



**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.

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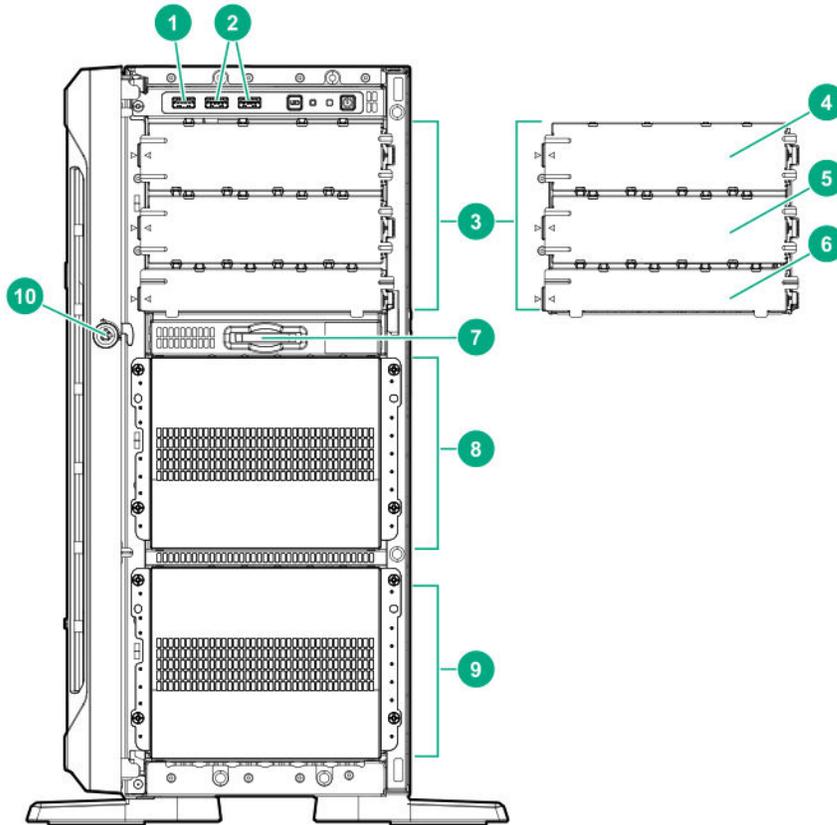
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Component identification

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	<u>Serial number/iLO information pull tab</u>
8	Box 2 ^{1, 3}

Table Continued

Item	Description
9	Box 3 ¹
10	Front bezel lock

¹ All three boxes support LFF and SFF drive cage options. Mixing LFF and SFF drives in the same server is not supported.

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

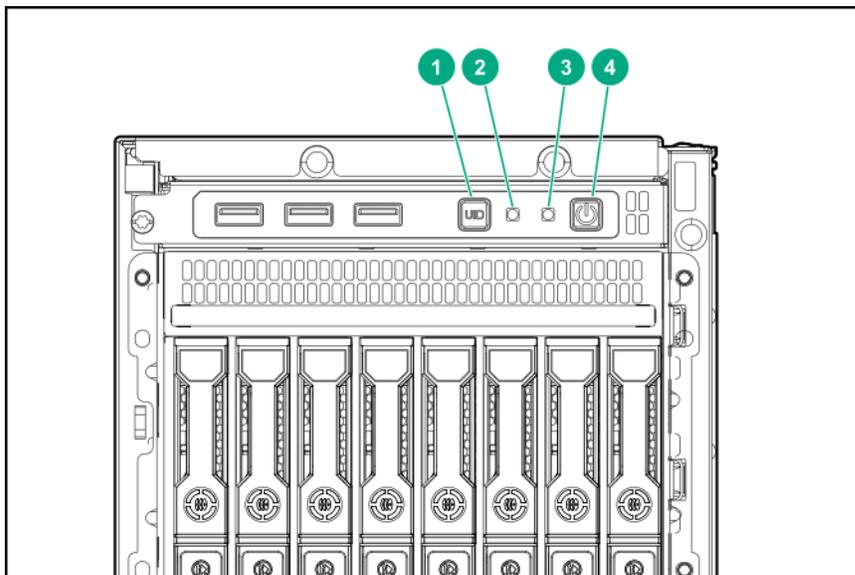
³ In SFF models, box 2 supports the 8 NVMe SSD Express Bay enablement option.

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 (<http://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	<ul style="list-style-type: none"> • 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 (1 flash per sec)	Network active
		Off	No network activity
3	Health LED ¹	Solid green	Normal
		Flashing green (1 flash per sec)	iLO is rebooting
		Flashing amber	System degraded ²
4	Power On/ Standby button and system power LED ¹	Flashing red (1 flash per sec)	System critical ²
		Solid green	Normal
		Flashing green (1 flash per sec)	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** on page 11.

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** on page 43.
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 (<http://www.hpe.com/support/ilo-docs>).

The procedure is complete.

UID button functionality

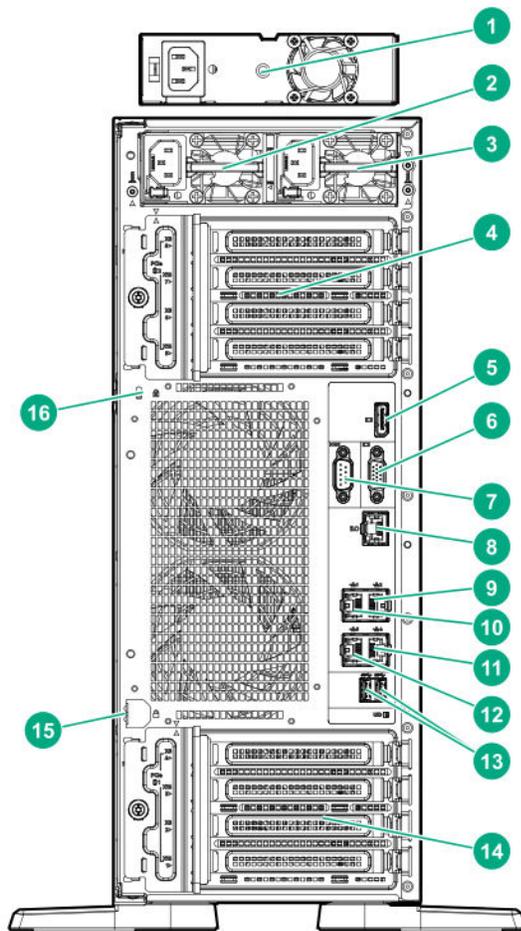
The UID button can be used to display the Server Health Summary when the server will not power on. For more information, see the iLO user guide on the Hewlett Packard Enterprise website (<http://www.hpe.com/support/ilo-docs>).

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
Removable HPE Smart Array SR Gen10 controller	6 flashes
System board PCIe slots	7 flashes
Power backplane or storage backplane	8 flashes
Power supply	9 flashes

Rear panel components

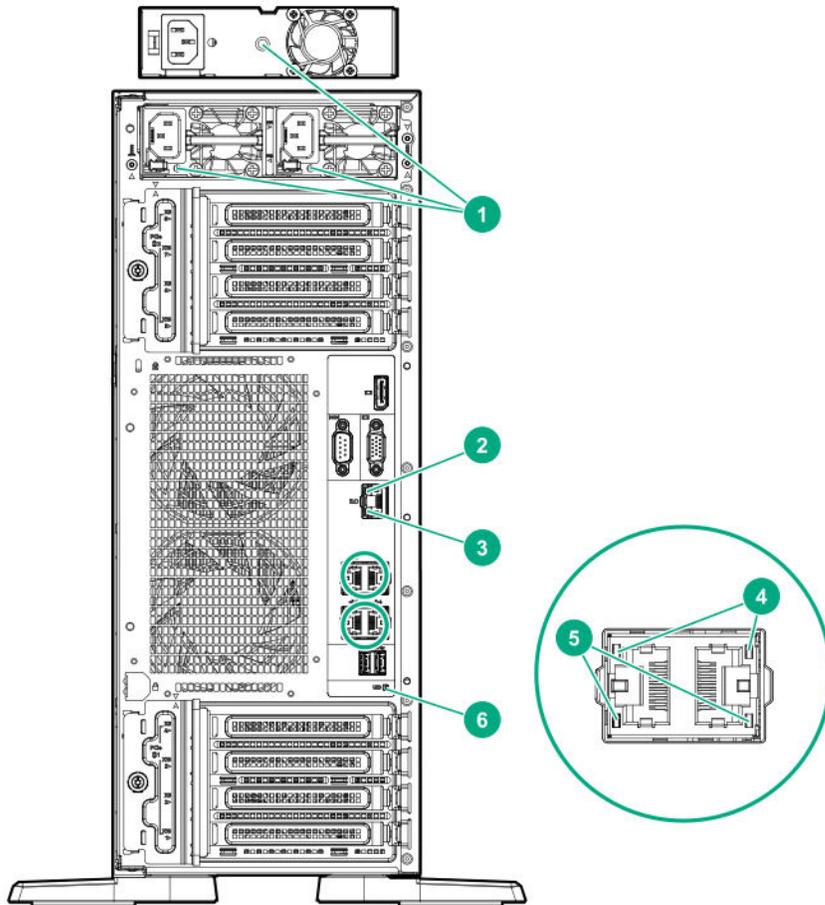


Item	Description
1	Standard power supply (non-hot-plug) ¹
2	Flexible Slot power supply 2 (hot-plug)
3	Flexible Slot power supply 1 (hot-plug)
4	PCIe slots 5-8 (bottom to top)
5	Display port
6	VGA port
7	Serial port
8	iLO Management Port
9	NIC port 2 (1Gb) ²
10	NIC port 1 (1Gb) ²
11	NIC port 4 (1Gb) ²
12	NIC port 3 (1Gb) ²
13	USB 3.0 ports (2)
14	PCIe 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

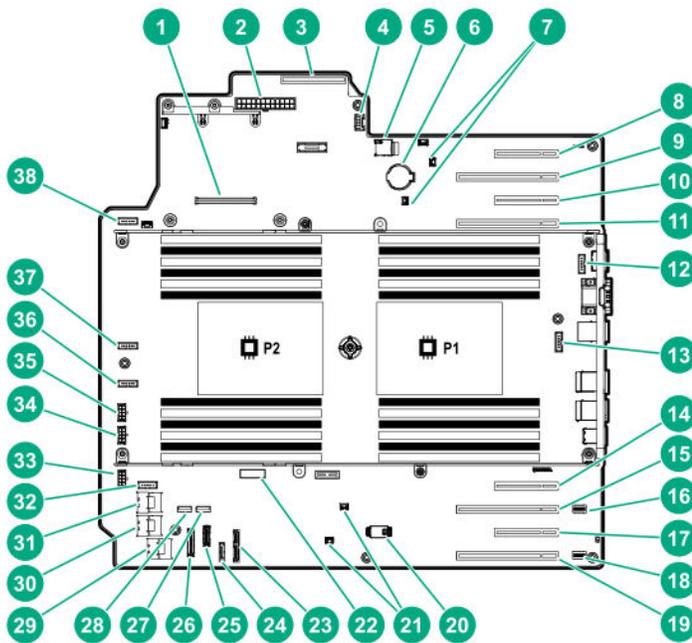


Item	LED	Status	Definition
1	Power supply	Solid green	Normal
		Off	System is off or power supply has failed.
2	iLO status	Solid green	Linked to network
		Flashing green	Network active
		Off	No network activity
3	iLO link	Solid green	Network link
		Off	No network link
4	NIC status	Solid green	Linked to network
		Flashing green	Network active

Table Continued

Item	LED	Status	Definition
		Off	No network activity
5	NIC link	Solid green	Network link
		Off	No network link
6	UID	Solid blue	Activated
		Flashing blue	System is being managed remotely.
		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	Smart Storage Battery connector
5	microSD card slot
6	System battery
7	Storage controller backup power connectors (2)

Table Continued

Item	Description
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
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	<u>System maintenance switch</u>
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

Table Continued

Item	Description
33	Box 3 drive power connector
34	Box 2 drive power connector
35	Box 1 drive power connector
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	Off = System configuration can be changed. On = System configuration is locked.
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

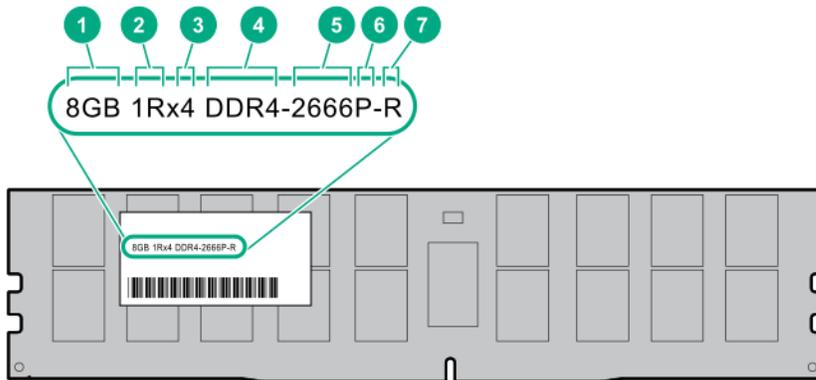
¹ To access the redundant ROM, set S1, S5, and S6 to On.

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](#) on page 182.

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.



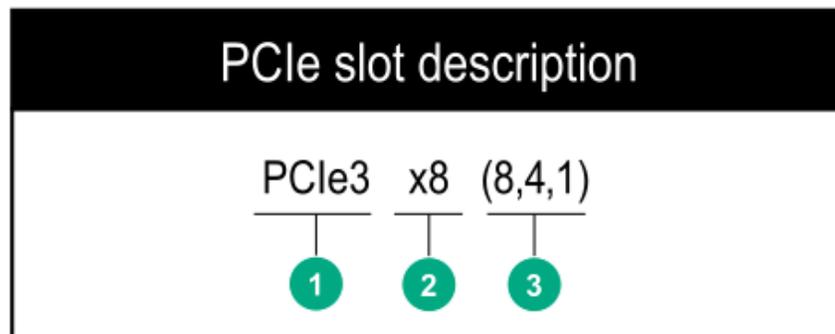
Item	Description	Example
1	Capacity	8 GB 16 GB 32 GB 64 GB 128 GB
2	Rank	1R = Single rank 2R = Dual rank 4R = Quad rank 8R = Octal rank
3	Data width on DRAM	x4 = 4-bit x8 = 8-bit x16 = 16-bit
4	Memory generation	PC4 = DDR4
5	Maximum memory speed	2133 MT/s 2400 MT/s 2666 MT/s

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)
7	DIMM type	R = RDIMM (registered) L = LRDIMM (load reduced) E = Unbuffered ECC (UDIMM)

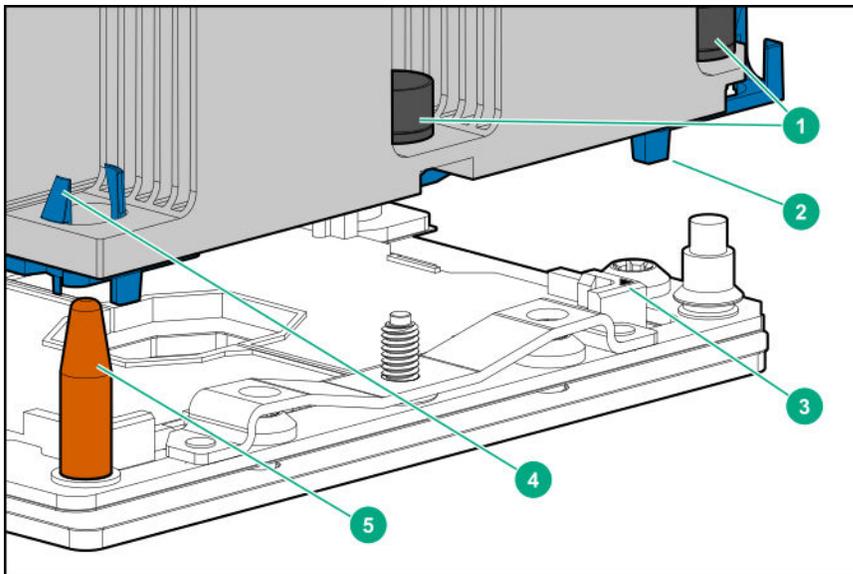
For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the Hewlett Packard Enterprise website (<http://www.hpe.com/info/qs>).

PCIe slot description



Item	Description	Definition
1	PCI Express version	<p>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.</p> <ul style="list-style-type: none"> • PCIe 1.x • PCIe 2.x • PCIe 3.x <p>The PCIe technology is under constant development. For the latest information, see the PCI-SIG website.</p>
2	Physical connector link width	<p>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.</p> <ul style="list-style-type: none"> • x1 • x2 • x4 • x8 • x16
3	Negotiable link width	<p>These numbers correspond to the maximum link bandwidth supported by the slot.</p>

Processor, heatsink, and socket components

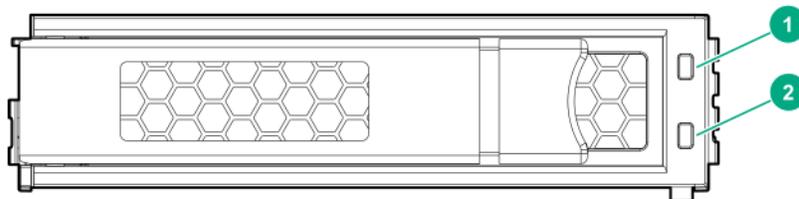


Item	Description
1	Heatsink nuts
2	Processor carrier
3	Pin 1 indicator ¹
4	Heatsink latch
5	Alignment post

¹ Symbol also on the processor and frame.

Drive LEDs and buttons

Low profile LFF drive LED definitions

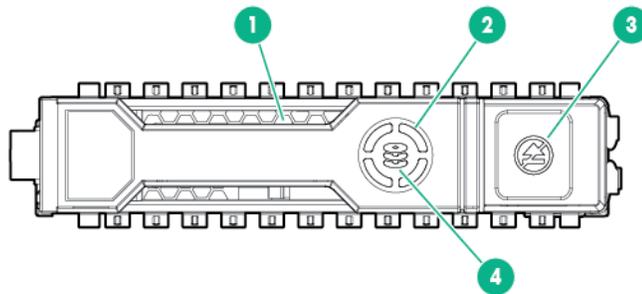


Item	LED	Status	Definition
1	Fault \Locate	Solid amber	The drive has failed.
		Solid blue	The drive is operating normally and being identified by a management application.
		Flashing amber/blue (1 flash per second)	The drive has failed, or a predictive failure alert has been received for this drive; 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: <ul style="list-style-type: none"> • 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.

Hot-plug 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: <ul style="list-style-type: none"> • 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.

Enabling embedded chipset SATA controller support

Use the **Embedded SATA Configuration** option to enable embedded chipset SATA (Serial Advanced Technology Attachment) controller support. You can select AHCI or HPE Smart Array S100i SR Gen10 SW RAID support. Make sure that you are using the correct operating system drivers for your selected option.

⚠ CAUTION: Dynamic Smart Array is not supported when the boot mode is configured to Legacy BIOS Mode. Enabling Dynamic Smart Array RAID results in data loss or data corruption on existing SATA drives. Back up all drives before enabling this option. See your operating system documentation before enabling SATA AHCI support to ensure your base media drivers support this feature.

Prerequisites

- The correct operating system drivers for your selected option.
- **Boot Mode** is set to **UEFI Mode**.

Procedure

1. From the **System Utilities** screen, select **System Configuration > BIOS/Platform Configuration (RBSU) > Storage Options > SATA Controller Options > Embedded SATA Configuration**.
2. Ensure that you are using the correct ACHI or RAID system drivers for your SATA option.
3. Select a setting.

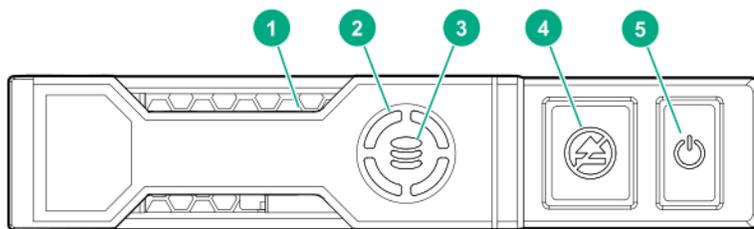
- **SATA AHCI Support**—Enables the embedded chipset SATA controller for AHCI.
- **Smart Array SW RAID Support**—Enables the embedded chipset SATA controller for Dynamic Smart Array RAID.

4. Save your setting.

NVMe SSD LED definitions

The NVMe SSD 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 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. Removing the NVMe SSD before the device has completed and ceased signal/traffic flow can cause loss of data.

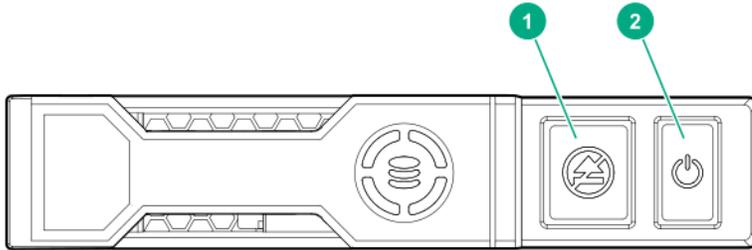


Item	LED	Status	Definition
1	Locate	Solid blue	The drive is being identified by a host application.
		Flashing blue	The drive carrier firmware is being updated or requires an update.
2	Activity ring	Rotating green	Drive activity
		Off	No drive activity
3	Drive status	Solid green	The drive is a member of one or more logical drives.
		Flashing green	The drive is doing one of the following: <ul style="list-style-type: none"> • 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.

Table Continued

Item	LED	Status	Definition
		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.

NVMe SSD button actions



Item	Button	Action
1	Do Not Remove	Press to open the release lever.
2	Power	Press to request PCIe ejection. Removal request can be denied by the: <ul style="list-style-type: none"> • RAID controller (one or more of the logical drives could fail) • Operating system

Drive bay numbering

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

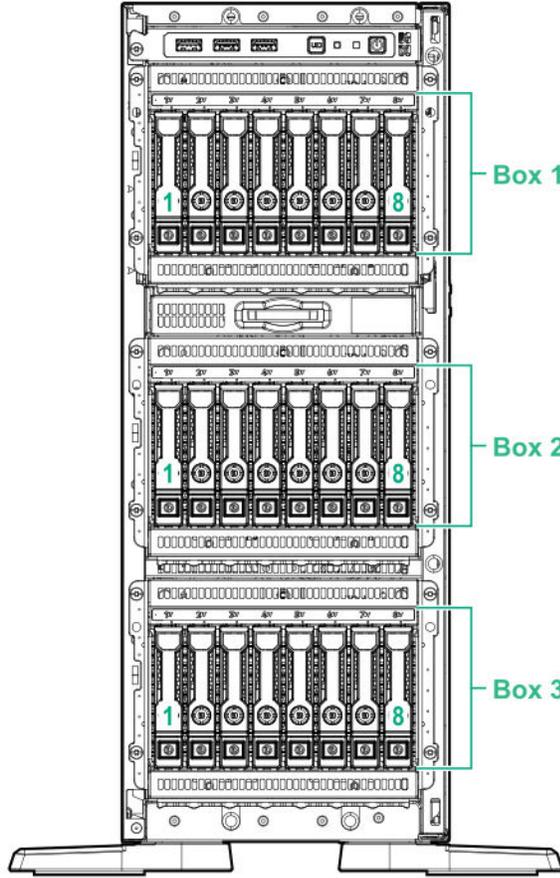
- Embedded Smart Array controller through the onboard SATA ports
- Smart Array type-a modular (AROC) and type-p standup plug-in storage controllers
- SAS expander card

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

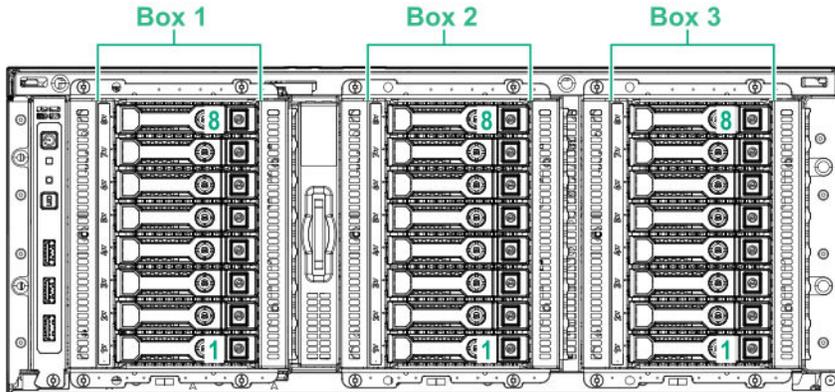
When the backplane is connected to a SAS expander, all drive boxes are treated as a single box 1. This means the drive bay numbering is continuous.

SFF drive bay numbering: Smart Array controller

Tower orientation

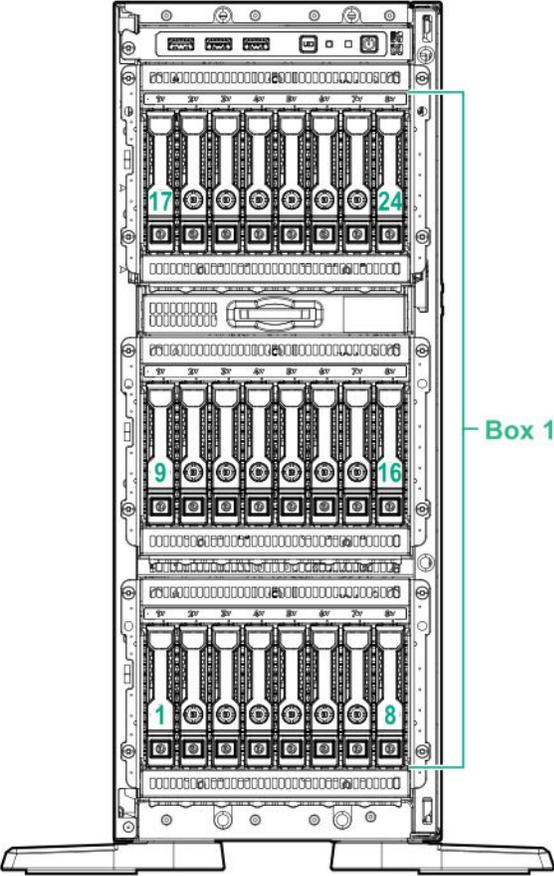


Rack orientation

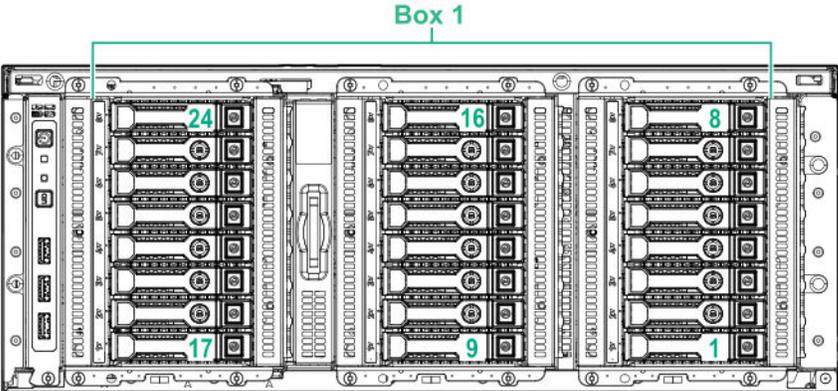


SFF drive bay numbering: SAS expander

Tower orientation

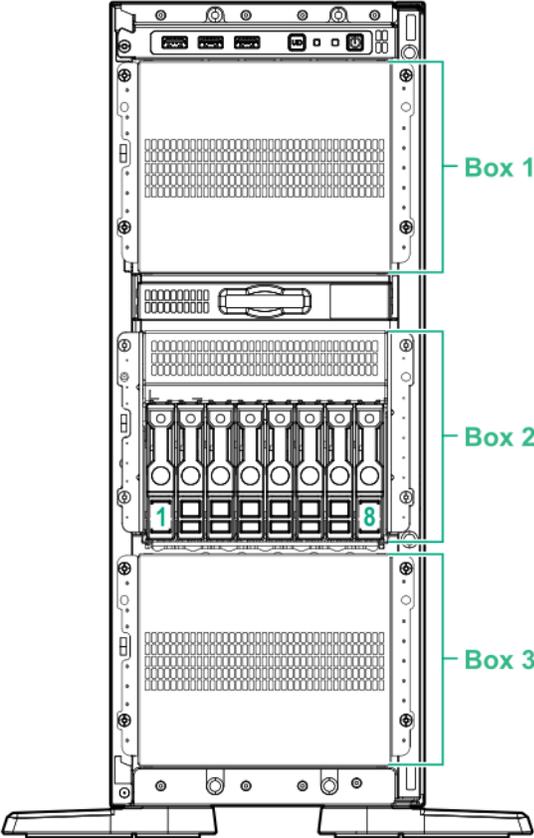


Rack orientation

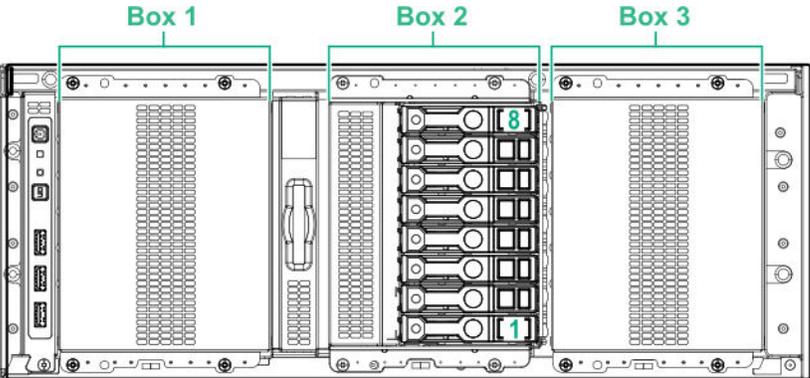


NVMe drive bay numbering

Tower orientation

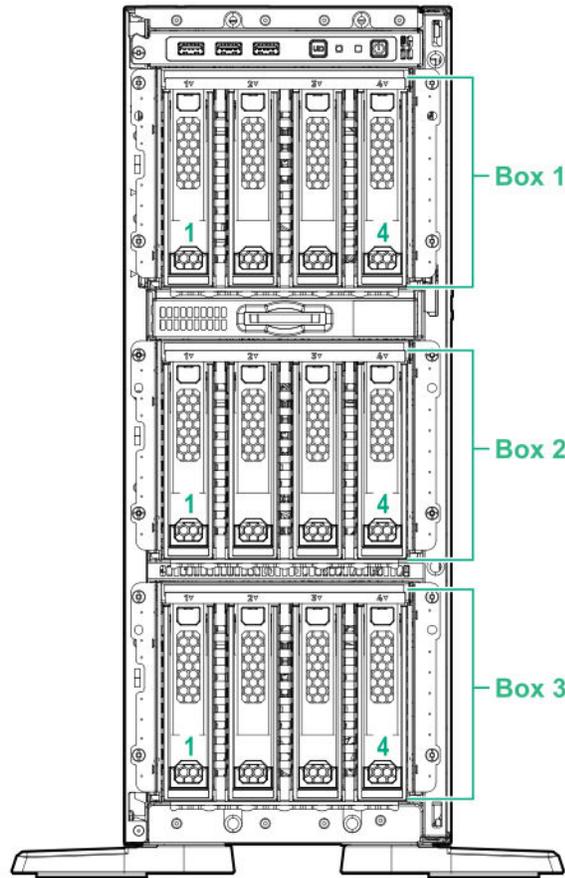


Rack orientation

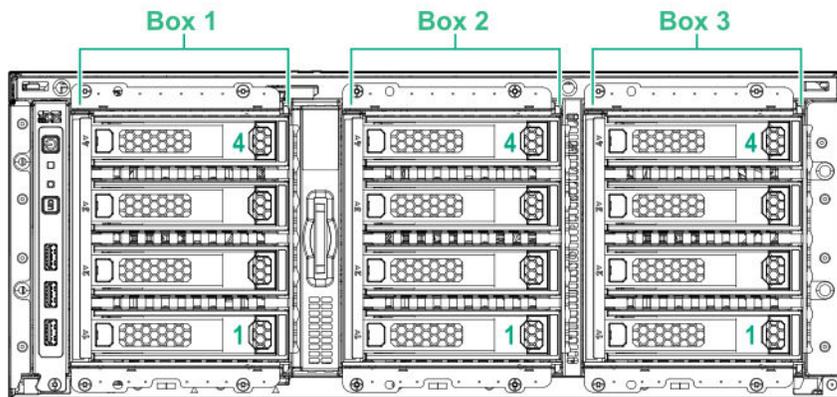


LFF drive bay numbering: Smart Array controller

Tower orientation

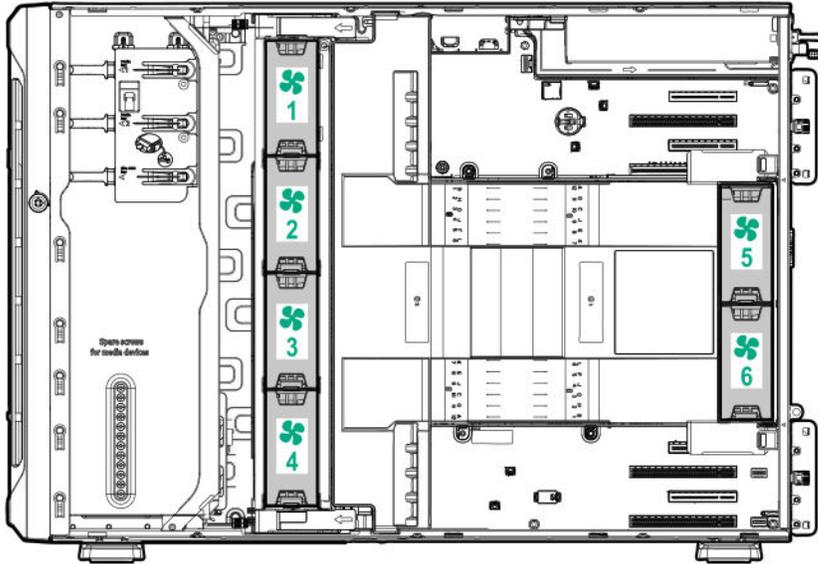


Rack orientation



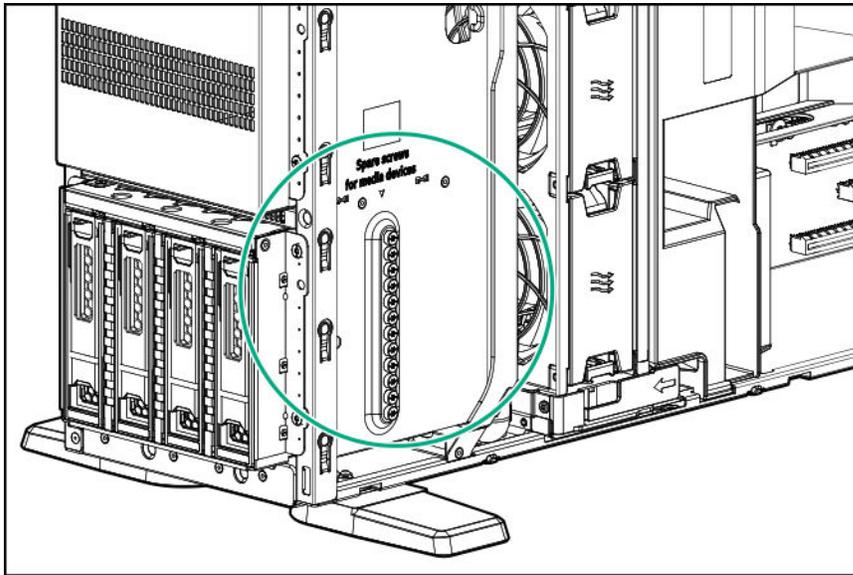
Fan bay numbering

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



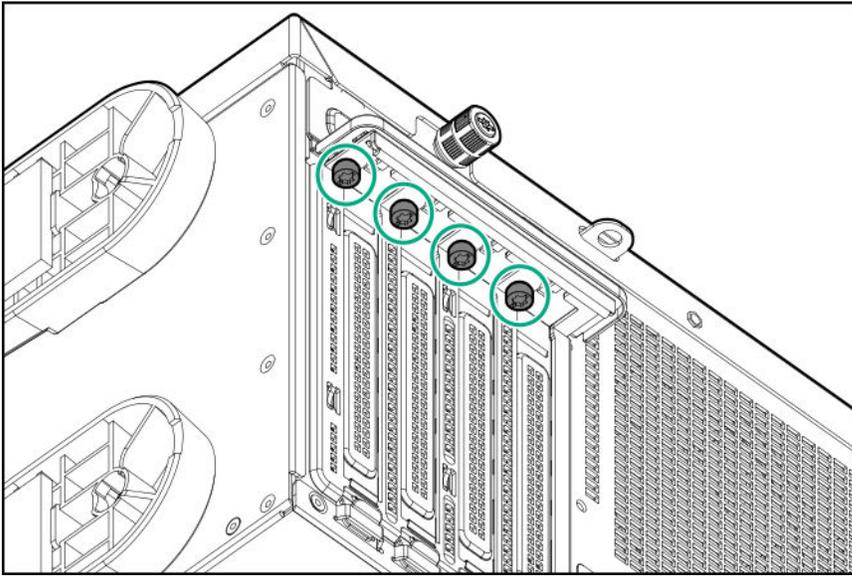
Media device screws

There are 16 T-15 Torx screws located 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.



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-Repair¹
 - 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-Repair¹
 - 4-Hour 24x7
 - Next Business Day
- Deployment service for both hardware and software
- Hewlett Packard Enterprise Education Services – Help train your IT staff.

¹The time commitment for this repair service might vary depending on the site's geographical region. 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**.

Setup overview

Prerequisites

Before setting up the server, be sure to read the following:

- **Operational requirements** on page 34
- Safety and compliance information on the HPE website:
<http://www.hpe.com/support/safety-compliance-enterpriseproducts>
- If the tower-to-rack conversion kit is used, observe the **Rack warnings and cautions** on page 37.

Procedure

1. Unbox the server and verify the contents:

- Server
- Chassis feet (4)
- Power cord
- Rack-mounting hardware (optional)
- Documentation

2. (Optional) Install hardware options. For installation instructions, see [Hardware options installation](#) on page 68.

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:

- To manage the server locally, use a KVM switch or a mouse, keyboard, and monitor.
- To manage the server remotely, use a remote browser to connect to the iLO web interface:
 - a. Verify that a network cable is connected to the iLO Management Port.
 - b. Locate the iLO hostname or IP address:
 - If a DHCP server assigns the IP address:
Locate the hostname on the serial number/iLO information pull tab.
Locate the iLO IP address displayed on the boot screen. You can also try pinging the hostname from a remote workstation.
 - If a static IP address is assigned, use that IP address to connect to the server iLO.
 - c. Using the iLO hostname or IP address, connect to the iLO web interface, and then log in to the iLO web interface.
`https://<iLO hostname or IP address>`
The default credentials are on the serial number/iLO information pull tab.
 - d. In the side navigation, click **Remote Console & Media**, and then launch a remote console.

Remote management is started.

5. Press the Power On/Standby button.

The iLO virtual power button can also power up the server through the iLO web interface or remote console.

6. (Optional) Create logical drives or set up RAID.

- If a Smart Array controller is installed, press **F10** at the boot screen to launch Intelligent Provisioning, and then access **HPE Smart Storage Administrator**.
- If there is no controller installed, **enable the embedded Smart Array controller in the UEFI System Utilities**, and then use HPE Smart Storage Administrator.

If you experience any issues, try **updating the firmware**.

7. Deploy an OS or virtualization software.

If an OS or virtualization software is already installed, Hewlett Packard Enterprise recommends **updating the drivers**.

To deploy an OS to a single server:

a. Verify that the OS is supported:

<http://www.hpe.com/info/ossupport>

b. Insert the installation media.

On remote deployments, use the iLO remote console to mount the image to a virtual drive. From the iLO Integrated Remote Console window, click **Virtual Drives**, and then select how to mount the media.

c. Deploy the OS.

- To use Intelligent Provisioning to perform an automated OS installation, press **F10** at the boot screen to launch Intelligent Provisioning.
- To boot the server from the installation media, press **F11** at the boot screen, and then select the boot device.

d. After the OS is installed, **update the drivers**.

For advanced deployment options, see **OS deployment options** on page 40.

8. 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, 1999 Edition (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.

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.
-
- ⚠ 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 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.
-

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 stabilize 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.

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 \pm 10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
 - Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
 - Use conductive field service tools.
 - Use a portable field service kit with a folding static-dissipating work mat.

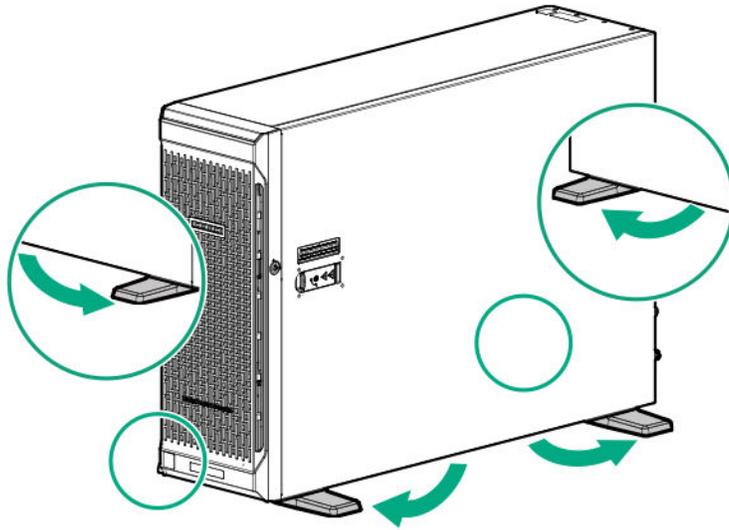
If you do not have any of the suggested equipment for proper grounding, have an authorized reseller install the part.

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

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

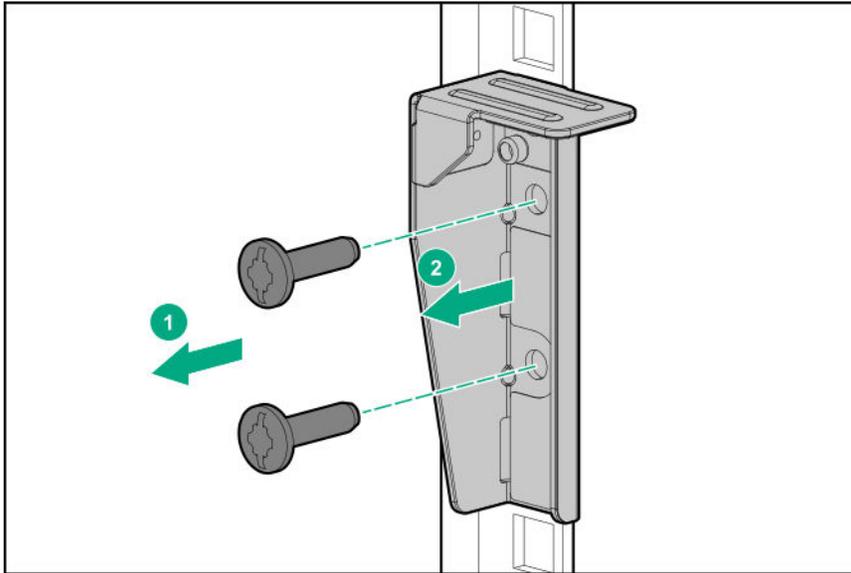
A server shipped in a rack is secured by shipping brackets. To allow the server tray to be extended out of the rack during normal server operation, remove these shipping brackets.

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-installed server at a later date.

Configuring the server

When the server is powered on, the POST screen is displayed. Use the following options to configure the server:

- **System utilities (F9)**
Use this option to configure UEFI, RBSU, or other boot settings.
- **Intelligent Provisioning (F10)**
Use this option to configure drives, access Smart Storage Administrator, or begin installing or deploying an operating system.
- **Boot order (F11)**
Use this option to select a boot device.
- **Network boot (F12)**
Use this option to PXE boot the server from the network.

OS deployment options

For a single server

You can use:

- **Intelligent Provisioning**
- **Installation media (USB or DVD)**

For multiple servers

You can use:

- [Scripting Toolkit \(STK\)](#)
- [iLO RESTful Interface Tool](#)

Deploying an OS from Intelligent Provisioning

Procedure

See the latest Intelligent Provisioning user guide on the [HPE website](#).

Deploying an OS from installation media

Prerequisites

Local deployment

For local deployments, be sure to have:

- Installation media (USB or DVD)
- The latest SPP

Remote deployment

For remote deployments, be sure to have:

- Server iLO IP address or domain name
- Access to the iLO web interface
- Virtual installation media mounted in the iLO Integrated Remote Console
- The latest SPP

Procedure

1. Verify that the OS is supported:
<http://www.hpe.com/info/ossupport>
2. Insert the installation media.
On remote deployments, use the iLO remote console to mount the image to a virtual drive. From the iLO Integrated Remote Console window, click **Virtual Drives** and then select how to mount the media.
3. Power up the server.
The iLO virtual power button can also power up the server through the iLO web interface or remote console.
4. Deploy the OS.
To boot the server from the installation media, press **F11** at the boot screen, and then select the boot device.
5. After the OS is installed, [update the drivers](#).

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, press the Power On/Standby button.

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.

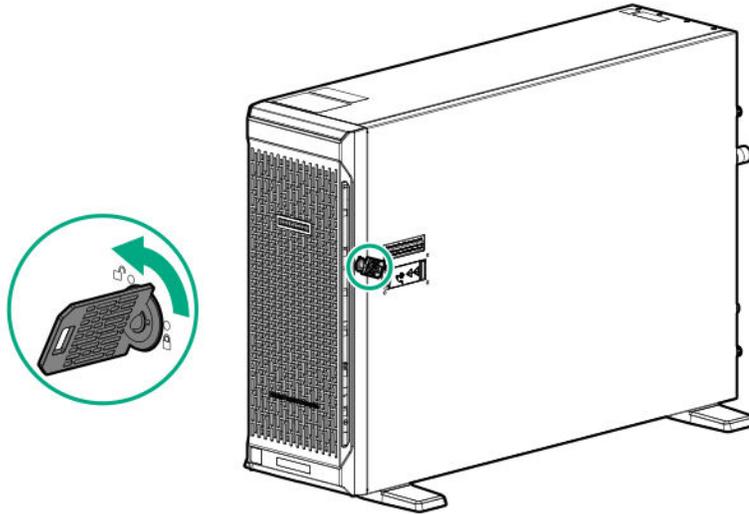
To power down the server, use one of the following methods:

- 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

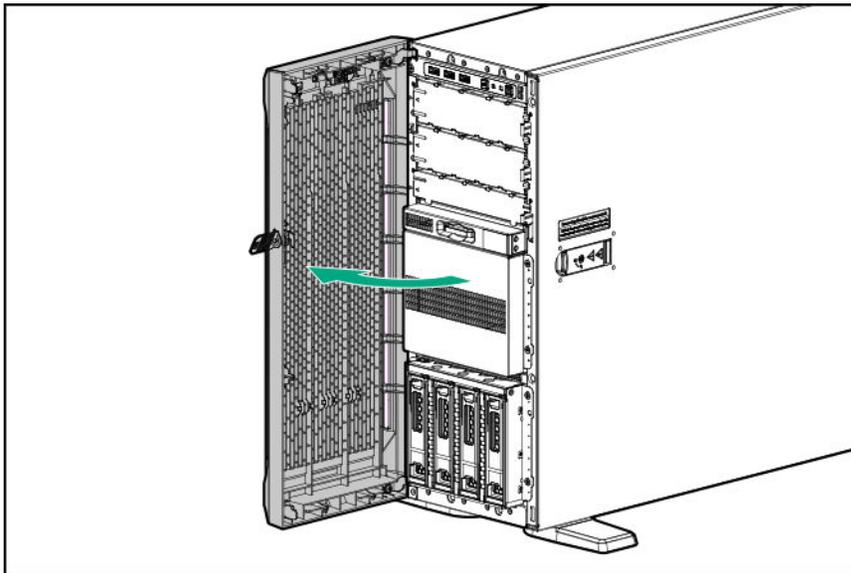
While pressing the key against the lock, rotate the key to the unlock position.



Open the front bezel

Procedure

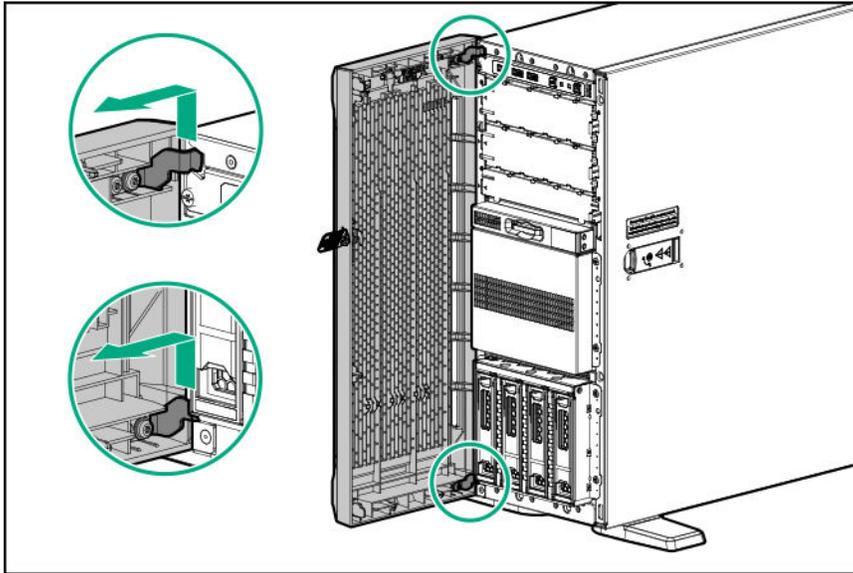
1. **Unlock the front bezel** on page 42.
2. Open the front bezel.



Remove the front bezel

Procedure

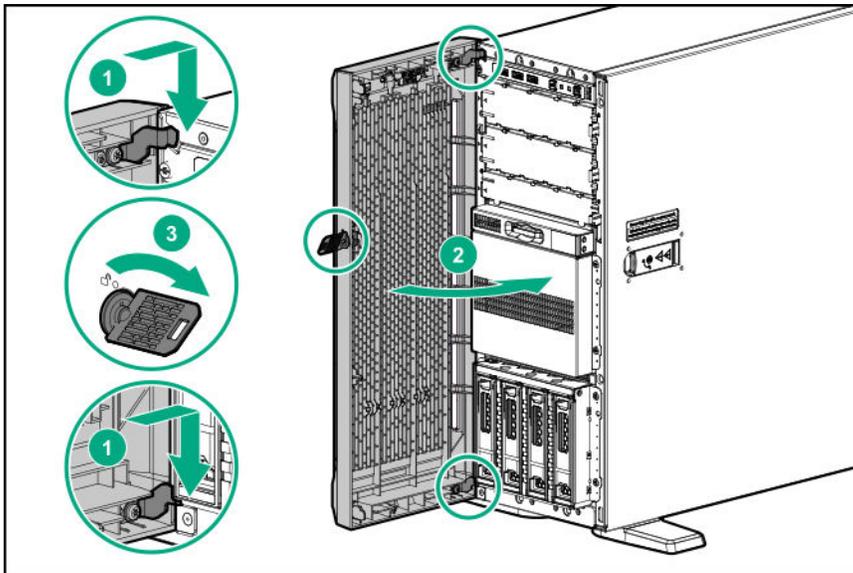
1. **Unlock the front bezel** on page 42.
2. **Open the front bezel** on page 43.
3. Release the bezel hinges from the chassis.



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.

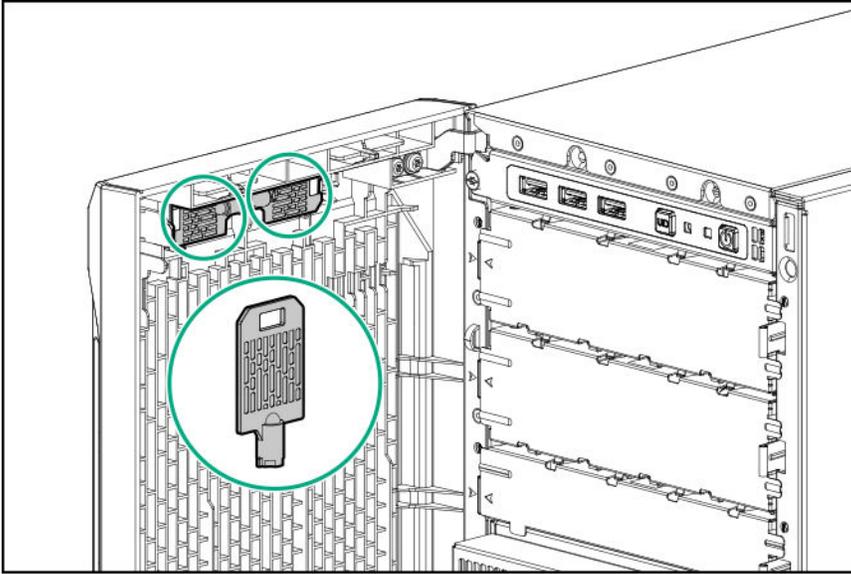


Store the front bezel keys

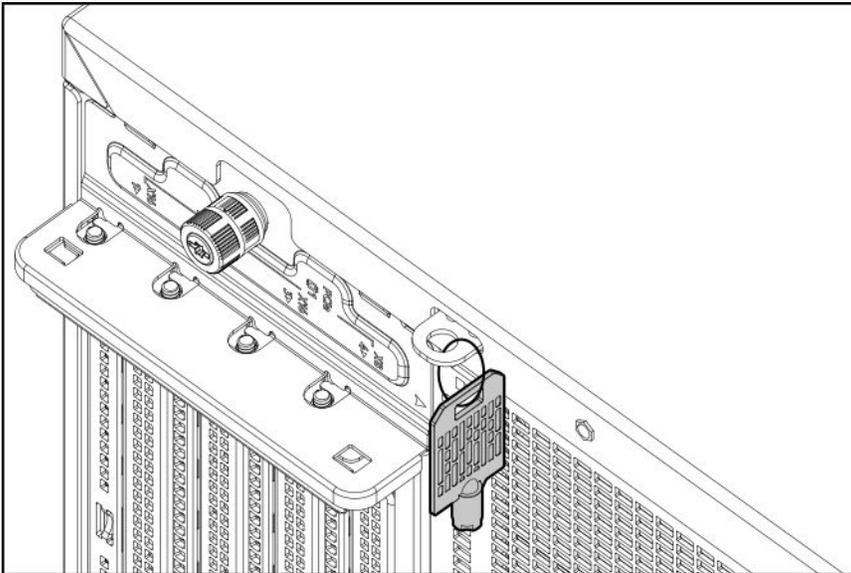
Two front bezel keys shipped with the server. You can keep these keys in either of these locations:

Procedure

- Store it inside the front bezel.



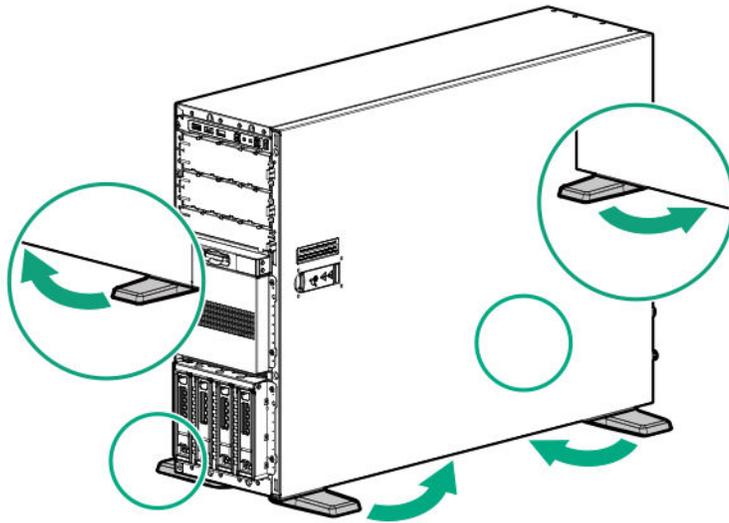
- Hang it from the padlock eye on the rear panel.



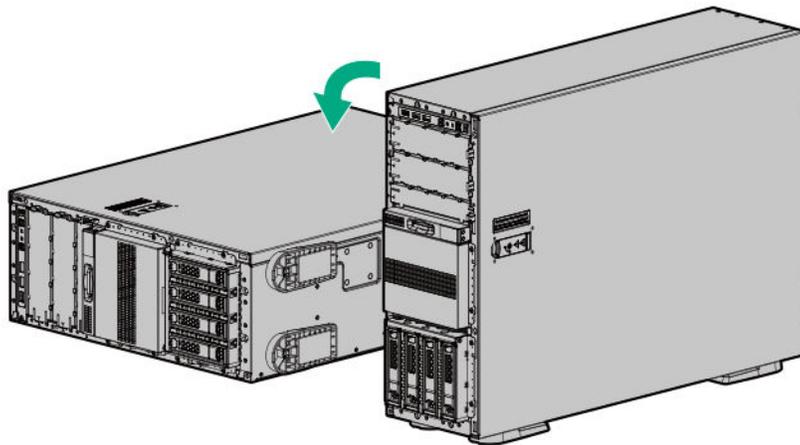
Position the tower server for hardware configuration

Procedure

1. Rotate the chassis feet inward.



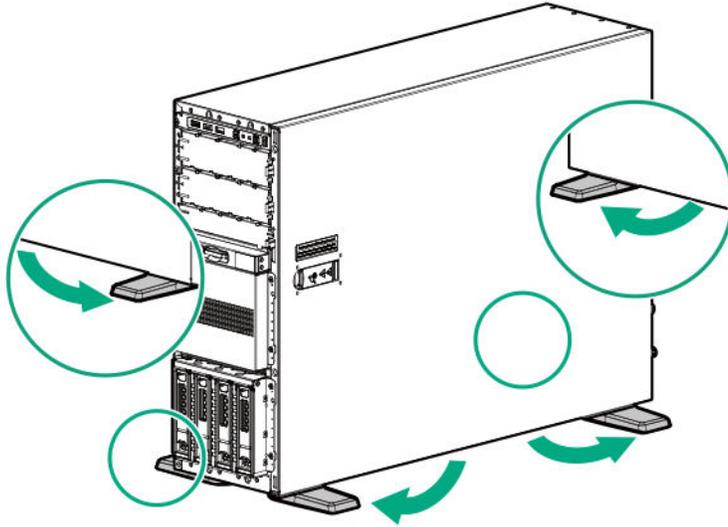
2. Place the server on a flat, level surface with the access panel facing up.



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.



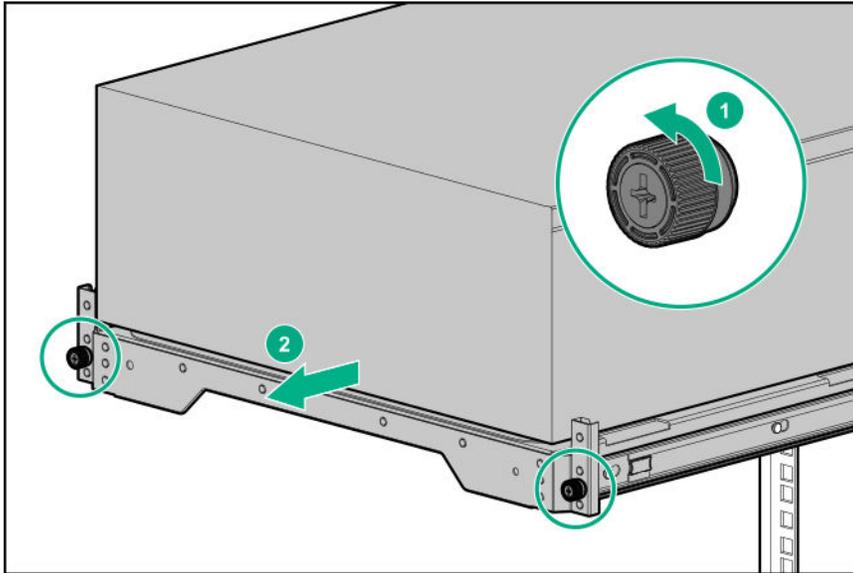
Extend the server from the rack

Procedure

1. If the rear panel cables are not secured by a cable management arm, do the following:
 - a. **Open the front bezel** on page 43.
 - b. **Power down the server** on page 42
 - c. Disconnect all peripheral cables from the server.
 - d. Disconnect each power cord from the server.
 - e. If front panel access is no longer needed, close the bezel.

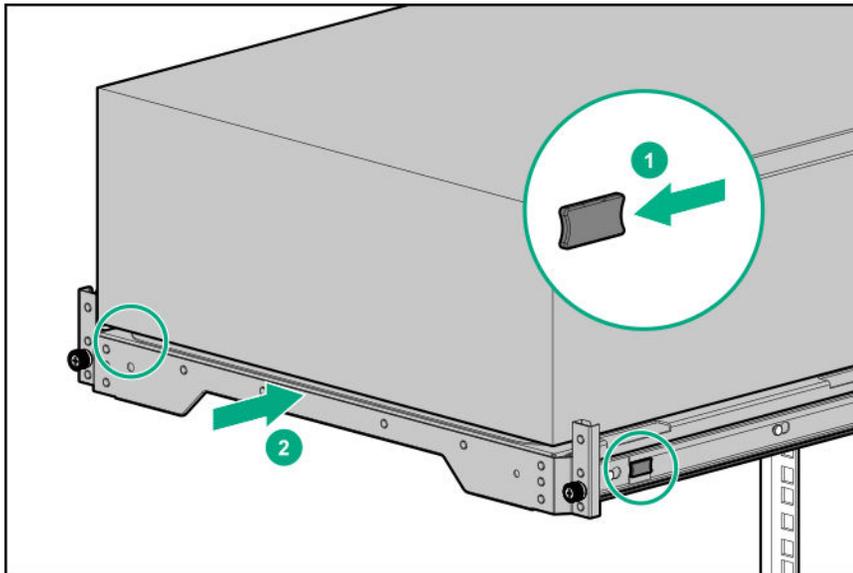
⚠ WARNING: To reduce the risk of personal injury or equipment damage, be sure that the rack is adequately stabilized before extending a component from the rack.

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.

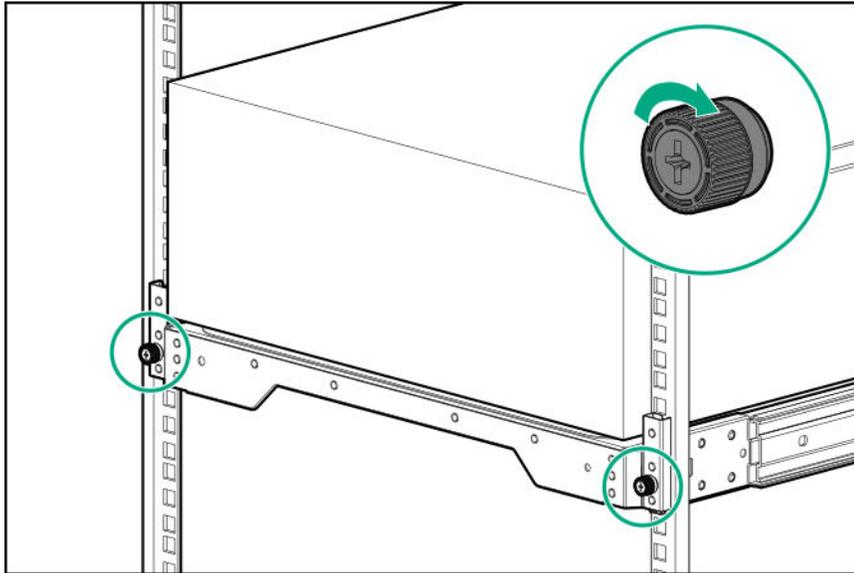


⚠ WARNING: To reduce the risk of personal injury, be careful when pressing the server rail-release latches and sliding the server into the rack. The sliding rails could pinch your fingers.

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** on page 42.

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.

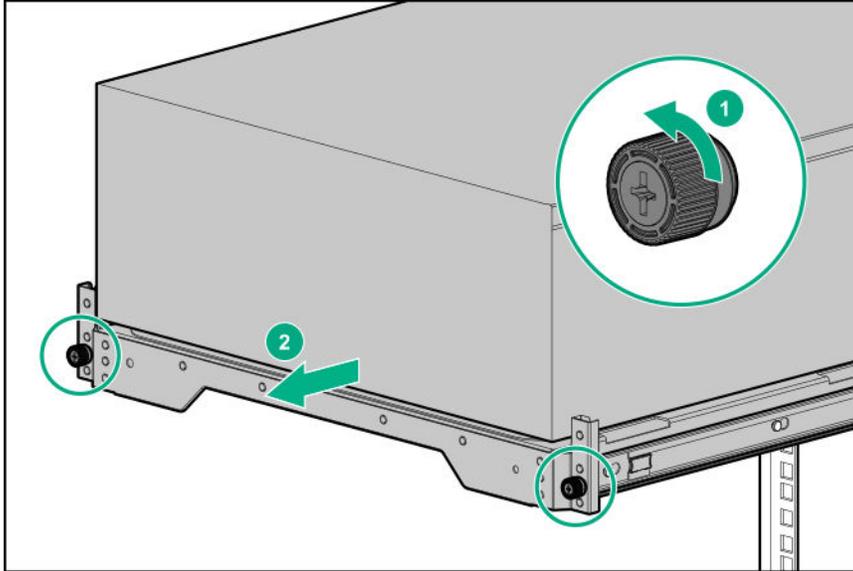
Prerequisites

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

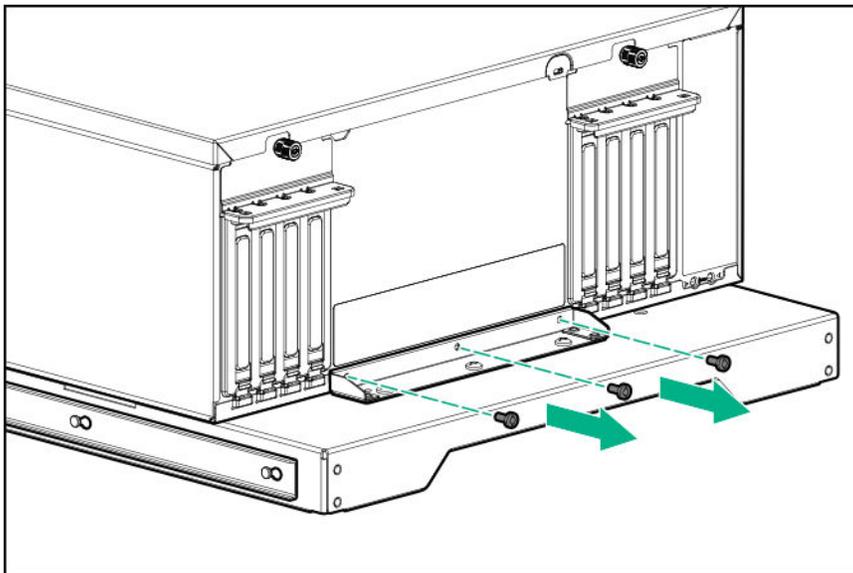
Procedure

1. **Power down the server** on page 42.
2. Remove all power:

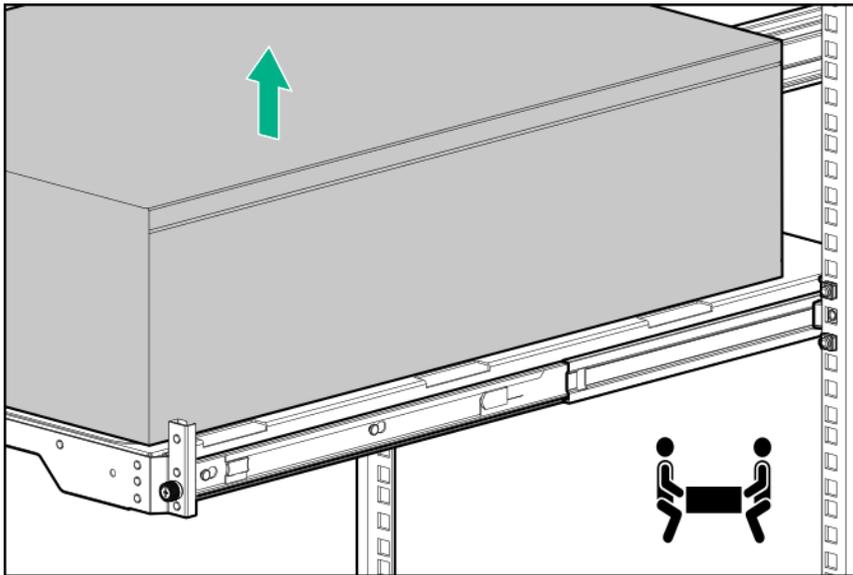
- a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
3. Disconnect all peripherals cables from the server.
 4. Slide the server tray out of the rack:
 - a. Loosen the server tray thumbscrews.
 - b. Grasp the tray notch to slide the server out of the rack.



5. Remove the chassis rear bracket screws.



6. Remove the server from the tray.

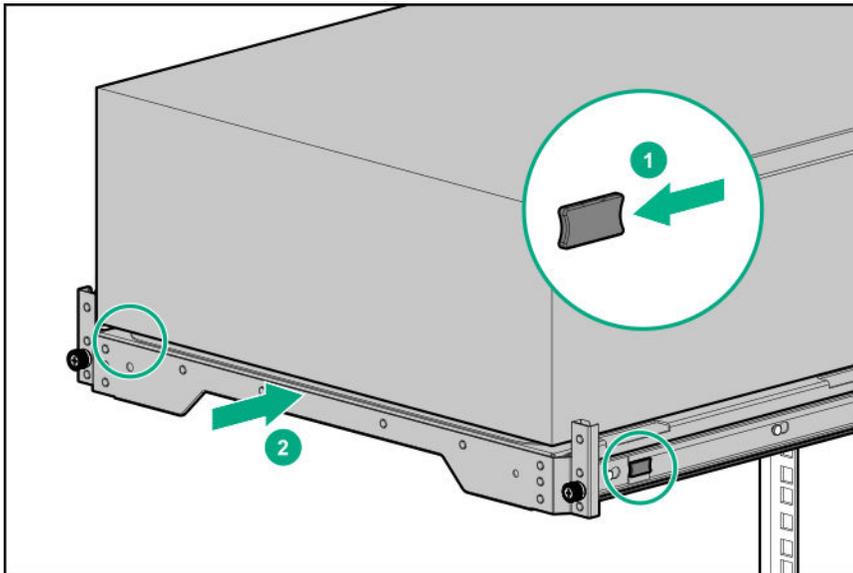


7. Place the server on a flat, level surface with access panel facing up.

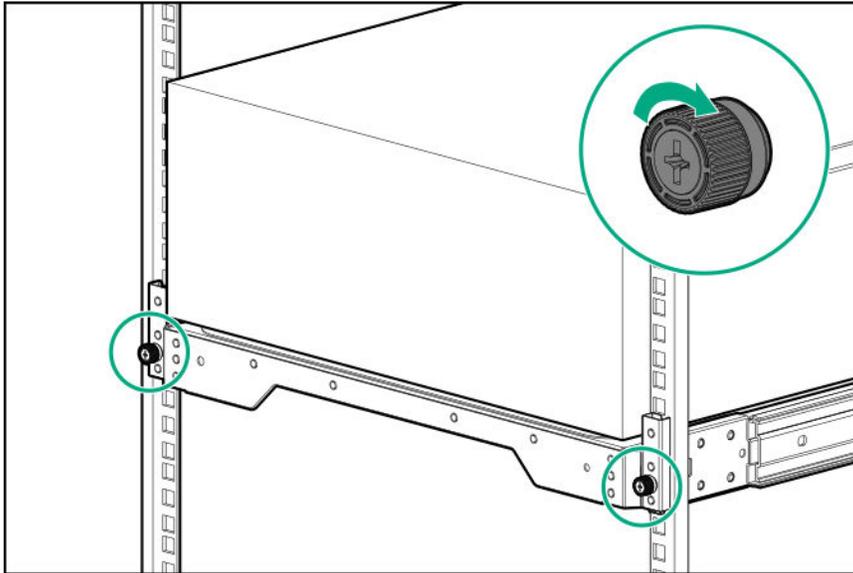
Slide the server into the rack

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.
-

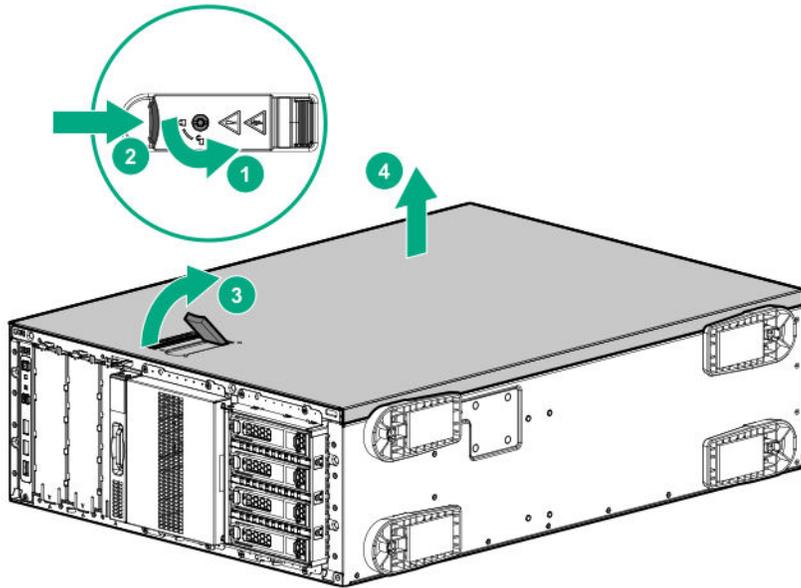
Prerequisites

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

Procedure

1. **Remove the front bezel** on page 43.
2. **Power down the server** on page 42.
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** on page 45.
 - Server in rack mode: **Extend the server from the rack** on page 47.
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

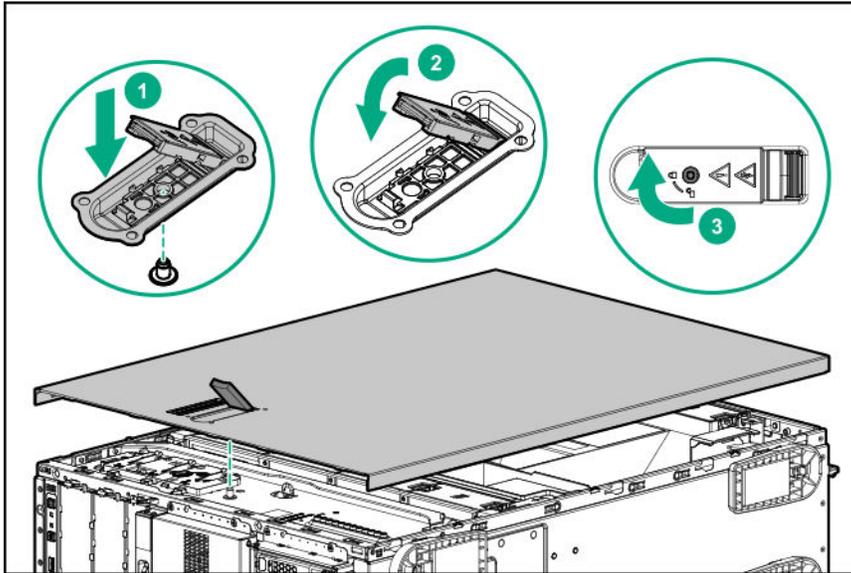
Prerequisites

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

Procedure

1. Place the access panel on top of the server with the latch open.
2. Insert the guide pin on the chassis through the hole on the access panel latch.
3. Close the access panel latch.

The access panel slides to a closed position.
4. Lock the access panel latch.



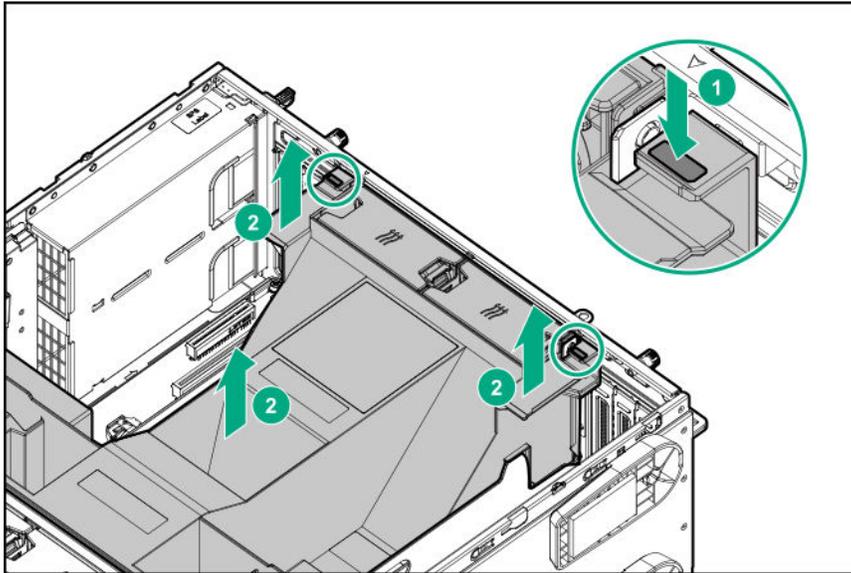
5. Perform the post-installation or maintenance steps required by the procedure that required the removal of the access panel.

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** on page 43.
2. **Power down the server** on page 42.
3. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
4. Disconnect all peripherals cables from the server.
5. Do one of the following:
 - Server in tower mode: **Position the tower server for hardware configuration** on page 45.
 - Server in rack mode: **Extend the server from the rack** on page 47.
6. **Remove the access panel** on page 52.
7. While pressing the blue air baffle latches, lift up the baffle from the chassis.

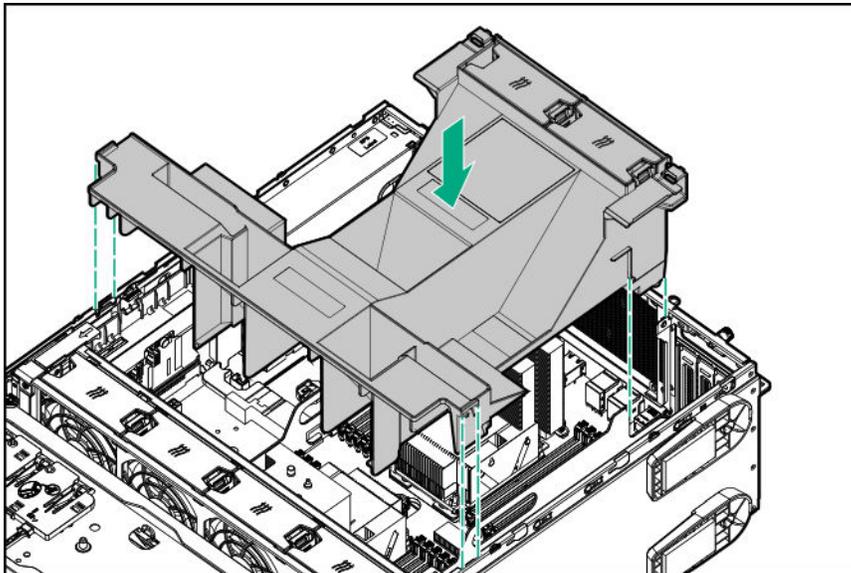


Install the air baffle

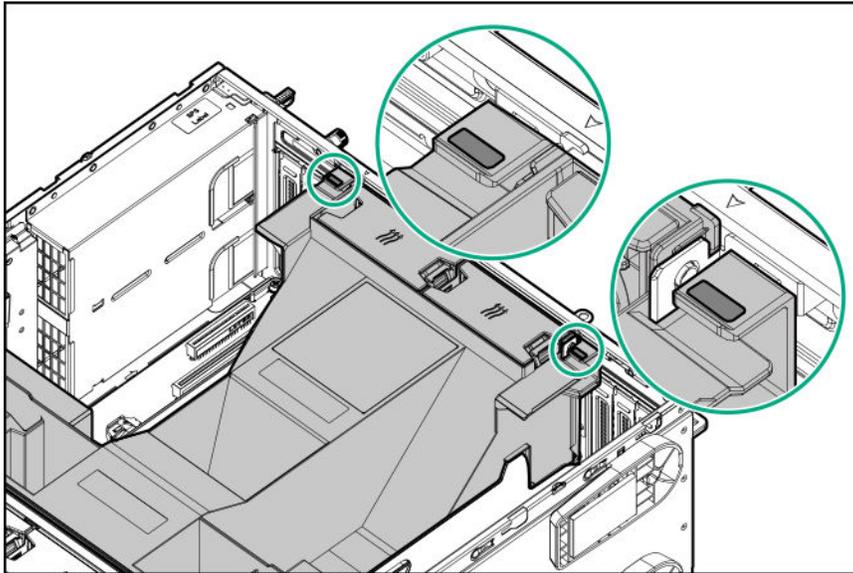
- ⚠ CAUTION:** For proper cooling, do not operate the server without the access panel, baffles, expansion slot covers, or blanks installed. If the server supports hot-plug components, minimize the amount of time the access panel is open.

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.



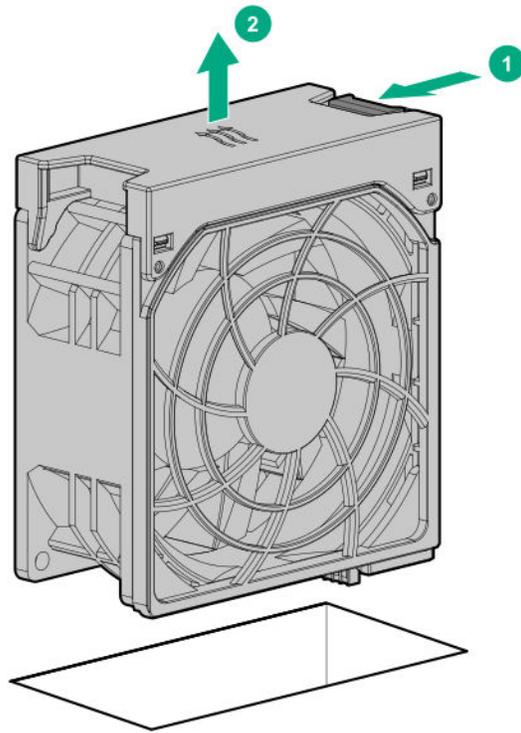
3. **Install the access panel** on page 53.
4. Perform the post-installation/maintenance steps required by the procedure that required the removal of the air baffle.

Remove a fan

-
- ⚠ 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.
-

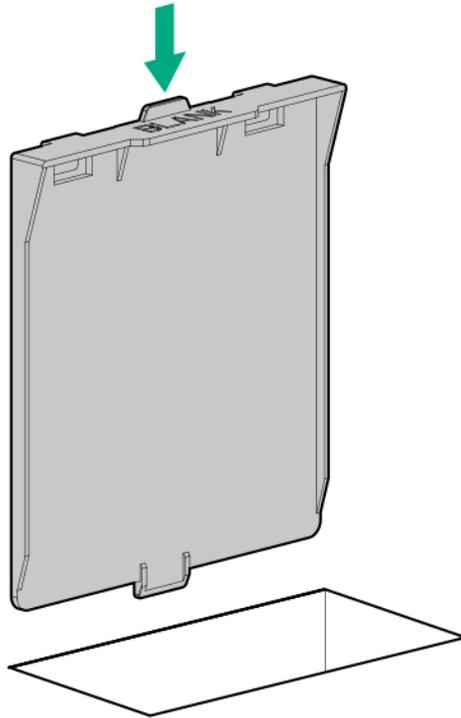
Procedure

While pressing the fan release latch, pull up the fan out of the bay.



Install the blank in fan bay 1

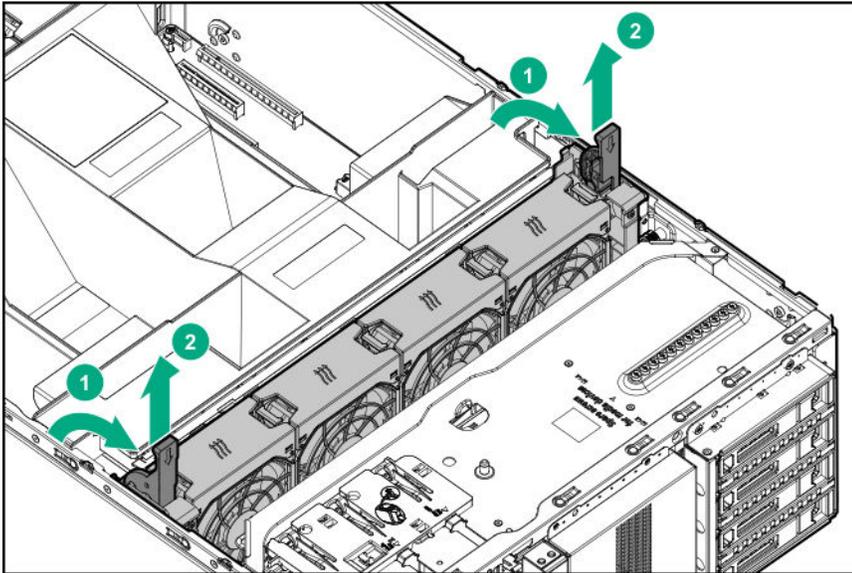
If the LTO tape drive or RDX drive options are installed, install the blank in fan bay 1. Make sure that the blank is firmly seated in the bay.



Remove the fan cage

Procedure

1. **Remove the front bezel** on page 43.
2. **Power down the server** on page 42.
3. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
4. Disconnect all peripherals cables from the server.
5. Do one of the following:
 - Server in tower mode: **Position the tower server for hardware configuration** on page 45.
 - Server in rack mode: **Extend the server from the rack** on page 47.
6. **Remove the access panel** on page 52.
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.



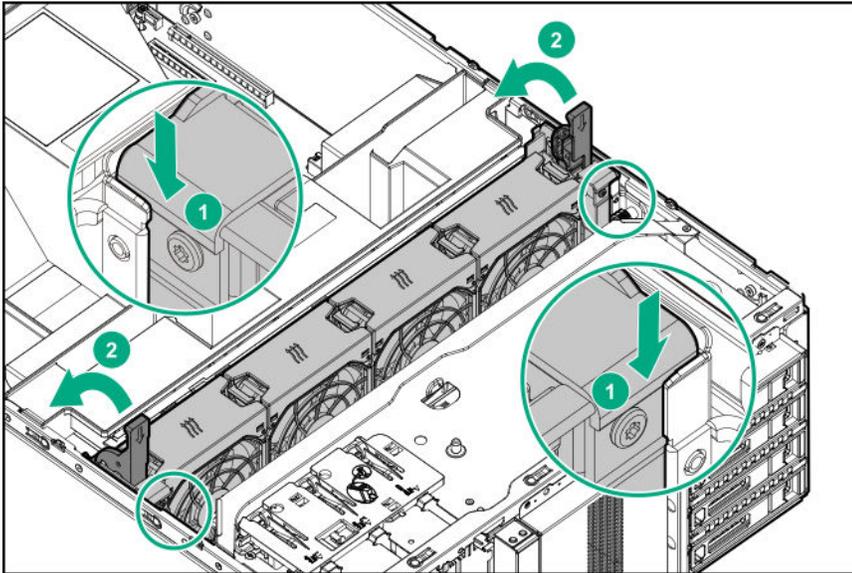
Install the fan cage

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.



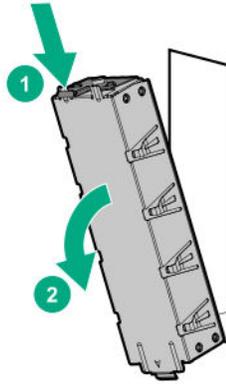
4. Perform the post-installation/maintenance steps required by the procedure that required the removal of the fan cage.

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

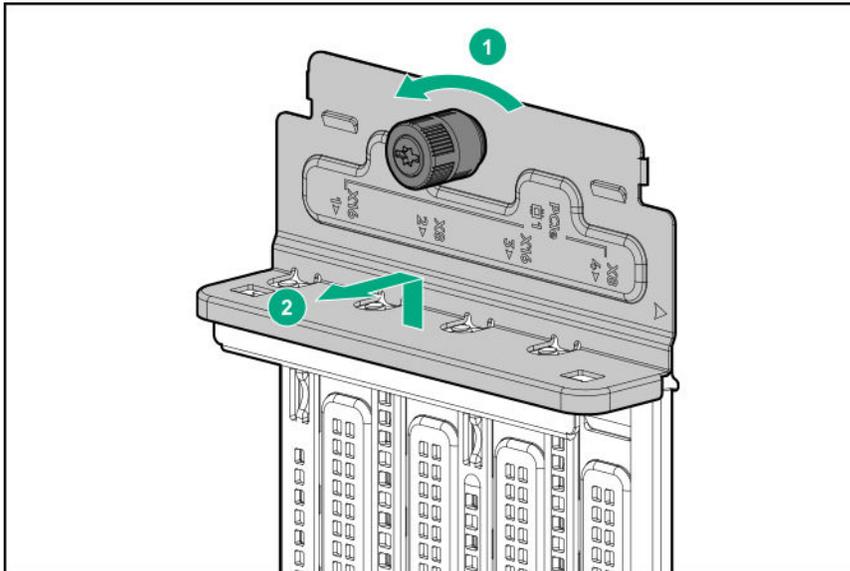
While pressing the latch on the media bay blank, pull out the blank from the bay.
Retain the blank for future use.



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.

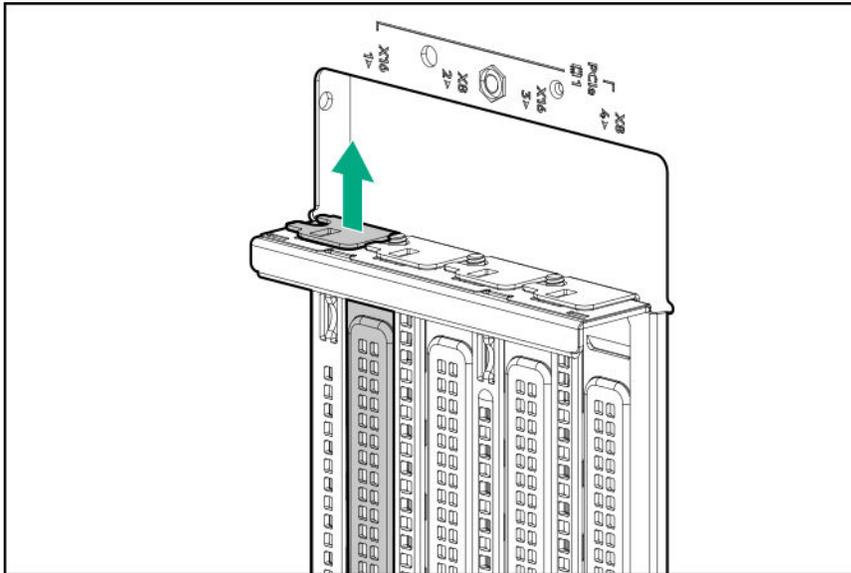


Remove the PCI slot blank

- ⚠ 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** on page 61.
2. Identify the expansion slot compatible with the option.
3. Pull up the blank opposite the selected expansion slot.



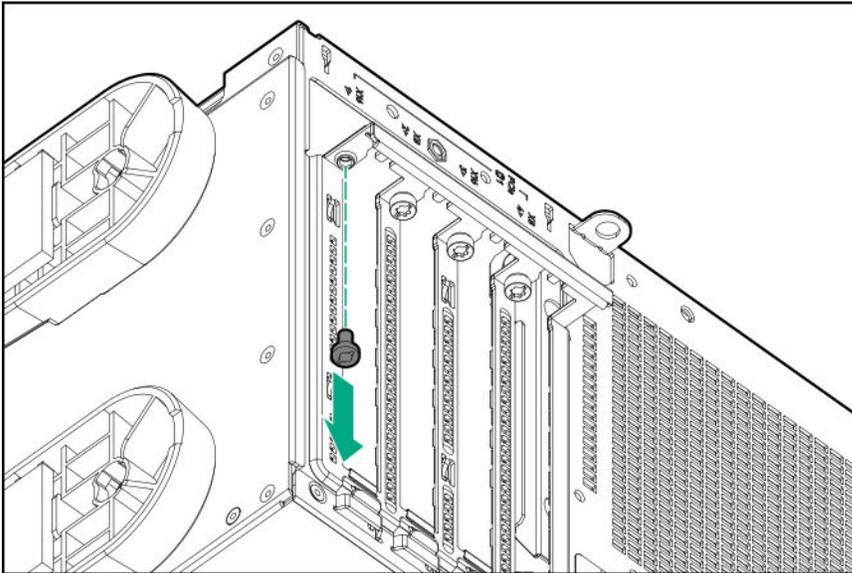
Remove a PCI board screw

Prerequisites

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

Procedure

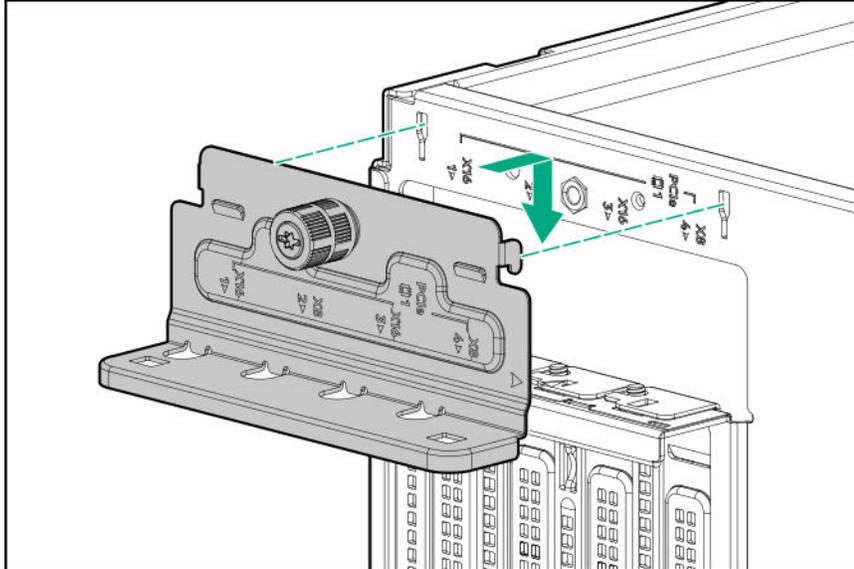
If the standup plug-in board option kit does not include a screw for installation, remove one of the preinstalled T-15 Torx screws underneath the PCI blank retainer deck.



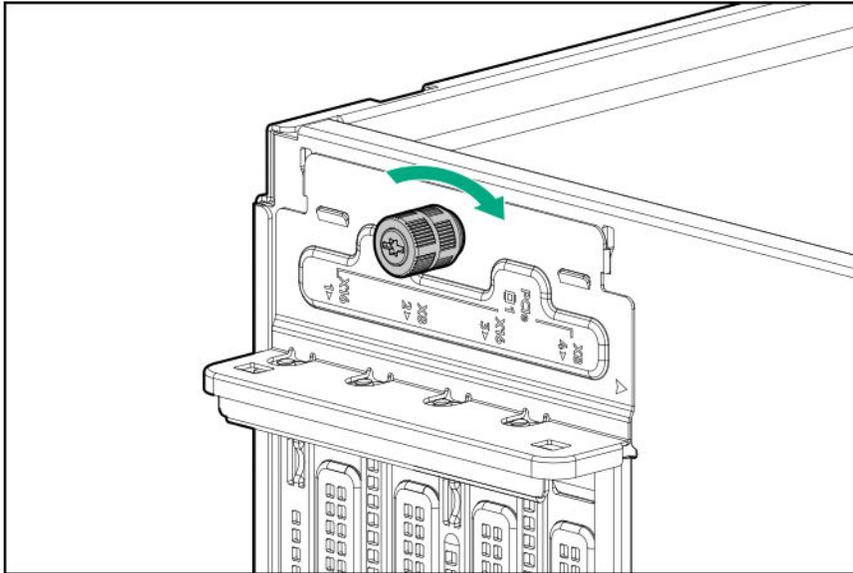
Install the PCI blank retainer

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.

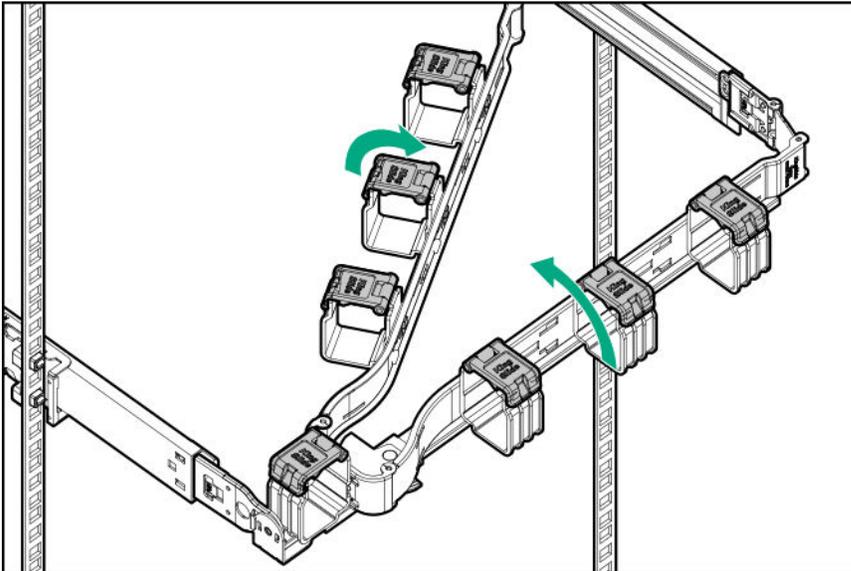


3. Perform the post-installation steps required by the standup plug-in board installation/removal.

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-installed 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.

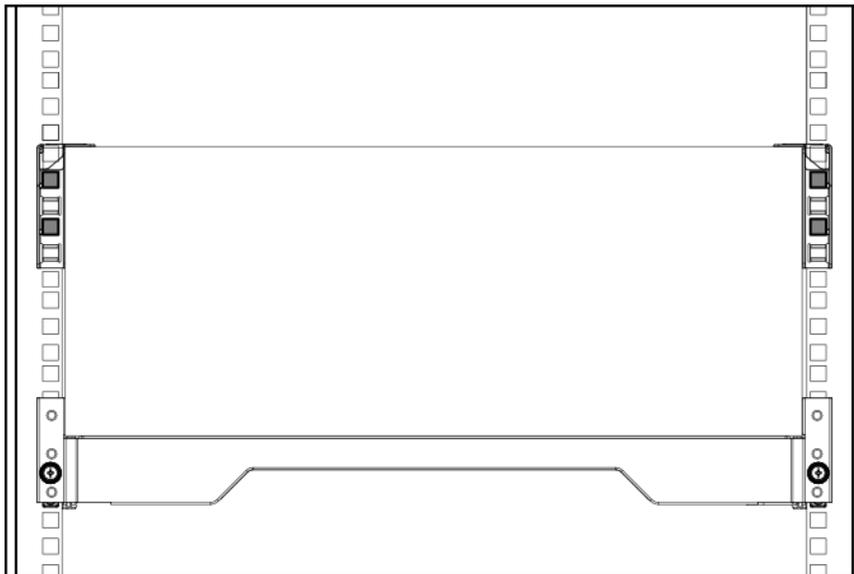
Prerequisites

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

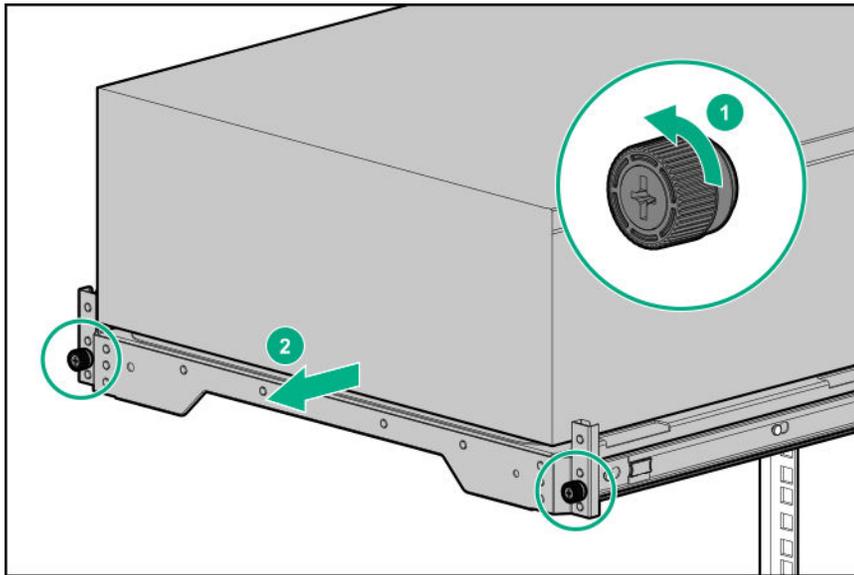
- Shipping hardware from the tower-to-rack conversion kit:
 - Shipping brackets (2)
 - Shipping bracket screws (4)
 - M5 square-hole cage nuts (4)
 - Rear shipping screws (2)
- Cage nut insertion tool
- T-25 Torx screwdriver
- Phillips No. 2 screwdriver

Procedure

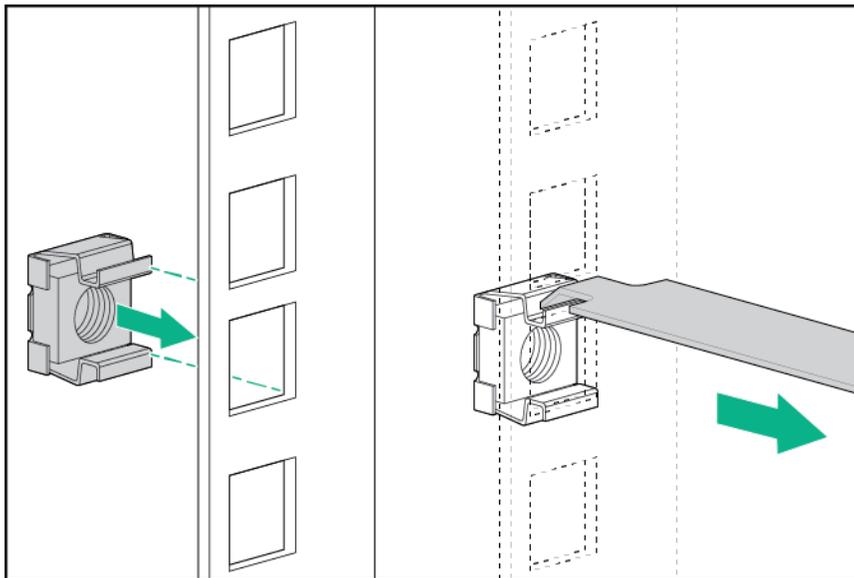
1. **Open the front bezel** on page 43.
2. **Power down the server** on page 42.
3. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
4. Disconnect all peripheral cables from the server.
5. Close the front bezel.
6. With the server 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.



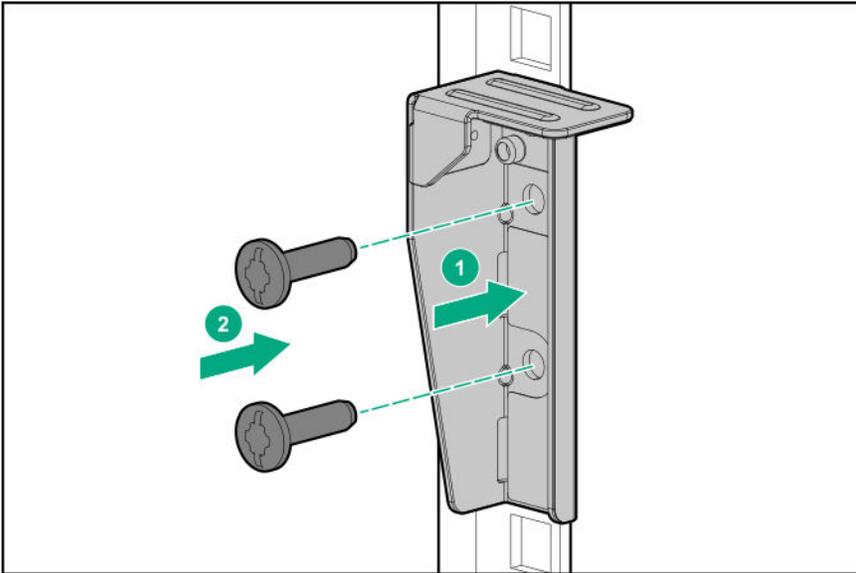
7. Slide the server tray out of the rack:
 - a. Loosen the server tray thumbscrews.
 - b. Grasp the tray notch to slide the server out of the rack.



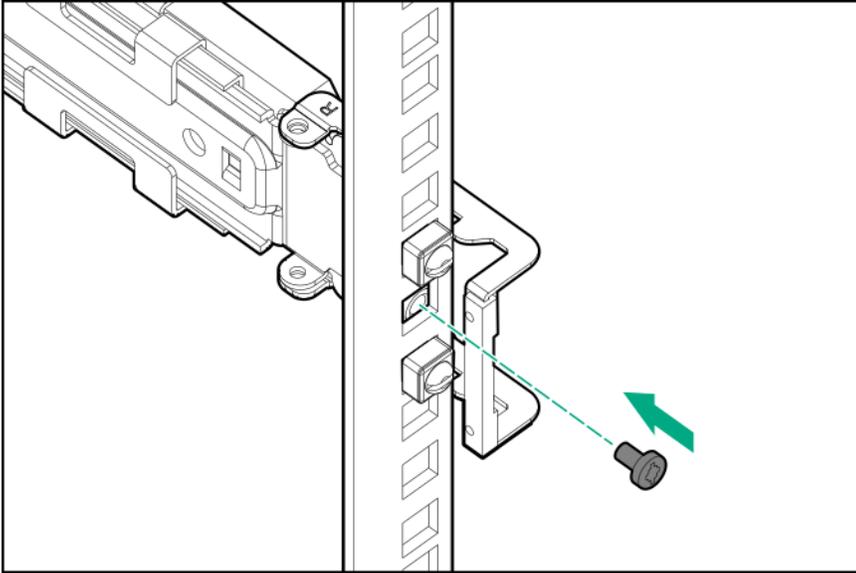
8. If you are installing the server in a square-hole rack, install the cage nuts. When installed, the flanges on the cage nut should face the outside of the rack:
 - a. Hook the bottom flange of the cage nut in the rack hole.
 - b. Insert the tip of the insertion tool through the hole and hook the top 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.



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:

<http://www.hpe.com/servers/ml350-gen10>

To view the warranty for your server and supported options, see [Warranty information](#) on page 199.

Introduction

If more than one option is being installed, read the installation instructions for all the hardware options and identify similar steps to 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 guidelines

Depending on the configuration, the server supports SAS, SATA, and NVMe drives.

Observe the following general guidelines:

- The system automatically sets all drive numbers.
- If only one drive is used, install it in the bay with the lowest drive number.

For drive numbering, see [Drive bay numbering](#) on page 25.

- 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.

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)

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

Installing an LFF non-hot-plug drive

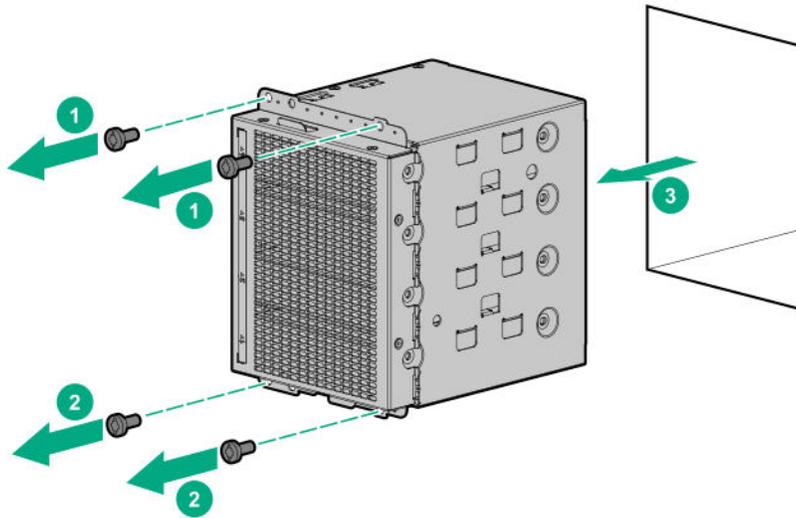
Prerequisites

Before you perform this procedure:

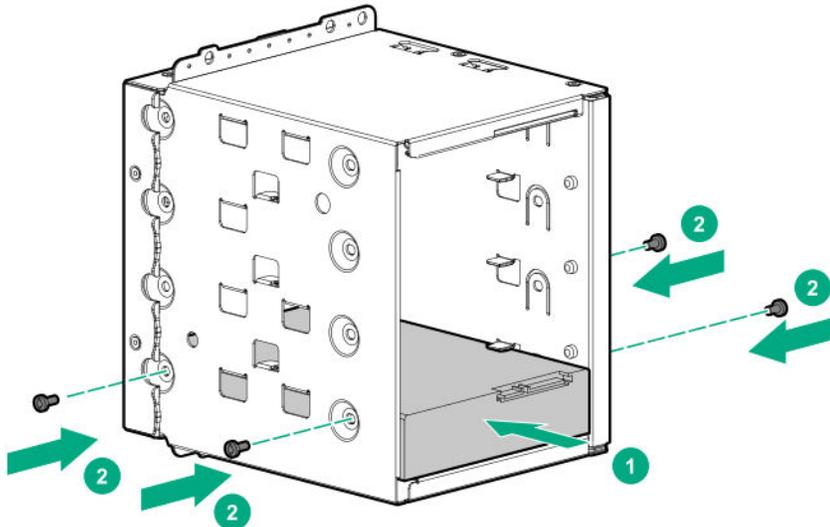
- **Make sure that the LFF non-hot-plug drive cage is available.**
- Make sure that you have the following items available:
 - LFF non-hot-plug drive option
 - T-15 Torx screwdriver

Procedure

1. **Remove the front bezel** on page 43.
2. **Power down the server** on page 42.
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** on page 45.
 - Server in rack mode: **Extend the server from the rack** on page 47.
6. **Remove the access panel** on page 52.
7. **Remove the air baffle** on page 54.
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** on page 59
16. **Install the air baffle** on page 55.
17. **Install the access panel** on page 53.
18. Do one of the following:

- Server in tower mode: **Position the tower server for operation** on page 46.
- Server in rack mode: **Slide the server into the rack** on page 51.

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** on page 42.
23. **Install the front bezel** on page 44.

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.

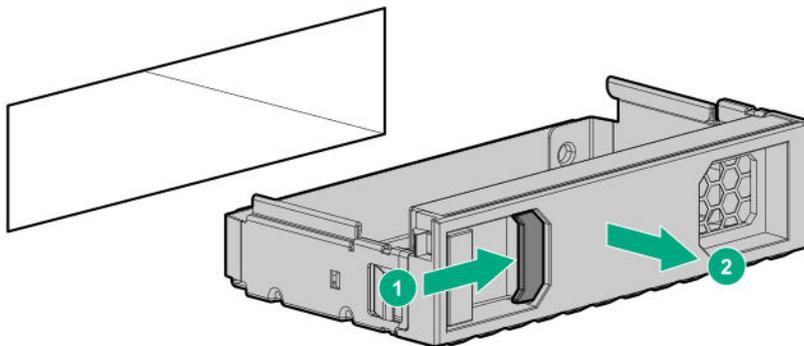
Prerequisites

Before you perform this procedure:

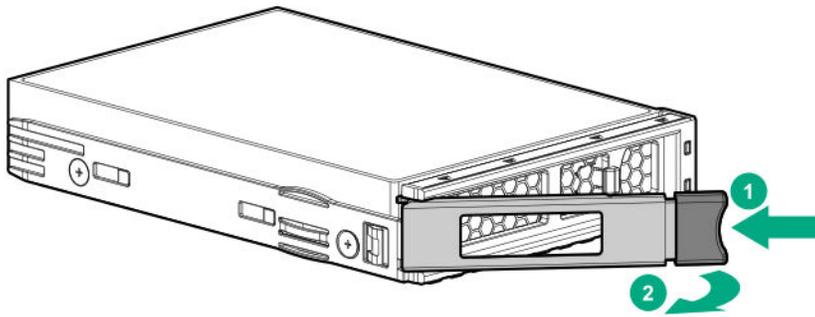
- **Make sure that the LFF hot-plug drive cage is installed.**
- Make sure that the LFF hot-plug drive option is available.

Procedure

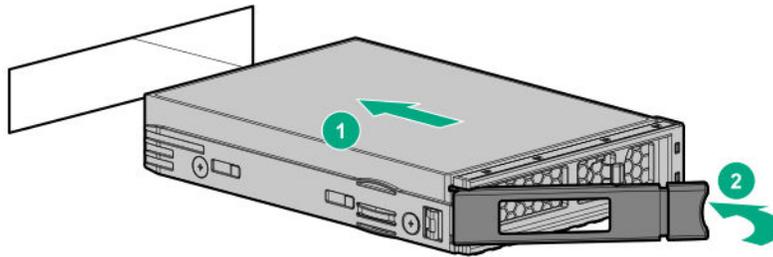
1. **Open the front bezel** on page 43.
2. Remove the drive blank.



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.

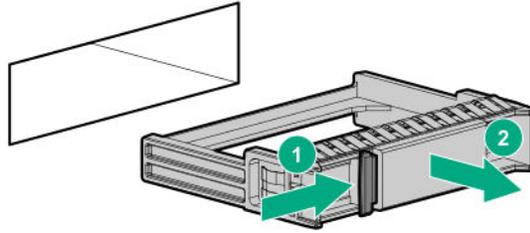
Prerequisites

Before you perform this procedure:

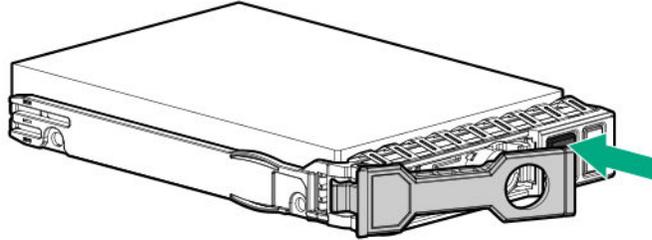
- **Make sure that the SFF hot-plug drive cage is installed.**
- Make sure that the SFF hot-plug drive option is available.
- If you are installing SFF SAS drives with 10K or 15K rpm rate, **make sure that the fan cage is installed.**

Procedure

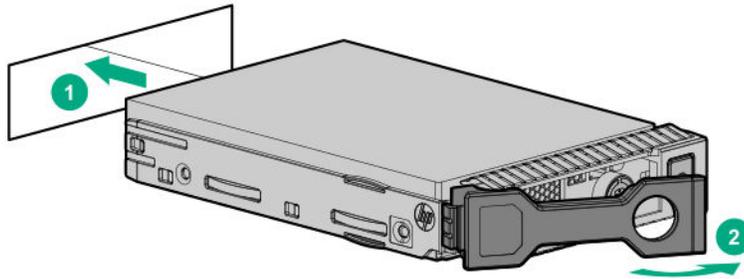
1. **Open the front bezel** on page 43.
2. Remove the drive blank.



3. Prepare the drive.



4. Install the SFF 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.

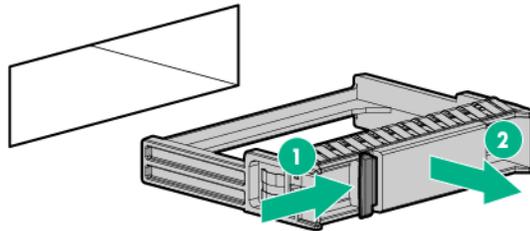
Prerequisites

Before you perform this procedure:

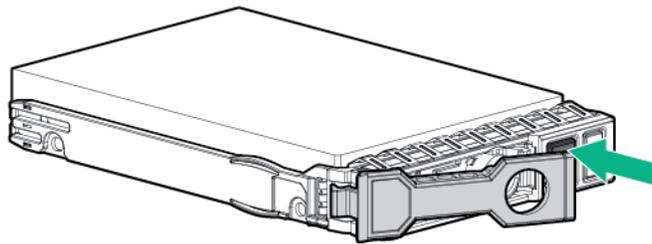
- **Make sure that the fan cage is installed.**
- **Make sure that the NVMe SSD Express Bay cage is installed.**
- Make sure that the NVMe SSD option is available.

Procedure

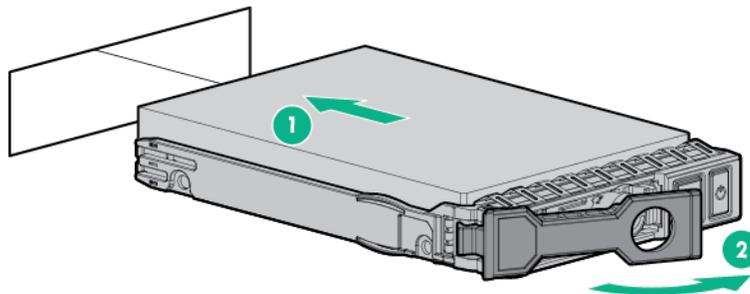
1. **Open the front bezel** on page 43.
2. If installing drives in bay 2-8, remove the drive blank.



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 (<http://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
-

-  **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.
-

-  **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.

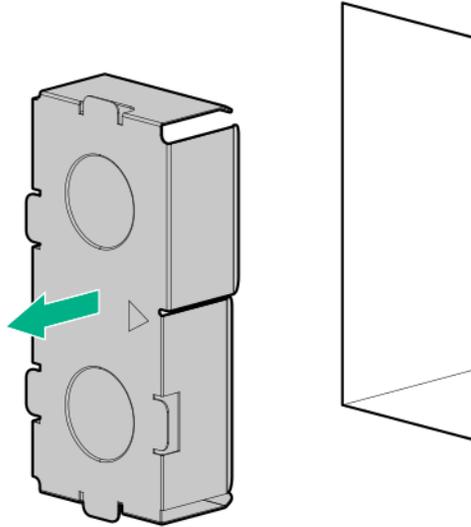
Install an AC power supply

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

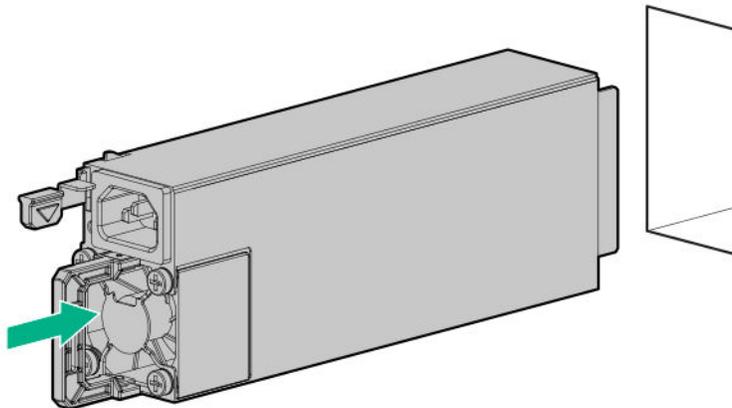
⚠ CAUTION: To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.

Procedure

1. If you are installing a power supply in the power supply bay 2, remove the power supply blank.



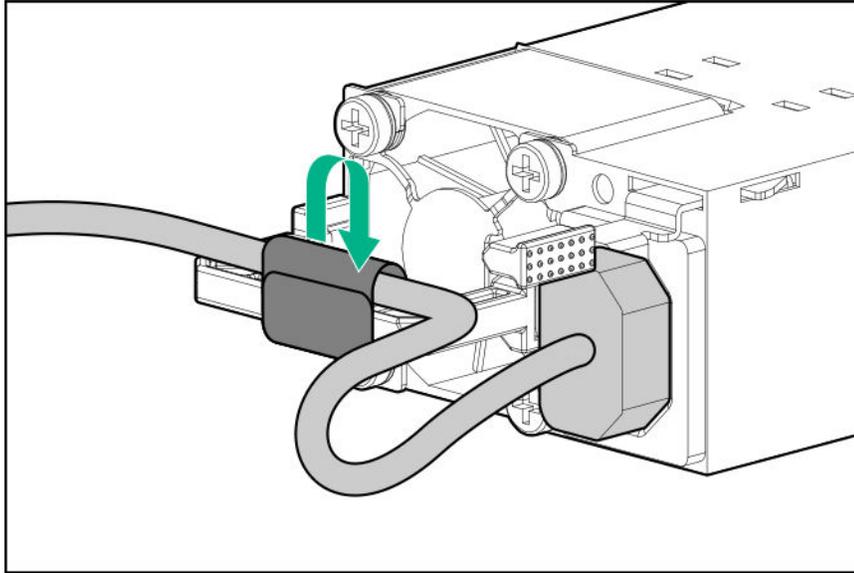
2. Slide the power supply into the bay until it clicks into place.



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.

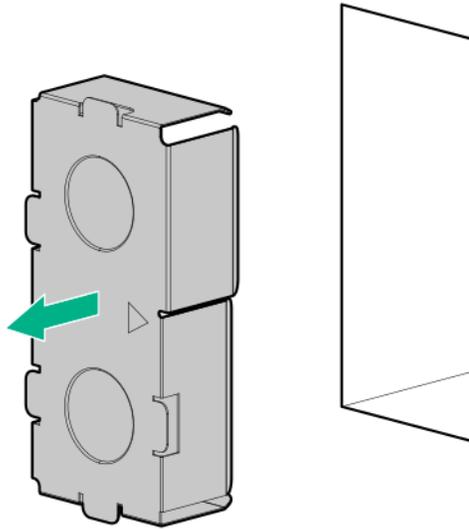
If this connection is made, all of the following must be met:

- 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.

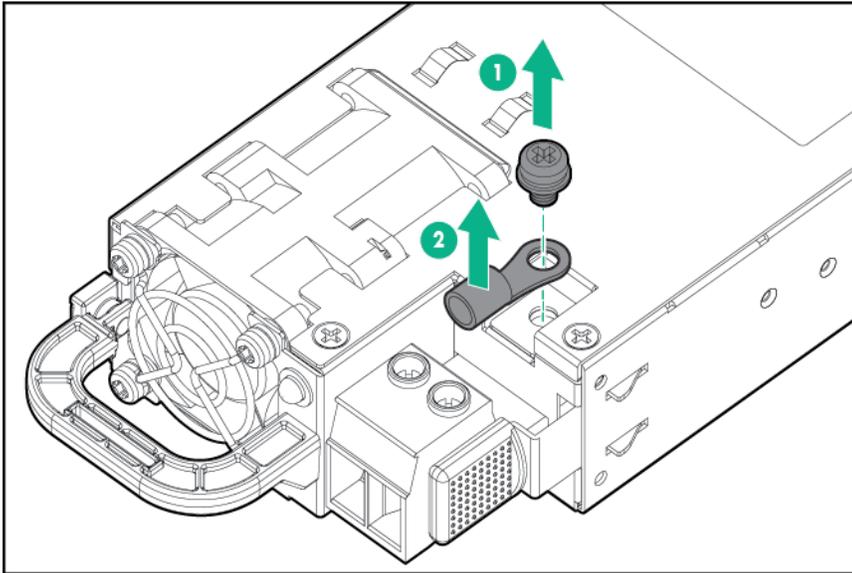
-
- ⚠ CAUTION:** To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.
-

Procedure

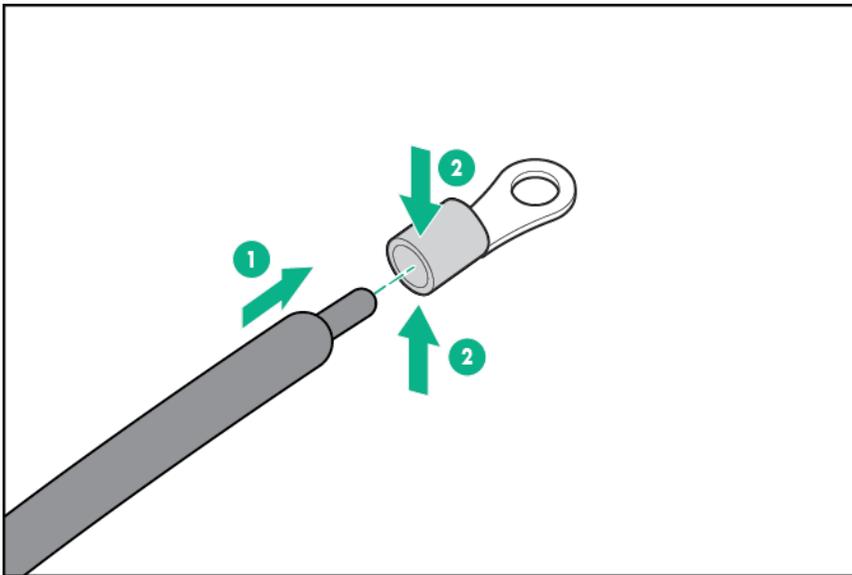
1. If you are installing a power supply in the power supply bay 2, remove the power supply blank.



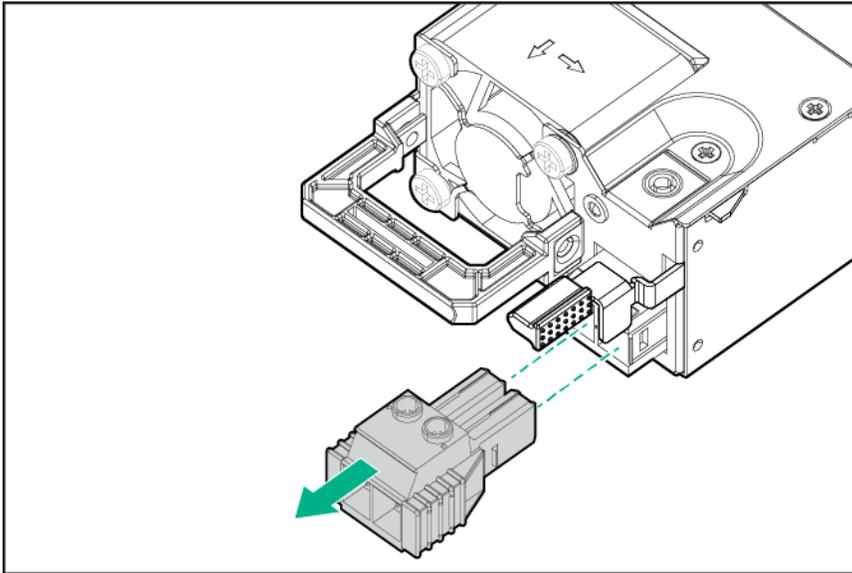
2. Remove the ring tongue.



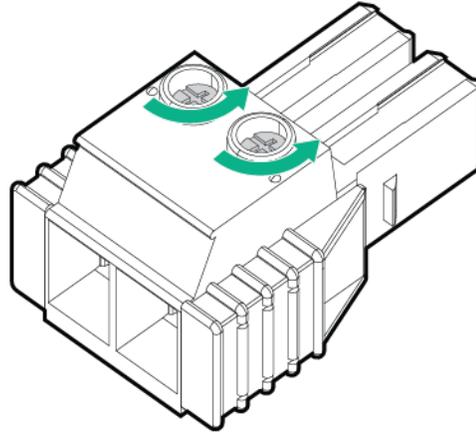
3. Crimp the ring tongue to the ground cable from the -48 V DC power source.



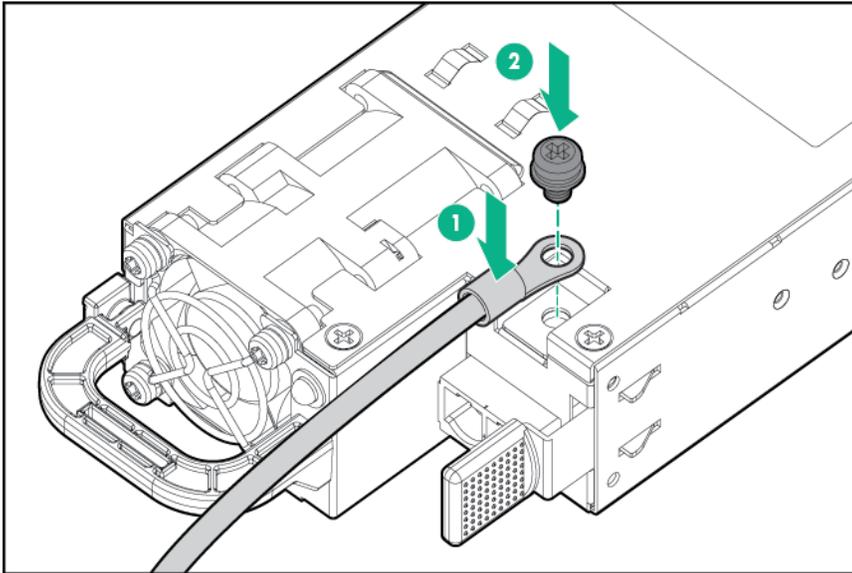
4. Remove the terminal block connector.



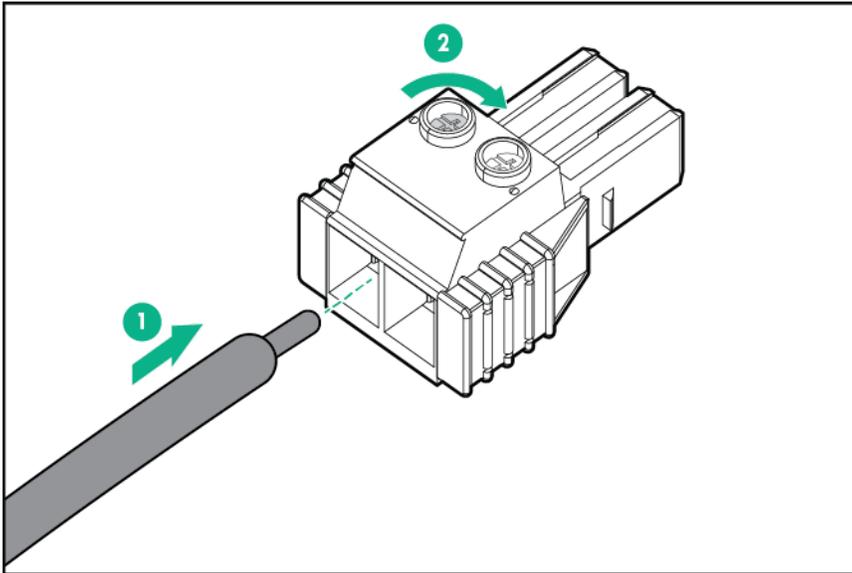
5. Loosen the screws on the terminal block connector.



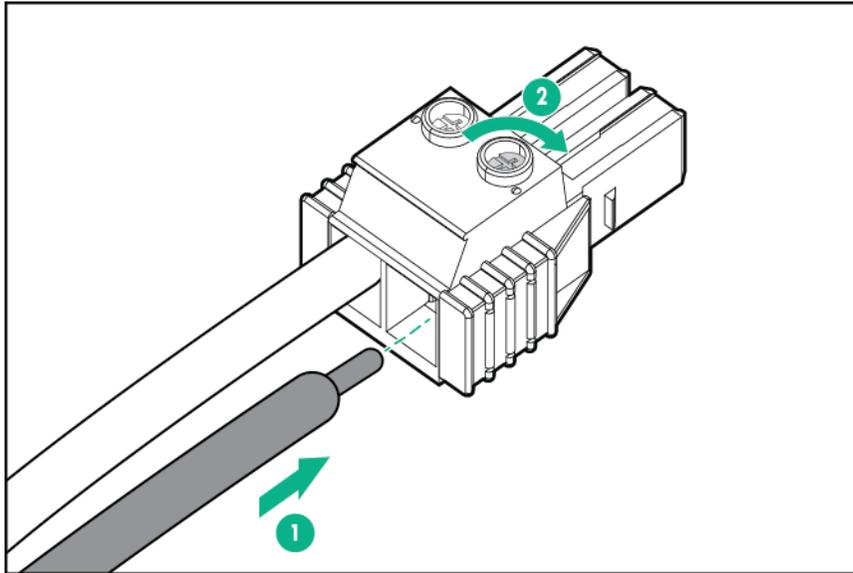
6. Attach the ground (earthed) wire to the ground screw and washer and tighten to 1.47 N m (13 lb-in) of torque. The ground wire must be connected before the -48 V wire and the return wire.
The ground wire must be connected before the -48 V wire and the return wire.



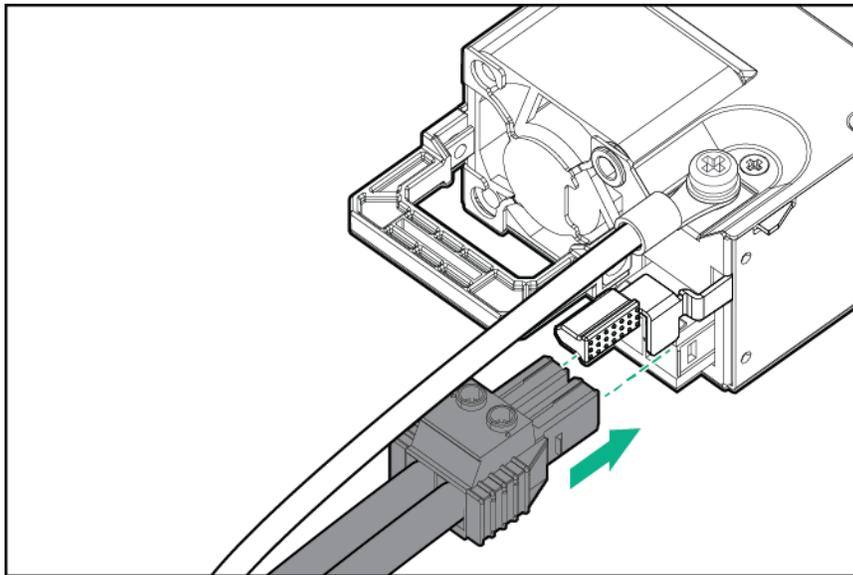
7. Insert the -48 V wire into the left side of the terminal block connector, and then tighten the screw to 1.3 N m (10 lb-in) of torque.



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.

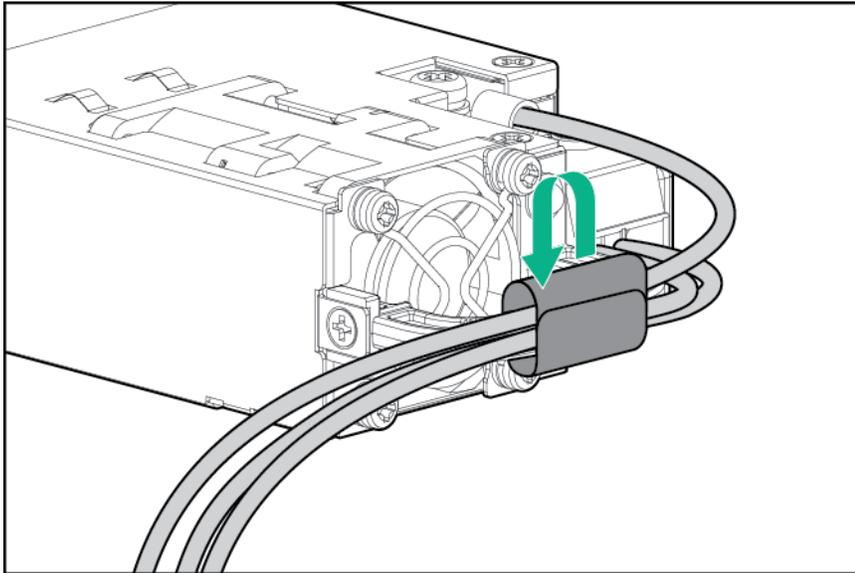


10. Secure the power cord, wires, and cables in the strain relief strap attached to the power supply handle:

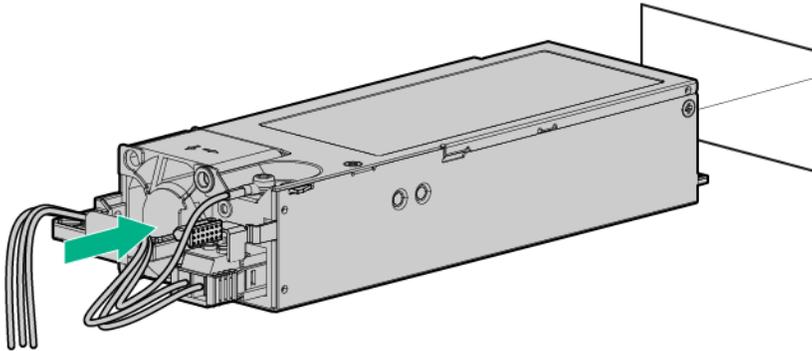
- a. Unwrap the strain relief strap from the power supply handle.

⚠ 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. After the kit is installed, complete in-rack serviceability for all server components is supported.

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-installed 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** on page 85.
4. **Install the server on the tray** on page 88.
5. **Install the cable management arm** on page 90.

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.

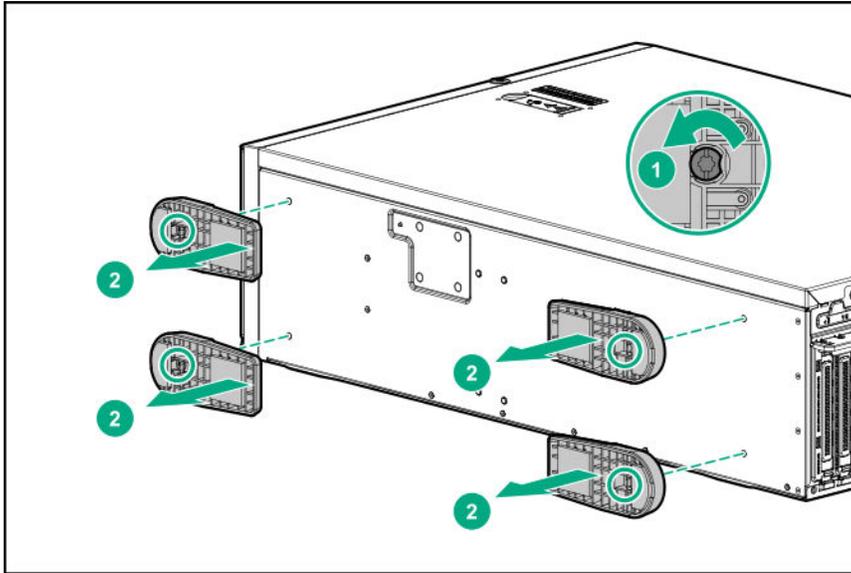
Procedure

1. **Open the front bezel** on page 43.
2. **Power down the server** on page 42.
3. Close the front bezel.
4. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
5. Disconnect all peripherals cables from the server.
6. If installed, unlock and remove the security padlock and/or the Kensington security lock.
For more information, see the lock documentation.

7. **Position the tower server for hardware configuration** on page 45.

8. 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.

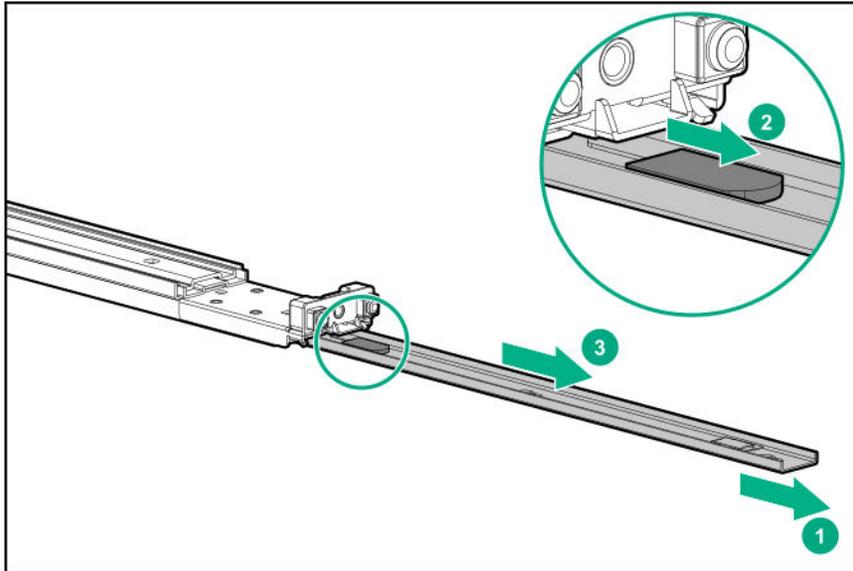
Prerequisites

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

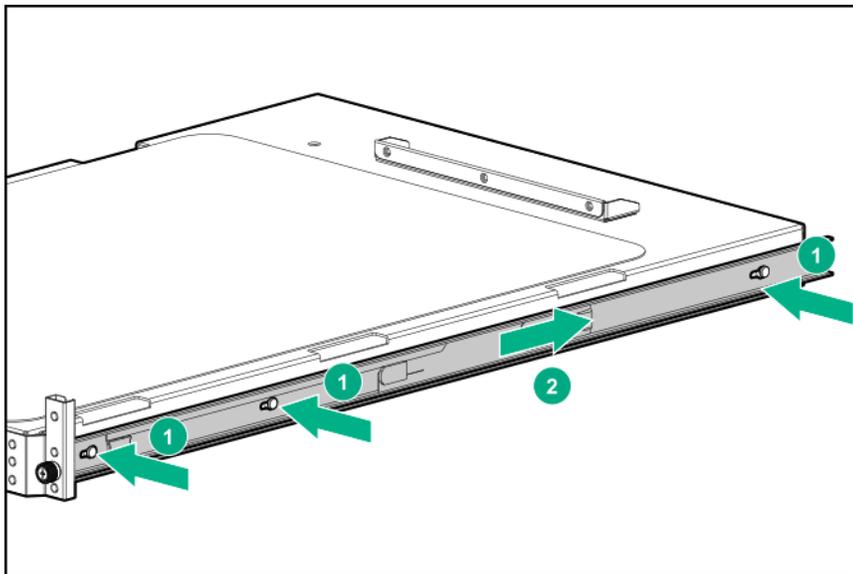
1. Disassemble the rail assemblies:
 - a. Pull out the inner rail until it is fully extended .
 - b. Slide and hold the white release tab in the direction shown, and then remove the inner sliding rail from the outer mounting rail.



c. Repeat steps a–b on the other rail assembly.

2. Install the sliding rails on the server tray:

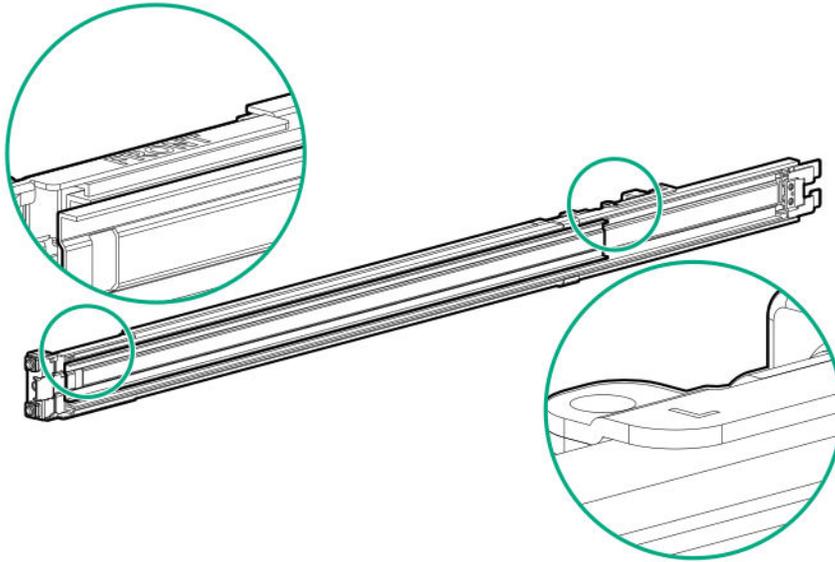
- a. Align the notches on the rail with the pins on the side.
- b. Slide the rail towards the rear of the tray to lock it into place.



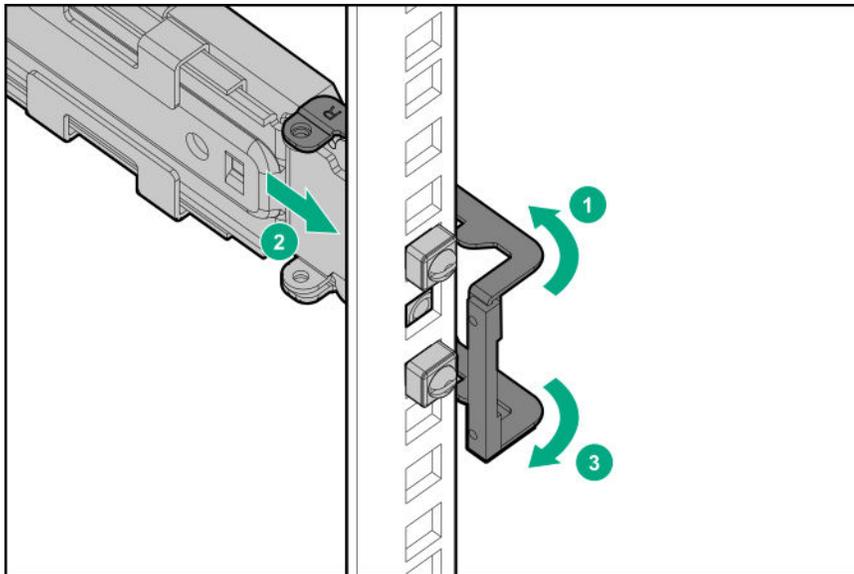
c. Repeat steps a–b on the other inner rail.

3. Locate the orientation markers on the mounting rails:

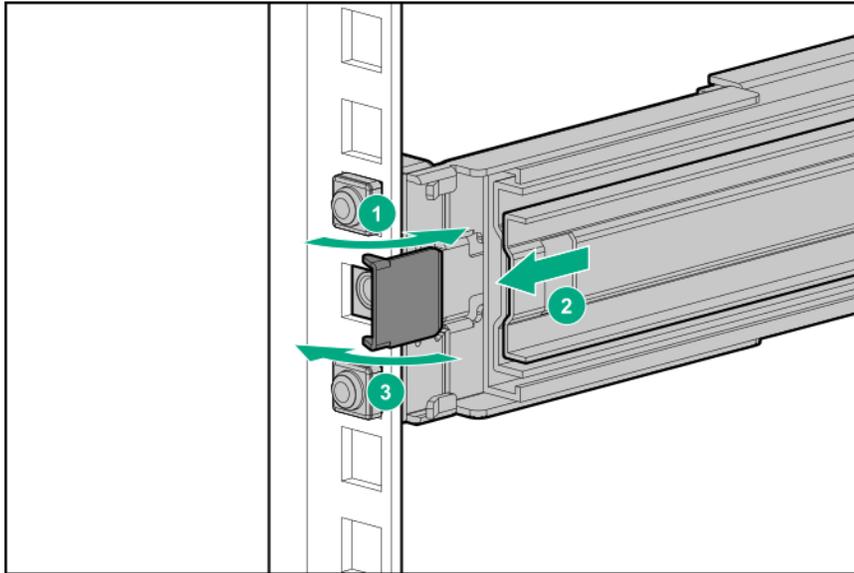
- The front end of the rails is marked **FRONT**.
- The rear end of the rails is marked with **L** for left and **R** for right.



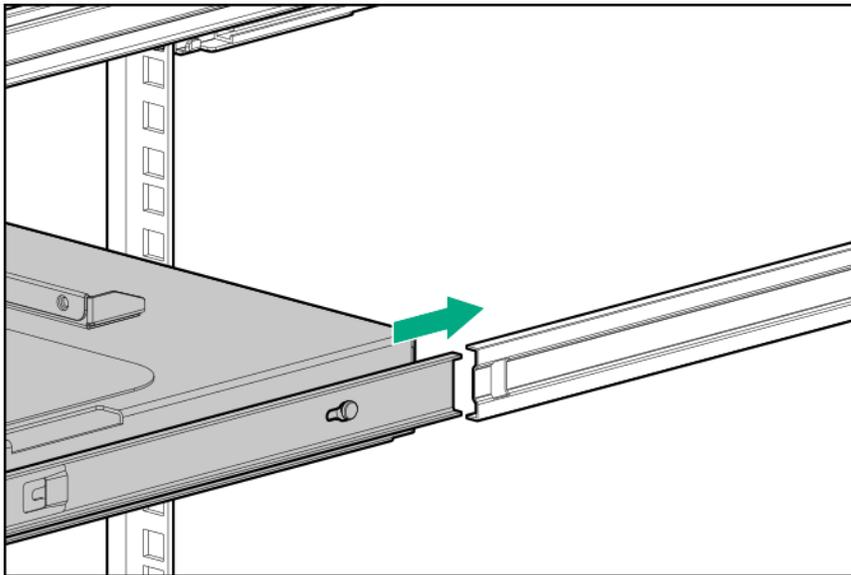
4. Fasten the mounting rails to the rack columns:
 - a. Retract and hold the rear retention bracket.
 - b. Insert the pegs on the mounting flange into the rack holes.
 - c. Release the rear retention bracket.



- 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.



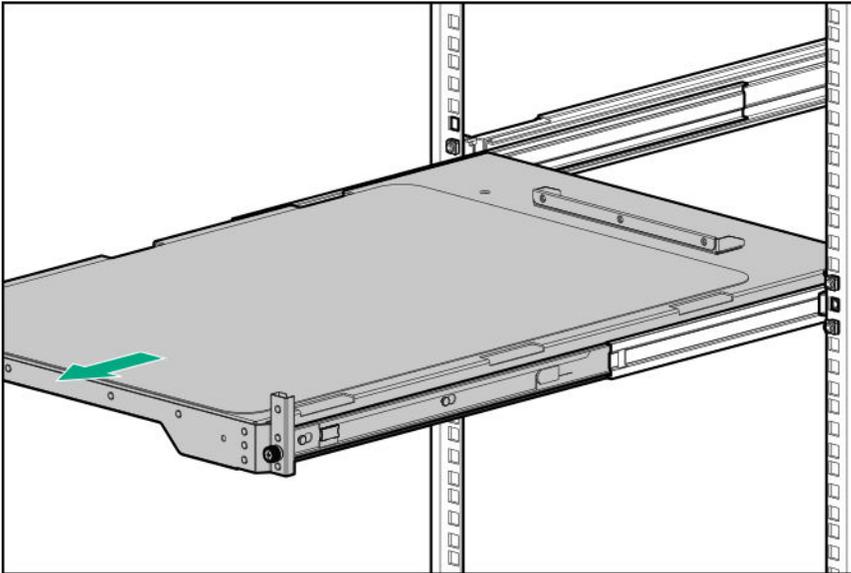
Install the server on the tray

Prerequisites

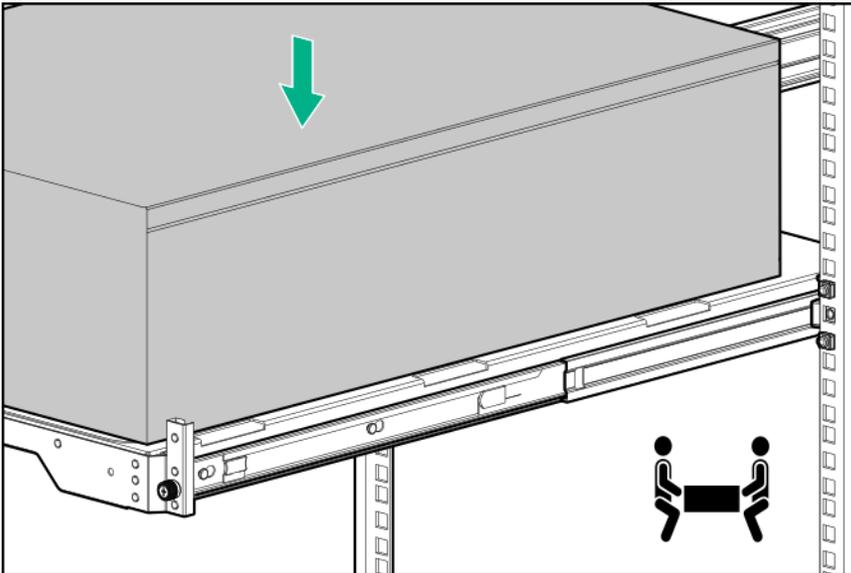
Before you perform this procedure, make sure that you have a T-15 Torx screwdriver available.

Procedure

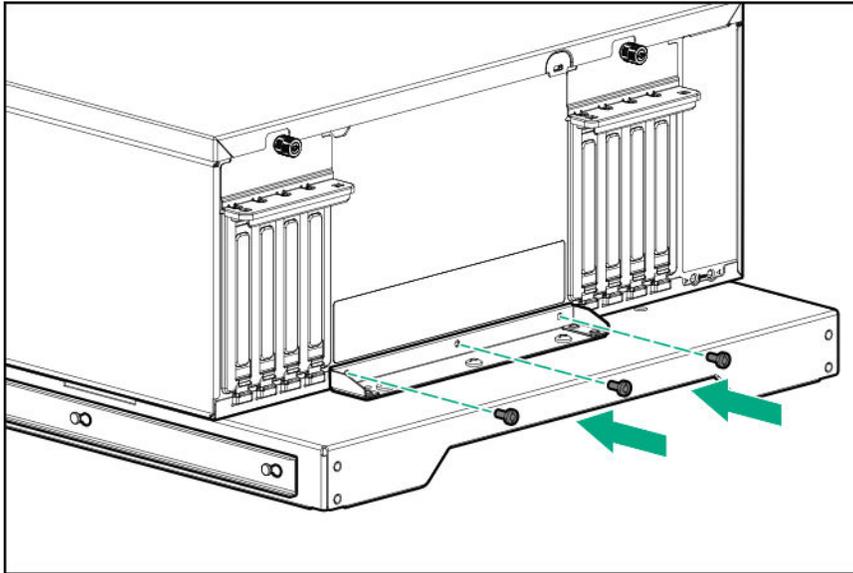
1. Grasp the tray notch to slide the tray out of the rack.



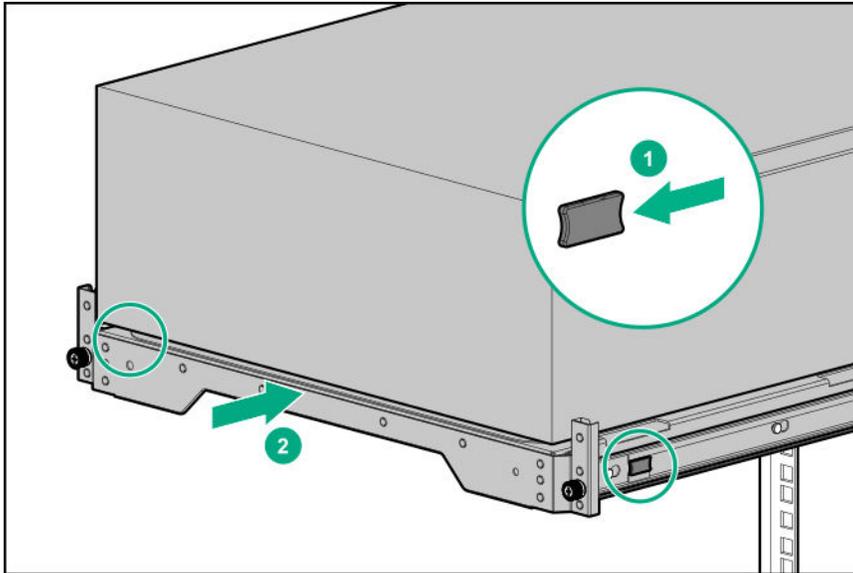
2. Place the server on the tray.
The rear panel of the server should be flushed against the rear bracket on the tray



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

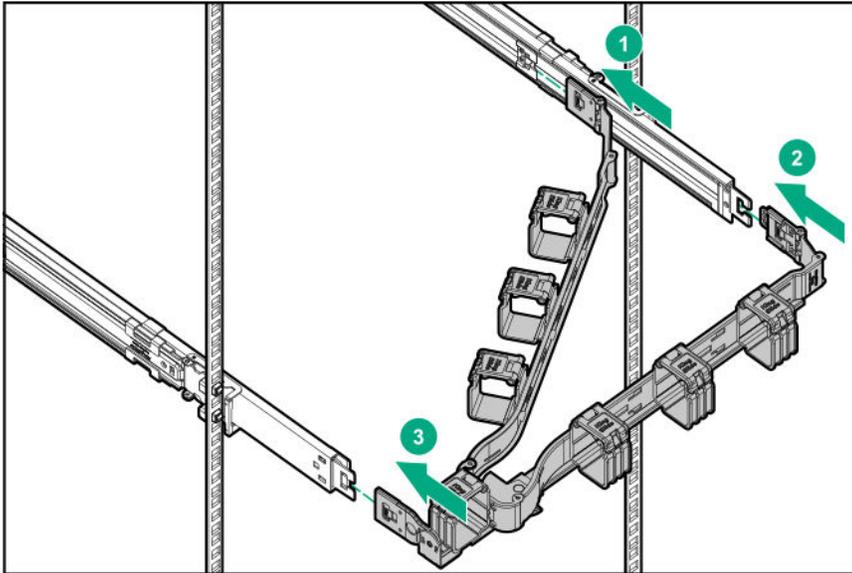
The cable management arm allows the server to be fully extended from the rack without the need to power off the system or disconnect any rear panel cables. This CMA is designed for ambidextrous implementation.

⚠ 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.

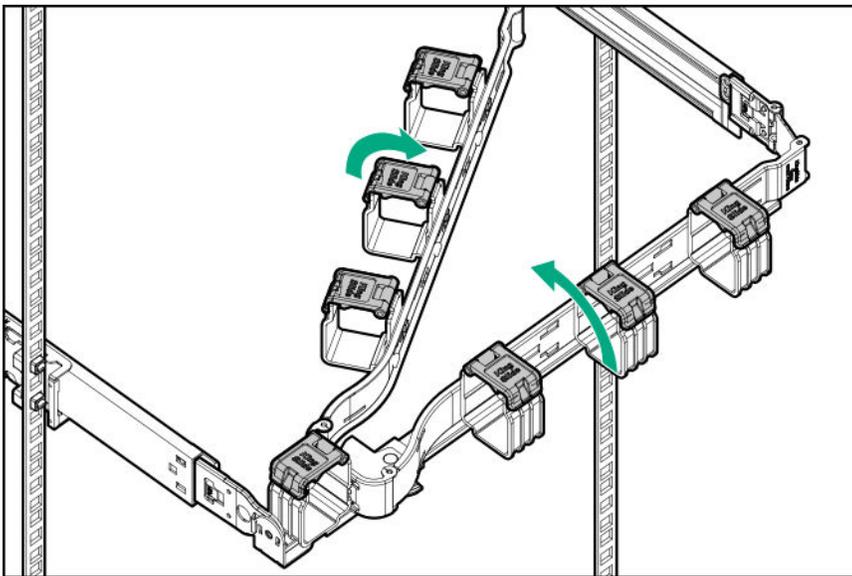
Procedure

1. Connect all peripheral cables and power cords to the rear panel.
2. Install the CMA:

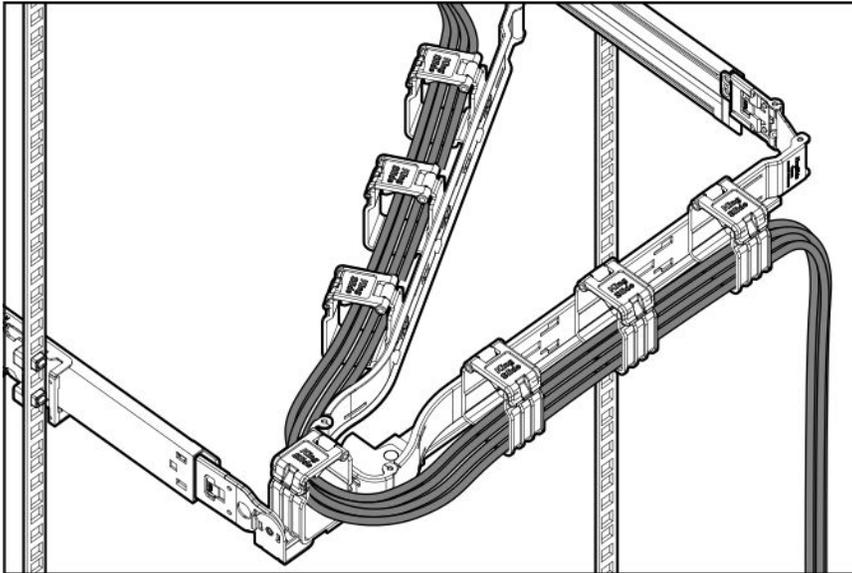
- a. Fasten the inner retention connector to left sliding rail hook.
- b. Fasten the outer retention connector to left mounting rail hook.
- c. Fasten the hinged connector to right mounting rail hook.



3. Open the cable clamps.



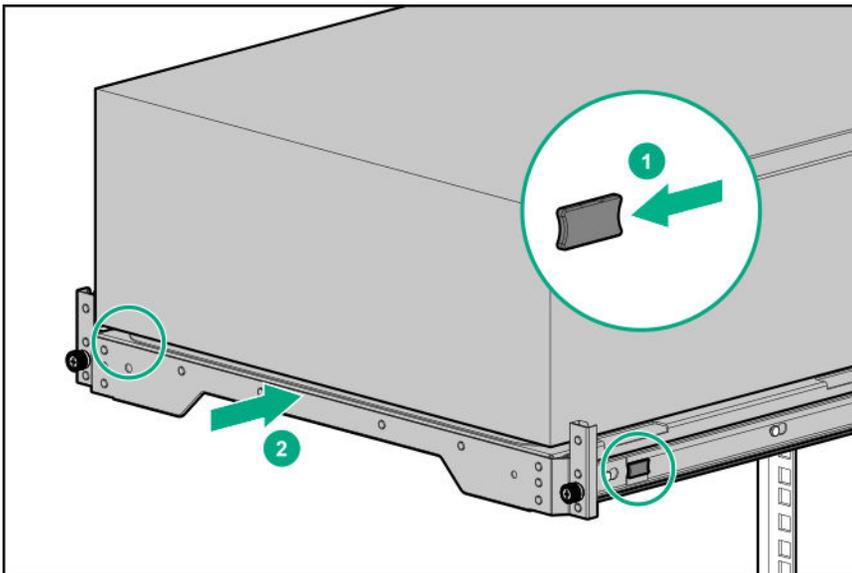
4. Route the rear panel cables and power cords through the CMA, and then close the cable clamps. Employ industry best practices in routing and managing these rear panel cables and power cords.



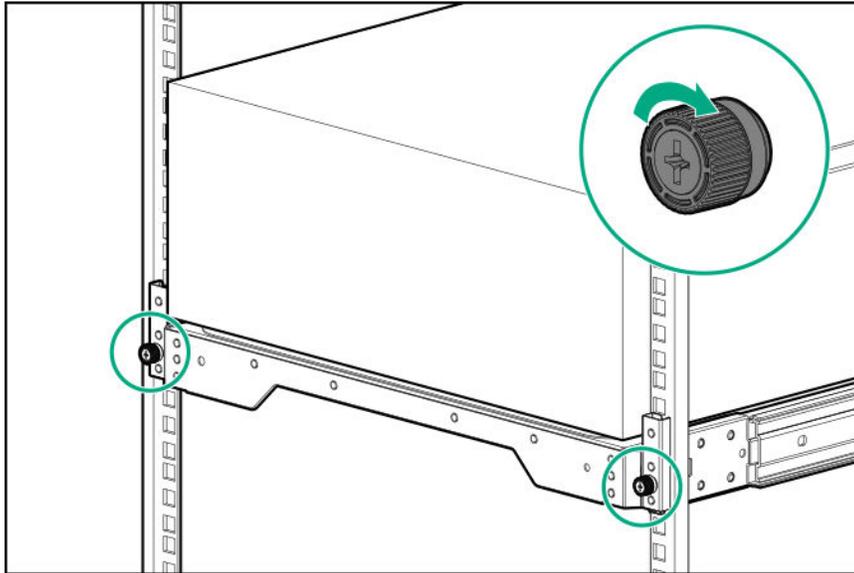
5. Verify the operation of the rack rails and the CMA:

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-installed server, **install the shipping hardware**
9. Connect each power cord to the power source.
10. **Power up the server** on page 42.

The installation is complete.

Drive cage options

The server supports several drive cage options. 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 4 LFF and 8 SFF hot-plug 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:

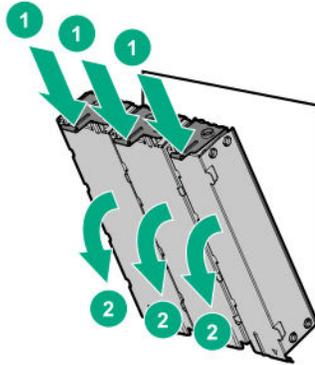
- Drive cage option kit
- LFF non-hot-plug drive option
- T-15 Torx screwdriver

Procedure

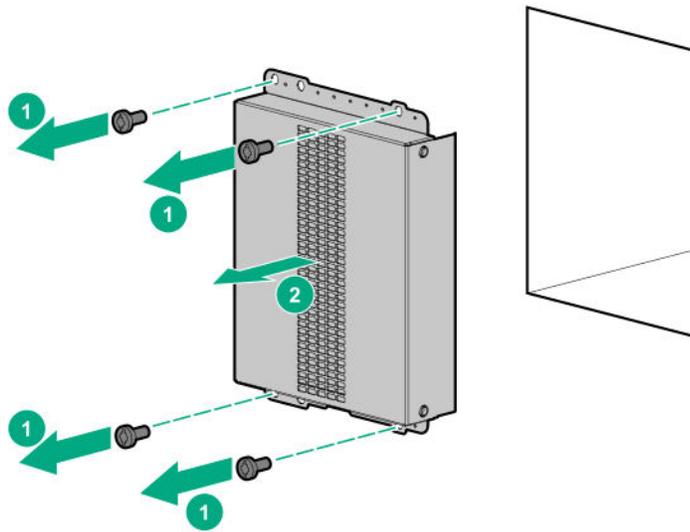
1. **Remove the front bezel** on page 43.
2. **Power down the server** on page 42.
3. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
4. Disconnect all peripheral cables from the server.
5. Do one of the following:
 - Server in tower mode: **Position the tower server for hardware configuration** on page 45.
 - Server in rack mode: **Extend the server from the rack** on page 47.
6. **Remove the access panel** on page 52.
7. **Remove the air baffle** on page 54.
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.

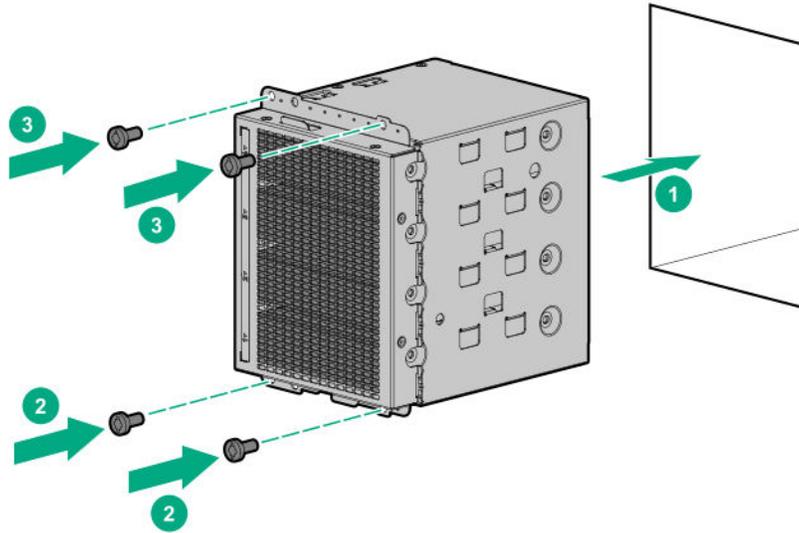


If the drive cage is to be installed in box 2 or 3, remove the drive cage blank.
Retain the blank for future use.



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** on page 59
15. **Install the air baffle** on page 55.
16. **Install the access panel** on page 53.
17. Do one of the following:
 - Server in tower mode: **Position the tower server for operation** on page 46.
 - Server in rack mode: **Slide the server into the rack** on page 51.
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** on page 42.
22. **Install the front bezel** on page 44.

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
- Cannot 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:

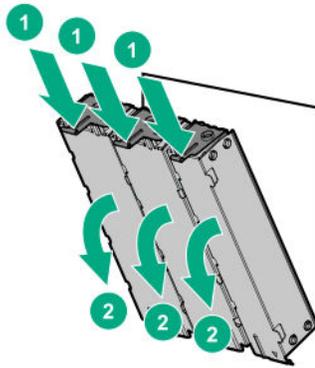
- Drive cage option kit
- **Storage controller cable option**
- LFF hot-plug drive option
- T-15 Torx screwdriver

Procedure

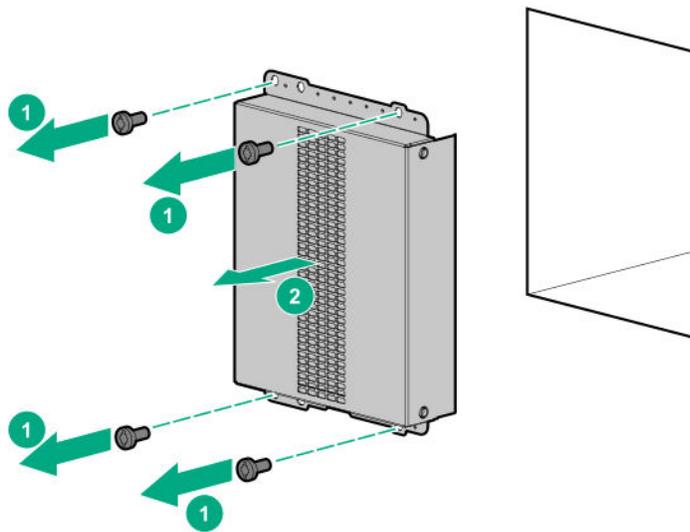
1. **Remove the front bezel** on page 43.
2. **Power down the server** on page 42.
3. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
4. Disconnect all peripheral cables from the server.
5. Do one of the following:
 - Server in tower mode: **Position the tower server for hardware configuration** on page 45.
 - Server in rack mode: **Extend the server from the rack** on page 47.
6. **Remove the access panel** on page 52.
7. **Remove the air baffle** on page 54.
8. If installed, **remove the fan cage**.

9. Do one of the following:

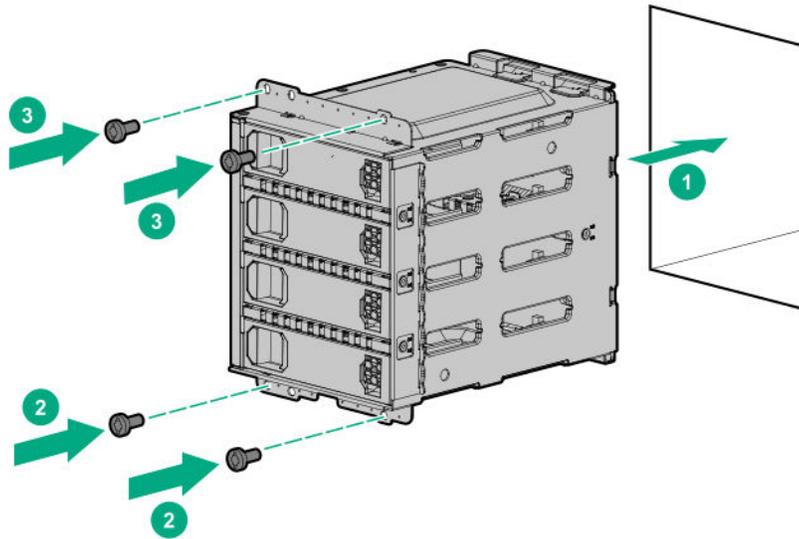
If the drive cage is to be installed in box 1, remove the media bay blanks.
Retain the blanks for future use.



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** on page 59

14. **Install the air baffle** on page 55.

15. **Install the access panel** on page 53.

16. Do one of the following:

- Server in tower mode: **Position the tower server for operation** on page 46.
- Server in rack mode: **Slide the server into the rack** on page 51.

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** on page 42.

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

22. **Install the front bezel** on page 44.

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
- Cannot be installed together with the 4 LFF non-hot-plug or hot-plug 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:

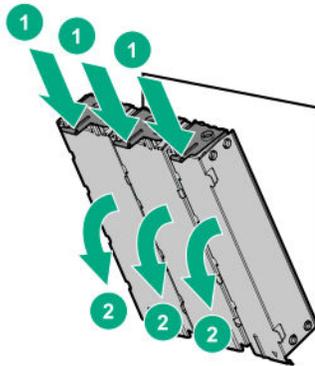
- Drive cage option kit
- **Storage controller cable option**
- SFF hot-plug drive option
- T-15 Torx screwdriver

Procedure

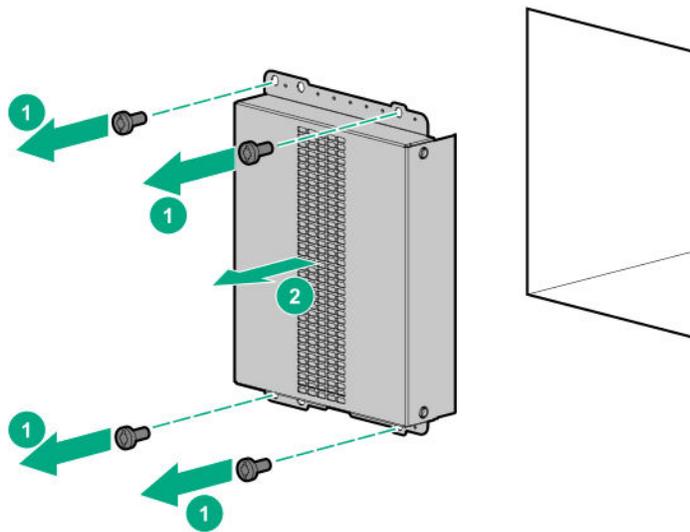
1. **Remove the front bezel** on page 43.
2. **Power down the server** on page 42.
3. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
4. Disconnect all peripheral cables from the server.
5. Do one of the following:
 - Server in tower mode: **Position the tower server for hardware configuration** on page 45.
 - Server in rack mode: **Extend the server from the rack** on page 47.
6. **Remove the access panel** on page 52.
7. **Remove the air baffle** on page 54.
8. If installed, **remove the fan cage**.

9. Do one of the following:

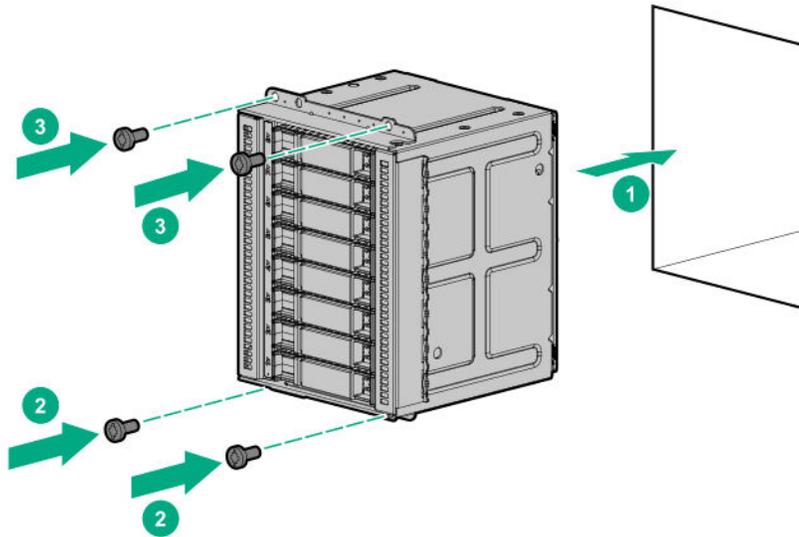
If the drive cage is to be installed in box 1, remove the media bay blanks.
Retain the blanks for future use.



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** on page 59

14. **Install the air baffle** on page 55.

15. **Install the access panel** on page 53.

16. Do one of the following:

- Server in tower mode: **Position the tower server for operation** on page 46.
- Server in rack mode: **Slide the server into the rack** on page 51.

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** on page 42.

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

22. **Install the front bezel** on page 44.

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 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)
- NVMe SSD data cables (2)
- Drive power cable
- T-15 Torx screws (4)

Installing the NVMe SSD Express Bay enablement option

Prerequisites

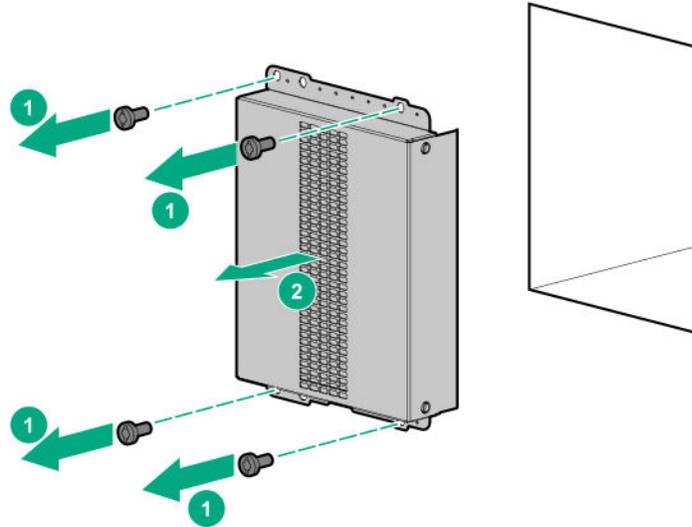
Before you perform this procedure:

- 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

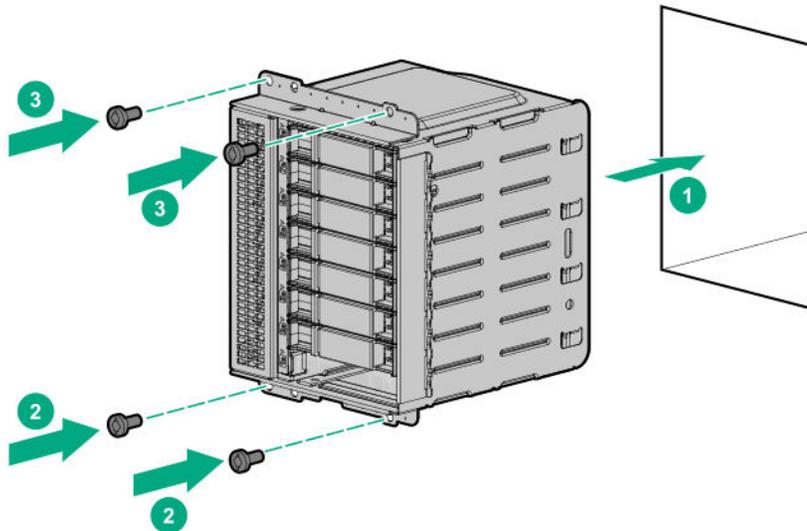
Procedure

1. **Remove the front bezel** on page 43.
2. **Power down the server** on page 42.
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** on page 45.
 - Server in rack mode: **Extend the server from the rack** on page 47.

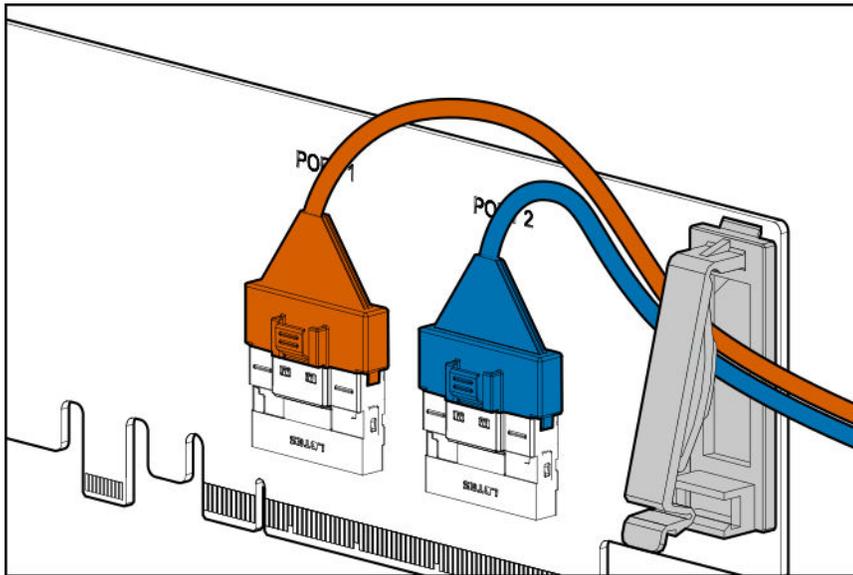
6. **Remove the access panel** on page 52.
7. **Remove the air baffle** on page 54.
8. If installed, **remove the fan cage**.
9. Remove the drive cage blank from box 2.
Retain the blank for future use.



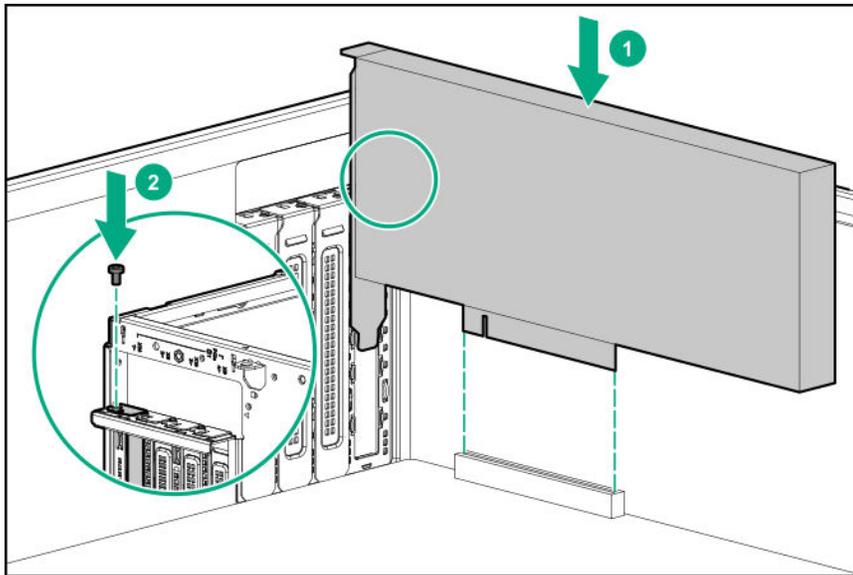
10. Install the drive cage in box 2.



11. **Remove the PCI blank retainer** on page 61.
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 NVMe 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** on page 63.
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** on page 59

21. **Install the air baffle** on page 55.
22. **Install the access panel** on page 53.
23. Do one of the following:
 - Server in tower mode: **Position the tower server for operation** on page 46.
 - Server in rack mode: **Slide the server into the rack** on page 51.
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** on page 42.
28. **Install the NVMe SSDs**.
29. **Install the front bezel** on page 44.

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:

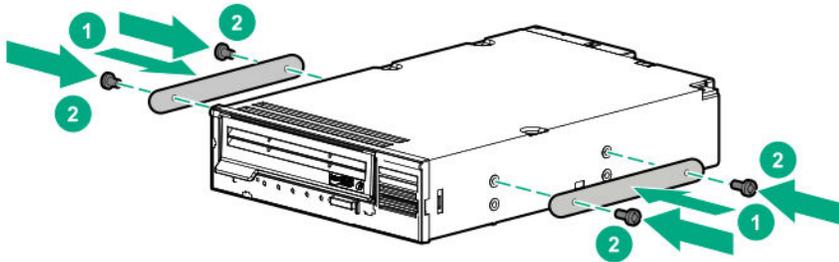
- **Make sure that a Smart Array controller board option is installed.**
- In a server that has the maximum number of drives installed in box 2 and box 3, and the RDX drive is present in the half-height media bay 2, make sure that the **fan cage is installed.**
- Make sure that you have the following 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

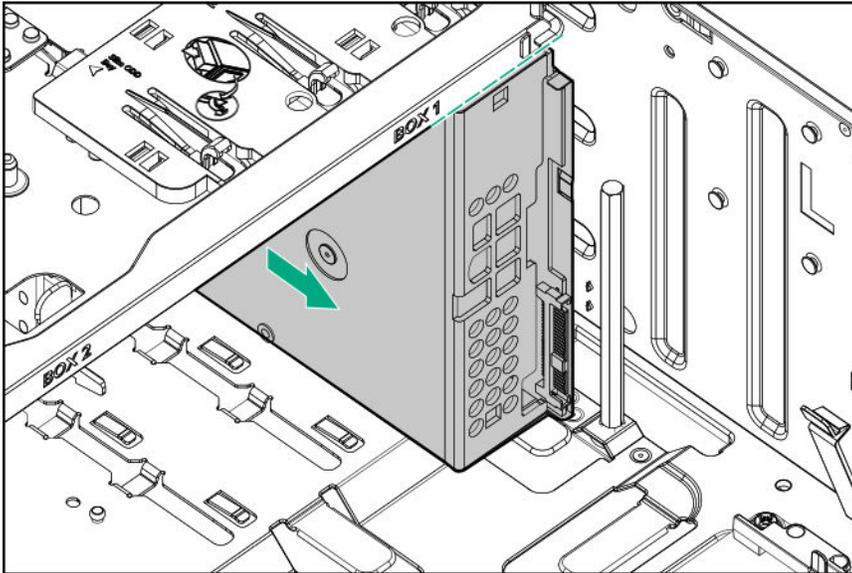
1. **Remove the front bezel** on page 43.
2. **Power down the server** on page 42.
3. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
4. Disconnect all peripheral cables from the server.
5. Do one of the following:
 - Server in tower mode: **Position the tower server for hardware configuration** on page 45.
 - Server in rack mode: **Extend the server from the rack** on page 47.
6. **Remove the access panel** on page 52.
7. **Remove the air baffle** on page 54.
8. If installed, **remove the fan cage**.
9. **Remove the fan from fan bay 1**.
10. **Install the blank in fan bay 1**.
11. **Remove the blank from the half-height media bay 1**.
12. 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.

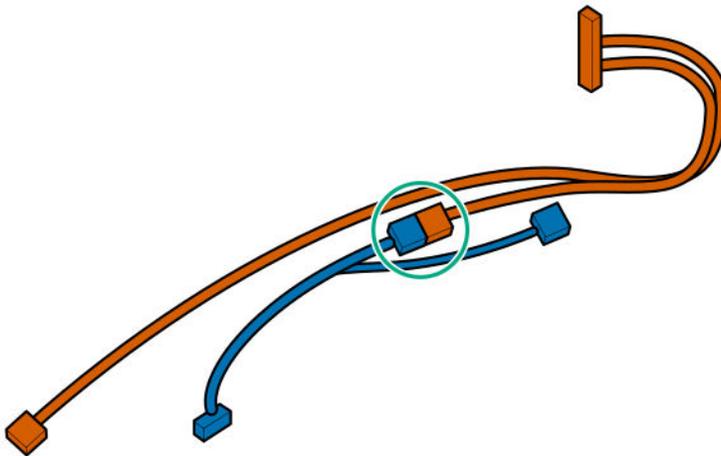
If you are installing an LTO tape drive that does not include its own mounting screws, use the preinstalled **media drive spare screws**.



13. 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.



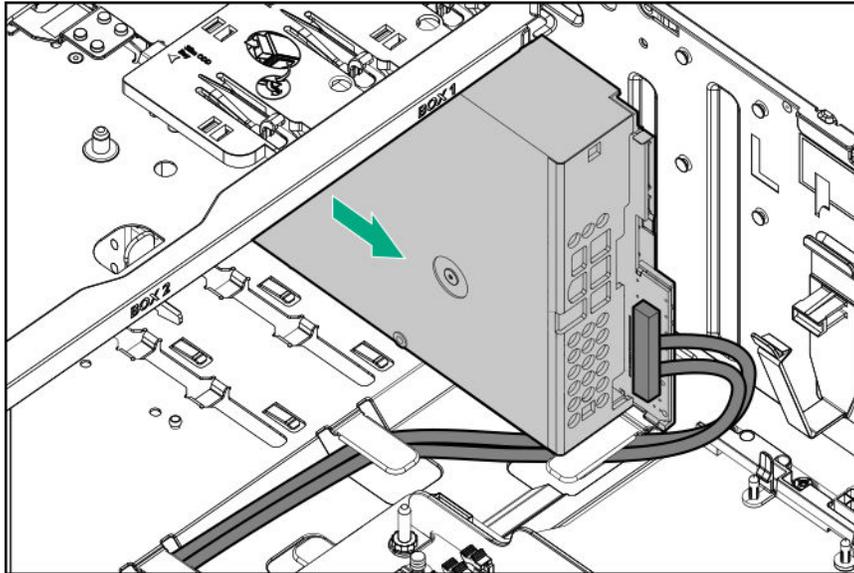
14. Connect the LTO/RDX power extension Y-cable to the LTO tape drive SAS-power Y-cable.



15. **Observe the guidelines for managing cables.**
16. 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** on page 171.

17. Slide the LTO tape drive fully into the half-height media bay 1 until it clicks into place.



18. 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** on page 59
19. **Install the air baffle** on page 55.
20. **Install the access panel** on page 53.
21. Do one of the following:
 - Server in tower mode: **Position the tower server for operation** on page 46.
 - Server in rack mode: **Slide the server into the rack** on page 51.
22. Connect all peripheral cables to the server.
23. Connect each power cord to the server.
24. Connect each power cord to the power source.
25. **Power up the server** on page 42.
26. **Install the front bezel** on page 44.
27. 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

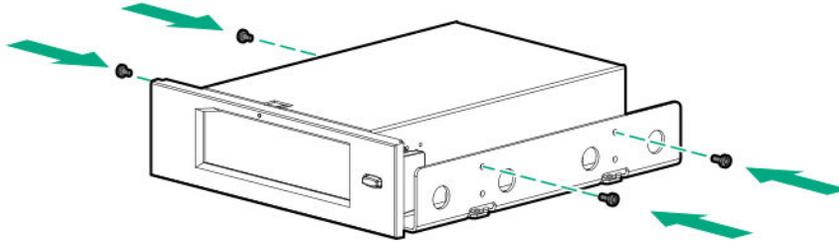
Before you perform this procedure:

- 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:
 - Fan blank
 - 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

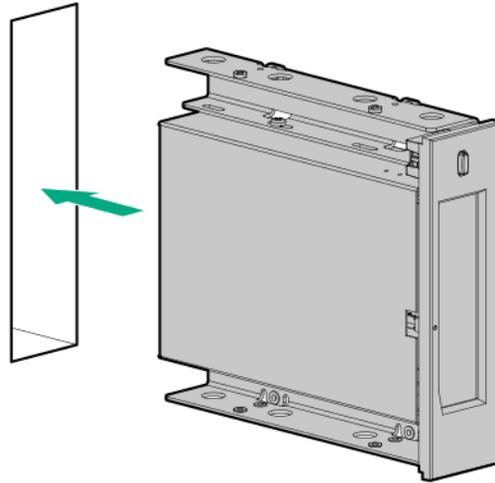
Procedure

1. **Remove the front bezel** on page 43.
2. **Power down the server** on page 42.
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** on page 45.
 - Server in rack mode: **Extend the server from the rack** on page 47.
6. **Remove the access panel** on page 52.
7. **Remove the air baffle** on page 54.
8. If installed, **remove the fan cage**.
9. **Remove the fan from fan bay 1**.
10. **Install the blank in fan bay 1**.
11. **Remove the blank from the half-height media bay 1 or 2**.
12. 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**.



13. Slide the RDX drive into the half-height media bay 1 or 2 until it clicks into place.



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

15. 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** on page 173.

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** on page 59

17. **Install the air baffle** on page 55.

18. **Install the access panel** on page 53.

19. Do one of the following:

- Server in tower mode: **Position the tower server for operation** on page 46.
- Server in rack mode: **Slide the server into the rack** on page 51.

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** on page 42.

24. **Install the front bezel** on page 44.

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.

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

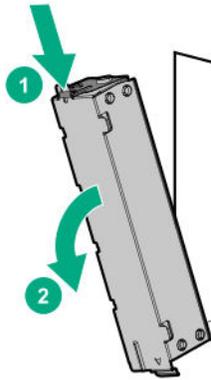
Before you perform this procedure, make sure that you have the following items available:

- 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

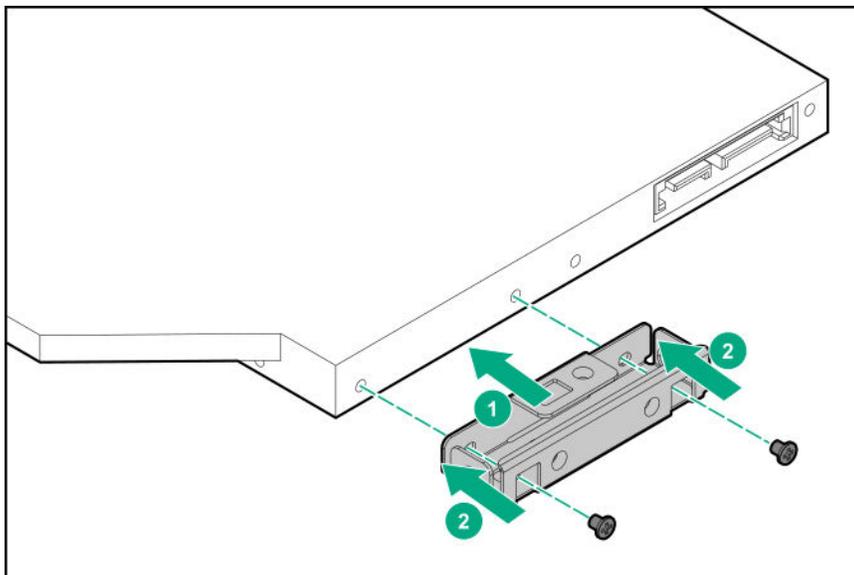
Procedure

1. **Remove the front bezel** on page 43.
2. **Power down the server** on page 42.
3. Remove all power:

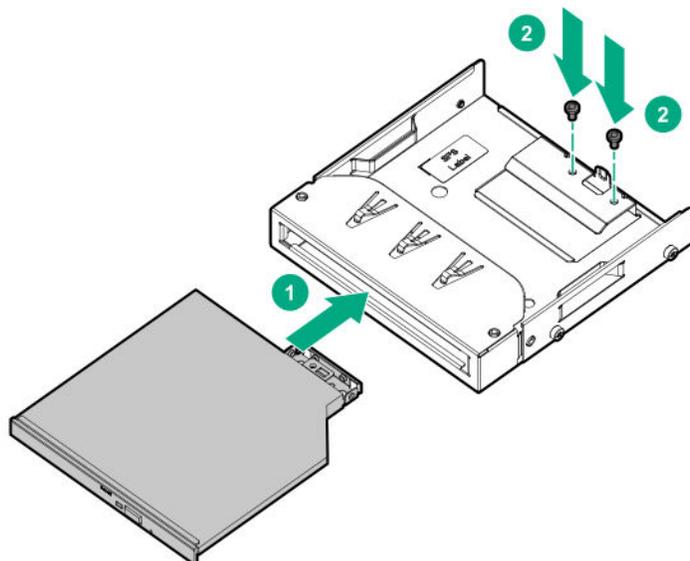
- a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
4. Disconnect all peripheral cables from the server.
 5. Do one of the following:
 - Server in tower mode: **Position the tower server for hardware configuration** on page 45.
 - Server in rack mode: **Extend the server from the rack** on page 47.
 6. **Remove the access panel** on page 52.
 7. **Remove the air baffle** on page 54.
 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.

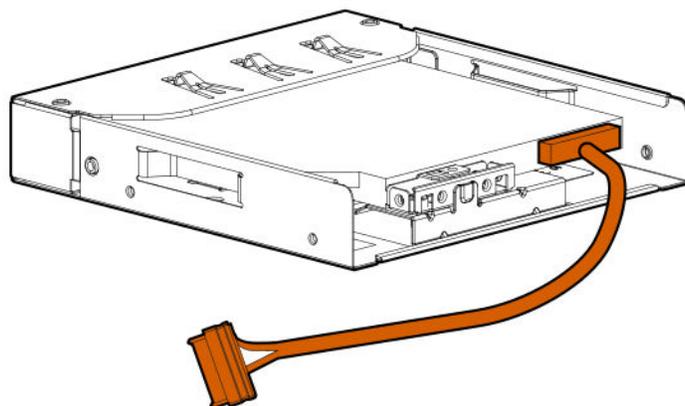


11. Install the optical drive in the drive cage.

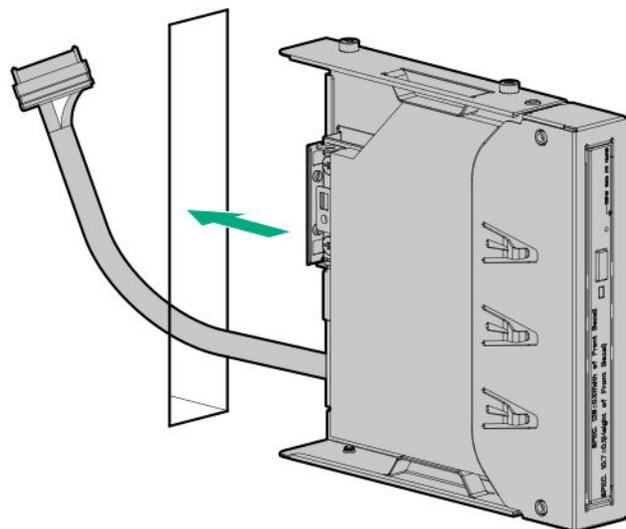


12. **Observe the guidelines for managing cables.**

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** on page 59
17. **Install the air baffle** on page 55.
18. **Install the access panel** on page 53.
19. Do one of the following:
 - Server in tower mode: **Position the tower server for operation** on page 46.
 - Server in rack mode: **Slide the server into the rack** on page 51.
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** on page 42.
24. **Install the front bezel** on page 44.

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 <http://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

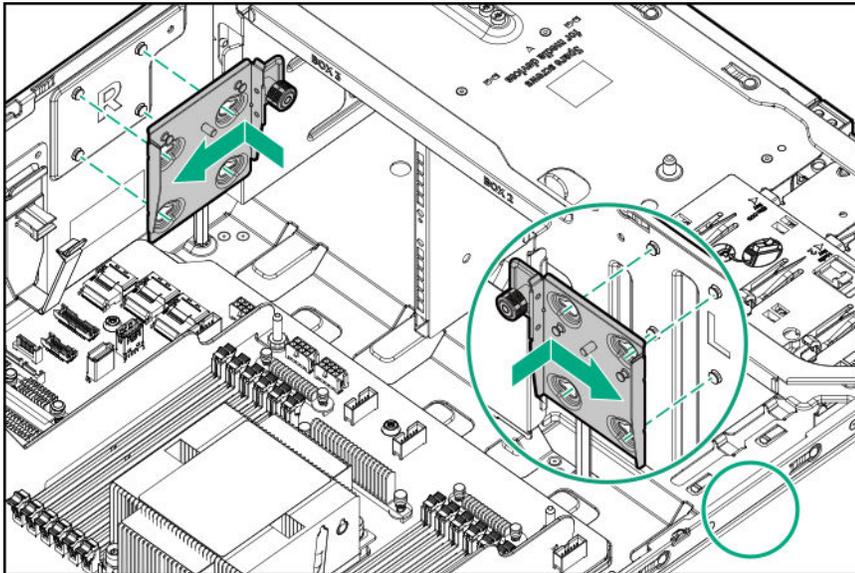
Before you perform this procedure, make sure that you have the following items available:

- Fan cage option kit
- T-15 Torx screwdriver

Procedure

1. **Remove the front bezel** on page 43.
2. **Power down the server** on page 42.
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.

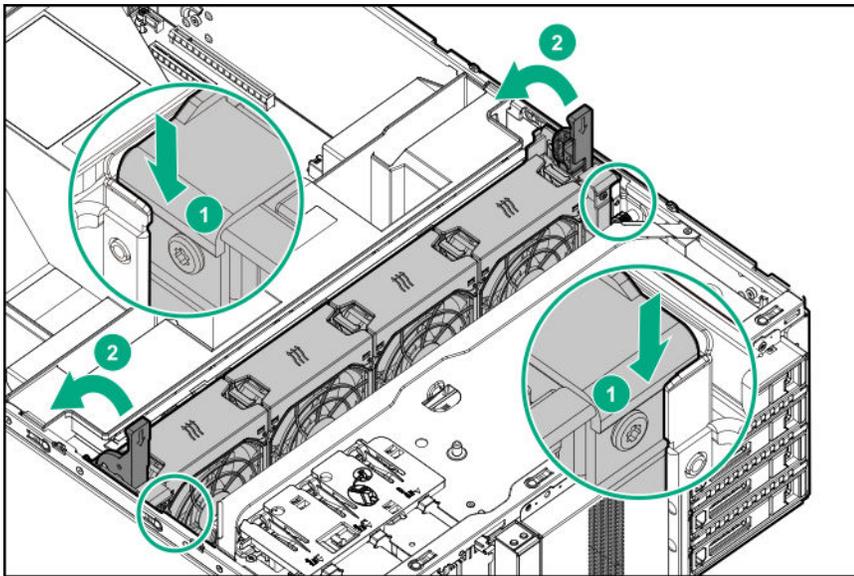
5. Do one of the following:
 - Server in tower mode: **Position the tower server for hardware configuration** on page 45.
 - Server in rack mode: **Extend the server from the rack** on page 47.
6. **Remove the access panel** on page 52.
7. **Remove the air baffle** on page 54.
8. If either an LTO tape drive or an RDX drive is installed, do the following:
 - a. **Remove the fan from fan bay 1.**
 - b. **Install the blank in fan bay 1.**
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** on page 53.
15. Do one of the following:
 - Server in tower mode: **Position the tower server for operation** on page 46.
 - Server in rack mode: **Slide the server into the rack** on page 51.
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** on page 42.

20. **Install the front bezel** on page 44.

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 (<http://www.hpe.com/docs/memory-population-rules>).

HPE SmartMemory speed information

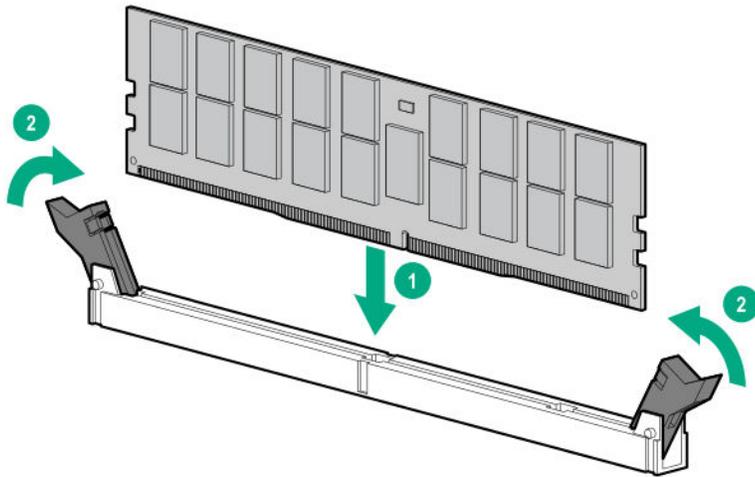
For more information about memory speed information, see the Hewlett Packard Enterprise website (<https://www.hpe.com/docs/memory-speed-table>).

Installing a DIMM

Procedure

1. **Remove the front bezel** on page 43.
2. **Power down the server** on page 42.
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** on page 45.
 - Server in rack mode: **Extend the server from the rack** on page 47.
6. **Remove the access panel** on page 52.
7. **Remove the air baffle** on page 54.
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** on page 59
12. **Install the air baffle** on page 55.
13. **Install the access panel** on page 53.
14. Do one of the following:
 - Server in tower mode: **Position the tower server for operation** on page 46.
 - Server in rack mode: **Slide the server into the rack** on page 51.
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** on page 42.
19. **Install the front bezel** on page 44.

The installation is complete.

Processor heatsink assembly option

Installing the processor heatsink assembly

Procedure

1. Review the information about Intelligent System Tuning support for specific processors and configurations from the product QuickSpecs on the server website at <http://www.hpe.com/servers/ml350-gen10>.
2. **Identify the processor, heatsink, and socket module components.**
3. **Review the processor cautions.**
4. **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 contamination, hold the heatsink only by the edge of its base plate. Do not touch the heatsink fins.
-

Install the processor heatsink assembly

Prerequisites

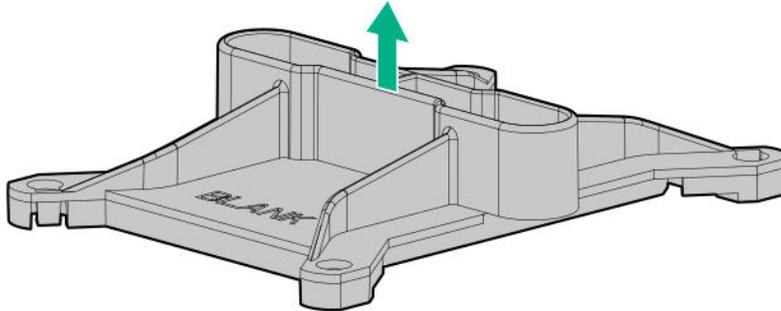
Before you perform this procedure :

- **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

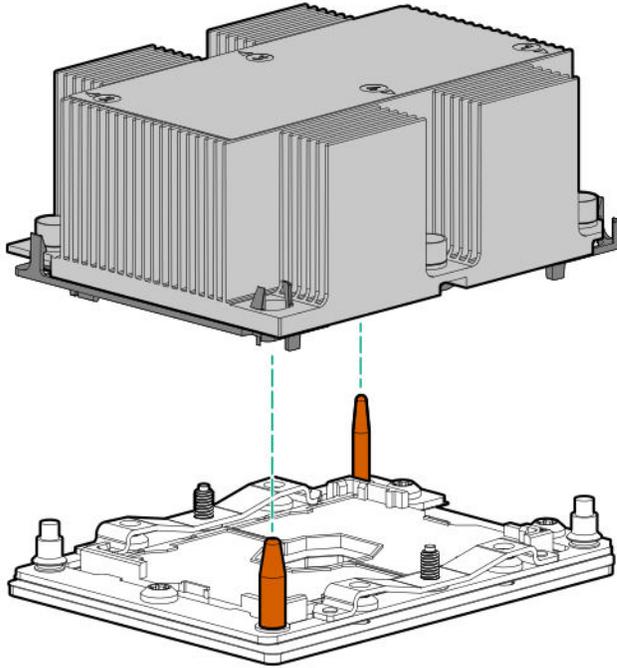
1. **Remove the front bezel** on page 43.
2. **Power down the server** on page 42.
3. Remove all power:

- 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** on page 45.
 - Server in rack mode: **Extend the server from the rack** on page 47.
6. **Remove the access panel** on page 52.
7. **Remove the air baffle** on page 54.
8. If you are installing the processor in the processor socket 2, **remove the fan cage**.
9. Remove the processor socket blank.
Retain the blank for future use.



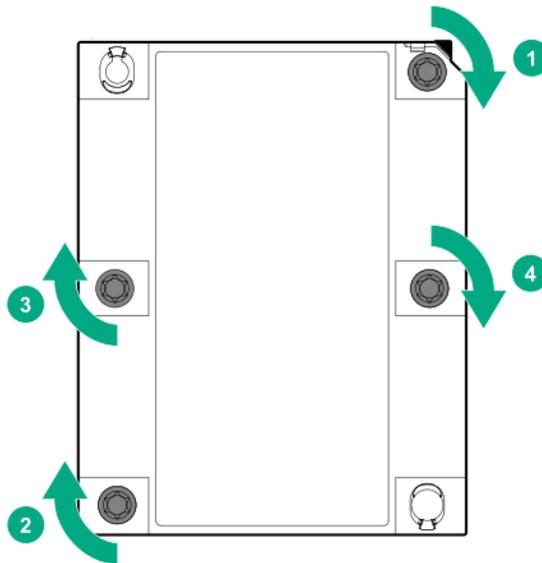
10. Install the processor heatsink assembly:
 - a. Locate and align the Pin 1 indicator on the processor frame and the socket.
 - b. Align the processor heatsink assembly with the heatsink alignment posts and gently lower it down until it sits evenly on the socket.
The heatsink alignment posts are keyed. 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.



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** on page 59

12. **Install the air baffle** on page 55.
13. **Install the access panel** on page 53.
14. Do one of the following:
 - Server in tower mode: **Position the tower server for operation** on page 46.
 - Server in rack mode: **Slide the server into the rack** on page 51.
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** on page 42.
19. **Install the front bezel** on page 44.

The installation is complete.

Storage controller options

The server supports the following storage controllers:

- Embedded storage controller – HPE Smart Array S100i SR Gen10 Controller
- Type-a modular Smart Array controller (AROC)
- Type-p standup plug-in Smart Array controller

The PCIe3 expansion slots 2 and 4 have a $\times 4$ link width. To take advantage of the full features of a $\times 8$ or $\times 16$ expansion boards, Hewlett Packard Enterprise recommends installing these boards in a $\times 8$ or $\times 16$ expansion slot as well.

For the location and description of the PCIe3 expansion slots, see **System board components** on page 15.

For more information on PCIe slot descriptions, see **PCIe slot description** on page 19.

Smart Array standup controller option

The server supports two Smart Array Gen10 standup plug-in controller options (type-p) per processor. For more information on the controller cable compatible with these standup controllers, see **Storage controller cables** on page 160.

Installing a Smart Array standup controller

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 (required for Smart Storage Battery installation)

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

- **Compatible controller cable option**

- T-15 Torx screwdriver

Before you perform this procedure, perform the following steps:

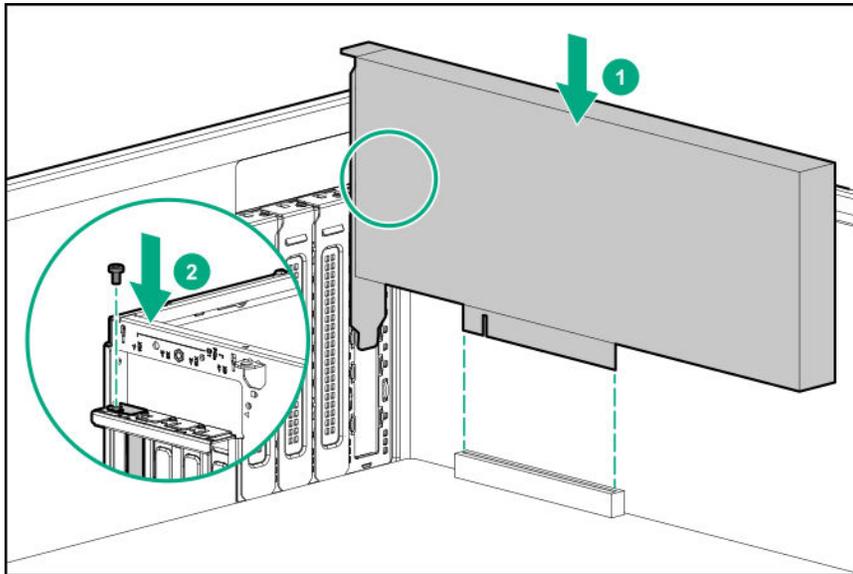
1. Back up data on the system.
2. Close all applications.
3. **Update the server firmware if it is not the latest revision.**
4. Do none of the following:
 - If the new Smart Array is the new boot device, install the device drivers.
 - If the new Smart Array is not the new boot device, go to the next 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** on page 43.
2. **Power down the server** on page 42.
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** on page 45.
 - Server in rack mode: **Extend the server from the rack** on page 47.
6. **Remove the access panel** on page 52.
7. **Remove the air baffle** on page 54.
8. If installed, **remove the fan cage.**
9. **Remove the PCI blank retainer** on page 61.

10. Identify the expansion slot compatible with the option.
11. **Remove the PCI slot blank** on page 61.
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** on page 63.
16. **Observe the guidelines for managing cables**.
17. **Cable the controller**.
18. If you are planning to install the Smart Storage Battery, **install it now**.
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** on page 59
20. **Install the air baffle** on page 55.
21. **Install the access panel** on page 53.
22. Do one of the following:
 - Server in tower mode: **Position the tower server for operation** on page 46.
 - Server in rack mode: **Slide the server into the rack** on page 51.
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** on page 44.

27. **Configure the storage controller.**

The installation is complete.

Smart Array modular controller option (AROC)

The server supports Smart Array Gen10 modular controller options (type-a, AROC). For more information on the controller cable compatible with these modular controllers, see **Storage controller cables** on page 160.

Installing a Smart Array modular controller (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:

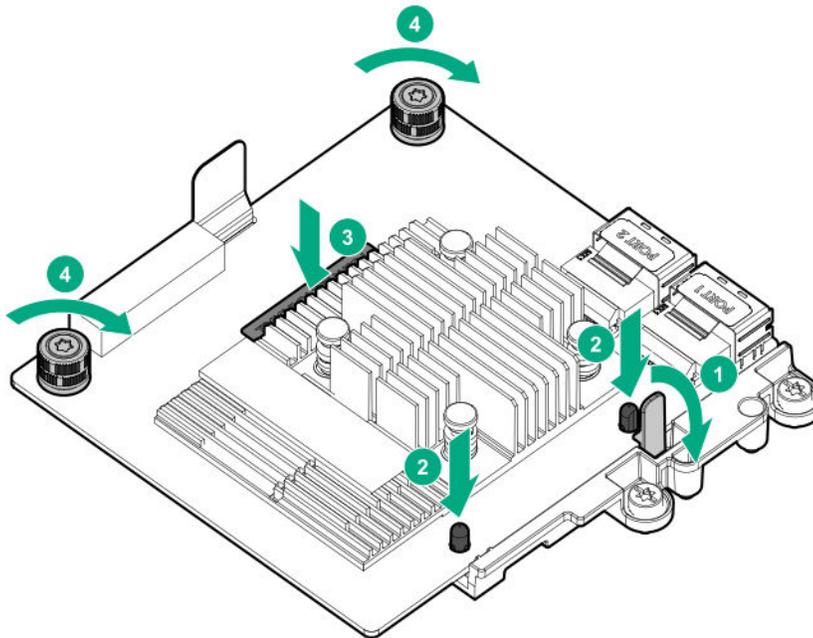
1. Back up data on the system.
2. Close all applications.
3. **Update the server firmware if it is not the latest revision.**
4. Do none of the following:
 - If the new Smart Array is the new boot device, install the device drivers.
 - If the new Smart Array is not the new boot device, go to the next 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** on page 43.
2. **Power down the server** on page 42.
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** on page 45.
 - Server in rack mode: **Extend the server from the rack** on page 47.
6. **Remove the access panel** on page 52.
7. **Remove the air baffle** on page 54.
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** on page 59

14. **Install the air baffle** on page 55.

15. **Install the access panel** on page 53.

16. Do one of the following:

- Server in tower mode: **Position the tower server for operation** on page 46.
- Server in rack mode: **Slide the server into the rack** on page 51.

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** on page 44.

21. **Configure the storage controller.**

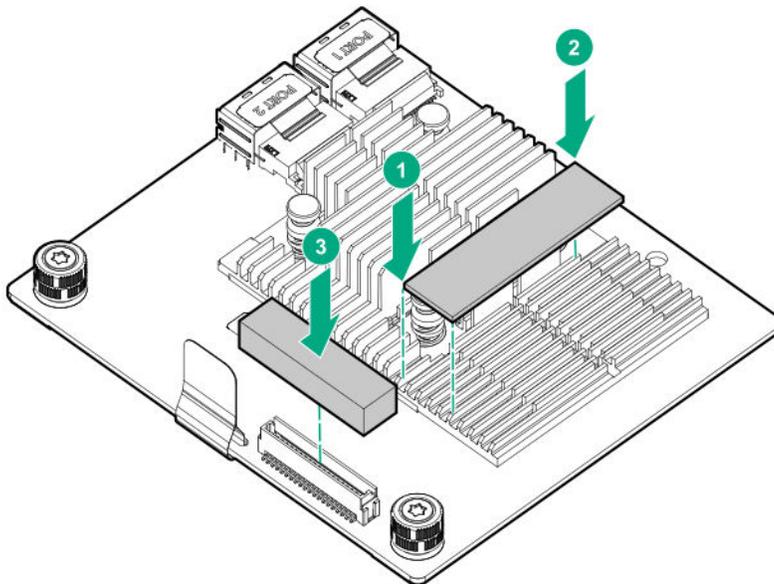
The installation is complete.

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** on page 42.
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.
 - For MR controllers, use Service Pack for ProLiant (SPP), MR Storage Administrator, or StorCLI.
 - For SR controllers, use SPP.
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 on the [Hewlett Packard Enterprise website](#).
- MR Storage Administrator – See the MR Storage Administrator User Guide on the [Hewlett Packard Enterprise website](#).

- StorCLI – See the StorCLI User Guide on the [Hewlett Packard Enterprise website](#).
- UEFI System Utilities or HPE Smart Storage Administrator – See the *HPE Smart Array SR Gen10 Configuration Guide* on the [Hewlett Packard Enterprise website](#).

Smart Storage Battery option

The Smart Storage Battery is a centralized backup source and is required to back up the write cache content onto flash memory on the Smart Array P-class Gen10 controllers in case of an unplanned server power loss. In this server, the 96 W, 260 mm battery supports 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 enabled until the battery is capable of providing the backup power.

Installing the Smart Storage Battery

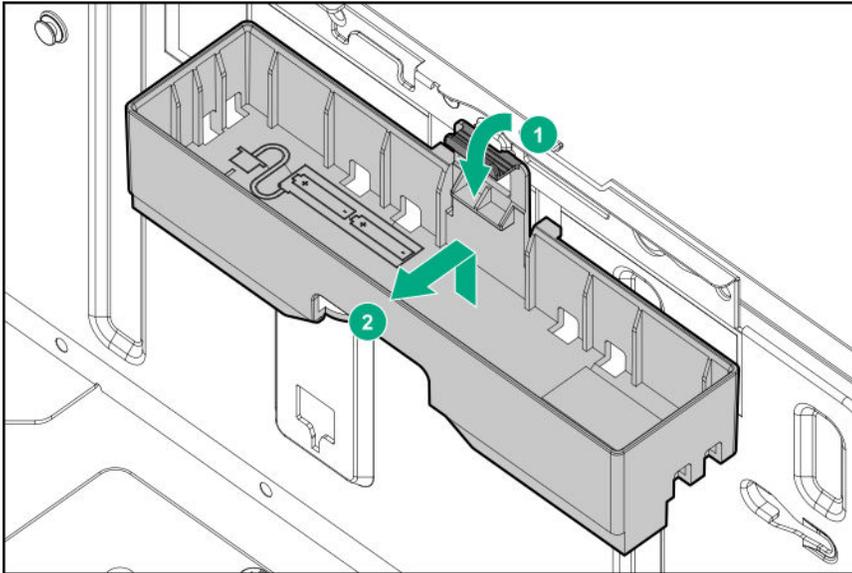
Prerequisites

Before you perform this procedure:

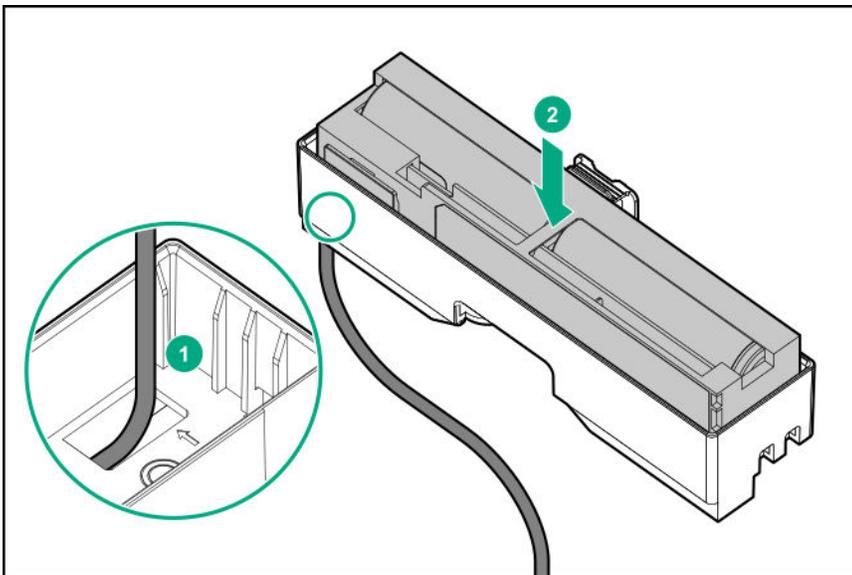
- **Make sure that a Smart Array P-class Gen10 standup controller is installed.**
- Make sure that you have the following items available:
 - Storage controller backup power cable (ships with the standup controller)
 - Smart Storage Battery option

Procedure

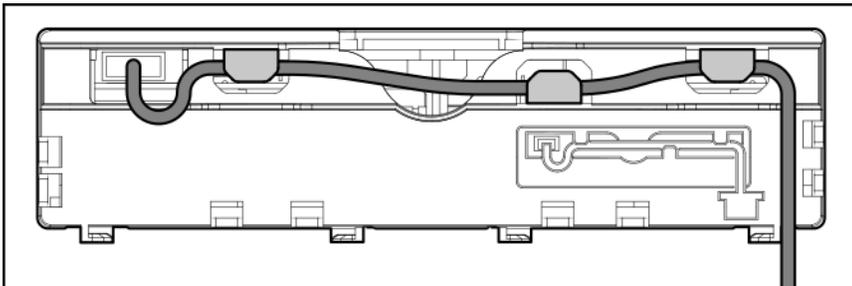
1. **Remove the front bezel** on page 43.
2. **Power down the server** on page 42.
3. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
4. Disconnect all peripheral cables from the server.
5. Do one of the following:
 - Server in tower mode: **Position the tower server for hardware configuration** on page 45.
 - Server in rack mode: **Extend the server from the rack** on page 47.
6. **Remove the access panel** on page 52.
7. **Remove the air baffle** on page 54.
8. While holding the snap-in latch in the open position, slide the holder up to disengage it from the chassis.



9. Install the Smart Storage Battery into the holder:
 - a. Route the battery cable through the holder cutout marked with a down arrow.
 - b. Install the battery in the holder.

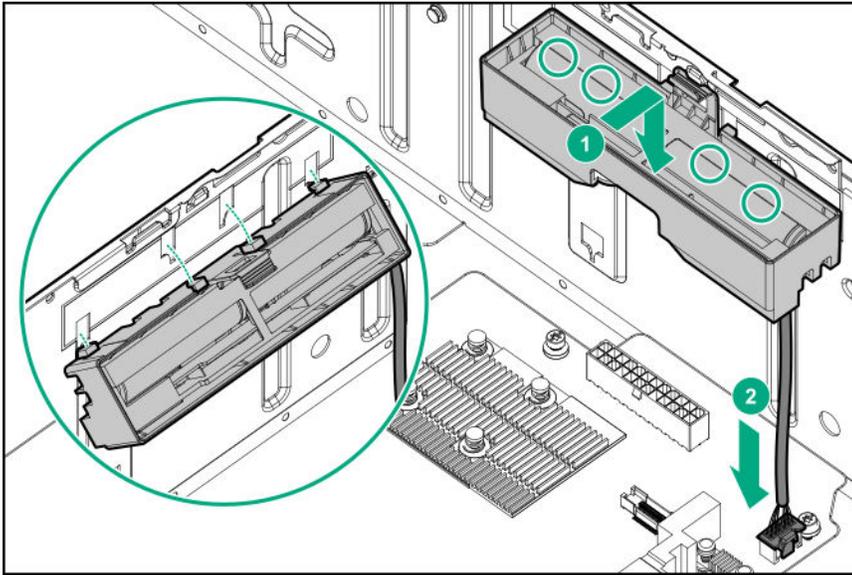


10. Secure the battery cable through the holder cable clips.



11. Install the Smart Storage Battery in the chassis:

- a. Insert the holder tabs into their corresponding chassis slots, and then slide the holder down
- b. Connect the battery cable to the system board.



12. **Connect the storage controller backup power cable.**
13. **Install the air baffle** on page 55.
14. **Install the access panel** on page 53.
15. Do one of the following:
 - Server in tower mode: **Position the tower server for operation** on page 46.
 - Server in rack mode: **Slide the server into the rack** on page 51.
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** on page 42.
20. **Install the front bezel** on page 44.

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 $\times 4$ link width. To take advantage of the full features of a $\times 8$ or $\times 16$ expansion boards, Hewlett Packard Enterprise recommends installing these boards in a $\times 8$ or $\times 16$ expansion slot as well.

For the location and description of the PCIe3 expansion slots, see **System board components** on page 15.

For more information on PCIe slot descriptions, see **PCIe slot description** on page 19.

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 NIC controllers

For fan cage information, see **Fan cage option** on page 115.

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

GPU installation requirements

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

For a list of specific GPU models supported, see the product QuickSpecs on the server website at <http://www.hpe.com/servers/ml350-gen10>.

For the latest information on GPU installation requirements and limitations, see the Customer Advisory (c03911173) at the [Hewlett Packard Enterprise website](#).

GPU auxiliary power requirement

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

The server 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** on page 174.

GPU thermal requirement

The fan cage option is required to meet the system thermal requirement when a GPU option is installed.

For fan cage information, see **Fan cage option** on page 115.

! **IMPORTANT:** Workloads for high-performance double-width GPUs 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

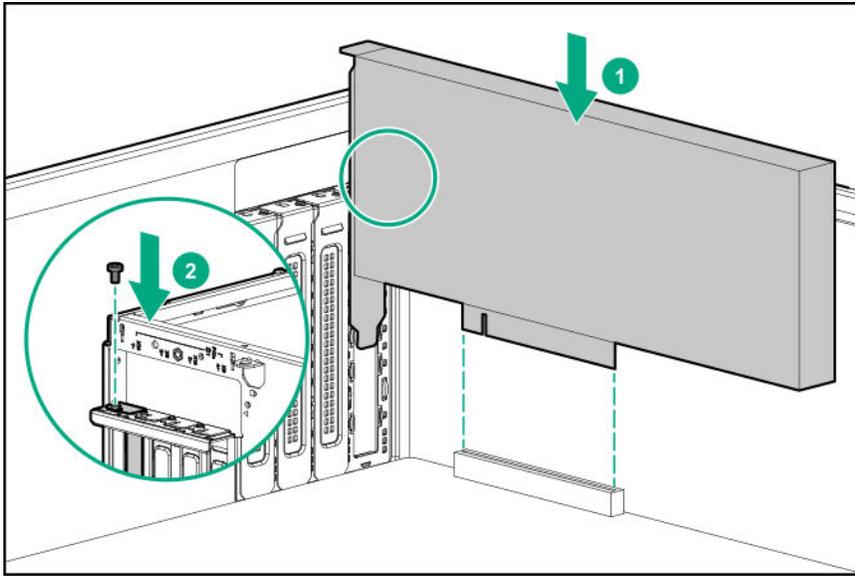
Before you perform this procedure:

- Check if the expansion board option requires the fan cage, see **Expansion board thermal requirement** on page 135.
- When installing a GPU option, review the **GPU installation requirements** on page 135.
- 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

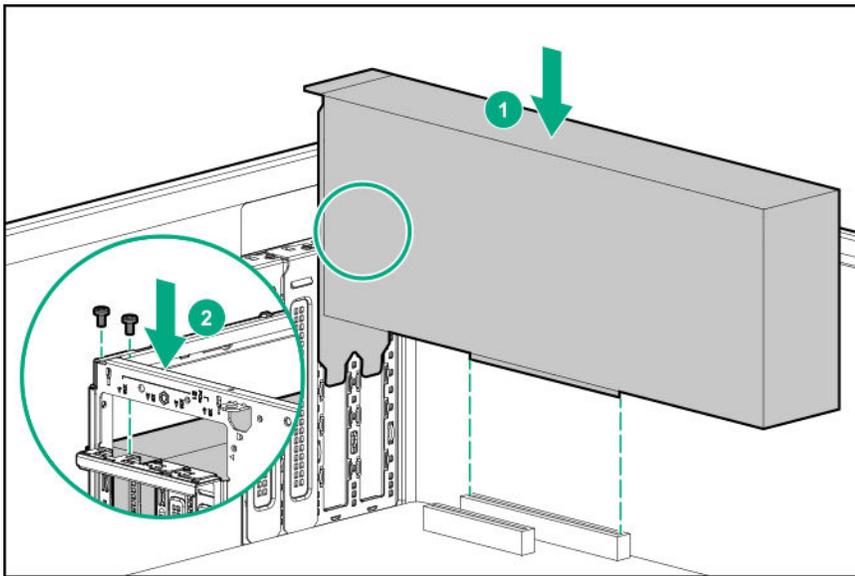
Procedure

1. **Remove the front bezel** on page 43.
2. **Power down the server** on page 42.
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** on page 45.
 - Server in rack mode: **Extend the server from the rack** on page 47.
6. **Remove the access panel** on page 52.
7. **Remove the air baffle** on page 54.
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** on page 61.
10. Identify the expansion slot compatible with the option.
11. **Remove the PCI slot blank** on page 61.
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** on page 63.
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** on page 59

20. **Install the air baffle** on page 55.

21. **Install the access panel** on page 53.

22. Do one of the following:

- Server in tower mode: **Position the tower server for operation** on page 46.
- Server in rack mode: **Slide the server into the rack** on page 51.

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** on page 42.

28. **Install the front bezel** on page 44.

The installation is complete.

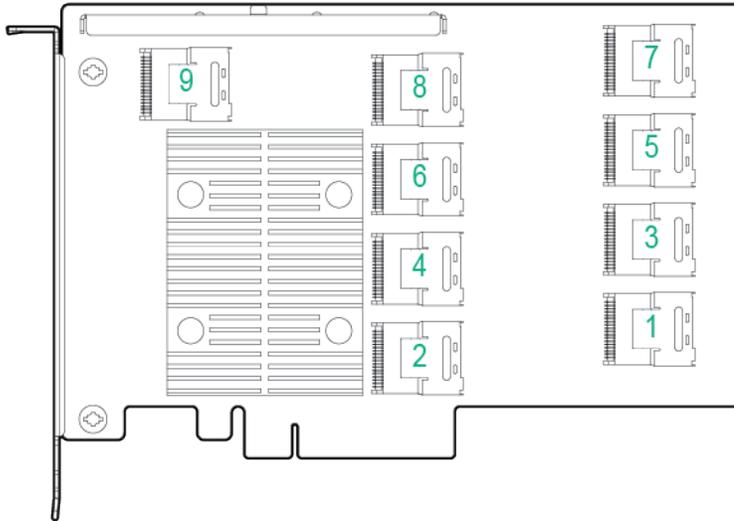
HPE 12G SAS expander card option

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 Port 2	Standup: 876502-001 Modular: 876495-001	CTRL Port 1 CTRL Port 2	—	—
Port 3 Port 4	876484-001	—	Box 3	1-4 5-8
Port 5 Port 6	876483-001	—	Box 2	9-12 13-16
Port 7 Port 8	876482-001	—	Box 1	17-20 21-24
Port 9 ¹	—	—	—	—

¹ This port will not be used in this server.

Installing the SAS expander card

Prerequisites

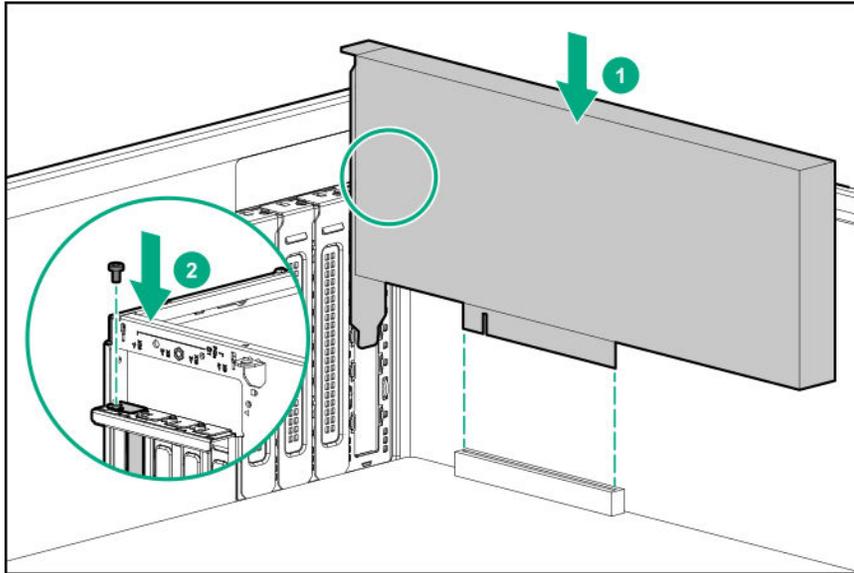
Before you perform this procedure:

- 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** on page 43.
2. **Power down the server** on page 42.
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** on page 45.
 - Server in rack mode: **Extend the server from the rack** on page 47.
6. **Remove the access panel** on page 52.
7. **Remove the air baffle** on page 54.
8. If installed, **remove the fan cage**.
9. **Remove the PCI blank retainer** on page 61.
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** on page 63.
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** on page 59

20. **Install the air baffle** on page 55.

21. **Install the access panel** on page 53.

22. Do one of the following:

- Server in tower mode: **Position the tower server for operation** on page 46.
- Server in rack mode: **Slide the server into the rack** on page 51.

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** on page 42.

27. **Install the front bezel** on page 44.

28. **Configure the storage controller.**

The installation is complete.

M.2 SSD enablement option

The server supports the installation of two M.2 SSD enablement boards. Each enablement board can support two M.2 SSDs. The M.2 SSD enablement board is supported in the PCIe3 expansion slots 1–4.

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 SSD enablement board
- M.2 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

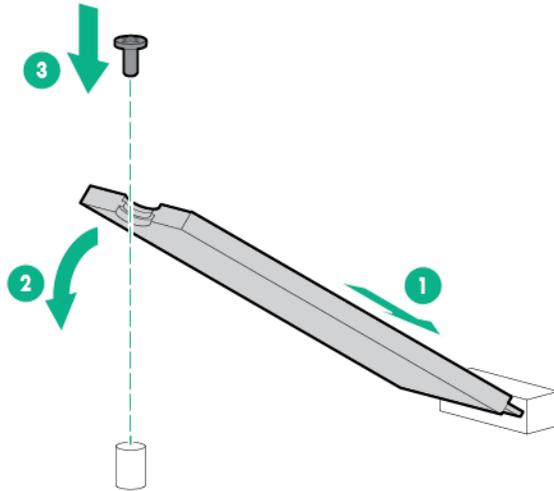
- T-15 Torx screwdriver
- Phillips No. 1 screwdriver – This is required only if the M.2 SSD is not preinstalled on the enablement board.

Procedure

1. **Remove the front bezel** on page 43.
2. **Power down the server** on page 42.
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** on page 45.
 - Server in rack mode: **Extend the server from the rack** on page 47.
6. **Remove the access panel** on page 52.
7. **Remove the air baffle** on page 54.
8. **Remove the PCI blank retainer** on page 61.
9. **Remove the PCI slot blank** on page 61.
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:

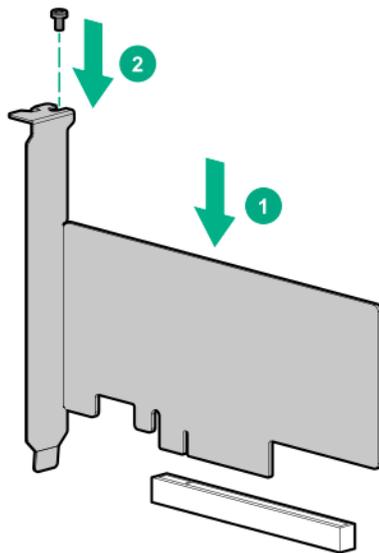
If only one SSD is being installed, install the SSD in port 1.

 - 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** on page 63.

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

16. **Connect the M.2 SATA cable.**

17. **Install the air baffle** on page 55.

18. **Install the access panel** on page 53.

19. Do one of the following:

- Server in tower mode: **Position the tower server for operation** on page 46.
- Server in rack mode: **Slide the server into the rack** on page 51.

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** on page 42.
24. **Install the front bezel** on page 44.

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**.

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**.

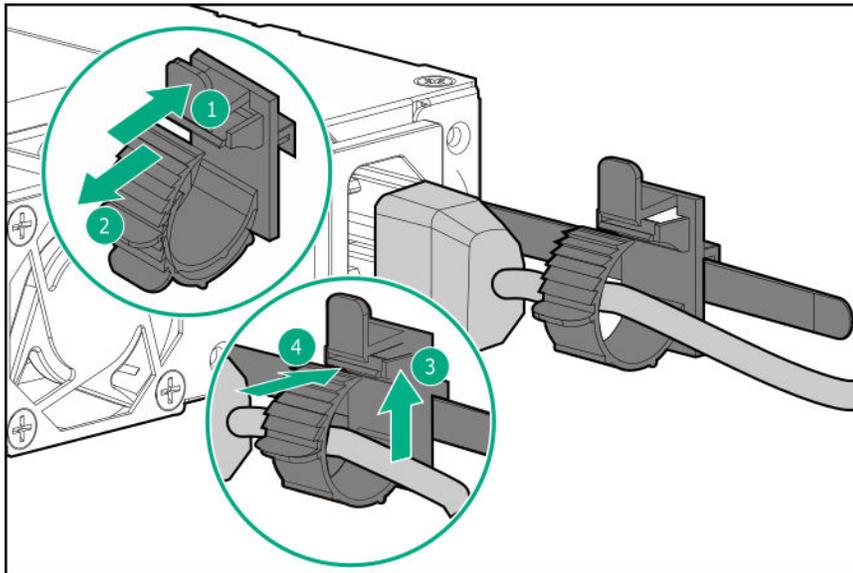
Remove the non-hot-plug power supply

Prerequisites

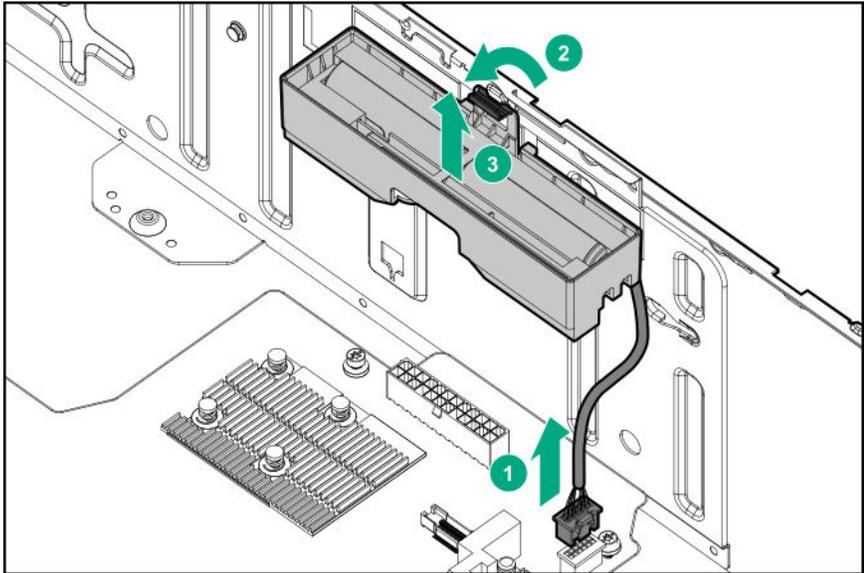
Before you perform this procedure, make sure that you have a T-10 Torx screwdriver available.

Procedure

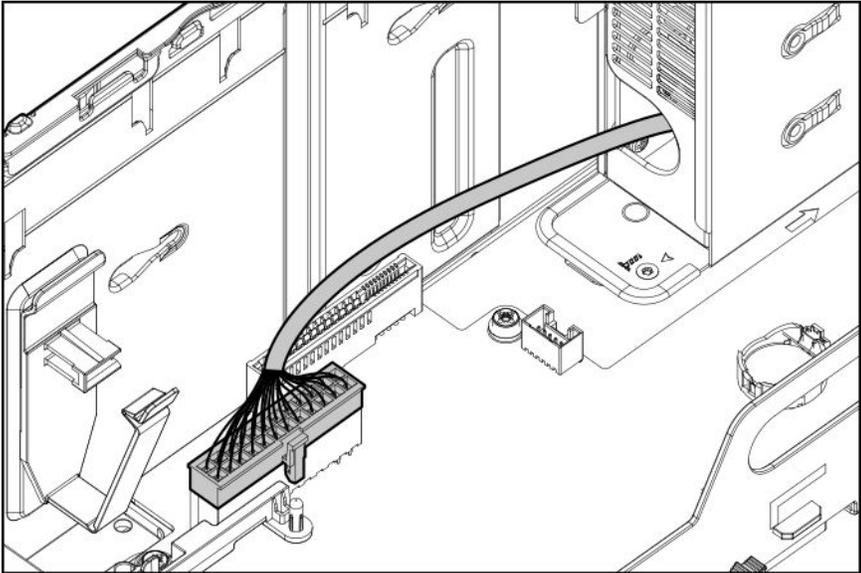
1. **Remove the front bezel** on page 43.
2. **Power down the server** on page 42.
3. Release the power cord from the strain relief clip.



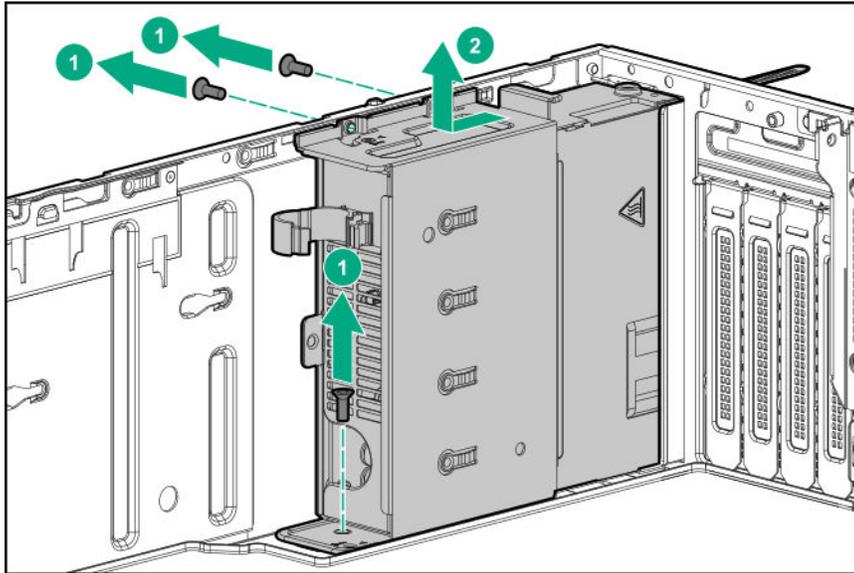
4. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
5. Disconnect all peripheral cables from the server.
6. Do one of the following:
 - Server in tower mode: **Position the tower server for hardware configuration** on page 45.
 - Server in rack mode: **Extend the server from the rack** on page 47.
7. **Remove the access panel** on page 52.
8. **Remove the air baffle** on page 54.
9. **Observe the guidelines for managing cables.**
10. Remove the Smart Storage Battery holder:
 - a. If a Smart Storage Battery is installed, disconnect the battery cable.
 - b. While holding the snap-in latch in the open position, slide the battery 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** on page 148.

Install the RPS enablement option

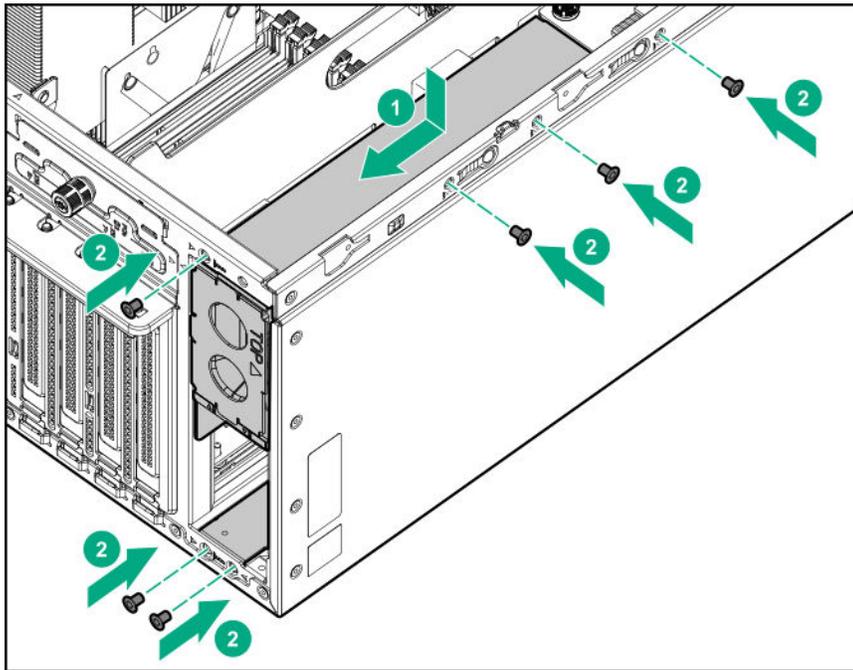
Prerequisites

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

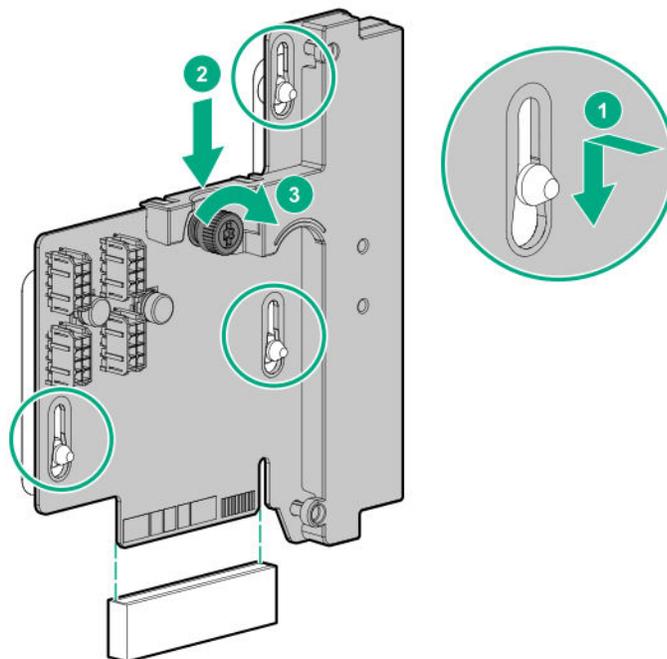
- Redundant power supply enablement option
- T-10 Torx screwdriver

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.

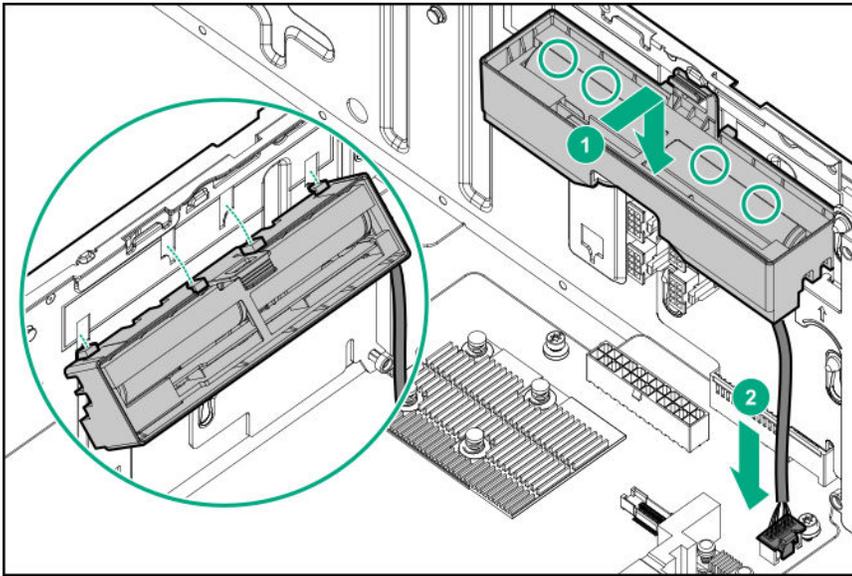


2. If only one power supply is going to be installed in the redundant power supply cage, make sure that the blank in the power supply bay 2 is firmly secured.
3. Install the power distribution board:
 - a. Align the notches on the board with the pins on the chassis.
 - b. Slide the board down to engage it fully with its connector.
 - c. Tighten the board thumbscrew.



4. Install the Smart Storage Battery holder:

- a. Insert the holder tabs into their corresponding chassis slots, and then slide the holder down.
- b. If the Smart Storage Battery cable was disconnected, connect it back.



5. **Install the air baffle** on page 55.
6. **Install the access panel** on page 53.
7. Do one of the following:
 - Server in tower mode: **Position the tower server for operation** on page 46.
 - Server in rack mode: **Slide the server into the rack** on page 51.
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** on page 42.
12. **Install the front bezel** on page 44.
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:

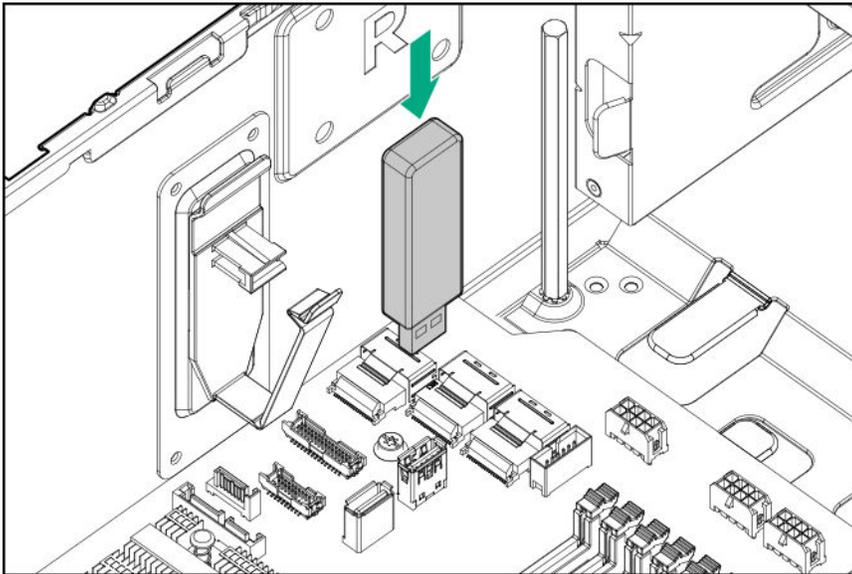
- USB flash media devices for booting up from flash solutions or for data backup/redundancy.
- USB RDX drives for an inexpensive and reliable way to securely store your data backups.

For RDX drive installation, see **Installing a USB RDX drive** on page 109.

Installing an internal USB device

Procedure

1. **Remove the front bezel** on page 43.
2. **Power down the server** on page 42.
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** on page 45.
 - Server in rack mode: **Extend the server from the rack** on page 47.
6. **Remove the access panel** on page 52.
7. **Remove the air baffle** on page 54.
8. **Locate the internal USB connector.**
9. Plug in the USB device into the internal USB port.



10. **Install the air baffle** on page 55.
11. **Install the access panel** on page 53.
12. Do one of the following:
 - Server in tower mode: **Position the tower server for operation** on page 46.
 - Server in rack mode: **Slide the server into the rack** on page 51.
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** on page 42.
17. **Install the front bezel** on page 44.

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 Gen9 and earlier servers.

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 (<http://www.hpe.com/info/qs>). For more information about Microsoft® Windows® BitLocker Drive Encryption feature, see the Microsoft website (<http://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.

❗ 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.

可信任平台模块 (Trusted Platform Module , TPM) 声明

HPE 特别提醒：在您在系统中启用 TPM 功能前，请您务必确认，您将要
对 TPM 的使用遵守相关的当地法律、法规及政策，并已获得所需的一切事先批
准及许可(如适用)。

若因您未获得相应的操作/使用许可而发生的合规问题，皆由您自行承担全部
责任，与 HPE 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, 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 Kit

Installing the Trusted Platform Module board

Preparing the server for installation

Procedure

1. Observe the following warnings:



WARNING: To reduce the risk of personal injury, electric shock, or damage to the equipment, remove power from the server by removing the power cord. 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.



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](#) on page 42).
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](#) on page 45.
 - Server in rack mode: [Extend the server from the rack](#) on page 47.
6. [Remove the access panel](#) on page 52.
7. [Remove the air baffle](#) on page 54.
8. Remove any options installed in the PCIe3 expansion slots 1–4.
9. Proceed to [Installing the TPM board and cover](#) on page 154.

Installing the TPM board and cover

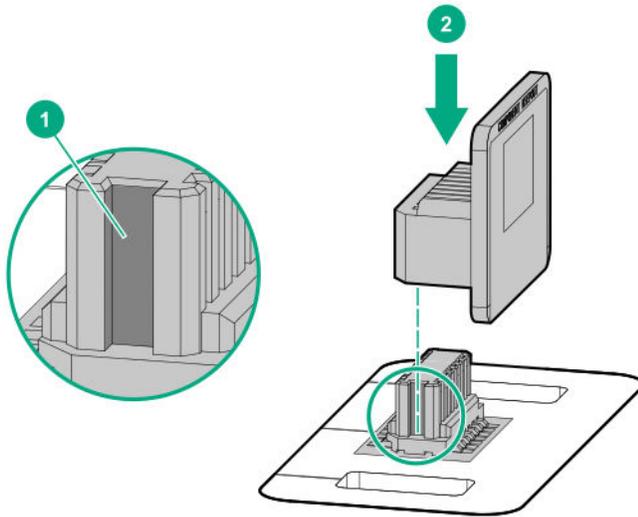
Procedure

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.

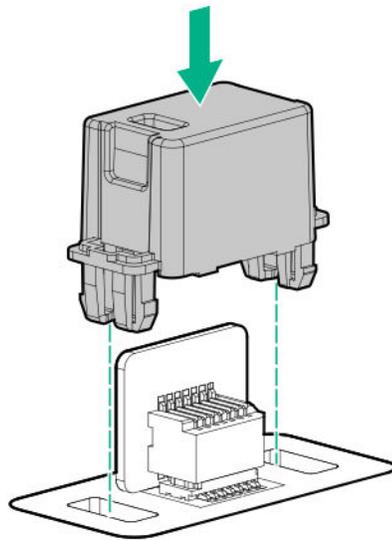
⚠ CAUTION: The TPM is keyed to install only in the orientation shown. Any attempt to install the TPM in a different orientation might result in damage to the TPM or system board.

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** on page 155.

Preparing the server for operation

Procedure

1. Install any options or cables previously removed to access the TPM connector.
2. **Install the air baffle** on page 55.
3. **Install the access panel** on page 53.
4. Do one of the following:

- Server in tower mode: **Position the tower server for operation** on page 46.
 - Server in rack mode: **Slide the server into the rack** on page 51.
5. Connect each power cord to the server.
 6. Connect each power cord to the power source.
 7. **Power up the server** on page 42.
 8. **Install the front bezel** on page 44.

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 or TPM 1.2.
- In Legacy Boot Mode, the Trusted Platform Module configuration can be changed between TPM 1.2 and TPM 2.0, 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 "TPM Visibility" is **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 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

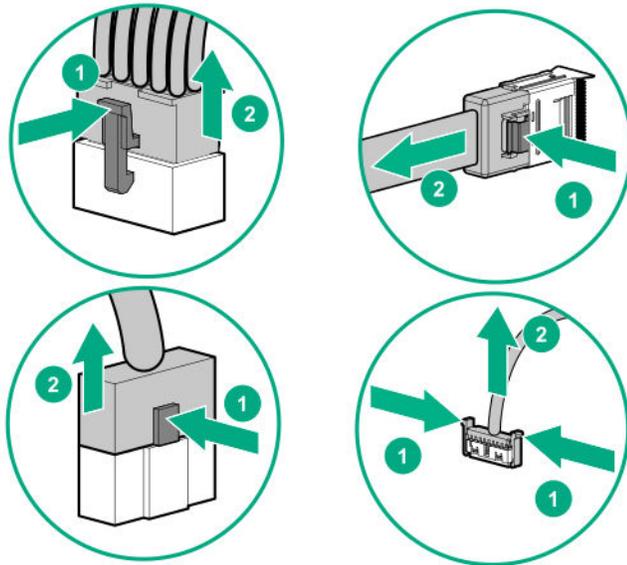
- Note the port labels on the PCA components. Not all of these components are used by all servers:
 - System board ports
 - Drive and power supply backplane ports
 - Expansion board ports (controllers, adapters, expanders, risers, and similar boards)
- Note the label near each cable connector. This label 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.

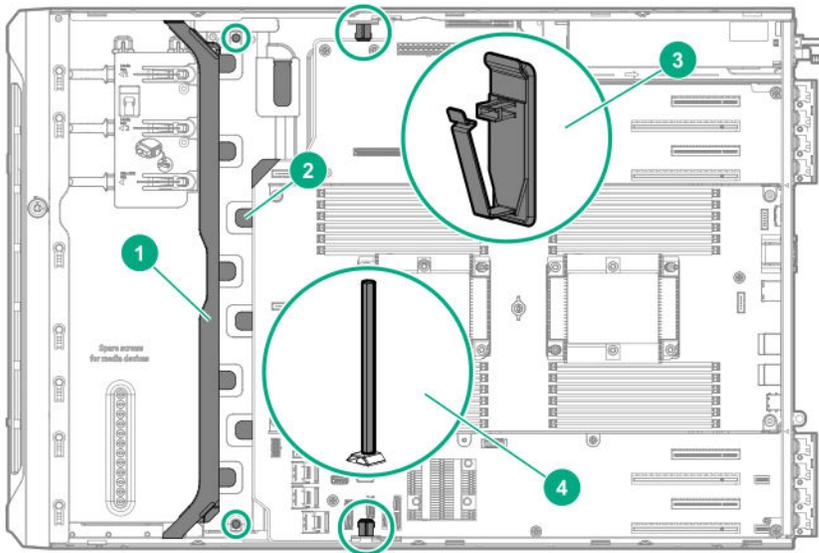
When disconnecting cables

- 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 embedded controller cabling \(SATA only\)](#) on page 162.

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 #
<u>Embedded controller</u>	877578-B21	876487-001	Box 1 or 2	Onboard SATA ports 2 and 3
		876488-001	Box 3	Onboard SATA port 1
<u>Type-p standup plug-in controller</u>	874574-B21	876500-001	Box 1, 2, or 3	Controller port 1 or 2
<u>Type-a modular controller (AROC)</u>	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

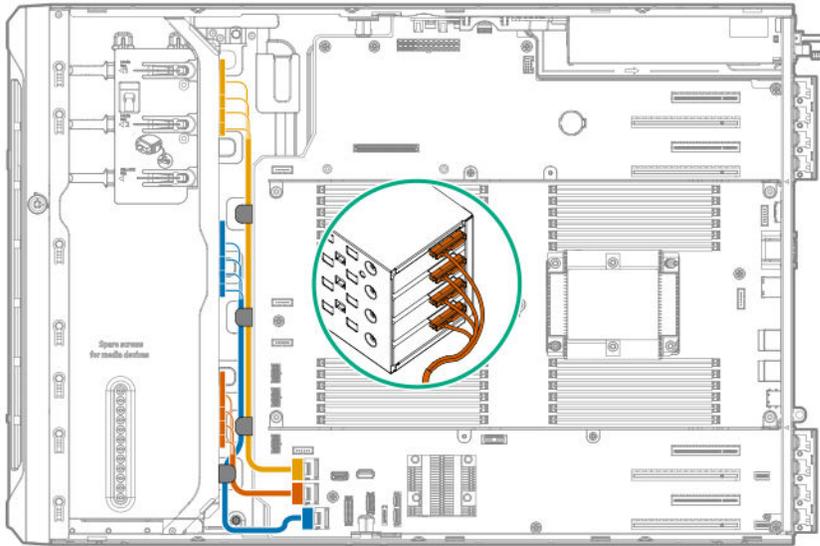
Controller type	Cable kit part number	Cable part number	From box #	To port #
<u>Embedded controller</u>	877579-B21	876486-001	Box 3	Onboard SATA ports 1 and 2
<u>Type-p standup plug-in controller</u>	874575-B21	876485-001	Box 1, 2, or 3	Controller ports 1 and 2

Table Continued

Controller type	Cable kit part number	Cable part number	From box #	To port #
	P00614-B21 ¹	P00511-001	<ul style="list-style-type: none"> • P1 slot installation: Box 1 • P2 slot installation: Box 3 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • P1 slot installation: Box 3 • P2 slot installation: Box 1 	<ul style="list-style-type: none"> • P1 slot installation: Controller ports 5 and 6 • P2 slot installation: Controller ports 1 and 2
<u>Type-a modular controller (AROC)</u>	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 embedded controller cabling (SATA only)



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 embedded controller cabling (SATA only)



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

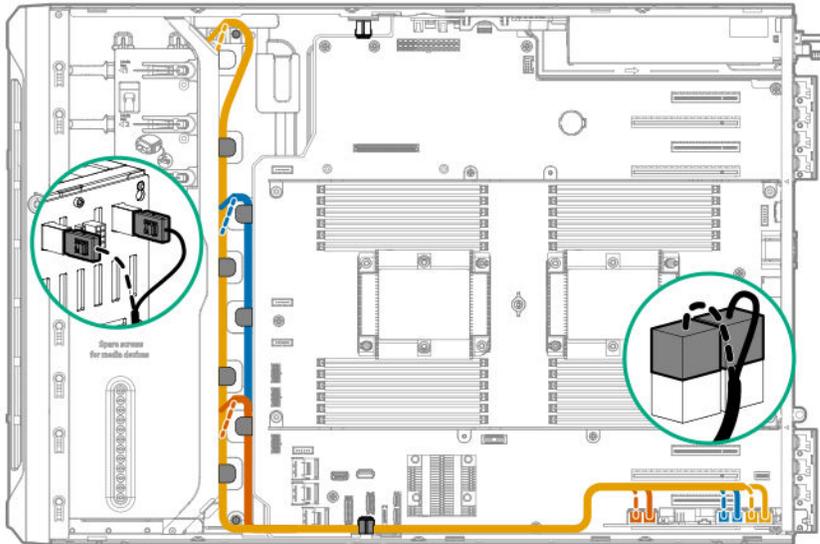


Cable color	Description
Gold	Box 1 Mini-SAS cable to the modular controller port 3
Blue	Box 2 Mini-SAS cable to the modular controller port 2
Orange	Box 3 Mini-SAS cable to the modular controller port 1

SFF hot-plug drive controller cabling

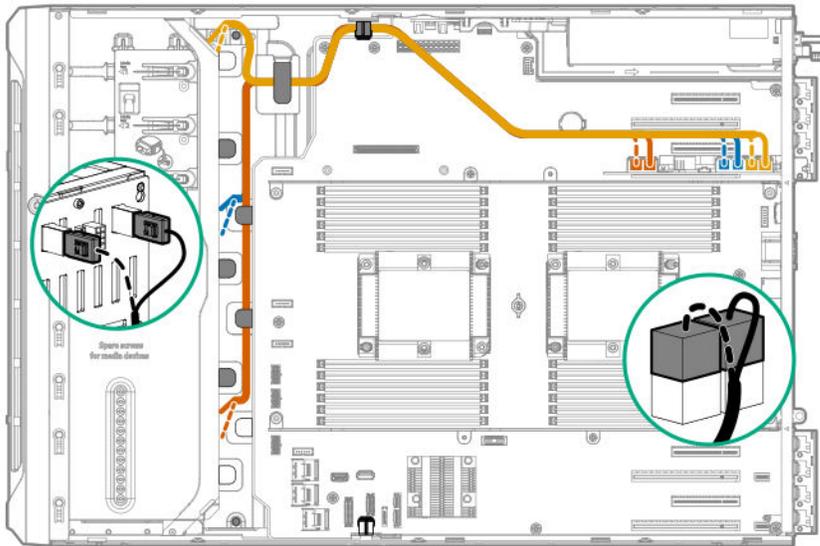
SFF hot-plug drive single standup controller cabling (SAS/SATA)

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



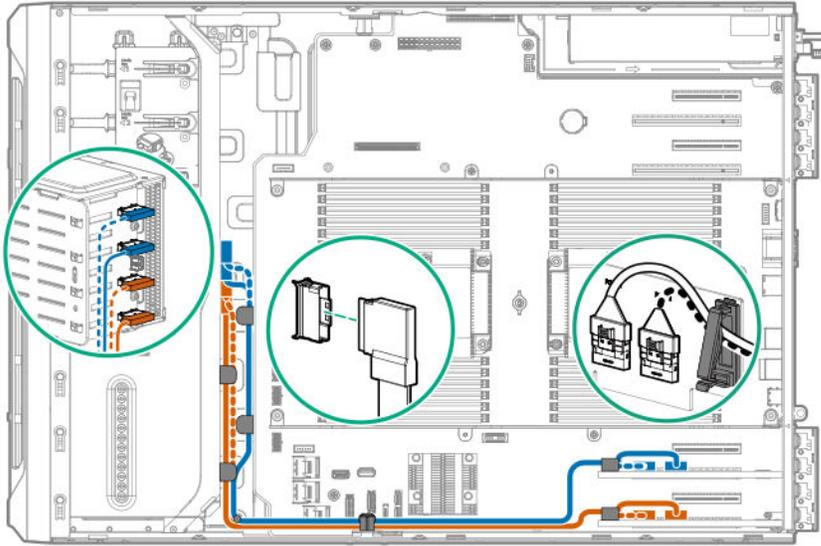
Cable color	Description
Gold	Box 1 Mini-SAS X-cable to the expander ports 7 and 8
Blue	Box 2 Mini-SAS X-cable to the expander ports 5 and 6
Orange	Box 3 Mini-SAS X-cable to the expander ports 3 and 4
Pink	Slot 3 standup controller Mini-SAS X-cable to the slot 2 expander ports 1 and 2

SAS expander card with modular controller cabling



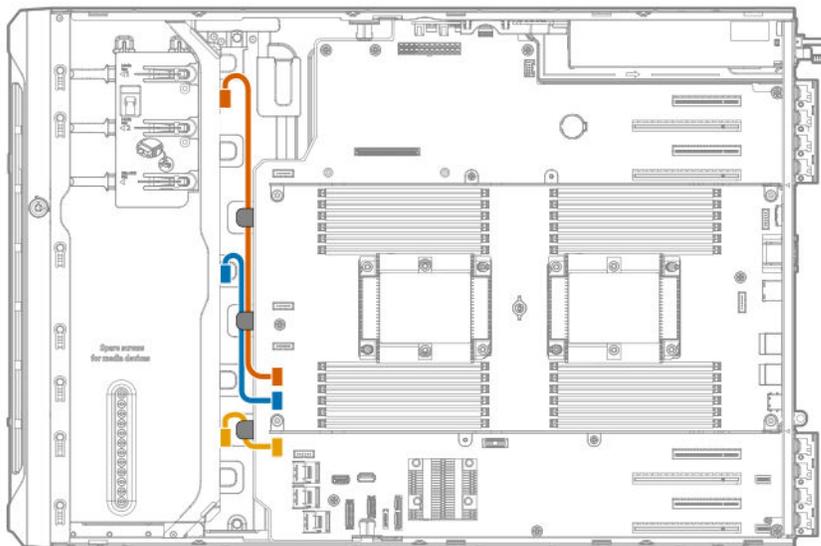
Cable color	Description
Pink	Modular controller Mini-SAS X-cable to expander ports 1 and 2
Gold	Box 1 Mini-SAS X-cable to the expander ports 7 and 8
Blue	Box 2 Mini-SAS X-cable to the expander ports 5 and 6
Orange	Box 3 Mini-SAS X-cable to the expander ports 3 and 4

NVMe SSD data cabling



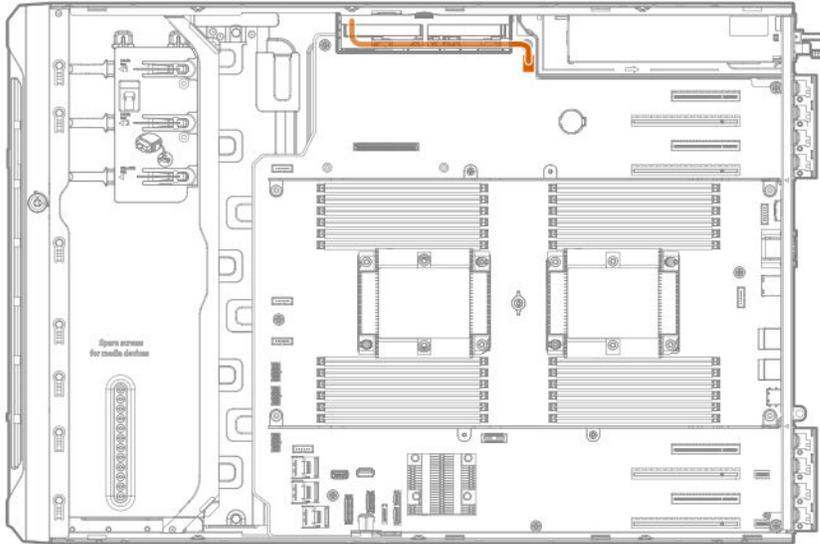
Cable color	Description
Blue	NVMe SSD backplane to the slot 3 NVMe riser board ports 1 and 2
Orange	NVMe SSD backplane to the slot 1 NVMe riser board ports 1 and 2

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

Smart Storage Battery cabling



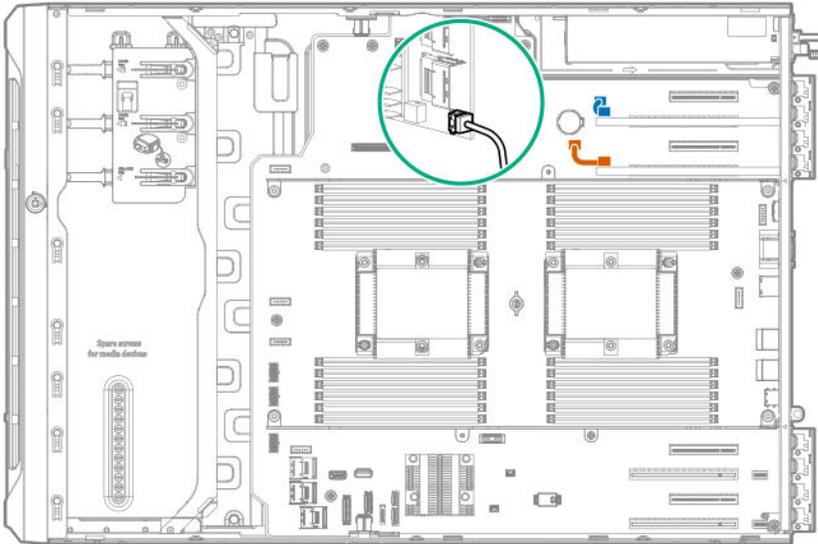
Storage controller backup power cabling

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

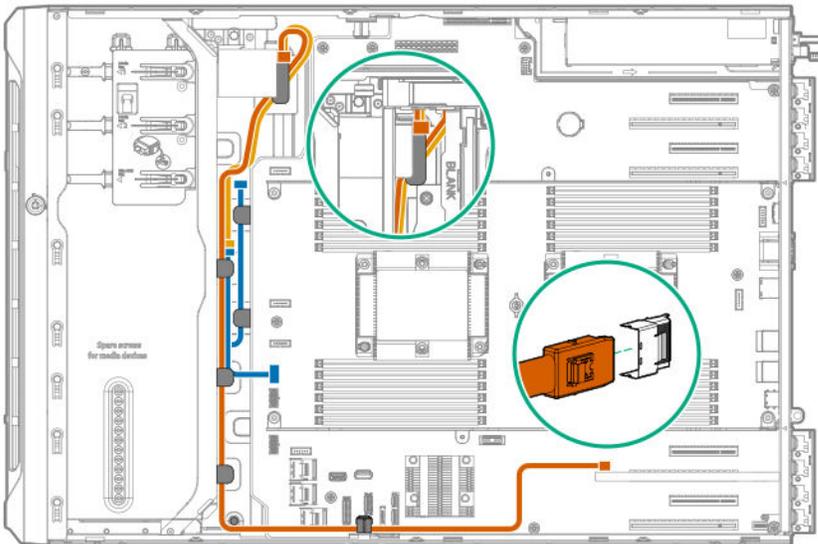


Cable color	Description
Blue	Slot 7 storage controller backup power cable
Orange	Slot 5 storage controller backup power cable

Media device cabling

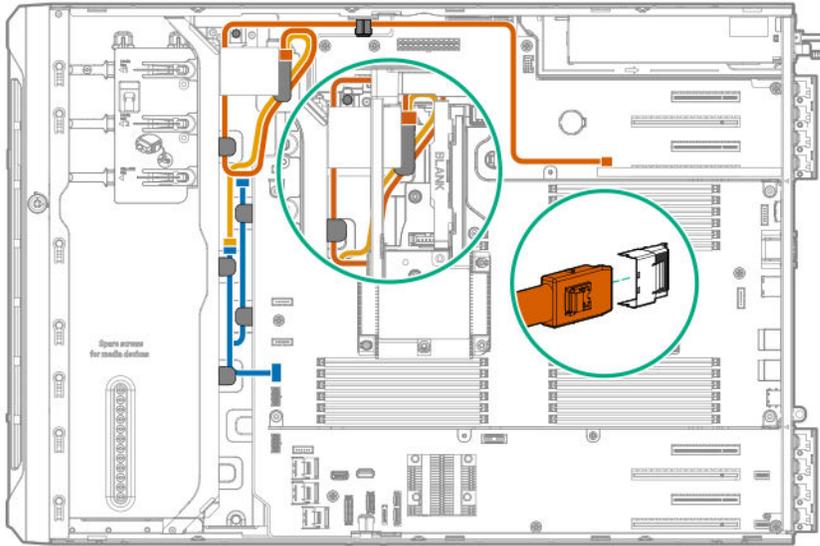
SAS LTO tape drive cabling

LTO tape drive cabling with the standup controller in slot 3



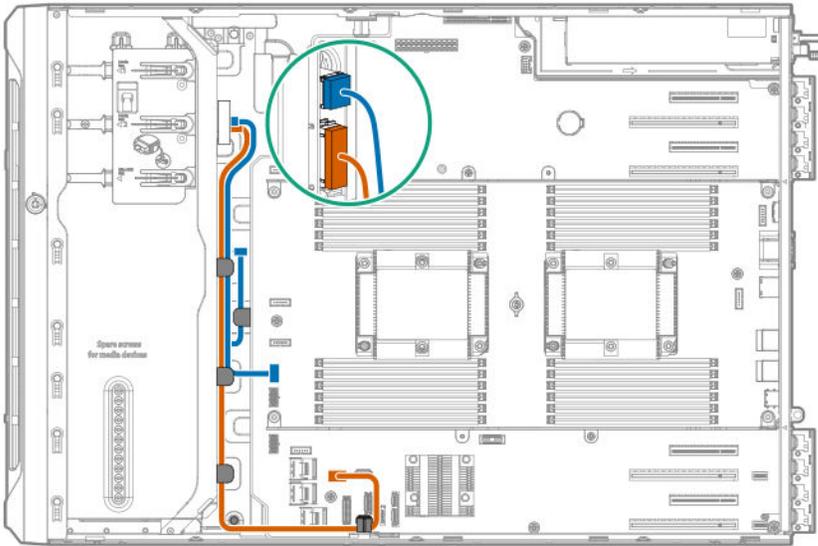
Cable color	Description
Gold	Power connector of the LTO tape drive power-SAS Y-cable to the LTO/RDX power Y-cable
Blue	LTO/RDX power Y-cable to the drive box 1 power connector
Orange	SAS connector of the LTO tape drive power-SAS Y-cable to the slot 3 standup controller

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

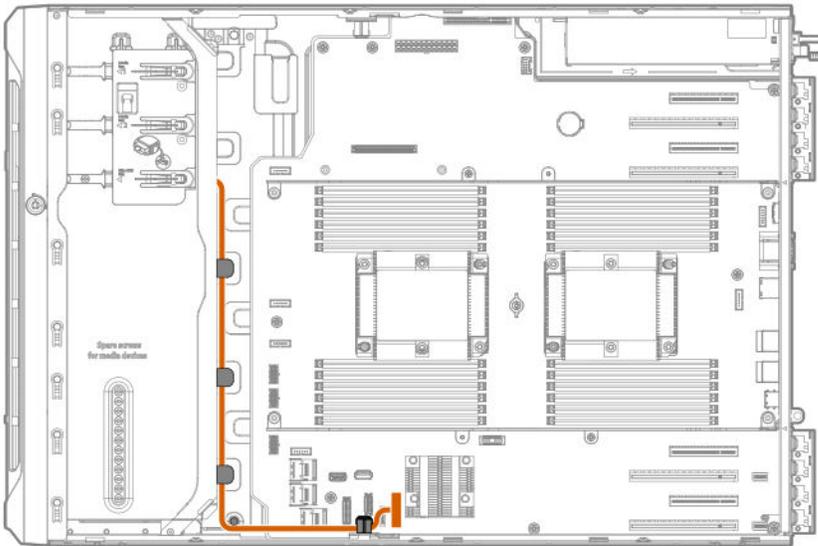
USB RDX drive cabling



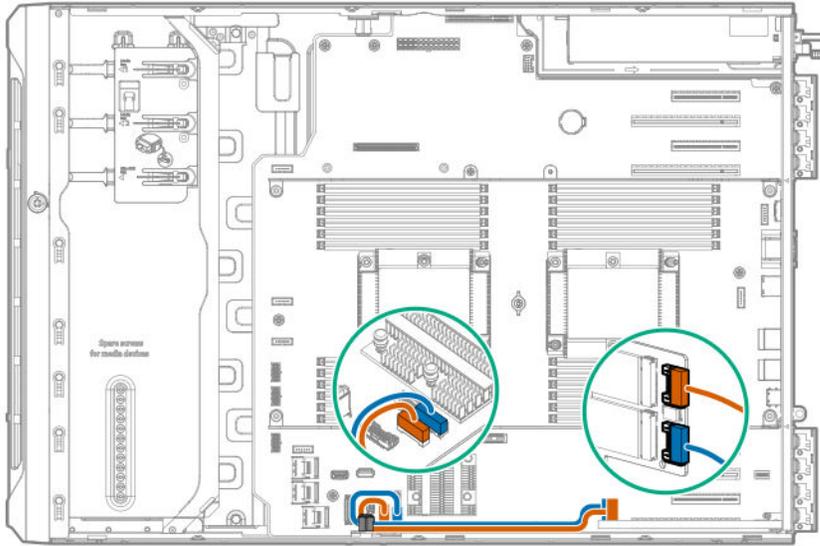
Cable color	Description
Blue	LTO/RDX power Y-cable to the drive box 1 power connector
Orange	RDX USB cable to the internal USB port 3.0

SATA optical drive cabling

Optical drive SATA cable to onboard SATA port 5

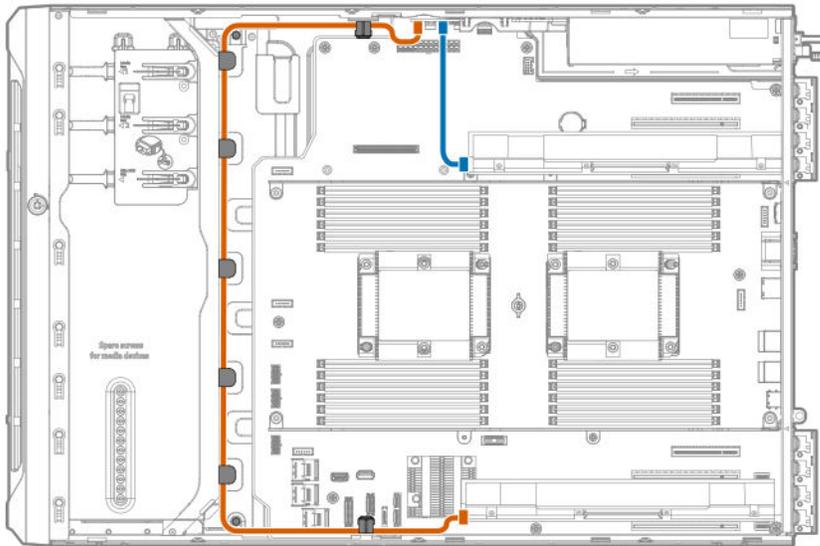


M.2 SATA SSD cabling



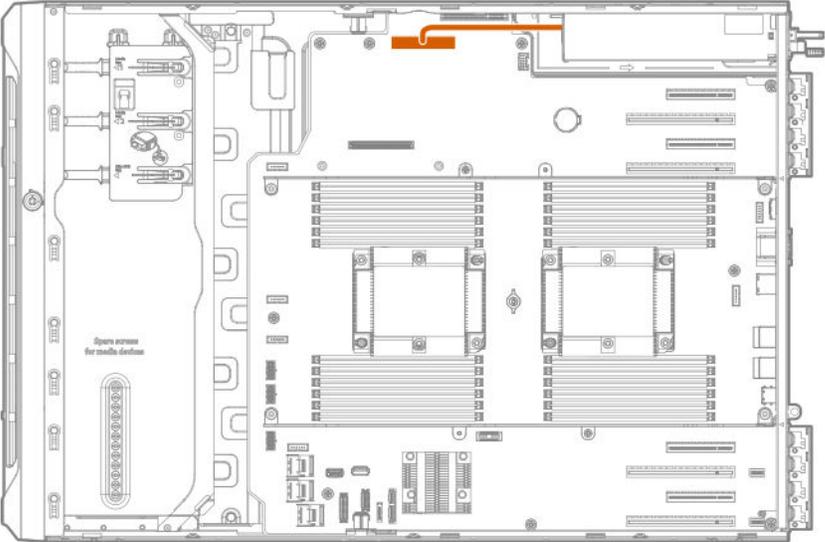
Cable color	Description
Orange	M.2 SSD port 1 SATA cable to onboard SATA port 4
Blue	M.2 SSD port 2 SATA cable to onboard SATA port 5

GPU auxiliary power cabling

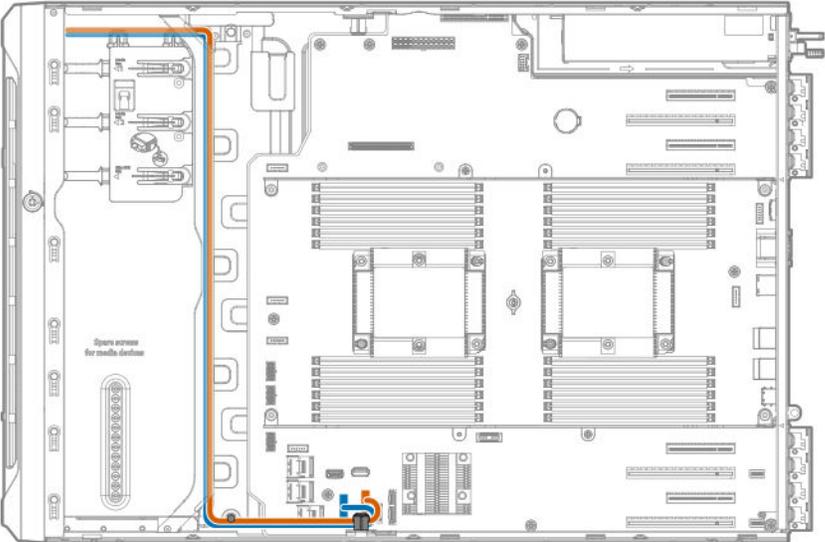


Cable color	Description
Orange	Processor 1 GPU auxiliary power cable to PDB
Blue	Processor 2 GPU auxiliary power cable to PDB

Standard power supply cabling (non-hot-plug)



Front I/O module cabling



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 on page 177	Online and Offline
HPE iLO 5 on page 177	Online and Offline
HPE Smart Storage Administrator on page 183	Online and Offline
iLO RESTful API on page 179	Online and Offline
Intelligent Provisioning on page 179	Online and Offline
Scripting Toolkit for Windows and Linux on page 181	Online
Service Pack for ProLiant on page 186	Online and Offline
Smart Update Manager on page 186	Online and Offline
UEFI System Utilities on page 181	Offline
HPE MR Storage Administrator on page 184	Offline
StorCLI on page 185	Offline

Product QuickSpecs

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

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: <http://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.

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 <http://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: <http://www.hpe.com/support/ahsv-docs>.

HPE iLO 5

iLO 5 is a remote server management processor embedded on the system boards of HPE ProLiant servers and Synergy 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. iLO (Standard) comes preconfigured on Hewlett Packard Enterprise servers without an additional cost or license.

Features that enhance server administrator productivity and additional new security features are licensed. For more information, see the iLO licensing guide at the following website: <http://www.hpe.com/support/ilo-docs>.

For more information about iLO, see the iLO user guide at the following website: <http://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 an iLO Federation group.

When an iLO Federation page loads, 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 the servers in an iLO Federation group.
- Group power control—Manage the power status of the servers in an iLO Federation group.
- Group power capping—Set dynamic power caps for the servers in an iLO Federation group.
- Group firmware update—Update the firmware of the servers in an iLO Federation group.
- Group license installation—Enter a license key to activate iLO licensed features on the servers in an iLO Federation group.
- 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: <http://www.hpe.com/support/ilo-docs>.

iLO Service Port

The Service Port is a USB port with the label **iLO** on ProLiant Gen10 servers and Synergy Gen10 compute modules.

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 iLO web interface, remote console, CLI, iLO RESTful API, or scripts.

Hewlett Packard Enterprise recommends the HPE USB to Ethernet Adapter (part number Q7Y55A).

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: <http://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 (<http://www.hpe.com/info/restfulinterface/docs>).

For specific information about automating tasks using the iLO RESTful API, see libraries and sample code at <http://www.hpe.com/info/redfish>.

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: <http://www.hpe.com/info/resttool>.

iLO Amplifier Pack

The 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. The 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: <http://www.hpe.com/support/ilo-ap-ug-en>.

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.

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.

-
- ❗ **IMPORTANT:** HPE ProLiant 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.
- From the iLO web interface using **Always On**. **Always On** allows you to access Intelligent Provisioning without rebooting your server.

Intelligent Provisioning operation

Intelligent Provisioning includes the following components:

- Critical boot drivers
- Active Health System (AHS)
- Erase Utility
- Deployment Settings

❗ **IMPORTANT:**

- Although your server is pre-loaded with firmware and drivers, you should update the firmware upon initial setup to ensure you have the latest versions. 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

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 (<http://www.hpe.com/info/ossupport>).

Management Security

HPE ProLiant Gen10 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 and iLO Advanced Premium Security Edition licenses provides security features that help ensure protection, detection, and recovery from advanced cyber-attacks. For more information, see the *HPE Gen10 Server Security Reference Guide* on the Hewlett Packard Enterprise Information Library at <http://www.hpe.com/support/gen10-security-ref-en>.

For information about the iLO Advanced Premium Security Edition license, see <http://www.hpe.com/servers/ilopremium>.

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 <http://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 (<http://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, maintain, troubleshoot, and configure the HPE MegaRAID products. MR Storage Administrator helps you to view, create, and manage storage configurations.

- **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.
- **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 <http://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 <http://www.hpe.com/info/P824i-pdocs>.

StorCLI

The Storage Command Line Interface (StorCLI) tool is the command line management software designed for the MegaRAID products. 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 <http://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 <http://www.hpe.com/info/P824i-pdocs>.

USB support

Hewlett Packard Enterprise Gen10 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 iSUT, 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 www.hpe.com/servers/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, 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 mode.
- Ability to create custom baselines and ISOs.
- Support for iLO Repository (Gen10 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: SUM does not support third-party controllers, including flashing hard drives behind the controllers.

Smart Update Tools

Smart Update Tools is a software utility used with iLO 4, HPE OneView, iLO Amplifier Pack, Service Pack for ProLiant (SPP), and Smart Update Manager (SUM) to stage, install, and activate firmware and driver updates.

NOTE: HPE OneView or iLO Amplifier Pack manage the iLO while iSUT runs on each server and deploys the updates. The same tool might not manage both applications. Create a process that notifies the administrators when updates are available.

- **Smart Update Tools:** Polls iLO to check for requests from HPE OneView or iLO Amplifier Pack for updates through the management network and orchestrates staging, deploying, and activating

updates. You can adjust the polling interval by issuing the appropriate command-line option provided by iSUT. Performs inventory on target servers, stages deployment, deploys updates, and then reboots the servers.

- **iLO Amplifier Pack:** Displays available updates for servers. Communicates with iSUT (or SUT 1.x) through iLO to perform updates.
- **HPE OneView:** Displays available updates for servers. Communicates with iSUT (or SUT 1.x) to initiate updates, reports the status on the **Firmware** section of the **Server Profile** page of HPE OneView. HPE OneView provides automated compliance reporting in the dashboard.
- **SPP:** A comprehensive systems software and firmware update solution, which is delivered as a single ISO image.
- **SUM:** A tool for firmware and driver maintenance for HPE ProLiant servers and associated options.

NOTE: Do not manage the same nodes with iLO Amplifier Pack and HPE OneView at the same time.

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.
8. Select **Image Description**, and then select a firmware image.

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 (<http://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 (<http://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 (<http://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:

<http://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 invoke the NMI handler and generate a crash dump log, the administrator can use the iLO Virtual NMI feature.

Troubleshooting resources

Troubleshooting resources are available for HPE Gen10 server products in the following documents:

- *Troubleshooting Guide for HPE ProLiant Gen10 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.
- *Integrated Management Log Messages and Troubleshooting Guide for HPE ProLiant Gen10 and HPE Synergy* provides IML messages and associated troubleshooting information to resolve critical and cautionary IML events.

To access the troubleshooting resources, see the Hewlett Packard Enterprise Information Library (<http://www.hpe.com/info/gen10-troubleshooting>).

Specifications

Environmental specifications

Specification	Value
Temperature range¹	—
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)
Weight, maximum	41 kg (90.39 lb)

Table Continued

Specification	Value
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** on page 192
This power supply is only supported when the server is in tower mode.
- **HPE 500W Flex Slot Platinum Hot-plug Low Halogen Power Supply** on page 193
- **HPE 800W Flex Slot Platinum Hot-plug Low Halogen Power Supply** on page 194
- **HPE 800W Flex Slot Titanium Hot-plug Low Halogen Power Supply** on page 195
- **HPE 800W Flex Slot Universal Hot-plug Low Halogen Power Supply** on page 195
- **HPE 800W Flex Slot -48VDC Hot-plug Low Halogen Power Supply** on page 196
- **HPE 1600W Flex Slot Platinum Hot-plug Low Halogen Power Supply** on page 197

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
Rated input current	5.8 A at 100 VAC 2.3 A at 240 VAC 2.7 A at 240 VDC for China only

Table Continued

Specification	Value
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 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	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
BTUs per hour	1902 at 100 VAC 1840 at 200 VAC 1832 at 240 VDC for China only
Power supply output	—

Table Continued

Specification	Value
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
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

Table Continued

Specification	Value
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
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 1600W 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	

Table Continued

Specification	Value
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

Safety, warranty, and regulatory information

Safety and regulatory compliance

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

Warranty information

[HPE ProLiant and x86 Servers and Options](#)

[HPE Enterprise Servers](#)

[HPE Storage Products](#)

[HPE Networking Products](#)

Belarus Kazakhstan Russia marking



Manufacturer and Local Representative Information

Manufacturer information:

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

Local representative information Russian:

- Russia:

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

- Belarus:

ИООО «Хьюлетт-Паккард Бел», Республика Беларусь, 220030, г. Минск, ул. Интернациональная, 36-1, Телефон/факс: +375 17 392 28 20

- Kazakhstan:

ТОО «Хьюлетт-Паккард (К)», Республика Казахстан, 050040, г. Алматы, Бостандыкский район, проспект Аль-Фараби, 77/7, Телефон/факс: + 7 727 355 35 52

Local representative information Kazakh:

- Russia:

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

- Belarus:

«HEWLETT-PACKARD Bel» ЖШС, Беларусь Республикасы, 220030, Минск қ.,
Интернациональная көшесі, 36/1, Телефон/факс: +375 17 392 28 20

- Kazakhstan:

ЖШС «Хьюлетт-Паккард (К)», Қазақстан Республикасы, 050040, Алматы қ.,
Бостандық ауданы, Әл-Фараби даңғылы, 77/7, Телефон/факс: +7 727 355 35 52

Manufacturing date:

The manufacturing date is defined by the serial number.

CCSYWWZZZZ (serial number format for this product)

Valid date formats include:

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

Turkey RoHS material content declaration

Türkiye Cumhuriyeti: EEE Yönetmeliğine Uygundur

Ukraine RoHS material content declaration

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

Websites

General websites

Hewlett Packard Enterprise Information Library

www.hpe.com/info/EIL

Subscription Service/Support Alerts

www.hpe.com/support/e-updates

Single Point of Connectivity Knowledge (SPOCK) Storage compatibility matrix

www.hpe.com/storage/spock

Storage white papers and analyst reports

www.hpe.com/storage/whitepapers

For additional general support websites, see [Support and other resources](#).

Product websites

Product QuickSpecs

<http://www.hpe.com/servers/ml350-gen10>

HPE ProLiant ML350 Gen10 support page

<http://www.hpe.com/support/ml350gen10>

HPE ProLiant ML350 Gen10 user documents

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

Information to collect

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

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
www.hpe.com/support/hpesc

Hewlett Packard Enterprise Support Center: Software downloads

www.hpe.com/support/downloads

Software Depot

www.hpe.com/support/softwaredepot

- To subscribe to eNewsletters and alerts:
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:
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 or go to the CSR website:

<http://www.hpe.com/support/selfrepair>

Remote support

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

If your product includes additional remote support details, use search to locate that information.

Remote support and Proactive Care information

HPE Get Connected

www.hpe.com/services/getconnected

HPE Proactive Care services

www.hpe.com/services/proactivecare

HPE Proactive Care service: Supported products list

www.hpe.com/services/proactivecaresupportedproducts

HPE Proactive Care advanced service: Supported products list

www.hpe.com/services/proactivecareadvancedsupportedproducts

Proactive Care customer information

Proactive Care central

www.hpe.com/services/proactivecarecentral

Proactive Care service activation

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

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

REST

representational state transfer

RoHS

Restriction of Hazardous Substances

RPS

redundant power supply

SD

secure digital

SAS

serial attached SCSI

SATA

serial ATA

SFF

small form factor

STK

scripting toolkit

SPP

Service Pack for ProLiant

SSD

solid state device

SUM

Smart Update Manager

SUT

Smart Update Tools

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