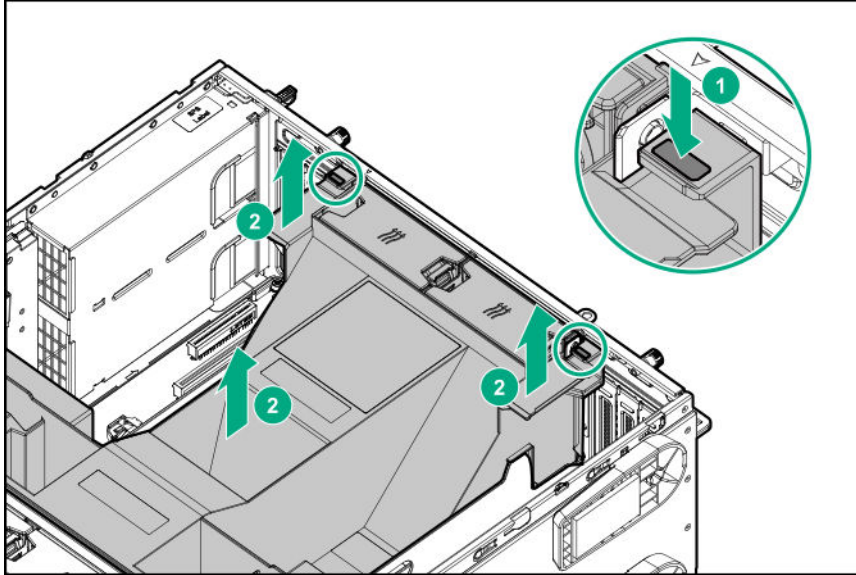
Install the air baffle

△ **CAUTION:** For proper cooling, do not operate the server without the access panel, baffles, expansion slot covers, or blanks installed. If the server supports hot-plug components, minimize the amount of time the access panel is open.

Procedure

1. Observe the alignment dash lines shown in the following image to install the air baffle on the chassis.
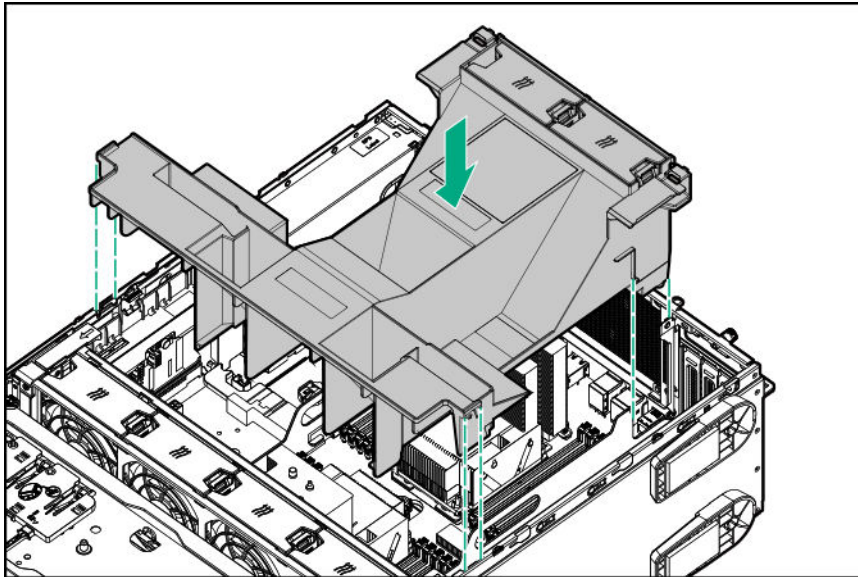
2. Press down the air baffle and make sure that the tabs on the blue latches are engaged in their chassis slots.
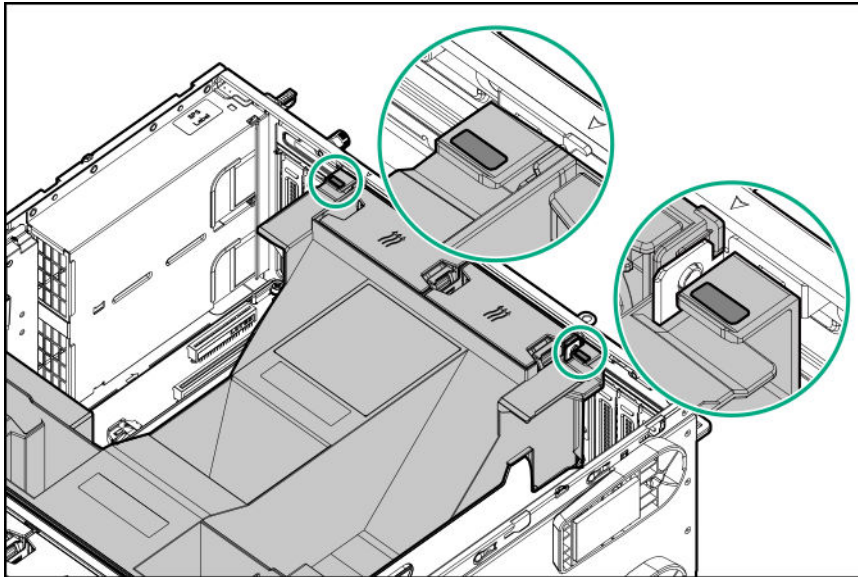
3. **Install the access panel**.

4. Perform the post-installation/maintenance steps required by the procedure that required the removal of the air baffle.

Remove the fan cage

Procedure

1. **Remove the front bezel**.

2. **Power down the server**.

3. Remove all power:

    a. Disconnect each power cord from the power source.

    b. Disconnect each power cord from the server.

4. Disconnect all peripheral cables from the server.

5. Do one of the following:

- Server in tower mode: **Position the tower server for hardware configuration**.

- Server in rack mode: **Extend the server from the rack**.

6. **Remove the access panel**.

7. Remove the fan cage:

    a. Open the blue latches to a 90° angle.

    b. Use the latches to pull up the fan cage out of the chassis.
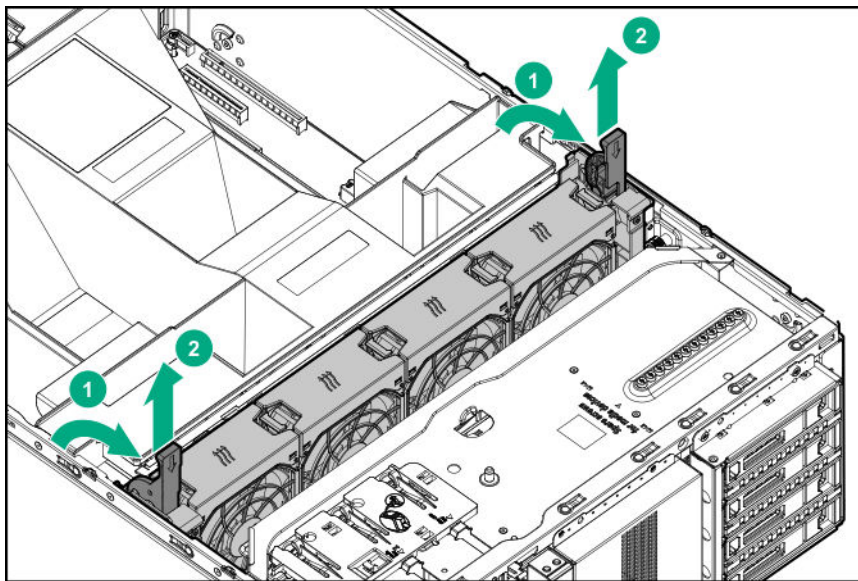
Install the fan cage

Procedure

1. **Observe the guidelines for managing cables**.

2. Make sure that all the system cables that are routed through the front cable channel are properly secured in the metal cable tabs. This is done to prevent system damage due to cables being inadvertently caught under the fan cage.
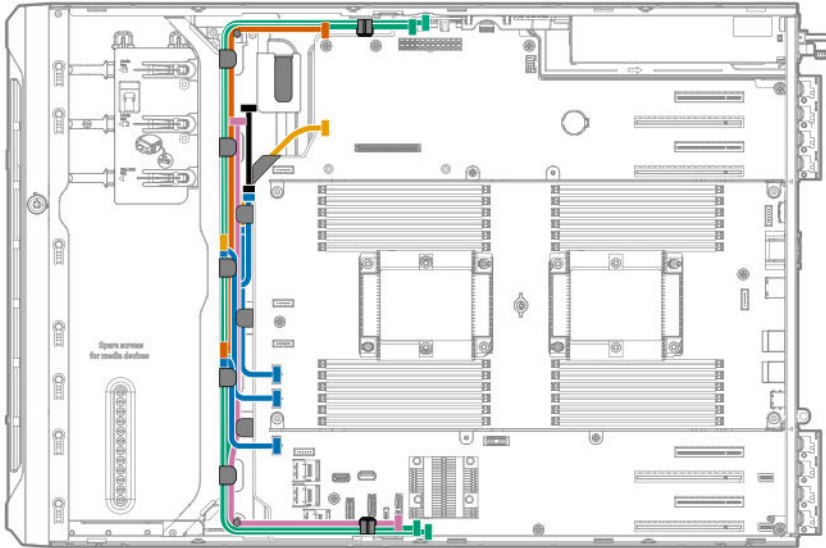
3. Install the fan cage:

   a. Align the fan cage with its chassis brackets.

   b. Close the latches until they click into place.
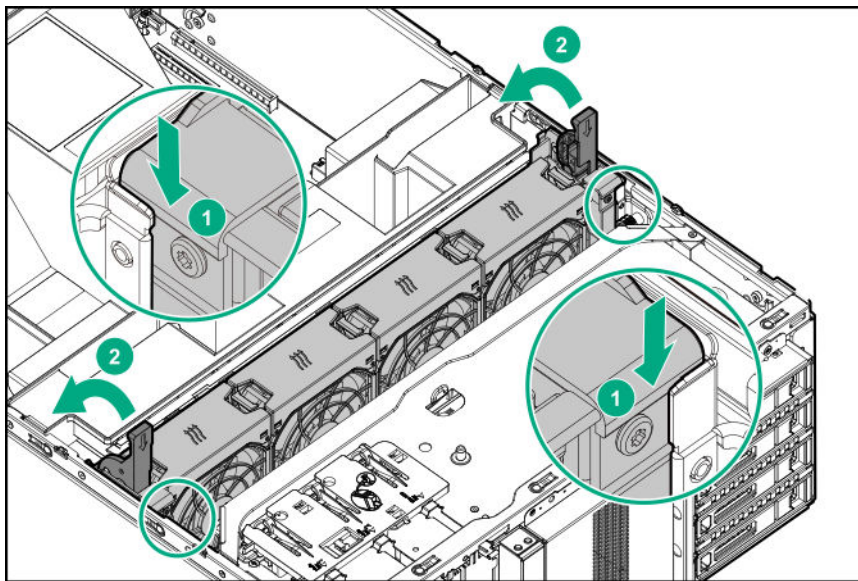
4. Perform the post-installation/maintenance steps required by the procedure that required the removal of the fan cage.

Remove the half-height media bay blank

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

Procedure

While pressing the latch on the media bay blank, pull out the blank from the bay.

Retain the blank for future use.
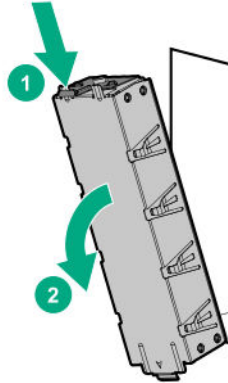
Remove the PCI blank retainer

Procedure

1. Perform the pre-installation steps required by the standup plug-in board installation.

2. Remove the PCI blank retainer:

   a. Loosen the retainer thumbscrew.

   b. Slide the retainer up, then remove it from the chassis.
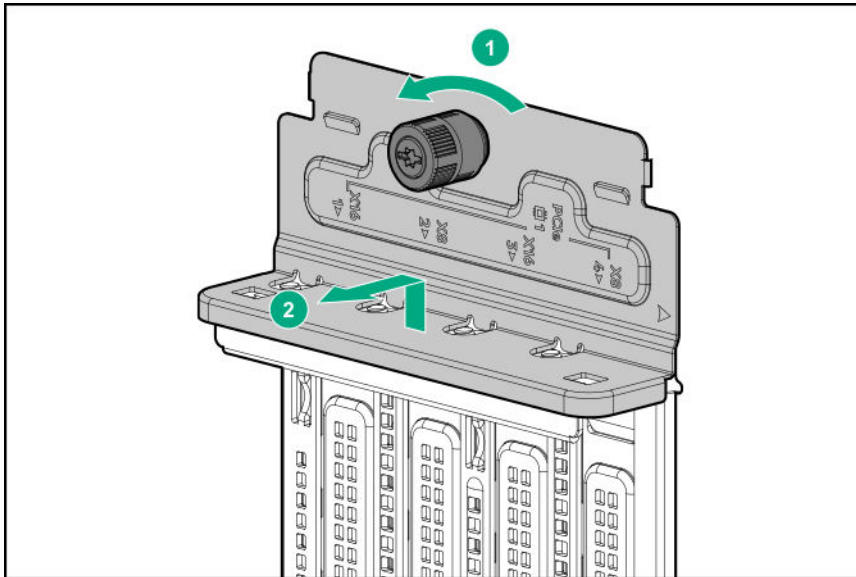
Remove the PCI slot blank

⚠ **CAUTION:** To prevent improper cooling and thermal damage, do not operate the server unless all PCI slots have either an expansion slot cover or an expansion board installed.

Procedure

1. **Remove the PCI blank retainer**.

2. Identify the expansion slot compatible with the option.

3. Pull up the blank opposite the selected expansion slot.
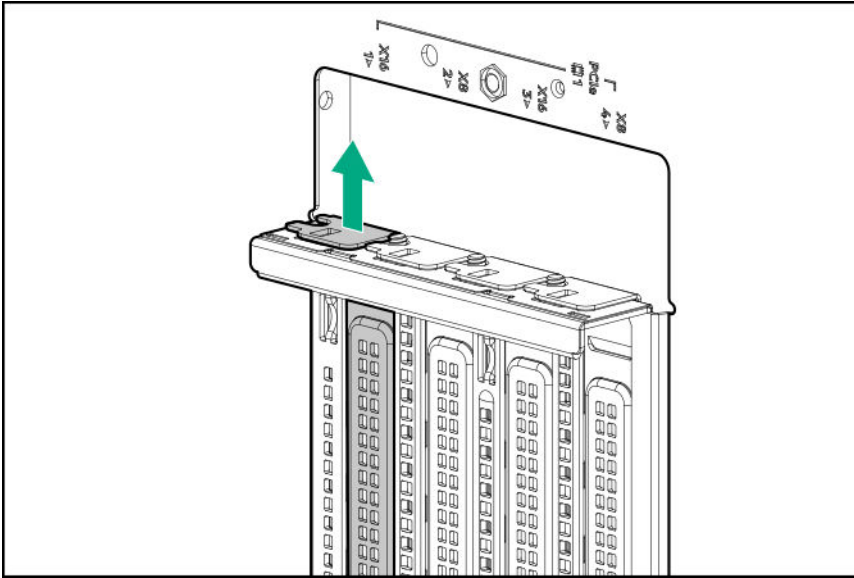
Remove a PCI board screw

Prerequisites

Before you perform this procedure, make sure that you have a T-15 Torx screwdriver available.

Procedure

If the standup plug-in board option kit does not include a screw for installation, remove one of the preinstalled T-15 Torx screws underneath the PCI blank retainer deck.
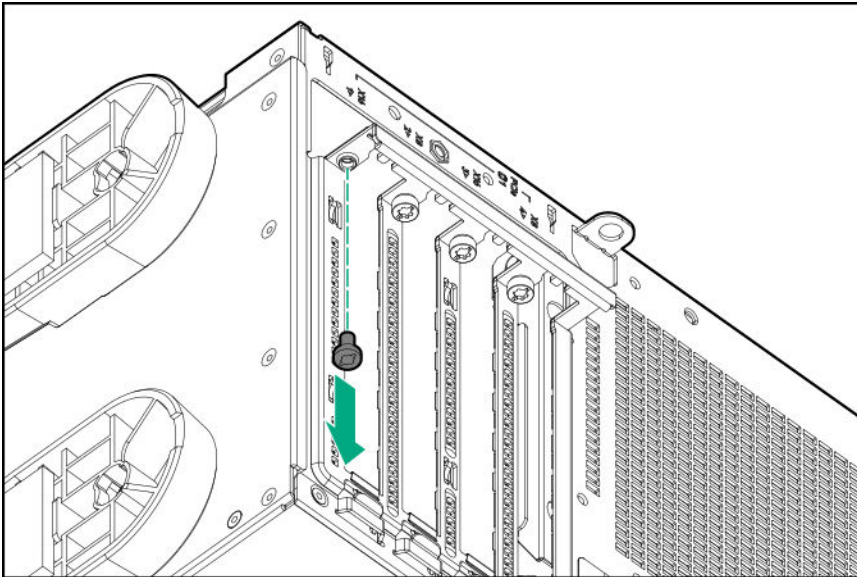
Install the PCI blank retainer

Procedure

1. Install the PCI blank retainer:

   a. Insert the tabs on the top edge of the retainer into the corresponding slots on the chassis.

   b. Slide down the retainer until the horizontal part is flushed against the top side of the slot blanks.
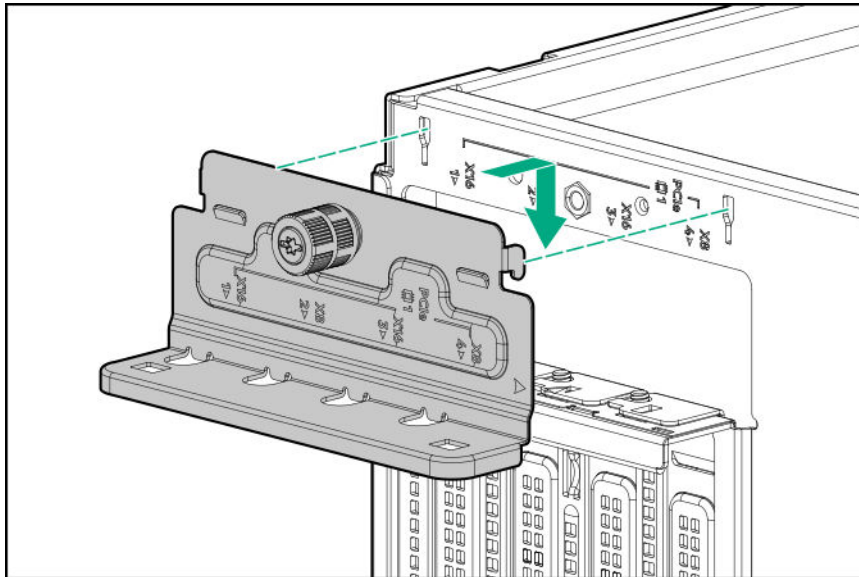
2. Tighten the retainer thumbscrew.
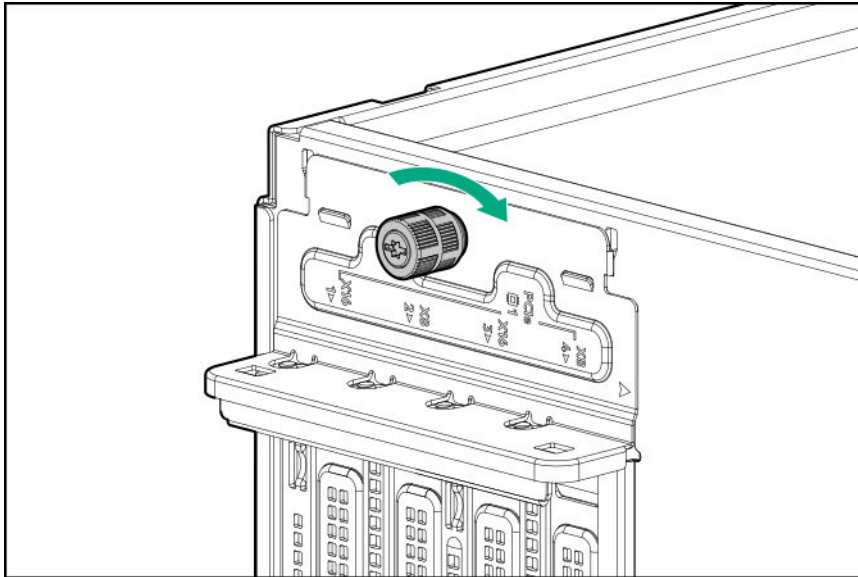
3. Perform the post-installation steps required by the standup plug-in board installation/removal.

Open the CMA cable clamps

Procedure

To secure or release the rear panel cables from the CMA, open the cable clamps.
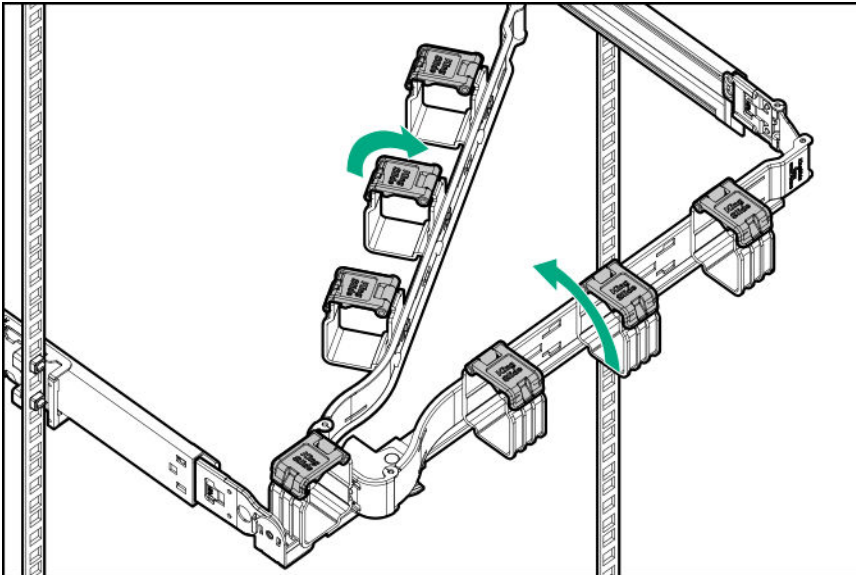
Install the shipping hardware

If you intend to transport or ship a rack-mounted server to a new location, make sure that the shipping hardware is installed. The shipping hardware protects the server from vibration damage that might occur during server shipment.

Prerequisites

Before you perform this procedure, make sure that you have the following items available:

- Shipping hardware from the tower-to-rack conversion kit:
  - Shipping brackets (2)
  - Shipping bracket screws (4)
  - M5 square-hole cage nuts (4)
  - Rear shipping screws (2)
- Cage nut insertion tool
- T-25 Torx screwdriver
- Phillips No. 2 screwdriver

Procedure

1. **Open the front bezel**.

2. **Power down the server**.

3. Remove all power:

   a. Disconnect each power cord from the power source.

   b. Disconnect each power cord from the server.

4. Disconnect all peripheral cables from the server.

5. Close the front bezel.

6. With the server installed in the rack, hold the shipping bracket against the rack column and note the correct mounting locations for both the brackets and the cage nuts as shown in the following image.
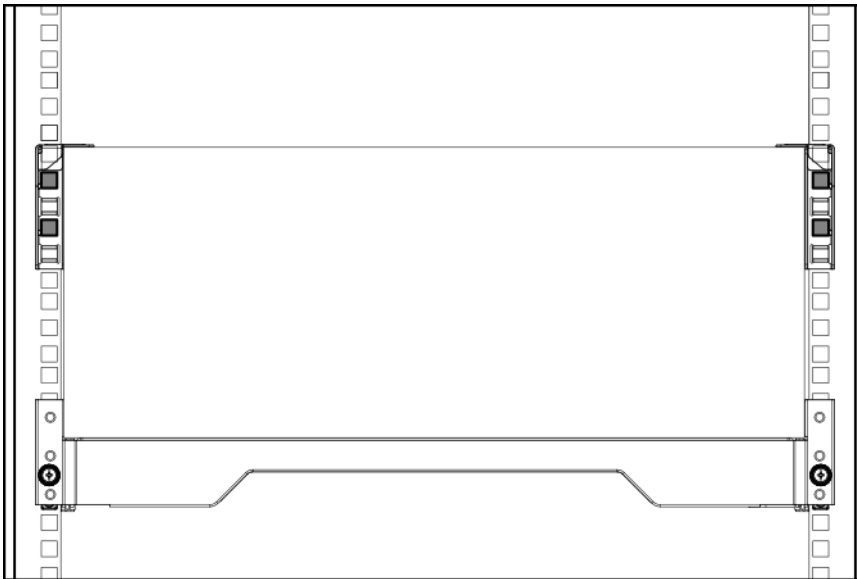

7. Slide the server tray out of the rack:

   a. Loosen the server tray thumbscrews.

   b. Grasp the tray notch to slide the server out of the rack.
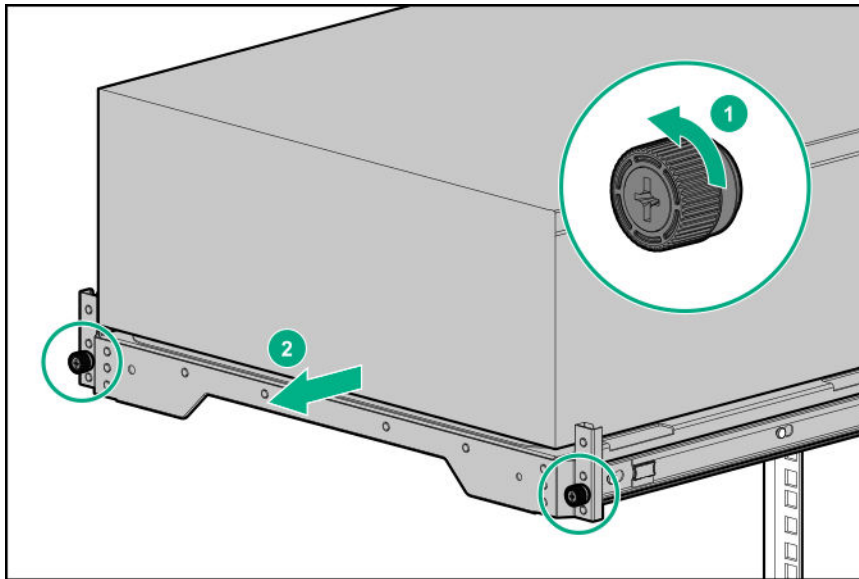
8. If you are installing the server in a square-hole rack, install the cage nuts. When installed, the flanges on the cage nut should face the outside of the rack:

   a. Hook the bottom flange of the cage nut in the rack hole.

   b. Insert the tip of the insertion tool through the hole and hook the top flange of the cage nut.

   c. Use the insertion tool to pull the cage nut through the hole until the top flange snaps into position.
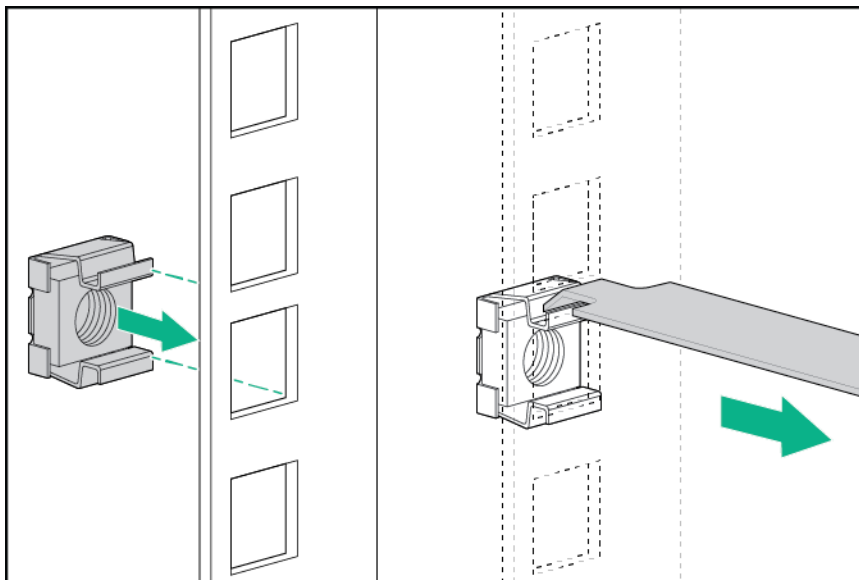
9. Secure the front end of rack rails to the rack columns with the shipping brackets.
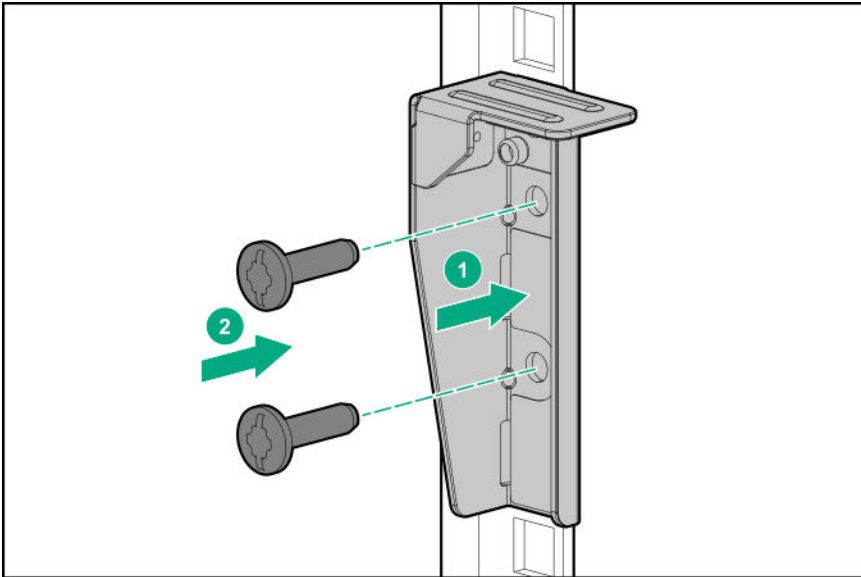
10. Secure the rear end of rack rails to the rack columns with the rear shipping screws.
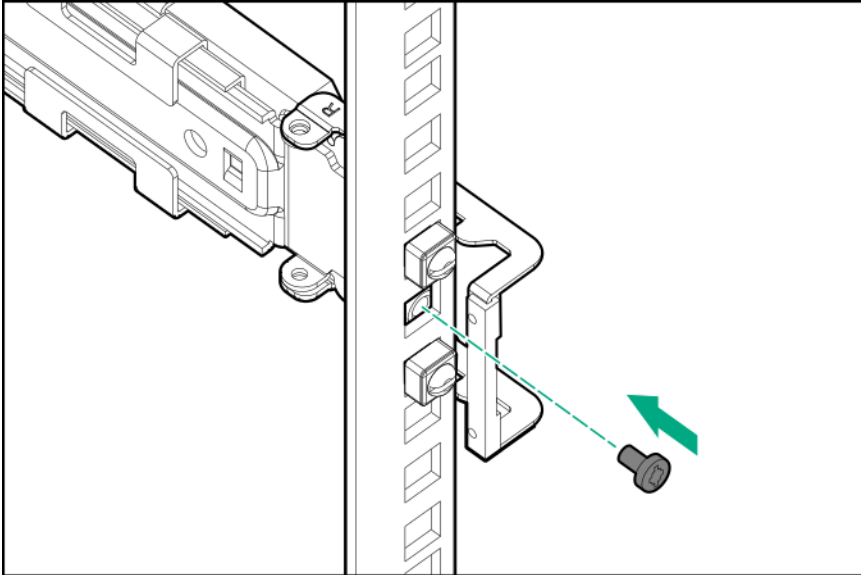
Setup

Optional service

Delivered by experienced, certified engineers, Hewlett Packard Enterprise support services help you keep your servers up and running with support packages tailored specifically for HPE ProLiant systems. Hewlett Packard Enterprise support services let you integrate both hardware and software support into a single package. A number of service level options are available to meet your business and IT needs.

Hewlett Packard Enterprise support services offer upgraded service levels to expand the standard product warranty with easy-to-buy, easy-to-use support packages that will help you make the most of your server investments. Some of the Hewlett Packard Enterprise support services for hardware, software or both are:

- Foundation Care – Keep systems running.
  - 6-Hour Call-to-Repair[1]
  - 4-Hour 24x7
  - Next Business Day

- Proactive Care – Help prevent service incidents and get you to technical experts when there is one.
  - 6-Hour Call-to-Repair[1]
  - 4-Hour 24x7
  - Next Business Day

- Deployment service for both hardware and software

- Hewlett Packard Enterprise Education Services – Help train your IT staff.

[1]The time commitment for this repair service might vary depending on the geographical region of site. For more service information available in your site, contact your local **Hewlett Packard Enterprise support center**.

For more information on Hewlett Packard Enterprise support services, see the **Hewlett Packard Enterprise website**.

Initial server installation

Depending on the user technical expertise and the complexity of the product, for the initial server installation, the user can choose to:

- **Order the HPE Installation Service**.

- **Perform the initial server setup procedure**.

HPE Installation Service

HPE Installation Service provides basic installation of Hewlett Packard Enterprise branded equipment, software products, as well as HPE-supported products from other vendors that are sold by HPE or by HPE authorized resellers. The Installation Service is part of a suite of HPE deployment services that are designed to give users the peace of mind that comes from knowing that their HPE and HPE-supported products have been installed by an HPE specialist.

The HPE Installation Service provides the following benefits:

- Installation by an HPE authorized technical specialist.

- Verification prior to installation that all service prerequisites are met.

- Delivery of the service at a mutually scheduled time convenient to your organization.

- Allows your IT resources to stay focused on their core tasks and priorities.

- Full coverage during the warranty period for products that require installation by an HPE authorized technical specialist.

For more information on the features, limitations, provisions, and ordering information of the HPE Installation Service, see this Hewlett Packard Enterprise website:

https://www.hpe.com/support/installation-service

Setting up the server

Prerequisites
Before setting up the server:

- Download the latest SPP:

  https://www.hpe.com/servers/spp/download

  Support validation required

- Verify that your OS or virtualization software is supported:

  https://www.hpe.com/info/ossupport

- Read the HPE UEFI requirements for ProLiant servers on the HPE website:

  https://www.hpe.com/info/ProLiantUEFI/docs

  If the UEFI requirements are not met, you might experience boot failures or other errors when installing the operating system.

- Obtain the storage driver if needed:

  ◦ Download it from the HPE Support Center website:

    https://www.hpe.com/support/hpesc

  ◦ Extract it from the SPP.

- Read the operational requirements for the server:

  Operational requirements

- Read the safety and compliance information:

  https://www.hpe.com/support/safety-compliance-enterpriseproducts

- If the tower-to-rack conversion kit is used, read the rack warnings and cautions:

  Rack warnings and cautions

Procedure

Unbox the server

1. Unbox the server and verify the contents:

- Server

- Chassis feet (4)

- Power cord

- Rack-mounting hardware (optional)

- Documentation

The server does not ship with OS media. All system software and firmware is preloaded on the server.

Install the hardware options

2. (Optional) Install hardware options. For installation instructions, see **Hardware options installation**.

Orient the server and connect the peripherals

3. Select the server orientation:

- **Tower orientation**

- Rack orientation

  ○ If the server was shipped with the tower-to-rack conversion kit, **install this hardware option**.

  ○ If the server was shipped in a rack, **remove the shipping brackets**.

4. Decide how to manage the server:

- Locally: Use a KVM switch or a connect a keyboard, monitor, and mouse.

- Remotely: Connect to the iLO web interface and run a remote console:

  a. Verify the following:

  ○ iLO is licensed to use the remote console feature.

    If iLO is not licensed, visit the HPE website:

    https://www.hpe.com/info/ilo

  ○ The iLO management port is connected to a secure network.

  b. Using a browser, navigate to the iLO web interface, and then log in.

    `https://<iLO hostname or IP address>`

    Note the following:

  ○ The iLO hostname is located on the serial number/iLO information pull tab.

  ○ If a DHCP server assigns the IP address, the IP address appears on the boot screen.

  ○ If a static IP address is assigned, use that IP address.

  ○ The default login credentials are located on the serial number/iLO information pull tab.

  c. In the side navigation, click the **Remote Console & Media** link, and then launch a remote console.

Power on the server

5. Press the Power On/Standby button.

For remote management, use the iLO virtual power button.

6. Using the SPP, **update the following**:

   - System ROM

   - Storage controller

   - Network controller

   - Intelligent Provisioning

Set up the storage

7. Set up the storage. Do one of the following:

   - To configure the server to boot from a SAN, see the following guide:

     https://www.hpe.com/info/boot-from-san-config-guide

   - If an HPE Smart Array controller is installed:
     ◦ For SR controllers, use the HPE Smart Storage Administrator to create arrays:

       a. From the boot screen, press **F10** to run Intelligent Provisioning.

       b. From Intelligent Provisioning, run **HPE Smart Storage Administrator**.

     ◦ For MR controllers, use the Smart Array Configuration utility within the UEFI System Utilities to create arrays. For more information, see the *HPE Smart Array P824i-p MR Gen10 User Guide*:

       https://www.hpe.com/info/P824i-p-docs

       Intelligent Provisioning and Smart Storage Administrator does not support Smart Array MR controller configuration.

       ⊙ **IMPORTANT:** Before you install an OS on drives connected to the HPE Smart Array P824i-p MR Gen10 Controller, configure the drives using **UEFI System Utilities (F9)**. If the drives are not configured, the OS will not detect the drives during installation. For more information, see *HPE Smart Array P824i-p MR Gen10 User Guide* at the Hewlett Packard Enterprise website **https://www.hpe.com/info/P824i-p-docs**.

   - If no controller option is installed, do one of the following:
     ◦ AHCI is enabled by default. You can deploy an OS or virtualization software.

     ◦ Disable AHCI, enable software RAID, and then create an array:

       a. From the boot screen, press **F9** to run UEFI System Utilities.

       b. From the UEFI System Utilities screen, select **System Configurations** > **BIOS/Platform Configuration (RBSU)** > **Storage Options** > **SATA Controller Options** > **Embedded SATA Configuration** > **Smart Array SW RAID Support**.

       c. Enable **Smart Array SW RAID Support**.

       d. Save the configuration and reboot the server.

       e. Create an array:

    I. From the boot screen, press **F9** to run UEFI System Utilities.

    II. From the UEFI System Utilities screen, select **System Configuration** > **Embedded Storage: HPE Smart Storage S100i SR Gen10** > **Array Configuration** > **Create Array**.

Deploy an OS or virtualization software

8. Deploy an OS or virtualization software. Do one of the following:

- Press **F10** at the POST screen.

    For Intelligent Provisioning 3.30 and later, you are prompted to select whether you want to enter the Intelligent Provisioning or HPE Rapid Setup Software. After you have selected a mode, you must reprovision the server to change the mode that launches when you boot to **F10**.

- Manually deploy an OS:

    a. Insert the installation media.

      For remote management, click **Virtual Drives** in the iLO remote console to mount images, drivers, or files to a virtual folder. If a storage driver is required to install the OS, use the virtual folder to store the driver.

    b. Press **F11** at boot screen to select the boot device.

    c. After the OS installed, **update the drivers**.

Register the server

9. To experience quick service and efficient support, register the server:

  https://myenterpriselicense.hpe.com

Operational requirements

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 system in a well-ventilated, climate-controlled environment.

The maximum recommended ambient operating temperature (TMRA) for most server products is 35°C (95°F). The temperature in the room where the rack is located must not exceed 35°C (95°F).

⚠ **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.

Power requirements

Installation of this equipment must comply with local and regional electrical regulations governing the installation of information technology 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 uninterruptible power supply. This device protects the hardware from damage caused by power surges and voltage spikes and keeps the system in operation during a power failure.

Electrical grounding requirements

The server must be grounded properly for proper operation and safety. In the United States, you must install the equipment in accordance with NFPA 70, National Electric Code Article 250, as well as any local and regional building codes. In Canada, you must install the equipment in accordance with Canadian Standards Association, CSA C22.1, Canadian Electrical Code. In all other countries, you must install the equipment in accordance with any regional or national electrical wiring codes, such as the International Electrotechnical Commission (IEC) Code 364, parts 1 through 7.

Furthermore, you must be sure that all power distribution devices used in the installation, such as branch wiring and receptacles, are listed or certified grounding-type devices.

Because of the high ground-leakage currents associated with multiple servers connected to the same power source, Hewlett Packard Enterprise recommends the use of a PDU that is either permanently wired to the building's branch circuit or includes a nondetachable cord that is wired to an industrial-style plug. NEMA locking-style plugs or those complying with IEC 60309 are considered suitable for this purpose. Using common power outlet strips for the server is not recommended.

Rack warnings and cautions

⚠ **WARNING:** When all components are removed, the server weighs 21 kg (46.30 lb). When all components are installed, the server can weigh up to 41 kg (90.39 lb).

Before configuring your rack solution, be sure to check the rack manufacturer weight limits and specifications. Failure to do so can result in physical injury or damage to the equipment and the facility.

⚠ **WARNING:** The server is 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. The server weighs more than 21 kg (46.30 lb), so at least two people must lift the server into the rack together. An additional person may be required to help align the server if the server is installed higher than chest level.

- Use caution when installing the server in or removing the server from the rack.

- Adequately stabilized the rack before extending a component outside the rack. Extend only one component at a time. A rack may become unstable if more than one component is extended.

- Do not stack anything on top of rail-mounted component 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, observe the following precautions:

- The leveling jacks are extended to the floor.

- The full weight of the rack rests on the leveling jacks.

- The stabilizing feet are attached to the rack if it is a single-rack installation.

- The racks are coupled together in multiple-rack installations.

⚠ **WARNING:** To reduce the risk of personal injury or equipment damage when unloading a rack:

- At least two people are needed to safely unload the rack from the pallet. An empty 42U rack can weigh as much as 115 kg (253 lb), can stand more than 2.1 m (7 ft) tall, and might become unstable when being moved on its casters.

- Never stand in front of the rack when it is rolling down the ramp from the pallet. Always handle the rack from both sides.

⚠ **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:** Before installing the server in a 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 server.

- Be sure sufficient clearance exists for cabling, installation and removal of the server, and movement of the rack doors.

ⓘ **IMPORTANT:** The HPE ProLiant ML350 Gen10 Server cable management arm is not supported on Compaq-branded 7000 series racks.

Server warnings and cautions

⚠ **WARNING:** To reduce the risk of personal injury, electric shock, or damage to the equipment, disconnect the power cord to remove power from the server. Pressing the Power On/Standby button does not shut off system power completely. Portions of the power supply and some internal circuitry remain active until AC power is removed.

⚠ **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 fire or burns after removing the energy pack:

- Do not disassemble, crush, or puncture the energy pack.

- Do not short external contacts.

- Do not dispose of the energy pack in fire or water.

After power is disconnected, battery voltage might still be present for 1s to 160s.

AVERTISSEMENT: Pour réduire les risques d'incendie ou de brûlures après le retrait du module batterie :

- N'essayez pas de démonter, d'écraser ou de percer le module batterie.

- Ne court-circuitez pas ses contacts externes.

- Ne jetez pas le module batterie dans le feu ou dans l'eau.

Après avoir déconnecté l'alimentation, une tension peut subsister dans la batterie durant 1 à 160 secondes.

⚠ **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.

⚠ **CAUTION:** To prevent damage to electrical components, properly ground the server before beginning any installation, removal, or replacement procedure. Improper grounding can cause **electrostatic discharge**.

⚠ **CAUTION:** To avoid data loss, Hewlett Packard Enterprise recommends that you back up all server data before installing or removing a hardware option, or performing a server maintenance or troubleshooting procedure.

CAUTION: Do not operate the server for long periods with the access panel open or removed. Operating the server in this manner results in improper airflow and improper cooling that can lead to thermal damage.

Electrostatic discharge

Be aware of the precautions you must follow when setting up the system or handling components. 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 system or component.

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. 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 ±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.

Setting up the server in tower mode

Procedure

1. Rotate the chassis feet outward to stabilize the server.
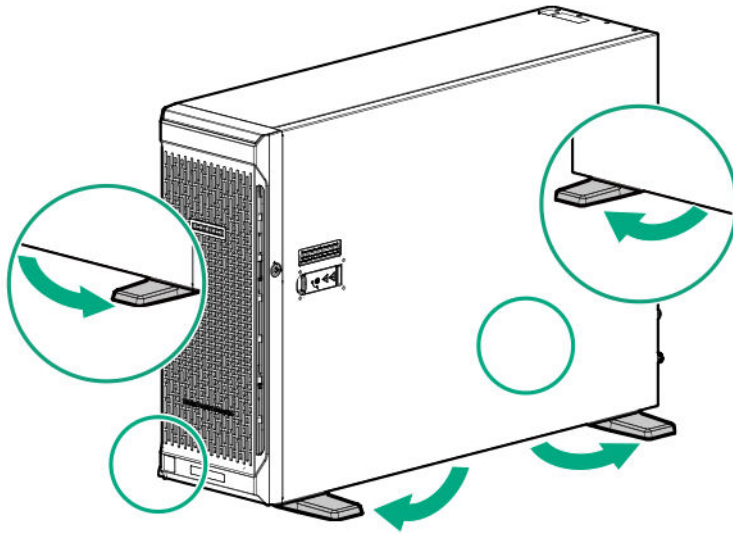
> ⚠️ **WARNING:** To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into RJ-45 connectors.

2. **Connect peripheral devices to the server.**

> ⚠️ **WARNING:** To reduce the risk of electric shock or damage to the equipment:
>
> - Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
>
> - Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
>
> - Unplug the power cord from the power supply to disconnect power to the equipment.
>
> - Do not route the power cord where it can be walked on or pinched by items placed against it. Pay particular attention to the plug, electrical outlet, and the point where the cord extends from the server.

3. Connect each power cord to the server.

4. Connect each power cord to the power source.

Removing the shipping brackets

A server shipped in a rack is secured by shipping brackets. To allow the server tray to be extended out of the rack during normal server operation, remove these shipping brackets.

Prerequisites

Before you perform this procedure, make sure that you have a T-25 Torx screwdriver available.

Procedure

1. Remove the screws securing the shipping bracket.

2. Remove the shipping bracket from the front rack column.
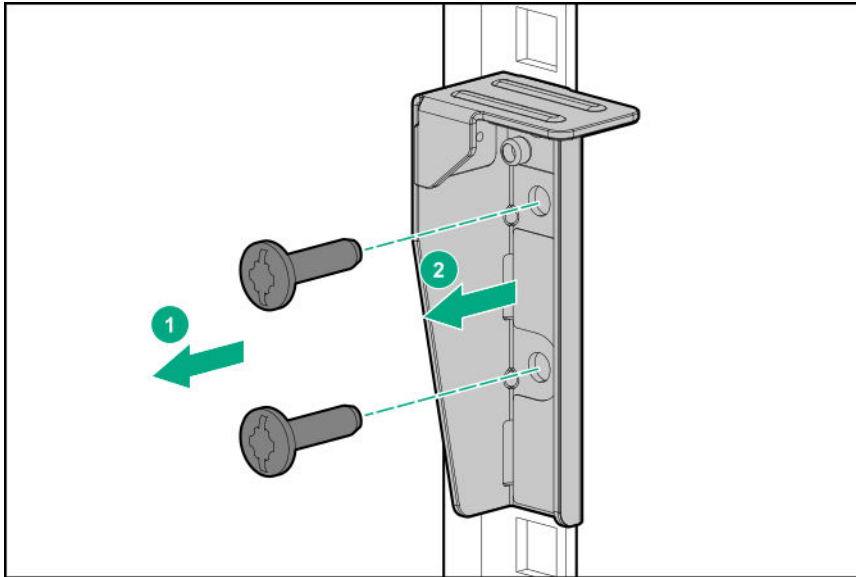
3. Repeat steps 1–2 to remove the bracket from the other opposite rack column.

   Retain the shipping brackets and screws in case there is a need to ship or transport the rack-mounted server at a later date.

POST screen options

When the server is powered on, the POST screen is displayed. The following options are displayed:

- **System Utilities** (**F9**)

  Use this option to configure the system BIOS.

- **Intelligent Provisioning** (**F10**)

  Use this option to deploy an operating system or configure storage.

- Boot menu (**F11**)

  Use this option to make a one-time boot selection.

- Network boot (**F12**)

  Use this option to boot the server from the network.

Installing or deploying an operating system

Before installing an operating system, observe the following:

- Be sure to read the HPE UEFI requirements for ProLiant servers on the **Hewlett Packard Enterprise website**. If UEFI requirements are not met, you might experience boot failures or other errors when installing the operating system.

- Update firmware before using the server for the first time, unless software or components require an older version. For more information, see **Keeping the system current**.

- For the latest information on supported operating systems, see the **Hewlett Packard Enterprise website**.

- The server does not ship with OS media. All system software and firmware is preloaded on the server.

Hardware options installation

This chapter provides detailed instructions on how to install hardware options.

For more information on supported options, see the product QuickSpecs on the HPE ProLiant ML350 Gen10 Server website at:

https://www.hpe.com/servers/ml350-gen10

To view the warranty for your server and supported options, see **Warranty information**.

Introduction

Install any hardware options before initializing the server. If multiple options are being installed, read the installation instructions for all the hardware options to identify similar steps and streamline the installation process.

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

> ⚠ **CAUTION:** To prevent damage to electrical components, properly ground the server before beginning any installation procedure. Improper grounding can cause electrostatic discharge.

Drive options

Drive support information

Depending on the drive cage option installed, the server supports the following drive types:

- Non-hot-plug LFF SATA drives

- Hot-plug LFF SATA or SAS drives

- Hot-plug SFF SATA or SAS drives (using the Smart Carrier)

- Hot-plug NVMe SSDs (using the Smart Carrier NVMe)

This server supports mixed LFF + SFF hot-plug drive configurations.

The embedded HPE Smart Array S100i SR Gen10 Controller supports SATA drive installation. For SAS support, install a Smart Array Gen10 type-a or type-p controller option.

Drive guidelines

Observe the following general guidelines:

- The system automatically sets all drive numbers.

  > ⚠ **CAUTION:** When a server is purchased without any drive installed, some drive bays might be empty while other drive bays might be populated with drive blanks.
  >
  > To maintain proper system cooling, do not operate the server without a drive or a drive blank installed.

- If only one drive is used, install it in the bay with the lowest drive number.

For drive numbering, see **Drive bay numbering**.

- The NVMe SSD is a PCIe bus device. Devices attached to a PCIe bus cannot be removed without allowing the device and bus to complete and cease the signal/traffic flow.

  Do not remove an NVMe SSD from the drive bay while the Do not remove LED is flashing. The Do not remove LED flashes to indicate that the device is still in use. Removal of the NVMe SSD before the device has completed and ceased signal/traffic flow can cause loss of data.

- Drives with the same capacity provide the greatest storage space efficiency when grouped into the same drive array.

Installing an LFF non-hot-plug drive

Prerequisites

Before you perform this procedure:

- **Make sure that the LFF non-hot-plug drive cage is available**.

- Make sure that you have the following items available:

  - LFF non-hot-plug drive option
  - T-15 Torx screwdriver

Procedure

1. **Remove the front bezel**.

2. **Power down the server**.

3. Remove all power:

   a. Disconnect each power cord from the power source.

   b. Disconnect each power cord from the server.

4. Disconnect all peripheral cables from the server.

5. Do one of the following:

   - Server in tower mode: **Position the tower server for hardware configuration**.

   - Server in rack mode: **Extend the server from the rack**.

6. **Remove the access panel**.

7. **Remove the air baffle**.

8. If installed, **remove the fan cage**.

9. If the LFF non-hot-plug drive cage is already installed, do the following:

   a. If there are drives already installed in the cage, disconnect the SATA-power split cable from the drives.

   b. Remove the drive cage.
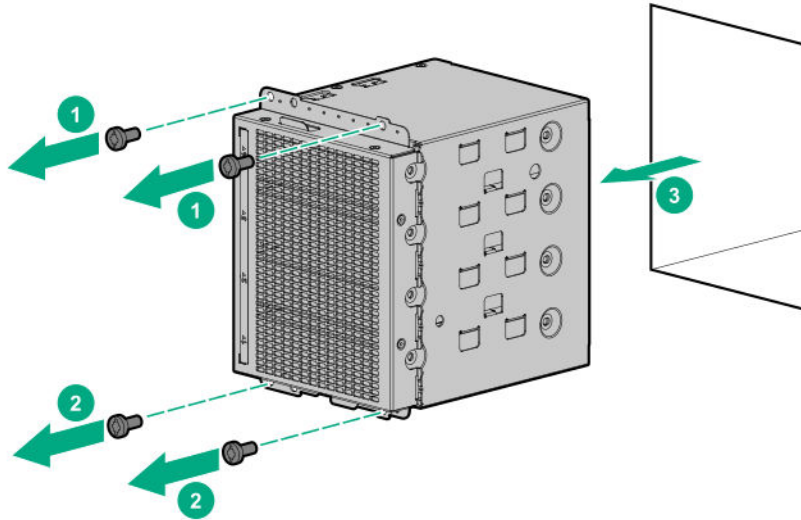
10. Remove the spare screws from the drive cage.

11. Install the drive.
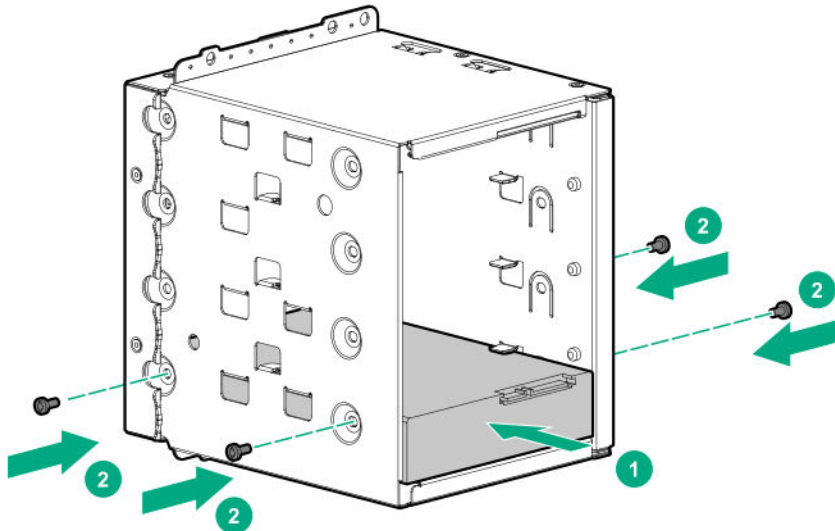
12. **Install the drive cage**.

13. **Observe the guidelines for managing cables**.

14. **Connect the drive SATA-power split cable to the drives and system board**.

15. If the fan cage was removed, do the following:

    a. Make sure that all the system cables that are routed through the front cable channel are properly secured in the metal cable tabs. This is done to prevent system damage due to cables being inadvertently caught under the fan cage.

    b. **Install the fan cage**.

16. **Install the air baffle**.

17. **Install the access panel**.

18. Do one of the following:

- Server in tower mode: **Position the tower server for operation**.

- Server in rack mode: **Slide the server into the rack**.

19. Connect all peripheral cables to the server.

20. Connect each power cord to the server.

21. Connect each power cord to the power source.

22. **Power up the server**.

23. **Install the front bezel**.

The installation is complete.

To configure arrays, see the *HPE Smart Array SR Gen10 Configuration Guide* at the **Hewlett Packard Enterprise website**.

Installing an LFF hot-plug drive

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

Prerequisites
Before you perform this procedure:

- **Make sure that the LFF hot-plug drive cage is installed**.

- Make sure that the LFF hot-plug drive option is available.

Procedure

1. **Open the front bezel**.

2. Remove the drive blank.

3. Prepare the drive.

4. Install the drive.

5. **Determine the status of the drive from the drive LED definitions**.

6. Close the front bezel.

The installation is complete.

To configure arrays, see the *HPE Smart Array SR Gen10 Configuration Guide* at the **Hewlett Packard Enterprise website**.

Installing an SFF hot-plug drive

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

Prerequisites
Before you perform this procedure:

- **Make sure that the SFF hot-plug drive cage is installed**.

- Make sure that the SFF hot-plug drive option is available.

- If you are installing SFF SAS drives with 10K or 15K rpm rate, **make sure that the fan cage is installed**.

Procedure

1. **Open the front bezel**.
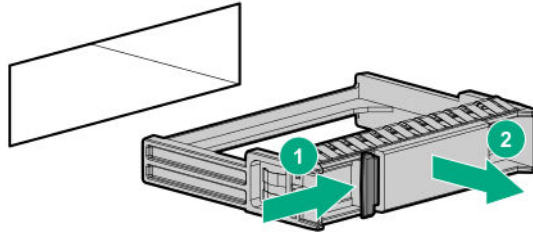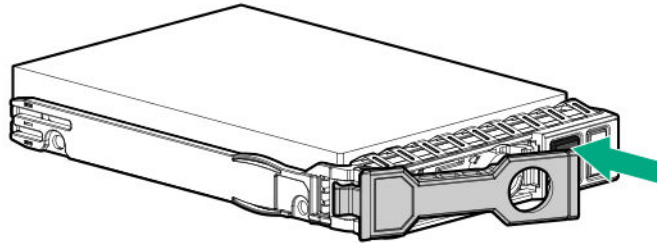
2. Remove the drive blank.

3. Prepare the drive.
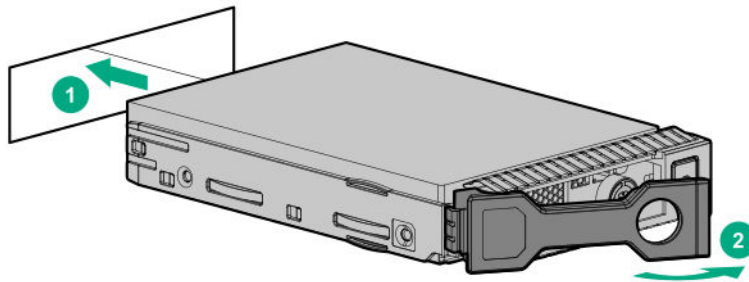
4. Install the drive.

5. **Determine the status of the drive from the drive LED definitions**.

6. Close the front bezel.

The installation is complete.

To configure arrays, see the *HPE Smart Array SR Gen10 Configuration Guide* at the **Hewlett Packard Enterprise website**.

Installing an NVMe SSD

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

ⓘ **IMPORTANT:** During high performance workloads, NVMe SSDs can cause the fans to operate at high speeds to maintain optimum system cooling. This high-speed fan operation leads to a sound pressure level of between 50 dB(A) to 55 dB(A). Hewlett Packard Enterprise recommends taking this possible acoustic condition into consideration when selecting a site for a server that has NVMe SSDs installed.

Prerequisites
Before you perform this procedure:

- **Make sure that the fan cage is installed**.

- **Make sure that the NVMe SSD Express Bay cage is installed**.

- Make sure that the NVMe SSD option is available.

Procedure

1. **Open the front bezel**.

2. If installing drives in bay 2-8, remove the drive blank.
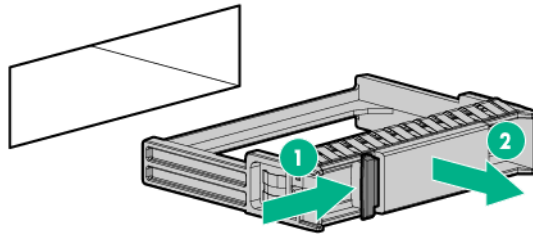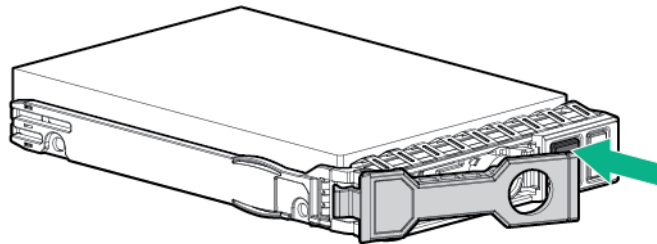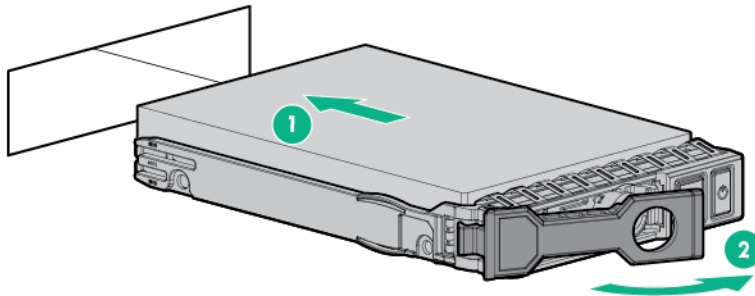
3. Prepare the drive.

4. Install the drive.

5. **Determine the status of the drive from the drive LED definitions**.

6. Close the front bezel.

The installation is complete.

Most current operating systems provide an NVMe SSD driver natively. Use this native (inbox) driver to configure and deploy NVMe SSDs.

The SmartSSD Wear Gauge reports in the HPE Smart Storage Administrator contain information about the current usage level and remaining expected lifetime of SSDs attached to the system. For more information, see the *HPE Smart Array SR Gen10 Configuration Guide* at the **Hewlett Packard Enterprise website**.

Power supply options

Depending on the installed options and the regional location where the server was purchased, the server can be configured with one of the following **power supplies**.

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 (**https://www.hpe.com/info/poweradvisor/online**).

Power supply warnings and cautions

⚠ **WARNING:** To reduce the risk of electric shock or damage to the equipment:

- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
- Unplug the power cord from the power supply to disconnect power to the equipment.
- Do not route the power cord where it can be walked on or pinched by items placed against it. Pay particular attention to the plug, electrical outlet, and the point where the cord extends from the server.

⚠ **WARNING:** To reduce the risk of injury from electric shock hazards, do not open power supplies. Refer all maintenance, upgrades, and servicing to qualified personnel

⚠ **CAUTION:** Mixing different types of power supplies in the same server might:

- Limit or disable some power supply features including support for power redundancy.
- Cause the system to become unstable and might shut down.

To ensure access to all available features, all power supplies in the same server should have the same output and efficiency ratings. Verify that all power supplies have the same part number and label color.

Install an AC power supply

⚠ **WARNING:** To reduce the risk of personal injury from hot surfaces, allow the power supply or power supply blank to cool before touching it.

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

Procedure

1. If you are installing a power supply in the power supply bay 2, remove the power supply blank.
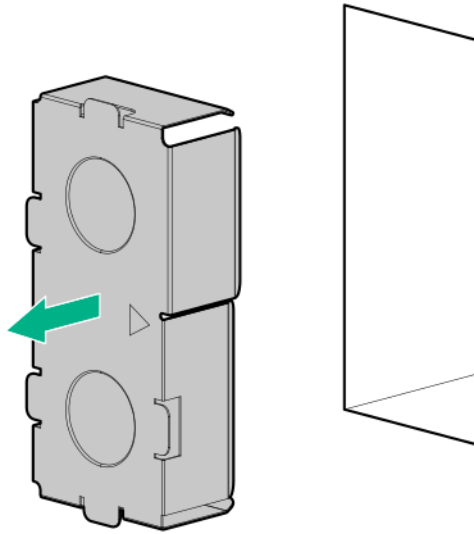
2. Slide the power supply into the bay until it clicks into place.
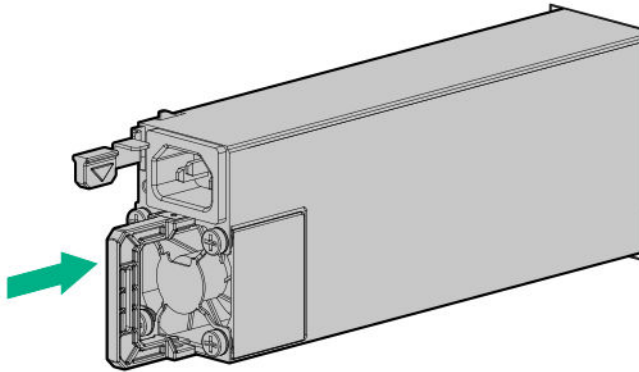
3. Connect the power cord to the power supply.

4. Secure the power cord in the strain relief strap attached to the power supply handle:

   a. Unwrap the strain relief strap from the power supply handle.

   ⚠ **CAUTION:** Avoid tight bend radii to prevent damaging the internal wires of a power cord or a server cable. Never bend power cords and server cables tight enough to cause a crease in the sheathing.

   b. Secure the power cord with the strain relief strap. Roll the extra length of the strap around the power supply handle.
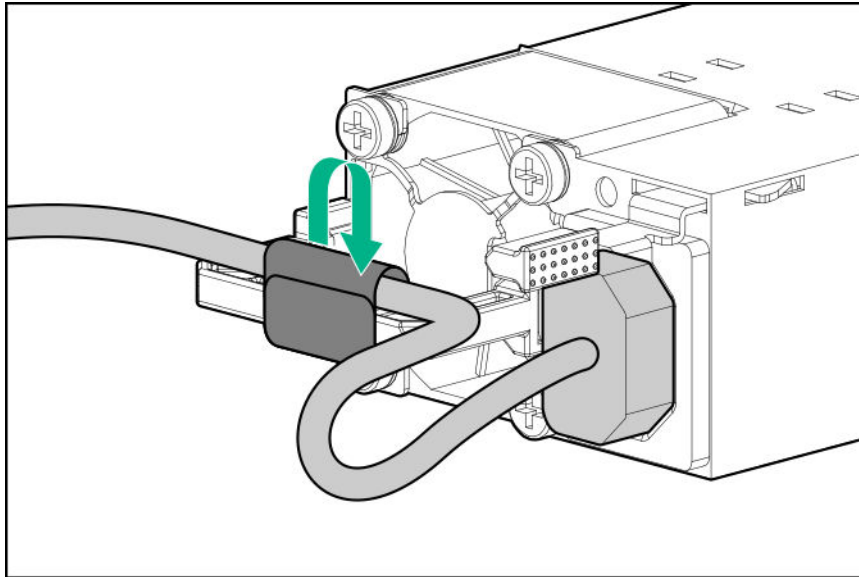
5. Connect the power cord to the power source.

6. Make sure that the power supply LED is green.

Install a DC power supply

The following input power cord option might be purchased from an authorized Hewlett Packard Enterprise reseller:

J6X43A—HPE 12 AWG 48 V DC 3.0 m Power Cord

If you are not using an input power cord option, the power supply cabling should be made in consultation with a licensed electrician and be compliant with local code.

If you are replacing the factory installed ground lug, use the KST RNB5-5 crimp terminal ring or equivalent. Use an M5-0.80 x 8 screw to attach the ground lug to the power input module.

⚠ **WARNING:** To reduce the risk of electric shock or energy hazards:

- This equipment must be installed by trained service personnel.

- Connect the equipment to a reliably grounded secondary circuit source. A secondary circuit has no direct connection to a primary circuit and derives its power from a transformer, converter, or equivalent isolation device.

- The branch circuit overcurrent protection must be rated 27 A.

⚠ **WARNING:** To reduce the risk of personal injury from hot surfaces, allow the power supply or power supply blank to cool before touching it.

CAUTION: This equipment is designed to permit the connection of the earthed conductor of the DC supply circuit to the earthing conductor at the equipment.

If this connection is made, all of the following must be met:

- This equipment must be connected directly to the DC supply system earthing electrode conductor or to a bonding jumper from an earthing terminal bar or bus to which the DC supply system earthing electrode conductor is connected.

- This equipment must be located in the same immediate area (such as adjacent cabinets) as any other equipment that has a connection between the earthed conductor of the same DC supply circuit and the earthing conductor, and also the point of earthing of the DC system. The DC system must be earthed elsewhere.

- The DC supply source is to be located within the same premises as the equipment.

- Switching or disconnecting devices must not be in the earthed circuit conductor between the DC source and the point of connection of the earthing electrode conductor.

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

Procedure

1. If you are installing a power supply in the power supply bay 2, remove the power supply blank.
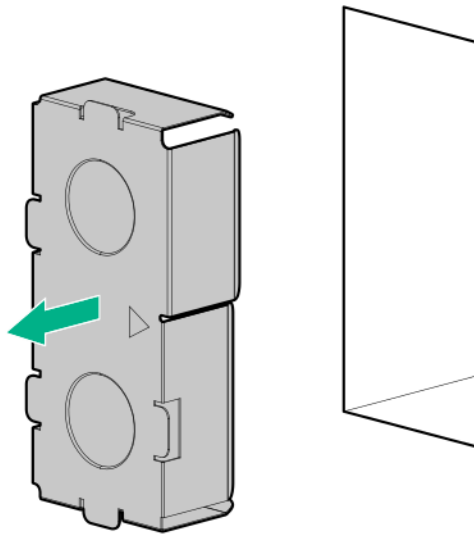
2. Remove the ring tongue.
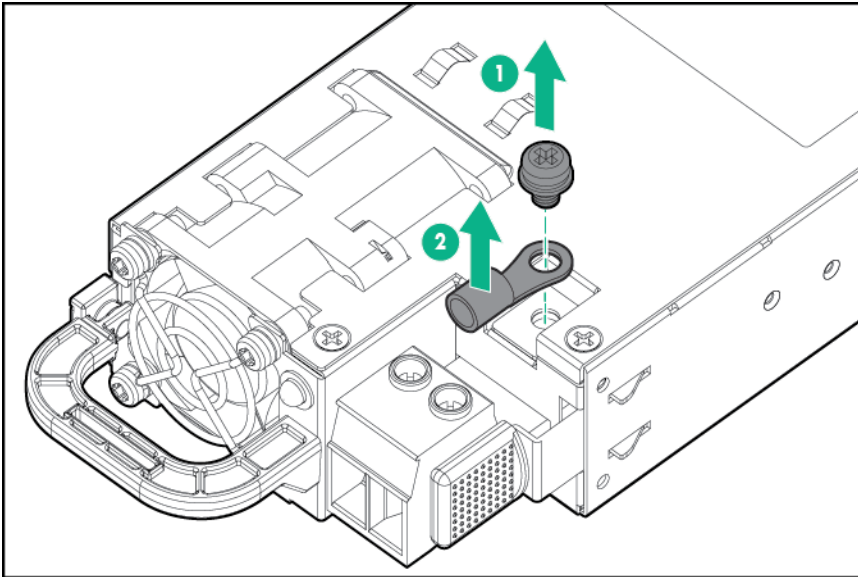
3. Crimp the ring tongue to the ground cable from the -48 V DC power source.
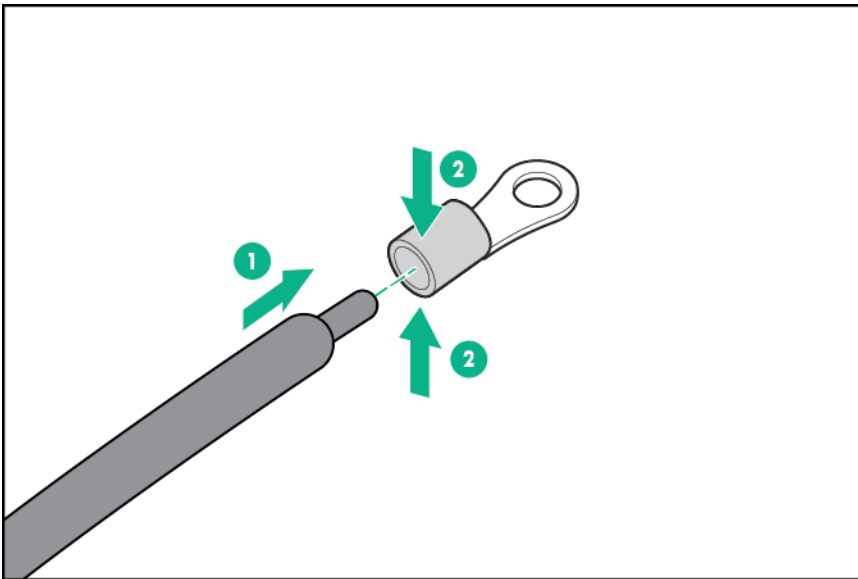
4. Remove the terminal block connector.
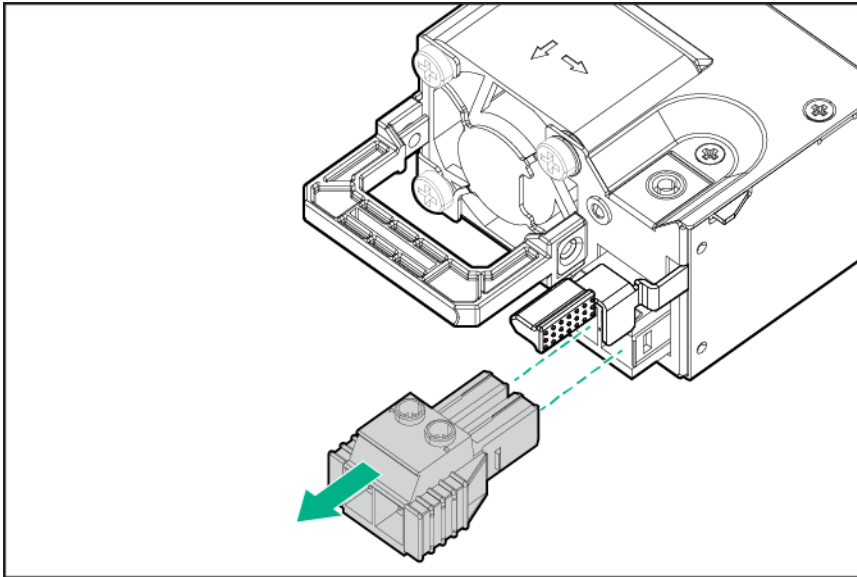
5. Loosen the screws on the terminal block connector.
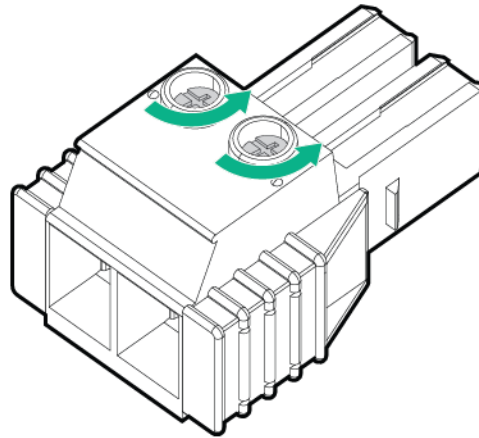
6. Attach the ground (earthed) wire to the ground screw and washer and tighten to 1.47 N m (13 lb-in) of torque. The ground wire must be connected before the -48 V wire and the return wire.

    The ground wire must be connected before the -48 V wire and the return wire.
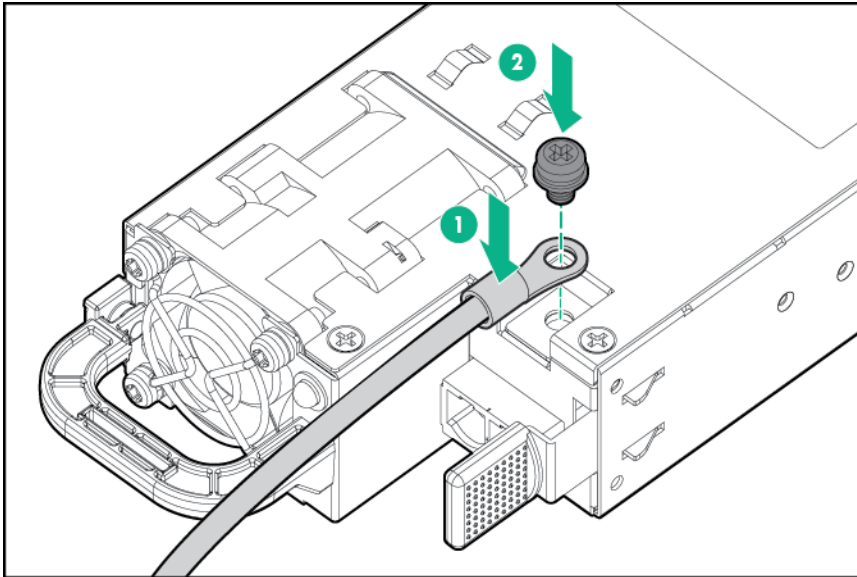
7. Insert the -48 V wire into the left side of the terminal block connector, and then tighten the screw to 1.3 N m (10 lb-in) of torque.
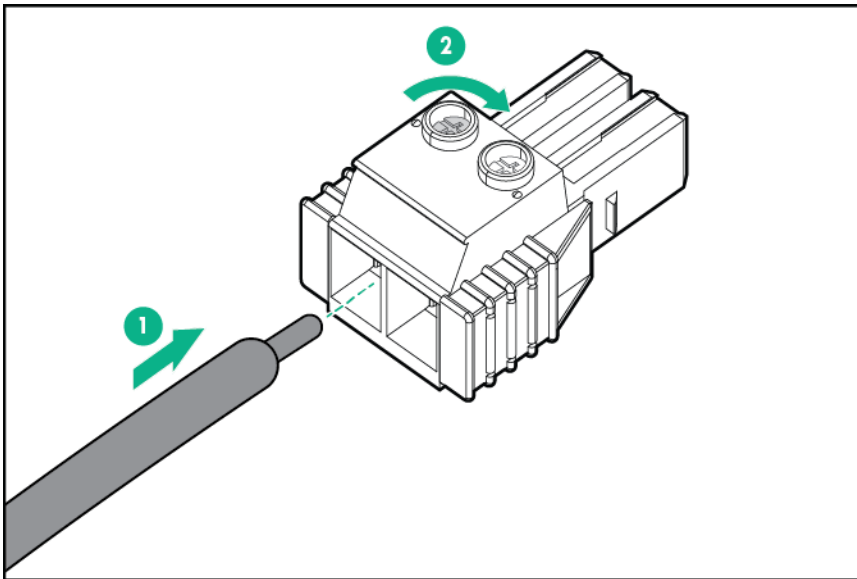
8. Insert the return wire into the right side of the connector, and then tighten the screw to 1.3 N m (10 lb-in) of torque.
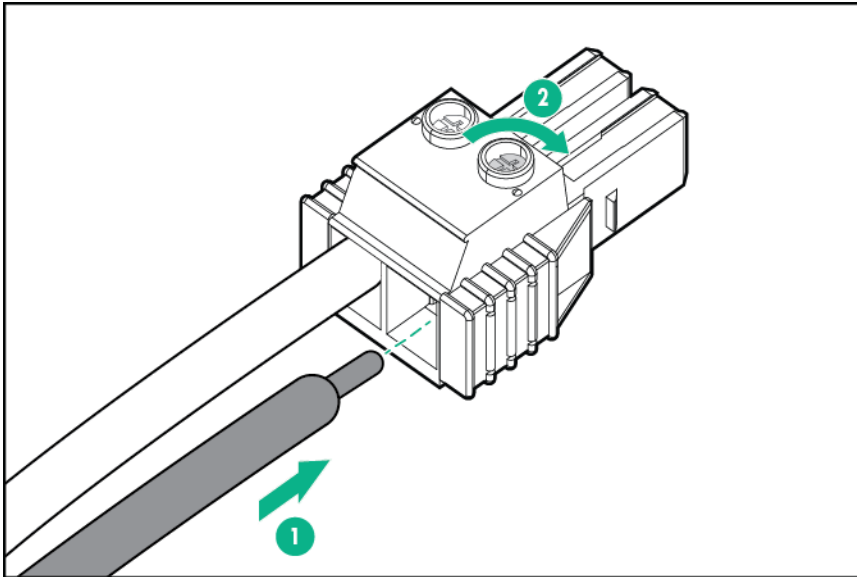
9. Install the terminal block connector in the power supply.
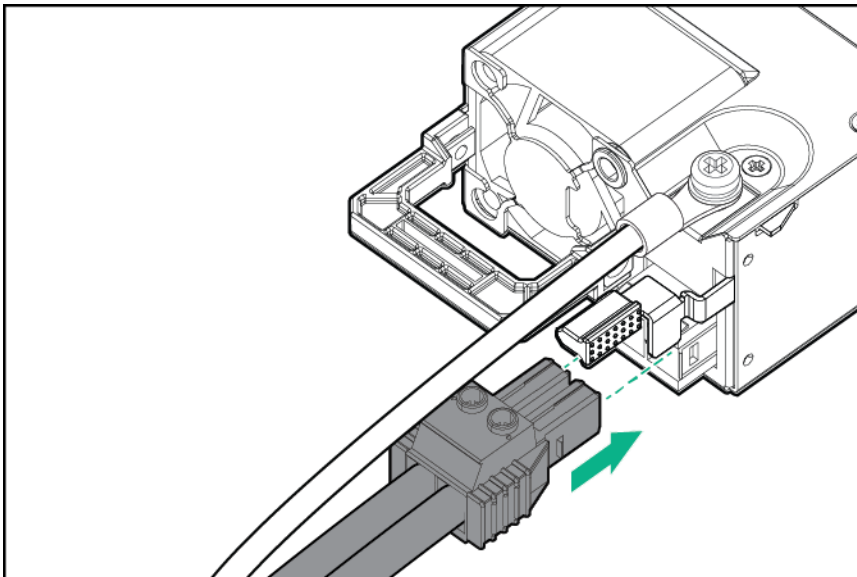
10. Secure the power cord, wires, and cables in the strain relief strap attached to the power supply handle:

a. Unwrap the strain relief strap from the power supply handle.

⚠ **CAUTION:** Avoid tight bend radii to prevent damaging the internal wires of a power cord or a server cable. Never bend power cords and server cables tight enough to cause a crease in the sheathing.

b. Secure the power cord, wires, and cables with the strain relief strap. Roll the extra length of the strap around the power supply handle.
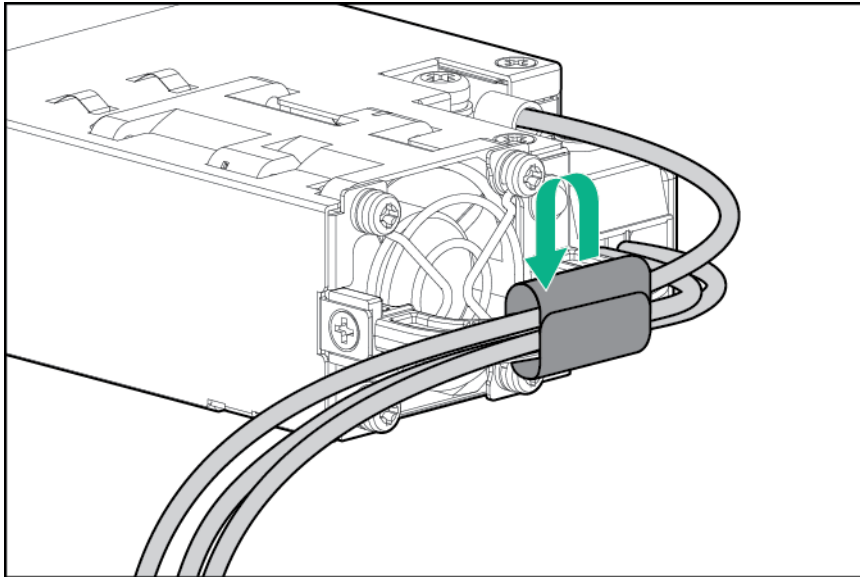
11. Slide the power supply into the bay until it clicks into place.
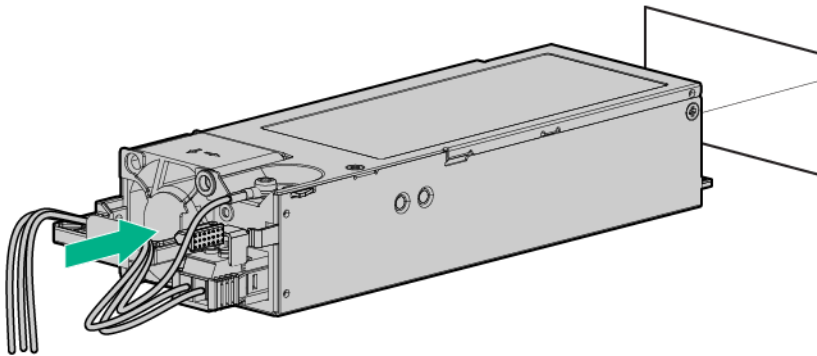
12. Make sure the -48 V DC power source is off or the PDU breaker is in the off position, and then connect the power cord to the -48 V DC power source or PDU.

13. Turn on the -48 V power source or switch the PDU breaker to the on position to supply -48 V to the power supply.

14. Make sure that the power supply LED is green.

Tower-to-rack conversion kit

Use the tower-to-rack conversion kit to switch the tower server to rack mode operation. A rack-mounted server occupies 5U space in the rack and supports in-rack serviceability for all server components.

Kit contents

- Left and right rack rail assemblies

- Server tray

- Cable management arm

- Chassis rear bracket screws (3)

- Shipping hardware – Install these hardware only if you intend to transport or ship a rack-mounted server to a new location.

- ◦ Shipping brackets (2)
- ◦ Shipping bracket screws (4)
- ◦ M5 square-hole cage nuts (4)
- ◦ Rear shipping screws (2)

Installing the tower-to-rack conversion kit

In this procedure, left and right terminology is from the perspective of a user facing the front of the rack.

Procedure

1. **Review the rack warnings and cautions**.

2. If the server is currently used in tower mode, **prepare the server for rack installation**.

3. **Install the rack rails and server tray**.

4. **Install the server into the rack**.

5. **Install the cable management arm**.

Prepare the server for rack installation

Prerequisites
Before you perform this procedure:

- • **Make sure that the fan cage option is installed**.

- • Make sure that you have a T-15 Torx screwdriver available.

Procedure

1. **Power down the server**.

   If you are physically powering down the server, **open the front bezel to access the power button**. Close the bezel after the server is powered down.

2. Remove all power:

   a. Disconnect each power cord from the power source.

   b. Disconnect each power cord from the server.

3. Disconnect all peripheral cables from the server.

4. If installed, unlock and remove the security padlock and/or the Kensington security lock.

   For more information, see the lock documentation.

5. **Position the tower server for hardware configuration**.

6. Remove the chassis feet.

   a. Loosen the screws on the chassis.

   b. Detach the chassis feet.
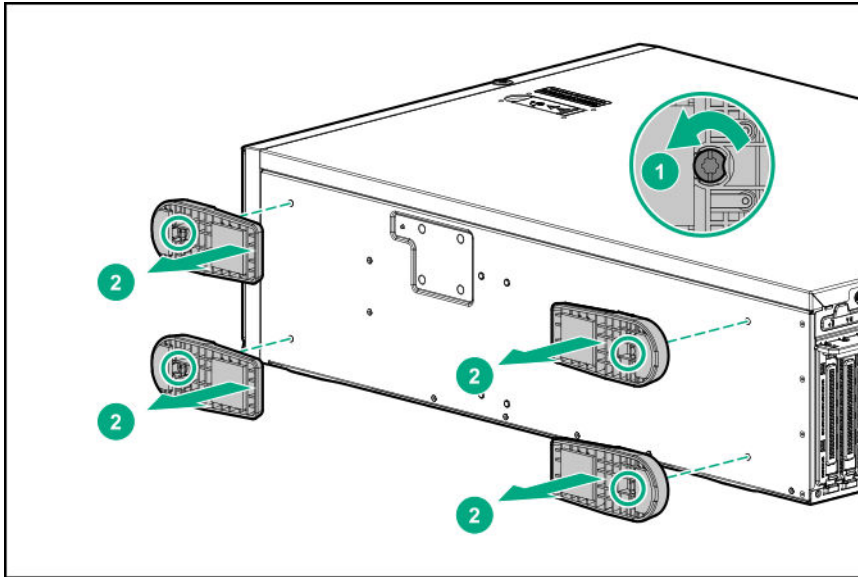
Install the rack rails and server tray

These rack rails can be installed in both round- or square-hole racks.

Prerequisites

Before you perform this procedure, make sure that you have the following items available:

- Left and right rack rail assemblies – These rails occupy 1U position on the rack.

- Server tray

- T-15 Torx screwdriver

Procedure

1. Disassemble the rail assemblies:

   a. Pull out the inner rail until it is fully extended .

   b. Slide and hold the white release tab in the direction shown, and then remove the inner sliding rail from the outer mounting rail.
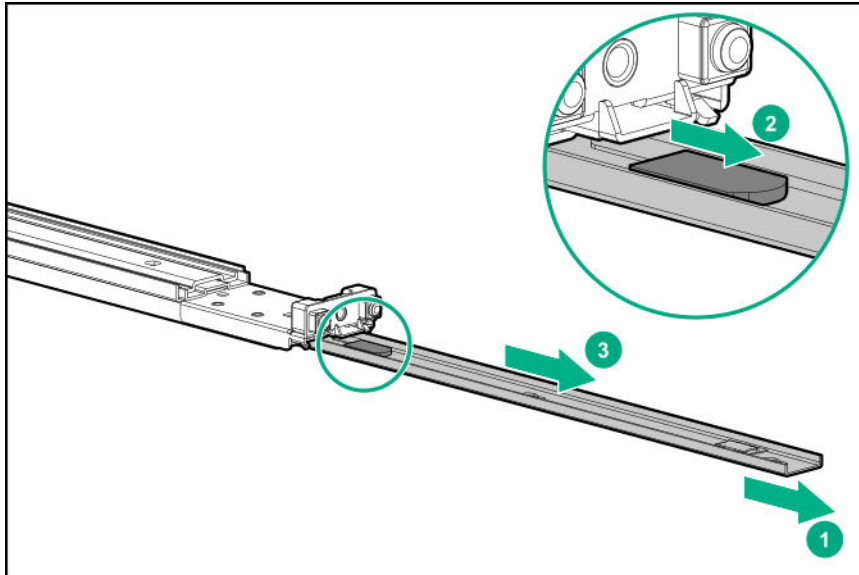
c. Repeat steps a–b on the other rail assembly.

2. Install the sliding rails on the server tray:

   a. Align the notches on the rail with the pins on the side.

   b. Slide the rail towards the rear of the tray to lock it into place.
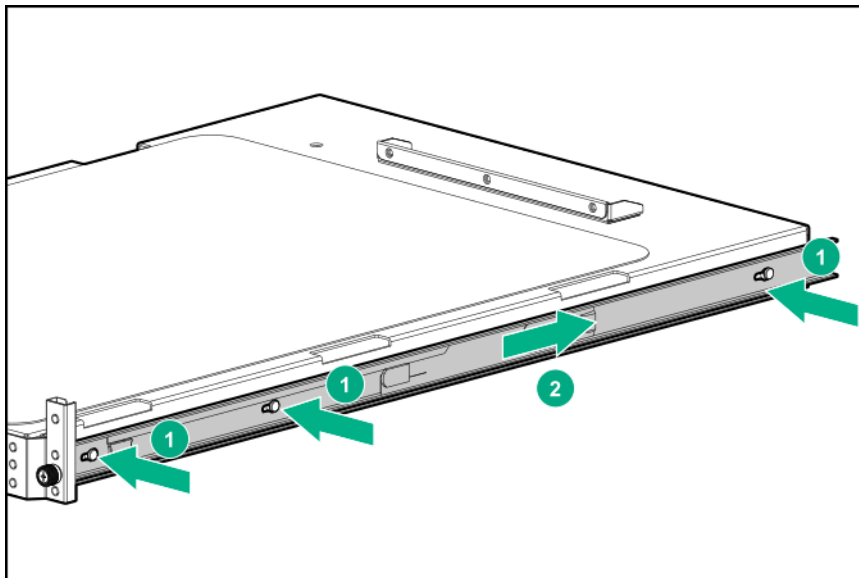
c. Repeat steps a–b on the other inner rail.

3. Locate the orientation markers on the mounting rails:

   - The front end of the rails is marked **FRONT**.

   - The rear end of the rails is marked with **L** for left and **R** for right.
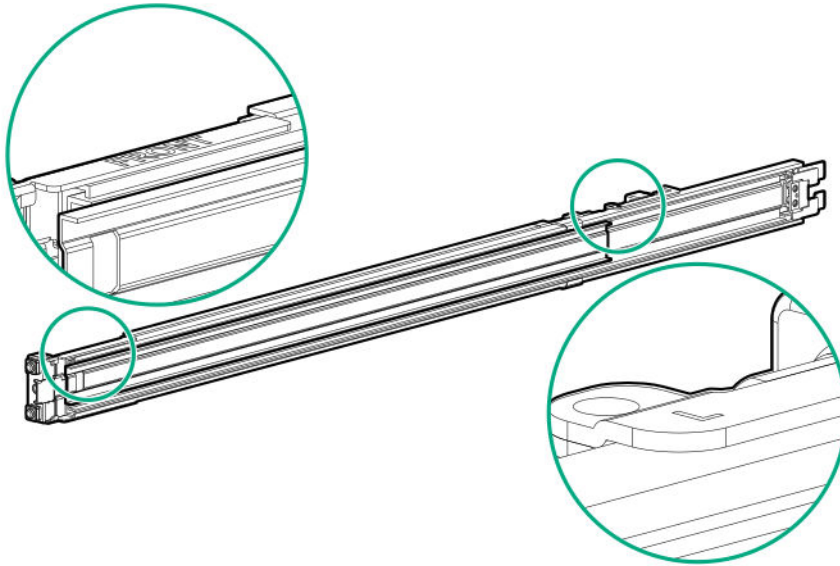
4. Fasten the mounting rails to the rack columns:

   a. Retract and hold the rear retention bracket.

   b. Insert the pegs on the mounting flange into the rack holes.

   c. Release the rear retention bracket.
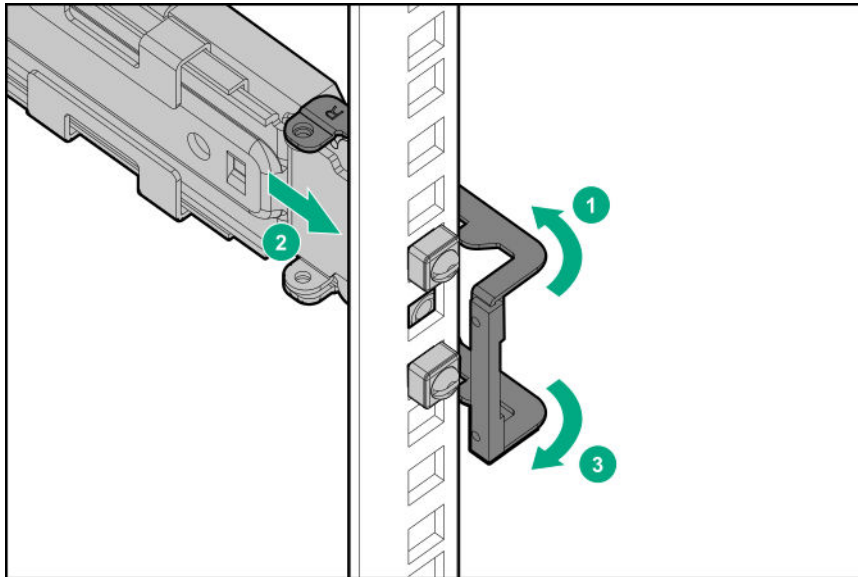
   d. Retract and hold the front retention bracket.

   e. Insert the pegs on the mounting flange into the rack holes.

   f. Release the front retention bracket.
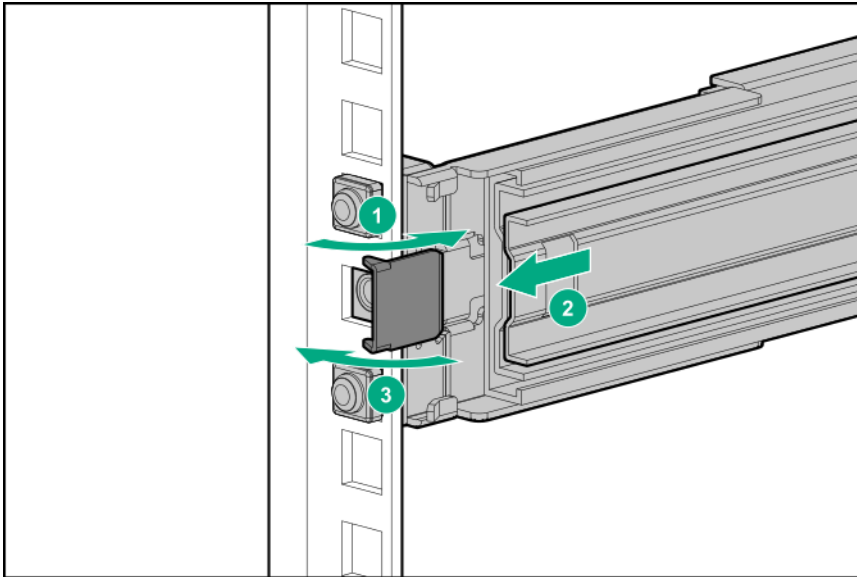
g. Repeat steps a-f to fasten the other mounting rail.

h. Make sure that both rails are mounted at the same vertical position on both sides of the rack.

5. Slide the server tray into the rack.

The rails will click and lock into place when the tray is properly engaged.
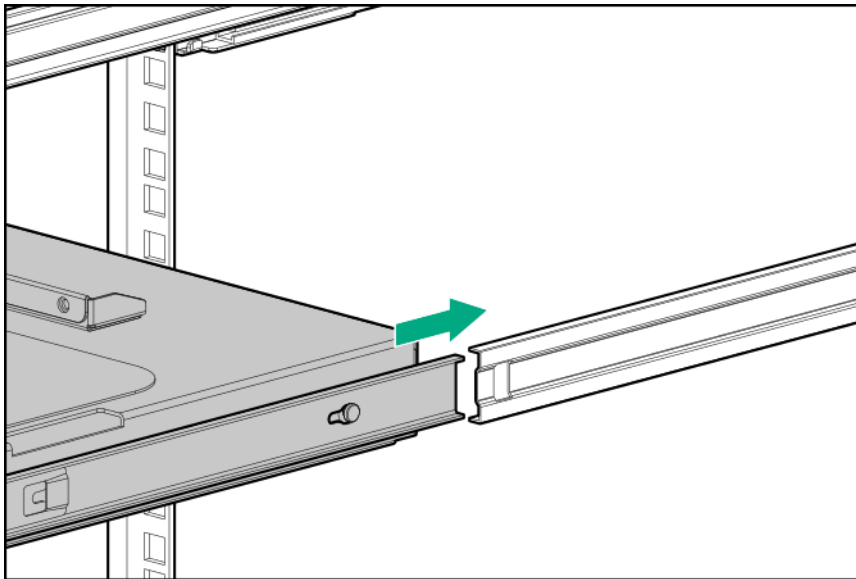
Install the server into the rack

Prerequisites

Before you perform this procedure, make sure that you have a T-15 Torx screwdriver available.

Procedure

1. Grasp the tray notch to slide the tray out of the rack.
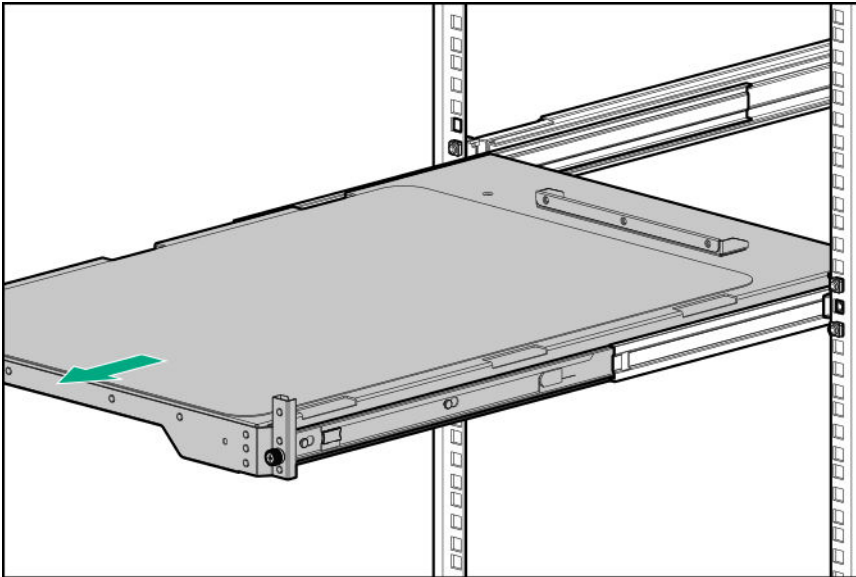
2. Place the server on the tray.

   The rear panel of the server should be flushed against the rear bracket on the tray
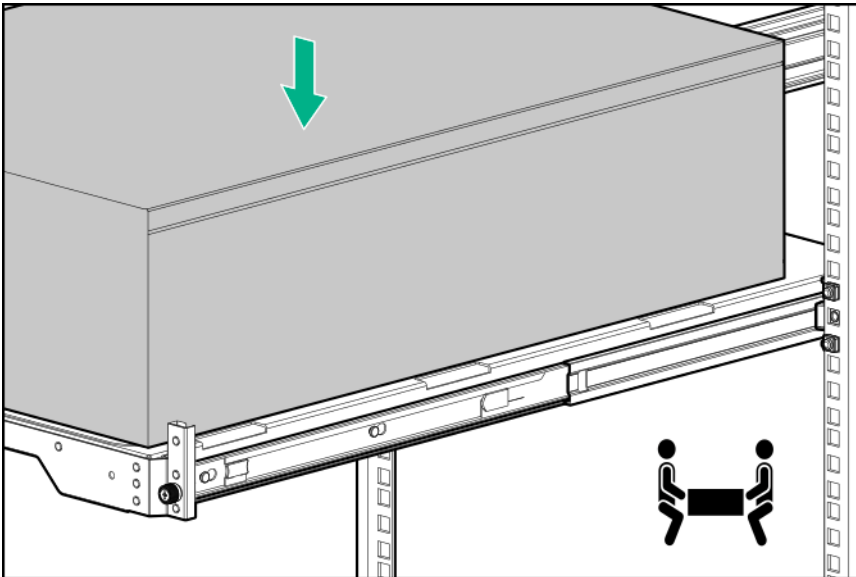
3. Install the chassis rear bracket screws.
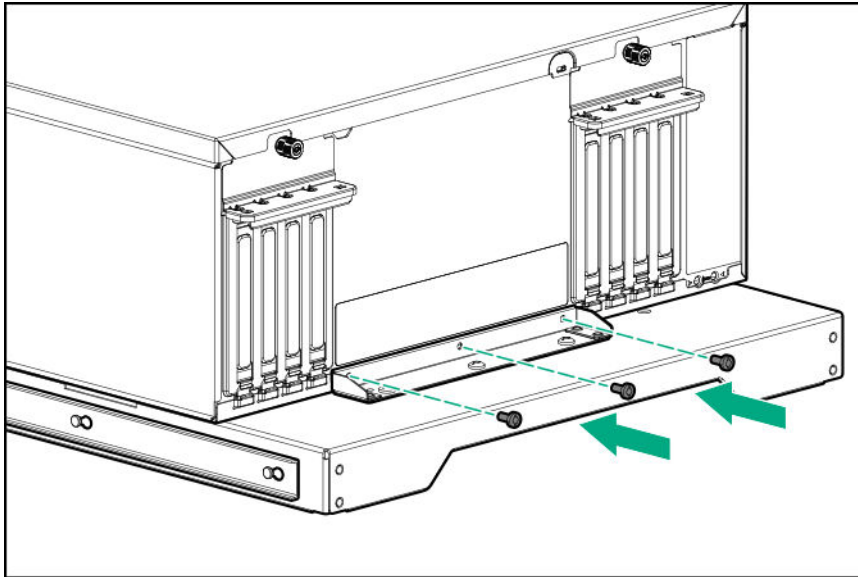
4. Press and hold the blue rail-release tabs, and then slide the tray back into the rack.
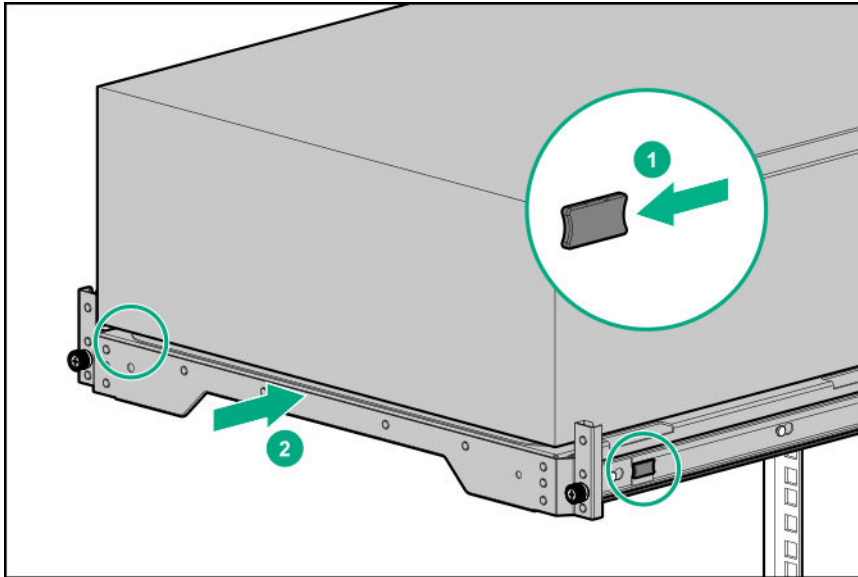
Install the cable management arm

The cable management arm allows the server to be fully extended from the rack without the need to power off the system or disconnect any rear panel cables. This CMA is designed for ambidextrous implementation.

⚠ **CAUTION:** Support the CMA during the installation. Do not allow the CMA to hang by its own weight until it is secured from all three connection points.

Procedure

1. Connect all peripheral cables and power cords to the rear panel.

2. Install the CMA:

a. Fasten the inner retention connector to left sliding rail hook.

b. Fasten the outer retention connector to left mounting rail hook.

c. Fasten the hinged connector to right mounting rail hook.
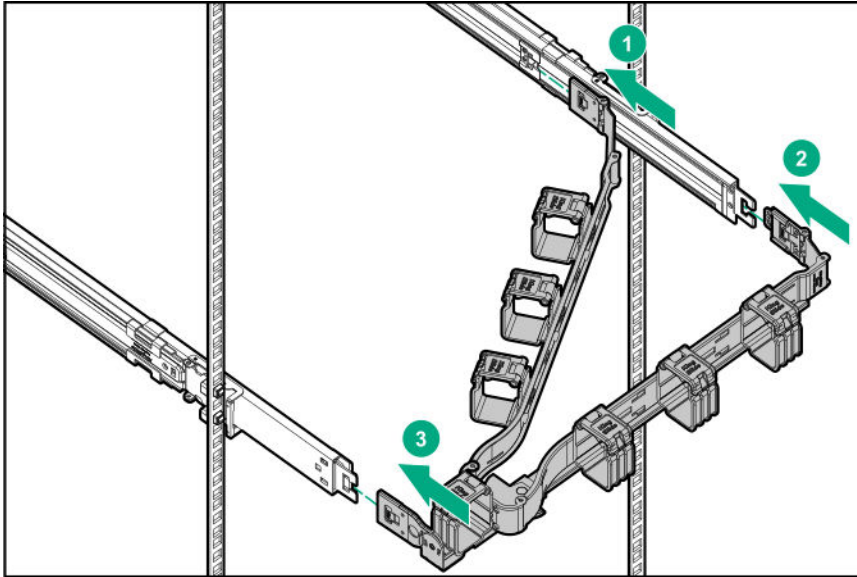
3. Open the cable clamps.
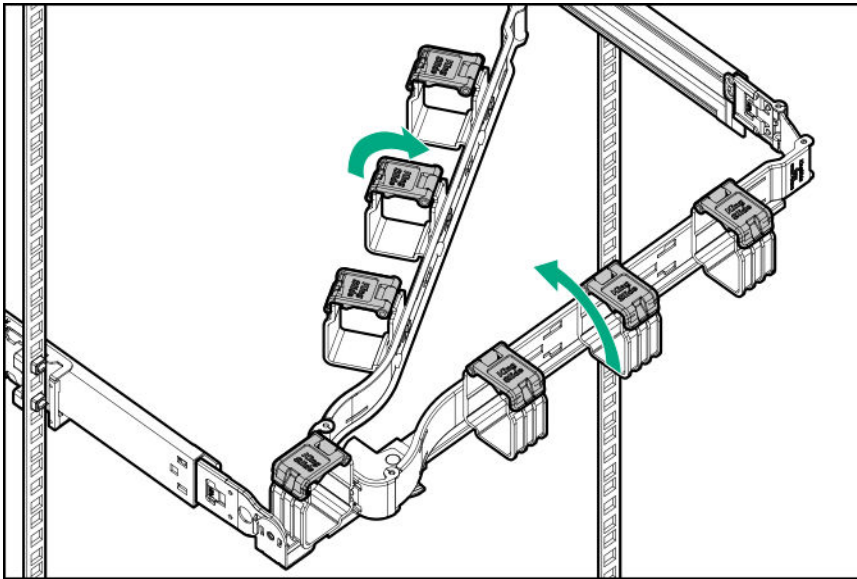
4. Route the rear panel cables and power cords though the CMA, and then close the cable clamps.

Employ industry best practices in routing and managing these rear panel cables and power cords.
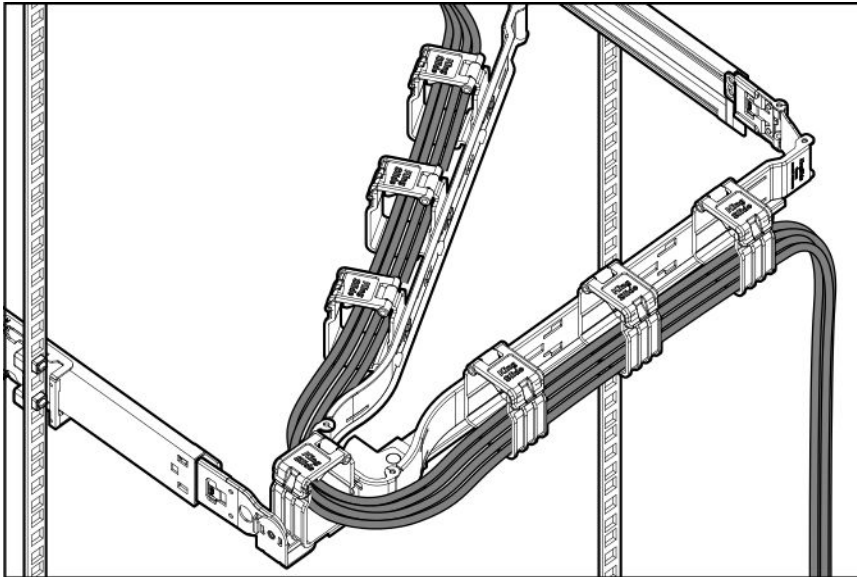
5. Verify the operation of the rack rails and the CMA:

   Two people might be needed for this procedure: one to slide the server tray in and out of the rack, and the other to observe the cables and CMA.

   a. Fully extend the server tray out of the rack.

   b. Check that there is enough slack in the cables and cords to allow for full extension of the CMA without any cable binding or crimping.

   c. Slide the server tray in and out of the rack to make sure that the cables and the CMA are working properly.

6. Press and hold the blue rail-release tabs, and then slide the tray back into the rack.
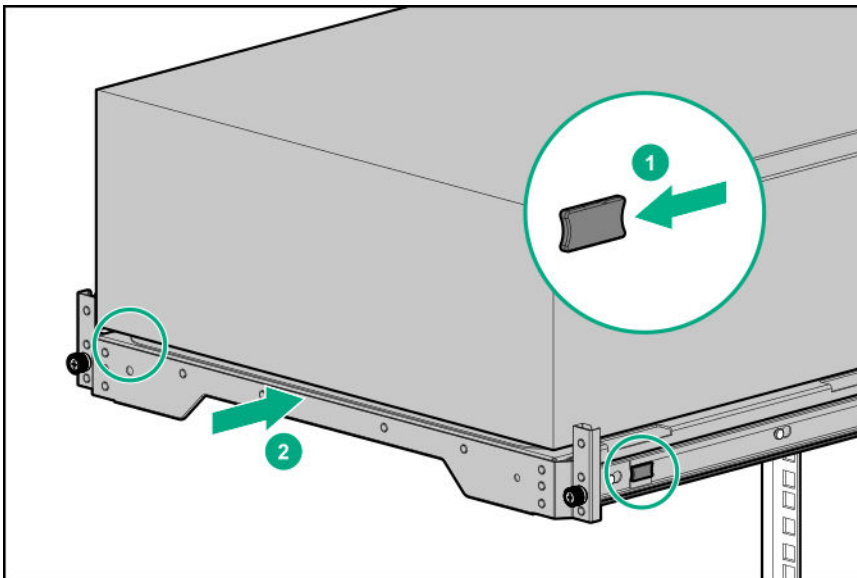
7. Tighten the server tray thumbscrews.
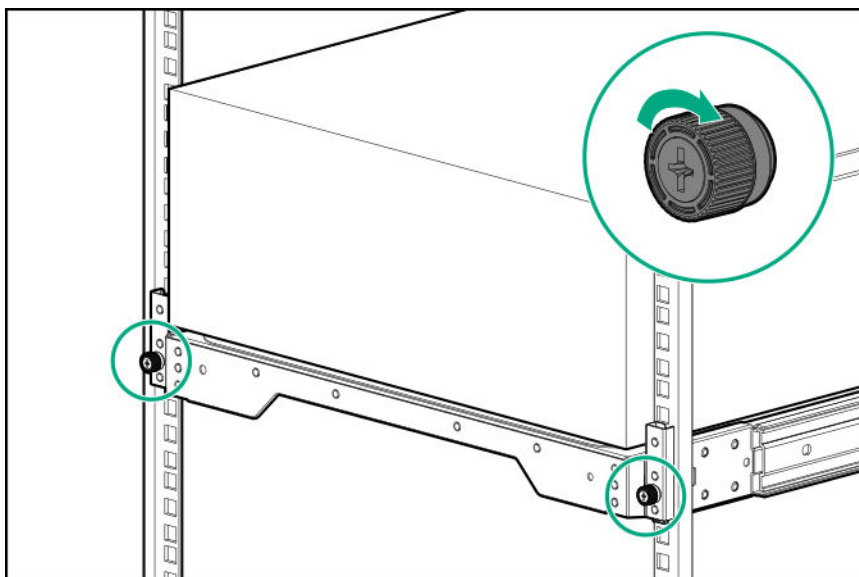
8. Do one of the following:

   • If the purpose of the conversion kit installation is to switch the server to rack mode operation, **power up the server**.

   • If the purpose of the conversion kit installation is to ship a rack-mounted server, **install the shipping hardware**

9. Connect each power cord to the power source.

10. **Power up the server**.

The installation is complete.

Drive cage options

The server supports the following drive cage options:

• **4 LFF non-hot-plug drive cage**

• **4 LFF hot-plug drive cage**

• **8 SFF hot-plug drive cage**

• **8 NVMe SSD Express Bay drive cage**

This server supports mixed LFF + SFF hot-plug drive configurations.

If the maximum number of drives are installed in all three drive boxes, the **fan cage option** is required.

4 LFF non-hot-plug drive cage option

The server supports the 4 LFF non-hot-plug drive cage option. This option:

• Can be installed in boxes 1–3

• Cannot be installed together with the other drive cage options

• Supports SATA drives only

Kit contents

- 4 LFF non-hot-plug drive cage

- SATA-power split cable

- T-15 screws (20) – There are four loose screws in the kit, plus 16 screws preinstalled on top of the drive cage.

Installing the 4 LFF non-hot-plug drive cage

Prerequisites

Before you perform this procedure, make sure that you have the following items available:

- Drive cage option kit

- LFF non-hot-plug drive option

- T-15 Torx screwdriver

Procedure

1. **Remove the front bezel**.

2. **Power down the server**.

3. Remove all power:

   a. Disconnect each power cord from the power source.

   b. Disconnect each power cord from the server.

4. Disconnect all peripheral cables from the server.

5. Do one of the following:

   - Server in tower mode: **Position the tower server for hardware configuration**.

   - Server in rack mode: **Extend the server from the rack**.

6. **Remove the access panel**.

7. **Remove the air baffle**.

8. If installed, **remove the fan cage**.

9. Do one of the following:

   If the drive cage is to be installed in box 1, remove the media bay blanks.

Retain the blanks for future use.

If the drive cage is to be installed in box 2 or 3, remove the drive cage blank.

Retain the blank for future use.

10. **Install the LFF non-hot-plug drives**.

11. Install the drive cage.
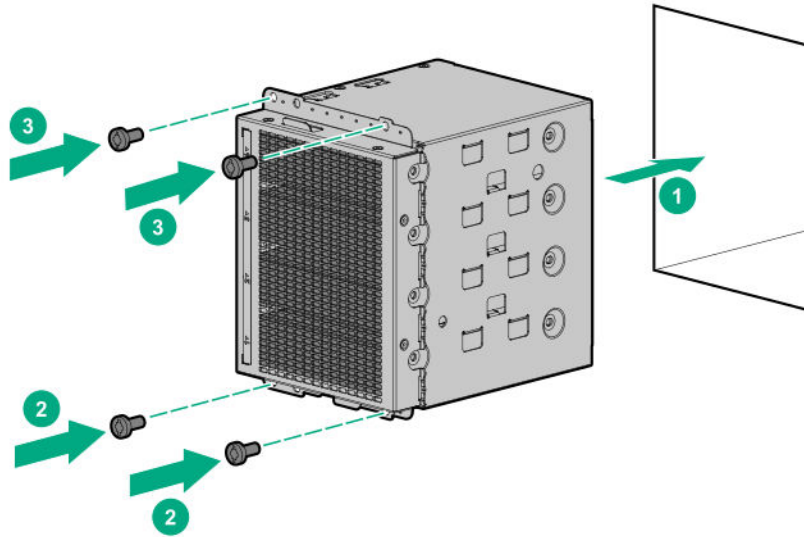
12. **Observe the guidelines for managing cables**.

13. **Connect the drive SATA-power split cable to the drives and system board**.

14. If the fan cage was removed, do the following:

    a. Make sure that all the system cables that are routed through the front cable channel are properly secured in the metal cable tabs. This is done to prevent system damage due to cables being inadvertently caught under the fan cage.

    b. **Install the fan cage**.

15. **Install the air baffle**.

16. **Install the access panel**.

17. Do one of the following:

    • Server in tower mode: **Position the tower server for operation**.

    • Server in rack mode: **Slide the server into the rack**.

18. Connect all peripheral cables to the server.

19. Connect each power cord to the server.

20. Connect each power cord to the power source.

21. **Power up the server**.

22. **Install the front bezel**.

The installation is complete.

4 LFF hot-plug drive cage option

The server supports the 4 LFF drive cage option. This option:

- Can be installed in boxes 1–3

- Can be installed together with the 8 SFF hot-plug drive cage option

- Supports SATA or SAS drives depending on the storage controller used

Kit contents

- 4 LFF hot-plug drive cage

- LFF drive blanks (4, preinstalled in the drive cage)

- Drive power cable

- T-15 Torx screws (4)

Installing the 4 LFF hot-plug drive cage

Prerequisites

Before you perform this procedure, make sure that you have the following items available:

- Drive cage option kit

- **Storage controller cable option**

- LFF hot-plug drive option

- T-15 Torx screwdriver

Procedure

1. **Remove the front bezel**.

2. **Power down the server**.

3. Remove all power:

   a. Disconnect each power cord from the power source.

   b. Disconnect each power cord from the server.

4. Disconnect all peripheral cables from the server.

5. Do one of the following:

   - Server in tower mode: **Position the tower server for hardware configuration**.

   - Server in rack mode: **Extend the server from the rack**.

6. **Remove the access panel**.

7. **Remove the air baffle**.

8. If installed, **remove the fan cage**.

9. Do one of the following:

   If the drive cage is to be installed in box 1, remove the media bay blanks.

Retain the blanks for future use.

If the drive cage is to be installed in box 2 or 3, remove the drive cage blank.

Retain the blank for future use.

10. Install the drive cage.

11. **Observe the guidelines for managing cables**.

12. Connect the drive cables:

    - **Storage controller cable**

    - **Drive power cable**

13. If the fan cage was removed, do the following:

    a. Make sure that all the system cables that are routed through the front cable channel are properly secured in the metal cable tabs. This is done to prevent system damage due to cables being inadvertently caught under the fan cage.

    b. **Install the fan cage**.

14. **Install the air baffle**.

15. **Install the access panel**.

16. Do one of the following:

    - Server in tower mode: **Position the tower server for operation**.

    - Server in rack mode: **Slide the server into the rack**.

17. Connect all peripheral cables to the server.

18. Connect each power cord to the server.

19. Connect each power cord to the power source.

20. **Power up the server**.

21. **Install the LFF hot-plug drives**.

22. **Install the front bezel**.

The installation is complete.

8 SFF hot-plug drive cage option

The server supports the 8 SFF hot-plug drive cage option. This option:

- Can be installed in boxes 1–3.

- Can be installed together with the 4 LFF hot-plug or 8 NVMe SSD Express Bay drive cage options.

- Supports SATA or SAS drives depending on the storage controller used.

Kit contents

- 8 SFF hot-plug drive cage

- SFF drive blanks (8, preinstalled in the drive cage)

- Drive power cable

- T-15 Torx screws (4)

Installing the 8 SFF hot-plug drive cage

Prerequisites

Before you perform this procedure, make sure that you have the following items available:

- Drive cage option kit

- **Storage controller cable option**

- SFF hot-plug drive option

- T-15 Torx screwdriver

Procedure

1. **Remove the front bezel**.

2. **Power down the server**.

3. Remove all power:

   a. Disconnect each power cord from the power source.

   b. Disconnect each power cord from the server.

4. Disconnect all peripheral cables from the server.

5. Do one of the following:

   - Server in tower mode: **Position the tower server for hardware configuration**.

   - Server in rack mode: **Extend the server from the rack**.

6. **Remove the access panel**.

7. **Remove the air baffle**.

8. If installed, **remove the fan cage**.

9. Do one of the following:

If the drive cage is to be installed in box 1, remove the media bay blanks.

Retain the blanks for future use.

If the drive cage is to be installed in box 2 or 3, remove the drive cage blank.

Retain the blank for future use.

10. Install the drive cage.

11. **Observe the guidelines for managing cables**.

12. Connect the drive cables:

    - **Storage controller cable**

    - **Drive power cable**

13. If the fan cage was removed, do the following:

    a. Make sure that all the system cables that are routed through the front cable channel are properly secured in the metal cable tabs. This is done to prevent system damage due to cables being inadvertently caught under the fan cage.

    b. **Install the fan cage**.

14. **Install the air baffle**.

15. **Install the access panel**.

16. Do one of the following:

    - Server in tower mode: **Position the tower server for operation**.

    - Server in rack mode: **Slide the server into the rack**.

17. Connect all peripheral cables to the server.

18. Connect each power cord to the server.

19. Connect each power cord to the power source.

20. **Power up the server**.

21. **Install the SFF hot-plug drives**.

22. **Install the front bezel**.

The installation is complete.

8 NVMe SSD Express Bay enablement option

The server supports the 8 NVMe SSD Express Bay enablement option. This option can only be installed in box 2 of an SFF hot-plug drive configuration.

NVMe SSDs are directly attached to the PCIe interface and do not have a dedicated hardware RAID engine similar to SAS controllers. This means that RAID configuration for NVMe SSDs is only supported through the operating system.

Kit contents

- 8 NVMe SSD Express Bay drive cage

- SSD drive blanks (7, preinstalled in the drive cage)

- NVMe riser boards (2)

  One NVMe riser supports up to four NVMe SSDs.

- NVMe SSD data cables (2)

- Drive power cable

- T-15 Torx screws (4)

Installing the NVMe SSD Express Bay enablement option

Prerequisites

Before you perform this procedure:

- Make sure that **the fan cage is installed**.

- Make sure that you have the following items available:
    - 8 NVMe SSD Express Bay enablement option kit

    - NVMe SSD option

    - T-15 Torx screwdriver

Procedure

1. **Remove the front bezel**.

2. **Power down the server**.

3. Remove all power:

    a. Disconnect each power cord from the power source.

    b. Disconnect each power cord from the server.

4. Disconnect all peripheral cables from the server.

5. Do one of the following:

    - Server in tower mode: **Position the tower server for hardware configuration**.

    - Server in rack mode: **Extend the server from the rack**.

6. **Remove the access panel**.

7. **Remove the air baffle**.

8. If installed, **remove the fan cage**.

9. Remove the drive cage blank from box 2.

    Retain the blank for future use.
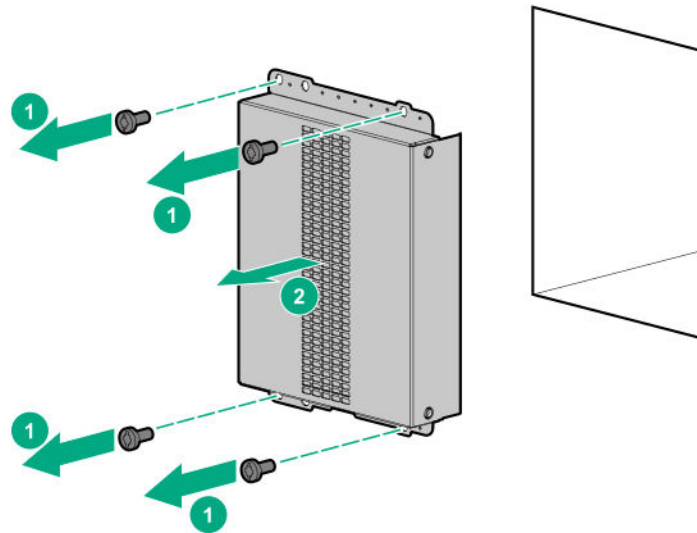
10. Install the drive cage in box 2.
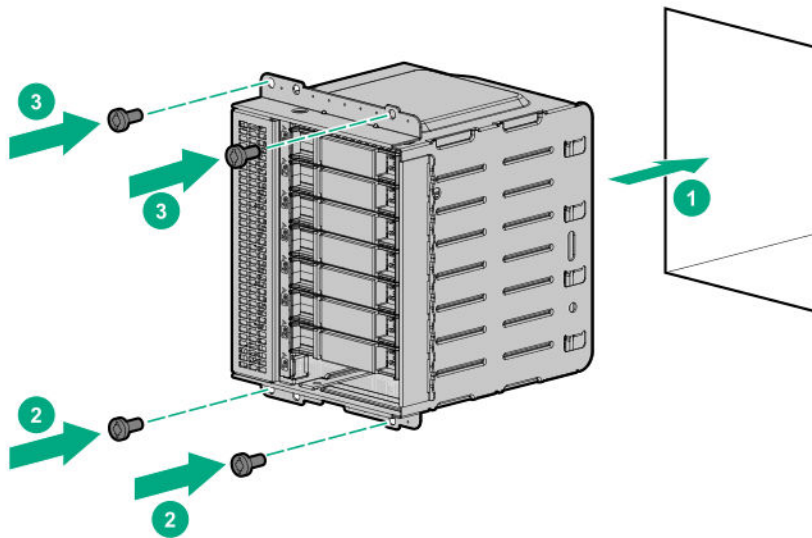
11. **Remove the PCI blank retainer**.

12. **Remove the PCI slot blanks opposite slots 1 and 3**.

13. **Remove the PCI board screws opposite slots 1 and 3**.

14. **Observe the guidelines for managing cables**.

15. Connect the NMVe SSD data cables to the riser boards, and then secure the cables in the cable clip.
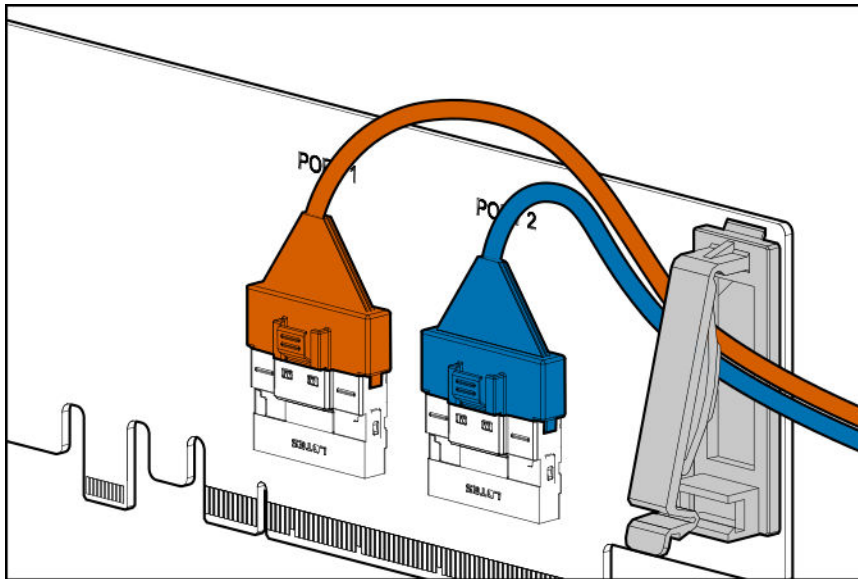
16. Install the NVMe riser boards in slots 1 and 3.
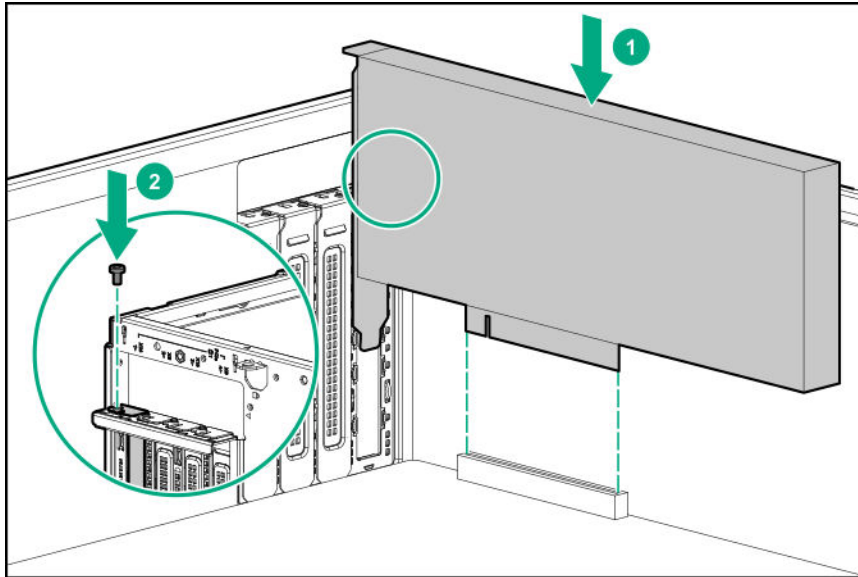
17. Make sure that the boards are firmly seated in the slots.

18. **Install the PCI blank retainer**.

19. Connect the drive cables:

- **NVMe SSD data cables**

- **Drive power cable**

20. If the fan cage was removed, do the following:

a. Make sure that all the system cables that are routed through the front cable channel are properly secured in the metal cable tabs. This is done to prevent system damage due to cables being inadvertently caught under the fan cage.

b. **Install the fan cage**.

21. **Install the air baffle**.

22. **Install the access panel**.

23. Do one of the following:

    - Server in tower mode: **Position the tower server for operation**.

    - Server in rack mode: **Slide the server into the rack**.

24. Connect all peripheral cables to the server.

25. Connect each power cord to the server.

26. Connect each power cord to the power source.

27. **Power up the server**.

28. **Install the NVMe SSDs**.

29. **Install the front bezel**.

The installation is complete.

Media device options

The server supports the following media device options in the box 1 bays:

- Half‑height media bay 1 – **SAS LTO tape drive** or **USB RDX drive**

- Half‑height media bay 2 – **USB RDX drive**

- 9.5 mm optical drive bay – **SATA optical drive**

Installing a SAS LTO tape drive

The half‑height media bay 1 supports the installation of a SAS LTO tape drive option.

Prerequisites
Before you perform this procedure:

- **Make sure that a Smart Array controller board option is installed**.

- In a server that has the maximum number of drives installed in box 2 and box 3, and the RDX drive is present in the half-height media bay 2, make sure that the **fan cage is installed**.

- Make sure that you have the following items available:

    ◦ Fan blank

    ◦ LTO tape drive SAS-power Y-cable

    ◦ LTO/RDX power extension Y-cable

    ◦ LTO tape drive option – The SAS and/or power cables that ship with the drive option will not be used in this server.

    ◦ T-15 Torx screwdriver

Procedure

1. **Remove the front bezel**.

2. **Power down the server**.

3. Remove all power:

    a. Disconnect each power cord from the power source.

    b. Disconnect each power cord from the server.

4. Disconnect all peripheral cables from the server.

5. Do one of the following:

    -   Server in tower mode: **Position the tower server for hardware configuration**.

    -   Server in rack mode: **Extend the server from the rack**.

6. **Remove the access panel**.

7. **Remove the air baffle**.

8. If installed, **remove the fan cage**.

9. **Remove the blank from the half-height media bay 1**.

10. Install the metal shims on the LTO tape drive.

    The shims and the T-15 Torx screws are included in the LTO tape drive option kit.

    If you are installing an LTO tape drive that does not include its own mounting screws, use the preinstalled **media drive spare screws**.
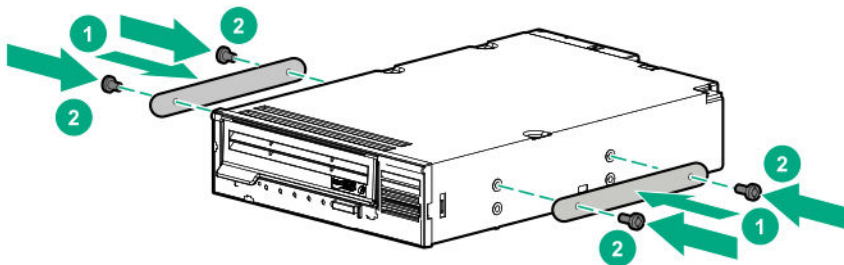
11. Slide the LTO tape drive into the half‑height media bay 1 until the rear edge of the drive is aligned with the rear edge of the drive box.
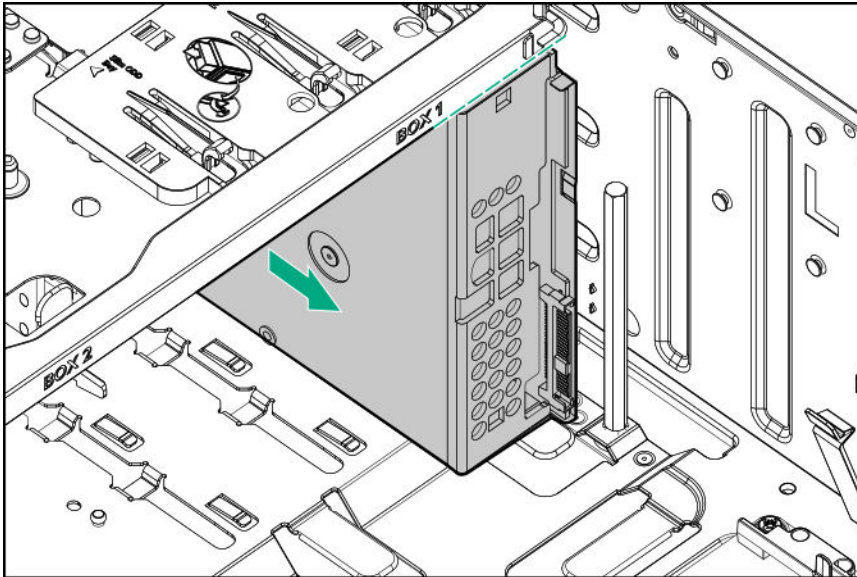
12. Connect the LTO/RDX power extension Y-cable to the LTO tape drive SAS-power Y-cable.
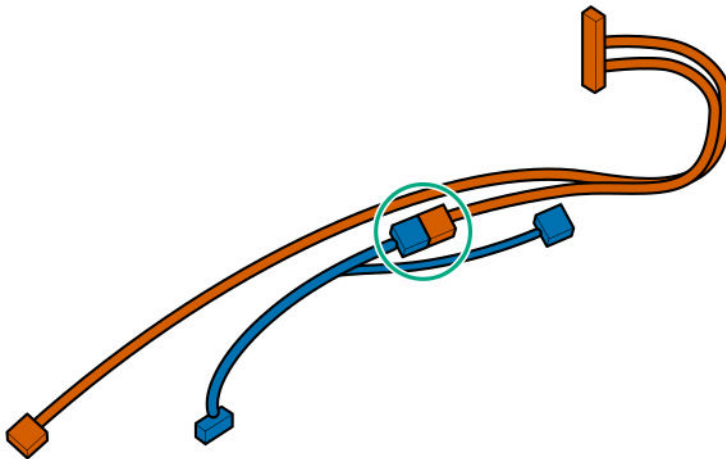
13. **Observe the guidelines for managing cables**.

14. Connect the LTO tape drive cables:

    a. Connect the common end of the SAS-power Y-cable to the LTO tape drive.

    b. Connect the common end of the power extension Y-cable to the drive box 1 power connector.

    c. Connect the SAS end of the SAS-power Y-cable to the Smart Array controller board.

    To view the cable routing, see **SAS LTO tape drive cabling**.

15. Slide the LTO tape drive fully into the half‑height media bay 1 until it clicks into place.
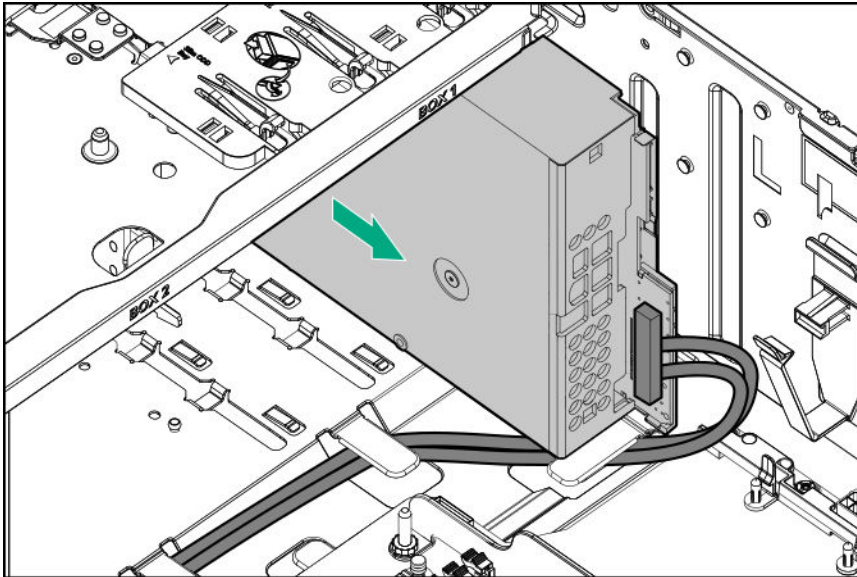
> ⚠ **CAUTION:** To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.

16. If the fan cage was removed, do the following:

   a. While pressing the release latch, pull up the fan 1 out of the bay.
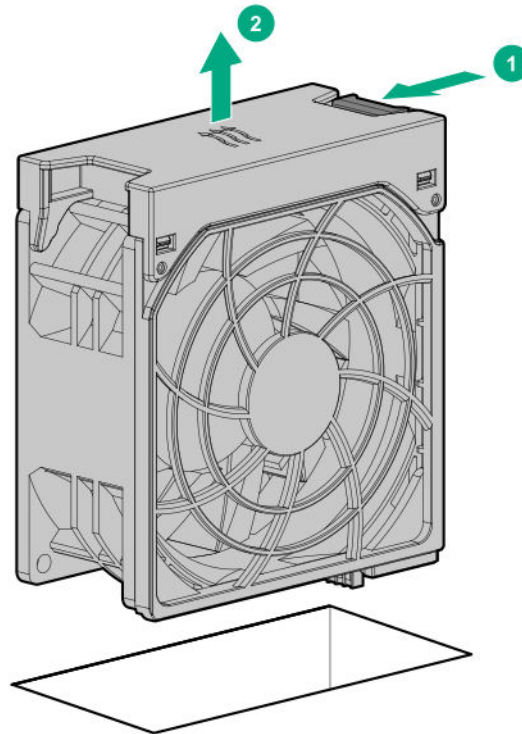
   b. Install the fan blank in bay 1.
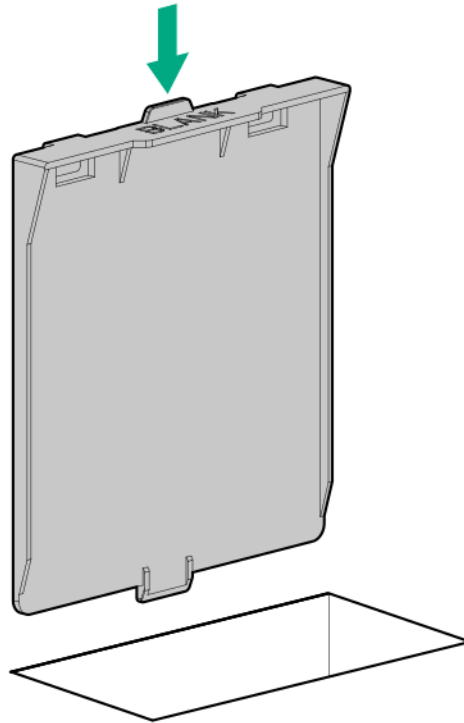
c. Make sure that the blank is firmly seated in the bay.

d. Make sure that all the system cables that are routed through the front cable channel are properly secured in the metal cable tabs.

   This is done to prevent system damage due to cables being inadvertently caught under the fan cage.

e. **Install the fan cage**.

Since the fan 1 was replaced by a fan blank, redundant fan mode is no longer supported in this configuration.

17. **Install the air baffle**.

18. **Install the access panel**.

19. Do one of the following:

    • Server in tower mode: **Position the tower server for operation**.

    • Server in rack mode: **Slide the server into the rack**.

20. Connect all peripheral cables to the server.

21. Connect each power cord to the server.

22. Connect each power cord to the power source.

23. **Power up the server**.

24. **Install the front bezel**.

25. Perform the verification and configuration procedures required by the drive option.

    For more information, see the drive user guide from the Storage section of the **Hewlett Packard Enterprise Information Library**.

The installation is complete.

Installing a USB RDX drive

The half‑height media bays 1 and 2 support the installation of a USB RDX drive option.

Prerequisites

Before you perform this procedure:

- In a server that has the maximum number of drives installed in box 2 and box 3, and the LTO tape drive is present in the half-height media bay 1, make sure that the **fan cage is installed**.

- Make sure that you have the following items available:

  - RDX USB cable

  - LTO/RDX power extension Y-cable

  - RDX drive option – The USB and/or power cables that ship with the drive option will not be used in this server.
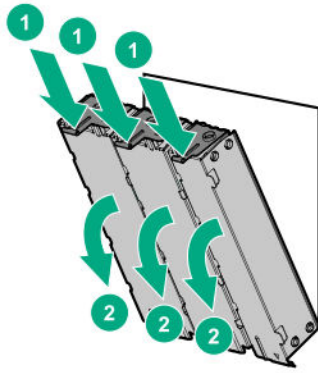
  - T-15 Torx screwdriver

Procedure

1. **Remove the front bezel**.

2. **Power down the server**.

3. Remove all power:

   a. Disconnect each power cord from the power source.

   b. Disconnect each power cord from the server.

4. Disconnect all peripheral cables from the server.

5. Do one of the following:

   - Server in tower mode: **Position the tower server for hardware configuration**.

   - Server in rack mode: **Extend the server from the rack**.

6. **Remove the access panel**.

7. **Remove the air baffle**.

8. If installed, **remove the fan cage**.

9. **Remove the blank from the half-height media bay 1 or 2.**

10. Install the RDX drive screws.

    These screws are included in the RDX drive option kit. If you are installing an RDX drive that does not include its own mounting screws, use the preinstalled **media drive spare screws**.
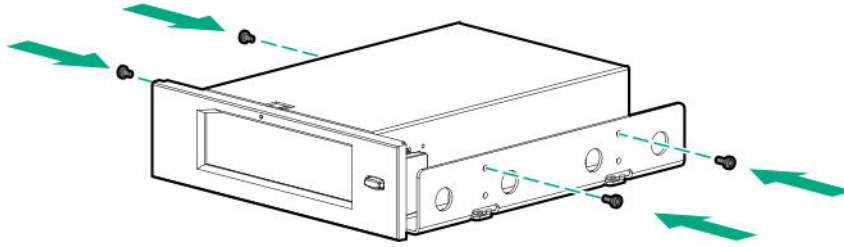
11. Slide the RDX drive into the half‑height media bay 1 or 2 until it clicks into place.
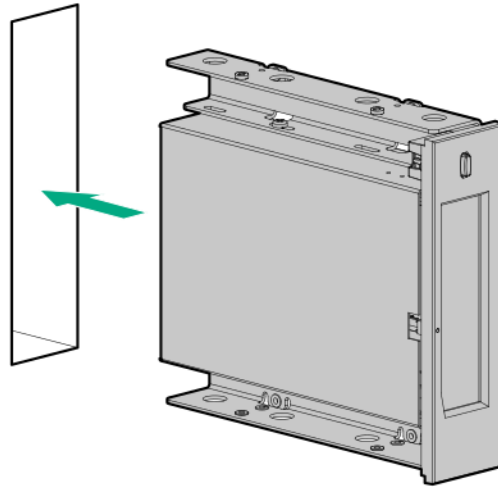
12. **Observe the guidelines for managing cables**.

13. Connect the RDX drive cables:

  a. Connect the USB cable to the RDX drive and to an internal USB port.

  For optimum performance, Hewlett Packard Enterprise recommends connecting the RDX+ drive to the internal USB 3.0, not 2.0 port. The drive is backward compatible with USB 2.0, but the performance will be degraded.

  b. Connect the RDX end of the power extension Y-cable to the RDX drive.

  c. Connect the common end of the power extension Y-cable to the drive box 1 power connector.

  To view the cable routing, see **USB RDX drive cabling**.

14. If the fan cage was removed, do the following:

  a. Make sure that all the system cables that are routed through the front cable channel are properly secured in the metal cable tabs. This is done to prevent system damage due to cables being inadvertently caught under the fan cage.

  b. **Install the fan cage**.

15. **Install the air baffle**.

16. **Install the access panel**.

17. Do one of the following:

- Server in tower mode: **Position the tower server for operation**.

- Server in rack mode: **Slide the server into the rack**.

18. Connect all peripheral cables to the server.

19. Connect each power cord to the server.

20. Connect each power cord to the power source.

21. **Power up the server**.

22. **Install the front bezel**.

23. Perform the verification and configuration procedures required by the drive option.

    For more information, see the drive user guide from the Storage section of the **Hewlett Packard Enterprise Information Library**.

The installation is complete.

Optical drive cage option

The server supports an optical drive cage option that allows the installation of a 9.5 mm optical drive.

Kit contents

- Optical drive cage

- Optical drive cage screws (2)

- Optical drive SATA-power cable

Installing a SATA optical drive

Prerequisites

Before you perform this procedure, make sure that you have the following items available:

- Optical drive cage option
  - Optical drive
  - Optical drive bracket
  - Optical drive bracket screws (2)
  - The SATA-power cable that ships with the drive option will not be used in this server

- T-15 Torx screwdriver

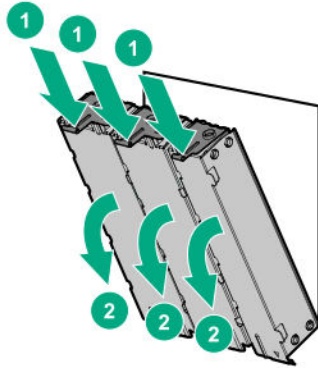- Phillips No. 1 screwdriver

Procedure

1. **Remove the front bezel**.

2. **Power down the server**.

3. Remove all power:

     a. Disconnect each power cord from the power source.

     b. Disconnect each power cord from the server.

4. Disconnect all peripheral cables from the server.

5. Do one of the following:

- Server in tower mode: **Position the tower server for hardware configuration**.

- Server in rack mode: **Extend the server from the rack**.

6. **Remove the access panel**.

7. **Remove the air baffle**.

8. If installed, **remove the fan cage**.

9. While pressing the latch on the optical drive blank, pull out the blank from the bay.

    Retain the blank for future use.
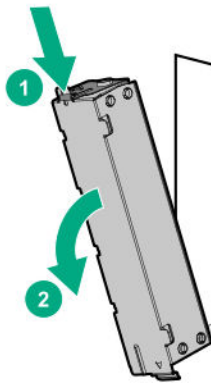
10. Install the optical drive bracket.
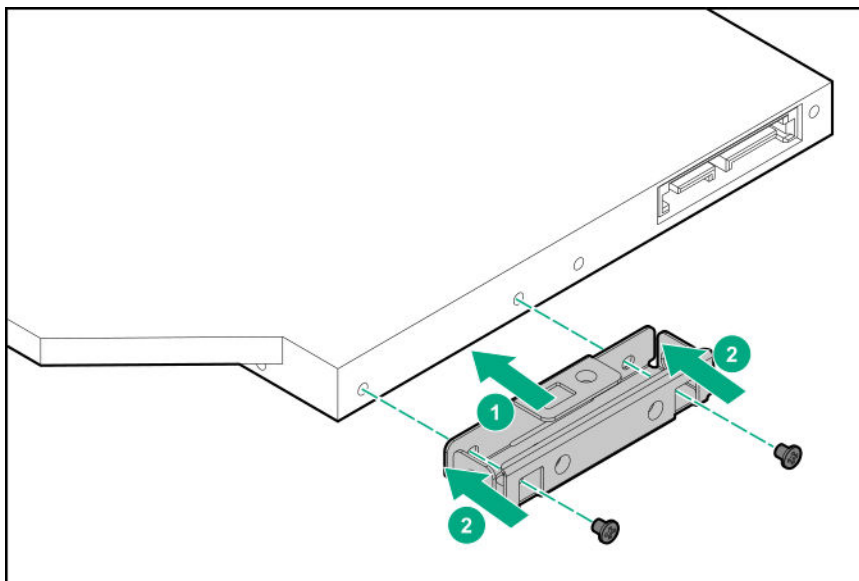
11. Install the optical drive in the drive cage.
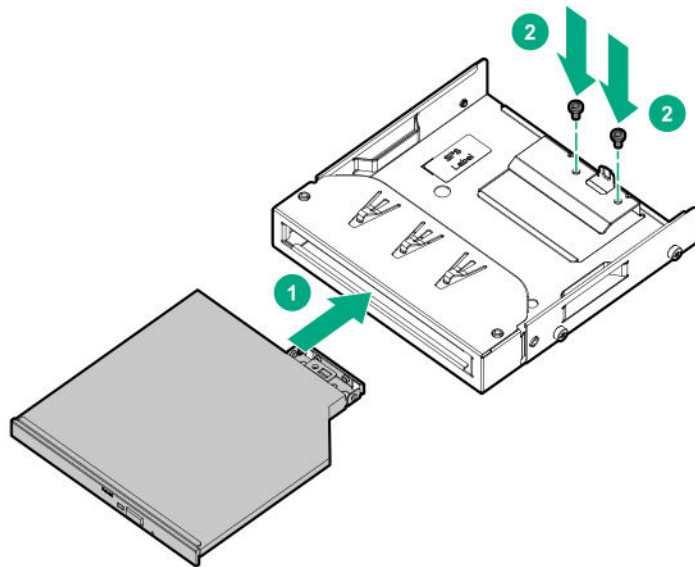
12. **<u>Observe the guidelines for managing cables</u>**.

13. Connect the SATA-power cable to the optical drive.
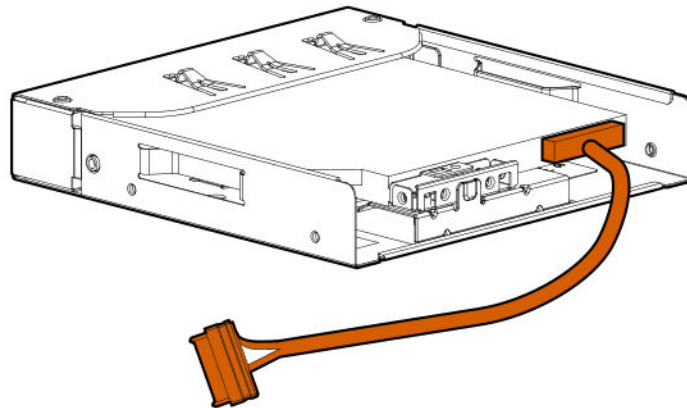
14. Slide the optical drive assembly with the SATA-power cable into the optical drive bay until it clicks into place.
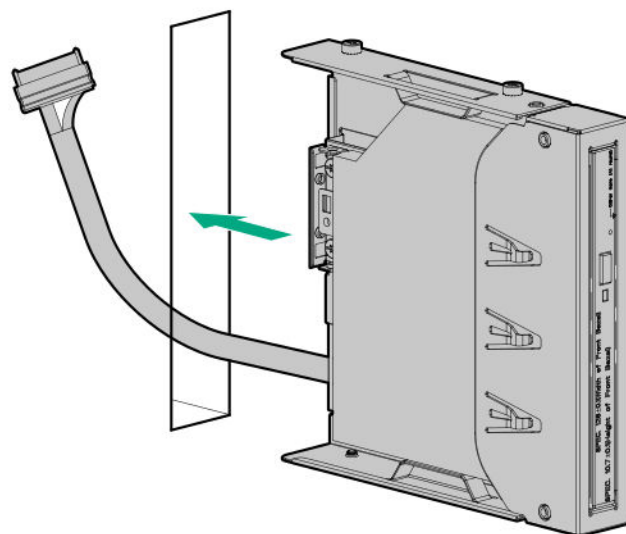
15. **Connect the optical drive power-SATA cable to the system board**.

16. If the fan cage was removed, do the following:

    a. Make sure that all the system cables that are routed through the front cable channel are properly secured in the metal cable tabs. This is done to prevent system damage due to cables being inadvertently caught under the fan cage.

    b. **Install the fan cage**.

17. **Install the air baffle**.

18. **Install the access panel**.

19. Do one of the following:

    - Server in tower mode: **Position the tower server for operation**.

    - Server in rack mode: **Slide the server into the rack**.

20. Connect all peripheral cables to the server.

21. Connect each power cord to the server.

22. Connect each power cord to the power source.

23. **Power up the server**.

24. **Install the front bezel**.

The installation is complete.

Fan cage option

The server supports a fan cage option. This fan cage is required for **specific hardware configurations**.

Kit contents

- Fan cage with four preinstalled fans

- Fan cage brackets (2)

Fan cage implementation

The fan cage is required to meet the system thermal requirements for the following configurations:

- Server operating in rack mode

- Dual-processor configuration

- Server with the following drive box configurations:

  ◦ The maximum number of drives is installed in boxes 1, 2, and 3 (12 drives for LFF configuration, 24 drives for SFF configuration).

  ◦ The maximum number of drives is installed in boxes 2 and 3, and at least two media devices are installed.

- Server with the following options installed:

- NVMe SSDs

- M.2 SSDs

- SFF SAS drives with 10K or 15K rpm rate

- Smart Array P-class 800-series Gen10 controllers*

- GPUs*

- HPE EDR InfiniBand adapters*

- High-performance NIC controllers*

  For specific models covered by the options marked with an asterisk (*), see the product QuickSpecs on the server website at **https://www.hpe.com/servers/ml350-gen10**.

- ASHRAE A3 and A4 compliant configurations

  For more information, see the **Hewlett Packard Enterprise website**.

Fan population and hot-plug support

The number of fans installed in the server determines fan redundancy. When redundant fan mode is enabled, hot-plug fan operation is supported.

In this server, fan operation can either be one of the following:

- Hot-plug – A failed fan can be replaced without powering down the server

- Non-hot-plug – To replace a failed fan, the user must either:

  - Keep the server powered on and complete the fan replacement within 30 seconds of opening the access panel, or

  - Power down and disconnect all power from the server before removing the access panel for fan replacement.

Bay 1	Bay 2	Bay 3	Bay 4	Bay 5	Bay 6	Redundant hot-plug support
—	—	—	—	Fan	Fan	No
Blank	Fan	Fan	Fan	Fan	Fan	No
Fan	Fan	Fan	Fan	Fan	Fan	Yes

Fan mode behavior

- In non-redundant fan mode, a fan failure or a missing fan causes:

  - The system Health LED to flash amber.

  - The operating system to orderly shut down.

- In redundant fan mode:

  - A fan failure or a missing fan will switch the system to non-redundant fan mode.

This change is indicated by the Health LED flashing amber. The system continues to operate normally in this mode.

- ◦ A second fan failure or a missing fan causes the operating system to orderly shut down.

Fan speed

The server supports variable fan speeds. The fans operate at minimum speed until a temperature change requires a fan speed increase to cool the server. The server shuts down during the following temperature‑related scenarios:

- At POST and in the OS, iLO 5 performs an orderly shutdown if a cautionary temperature level is detected. If the server hardware detects a critical temperature level before an orderly shutdown occurs, the server performs an immediate shutdown.

- When the Thermal Shutdown feature is disabled in the BIOS/Platform Configuration (RBSU), iLO 5 does not perform an orderly shutdown when a cautionary temperature level is detected. Disabling this feature does not disable the server hardware from performing an immediate shutdown when a critical temperature level is detected.

> △ **CAUTION:** A thermal event can damage server components when the Thermal Shutdown feature is disabled in the BIOS/Platform Configuration (RBSU).

Installing the fan cage

Prerequisites

Before you perform this procedure, make sure that you have the following items available:

- Fan cage option kit
- T-15 Torx screwdriver

Procedure

1. **Remove the front bezel**.

2. **Power down the server**.

3. Remove all power:

   a. Disconnect each power cord from the power source.

   b. Disconnect each power cord from the server.

4. Disconnect all peripheral cables from the server.

5. Do one of the following:

   - Server in tower mode: **Position the tower server for hardware configuration**.

   - Server in rack mode: **Extend the server from the rack**.

6. **Remove the access panel**.

7. **Remove the air baffle**.

8. If an LTO tape drive is installed, do the following:

a. While pressing the release latch, pull up the fan 1 out of the bay.
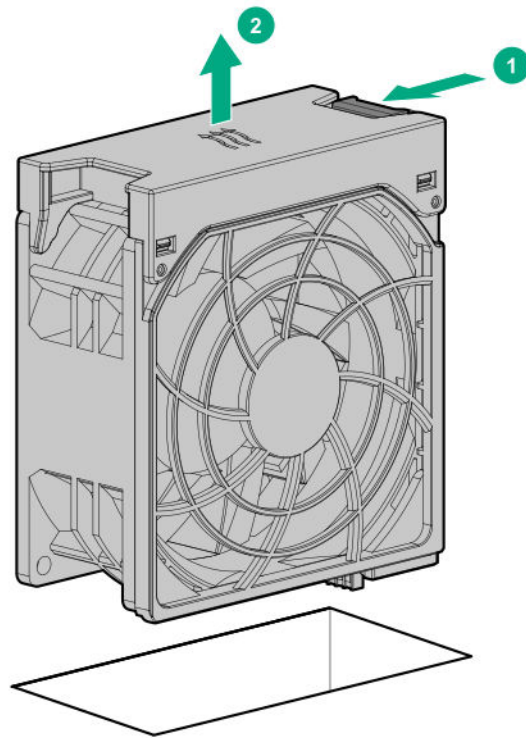
b. Install the fan blank in bay 1.
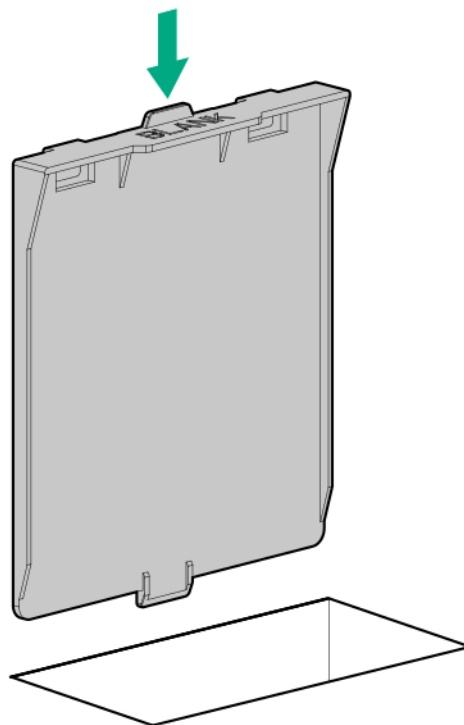
c. Make sure that the blank is firmly seated in the bay.

9. Note the orientation markers on the fan cage brackets: **L** for left and **R** for right.

   In this procedure, left and right terminology is from the perspective of a user facing the front panel.

10. Install the fan cage brackets:

    a. Align the notches on the bracket with the pins on the side of the chassis.

    b. Slide the bracket towards the rear of the chassis until the spring plunger clicks into place.
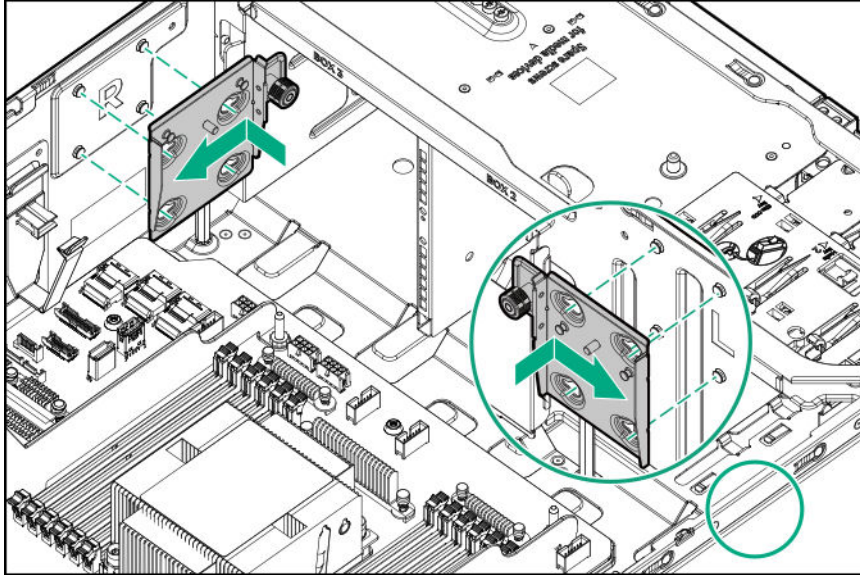
    c. Repeat steps a–b to install the other bracket.

11. **Observe the guidelines for managing cables**.

12. Make sure that all the system cables that are routed through the front cable channel are properly secured in the metal cable tabs. This is done to prevent system damage due to cables being inadvertently caught under the fan cage.
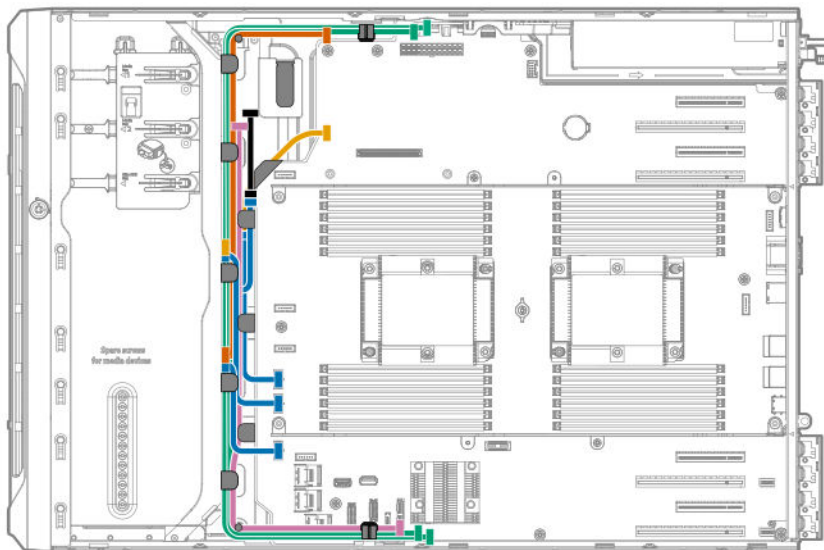
13. Install the fan cage:

a. Align the fan cage with its chassis brackets.

b. Close the latches until they click into place.

14. **Install the access panel**.

15. Do one of the following:

    - Server in tower mode: **Position the tower server for operation**.

    - Server in rack mode: **Slide the server into the rack**.

16. Connect all peripheral cables to the server.

17. Connect each power cord to the server.

18. Connect each power cord to the power source.

19. **Power up the server**.

20. **Install the front bezel**.
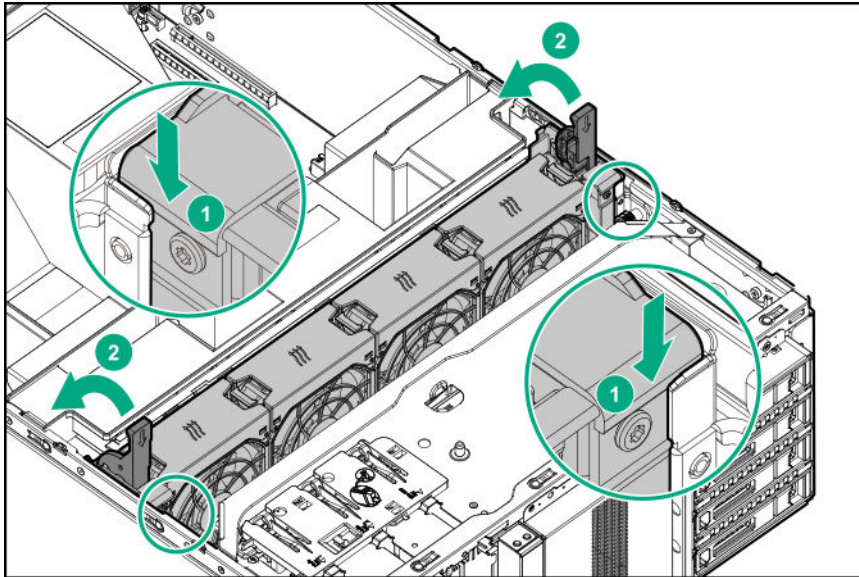
The installation is complete.

Memory options

ⓘ **IMPORTANT:** This server does not support mixing LRDIMMs and RDIMMs. Attempting to mix any combination of these DIMMs can cause the server to halt during BIOS initialization. All memory installed in the server must be of the same type.

DIMM population information

For specific DIMM population information, see the DIMM population guidelines on the Hewlett Packard Enterprise website (**https://www.hpe.com/docs/memory-population-rules**).

DIMM-processor compatibility

The installed processor determines the type of DIMM that is supported in the server:

- First-generation Intel Xeon Scalable processors support DDR4-2666 DIMMs.

- Second-generation Intel Xeon Scalable processors support DDR4-2933 DIMMs.

Mixing DIMM types is not supported. Install only the supported DDR4-2666 or DDR4-2933 DIMMs in the server.

HPE SmartMemory speed information

For more information about memory speed information, see the Hewlett Packard Enterprise website (**https://www.hpe.com/docs/memory-speed-table**).

Installing a DIMM

Procedure

1. **Remove the front bezel**.

2. **Power down the server**.

3. Remove all power:

    a. Disconnect each power cord from the power source.

    b. Disconnect each power cord from the server.

4. Disconnect all peripheral cables from the server.

5. Do one of the following:

    - Server in tower mode: **Position the tower server for hardware configuration**.

    - Server in rack mode: **Extend the server from the rack**.

6. **Remove the access panel**.

7. **Remove the air baffle**.

8. If you are installing a DIMM for processor 2, and the fan cage is present, **remove the fan cage**.

9. Open the DIMM slot latches.

10. Align the notch on the bottom edge of the DIMM with the keyed surface of the DIMM slot, and then fully press the DIMM into the slot until the latches snap back into place.

    The DIMM slots are structured to ensure proper installation. If you try to insert a DIMM but it does not fit easily into the slot, you might have positioned it incorrectly. Reverse the orientation of the DIMM and insert it again
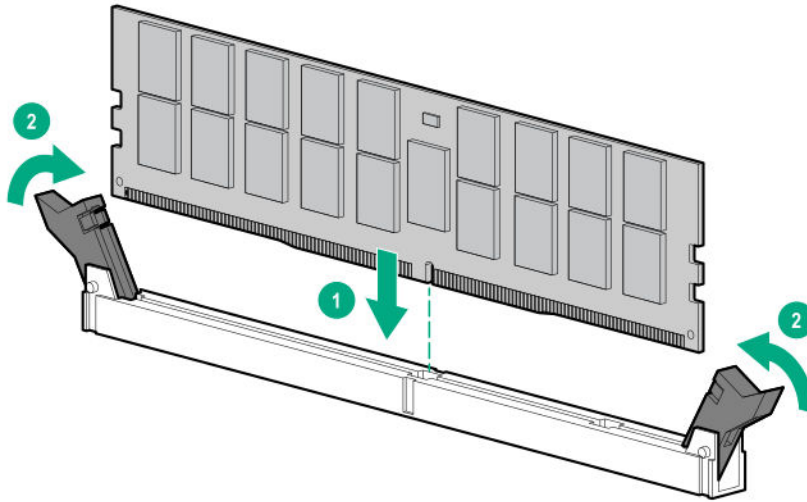
11. If the fan cage was removed, do the following:

   a. Make sure that all the system cables that are routed through the front cable channel are properly secured in the metal cable tabs. This is done to prevent system damage due to cables being inadvertently caught under the fan cage.

   b. **Install the fan cage**.

12. **Install the air baffle**.

13. **Install the access panel**.

14. Do one of the following:

   • Server in tower mode: **Position the tower server for operation**.

   • Server in rack mode: **Slide the server into the rack**.

15. Connect all peripheral cables to the server.

16. Connect each power cord to the server.

17. Connect each power cord to the power source.

18. **Power up the server**.

19. **Install the front bezel**.

The installation is complete.

After installing the DIMMs, use the **System Utilities** > **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Memory Options** to configure the memory settings.

Processor heatsink assembly option

Installing the processor heatsink assembly

Procedure

1. Review the *HPE Server Performance Management and Tuning Guide* for Intelligent System Tuning support on the **Hewlett Packard Enterprise website**.

2. See the product QuickSpecs on the **Hewlett Packard Enterprise website** to identify processor models with specific system operating temperature requirement.

   To select a thermal configuration setting to match the stated temperature requirement, from the **System Utilities** screen, select **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Advanced Options** > **Fan and Thermal Options** > **Thermal Configuration**.

3. **Identify the processor, heatsink, and socket module components**.

4. **Review the processor cautions**.

5. **Install the processor heatsink assembly**.

Processor cautions

⚠ **CAUTION:** To prevent possible server malfunction and damage to the equipment, multiprocessor configurations must contain processors with the same part number.

⚠ **CAUTION:** If installing a processor with a faster speed, update the system ROM before installing the processor.

   To download firmware and view installation instructions, see the **Hewlett Packard Enterprise Support Center website**.

⚠ **CAUTION: THE CONTACTS ARE VERY FRAGILE AND EASILY DAMAGED.** To avoid damage to the socket or processor, do not touch the contacts.

⚠ **CAUTION:** To prevent mechanical damage or depositing oil on your hands or other contaminant to the heatsink contact surface, hold the heatsink only by the edge of its base plate. Do not touch the heatsink fins.

ⓘ **IMPORTANT:** Existing HPE ProLiant and HPE Synergy Gen10 server products containing first-generation Intel Xeon Scalable processors may not be upgraded to second-generation Intel Xeon Scalable processors at this time.

   For more information, see the product QuickSpecs on the Hewlett Packard Enterprise website (**https://www.hpe.com/info/qs**).

Install the processor heatsink assembly

Prerequisites
Before you perform this procedure :

- **Make sure that the fan cage is available**.

- Make sure that the following items are available:

- Processor heatsink assembly option
- T-30 Torx screwdriver

Procedure

1. **Remove the front bezel**.

2. **Power down the server**.

3. Remove all power:

   a. Disconnect each power cord from the power source.

   b. Disconnect each power cord from the server.

4. Disconnect all peripheral cables from the server.

5. Do one of the following:

   - Server in tower mode: **Position the tower server for hardware configuration**.

   - Server in rack mode: **Extend the server from the rack**.

6. **Remove the access panel**.

7. **Remove the air baffle**.

8. If you an installing the processor in the processor socket 2, **remove the fan cage**.

9. Remove the processor socket blank.

   Retain the blank for future use.
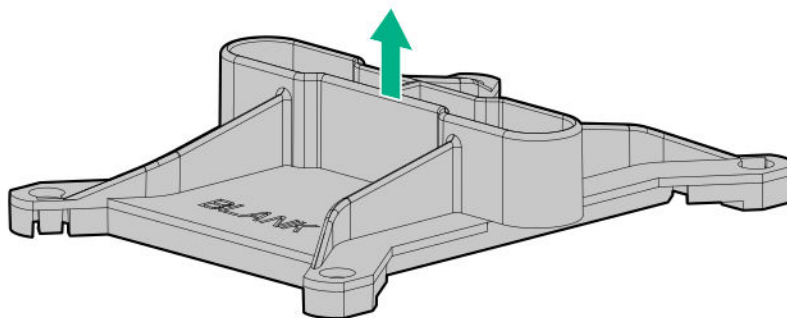
10. The processor heatsink assemblies for processor sockets 1 and 2 are not interchangeable. Note the appropriate assembly orientation on the heatsink label.

11. Install the processor heatsink assembly:

    a. Locate and align the Pin 1 indicator on the processor frame and the socket.

    b. Align the processor heatsink assembly with the heatsink alignment posts and gently lower it down until it sits evenly on the socket.

       The heatsink alignment posts are keyed. The processor will only install one way.

A standard heatsink is shown, your heatsink might look different.
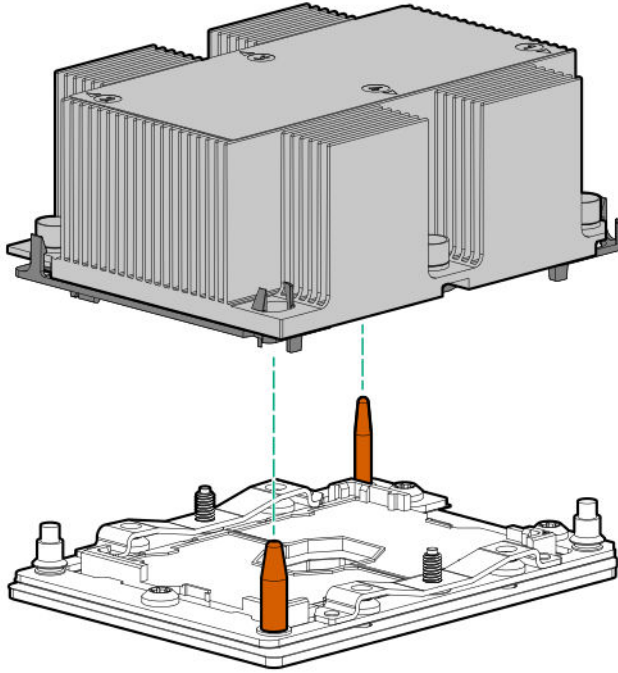
⚠ **CAUTION:** Be sure to tighten each heatsink nut fully in the order indicated. Otherwise, boot failure or intermittent shutdowns might occur.

c. Using a T-30 Torx screwdriver, tighten the nuts until they stop.
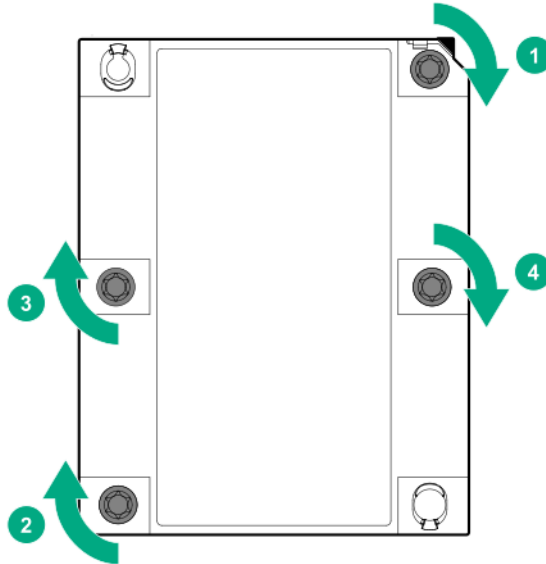
12. If the fan cage was removed, do the following:

a. Make sure that all the system cables that are routed through the front cable channel are properly secured in the metal cable tabs. This is done to prevent system damage due to cables being inadvertently caught under the fan cage.

b. **Install the fan cage**.

13. **Install the air baffle**.

14. **Install the access panel**.

15. Do one of the following:

   - Server in tower mode: **Position the tower server for operation**.

   - Server in rack mode: **Slide the server into the rack**.

16. Connect all peripheral cables to the server.

17. Connect each power cord to the server.

18. Connect each power cord to the power source.

19. **Power up the server**.

20. **Install the front bezel**.

The installation is complete.

Storage controller options

The server supports the following storage controllers:

- For SATA drives only – Embedded HPE Smart Array S100i SR Gen10 Controller

- For SAS and SATA drives:

  ○ Type-a modular Smart Array controller (AROC)

  ○ Type-p standup plug-in Smart Array controller

    The PCIe3 expansion slots 2 and 4 have a x4 link width. To take advantage of the full features of a x8 or x16 expansion boards, Hewlett Packard Enterprise recommends installing these boards in a x8 or x16 expansion slot as well.

    For the location and description of the PCIe3 expansion slots, see **System board components**.

    For more information on PCIe slot descriptions, see **PCIe slot description**.

Standup PCIe plug-in Smart Array controller option (type-p)

The server supports two Smart Array Gen10 standup plug-in controllers (type-p) per processor. For more information on the controller cable compatible with these standup controllers, see **Storage controller cables**.

Installing a standup PCIe plug-in Smart Array controller (type-p)

Prerequisites

Before you perform this procedure, make sure that you have the following items available:

- Smart Array standup controller option kit

This kit includes the:

- ◦ Smart Array storage controller

- ◦ Controller backup power cable

- **Compatible controller cable option**

- If you are installing a Smart Array P-class 800 series Gen10 controller, **make sure that the fan cage is installed**.

- If you are installing a Smart Array P-class Gen10 controller, **an energy pack option is required**.

- T-15 Torx screwdriver

Before you perform this procedure, perform the following steps:

1. Back up data on the system.

2. Close all applications.

3. **Update the server firmware if it is not the latest revision**.

4. Do one of the following:

   - If the new Smart Array is the new boot device, install the device drivers.

   - If the new Smart Array is not the new boot device, go to the next step.

5. Ensure that users are logged off and that all tasks are completed on the server.

⚠ **CAUTION:** In systems that use external data storage, be sure that the server is the first unit to be powered down and the last to be powered back up. Taking this precaution ensures that the system does not erroneously mark the drives as failed when the server is powered up.

Procedure

1. **Remove the front bezel**.

2. **Power down the server**.

3. Remove all power:

   a. Disconnect each power cord from the power source.

   b. Disconnect each power cord from the server.

4. Disconnect all peripheral cables from the server.

5. Do one of the following:

   - Server in tower mode: **Position the tower server for hardware configuration**.

   - Server in rack mode: **Extend the server from the rack**.

6. **Remove the access panel**.

7. **Remove the air baffle**.

8. If installed, **remove the fan cage**.

9. **Remove the PCI blank retainer**.

10. Identify the expansion slot compatible with the option.

11. **Remove the PCI slot blank**.

12. If the storage controller option does not include a screw for installation, **remove one of the preinstalled PCI board screw**.

13. Install the standup storage controller.
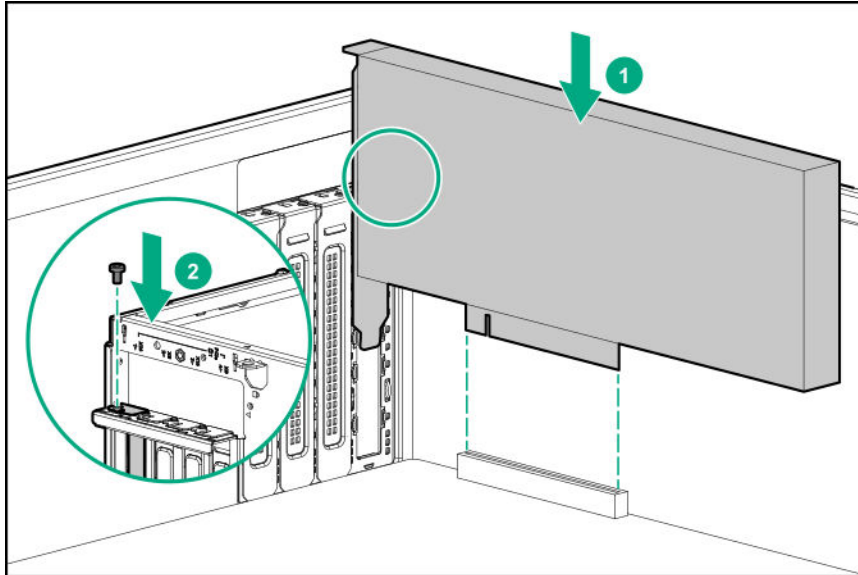
14. Make sure that the board is firmly seated in the slot.

15. **Install the PCI blank retainer**.

16. **Observe the guidelines for managing cables**.

17. **Cable the controller**.

18. To enable HPE Smart Array SR SmartCache or HPE Smart Array MR CacheCade in a Smart Array P-class type-p Gen10 controller, **install an energy pack**.

    SmartCache and CacheCade enable solid-state drives to be used as caching devices for hard drive media. These features accelerate access to frequently used data by caching hot data from the hard drives onto the solid-state drives.

19. If the fan cage was removed, do the following:

    a. Make sure that all the system cables that are routed through the front cable channel are properly secured in the metal cable tabs. This is done to prevent system damage due to cables being inadvertently caught under the fan cage.

    b. **Install the fan cage**.

20. **Install the air baffle**.

21. **Install the access panel**.

22. Do one of the following:

- Server in tower mode: **Position the tower server for operation**.

- Server in rack mode: **Slide the server into the rack**.

23. Connect all peripheral cables to the server.

24. Connect each power cord to the server.

25. Connect each power cord to the power source.

26. **Install the front bezel**.

27. **Configure the storage controller**.

The installation is complete.

Modular Smart Array controller option (type-a, AROC)

The server support one Smart Array Gen10 modular controller (type-a, AROC). For more information on the controller cable compatible with a modular controller, see **Storage controller cables**.

Installing a modular Smart Array controller option (type-a, AROC)

Prerequisites

Before you perform this procedure, make sure that you have the following items available:

- Smart Array modular controller option

- **Compatible controller cable option**

- T-15 Torx screwdriver

Before you perform this procedure, perform the following steps:

1. Back up data on the system.

2. Close all applications.

3. **Update the server firmware if it is not the latest revision**.

4. Do one of the following:

- If the new Smart Array is the new boot device, install the device drivers.

- If the new Smart Array is not the new boot device, go to the next step.

5. Ensure that users are logged off and that all tasks are completed on the server.

⚠ **CAUTION:** In systems that use external data storage, be sure that the server is the first unit to be powered down and the last to be powered back up. Taking this precaution ensures that the system does not erroneously mark the drives as failed when the server is powered up.

**Procedure**

1. **Remove the front bezel**.

2. **Power down the server**.

3. Remove all power:

    a. Disconnect each power cord from the power source.

    b. Disconnect each power cord from the server.

4. Disconnect all peripheral cables from the server.

5. Do one of the following:

   - Server in tower mode: **Position the tower server for hardware configuration**.

   - Server in rack mode: **Extend the server from the rack**.

6. **Remove the access panel**.

7. **Remove the air baffle**.

8. If installed, **remove the fan cage**.

9. If a server that has both a modular storage controller and a double-width GPU present in the PCIe slot 5 or 7 is going to be transported to a different location, **install the AROC cover and cushion included the AROC cable kit**.

10. Install the modular storage controller:

    a. While holding the snap-in latch in the open position, insert the alignment pins on the system board through the holes on the controller board.

    b. Release the snap-in latch and make sure that it properly engages over the side of the controller board.

    c. Press on the area of the controller board marked as **PRESS TO INSTALL** to ensure that the board is firmly seated on the slot.

    d. Tighten the controller board thumbscrews.
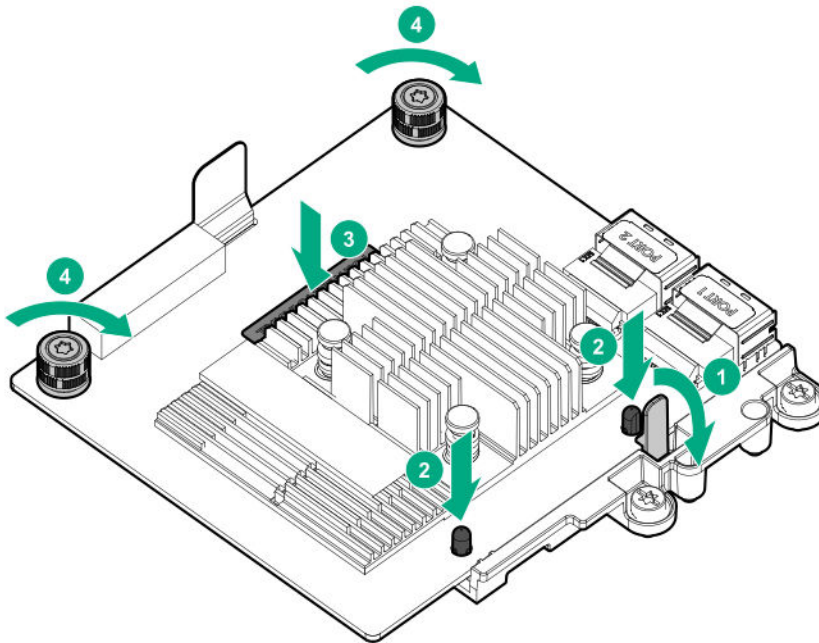
11. **Observe the guidelines for managing cables**.

12. **Cable the controller**.

13. If the fan cage was removed, do the following:

   a. Make sure that all the system cables that are routed through the front cable channel are properly secured in the metal cable tabs. This is done to prevent system damage due to cables being inadvertently caught under the fan cage.

   b. **Install the fan cage**.

14. **Install the air baffle**.

15. **Install the access panel**.

16. Do one of the following:

   • Server in tower mode: **Position the tower server for operation**.

   • Server in rack mode: **Slide the server into the rack**.

17. Connect all peripheral cables to the server.

18. Connect each power cord to the server.

19. Connect each power cord to the power source.

20. **Install the front bezel**.

21. **Configure the storage controller**.

The installation is complete.

Installing the AROC cover and cushion

The AROC cover and cushion protect the controller board from vibration damage that might occur during server shipment. The AROC cover is intended for a debug connector that might not be present in all modular controller models.

Procedure

1. Remove the protective film from the cushion.

2. Align one end of the cushion to the edge of the heatsink, and then press the cushion down to attach it.

3. For modular controllers with a debug connector, install the rubber cover over the connector.
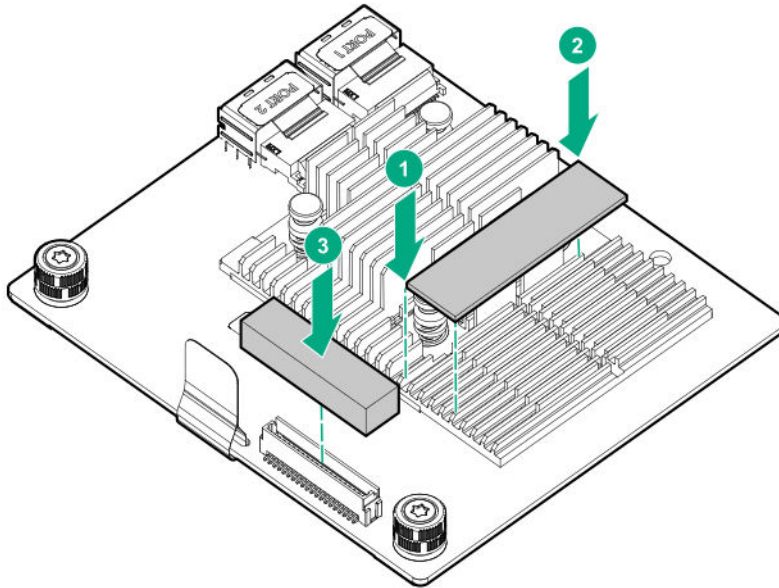
Configuring an HPE Smart Array Gen10 controller

Procedure

1. **Power up the server**.

2. If you are running the server in UEFI Boot Mode, select the boot options.

3. **Update the drive firmware if it is not the latest revision**.

4. (Optional) If running the server in Legacy Boot Mode, set the controller as the boot controller.

5. (Optional) If running the server in Legacy Boot Mode, change the controller boot order.

6. If the new controller is not the new boot device, install the device drivers.

7. Update the controller firmware if it is not the latest revision.

   - For MR controllers, use Service Pack for ProLiant (SPP), MR Storage Administrator, or StorCLI.

   - For SR controllers, use SPP.

8. Create arrays and logical drives.

   - For MR controllers, use UEFI System Utilities, MR Storage Administrator, or StorCLI.

   - For SR controllers, use UEFI System Utilities or HPE Smart Storage Administrator (HPE SSA).

See the following resources for more information:

- SPP – See the product documentation in the information library:

  https://www.hpe.com/info/spp/docs

- MR Storage Administrator – See the *HPE MR Storage Administrator User Guide* in the information library:

  https://www.hpe.com/info/smartstorage-docs

- StorCLI – See the *HPE StorCLI User Guide* in the information library:

  https://www.hpe.com/info/P824i-pdocs

- UEFI System Utilities or HPE Smart Storage Administrator – See the *HPE Smart Array SR Gen10 Configuration Guide* in the information library:

  https://www.hpe.com/info/smartstorage-docs

Energy pack options

Hewlett Packard Enterprise offers two centralized backup power source options to back up write cache content on P-class Smart Array controllers in case of an unplanned server power outage.

- **HPE Smart Storage Battery**

- **HPE Smart Storage Hybrid Capacitor**

  > ⓘ **IMPORTANT:** The HPE Smart Storage Hybrid Capacitor is only supported on Gen10 and later servers.

One energy pack option can support multiple devices. An energy pack option is required for P-class Smart Array controllers. Once installed, the status of the energy pack displays in HPE iLO. For more information, see the HPE iLO user guide on the Hewlett Packard Enterprise website (**https://www.hpe.com/support/ilo-docs**).

HPE Smart Storage Battery

The HPE Smart Storage Battery supports the following devices:

- HPE Smart Array SR controllers

- HPE Smart Array MR controllers

A single 96W battery can support up to 24 devices.

After the battery is installed, it might take up to two hours to charge. Controller features requiring backup power are not re-enabled until the battery is capable of supporting the backup power.

This server supports the 96W HPE Smart Storage Battery with the 260mm cable.

HPE Smart Storage Hybrid Capacitor

The HPE Smart Storage Hybrid Capacitor supports the following devices:

- HPE Smart Array SR controllers

- HPE Smart Array MR controllers

The capacitor pack can support up to three devices.

This server supports the HPE Smart Storage Hybrid Capacitor with the 260mm cable.

Before installing the HPE Smart Storage Hybrid Capacitor, verify that the system BIOS meets the minimum firmware requirements to support the capacitor pack.

> ⓘ **IMPORTANT:** If the system BIOS or controller firmware is older than the minimum recommended firmware versions, the capacitor pack will only support one device.

The capacitor pack is fully charged after the system boots.

Minimum firmware versions

Product	Minimum firmware version
HPE ProLiant ML350 Gen10 Server system ROM	2.00
HPE Smart Array SR controllers	1.90
HPE Smart Array MR controllers	24.23.0-0041

Installing an energy pack

Prerequisites

Before you perform this procedure:

- **Make sure that a Smart Array P-class Gen10 controller is installed**.

- Make sure that you have the following items available:

  ◦ Storage controller backup power cable (ships with the storage controller)

  ◦ Energy pack option

- If you are installing the HPE Smart Storage Hybrid Capacitor, **verify that the system BIOS meets the minimum firmware requirements**.

Procedure

1. **Remove the front bezel**.

2. **Power down the server**.

3. Remove all power:

   a. Disconnect each power cord from the power source.

   b. Disconnect each power cord from the server.

4. Disconnect all peripheral cables from the server.

5. Do one of the following:

   - Server in tower mode: **Position the tower server for hardware configuration**.

   - Server in rack mode: **Extend the server from the rack**.

6. **Remove the access panel**.

7. **Remove the air baffle**.

⚠ **CAUTION:** The snap-in latch of the energy pack holder is flexible. However, to avoid damaging this latch, do not apply too much pressure on this latch when removing or installing the energy pack from the chassis.

8. While carefully holding the snap-in latch in the open position, slide the energy pack holder up to disengage it from the chassis.
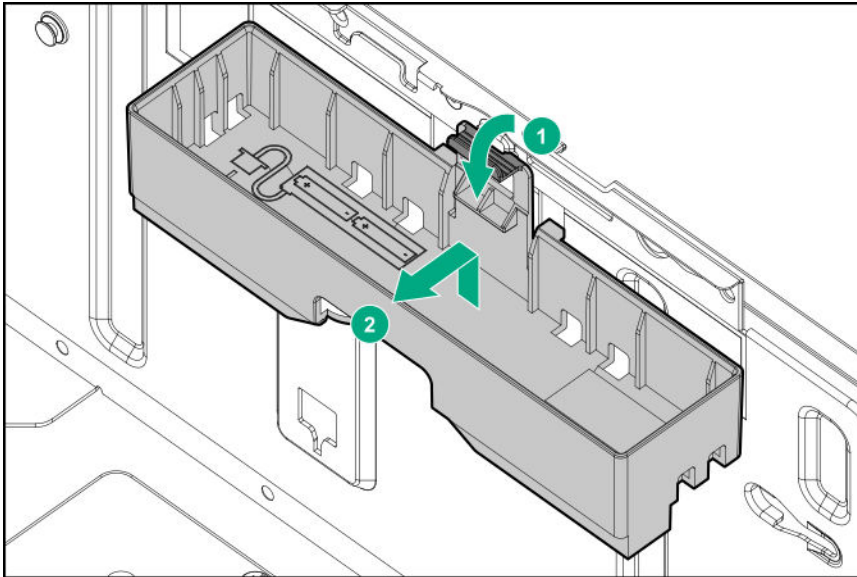
9. Install the energy pack into the holder:

   a. Route the energy pack cable through the holder cutout marked with a down arrow.

   b. Install the energy pack in the holder.
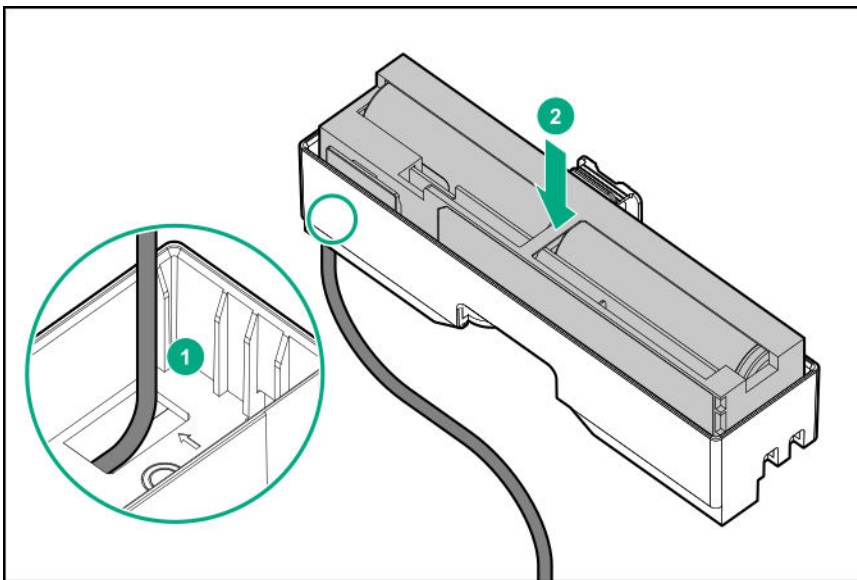
10. Secure the energy pack cable through the holder cable clips.
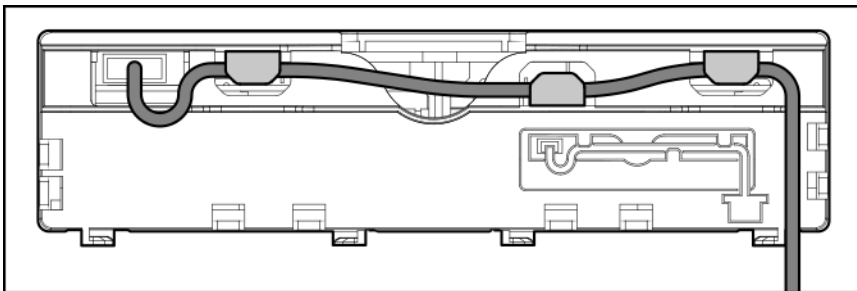
11. Install the energy pack in the chassis:

a. Insert the holder tabs into their corresponding chassis slots, and then slide the holder down

b. Connect the energy pack cable to the system board.
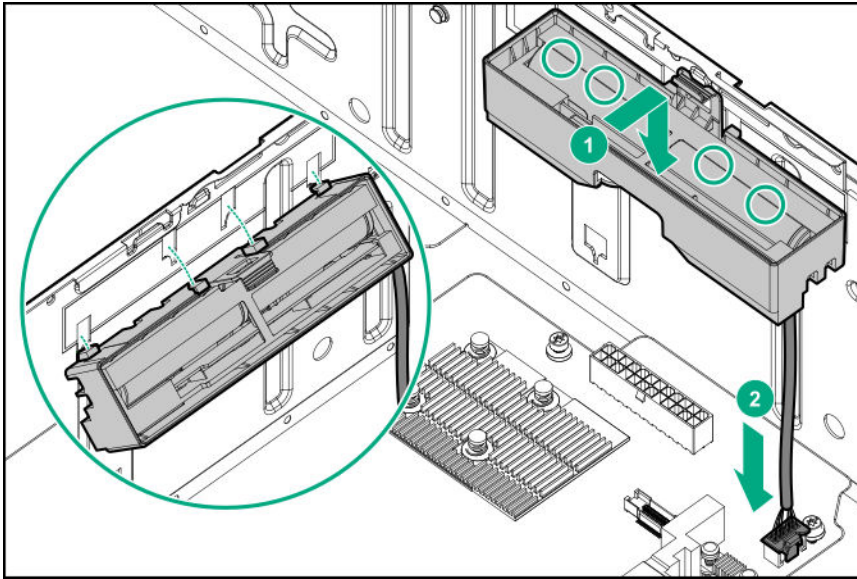
12. **Connect the storage controller backup power cable**.

13. **Install the air baffle**.

14. **Install the access panel**.

15. Do one of the following:

    - Server in tower mode: **Position the tower server for operation**.

    - Server in rack mode: **Slide the server into the rack**.

16. Connect all peripheral cables to the server.

17. Connect each power cord to the server.

18. Connect each power cord to the power source.

19. **Power up the server**.

20. **Install the front bezel**.

The installation is complete.

Expansion board options

The server has eight PCIe3 expansion slots that support full-height expansion boards.

The PCIe3 expansion slots 2 and 4 have a x4 link width. To take advantage of the full features of a x8 or x16 expansion boards, Hewlett Packard Enterprise recommends installing these boards in a x8 or x16 expansion slot as well.

For the location and description of the PCIe3 expansion slots, see **System board components**.

For more information on PCIe slot descriptions, see **PCIe slot description**.

Expansion board thermal requirement

The fan cage option is required to meet the system thermal requirement when the following expansion board options are installed:

- Smart Array P-class 800-series Gen10 controllers

- GPUs

- HPE EDR InfiniBand adapters

- High-performance Ethernet controllers

For fan cage information, see **Fan cage option**.

For a list of specific models supported for each of these expansion options, see the product QuickSpecs on the server website at **https://www.hpe.com/servers/ml350-gen10**.

Accelerator options

This server supports various accelerator options to meet your computational and graphics workload requirements. For a list of supported accelerator models, see the server QuickSpecs on the Hewlett Packard Enterprise website (**https://www.hpe.com/info/qs**).

- PCIe workload accelerators – These options are PCIe card‑based, direct‑attach solutions that use solid‑state storage technology directly on the PCI bus to boost I/O performance and reduce latency to scale in line with your processing requirements.

- Computational and graphics accelerators – These options deliver accelerated compute performance for a range of deep learning, high-performance computing (HPC), and graphics-intensive applications.

Accelerator installation information

- The PCIe3 x16 expansion slots 1, 3, 5, and 7 support both single-width and double-width accelerators.

- The maximum number of accelerators supported in this server depends on the drive configuration and whether the accelerator is single- or double-width.

- This server does not support the installation of different accelerator models in the same system.

- This server supports NVIDIA NVLink technology for specific accelerators. This technology allows two matching accelerators to communicate directly through a high-speed interconnection—NVLink bridge. This interconnection effectively combines the available memory of both accelerators for increased workload performance. For more information, see the **NVIDIA website**.

- Some accelerator options shipped with an extender bracket attached or included in the option box. See the accelerator documentation for information on when this extender bracket might be required for installation.

For a list of supported accelerator models, see the product QuickSpecs on the server website at **https://www.hpe.com/servers/ml350-gen10**.

GPU auxiliary power cabling

Depending on the maximum power requirement of the GPU, an external auxiliary power connection might be required. See the GPU documentation for the specific auxiliary power connections required for that model.

The GPU auxiliary power cable kit consists of two cables of different lengths for:

- GPUs installed in the PCIe x16 slots 1 and 3, use the 879289-001 power cable (1000 mm, 39.37 in).

- GPUs installed in the PCIe slots 5 and 7, use the 876503-001 power cable (180 mm, 7.09 in).

For more information on how these cables are routed, see **GPU auxiliary power cabling**.

Thermal and power requirements for accelerator options

- The fan cage option is required to meet the system thermal requirement when an accelerator is installed. For fan cage information, see **Fan cage option**.

- The system operating temperature requirement will vary depending on the accelerator model, the drive configuration, and the thermal configuration setting enabled in BIOS. For more information, see the product QuickSpecs on the **Hewlett Packard Enterprise website**.

  To select a thermal configuration setting, from the **System Utilities** screen, select **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Advanced Options** > **Fan and Thermal Options** > **Thermal Configuration**.

- For high-power accelerator options, Hewlett Packard Enterprise recommends using the HPE 1600 W Flex Slot Platinum Hot-plug Low Halogen Power Supply. Use the HPE Power Advisor tool to estimate the power consumption requirement based on specific system configuration. For more information on this tool, see the **Hewlett Packard Enterprise website**.

ⓘ **IMPORTANT:** Workloads for high performance double-width accelerators with passive cooling can cause the fans to operate at high speeds to maintain optimum system cooling. This high-speed fan operation leads to a sound pressure level of between 75 dB(A) to 80 dB(A). Hewlett Packard Enterprise does not recommend operating the server under this passive cooling condition in or near a site where there is a reasonable expectation for a quiet environment.

Installing an expansion board

Prerequisites

Before you perform this procedure:

- Check if the expansion board option requires the fan cage, see **Expansion board thermal requirement**.

- When installing an accelerator option, review the **Accelerator installation information**.

- Make sure that you have the following items available:

  ◦ Expansion board option kit

  ◦ Internal and external cabling required by the expansion board

  ◦ T-15 Torx screwdriver

Procedure

1. **Remove the front bezel**.

2. **Power down the server**.

3. Remove all power:

   a. Disconnect each power cord from the power source.

   b. Disconnect each power cord from the server.

4. Disconnect all peripheral cables from the server.

5. Do one of the following:

   - Server in tower mode: **Position the tower server for hardware configuration**.

   - Server in rack mode: **Extend the server from the rack**.

6. **Remove the access panel**.

7. **Remove the air baffle**.

8. Optional: If installed, **remove the fan cage**.

   This step is only required if the expansion board cabling needs to be routed through the front cable channel.

9. **Remove the PCI blank retainer**.

10. Identify the expansion slot compatible with the option.

11. **Remove the PCI slot blank**.

    If you are installing a double-width expansion board, remove two PCI slot blanks.

12. If the expansion board option does not include a screw for installation, **remove one of the preinstalled PCI board screw**.

13. Make sure that any switches or jumpers on the expansion board are set properly.

    For more information, see the documentation that ships with the option.

14. Install the expansion board.

    - Single-width standup expansion board
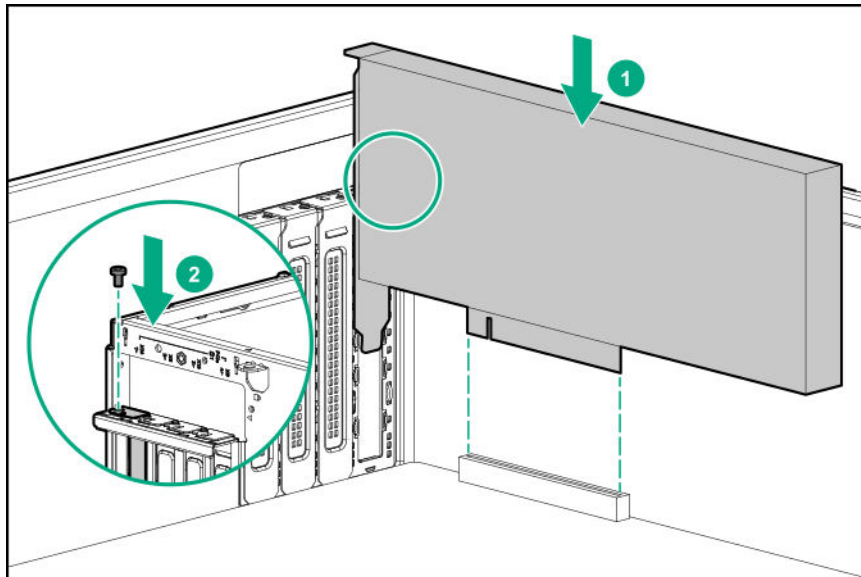
    - Double-width standup expansion board
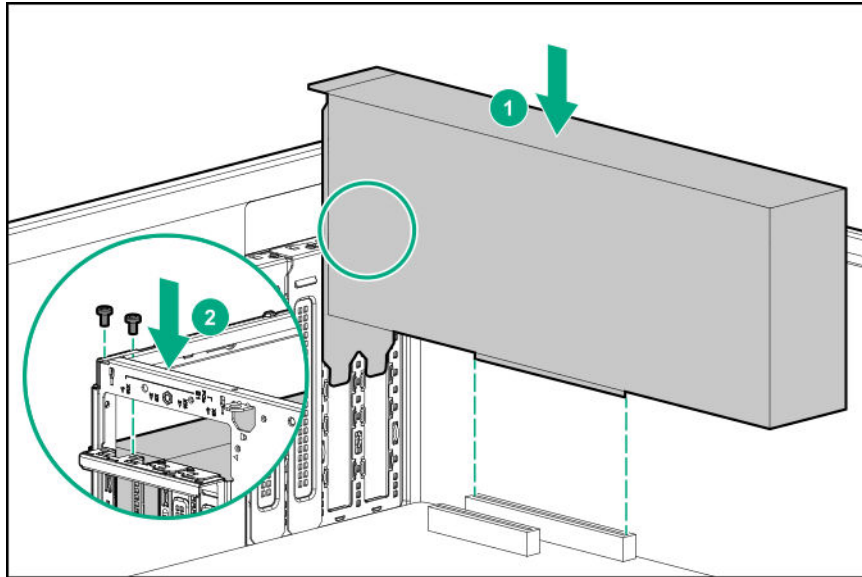
15. Make sure that the board is firmly seated in the slot.

16. **Observe the guidelines for managing cables**.

17. Connect all necessary internal cabling to the expansion board.

    For more information on these cabling requirements, see the documentation that ships with the option.

18. **Install the PCI blank retainer**.

19. If the fan cage was removed, do the following:

    a. Make sure that all the system cables that are routed through the front cable channel are properly secured in the metal cable tabs. This is done to prevent system damage due to cables being inadvertently caught under the fan cage.

    b. **Install the fan cage**.

20. **Install the air baffle**.

21. **Install the access panel**.

22. Do one of the following:

    - Server in tower mode: **Position the tower server for operation**.

    - Server in rack mode: **Slide the server into the rack**.

23. Connect all necessary external cabling to the expansion board.

    For more information on these cabling requirements, see the documentation that ships with the option.

24. Connect all peripheral cables to the server.

25. Connect each power cord to the server.

26. Connect each power cord to the power source.

27. **Power up the server**.

28. **Install the front bezel**.

The installation is complete.

HPE 12G SAS expander card option

The HPE 12G SAS Expander Card connects to a Smart Array E-class and P-class Gen10 controllers. In this server, this expander card supports the 24 SFF hot-plug drive configuration.

Kit contents

- HPE 12G SAS Expander Card

- Expander card to backplane Mini-SAS X-cables (3)

- Expander card to standup controller Mini-SAS X-cable

- Expander card to modular controller Mini-SAS X-cable

SAS expander card port numbering

Expander port	Cable part number	Controller	Box number	SFF drive numbering: SAS expander
Port 1	Standup: 876502-001	CTRL Port 1	—	—
Port 2	Modular: 876495-001	CTRL Port 2		
Port 3	876484-001	—	Box 3	1-4
Port 4				5-8
Port 5	876483-001	—	Box 2	9-12
Port 6				13-16

Table Continued

Expander port	Cable part number	Controller	Box number	SFF drive numbering: SAS expander
Port 7	876482-001	—	Box 1	17-20
Port 8				21-24
Port 9[1]	—	—	—	—

[1] This port will not be used in this server.

Installing the SAS expander card

Prerequisites

Before you perform this procedure:

- Make sure that you have the latest firmware for the controllers and the expander card. To download the latest firmware, see the **Hewlett Packard Enterprise website**.

- Note the port numbering on the:

  - Controller cables

  - **SAS expander card**

  - Controller boards and drive backplanes

- Make sure you have the following items available:

  - HPE 12G SAS expander card option kit

  - Smart Array E-class or P-class Gen10 controller option with internal ports

  - T-15 Torx screwdriver

Procedure

1. **Remove the front bezel**.

2. **Power down the server**.

3. Remove all power:

   a. Disconnect each power cord from the power source.

   b. Disconnect each power cord from the server.

4. Disconnect all peripheral cables from the server.

5. Do one of the following:

   - Server in tower mode: **Position the tower server for hardware configuration**.

   - Server in rack mode: **Extend the server from the rack**.

6. **Remove the access panel**.

7. **Remove the air baffle**.

8. If installed, **remove the fan cage**.

9. **Remove the PCI blank retainer**.

10. **Remove the blanks opposite the processor 1 PCIe3 expansion slots where the expander card and the standup storage controller board will be installed**.

    In this server, the expander card is supported in the PCIe3 expansion slots 2 and 4.

11. **Remove the PCI board screws opposite the selected slots**.

12. **Observe the guidelines for managing cables**.

13. **Connect the Mini-SAS X-cables to the expander card**.

14. Install the SAS expander card.
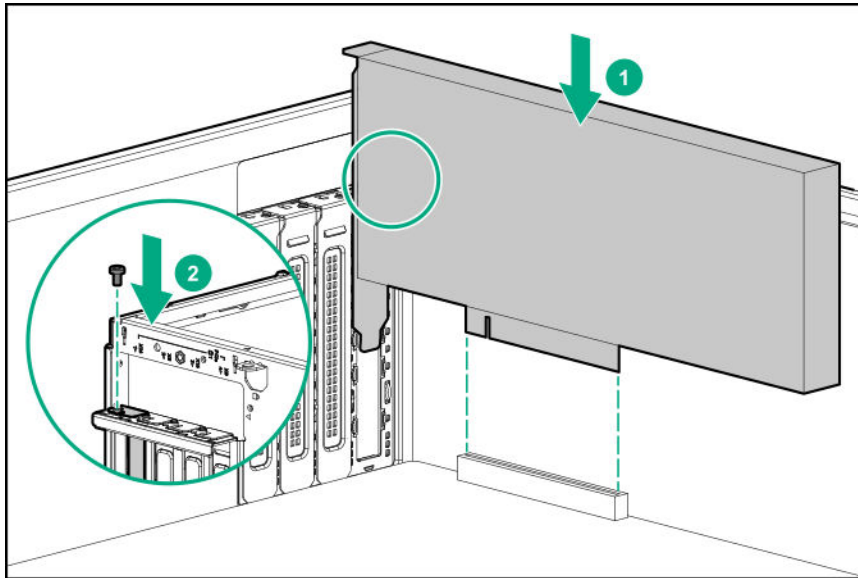
15. Make sure that the card is firmly seated in the slot.

16. If you are using the expander card with a standup controller, do the following:

    a. **Install the standup controller**.

    b. Connect the 876502-001 Mini-SAS X-cable to the standup controller.

    c. Connect the following Mini-SAS X-cables to the drive backplanes:

       • 876482-001 Mini-SAS X-cable = Drive box backplane 1

       • 876483-001 Mini-SAS X-cable = Drive box backplane 2

       • 876484-001 Mini-SAS X-cable = Drive box backplane 3

    To view the cable routing, see **SAS expander card with standup controller cabling**.

17. If you are using the expander card with a modular controller (AROC), do the following:

    a. **Install the modular controller**.

    b. Route and connect the 876495-001 Mini-SAS X-cable to the modular controller.

    c. Route and connect the following Mini-SAS X-cables to the drive backplanes:

- 876482-001 Mini-SAS X-cable = Drive box backplane 1

- 876483-001 Mini-SAS X-cable = Drive box backplane 2

- 876484-001 Mini-SAS X-cable = Drive box backplane 3

   To view the cable routing, see **SAS expander card with modular controller cabling**.

18. **Install the PCI blank retainer**.

19. If the fan cage was removed, do the following:

    a. Make sure that all the system cables that are routed through the front cable channel are properly secured in the metal cable tabs. This is done to prevent system damage due to cables being inadvertently caught under the fan cage.

    b. **Install the fan cage**.

20. **Install the air baffle**.

21. **Install the access panel**.

22. Do one of the following:

    - Server in tower mode: **Position the tower server for operation**.

    - Server in rack mode: **Slide the server into the rack**.

23. Connect all peripheral cables to the server.

24. Connect each power cord to the server.

25. Connect each power cord to the power source.

26. **Power up the server**.

27. **Install the front bezel**.

28. **Configure the storage controller**.

The installation is complete.

M.2 SSD options

The server supports the installation of M.2 SATA and NVMe SSD options for:

- Booting up from flash solution

- Data backup/redundancy

M.2 SATA SSD enablement option

The server supports the installation of an M.2 SATA SSD enablement board in the PCIe3 expansion slots 1–4. This enablement board supports two M.2 2280 SATA SSDs.

Use the embedded HPE Smart Array S100i SR Gen10 Controller to manage the M.2 SATA SSDs. The S100i SR Gen10 SW RAID support requires that the server boot mode be set to UEFI.

Kit contents

- M.2 SATA SSD enablement board

- M.2 SATA SSD – The SSD can either be preinstalled in the enablement board or sold separately.

- M.2 SATA cable

Installing an M.2 SATA SSD

Prerequisites
Before you perform this procedure:

- **Make sure that the fan cage is installed**.

- Make sure you have the following items available:
  - M.2 SSD enablement option

  - M.2 SSD

  - T-15 Torx screwdriver

  - Phillips No. 1 screwdriver – This is required only if the M.2 SSD is not preinstalled on the enablement board.

Procedure

1. **Remove the front bezel**.

2. **Power down the server**.

3. Remove all power:

   a. Disconnect each power cord from the power source.

   b. Disconnect each power cord from the server.

4. Disconnect all peripheral cables from the server.

5. Do one of the following:

   - Server in tower mode: **Position the tower server for hardware configuration**.

   - Server in rack mode: **Extend the server from the rack**.

6. **Remove the access panel**.

7. **Remove the air baffle**.

8. **Remove the PCI blank retainer**.

9. **Remove the PCI slot blank**.

10. If the M.2 SSD enablement board option does not include a screw for installation, **remove one of the preinstalled PCI board screw**.

11. If the SSD is not preinstalled on the M.2 SSD enablement board, do the following:

    If only one SSD is being installed, install the SSD in slot 1.

a. Insert the SSD into the M.2 slot at a 45° angle.

b. Carefully press the SSD down to the horizontal position.

c. Install the SSD mounting screw.
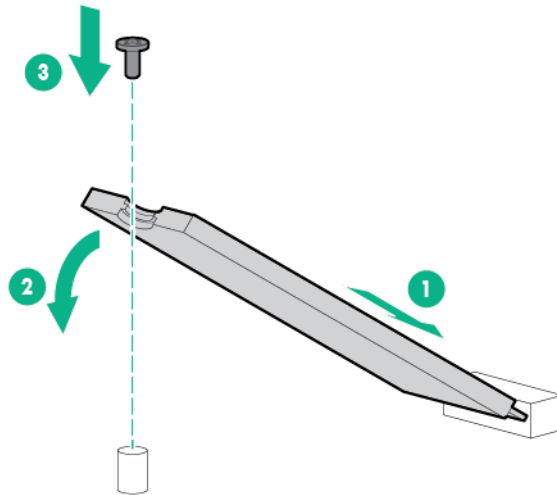
d. If you are installing a second SSD, repeat steps a–c.

12. Install the M.2 SSD enablement board.
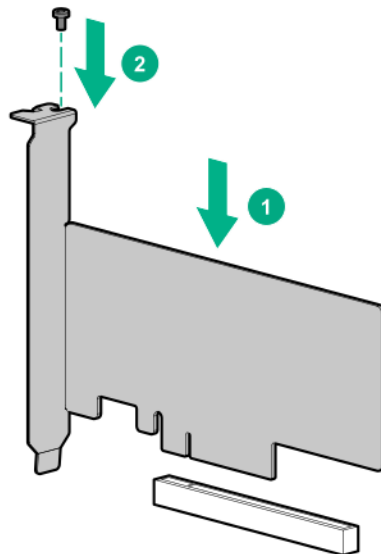
13. Make sure that the board is firmly seated in the slot.

14. **Install the PCI blank retainer**.

15. **Observe the guidelines for managing cables**.

16. **Connect the M.2 SATA cables**.

17. **Install the air baffle**.

18. **Install the access panel**.

19. Do one of the following:

- Server in tower mode: **Position the tower server for operation**.

- Server in rack mode: **Slide the server into the rack**.

20. Connect all peripheral cables to the server.

21. Connect each power cord to the server.

22. Connect each power cord to the power source.

23. **Power up the server**.

24. **Install the front bezel**.

The installation is complete.

To configure the M.2 SATA SSDs, see the *HPE Smart Array SR Gen10 Configuration Guide* at the **Hewlett Packard Enterprise website**.

Installing the HPE NS204i-p NVMe OS Boot Device option

The server supports installation of the HPE NS204i-p Gen10 Plus Boot Device in the PCIe3 expansion slots 1–4. The boot device supports two M.2 NVMe 22110 (110 mm) or 22080 (80 mm) SSDs. The SSDs can be of same physical size, or one of each size, and can be installed at the same time. Depending on the SSD size, you might need to relocate the M.2 drive retaining latches on the boot device.

Prerequisites

Before you perform this procedure:

- **Make sure that the server is updated with the latest operating system firmware and drivers**.

- **Make sure that the fan cage is installed**.

- Make sure that you have a T-15 Torx screwdriver available.

Procedure

Installing drives onto the boot device

1. Remove the liner from the thermal interface pad.
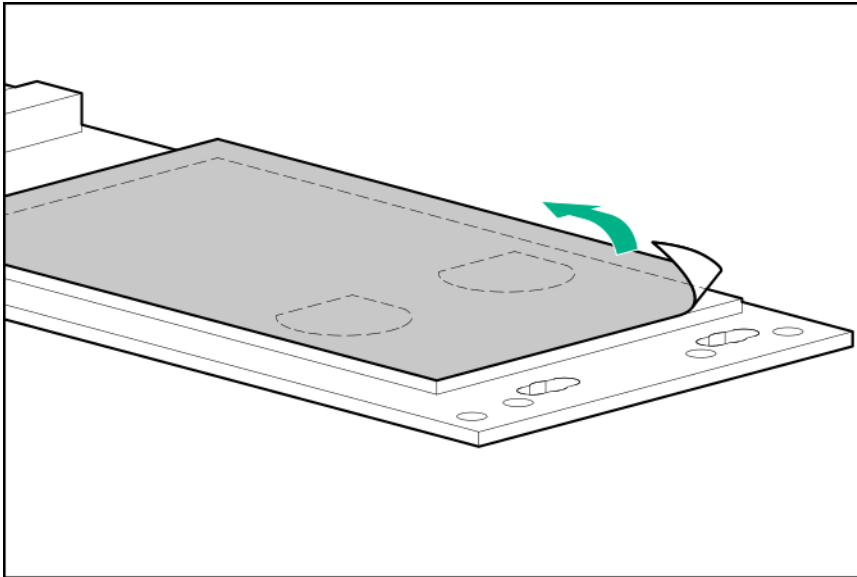
2. Install the drives.
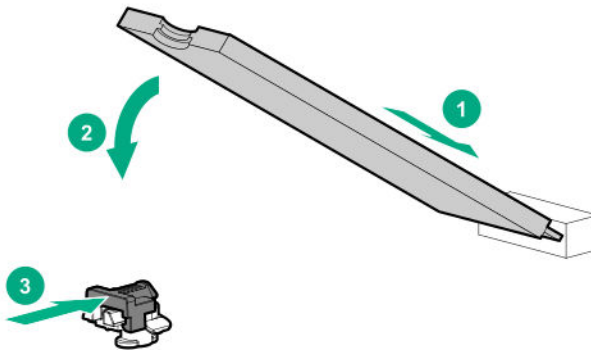
Installing the boot device

3. **Remove the front bezel**.

4. **Power down the server**.

5. Remove all power:

    a. Disconnect each power cord from the power source.

    b. Disconnect each power cord from the server.

6. Disconnect all peripheral cables from the server.

7. Do one of the following:

    • Server in tower mode: **Position the tower server for hardware configuration**.

    • Server in rack mode: **Extend the server from the rack**.

8. **Remove the access panel**.

9. **Remove the air baffle**.

10. **Remove the PCI blank retainer**.

11. **Remove the PCI slot blank**.

12. If the boot device does not include a screw for installation, **remove one of the preinstalled PCI board screw**.

13. Install the boot device.
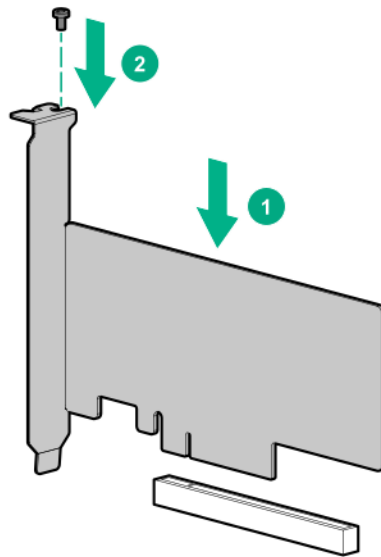
14. Make sure that the board is firmly seated in the slot.

15. **Install the PCI blank retainer**.

16. **Install the air baffle**.

17. **Install the access panel**.

18. Do one of the following:

    - Server in tower mode: **Position the tower server for operation**.

    - Server in rack mode: **Slide the server into the rack**.

19. Connect all peripheral cables to the server.

20. Connect each power cord to the server.

21. Connect each power cord to the power source.

22. **Power up the server**.

23. **Install the front bezel**.

Deploying an operating system

24. Deploy a supported operating system to the boot device drive.

    For more information, see the product QuickSpecs (**https://www.hpe.com/info/qs**).

    After the OS installation completes, the system automatically copies the operating system to the second, mirrored drive on the boot device.

25. Proceed with normal system setup and operation.

The installation is complete.

Redundant power supply enablement option

The RPS enablement option supports the installation of two Gen10 Flexible Slot (Flex Slot) power supplies.

Adding a second power supply provides redundant power support to the server if one power supply fails. You do not have to power down the server before removing or installing a redundant hot-plug power supply.

Kit contents

- Redundant power supply cage
- Power distribution board

Installing the redundant power supply enablement option

Procedure

1. **Review the power supply warnings and cautions**.

2. **Remove the non-hot-plug power supply**.

3. **Install the RPS enablement option**.

Remove the non-hot-plug power supply

Prerequisites

Before you perform this procedure, make sure that you have a T-10 Torx screwdriver available.

Procedure

1. **Remove the front bezel**.

2. **Power down the server**.

3. Release the power cord from the strain relief clip.
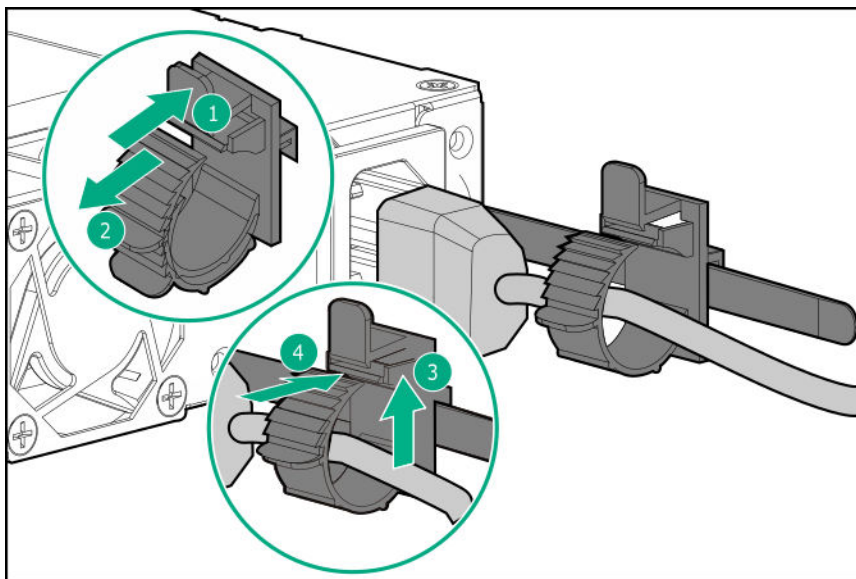
4. Remove all power:

    a. Disconnect each power cord from the power source.

    b. Disconnect each power cord from the server.

5. Disconnect all peripheral cables from the server.

6. Do one of the following:

- Server in tower mode: **Position the tower server for hardware configuration**.

- Server in rack mode: **Extend the server from the rack**.

7. Remove the access panel.

8. Remove the air baffle.

9. Observe the guidelines for managing cables.

⚠ **CAUTION:** The snap-in latch of the energy pack holder is flexible. However, to avoid damaging this latch, do not apply too much pressure on this latch when removing or installing the energy pack from the chassis.

---

10. Remove the energy pack holder:

    a. If an energy pack is installed, disconnect the energy pack cable.

    b. While carefully holding the snap-in latch in the open position, slide the energy pack holder up to disengage it from the chassis.
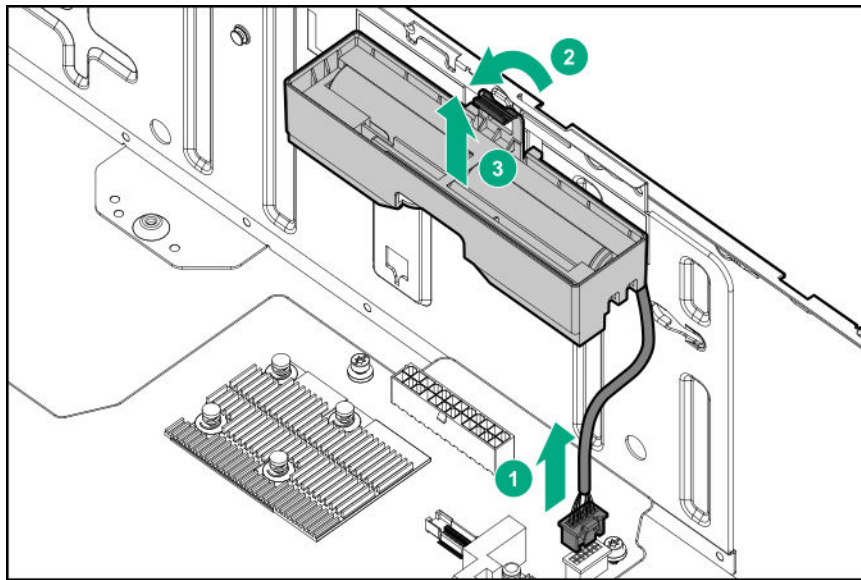
11. Disconnect the non-hot-plug power supply cable.
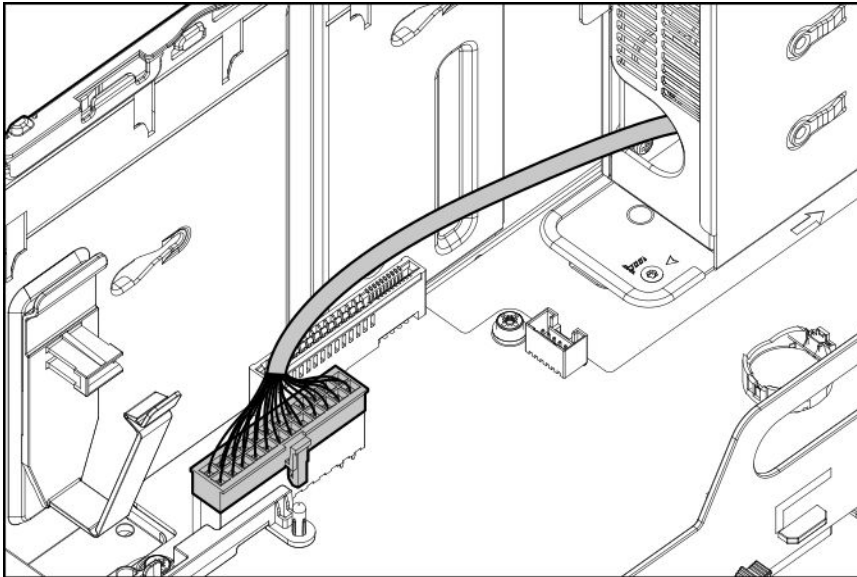
12. Remove the non-hot-plug power supply.
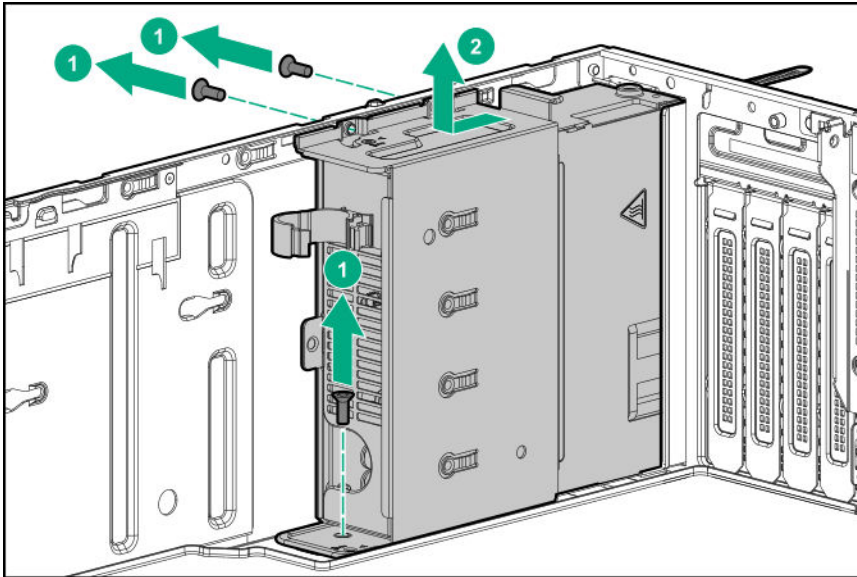
13. **Install the RPS enablement option**.

Install the RPS enablement option

Prerequisites

Before you perform this procedure, make sure that you have the following items available:

- Redundant power supply enablement option
- T-10 Torx screwdriver

Procedure

1. Install the redundant power supply cage:

a. Mount the cage on the chassis.

b. Secure the RPS cage with the screws kept from the removed non-hot-plug power supply.
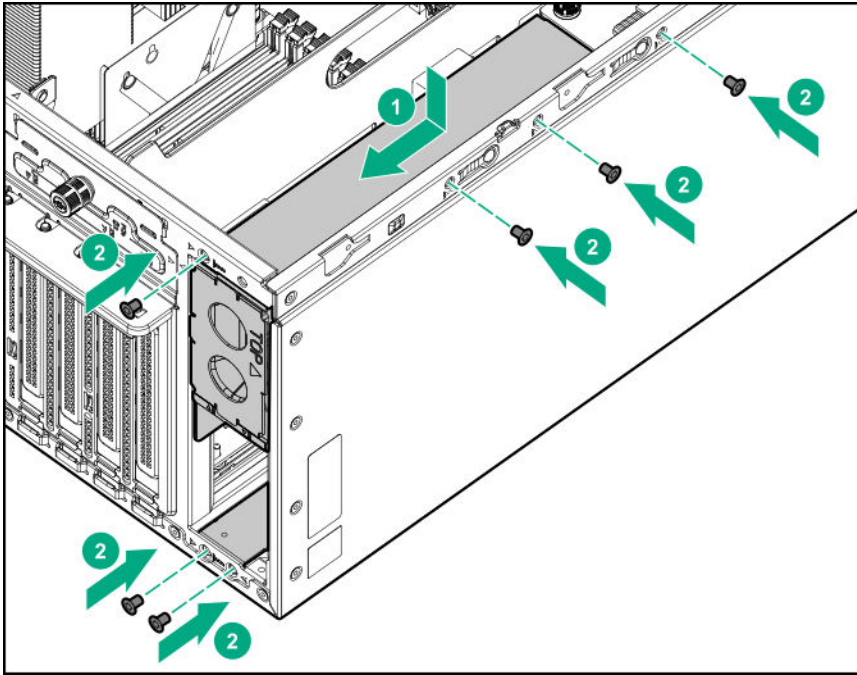
2. If only one power supply is going to be installed in the redundant power supply cage, make sure that the blank in the power supply bay 2 is firmly secured.

3. Install the power distribution board:

a. Align the notches on the board with the pins on the chassis.

b. Slide the board down to engage it fully with its connector.

c. Tighten the board thumbscrew.
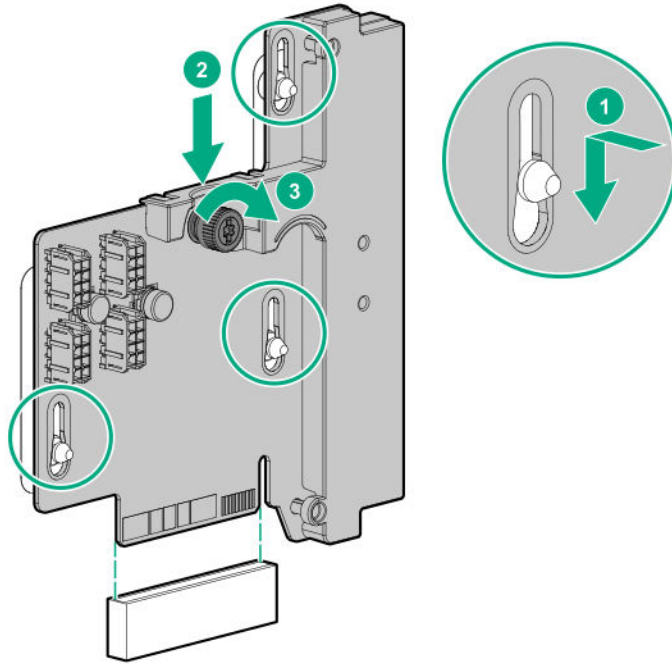
4. Install the energy pack holder:

   a. Insert the holder tabs into their corresponding chassis slots, and then slide the holder down.

   b. If the energy pack cable was disconnected, connect it back.
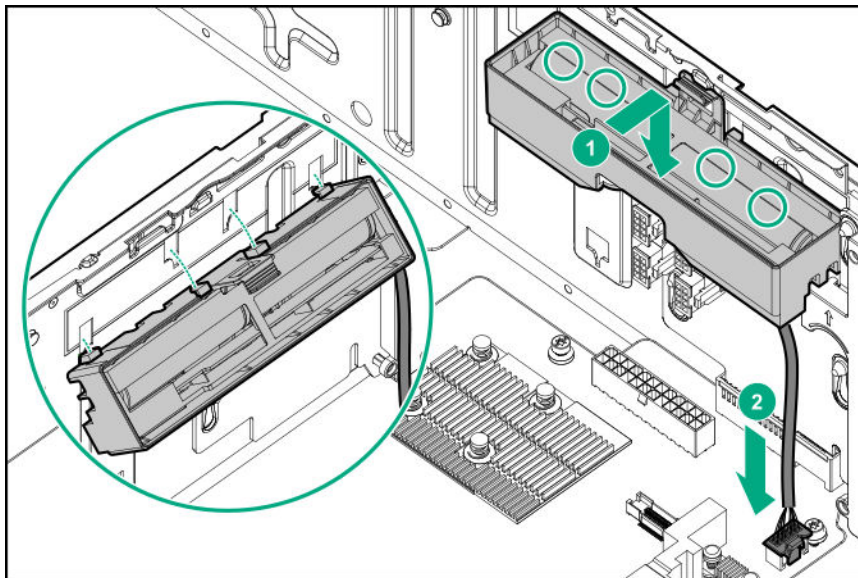
5. **Install the air baffle**.

6. **Install the access panel**.

7. Do one of the following:

   • Server in tower mode: **Position the tower server for operation**.

   • Server in rack mode: **Slide the server into the rack**.

8. Connect all peripheral cables to the server.

9. Connect each power cord to the server.

10. Connect each power cord to the power source.

11. **Power up the server**.

12. **Install the front bezel**.

13. **Install the power supply**.

The installation is complete.

Internal USB device options

The server has one internal USB 2.0 port and one USB 3.0 port. Use these ports to install internal USB devices such as:

• USB flash media devices for booting up from flash solutions or for data backup/redundancy.

• USB RDX drives for an inexpensive and reliable way to securely store your data backups.

For RDX drive installation, see **Installing a USB RDX drive**.

Installing an internal USB device

Procedure

1. **Remove the front bezel**.

2. **Power down the server**.

3. Remove all power:

   a. Disconnect each power cord from the power source.

   b. Disconnect each power cord from the server.

4. Disconnect all peripheral cables from the server.

5. Do one of the following:

   • Server in tower mode: **Position the tower server for hardware configuration**.

   • Server in rack mode: **Extend the server from the rack**.

6. **Remove the access panel**.

7. **Remove the air baffle**.

8. **Locate the internal USB connector**.

9. Plug in the USB device into the internal USB port.
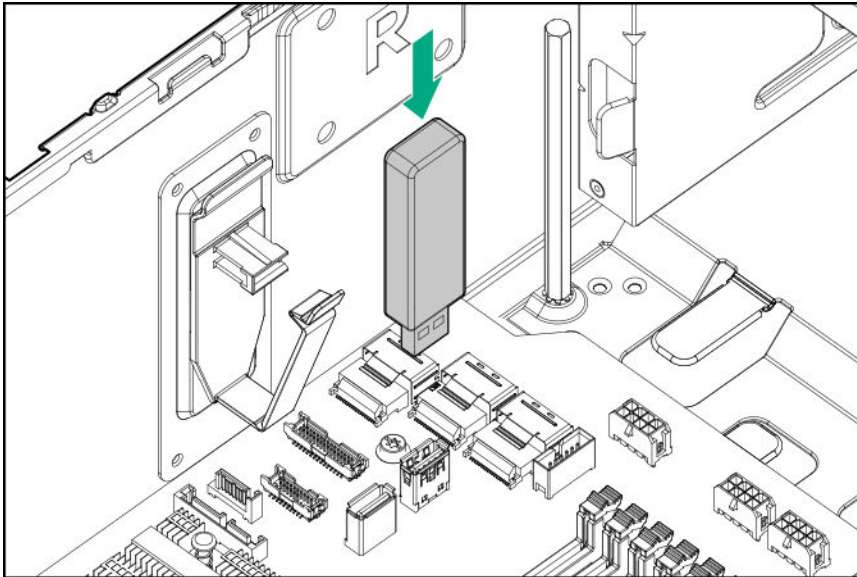
10. **Install the air baffle**.

11. **Install the access panel**.

12. Do one of the following:

    • Server in tower mode: **Position the tower server for operation**.

    • Server in rack mode: **Slide the server into the rack**.

13. Connect all peripheral cables to the server.

14. Connect each power cord to the server.

15. Connect each power cord to the power source.

16. **Power up the server**.

17. **Install the front bezel**.

The installation is complete.

HPE Trusted Platform Module 2.0 Gen10 option

Overview

Use these instructions to install and enable an HPE TPM 2.0 Gen10 Kit in a supported server. This option is not supported on a Gen9 and earlier server.

This procedure includes three sections:

1. Installing the Trusted Platform Module board.

2. Enabling the Trusted Platform Module.

3. Retaining the recovery key/password.

HPE TPM 2.0 installation is supported with specific operating system support such as Microsoft Windows Server 2012 R2 and later. For more information about operating system support, see the product QuickSpecs on the Hewlett Packard

Enterprise website (**https://www.hpe.com/info/qs**). For more information about Microsoft Windows BitLocker Drive Encryption feature, see the Microsoft website (**https://www.microsoft.com**).

△ **CAUTION:** If the TPM is removed from the original server and powered up on a different server, data stored in the TPM including keys will be erased.

① **IMPORTANT:** In UEFI Boot Mode, the HPE TPM 2.0 Gen10 Kit can be configured to operate as TPM 2.0 (default) or TPM 1.2 on a supported server. In Legacy Boot Mode, the configuration can be changed between TPM 1.2 and TPM 2.0, but only TPM 1.2 operation is supported.

HPE Trusted Platform Module 2.0 guidelines

△ **CAUTION:** Always observe the guidelines in this document. Failure to follow these guidelines can cause hardware damage or halt data access.

Hewlett Packard Enterprise SPECIAL REMINDER: Before enabling TPM functionality on this system, you must ensure that your intended use of TPM complies with relevant local laws, regulations and policies, and approvals or licenses must be obtained if applicable.

For any compliance issues arising from your operation/usage of TPM which violates the above mentioned requirement, you shall bear all the liabilities wholly and solely. Hewlett Packard Enterprise will not be responsible for any related liabilities.

慧与特别提醒：在您启用系统中的TPM功能前，请务必确认您对TPM的使用遵守当地相关法律、法规及政策，并已事先获得所需的一切批准及许可（如适用），因您未获得相应的操作/使用许可而导致的违规问题，皆由您自行承担全部责任，与慧与无涉。

When installing or replacing a TPM, observe the following guidelines:

- Do not remove an installed TPM. Once installed, the TPM becomes a permanent part of the system board.

- When installing or replacing hardware, Hewlett Packard Enterprise service providers cannot enable the TPM or the encryption technology. For security reasons, only the customer can enable these features.

- When returning a system board for service replacement, do not remove the TPM from the system board. When requested, Hewlett Packard Enterprise Service provides a TPM with the spare system board.

- Any attempt to remove the cover of an installed TPM from the system board can damage the TPM cover, the TPM, and the system board.

- If the TPM is removed from the original server and powered up on a different server, all data stored in the TPM including keys will be erased.

- When using BitLocker, always retain the recovery key/password. The recovery key/password is required to complete Recovery Mode after BitLocker detects a possible compromise of system integrity.

- Hewlett Packard Enterprise is not liable for blocked data access caused by improper TPM use. For operating instructions, see the TPM documentation or the encryption technology feature documentation provided by the operating system.

Installing and enabling the HPE TPM 2.0 Gen10 option

Installing the Trusted Platform Module board

Preparing the server for installation

Procedure

1. Observe the following warnings:

   ⚠ **WARNING:** The front panel Power On/Standby button does not shut off system power. Portions of the power supply and some internal circuitry remain active until AC power is removed.

   To reduce the risk of personal injury, electric shock, or damage to the equipment, remove power from the server:

   - For rack and tower servers, remove the power cord.

   - For server blades and compute modules, remove the server blade or compute module from 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.

2. Update the system ROM.

   Locate and download the latest ROM version from the **Hewlett Packard Enterprise Support Center website**. Follow the instructions on the website to update the system ROM.

3. Power down the server (**Power down the server**).

4. Remove all power:

   a. Disconnect each power cord from the power source.

   b. Disconnect each power cord from the server.

5. Do one of the following:

   - Server in tower mode: **Position the tower server for hardware configuration**.

   - Server in rack mode: **Extend the server from the rack**.

6. **Remove the access panel**.

7. **Remove the air baffle**.

8. Remove any options installed in the PCIe3 expansion slots 1–4.

9. Proceed to **Installing the TPM board and cover**.

Installing the TPM board and cover

Procedure

1. Observe the following alerts:

   ⚠ **CAUTION:** If the TPM is removed from the original server and powered up on a different server, data stored in the TPM including keys will be erased.

⚠ **CAUTION:** The TPM is keyed to install only in the orientation shown. Any attempt to install the TPM in a different orientation might result in damage to the TPM or system board.

2. Align the TPM board with the key on the connector, and then install the TPM board. To seat the board, press the TPM board firmly into the connector. To locate the TPM connector on the system board, see the server label on the access panel.
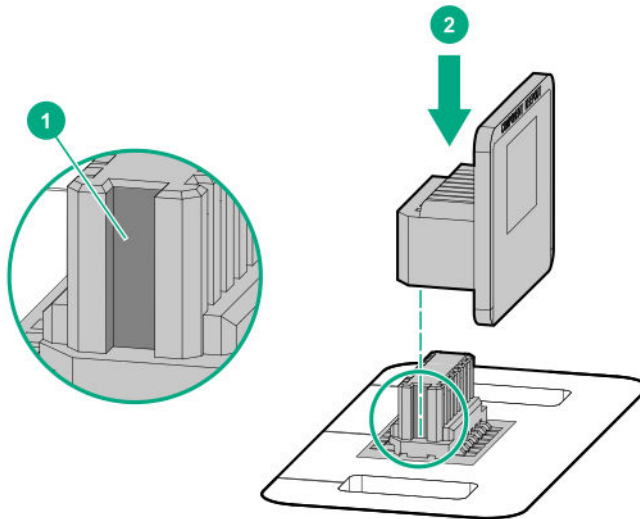
3. Install the TPM cover:

   a. Line up the tabs on the cover with the openings on either side of the TPM connector.

   b. To snap the cover into place, firmly press straight down on the middle of the cover.
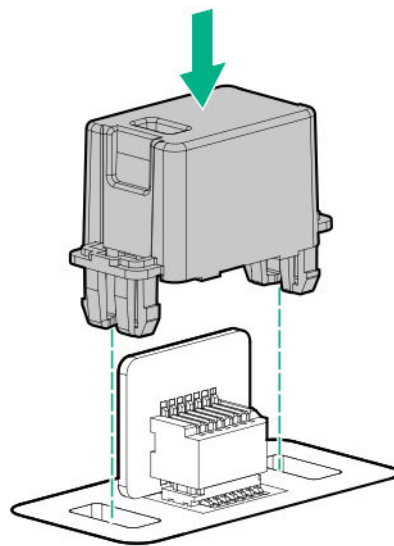
4. Proceed to **Preparing the server for operation**.

Preparing the server for operation

Procedure

1. Install any options or cables previously removed to access the TPM connector.

2. **Install the air baffle**.

3. **Install the access panel**.

4. Do one of the following:

    - Server in tower mode: **Position the tower server for operation**.

    - Server in rack mode: **Slide the server into the rack**.

5. Connect each power cord to the server.

6. Connect each power cord to the power source.

7. **Power up the server**.

8. **Install the front bezel**.

Enabling the Trusted Platform Module

When enabling the Trusted Platform module, observe the following guidelines:

- By default, the Trusted Platform Module is enabled as TPM 2.0 when the server is powered on after installing it.

- In UEFI Boot Mode, the Trusted Platform Module can be configured to operate as TPM 2.0 (default) or TPM 1.2.

- In Legacy Boot Mode, the Trusted Platform Module configuration can be changed between TPM 1.2 and TPM 2.0 (default), but only TPM 1.2 operation is supported.

Enabling the Trusted Platform Module as TPM 2.0

Procedure

1. During the server startup sequence, press the **F9** key to access **System Utilities**.

2. From the System Utilities screen, select **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Server Security** > **Trusted Platform Module options**.

3. Verify the following:

    - "Current TPM Type" is set to **TPM 2.0**.

    - "Current TPM State" is set to **Present and Enabled**.

    - "TPM Visibility" is set to **Visible**.

4. If changes were made in the previous step, press the **F10** key to save your selection.

5. If **F10** was pressed in the previous step, do one of the following:

    - If in graphical mode, click **Yes**.

    - If in text mode, press the **Y** key.

6. Press the **ESC** key to exit System Utilities.

7. If changes were made and saved, the server prompts for reboot request. Press the **Enter** key to confirm reboot.

   If the following actions were performed, the server reboots a second time without user input. During this reboot, the TPM setting becomes effective.

   - Changing from TPM 1.2 and TPM 2.0

   - Changing TPM bus from FIFO to CRB

   - Enabling or disabling TPM

   - Clearing the TPM

8. Enable TPM functionality in the OS, such as Microsoft Windows BitLocker or measured boot.

   For more information, see the **Microsoft website**.

Enabling the Trusted Platform Module as TPM 1.2

Procedure

1. During the server startup sequence, press the **F9** key to access **System Utilities**.

2. From the System Utilities screen select **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Server Security** > **Trusted Platform Module options**.

3. Change the "TPM Mode Switch Operation" to **TPM 1.2**.

4. Verify that "TPM Visibility" is set to **Visible**.

5. Press the **F10** key to save your selection.

6. When prompted to save the change in System Utilities, do one of the following:

   - If in graphical mode, click **Yes**.

   - If in text mode, press the **Y** key.

7. Press the **ESC** key to exit System Utilities.

   The server reboots a second time without user input. During this reboot, the TPM setting becomes effective.

8. Enable TPM functionality in the OS, such as Microsoft Windows BitLocker or measured boot.

   For more information, see the **Microsoft website**.

Retaining the BitLocker recovery key/password

The recovery key/password is generated during BitLocker setup, and can be saved and printed after BitLocker is enabled. When using BitLocker, always retain the recovery key/password. The recovery key/password is required to enter Recovery Mode after BitLocker detects a possible compromise of system integrity.

To help ensure maximum security, observe the following guidelines when retaining the recovery key/password:

- Always store the recovery key/password in multiple locations.

- Always store copies of the recovery key/password away from the server.

- Do not save the recovery key/password on the encrypted hard drive.

Cabling

Cabling guidelines

The cable colors in the cabling diagrams used in this chapter are for illustration purposes only. Most of the server cables are black.

Observe the following guidelines when working with server cables.

Before connecting cables

- Note the port labels on the PCA components. Not all of these components are used by all servers:
  - System board ports
  - Drive and power supply backplane ports
  - Expansion board ports (controllers, adapters, expanders, risers, and similar boards)

- Note the label near each cable connector. This label indicates the destination port for the cable connector.

- Some data cables are pre-bent. Do not unbend or manipulate the cables.

- To prevent mechanical damage or depositing oil that is present on your hands, and other contamination, do not touch the ends of the connectors.

When connecting cables

- Before connecting a cable to a port, lay the cable in place to verify the length of the cable.

- Use the internal cable management features to properly route and secure the cables.

- When routing cables, be sure that the cables are not in a position where they can be pinched or crimped.

- Avoid tight bend radii to prevent damaging the internal wires of a power cord or a server cable. Never bend power cords and server cables tight enough to cause a crease in the sheathing.

- Make sure that the excess length of cables are properly secured to avoid excess bends, interference issues, and airflow restriction.

- To prevent component damage and potential signal interference, make sure that all cables are in their appropriate routing position before installing a new component and before closing up the server after hardware installation/ maintenance.

When disconnecting cables

- Grip the body of the cable connector. Do not pull on the cable itself because this action can damage the internal wires of the cable or the pins on the port.

- If a cable does not disconnect easily, check for any release latch that must be pressed to disconnect the cable.
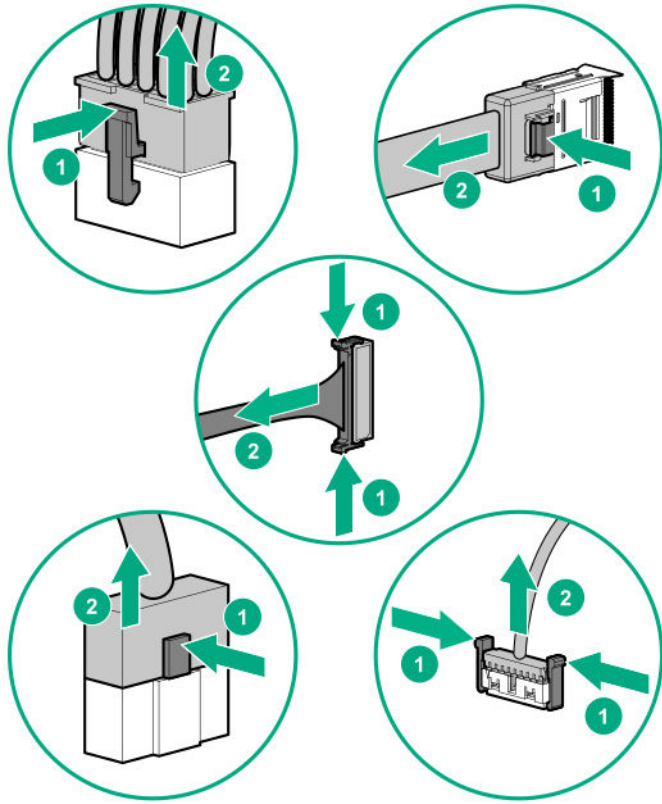
- Remove cables that are no longer being used. Retaining them inside the server can restrict airflow. If you intend to use the removed cables later, label and store them for future use.

Internal cabling management
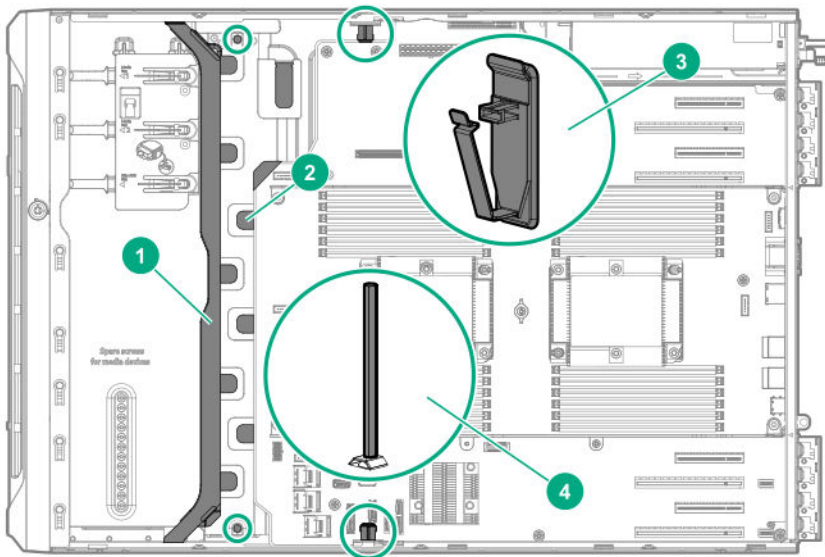
Item	Description
1	Front I/O cable assembly channel
2	Front cable channel with metal tabs
3	Cable clips
4	Alignment posts

Storage cabling

Storage controller cables

LFF non-hot-plug drive embedded controller cables

For controller cabling diagrams, see the **LFF non-hot-plug drive onboard SATA port cabling** .

Cable location	Cable part number	From box #	To port #
Default in the server chassis	876493-002	Box 3	Onboard SATA port 1
Included in the non-hot-plug drive cage option	876492-002	Box 1 or 2	Onboard SATA port 2 or 3

LFF hot-plug drive controller cables

Controller type	Cable kit part number	Cable part number	From box #	To port #
Embedded controller	877578-B21	876487-001	Box 1 or 2	Onboard SATA ports 2 and 3
		876488-001	Box 3	Onboard SATA port 1
Type-p standup plug‑in controller	874574-B21	876500-001	Box 1, 2, or 3	Controller port 1 or 2
Type-a modular controller (AROC)	874573-B21	876499-001	Box 1	Controller port 3
		876501-001	Box 1 or 2	Controller port 2
		876498-001	Box 2 or 3	Controller port 1

SFF hot-plug drive controller cables

Controller type	Cable kit part number	Cable part number	From box #	To port #
Embedded controller	877579-B21	876486-001	Box 3	Onboard SATA ports 1 and 2
Type-p standup plug‑in controller	874575-B21	876485-001	Box 1, 2, or 3	Controller ports 1 and 2
	P00614-B21[1]	P00511-001	• P1 slot installation: Box 1 • P2 slot installation: Box 3	• P1 slot installation: Controller ports 1 and 2 • P2 slot installation: Controller ports 5 and 6
		P00509-001	Box 2	Controller ports 3 and 4
		P00510-001	• P1 slot installation: Box 3 • P2 slot installation: Box 1	• P1 slot installation: Controller ports 5 and 6 • P2 slot installation: Controller ports 1 and 2
Type-a modular controller (AROC)	877575-B21	876497-001	Box 1 or 2	Controller ports 3 and 4
		876496-001	Box 2 or 3	Controller ports 1 and 2

[1] The P00512-001 cable (510 mm) included in the P00614-B21 cable kit is not for use in this server.

LFF non-hot-plug drive onboard SATA port cabling
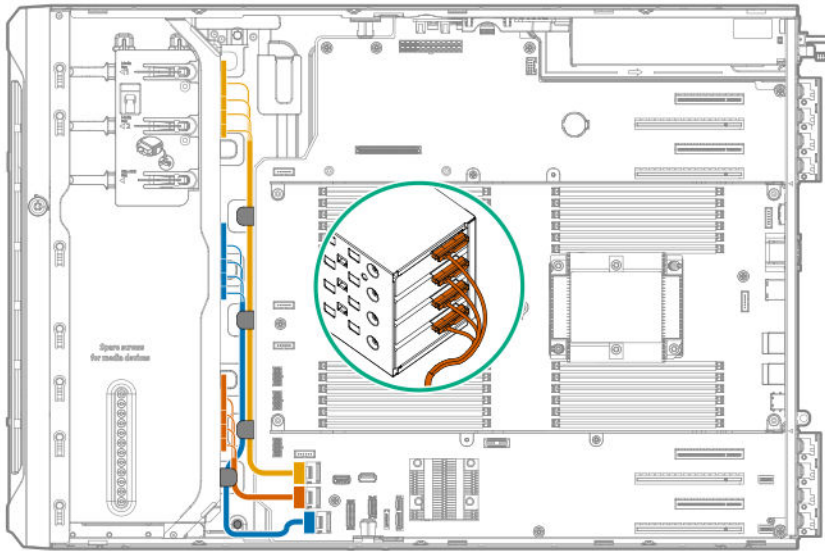
Cable color	Description
Gold	Box 1 SATA-power split cable to the onboard SATA port 3
Blue	Box 2 SATA-power split cable to the onboard SATA port 2
Orange	Box 3 SATA-power split cable to the onboard SATA port 1

LFF hot-plug drive controller cabling

LFF hot-plug drive onboard SATA port cabling

Cable color	Description
Gold	Box 1 Mini-SAS cable to the onboard SATA port 3
Blue	Box 2 Mini-SAS cable to the onboard SATA port 2
Orange	Box 3 Mini-SAS cable to the onboard SATA port 1

LFF hot-plug drive standup controller cabling (SAS/SATA)

Slot 1 standup controller + onboard SATA port 1 cabling

Cable color	Description
Gold	Box 1 Mini-SAS X-cable to the standup controller port 2
Blue	Box 2 Mini-SAS X-cable to the standup controller port 1
Orange	Box 3 Mini-SAS cable to the onboard SATA port 1

Slots 1 and 3 standup controller cabling

Cable color	Description
Gold	Box 1 Mini-SAS cable to the slot 3 controller port 1
Blue	Box 2 Mini-SAS X-cable to the slot 1 controller port 2
Orange	Box 3 Mini-SAS X-cable to the slot 1 controller port 1

LFF hot-plug drive modular controller cabling (SAS/SATA)

Modular controller + onboard SATA port 1 cabling

Cable color	Description
Gold	Box 1 Mini-SAS cable to the modular controller port 2
Blue	Box 2 Mini-SAS cable to the modular controller port 1
Orange	Box 3 Mini-SAS cable to the onboard SATA port 1

Modular controller cabling

Cable color	Description
Gold	Box 1 Mini-SAS cable to the modular controller port 3
Blue	Box 2 Mini-SAS cable to the modular controller port 2
Orange	Box 3 Mini-SAS cable to the modular controller port 1

SFF hot-plug drive controller cabling

SFF hot-plug drive single standup controller cabling (SAS/SATA)

SFF hot-plug drive single standup controller cabling for P1 installation (SAS/SATA)
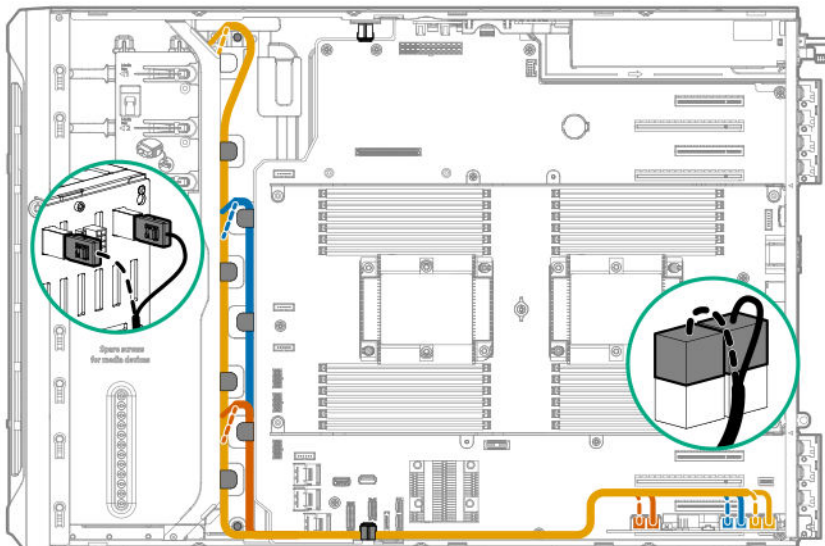
Cable color	Description
Gold	Box 1 Mini-SAS X-cable to standup controller ports 1 and 2
Blue	Box 2 Mini-SAS X-cable to standup controller ports 3 and 4
Orange	Box 3 Mini-SAS X-cable to standup controller ports 5 and 6

SFF hot-plug drive single standup controller cabling for P2 installation (SAS/SATA)
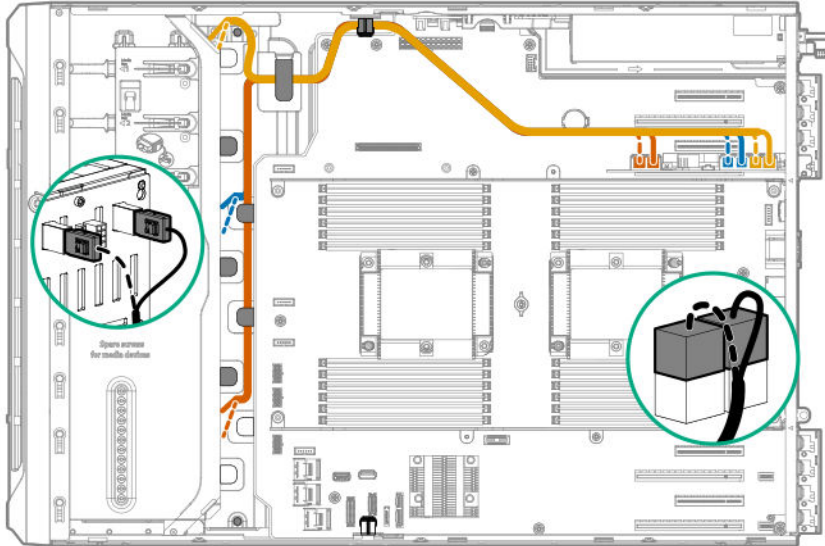
Cable color	Description
Gold	Box 1 Mini-SAS X-cable to standup controller ports 1 and 2
Blue	Box 2 Mini-SAS X-cable to standup controller ports 3 and 4
Orange	Box 3 Mini-SAS X-cable to standup controller ports 5 and 6

SFF hot-plug drive multiple standup controller cabling (SAS/SATA)

Cable color	Description
Gold	Box 1 Mini-SAS X-cable to the slot 5 standup controller ports 1 and 2
Blue	Box 2 Mini-SAS X-cable to the slot 1 standup controller ports 1 and 2
Orange	Box 3 Mini-SAS X-cable to the slot 3 standup controller ports 1 and 2

SFF hot-plug drive modular controller cabling (SAS/SATA)

Modular controller + onboard SATA ports 1 and 2 cabling

Cable color	Description
Gold	Box 1 Mini-SAS X-cable to the modular controller ports 3 and 4
Blue	Box 2 Mini-SAS X-cable to the modular controller ports 1 and 2
Orange	Box 3 Mini-SAS X-cable to the onboard SATA ports 1 and 2

Modular controller cabling

Cable color	Description
—	Box 1 is empty or occupied by **media devices**.
Blue	Box 2 Mini-SAS X-cable to the modular controller ports 3 and 4
Orange	Box 3 Mini-SAS X-cable to the modular controller ports 1 and 2

SFF hot-plug drive SAS expander cabling (SAS/SATA)

SAS expander card with standup controller cabling
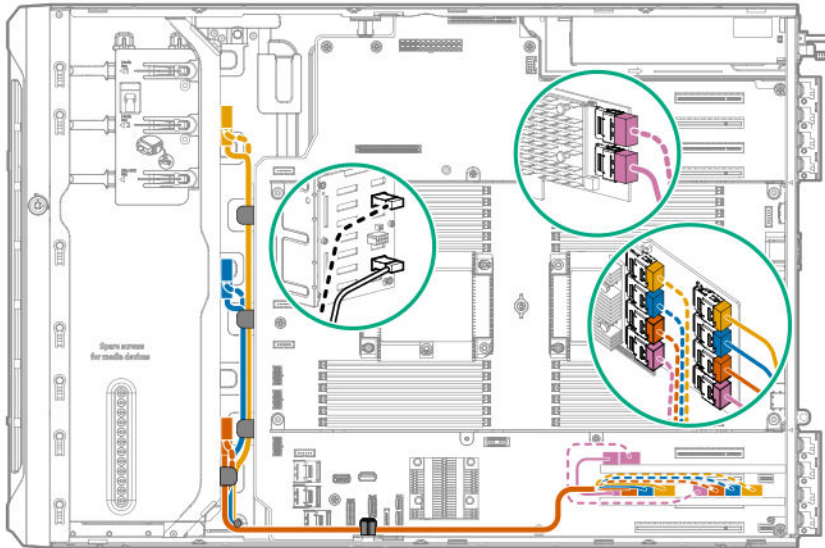
Cable color	Description
Gold	Box 1 Mini-SAS X-cable to the expander ports 7 and 8
Blue	Box 2 Mini-SAS X-cable to the expander ports 5 and 6
Orange	Box 3 Mini-SAS X-cable to the expander ports 3 and 4
Pink	Slot 3 standup controller Mini-SAS X-cable to the slot 2 expander ports 1 and 2

SAS expander card with modular controller cabling

Cable color	Description
Pink	Modular controller Mini-SAS X-cable to expander ports 1 and 2
Gold	Box 1 Mini-SAS X-cable to the expander ports 7 and 8
Blue	Box 2 Mini-SAS X-cable to the expander ports 5 and 6
Orange	Box 3 Mini-SAS X-cable to the expander ports 3 and 4

NVMe SSD data cabling
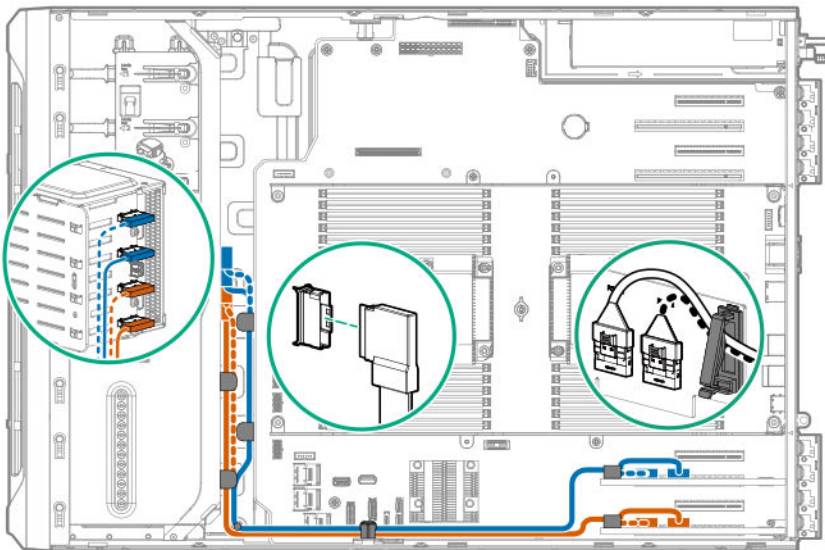
Cable color	Description
Blue	NVMe SSD backplane to the slot 3 NVMe riser board ports 1 and 2
Orange	NVMe SSD backplane to the slot 1 NVMe riser board ports 1 and 2

M.2 SATA SSD cabling

The server supports the installation of one M.2 SATA SSD enablement board in the PCIe3 expansion slots 1–4. The illustration below shows the enablement board in slot 1. Cable routing from slots 3–4 will follow the same path.
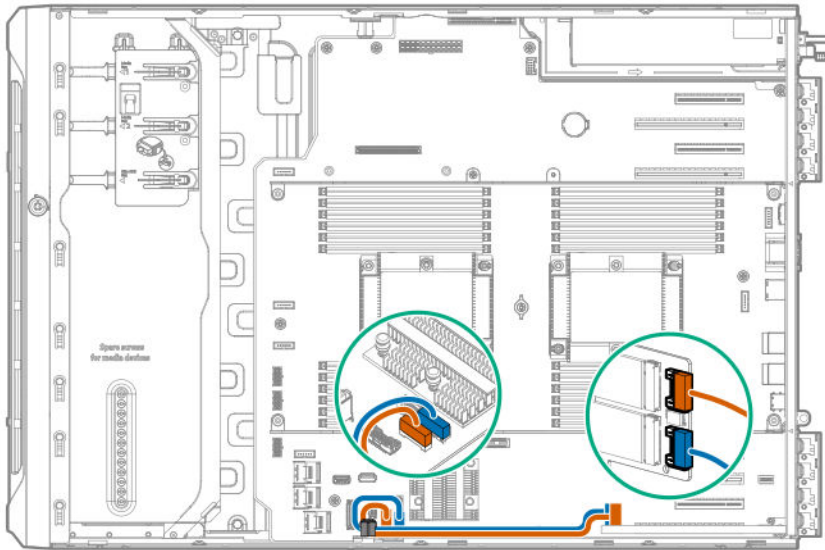
Cable color	Desription
Orange	M.2 SSD port 1 SATA cable to onboard SATA port 4
Blue	M.2 SSD port 2 SATA cable to onboard SATA port 5

Drive power cabling
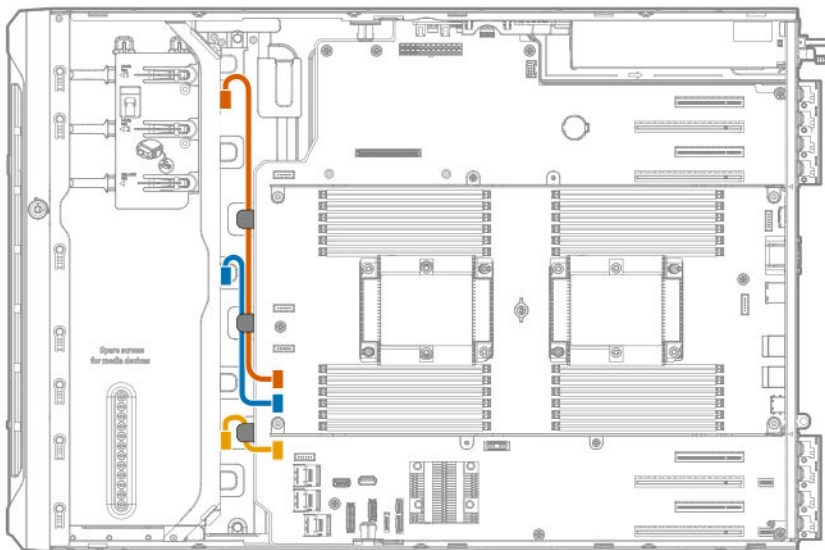
Cable color	Description
Orange	Box 1 drive power connector cable
Blue	Box 2 drive power connector cable
Gold	Box 3 drive power connector cable

Energy pack cabling
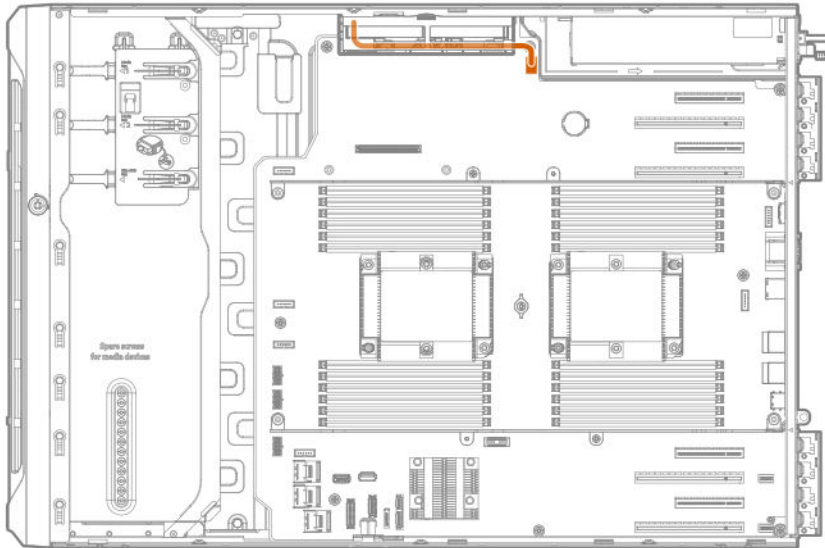
Storage controller backup power cabling

The storage controller backup power connector in your controller might be in a different location from what is shown in the following illustrations. For more information on the location of the backup power connector in your controller, see the controller user guide from the information library:

https://www.hpe.com/info/smartstorage-docs

Smart Array P-class storage controllers in slots 1 and 3
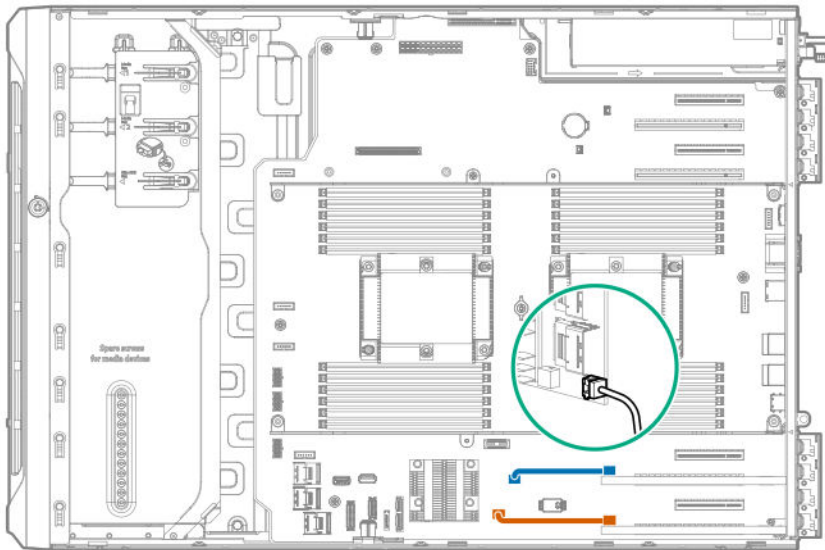
Cable color	Description
Blue	Slot 3 storage controller backup power cable
Orange	Slot 1 storage controller backup power cable

Smart Array P-class storage controllers in slots 5 and 7
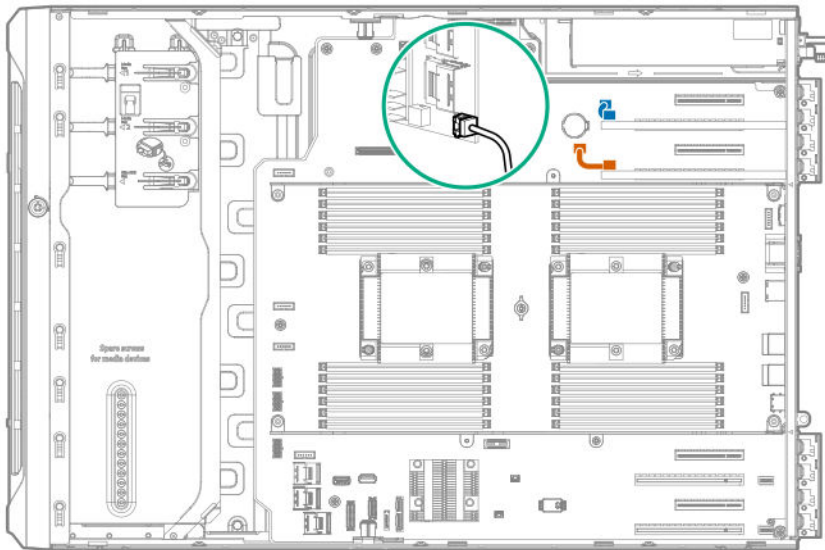
Cable color	Description
Blue	Slot 7 storage controller backup power cable
Orange	Slot 5 storage controller backup power cable

Media device cabling

SAS LTO tape drive cabling

LTO tape drive cabling with the standup controller in slot 3
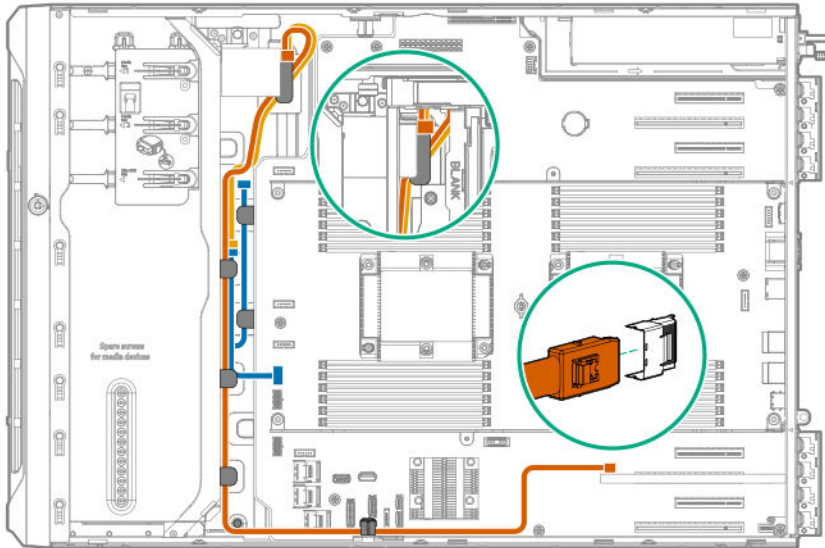
Cable color	Description
Gold	Power connector of the LTO tape drive power-SAS Y-cable to the LTO/RDX power Y-cable
Blue	LTO/RDX power Y-cable to the drive box 1 power connector
Orange	SAS connector of the LTO tape drive power-SAS Y-cable to the slot 3 standup controller

LTO tape drive cabling with the standup controller in slot 5
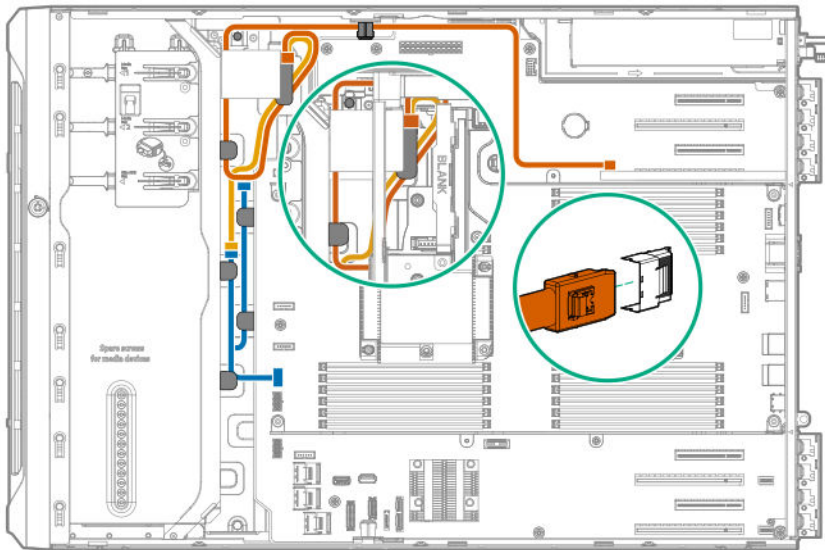
Cable color	Description
Orange	SAS connector of the LTO tape drive power-SAS Y-cable to the slot 5 standup controller
Gold	Power connector of the LTO tape drive power-SAS Y-cable to the LTO/RDX power Y-cable
Blue	LTO/RDX power Y-cable to the drive box 1 power connector

USB RDX drive cabling
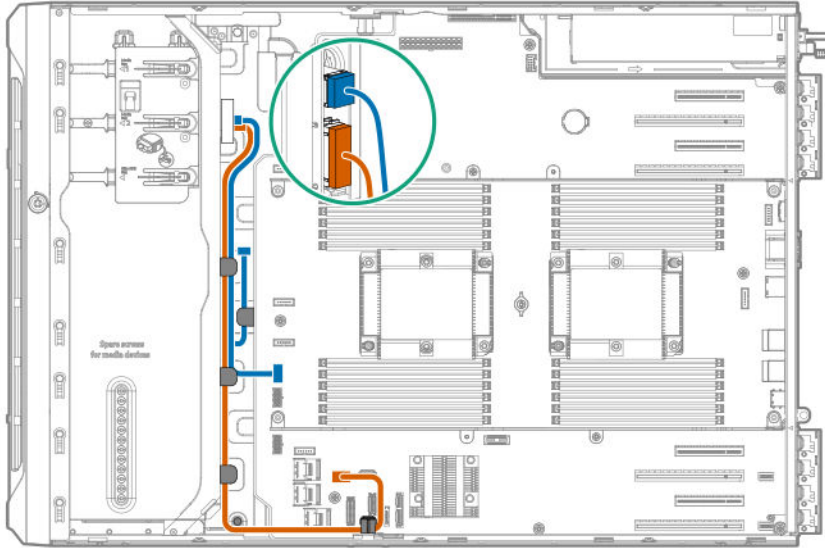
Cable color	Description
Blue	LTO/RDX power Y-cable to the drive box 1 power connector
Orange	RDX USB cable to the internal USB port 3.0

SATA optical drive cabling

Optical drive SATA cable to onboard SATA port 5
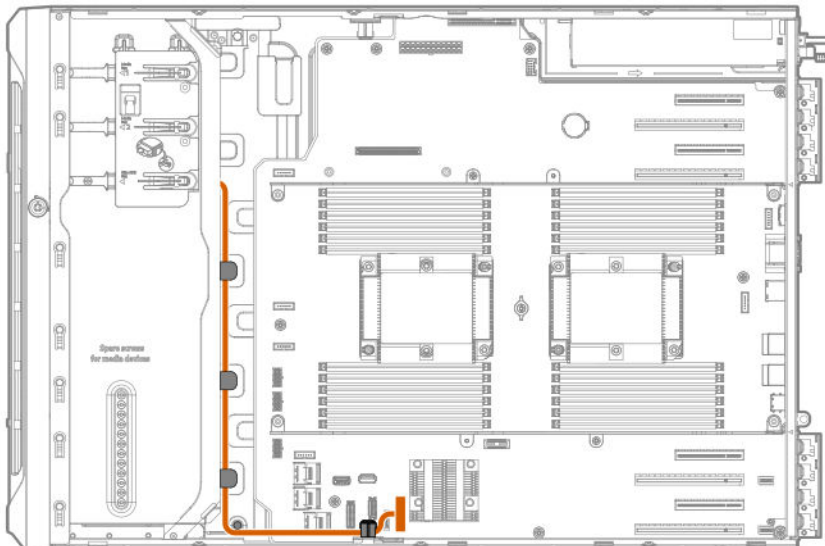
GPU auxiliary power cabling
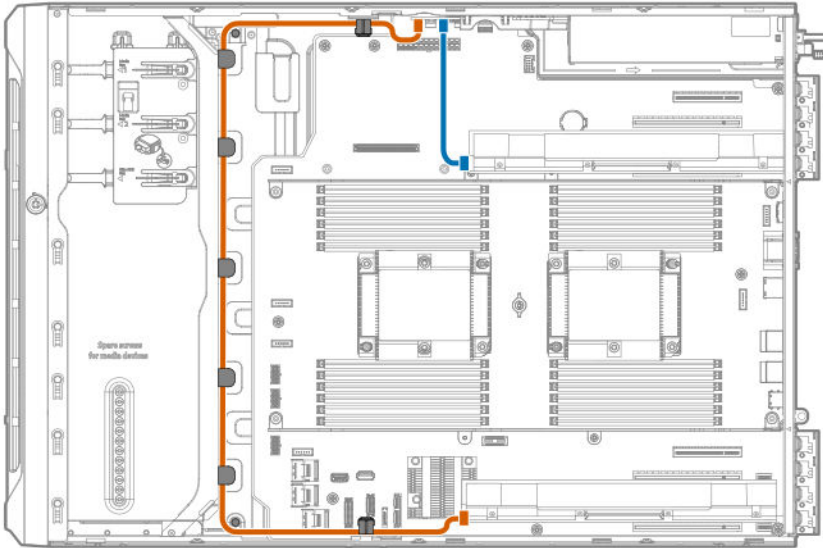
Cable color	Description
Orange	Processor 1 GPU auxiliary power cable to PDB
Blue	Processor 2 GPU auxiliary power cable to PDB

Standard power supply cabling (non-hot-plug)
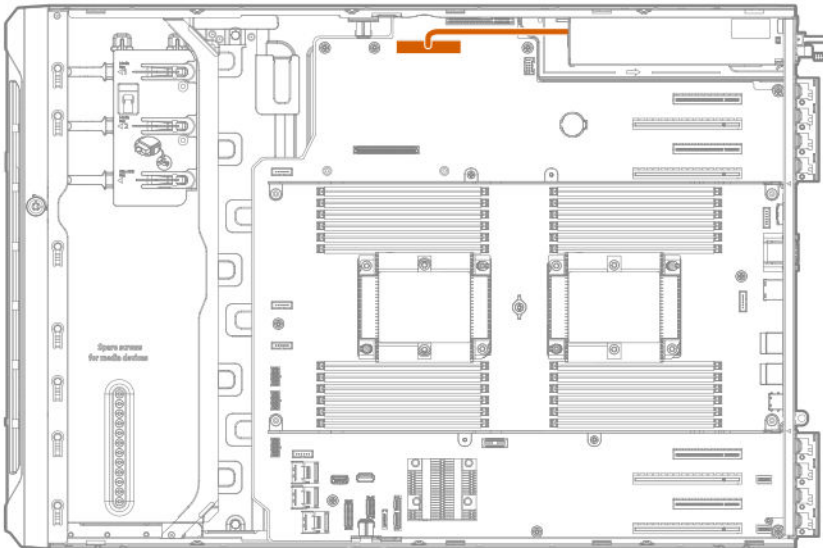
Front I/O module cabling

The front I/O module cable is routed underneath the cable channel on top of the drive boxes.
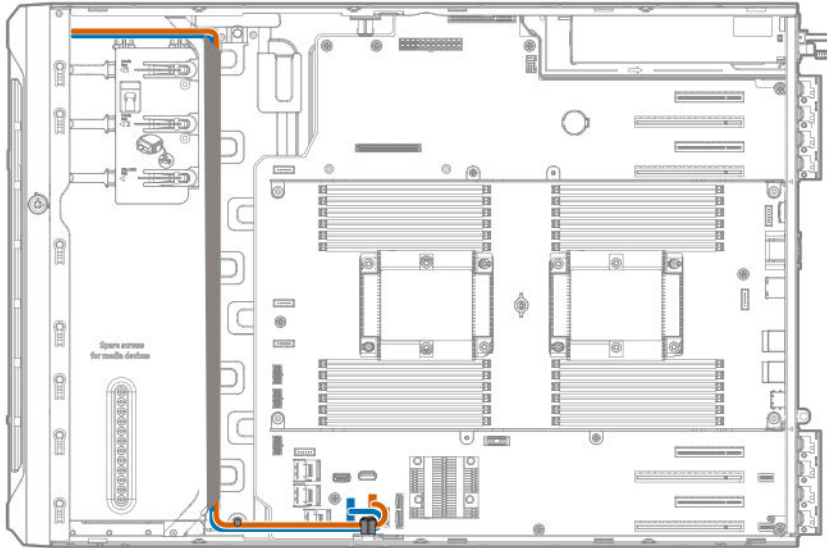
Cable color	Description
Blue	Front I/O cable
Orange	Front USB cable

Software and configuration utilities

Server mode

The software and configuration utilities presented in this section operate in online mode, offline mode, or in both modes.

Software or configuration utility	Server mode
Active Health System	Online and Offline
HPE iLO 5	Online and Offline
HPE Smart Storage Administrator	Online and Offline
iLO RESTful API	Online and Offline
Intelligent Provisioning	Online and Offline
Scripting Toolkit for Windows and Linux	Online
Service Pack for ProLiant	Online and Offline
Smart Update Manager	Online and Offline
UEFI System Utilities	Offline
HPE MR Storage Administrator	Online
StorCLI	Online

Product QuickSpecs

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

Active Health System Viewer

Active Health System Viewer (AHSV) is an online tool used to read, diagnose, and resolve server issues quickly using AHS uploaded data. AHSV provides Hewlett Packard Enterprise recommended repair actions based on experience and best practices. AHSV provides the ability to:

- Read server configuration information
- View Driver/Firmware inventory
- Review Event Logs

- Respond to Fault Detection Analytics alerts

- Open new and update existing support cases

Active Health System

The Active Health System monitors and records changes in the server hardware and system configuration.

The Active Health System provides:

- Continuous health monitoring of over 1600 system parameters

- Logging of all configuration changes

- Consolidated health and service alerts with precise time stamps

- Agentless monitoring that does not affect application performance

For more information about the Active Health System, see the iLO user guide at the following website: **https://www.hpe.com/support/ilo-docs**.

Active Health System data collection

The Active Health System does not collect information about your operations, finances, customers, employees, or partners.

Examples of information that is collected:

- Server model and serial number

- Processor model and speed

- Storage capacity and speed

- Memory capacity and speed

- Firmware/BIOS and driver versions and settings

The Active Health System does not parse or change OS data from third-party error event log activities (for example, content created or passed through the OS).

Active Health System Log

The data collected by the Active Health System is stored in the Active Health System Log. The data is logged securely, isolated from the operating system, and separate from customer data. Host resources are not consumed in the collection and logging of Active Health System data.

When the Active Health System Log is full, new data overwrites the oldest data in the log.

It takes less than 5 minutes to download the Active Health System Log and send it to a support professional to help you resolve an issue.

When you download and send Active Health System data to Hewlett Packard Enterprise, you agree to have the data used for analysis, technical resolution, and quality improvements. The data that is collected is managed according to the privacy statement, available at **https://www.hpe.com/info/privacy**.

You can also upload the log to the Active Health System Viewer. For more information, see the Active Health System Viewer documentation at the following website: **https://www.hpe.com/support/ahsv-docs**.

HPE iLO 5

iLO 5 is a remote server management processor embedded on the system boards of supported HPE servers and compute modules. iLO enables the monitoring and controlling of servers from remote locations. iLO management is a powerful tool that provides multiple ways to configure, update, monitor, and repair servers remotely.

For more information about iLO, see the iLO user guide at the following website: **https://www.hpe.com/support/ilo-docs**.

iLO Federation

iLO Federation enables you to manage multiple servers from one system using the iLO web interface.

When configured for iLO Federation, iLO uses multicast discovery and peer-to-peer communication to enable communication between the systems in iLO Federation groups.

When you navigate to one of the iLO Federation pages, a data request is sent from the iLO system running the web interface to its peers, and from those peers to other peers until all data for the selected iLO Federation group is retrieved.

iLO supports the following features:

- Group health status—View server health and model information.

- Group virtual media—Connect URL-based media for access by a group of servers.

- Group power control—Manage the power status of a group of servers.

- Group power capping—Set dynamic power caps for a group of servers.

- Group firmware update—Update the firmware of a group of servers.

- Group license installation—Enter a license key to activate iLO licensed features on a group of servers.

- Group configuration—Add iLO Federation group memberships for multiple iLO systems.

Any user can view information on iLO Federation pages, but a license is required for using the following features: Group virtual media, Group power control, Group power capping, Group configuration, and Group firmware update.

For more information about iLO Federation, see the iLO user guide at the following website: **https://www.hpe.com/support/ilo-docs**.

iLO Service Port

The Service Port is a USB port with the label **iLO** on supported servers and compute modules.

To find out if your server or compute module supports this feature, see the server specifications document at the following website: **https://www.hpe.com/info/qs**.

When you have physical access to a server, you can use the Service Port to do the following:

- Download the Active Health System Log to a supported USB flash drive.

  When you use this feature, the connected USB flash drive is not accessible by the host operating system.

- Connect a client (such as a laptop) with a supported USB to Ethernet adapter to access the following:

  ◦ iLO web interface

  ◦ Remote console

  ◦ iLO RESTful API

  ◦ CLI

Hewlett Packard Enterprise recommends the HPE USB to Ethernet Adapter (part number Q7Y55A).

Some servers, such as the XL170r, require an adapter to connect a USB to Ethernet adapter to the iLO Service Port.

Hewlett Packard Enterprise recommends the HPE Micro USB to USB Adapter (part number 789904-B21).

When you use the iLO Service Port:

- Actions are logged in the iLO event log.

- The server UID flashes to indicate the Service Port status.

  You can also retrieve the Service Port status by using a REST client and the iLO RESTful API.

- You cannot use the Service Port to boot any device within the server, or the server itself.

- You cannot access the server by connecting to the Service Port.

- You cannot access the connected device from the server.

For more information about the iLO Service Port, see the iLO user guide at the following website: **https://www.hpe.com/support/ilo-docs**.

iLO RESTful API

iLO includes the iLO RESTful API, which is Redfish API conformant. The iLO RESTful API is a management interface that server management tools can use to perform configuration, inventory, and monitoring tasks by sending basic HTTPS operations (GET, PUT, POST, DELETE, and PATCH) to the iLO web server.

To learn more about the iLO RESTful API, see the Hewlett Packard Enterprise website (**https://www.hpe.com/support/restfulinterface/docs**).

For specific information about automating tasks using the iLO RESTful API, see libraries and sample code at **https://www.hpe.com/info/redfish**.

🎥 For more information, watch the **Redfish & How it works with HPE Server Management** video.

RESTful Interface Tool

The RESTful Interface Tool (iLOREST) is a scripting tool that allows you to automate HPE server management tasks. It provides a set of simplified commands that take advantage of the iLO RESTful API. You can install the tool on your computer for remote use or install it locally on a server with a Windows or Linux Operating System. The RESTful Interface Tool offers an interactive mode, a scriptable mode, and a file-based mode similar to CONREP to help decrease automation times.

For more information, see the following website: **https://www.hpe.com/info/resttool**.

iLO Amplifier Pack

iLO Amplifier Pack is an advanced server inventory, firmware and driver update solution that enables rapid discovery, detailed inventory reporting, firmware, and driver updates by leveraging iLO advanced functionality. iLO Amplifier Pack performs rapid server discovery and inventory for thousands of supported servers for the purpose of updating firmware and drivers at scale.

For more information about iLO Amplifier Pack, see the *iLO Amplifier Pack User Guide* at the following website: **https://www.hpe.com/support/ilo-ap-ug-en**.

Integrated Management Log

The IML records hundreds of events and stores them in an easy-to-view form. The IML timestamps each event with one-minute granularity.

You can view recorded events in the IML in several ways, including the following:

- From within HPE SIM

- From within the UEFI System Utilities

- From within the Embedded UEFI shell

- From within the iLO web interface

Intelligent Provisioning

Intelligent Provisioning is a single-server deployment tool embedded in ProLiant servers and HPE Synergy compute modules. Intelligent Provisioning simplifies server setup, providing a reliable and consistent way to deploy servers.

NOTE:

- Rapid Setup Software is only available on the ProLiant 300 Series servers or below. When you launch F10 mode from the POST screen, you are prompted to select whether you want to enter the Intelligent Provisioning or HPE Rapid Setup Software mode.

- After you have selected a mode, you must reprovision the server to change the mode that launches when you boot to F10.

Intelligent Provisioning prepares the system for installing original, licensed vendor media and Hewlett Packard Enterprise-branded versions of OS software. Intelligent Provisioning also prepares the system to integrate optimized server support software from the Service Pack for ProLiant (SPP). SPP is a comprehensive systems software and firmware solution for ProLiant servers, server blades, their enclosures, and HPE Synergy compute modules. These components are preloaded with a basic set of firmware and OS components that are installed along with Intelligent Provisioning.

(i) **IMPORTANT:** HPE ProLiant DX/XL servers do not support operating system installation with Intelligent Provisioning, but they do support the maintenance features. For more information, see "Performing Maintenance" in the Intelligent Provisioning user guide and online help.

After the server is running, you can update the firmware to install additional components. You can also update any components that have been outdated since the server was manufactured.

To access Intelligent Provisioning:

- Press **F10** from the POST screen and enter either Intelligent Provisioning or HPE Rapid Setup Software.

- From the iLO web interface using **Lifecycle Management**. **Lifecycle Management** allows you to access Intelligent Provisioning without rebooting your server.

Intelligent Provisioning operation

NOTE: Intelligent Provisioning 3.40 and later requires iLO firmware version 2.10 or later.

Intelligent Provisioning includes the following components:

- Critical boot drivers

- Active Health System (AHS)

- Erase Utility

- Deployment Settings

IMPORTANT:

- Although your server is preloaded with firmware and drivers, Hewlett Packard Enterprise recommends updating the firmware upon initial setup. Also, downloading and updating the latest version of Intelligent Provisioning ensures the latest supported features are available.

- For ProLiant servers, firmware is updated using the Intelligent Provisioning Firmware Update utility.

- Do not update firmware if the version you are currently running is required for compatibility.

NOTE: Intelligent Provisioning does not function within multihomed configurations. A multihomed host is one that is connected to two or more networks or has two or more IP addresses.

Intelligent Provisioning provides installation help for the following operating systems:

- Microsoft Windows Server

- Red Hat Enterprise Linux

- SUSE Linux Enterprise Server

- VMware ESXi/vSphere Custom Image

- ClearOS

Not all versions of an OS are supported. For information about specific versions of a supported operating system, see the OS Support Matrix on the Hewlett Packard Enterprise website (**https://www.hpe.com/info/ossupport**).

Management security

HPE ProLiant Gen10, HPE ProLiant Gen10 Plus, and HPE Apollo servers are built with some of the industry's most advanced security capabilities, out of the box, with a foundation of secure embedded management applications and firmware. The management security provided by HPE embedded management products enables secure support of modern workloads, protecting your components from unauthorized access and unapproved use. The range of embedded management and optional software and firmware available with the iLO Advanced license provides security features that help ensure protection, detection, and recovery from advanced cyber attacks. For more information, see the *HPE Gen10 and Gen10 Plus Security Reference Guide* on the Hewlett Packard Enterprise Information Library at **https://www.hpe.com/support/gen10-security-ref-en**.

Scripting Toolkit for Windows and Linux

The STK for Windows and Linux is a server deployment product that delivers an unattended automated installation for high-volume server deployments. The STK is designed to support ProLiant servers. The toolkit includes a modular set of utilities and important documentation that describes how to apply these tools to build an automated server deployment process.

The STK provides a flexible way to create standard server configuration scripts. These scripts are used to automate many of the manual steps in the server configuration process. This automated server configuration process cuts time from each deployment, making it possible to scale rapid, high-volume server deployments.

For more information or to download the STK, see the **Hewlett Packard Enterprise website**.

UEFI System Utilities

The UEFI System Utilities is embedded in the system ROM. Its features enable you to perform a wide range of configuration activities, including:

- Configuring system devices and installed options.

- Enabling and disabling system features.

- Displaying system information.

- Selecting the primary boot controller or partition.

- Configuring memory options.

- Launching other preboot environments.

HPE servers with UEFI can provide:

- Support for boot partitions larger than 2.2 TB. Such configurations could previously only be used for boot drives when using RAID solutions.

- Secure Boot that enables the system firmware, option card firmware, operating systems, and software collaborate to enhance platform security.

- UEFI Graphical User Interface (GUI)

- An Embedded UEFI Shell that provides a preboot environment for running scripts and tools.

- Boot support for option cards that only support a UEFI option ROM.

Selecting the boot mode

This server provides two **Boot Mode** configurations: UEFI Mode and Legacy BIOS Mode. Certain boot options require that you select a specific boot mode. By default, the boot mode is set to **UEFI Mode**. The system must boot in **UEFI Mode** to use certain options, including:

- Secure Boot, UEFI Optimized Boot, Generic USB Boot, IPv6 PXE Boot, iSCSI Boot, and Boot from URL

- Fibre Channel/FCoE Scan Policy

NOTE: The boot mode you use must match the operating system installation. If not, changing the boot mode can impact the ability of the server to boot to the installed operating system.

Prerequisite

When booting to **UEFI Mode**, leave **UEFI Optimized Boot** enabled.

Procedure

1. From the **System Utilities** screen, select **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Boot Options** > **Boot Mode**.

2. Select a setting.

   - **UEFI Mode** (default)—Configures the system to boot to a UEFI compatible operating system.

   - **Legacy BIOS Mode**—Configures the system to boot to a traditional operating system in Legacy BIOS compatibility mode.

3. Save your setting.

4. Reboot the server.

Secure Boot

Secure Boot is a server security feature that is implemented in the BIOS and does not require special hardware. Secure Boot ensures that each component launched during the boot process is digitally signed and that the signature is validated against a set of trusted certificates embedded in the UEFI BIOS. Secure Boot validates the software identity of the following components in the boot process:

- UEFI drivers loaded from PCIe cards

- UEFI drivers loaded from mass storage devices

- Preboot UEFI Shell applications

- OS UEFI boot loaders

When Secure Boot is enabled:

- Firmware components and operating systems with boot loaders must have an appropriate digital signature to execute during the boot process.

- Operating systems must support Secure Boot and have an EFI boot loader signed with one of the authorized keys to boot. For more information about supported operating systems, see **https://www.hpe.com/servers/ossupport**.

You can customize the certificates embedded in the UEFI BIOS by adding or removing your own certificates, either from a management console directly attached to the server, or by remotely connecting to the server using the iLO Remote Console.

You can configure Secure Boot:

- Using the **System Utilities** options described in the following sections.

- Using the iLO RESTful API to clear and restore certificates. For more information, see the Hewlett Packard Enterprise website (**https://www.hpe.com/info/redfish**).

- Using the `secboot` command in the Embedded UEFI Shell to display Secure Boot databases, keys, and security reports.

Launching the Embedded UEFI Shell

Use the **Embedded UEFI Shell** option to launch the Embedded UEFI Shell. The Embedded UEFI Shell is a preboot command-line environment for scripting and running UEFI applications, including UEFI boot loaders. The Shell also provides CLI-based commands you can use to obtain system information, and to configure and update the system BIOS.

Prerequisites

Embedded UEFI Shell is set to **Enabled**.

Procedure

1. From the **System Utilities** screen, select **Embedded Applications** > **Embedded UEFI Shell**.

   The **Embedded UEFI Shell** screen appears.

2. Press any key to acknowledge that you are physically present.

This step ensures that certain features, such as disabling **Secure Boot** or managing the **Secure Boot** certificates using third-party UEFI tools, are not restricted.

3. If an administrator password is set, enter it at the prompt and press **Enter**.

   The `Shell>` prompt appears.

4. Enter the commands required to complete your task.

5. Enter the `exit` command to exit the Shell.

HPE Smart Storage Administrator

HPE SSA is the main tool for configuring arrays on HPE Smart Array SR controllers. It exists in three interface formats: the HPE SSA GUI, the HPE SSA CLI, and HPE SSA Scripting. All formats provide support for configuration tasks. Some of the advanced tasks are available in only one format.

The diagnostic features in HPE SSA are also available in the standalone software HPE Smart Storage Administrator Diagnostics Utility CLI.

During the initial provisioning of the server or compute module, an array is required to be configured before the operating system can be installed. You can configure the array using SSA.

HPE SSA is accessible both offline (either through HPE Intelligent Provisioning or as a standalone bootable ISO image) and online:

- Accessing HPE SSA in the offline environment

  ⓘ **IMPORTANT:** If you are updating an existing server in an offline environment, obtain the latest version of HPE SSA through Service Pack for ProLiant before performing configuration procedures.

  Using one of multiple methods, you can run HPE SSA before launching the host operating system. In offline mode, users can configure or maintain detected and supported devices, such as optional Smart Array controllers and integrated Smart Array controllers. Some HPE SSA features are only available in the offline environment, such as setting the boot controller and boot volume.

- Accessing HPE SSA in the online environment

  This method requires an administrator to download the HPE SSA executables and install them. You can run HPE SSA online after launching the host operating system.

For more information, see *HPE Smart Array SR Gen10 Configuration Guide* at the **Hewlett Packard Enterprise website**.

HPE MR Storage Administrator

HPE MR Storage Administrator is a web-based application that enables you to monitor, configure, maintain, and troubleshoot the HPE Smart Array MR controller. MR Storage Administrator enables you to view, create, and manage storage configurations.

ⓘ **IMPORTANT:** The HPE MR Storage Administrator manages **only** the HPE Smart Array MR controllers. It does not manage HPE Smart Array SR controllers.

- **Monitoring and configuring**: MR Storage Administrator enables you to monitor the controllers and configure the drives on the controller. It displays the status of the controller cards, logical drives, and drives on the controller. The device status icons notify you if there are drive failures and other events that require your immediate attention. Email notifications about the status of the server are sent based on your alert settings. The system errors and events are recorded and displayed in an event log file. You can also import or clear foreign configurations.

> ⓘ **IMPORTANT:** Limited alerting and monitoring is available through iLO when HPE Agentless Management Service is installed. The HPE Smart Array P824i-p MR Gen10 controller supports limited alerts through iLO using the AMS agent.

- **Maintaining**: Using MR Storage Administrator, you can perform system maintenance tasks, such as updating the controller firmware.

- **Troubleshooting**: MR Storage Administrator displays information related to drive failures, device failures, and other issues. It also provides recommendations and displays contextual links, helping you to locate the drives/devices that have issues and troubleshoot them. You can also download a report of the devices and their configurations, properties, and settings and send it to Hewlett Packard Enterprise Support for further troubleshooting.

Obtain MR Storage Administrator installation files through the Service Pack for ProLiant, or SPP, which you can download from the Hewlett Packard Enterprise website (**https://www.hpe.com/servers/spp/download**). Be sure to use the latest SPP version for the server.

For more information about the MR Storage Administrator, see *MR Storage Administrator User Guide* on the Hewlett Packard Enterprise website (**https://www.hpe.com/info/P824i-pdocs**).

HPE InfoSight for servers

The HPE InfoSight portal is a secure web interface hosted by HPE that allows you to monitor supported devices through a graphical interface.

HPE InfoSight for servers:

- Combines the machine learning and predictive analytics of HPE InfoSight with the health and performance monitoring of Active Health System (AHS) and HPE iLO to optimize performance and predict and prevent problems

- Provides automatic collection and analysis of the sensor and telemetry data from AHS to derive insights from the behaviors of the install base to provide recommendations to resolve problems and improve performance

For more information on getting started and using HPE InfoSight for servers, go to: **https://www.hpe.com/info/infosight-servers-docs**.

StorCLI

The Storage Command Line Interface (StorCLI) tool is the command line management software designed for the HPE Smart Array MR controller. StorCLI is a command line interface that is designed to be easy to use, consistent, and easy to script.

Obtain StorCLI through the Service Pack for ProLiant, or SPP, which you can download from **https://www.hpe.com/servers/spp/download**. Be sure to use the latest SPP version for the server.

For more information about StorCLI, see *StorCLI User Guide* on the Hewlett Packard Enterprise website **https://www.hpe.com/info/P824i-pdocs**.

USB support

Hewlett Packard Enterprise Gen10 and Gen10 Plus servers support all USB operating speeds depending on the device that is connected to the server.

External USB functionality

Hewlett Packard Enterprise provides external USB support to enable local connection of USB devices for server administration, configuration, and diagnostic procedures.

For additional security, external USB functionality can be disabled through USB options in UEFI System Utilities.

Redundant ROM support

The server enables you to upgrade or configure the ROM safely with redundant ROM support. The server has a single ROM that acts as two separate ROM images. In the standard implementation, one side of the ROM contains the current ROM program version, while the other side of the ROM contains a backup version.

NOTE: The server ships with the same version programmed on each side of the ROM.

Safety and security benefits

When you flash the system ROM, the flashing mechanism writes over the backup ROM and saves the current ROM as a backup, enabling you to switch easily to the alternate ROM version if the new ROM becomes corrupted for any reason. This feature protects the existing ROM version, even if you experience a power failure while flashing the ROM.

Keeping the system current

Updating firmware or system ROM

To update firmware or system ROM, use one of the following methods:

- The **Firmware Update** option in the System Utilities.

- The `fwupdate` command in the **Embedded UEFI Shell**.

- Service Pack for ProLiant (SPP)

- HPE online flash components

- Moonshot Component Pack

Service Pack for ProLiant

SPP is a systems software and firmware solution delivered as a single ISO file download. This solution uses SUM as the deployment tool and is tested and supports HPE ProLiant, HPE BladeSystem, HPE Synergy, and HPE Apollo servers and infrastructure.

SPP, along with SUM and SUT, provides Smart Update system maintenance tools that systematically update HPE ProLiant, HPE BladeSystem, HPE Synergy, and HPE Apollo servers and infrastructure.

SPP can be used in an online mode on a server running Windows, Linux, or VMware vSphere ESXi, or in an offline mode where the server is booted to an operating system included in the ISO file.

The preferred method for downloading an SPP is using the SPP Custom Download at **https://www.hpe.com/servers/spp/custom**.

The SPP is also available for download from the SPP download page at **https://www.hpe.com/servers/spp/download**.

Smart Update Manager

SUM is an innovative tool for maintaining and updating the firmware, drivers, and system software of HPE ProLiant, HPE BladeSystem, HPE Synergy, HPE Superdome Flex servers, and HPE Apollo servers, infrastructure, and associated options.

SUM identifies associated nodes you can update at the same time to avoid interdependency issues.

Key features of SUM include:

- Discovery engine that finds installed versions of hardware, firmware, and software on nodes.

- SUM deploys updates in the correct order and ensures that all dependencies are met before deploying an update.

- Interdependency checking.

- Automatic and step-by-step Localhost Guided Update process.

- Web browser-based user interface.

- Ability to create custom baselines and ISOs.

- Support for iLO Repository (Gen10 or later iLO 5 nodes only).

- Simultaneous firmware and software deployment for multiple remote nodes.

- Local offline firmware deployments with SPP deliverables.

- Extensive logging in all modes.

NOTE: Support for HPE Integrity servers has been discontinued from SUM 8.x.

Integrated Smart Update Tools

Integrated Smart Update Tools (SUT) is the smart update solution for performing online firmware and driver updates. SUT is used with iLO 4, iLO 5, and with update solutions (management appliances such as iLO Amplifier Pack or HPE OneView and Smart Update Manager (SUM) to stage, install, and activate firmware and driver updates.

The solution must be installed on the operating system, where it updates results through Rich Infrastructure Services (RIS) communication.

- **SUT**: Polls iLO to check for requests from SUM, iLO Amplifier Pack, or HPE OneView for updates through local iLO using the iLO channel interface driver installed on the OS and orchestrates staging, deploying, and activating updates. You can adjust the polling interval by issuing the appropriate command-line option provided by SUT. Performs inventory on target servers, stages deployment, deploys updates, and then reboots the servers.

- **iLO 5 with integrated Smart Update** (Gen10 or later servers only): Performs iLO Repository-based updates by downloading the components from iLO Repository when iLO Installation Queue has the components which can be updated by SUT.

- **iLO Amplifier Pack and HPE OneView**: Displays available updates for servers. Communicates with SUT (or SUT 1.x) to initiate updates using the iLO Redfish interface. SUT reports the status of updates to iLO Amplifier Pack through iLO Restful Interface.

- **SUM**: A tool for firmware and driver maintenance for HPE ProLiant servers and associated options.

NOTE: SUM and iLO Amplifier Pack should not manage the same nodes.

Updating firmware from the System Utilities

Use the **Firmware Updates** option to update firmware components in the system, including the system BIOS, NICs, and storage cards.

Procedure

1. Access the System ROM Flash Binary component for your server from the Hewlett Packard Enterprise Support Center.

2. Copy the binary file to a USB media or iLO virtual media.

3. Attach the media to the server.

4. Launch the **System Utilities**, and select **Embedded Applications** > **Firmware Update**.

5. Select a device.

   The **Firmware Updates** screen lists details about your selected device, including the current firmware version in use.

6. Select **Select Firmware File**.

7. Select the flash file in the **File Explorer** list.

   The firmware file is loaded and the **Firmware Updates** screen lists details of the file in the **Selected firmware file** field.

8. Select **Image Description**, and then select a firmware image.

   A device can have multiple firmware images.

9. Select **Start firmware update**.

Updating the firmware from the UEFI Embedded Shell

Procedure

1. Access the System ROM Flash Binary component for your server from the Hewlett Packard Enterprise Support Center (**https://www.hpe.com/support/hpesc**).

2. Copy the binary file to a USB media or iLO virtual media.

3. Attach the media to the server.

4. Boot to the UEFI Embedded Shell.

5. To obtain the assigned file system volume for the USB key, enter `map -r`.

6. Change to the file system that contains the System ROM Flash Binary component for your server. Enter one of the `fsx` file systems available, such as `fs0:` or `fs1:`, and press **Enter**.

7. Use the `cd` command to change from the current directory to the directory that contains the binary file.

8. Flash the system ROM by entering `fwupdate -d BIOS -f` *filename*.

9. Reboot the server. A reboot is required after the firmware update in order for the updates to take effect and for hardware stability to be maintained.

Online Flash components

This component provides updated system firmware that can be installed directly on supported operating systems. Additionally, when used in conjunction with SUM, this Smart Component allows the user to update firmware on remote servers from a central location. This remote deployment capability eliminates the need for the user to be physically present at the server to perform a firmware update.

Drivers

> **(!) IMPORTANT:** Always perform a backup before installing or updating device drivers.

Update drivers using any of the following **Smart Update Solutions**:

- Download the latest Service Pack for ProLiant (includes Smart Update Manager)

- Create a custom SPP download

- Download Smart Update Manager for Linux

- Download specific drivers

  To locate the drivers for a server, go to the **Hewlett Packard Enterprise Support Center website**, and then search for the product name/number.

Software and firmware

Update software and firmware before using the server for the first time, unless any installed software or components require an older version.

For system software and firmware updates, use one of the following sources:

- Download the SPP from the Hewlett Packard Enterprise website (**https://www.hpe.com/servers/spp/download**).

- Download individual drivers, firmware, or other system software components from the server product page in the Hewlett Packard Enterprise Support Center website (**https://www.hpe.com/support/hpesc**).

Operating system version support

For information about specific versions of a supported operating system, refer to the **operating system support matrix**.

HPE Pointnext Portfolio

HPE Pointnext delivers confidence, reduces risk, and helps customers realize agility and stability. Hewlett Packard Enterprise helps customers succeed through Hybrid IT by simplifying and enriching the on-premise experience, informed by public cloud qualities and attributes.

Operational Support Services enable you to choose the right service level, length of coverage, and response time to fit your business needs. For more information, see the Hewlett Packard Enterprise website:

https://www.hpe.com/us/en/services/operational.html

Utilize the Advisory and Transformation Services in the following areas:

- Private or hybrid cloud computing

- Big data and mobility requirements

- Improving data center infrastructure

- Better use of server, storage, and networking technology

For more information, see the Hewlett Packard Enterprise website:

https://www.hpe.com/services/consulting

Proactive notifications

30 to 60 days in advance, Hewlett Packard Enterprise sends notifications to subscribed customers on upcoming:

- Hardware, firmware, and software changes

- Bulletins

- Patches

- Security alerts

You can subscribe to proactive notifications on the **Hewlett Packard Enterprise website**.

Troubleshooting

NMI functionality

An NMI crash dump enables administrators to create crash dump files when a system is hung and not responding to traditional debugging methods.

An analysis of the crash dump log is an essential part of diagnosing reliability problems, such as hanging operating systems, device drivers, and applications. Many crashes freeze a system, and the only available action for administrators is to cycle the system power. Resetting the system erases any information that could support problem analysis, but the NMI feature preserves that information by performing a memory dump before a hard reset.

To force the OS to initiate the NMI handler and generate a crash dump log, the administrator can use the iLO Generate NMI feature.

Troubleshooting resources

Troubleshooting resources are available for HPE Gen10 and Gen10 Plus server products in the following documents:

- *Troubleshooting Guide for HPE ProLiant Gen10 and Gen10 Plus servers* provides procedures for resolving common problems and comprehensive courses of action for fault isolation and identification, issue resolution, and software maintenance.

- *Error Message Guide for HPE ProLiant Gen10 servers and HPE Synergy* provides a list of error messages and information to assist with interpreting and resolving error messages.

- *Error Message Guide for HPE ProLiant Gen10 Plus servers and HPE Synergy* provides a list of error messages and information to assist with interpreting and resolving error messages.

- *Integrated Management Log Messages and Troubleshooting Guide for HPE ProLiant Gen10 and Gen10 Plus servers and HPE Synergy* provides IML messages and associated troubleshooting information to resolve critical and cautionary IML events.

To access troubleshooting resources for your product, see the Hewlett Packard Enterprise Information Library:

- For Gen10 servers, see **https://www.hpe.com/info/gen10-troubleshooting**.

- For Gen10 Plus servers, see **https://www.hpe.com/info/gen10plus-troubleshooting**.

System battery replacement

System battery information

The server contains an internal lithium manganese dioxide, a vanadium pentoxide, or an alkaline battery that provides power to the real-time clock. If this battery is not properly handled, a risk of the fire and burns exists. To reduce the risk of personal injury:

- Do not attempt to recharge the battery.

- Do not expose the battery to temperatures higher than 60°C (140°F).

- Do not expose the battery to extremely low air pressure as it might lead to explosion or leakage of flammable liquid or gas.

- Do not disassemble, crush, puncture, short external contacts, or dispose the battery in fire or water.

- If the server no longer automatically displays the correct date and time, then replace the battery that provides power to the real-time clock. Under normal use, battery life is 5 to 10 years.

Removing and replacing the system battery

Procedure

1. **Remove the front bezel**.

2. **Power down the server**.

3. Remove all power:

   a. Disconnect each power cord from the power source.

   b. Disconnect each power cord from the server.

4. Disconnect all peripheral cables from the server.

5. Do one of the following:

   - Server in tower mode: **Position the tower server for hardware configuration**.

   - Server in rack mode: **Extend the server from the rack**.

6. **Remove the access panel**.

7. **Remove the air baffle**.

8. **Replace the system battery**.

9. **Install the air baffle**.

10. **Install the access panel**.

11. Do one of the following:

- Server in tower mode: **Position the tower server for operation**.

- Server in rack mode: **Slide the server into the rack**.

12. Connect all peripheral cables to the server.

13. Connect each power cord to the server.

14. Connect each power cord to the power source.

15. **Power up the server**.

16. **Install the front bezel**.

The installation is complete.

Replace the system battery

Prerequisites
Before you perform this procedure make sure you have a small flat-bladed, nonconductive tool available.

Procedure

1. **Locate the battery on the system board**.

2. Use a small flat-bladed, nonconductive tool to carefully lift the front of the battery from the socket.

3. Remove the battery.
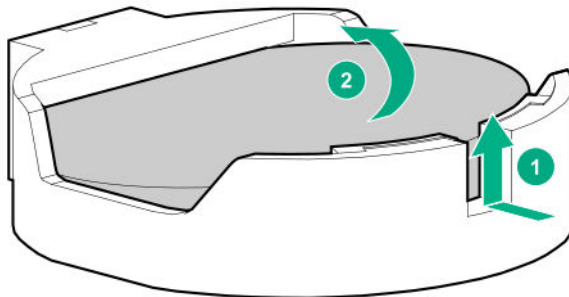
4. Install the system battery.
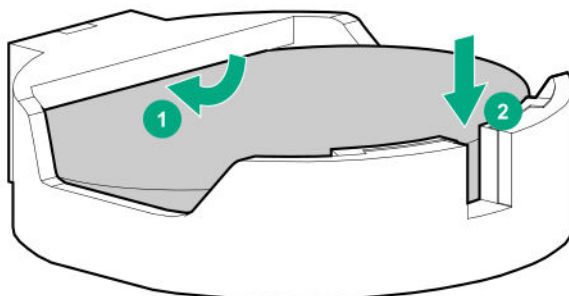
For more information about battery replacement or proper disposal, contact an authorized reseller or an authorized service provider.

Safety, warranty, and regulatory information

Regulatory information

To view the regulatory information for your product, view the *Safety and Compliance Information for Server, Storage, Power, Networking, and Rack Products,* available at the Hewlett Packard Enterprise Support Center:

https://www.hpe.com/support/Safety-Compliance-EnterpriseProducts

Additional regulatory information

Hewlett Packard Enterprise is committed to providing our customers with information about the chemical substances in our products as needed to comply with legal requirements such as REACH (Regulation EC No 1907/2006 of the European Parliament and the Council). A chemical information report for this product can be found at:

https://www.hpe.com/info/reach

For Hewlett Packard Enterprise product environmental and safety information and compliance data, including RoHS and REACH, see:

https://www.hpe.com/info/ecodata

For Hewlett Packard Enterprise environmental information, including company programs, product recycling, and energy efficiency, see:

https://www.hpe.com/info/environment

Notices for Eurasian Economic Union

EAC

Manufacturer and Local Representative Information

Manufacturer information:

Hewlett Packard Enterprise, 6280 America Center Drive, San Jose, CA 95002 U.S.

Local representative information Russian:

- **Russia**

  ООО "Хьюлетт Паккард Энтерпрайз", Российская Федерация, 125171, г. Москва, Ленинградское шоссе, 16А, стр.3, Телефон: +7 499 403 4248 Факс: +7 499 403 4677

- **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: +7 499 403 4248 Факс: +7 499 403 4677

- **Kazakhstan**

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

Manufacturing date:

The manufacturing date is defined by the serial number.

CCSYWWZZZZ (product serial number format)

WW = Week of manufacture (calendar week)

Y = Year of manufacture (decade, year)
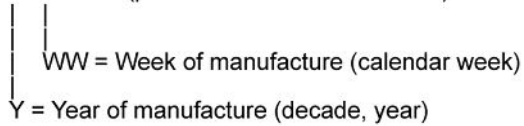
If you need help identifying the manufacturing date, contact **tre@hpe.com**.

Turkey RoHS material content declaration

Türkiye Cumhuriyeti: AEEE 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

Warranty information

To view the warranty information for your product, see the links provided below:

HPE ProLiant and IA-32 Servers and Options

https://www.hpe.com/support/ProLiantServers-Warranties

HPE Enterprise and Cloudline Servers

https://www.hpe.com/support/EnterpriseServers-Warranties

HPE Storage Products

https://www.hpe.com/support/Storage-Warranties

HPE Networking Products

https://www.hpe.com/support/Networking-Warranties

Specifications

Environmental specifications

Specification	Value
Temperature range[1]	—
Operating	10°C to 35°C (50°F to 95°F)
Nonoperating	-30°C to 60°C (-22°F to 140°F)
Relative humidity (noncondensing)	—
Operating	8% to 90%
	28°C (82.4°F), maximum wet bulb temperature
Nonoperating	5% to 95%
	38.7°C (101.7°F), maximum wet bulb temperature

[1] All temperature ratings shown are for sea level. An altitude derating of 1.0°C per 305 m (1.8°F per 1000 ft) to 3050 m (10,000 ft) is applicable. No direct sunlight allowed. Maximum rate of change is 20°C per hour (36°F per hour). The upper limit and rate of change might be limited by the type and number of options installed.

For certain approved hardware configurations, the supported system inlet temperature range is extended:

- 5°C to 10°C (41°F to 50°F) and 35°C to 40°C (95°F to 104°F) at sea level with an altitude derating of 1.0°C per every 175 m (1.8°F per every 574 ft) above 900 m (2953 ft) to a maximum of 3050 m (10,000 ft).

- 40°C to 45°C (104°F to 113°F) at sea level with an altitude derating of 1.0°C per every 125 m (1.8°F per every 410 ft) above 900 m (2953 ft) to a maximum of 3050 m (10,000 ft).

The approved hardware configurations for this system are listed on the **Hewlett Packard Enterprise website**.

Mechanical specifications

Specification	Value
Tower model	—
Height	46.25 cm (18.21 in)
Depth	64.8 cm (25.51 in)
Width	17.4 cm (6.85 in)
Weight, minimum	21 kg (46.30 lb)

Table Continued

Specification	Value
Weight, maximum	41 kg (90.39 lb)
Rack model	—
Height	17.4 cm (6.85 in)
Depth	64.8 cm (25.51 in)
Width	44.5 cm (17.52 in)
Weight, minimum	21 kg (46.30 lb)
Weight, maximum	41 kg (90.39 lb)

Power supply specifications

Depending on the installed options and the regional location where the server was purchased, the server can be configured with one of the following power supplies:

- **HPE 500W Low Halogen Non-hot-plug Power Supply**

    This power supply is only supported when the server is in tower mode.

- **HPE 500W Flex Slot Platinum Hot-plug Low Halogen Power Supply**

- **HPE 800W Flex Slot Platinum Hot-plug Low Halogen Power Supply**

- **HPE 800W Flex Slot Titanium Hot-plug Low Halogen Power Supply**

- **HPE 800W Flex Slot Universal Hot-plug Low Halogen Power Supply**

- **HPE 800W Flex Slot -48VDC Hot-plug Low Halogen Power Supply**

- **HPE 1600 W Flex Slot Platinum Hot-plug Low Halogen Power Supply**

For detailed power supply specifications, see the QuickSpecs on the **Hewlett Packard Enterprise website**.

HPE 500W Low Halogen Non-hot-plug Power Supply

Specification	Value
Input requirements	—
Rated input voltage	100 VAC to 240 VAC 240 VDC for China only
Rated input frequency	50 Hz to 60 Hz

Table Continued

Specification	Value
Rated input current	5.8 A at 100 VAC
	2.3 A at 240 VAC
	2.7 A at 240 VDC for China only
Maximum rated input power	578 W at 100 VAC
	557 W at 240 VAC
BTUs per hour	1953 at 100 VAC
	1882 at 240 VAC
Power supply output	—
Rated steady-state power	500 W at 100 VAC to 240 VAC input
	500 W at 240 VDC input for China only
Maximum peak power	500 W at 100 VAC to 240 VAC input
	500 W at 240 VDC input for China only

HPE 500W Flex Slot Platinum Hot-plug Low Halogen Power Supply

Specification	Value
Input requirements	—
Rated input voltage	100 VAC to 240 VAC
	240 VDC for China only
Rated input frequency	50 Hz to 60 Hz
	Not applicable to 240 VDC
Rated input current	5.6 A at 100 VAC
	2.7 A at 200 VAC
	2.3 A at 240 VDC for China only
Maximum rated input power	557 W at 100 VAC
	539 W at 200 VAC
	537 W at 240 VDC for China only

Table Continued

Specification	Value
BTUs per hour	1902 at 100 VAC
	1840 at 200 VAC
	1832 at 240 VDC for China only
Power supply output	—
Rated steady-state power	500 W at 100 VAC to 127 VAC input
	500 W at 100 VAC to 240 VAC input
	500 W at 240 VDC input for China only
Maximum peak power	500 W at 100 VAC to 127 VAC input
	500 W at 100 VAC to 240 VAC input
	500 W at 240 VDC input for China only

HPE 800W Flex Slot Platinum Hot-plug Low Halogen Power Supply

Specification	Value
Input requirements	—
Rated input voltage	100 VAC to 127 VAC
	200 VAC to 240 VAC
	240 VDC for China only
Rated input frequency	50 Hz to 60 Hz
	Not applicable to 240 VDC
Rated input current	9.1 A at 100 VAC
	4.4 A at 200 VAC
	3.6 A at 240 VDC for China only
Maximum rated input power	899 W at 100 VAC
	867 W at 200 VAC
	864 W at 240 VDC for China only
BTUs per hour	3067 at 100 VAC
	2958 at 200 VAC
	2949 at 240 VAC for China only

Table Continued

Specification	Value
Power supply output	—
Rated steady-state power	800 W at 100 VAC to 127 VAC input
	800 W at 100 VAC to 240 VAC input
	800 W at 240 VDC input for China only
Maximum peak power	800 W at 100 VAC to 127 VAC input
	800 W at 100 VAC to 240 VAC input
	800 W at 240 VDC input for China only

HPE 800W Flex Slot Titanium Hot-plug Low Halogen Power Supply

Specification	Value
Input requirements	—
Rated input voltage	200 VAC to 240 VAC
	240 VDC for China only
Rated input frequency	50 Hz to 60 Hz
	Not applicable to 240 VDC
Rated input current	4.35 A at 200 VAC 3.62 A at 240 VAC
	3.62 A at 240 VDC for China only
Maximum rated input power	851 W at 200 VAC
	848 W at 240 VAC
	848 W at 240 VDC for China only
BTUs per hour	2905 at 200 VAC
	2893 at 240 VAC
	2893 at 240 VDC for China only
Power supply output	—
Rated steady-state power	800 W at 200 VAC to 240 VAC input
	800 W at 240 VDC input for China only
Maximum peak power	800 W at 200 VAC to 240 VAC input
	800 W at 240 VDC input for China only

HPE 800W Flex Slot Universal Hot-plug Low Halogen Power Supply

Specification	Value
Input requirements	—
Rated input voltage	200 VAC to 277 VAC
	380 VDC
Rated input frequency	50 Hz to 60 Hz
Rated input current	4.4 A at 200 VAC
	3.1 A at 277 VAC
	2.3 A at 380 VDC
Maximum rated input power	869 W at 200 VAC
	865 W at 230 VAC
	861 W at 277 VAC
	863 W at 380 VDC
BTUs per hour	2964 at 200 VAC
	2951 at 230 VAC
	2936 at 277 VAC
	2943 at 380 VDC
Power supply output	—
Rated steady-state power	800 W at 200 VAC to 277 VAC input
Maximum peak power	800 W at 200 VAC to 277 VAC input

HPE 800W Flex Slot -48VDC Hot-plug Low Halogen Power Supply

Specification	Value
Input requirements	—
Rated input voltage	-40 VDC to -72 VDC
	-48 VDC nominal input
Rated input current	22.1 A at -40 VDC input
	18.2 A at -48 VDC input, nominal input
	12.0 A at -72 VDC input

Table Continued

Specification	Value
Rated input power (W)	874 W at -40 VDC input
	865 W at -48 VDC input, nominal input
	854 W at -72 VDC input
Rated input power (BTUs per hour)	2983 at -40 VDC input
	2951 at -48 VDC input, nominal input
	2912 at -72 VDC input
Power supply output	—
Rated steady-state power (W)	800 W at -40 VDC to -72 VDC
Maximum peak power (W)	800 W at -40 VDC to -72 VDC
Maximum peak power	800 W at -40 VDC to -72 VDC input

⚠ **WARNING:** To reduce the risk of electric shock or energy hazards:

- This equipment must be installed by trained service personnel.

- Connect the equipment to a reliably grounded secondary circuit source. A secondary circuit has no direct connection to a primary circuit and derives its power from a transformer, converter, or equivalent isolation device.

- The branch circuit overcurrent protection must be rated 27 A.

⚠ **CAUTION:** This equipment is designed to permit the connection of the earthed conductor of the DC supply circuit to the earthing conductor at the equipment.

If this connection is made, all of the following must be met:

- This equipment must be connected directly to the DC supply system earthing electrode conductor or to a bonding jumper from an earthing terminal bar or bus to which the DC supply system earthing electrode conductor is connected.

- This equipment must be located in the same immediate area (such as adjacent cabinets) as any other equipment that has a connection between the earthed conductor of the same DC supply circuit and the earthing conductor, and also the point of earthing of the DC system. The DC system must be earthed elsewhere.

- The DC supply source is to be located within the same premises as the equipment.

- Switching or disconnecting devices must not be in the earthed circuit conductor between the DC source and the point of connection of the earthing electrode conductor.

HPE 1600 W Flex Slot Platinum Hot-plug Low Halogen Power Supply

Specification	Value
Input requirements	—
Rated input voltage	200 VAC to 240 VAC 240 VDC for China only
Rated input frequency	50 Hz to 60 Hz
Rated input current	8.7 A at 200 VAC 7.2 A at 240 VAC
Maximum rated input power	1734 W at 200 VAC 1725 W at 240 VAC
BTUs per hour	5918 at 200 VAC 5884 at 240 VAC
Power supply output	—
Rated steady-state power	1600 W at 200 VAC to 240 VAC input 1600 W at 240 VDC input
Maximum peak power	2200 W for 1 ms (turbo mode) at 200 VAC to 240 VAC input

Websites

General websites

Hewlett Packard Enterprise Information Library

   https://www.hpe.com/info/EIL

Single Point of Connectivity Knowledge (SPOCK) Storage compatibility matrix

   https://www.hpe.com/storage/spock

Storage white papers and analyst reports

   https://www.hpe.com/storage/whitepapers

For additional websites, see **Support and other resources**.

Product websites

HPE ProLiant ML350 Gen10 Server product page

   https://www.hpe.com/servers/ml350-gen10

HPE ProLiant ML350 Gen10 Server support page

   https://www.hpe.com/support/ml350gen10

HPE ProLiant ML350 Gen10 Server user documents

   https://www.hpe.com/info/ml350gen10-docs

Support and other resources

Accessing Hewlett Packard Enterprise Support

- For live assistance, go to the Contact Hewlett Packard Enterprise Worldwide website:

  https://www.hpe.com/info/assistance

- To access documentation and support services, go to the Hewlett Packard Enterprise Support Center website:

  https://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

ClearCARE technical support

Support for ClearOS and ClearVM is not provided by Hewlett Packard Enterprise. Support for ClearOS and ClearVM is purchased and delivered by ClearCenter. You can purchase single support incidents by submitting a support ticket to ClearCenter, or you can purchase a Bronze, Silver, Gold, or Platinum ClearCARE subscription. For more information, go to the ClearOS website:

https://www.clearos.com/

Several levels of professional technical support are available to licensed users. For more information, go to the ClearCARE support website:

https://www.clearos.com/products/support/clearcare-overview

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:

  Hewlett Packard Enterprise Support Center

  https://www.hpe.com/support/hpesc

Hewlett Packard Enterprise Support Center: Software downloads

https://www.hpe.com/support/downloads

My HPE Software Center

https://www.hpe.com/software/hpesoftwarecenter

- To subscribe to eNewsletters and alerts:

  https://www.hpe.com/support/e-updates

- 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:

  https://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 HPE Passport set up with relevant entitlements.

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.

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.

If your product includes additional remote support details, use search to locate that information.

Remote support and Proactive Care information

HPE Get Connected

https://www.hpe.com/services/getconnected

HPE Proactive Care services

https://www.hpe.com/services/proactivecare

HPE Datacenter Care services

https://www.hpe.com/services/datacentercare

HPE Proactive Care service: Supported products list

https://www.hpe.com/services/proactivecaresupportedproducts

HPE Proactive Care advanced service: Supported products list

https://www.hpe.com/services/proactivecareadvancedsupportedproducts

Proactive Care customer information

Proactive Care central

https://www.hpe.com/services/proactivecarecentral

Proactive Care service activation

https://www.hpe.com/services/proactivecarecentralgetstarted

Documentation feedback

Hewlett Packard Enterprise is committed to providing documentation that meets your needs. To help us improve the documentation, send any errors, suggestions, or comments to Documentation Feedback (**docsfeedback@hpe.com**). When submitting your feedback, include the document title, part number, edition, and publication date located on the front cover of the document. For online help content, include the product name, product version, help edition, and publication date located on the legal notices page.

Acronyms and abbreviations

3DS TSV

three-dimensional stacked through-silicon via (integrated circuit packaging technology)

AHCI

advanced host controller interface

AHS

Active Health System

AHSV

Active Health System Viewer

API

application program interface

ASHRAE

American Society of Heating, Refrigerating and Air-Conditioning Engineers

CAS

column address strobe

CMA

cable management arm

CSA

Canadian Standards Association

CSR

customer self repair

DDR4

double data rate-4

DHCP

dynamic host configuration protocol

EAC

EurAsian Conformity

EDR

enhanced data rate

FCoE

Fibre Channel over Ethernet

GPU

graphics processing unit

HPE SSA

HPE Smart Storage Administrator

IEC

International Electrotechnical Commission

iLO

Integrated Lights-Out

IML

Integrated Management Log

ISO

International Organization for Standardization

iSUT

Integrated Smart Update Tools

KVM

keyboard, video and mouse

LFF

large form factor

LRDIMM

load reduced dual in-line memory module

LTO

linear tape-open

NMI

nonmaskable interrupt

NVMe

nonvolatile memory express

PCA

printed circuit assembly

PCIe

Peripheral Component Interconnect Express

PDB

power distribution board

PDU

power distribution unit

POST

Power-On Self-Test

PXE

Preboot eXecution Environment

QR code

quick response code

RBSU

ROM-Based Setup Utility

RDIMM

registered dual in-line memory module

REACH

Registration, Evaluation, Authorization, Restriction of Chemicals (European Union chemical regulatory framework)

REST

representational state transfer

RoHS

Restriction of Hazardous Substances

RPS

redundant power supply

SAS

serial attached SCSI

SATA

serial ATA

SD

secure digital

SFF

small form factor

SMB

small and medium business

SPP

Service Pack for ProLiant

SSD

solid state device

STK

scripting toolkit

StorCLI

Storage Command Line Interface

SUM

Smart Update Manager

TMRA

recommended ambient operating temperature

TPM

Trusted Platform Module

UDIMM

unbuffered dual in-line memory module

UEFI

Unified Extensible Firmware Interface

UID

unit identification

UPS

uninterruptible power supply