HPE ProLiant DL560 Gen10 Server

User Guide

Abstract

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

Contents

Software and configuration utilities...122

Troubleshooting..134

Replacing the system battery..135

Specifications..136

Websites.. 143

Support and other resources... 144

Component identification

Front panel components
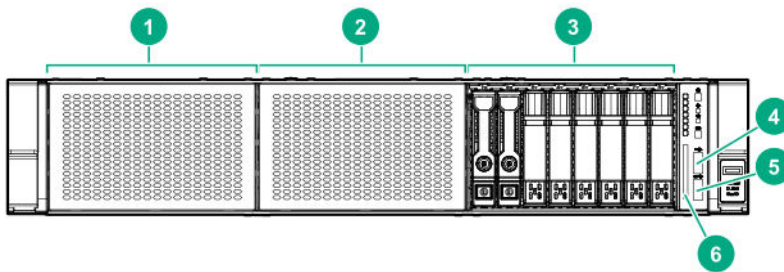
Item	Description
1	Box 1 — Supported options: • **Universal media bay components** on page 8 • **Eight-bay SFF HDD drive cage** on page 8 • **Two-bay NVMe/Six-bay SFF HDD drive cage** on page 9
2	Box 2 — Supported options: • **Eight-bay SFF HDD drive cage** on page 8 • **Eight-bay SFF NVMe drive cage** on page 9 • **Two-bay NVMe/Six-bay SFF HDD drive cage** on page 9
3	Box 3 — Supported options: • **Eight-bay SFF HDD drive cage** on page 8 • **Two-bay NVMe/Six-bay SFF HDD drive cage** on page 9
4	iLO Service Port (169.254.1.2)
5	Front USB 3.0 port
6	Serial number and iLO information pull tab

Universal media bay components
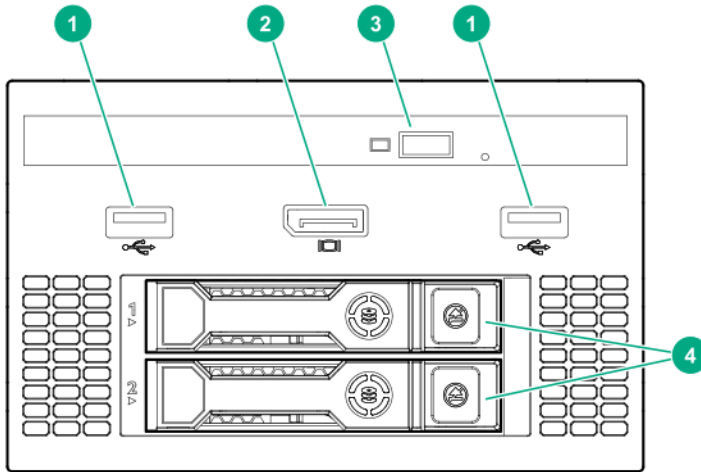
Item	Description
1	USB 2.0 port
2	Video display port
3	Optical disk drive (optional)
4	Drives (optional)

Drive bay numbering

Eight-bay SFF HDD drive cage
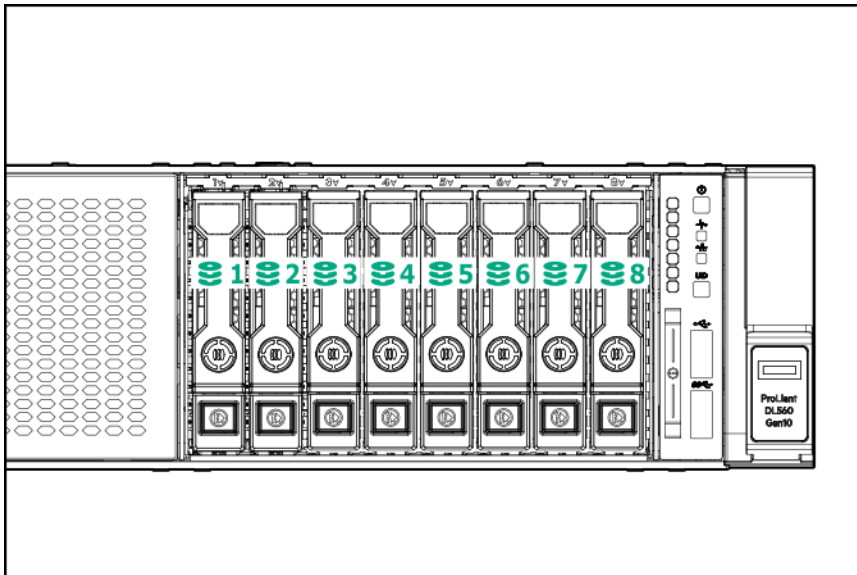
Eight-bay SFF NVMe drive cage
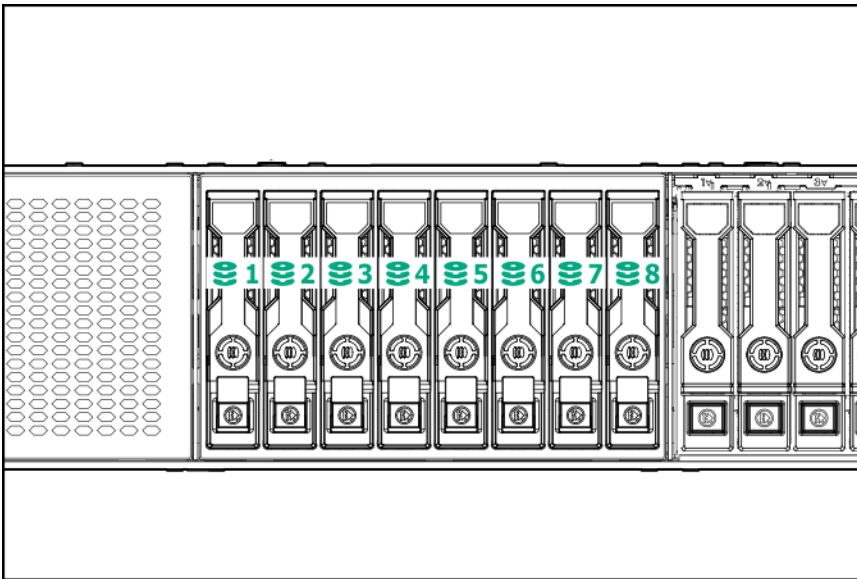
Two-bay NVMe/Six-bay SFF HDD drive cage
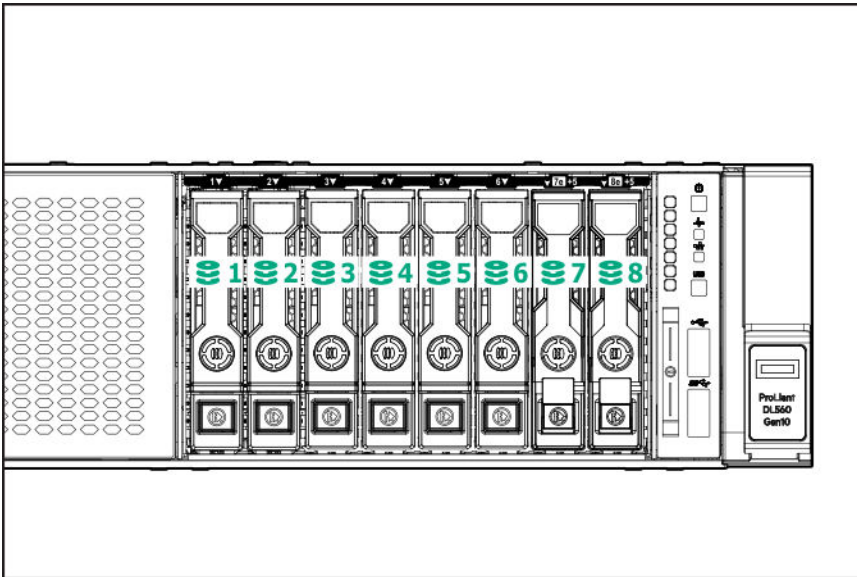
Front panel LEDs and buttons

Power switch module
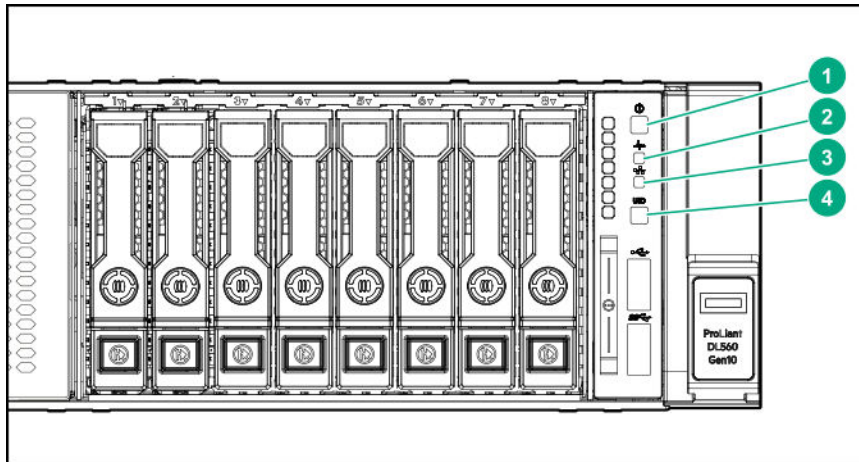
Systems Insight Display module (optional)
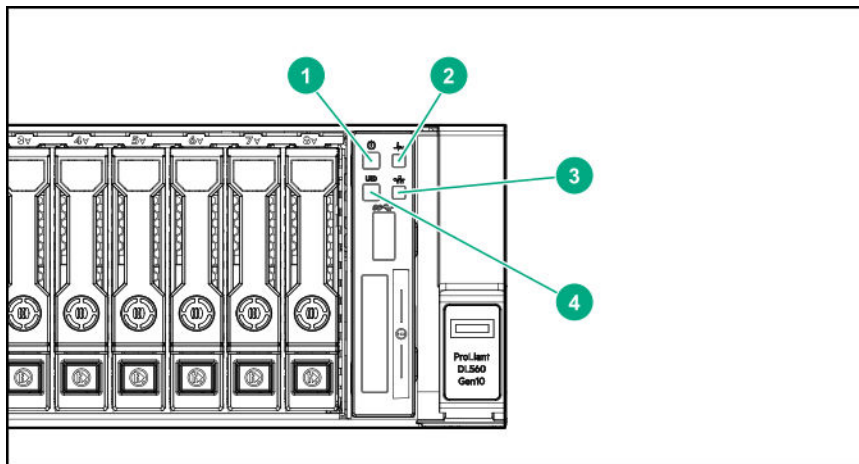
Item	Description	Status
1	Power On/Standby button and system power LED[1]	Solid green = System on
		Flashing green (1 Hz/cycle per sec) = Performing power on sequence
		Solid amber = System in standby
		Off = No power present[2]
2	Health LED[1]	Solid green = Normal
		Flashing green (1 Hz/cycle per sec) = iLO is rebooting
		Flashing amber = System degraded
		Flashing red (1 Hz/cycle per sec) = System critical[3]

Table Continued

Item	Description	Status
3	NIC status LED[1]	Solid green = Link to network
		Flashing green (1 Hz/cycle per sec) = Network active
		Off = No network activity
4	UID button/LED[1]	Solid blue = Activated
		Flashing blue:
		• 1 Hz/cycle per sec = Remote management or firmware upgrade in progress
		• 4 Hz/cycle per sec = iLO manual reboot sequence initiated
		• 8 Hz/cycle per sec = iLO manual reboot sequence in progress
		Off = Deactivated

[1] When all four LEDs described in this table flash simultaneously, a power fault has occurred.

[2] Facility power is not present, power cord is not attached, no power supplies are installed, power supply failure has occurred, or the power button cable is disconnected.

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

Systems Insight Display LEDs

The Systems Insight Display LEDs represent the system board layout. The display enables diagnosis with the access panel installed.
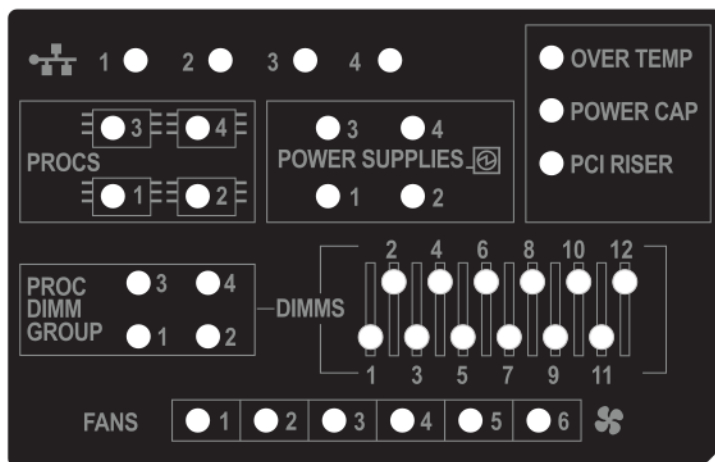
Description	Status
Processor LEDs	Off = Normal
	Amber = Failed processor
DIMM LEDs	Off = Normal
	Amber = Failed DIMM or configuration issue
Fan LEDs	Off = Normal
	Amber = Failed fan or missing fan
NIC LEDs	Off = No link to network
	Solid green = Network link
	Flashing green = Network link with activity
	If power is off, the front panel LED is not active. For status, see "**Rear panel LEDs** on page 17."
Power supply LEDs	Off = Normal
	Solid amber = Power subsystem degraded, power supply failure, or input power lost.
PCI riser LED	Off = Normal
	Amber = Incorrectly installed PCI riser cage
Over temp LED	Off = Normal
	Amber = High system temperature detected
Proc DIMM Group LED	Off = Normal
	Amber = Failed DIMM or configuration issue
Power cap LED	Off = System is in standby, or no cap is set.
	Solid green = Power cap applied

When the health LED on the front panel illuminates either amber or red, the server is experiencing a health event. For more information on the combination of these LEDs, see "**Systems Insight Display combined LED descriptions** on page 12."

Systems Insight Display combined LED descriptions

The combined illumination of the following LEDs indicates a system condition:

- Systems Insight Display LEDs
- System power LED
- Health LED

Systems Insight Display LED and color	Health LED	System power LED	Status
Processor (amber)	Red	Amber	One or more of the following conditions may exist: • Processor in socket X has failed. • Processor X is not installed in the socket. • Processor X is unsupported. • ROM detects a failed processor during POST.
Processor (amber)	Amber	Green	Processor in socket X is in a pre-failure condition.
DIMM (amber)	Red	Green	One or more DIMMs have failed.
DIMM (amber)	Amber	Green	DIMM in slot X is in a pre-failure condition.
Over temp (amber)	Amber	Green	The Health Driver has detected a cautionary temperature level.
Over temp (amber)	Red	Amber	The server has detected a hardware critical temperature level.
PCI riser (amber)	Red	Green	The PCI riser cage is not seated properly.
Fan (amber)	Amber	Green	One fan has failed or has been removed.
Fan (amber)	Red	Green	Two or more fans have failed or been removed.
Power supply (amber)	Red	Amber	One or more of the following conditions may exist: • Only one power supply is installed and that power supply is in standby. • Power supply fault • System board fault
Power supply (amber)	Amber	Green	One or more of the following conditions may exist: • Redundant power supply is installed and only one power supply is functional. • AC power cord is not plugged into redundant power supply. • Redundant power supply fault • Power supply mismatch at POST or power supply mismatch through hot-plug addition

Table Continued

Systems Insight Display LED and color	Health LED	System power LED	Status
Power cap (off)	—	Amber	Standby
Power cap (green)	—	Flashing green	Waiting for power
Power cap (green)	—	Green	Power is available.
Power cap (flashing amber)	—	Amber	Power is not available.

ⓘ **IMPORTANT:**
If more than one DIMM slot LED is illuminated, further troubleshooting is required. Test each bank of DIMMs by removing all other DIMMs. Isolate the failed DIMM by replacing each DIMM in a bank with a known working DIMM.

Drives

NVMe drive components and LEDs
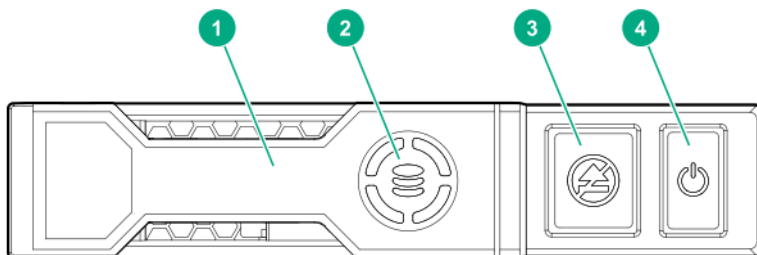
Item	Description
1	Release lever
2	Activity ring
3	Do Not Remove LED[1]
4	Request to Remove NVMe Drive button

[1]Do not remove an NVMe SSD from the drive bay while the Do Not Remove button LED is flashing. The Do Not Remove button LED flashes to indicate 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.

SAS/SATA drive components and LEDs

Item	Description	Status
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 LED	• Rotating green = Drive activity. • Off = No drive activity.
3	Do not remove LED	• 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 LED	• Solid green = The drive is a member of one or more logical drives. • Flashing green = The drive is rebuilding or performing a RAID migration, strip size migration, capacity expansion, or logical drive extension, or is erasing. • Flashing amber/green = The drive is a member of one or more logical drives and predicts the drive will fail. • Flashing amber = The drive is not configured and predicts the drive will fail. • Solid amber = The drive has failed. • Off = The drive is not configured by a RAID controller.

Drive guidelines

⚠ **CAUTION:**
Do not remove an NVMe SSD from the drive bay while the Do Not Remove button LED is flashing. The Do Not Remove button LED flashes to indicate 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.

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

Observe the following general guidelines:

- For drive numbering, see "**Drive bay numbering** on page 8."
- 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.
- The system automatically sets all device numbers.
- If only one hard drive is used, install it in the bay with the lowest device number.
- Drives should be the same capacity to provide the greatest storage space efficiency when drives are grouped into the same drive array.

Rear panel components

Rear panel with optional tertiary riser
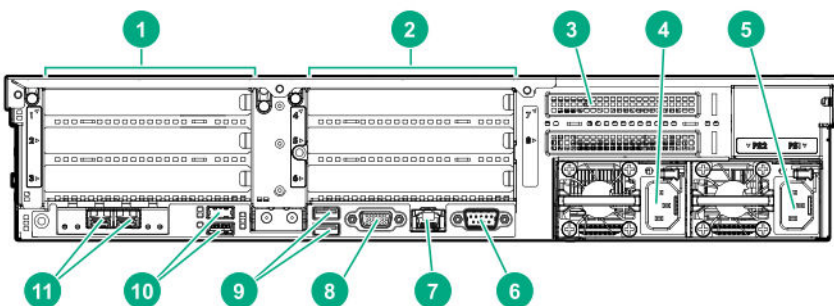
Item	Description
1	Primary PCIe riser slots 1-3
2	Secondary PCIe riser slot bays 4-6 (Optional)
3	Tertiary PCIe riser slots 7-8 (Optional)
4	Power supply 2 (PS2)
5	Power supply 1 (PS1)
6	Serial port
7	iLO Management Port
8	Video port
9	Rear USB 2.0 ports (2)
10	Rear USB 3.0 ports (2)
11	FlexibleLOM (optional)

Rear panel with optional redundant power supplies
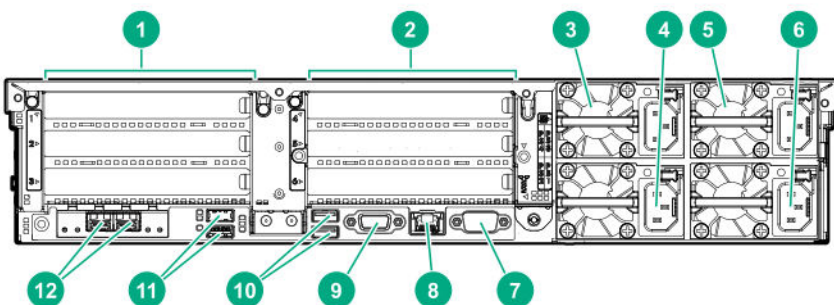
Item	Description
1	Primary PCIe riser slots 1-3
2	Secondary PCIe riser slot bays 4-6 (Optional)
3	Power supply 4 (PS4, optional)
4	Power supply 2 (PS2)
5	Power supply 3 (PS3, optional)
6	Power supply 1 (PS1)
7	Serial port
8	iLO Management Port
9	Video port
10	Rear USB 2.0 ports (2)
11	Rear USB 3.0 ports (2)
12	FlexibleLOM (optional)

Rear panel LEDs
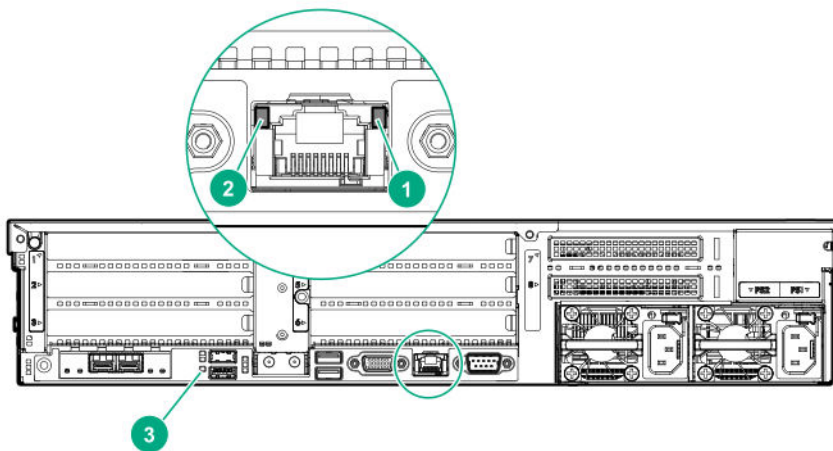
Item	Description	Status
1	Link LED	Off = No network link Green = Network link
2	Activity LED	Off = No network activity Solid green = Link to network Flashing green = Network activity
3	UID LED	Off = Deactivated Solid blue = Activated Flashing blue = System being managed remotely

Power supply LEDs

The power supply LED is located on each power supply.
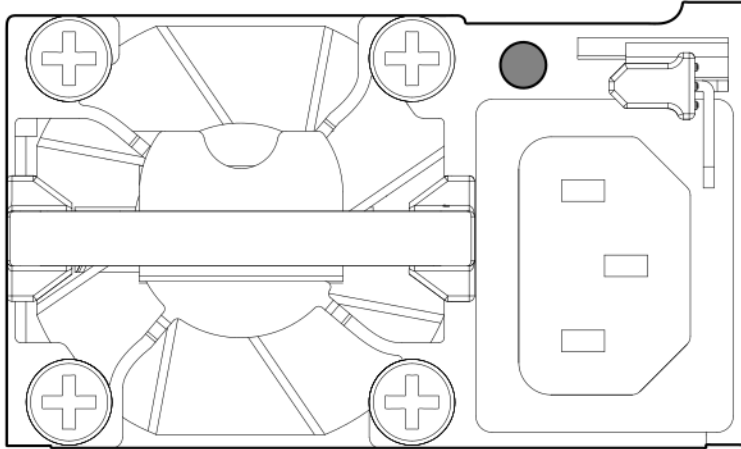
LED Status	Description
Off	System is off or power supply has failed.
Solid Green	Normal

Fan bay numbering
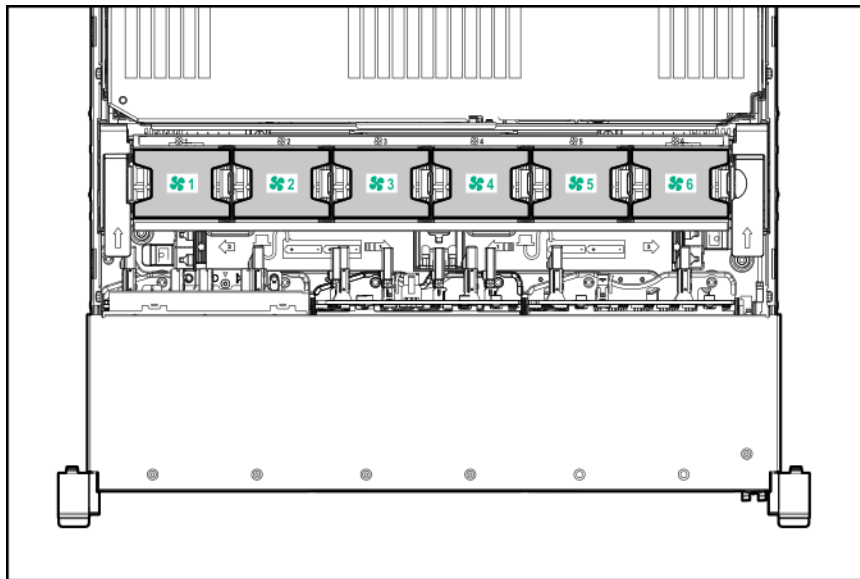
System board components
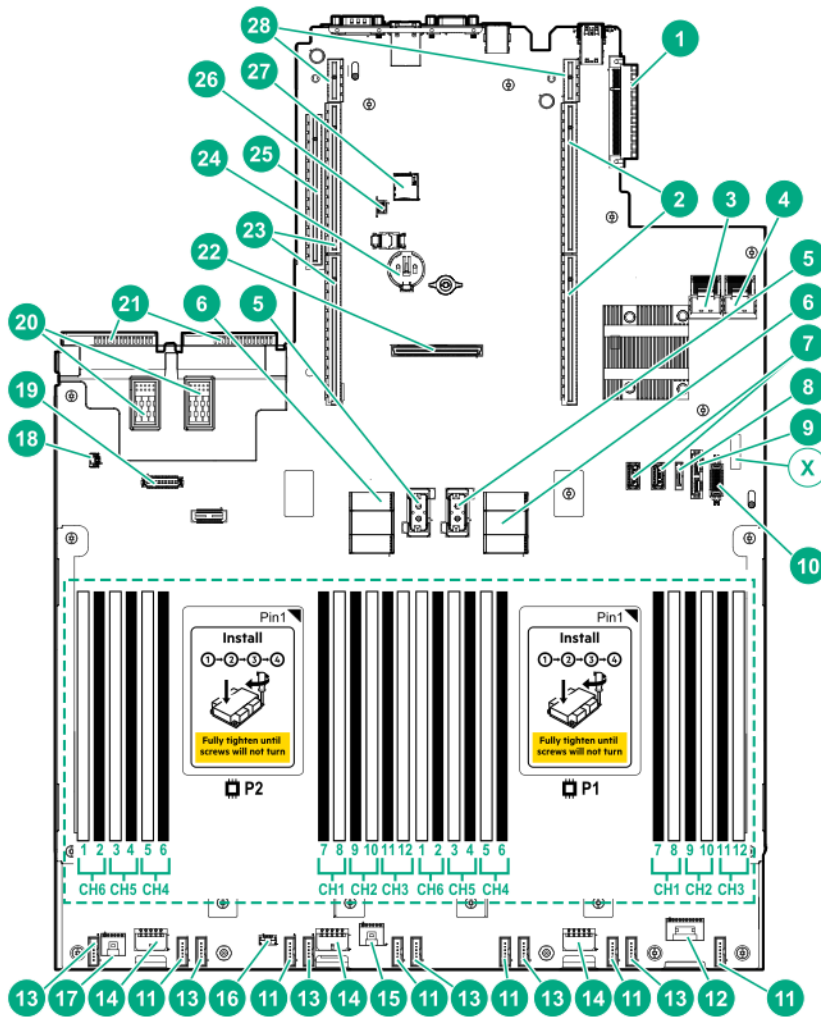
Item	Description
1	FlexibleLOM connector
2	Primary PCIe riser connector (processor 1 required)
3	x4 SATA port 1
4	x4 SATA port 2
5	Upper processor mezzanine connector — Power (2)
6	Upper processor mezzanine connector — Signals (2)
7	USB 3.0 (2)
8	x1 SATA port
9	x1 SATA port/optical port
X	System maintenance switch
10	Front USB 3.0 connector

Table Continued

Item	Description
11	Fan connectors (6)
12	Front power switch connector
13	Reserved (6)
14	Drive backplane power connectors (3)
15	HPE Smart Storage Battery connector 1 (system board)
16	Optional 2SFF HDD x1 SATA board sideband connector
17	HPE Smart Storage Battery connector 2 (processor mezzanine board)
18	Intrusion detection switch connector
19	Universal media bay USB/Display port connector
20	Optional power supply connectors (PS3, PS4)
21	Standard power supply connectors (PS1, PS2)
22	Flexible Smart Array connector
23	Secondary PCIe riser connector (processor 2 required)
24	System battery
25	Tertiary PCIe riser connector (processor 2 required)
26	TPM connector
27	microSD card slot
28	Reserved (2)

Processor, heatsink, and socket components
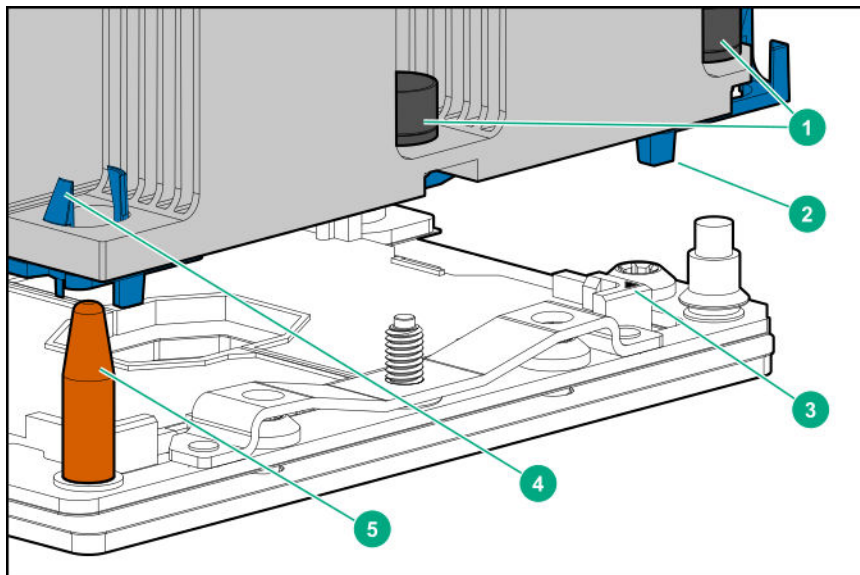
Item	Description
1	Heatsink nuts
2	Processor frame
3	Pin 1 indicator[1]
4	Heatsink latch
5	Alignment post

[1] Symbol also on the processor and frame.

DIMM slot locations

DIMM slots are numbered sequentially (1 through 12) for each processor on the system and mezzanine boards.

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

System board DIMM slots
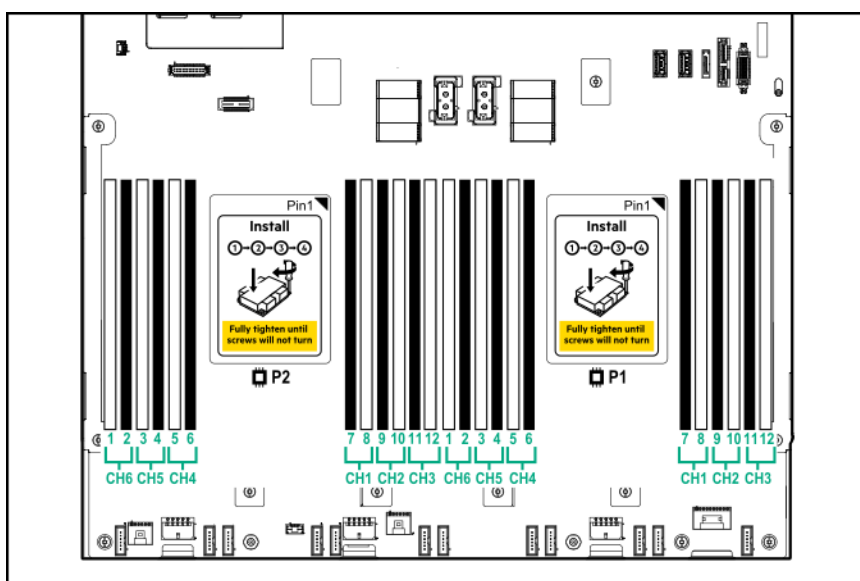
Processor mezzanine board DIMM slots
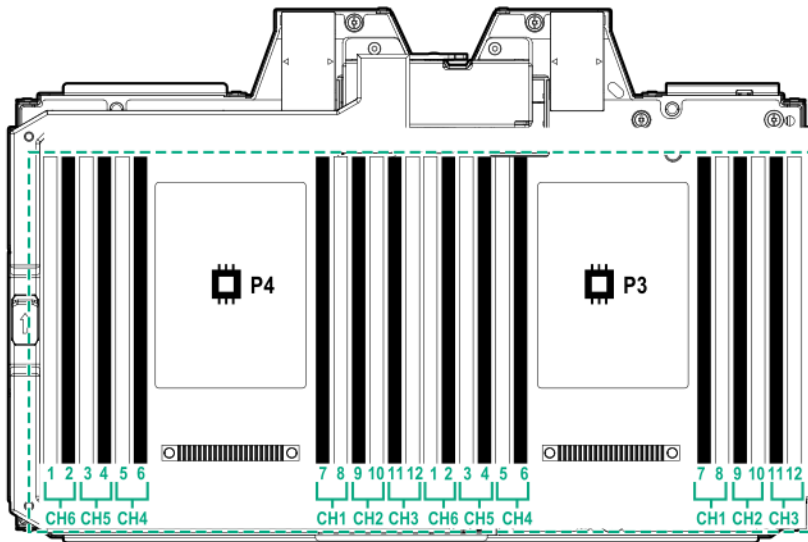
Drive cage backplane identification

Eight-bay SFF HDD drive cage backplane
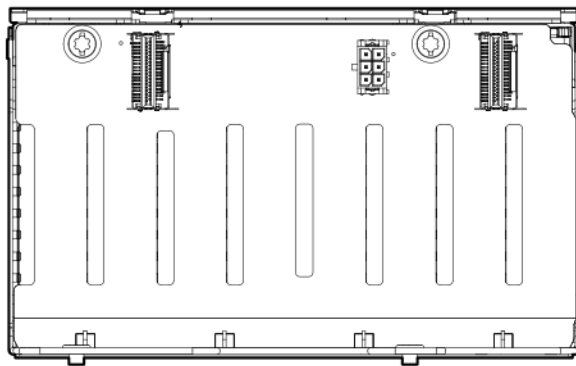
Eight-bay SFF NVMe SSD drive cage backplane
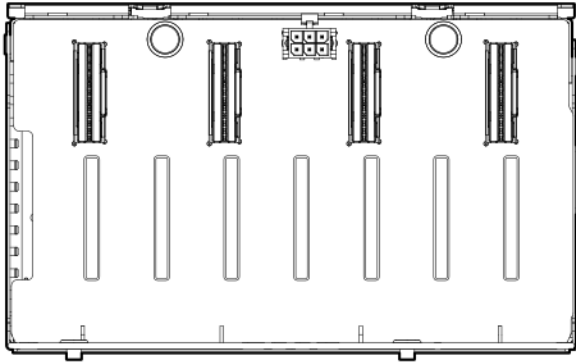
Two-bay NVMe/Six-bay SFF HDD drive cage backplane
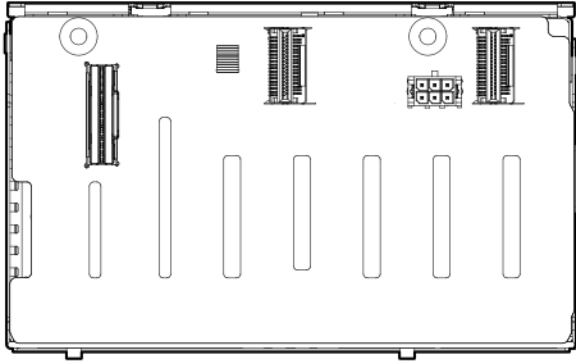
Two-bay SFF drive cage backplane
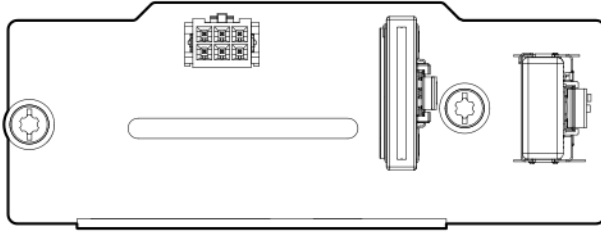
HPE 12G SAS Expander Card port numbering

Riser components

4-port Slimline riser
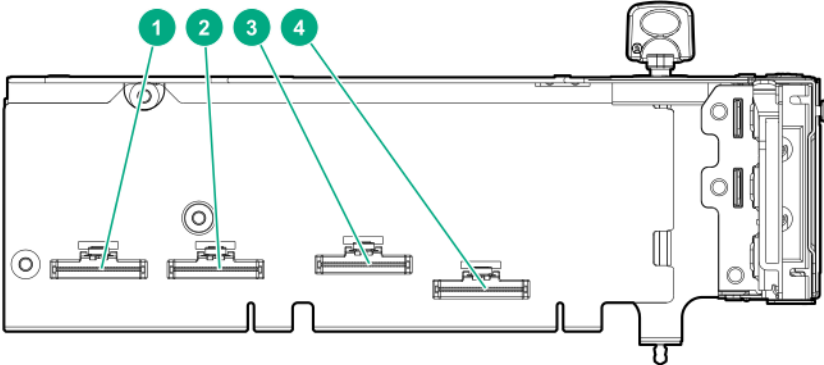
Item	Description
1–4	x8 Slimline NVMe connectors

Three-slot riser (three x8 slots)
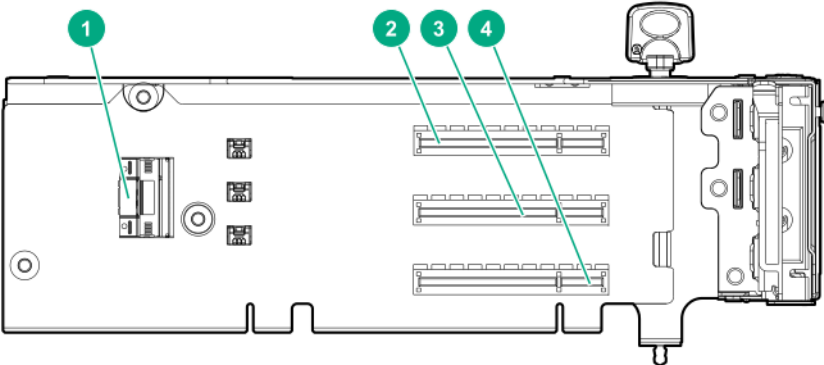
Item	Description
1	x8 Slimline NVMe connector
2–4	x8 PCIe slots

M.2 three-slot riser
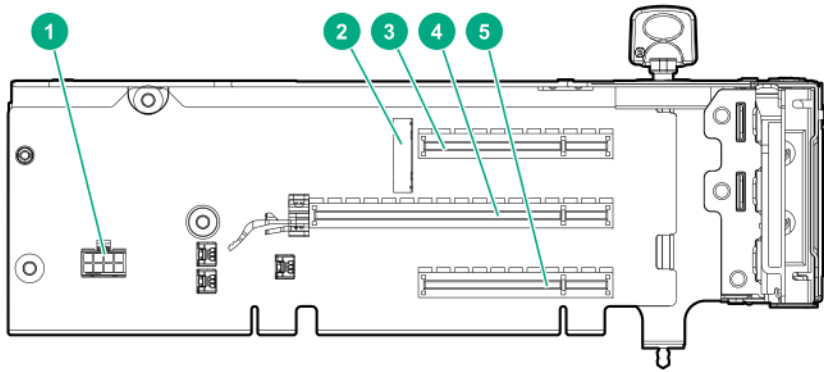
Item	Description
1	GPU cable connector
2	M.2 SSD drive connectors[1]
3	x8 PCIe slot
4	x16 PCIe slot
5	x8 PCIe slot

[1]The riser supports installation of a second M.2 SSD drive on the reverse side.

Three-slot riser (2 x8 and 1 x16 slots)
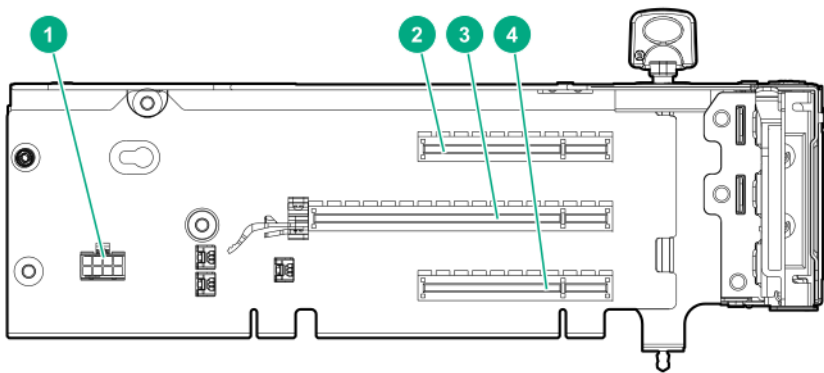
Item	Description
1	GPU cable connector
2	x8 PCIe slot
3	x16 PCIe slot
4	x8 PCIe slot

Two-slot GPU riser
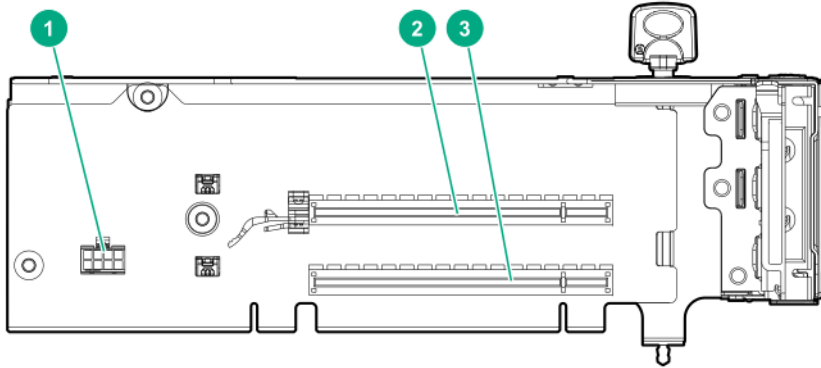
Item	Description
1	GPU cable connector
2	x16 PCIe slot
3	x16 PCIe slot

Two-slot x8 riser (tertiary)
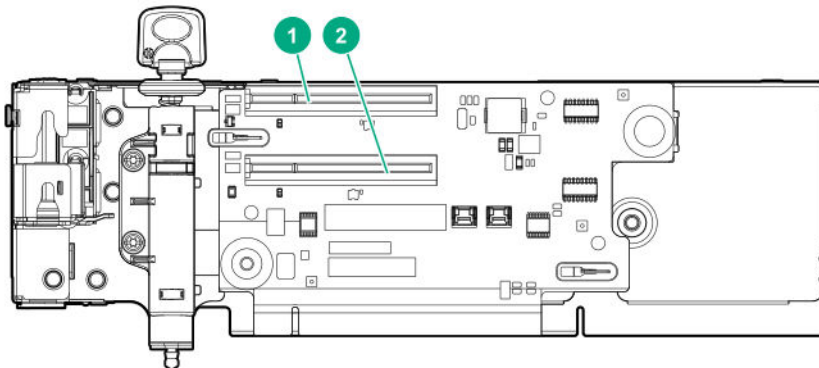
Item	Description
1	x8 PCIe slot
2	x8 PCIe slot

x8 riser (tertiary)
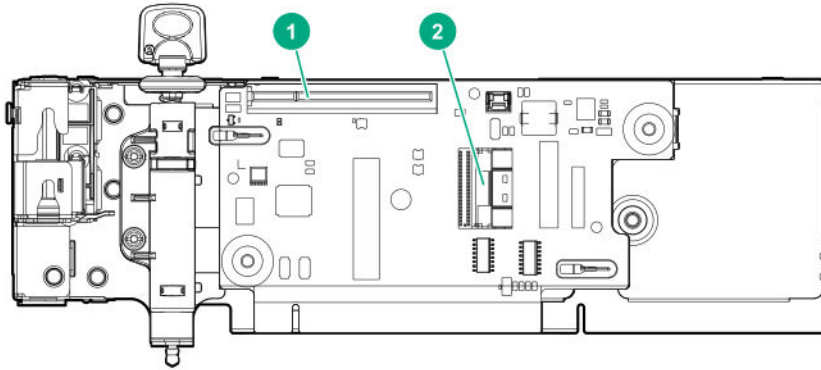
Item	Description
1	x8 PCIe slot
2	x8 Slimline NVMe connector

Dual Slimline riser (tertiary)
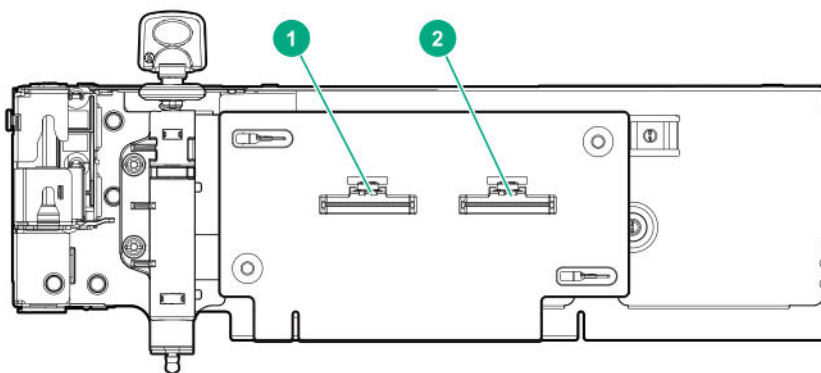
Item	Description
1	x8 Slimline NVMe connector
2	x8 Slimline NVMe connector

Setup

HPE support services

Delivered by experienced, certified engineers, HPE support services help you keep your servers up and running with support packages tailored specifically for HPE ProLiant systems. HPE 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.

HPE 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 HPE support services for hardware, software or both are:

- Foundation Care – Keep systems running.

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

  ◦ 6-Hour Call-to-Repair
  ◦ 4-Hour 24x7
  ◦ Next Business Day
- Startup and implementation services for both hardware and software
- HPE Education Services – Help train your IT staff.

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

Setup overview

Procedure

1. Review the operational requirements for the server (**Operational requirements** on page 30).
2. Read the following safety notices, warnings, and cautions:

   - Server warnings and cautions (**Server warnings and cautions** on page 32)
   - Rack warnings (**Rack warnings** on page 33)
   - Electrostatic discharge (**Electrostatic discharge** on page 33)
3. Verify the contents in the server box (**Server box contents** on page 34).
4. Install hardware options (**Installing hardware options** on page 49).
5. Install the server into a rack (**Installing the server into the rack** on page 34).
6. Configure the server (**Configuring the server** on page 36).
7. Install or deploy an operating system (**Operating system** on page 36).
8. Register your server (**Registering the server** on page 37).

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).

ⓘ **IMPORTANT:**
The HPE ProLiant DL560 Gen10 Server cable management arm is not supported on Compaq branded 7000 series racks.

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:**

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. If the server is installed higher than chest level, a third person may be required to help align the server.
• Use caution when installing the server in or removing the server from the rack; it is unstable when not fastened to the rails.

WARNING:

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

WARNING:

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

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.

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

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

- 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.
- Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.

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.

Electrostatic discharge

Be aware of the precautions you must follow when setting up the system or handling components. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the system or component.

To prevent electrostatic damage:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.

- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:
    ◦ Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm ±10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
    ◦ Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
    ◦ Use conductive field service tools.
    ◦ Use a portable field service kit with a folding static-dissipating work mat.

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

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

Server box contents

The server shipping box contains the following contents:

- A server
- A power cord
- Rack-mounting hardware
- Documentation

Installing hardware options

Install any hardware options before initializing the server. For options installation information, refer to the option documentation. For server-specific information, see "**Installing hardware options** on page 49."

Installing the server into the rack

⚠ **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.

Procedure

1. Install the server and cable management arm into the rack.

   For more information, see the installation instructions that ship with the 2U Quick Deploy Rail System.
2. Connect peripheral devices to the server.

   For information on identifying connectors, see "**Rear panel components** on page 16."

⚠ **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.

3. Connect the power cord to the rear of the server.
4. Install the power cord anchors.
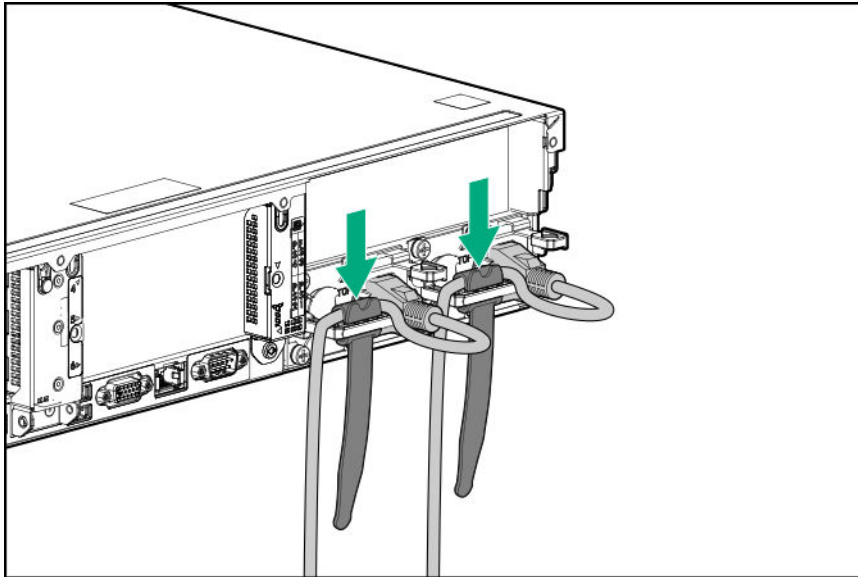
5. Secure the cables to the cable management arm.

> ⓘ **IMPORTANT:**
>
> When using cable management arm components, be sure to leave enough slack in each of the cables to prevent damage to the cables when the server is extended from the rack.
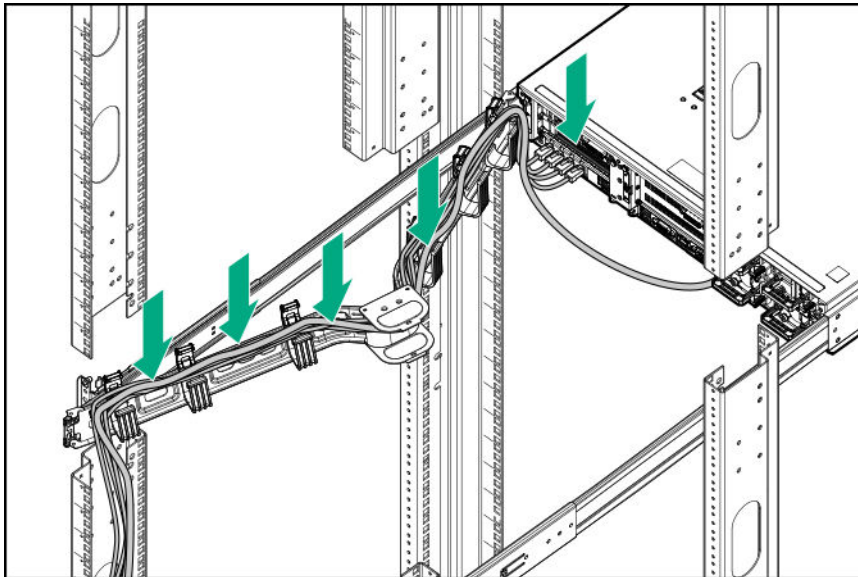
6. Connect the power cord to the AC power source.

> ⚠ **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.

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.

Operating system

This ProLiant server does not ship with provisioning media. Everything required to manage and install the system software and firmware is preloaded on the server.

To operate properly, the server must have a supported operating system. Attempting to run an unsupported operating system can cause serious and unpredictable results. For the latest information on operating system support, see the **Hewlett Packard Enterprise website**.

Failure to observe UEFI requirements for ProLiant Gen10 servers can result in errors installing the operating system, failure to recognize boot media, and other boot failures. For more information on these requirements, see the *HPE UEFI Requirements* on the **Hewlett Packard Enterprise website**.

To install an operating system on the server, use one of the following methods:

- Intelligent Provisioning—For single-server deployment, updating, and provisioning capabilities. For more information, see **Installing the operating system with Intelligent Provisioning** on page 36.
- Insight Control server provisioning—For multiserver remote OS deployment, use Insight Control server provisioning for an automated solution. For more information, see the Insight Control documentation on the **Hewlett Packard Enterprise website**.

For additional system software and firmware updates, download the Service Pack for ProLiant from the **Hewlett Packard Enterprise website**. Software and firmware must be updated before using the server for the first time, unless any installed software or components require an older version.

For more information, see **Keeping the system current** on page 129.

For more information on using these installation methods, see the **Hewlett Packard Enterprise website**.

Installing the operating system with Intelligent Provisioning

Procedure

1. Connect the Ethernet cable between the network connector on the server and a network jack.
2. Press the Power On/Standby button.
3. During server POST, press **F10**.
4. Complete the initial Preferences and Registration portion of **Intelligent Provisioning**.
5. At the 1 Start screen, click **Configure and Install**.
6. To finish the installation, follow the onscreen prompts. An Internet connection is required to update the firmware and systems software.

Registering the server

To experience quicker service and more efficient support, register the product at the **Hewlett Packard Enterprise Product Registration website**.

Operations

Powering up the server

Procedure

1. 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.

  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.

Extend the server from the rack

> ⚠ **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.

1. Pull down the quick release levers on each side of the server.
2. Extend the server from the rack.
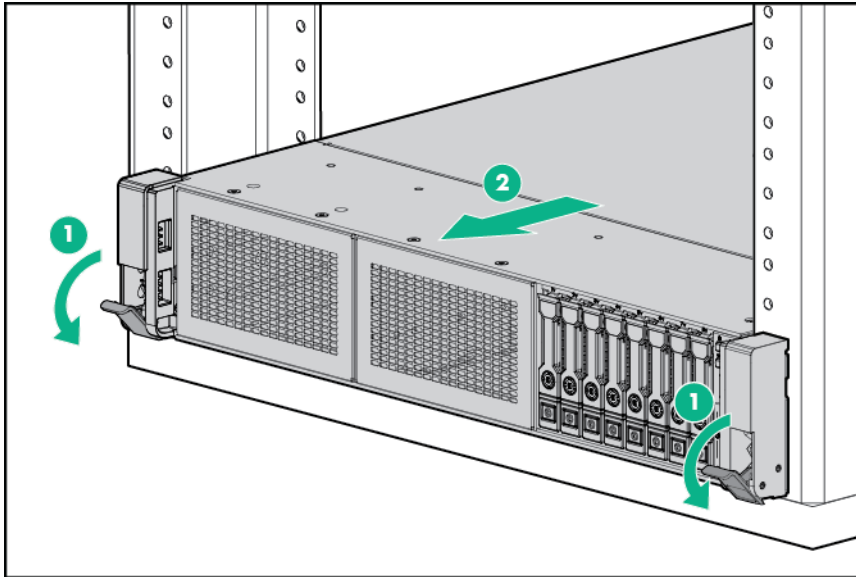
3. After performing the installation or maintenance procedure, slide the server back into the rack, and then press the server firmly into the rack to secure it in place.

⚠ **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.

Removing the server from the rack

To remove the server from a Hewlett Packard Enterprise, Compaq-branded, Telco, or third-party rack:

Procedure

1. Power down the server (**Power down the server** on page 38).
2. Extend the server from the rack (**Extend the server from the rack** on page 38).
3. Disconnect the cabling and remove the server from the rack.

   For more information, see the documentation that ships with the rack mounting option.
4. Place the server on a sturdy, level surface.

Releasing the cable management arm

Release the cable management arm and then swing the arm away from the rack.
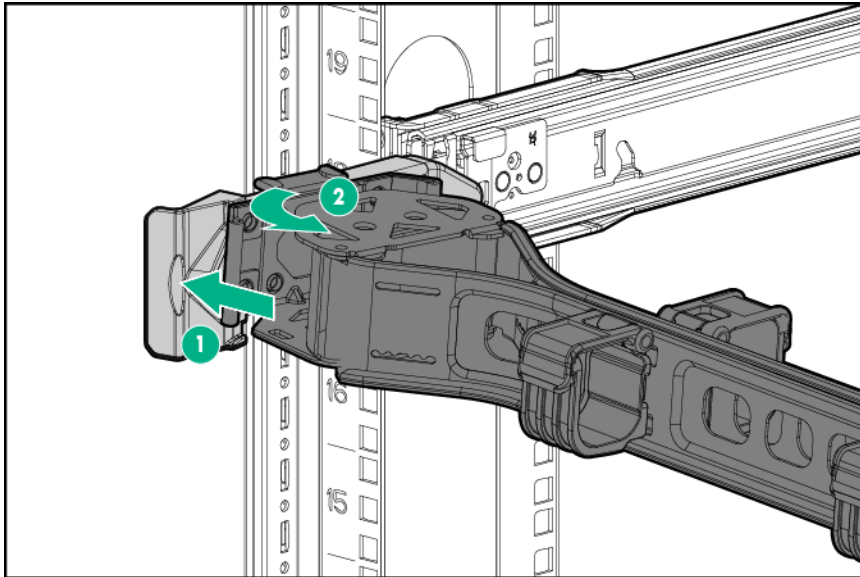
Accessing the Systems Insight Display

Procedure

1. Press and release the panel.
2. After the display fully ejects, rotate the display to view the LEDs.
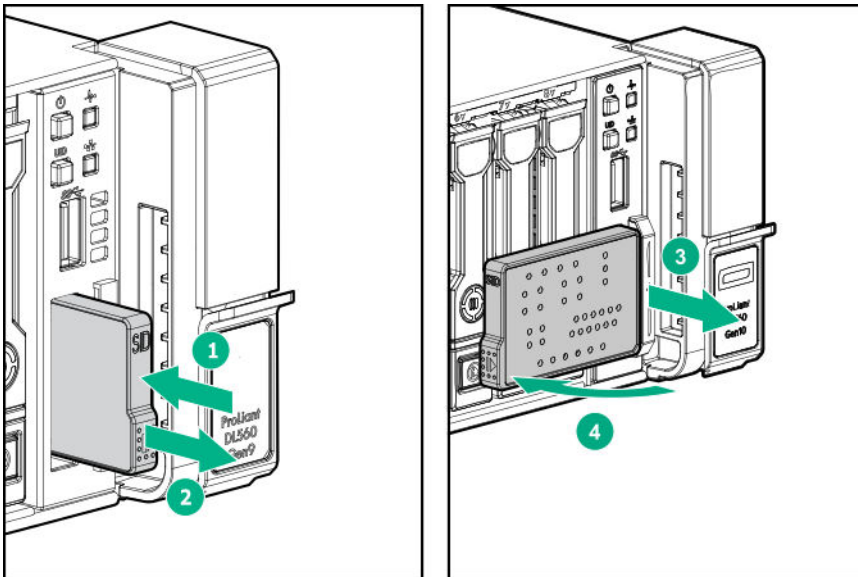
Removing the access panel

⚠️ **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

A T-10 Torx screwdriver might be needed to unlock the access panel.

Procedure

1. Power down the server (**Power down the server** on page 38).
2. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.
3. Do one of the following:
   • Extend the server from the rack (**Extend the server from the rack** on page 38).
   • Remove the server from the rack (**Removing the server from the rack** on page 39).
4. If the locking latch is locked, use a T-10 Torx screwdriver to unlock the latch.
5. Open the locking latch.

   The access panel slides back, releasing it from the chassis.
6. Lift and remove the access panel.
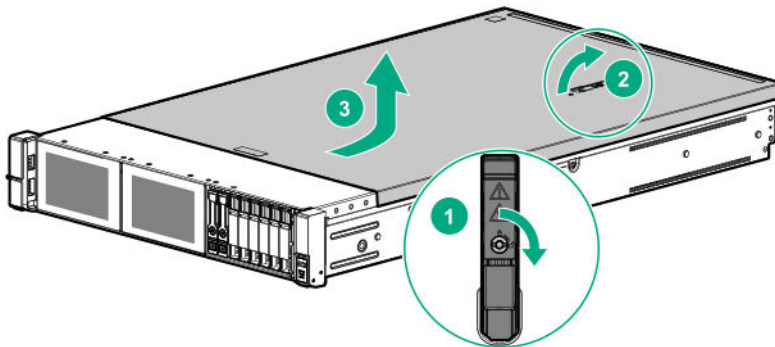
Turn the access panel over to locate the server label. This label provides convenient access to component identification and LED status indicators.

Installing the access panel

Procedure

1. Place the access panel on top of the server with the latch open.

   Allow the panel to extend past the rear of the server approximately 1.25 cm (0.5 in).
2. Push down on the latch.

   The access panel slides to a closed position.
3. Tighten the security screw on the latch.
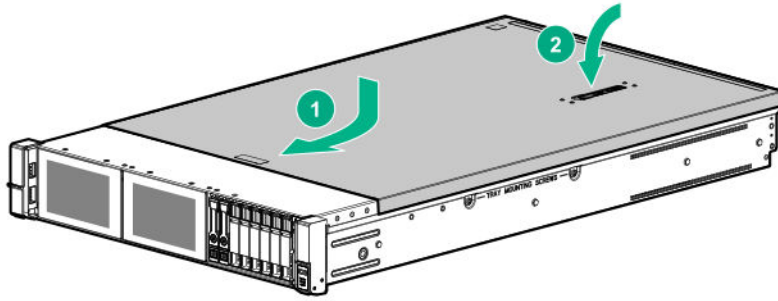
Removing the air baffle

The air baffle must be installed in 1- and 2-processor configurations.

⚠ **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.

To remove the component:

Procedure

1. Power down the server (**Power down the server** on page 38).
2. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.
3. Do one of the following:
   • Extend the server from the rack (**Extend the server from the rack** on page 38).
   • Remove the server from the rack (**Removing the server from the rack** on page 39).
4. Remove the access panel (**Removing the access panel** on page 40).
5. Remove the air baffle.
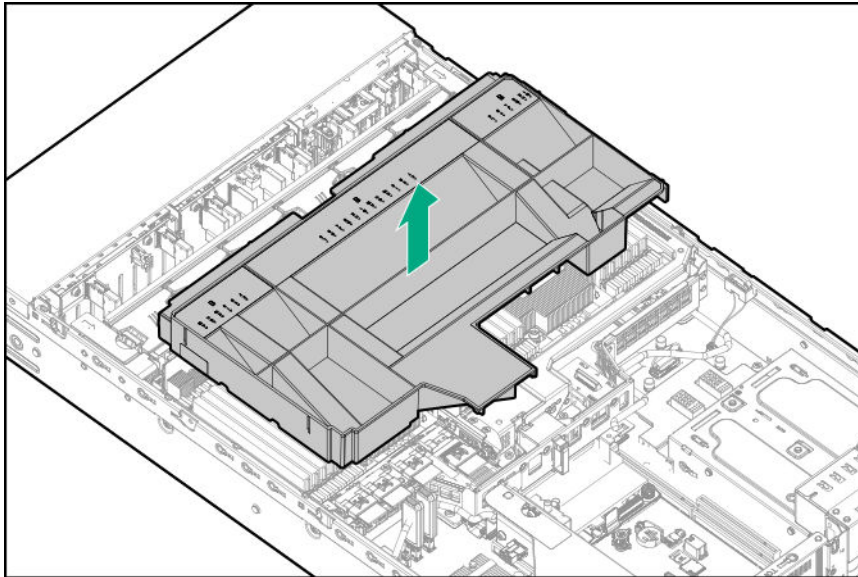
Installing the air baffle

The air baffle must be installed in one- and two-processor configurations.

⚠ **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. Install the air baffle.
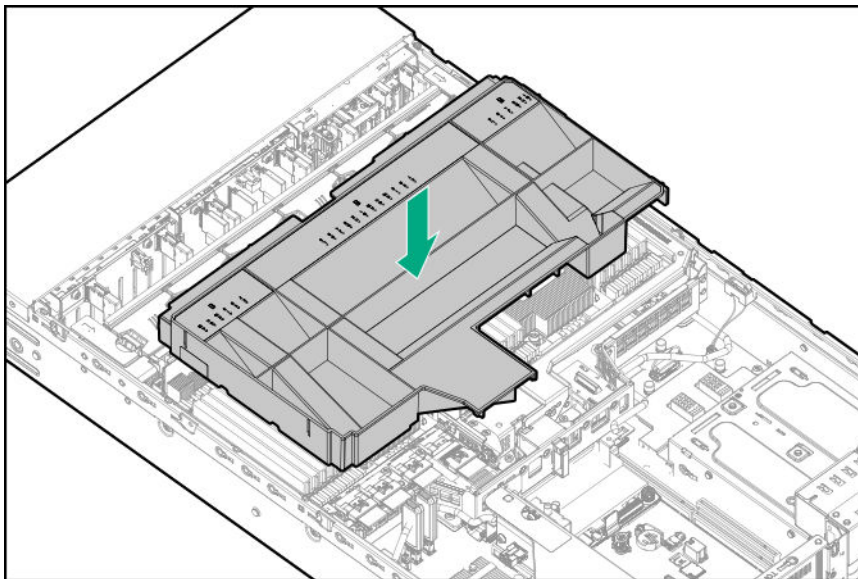
2. Install the access panel (**Installing the access panel** on page 41).
3. Install the server into the rack (**Installing the server into the rack** on page 34).
4. Connect each power cord to the server.
5. Connect each power cord to the power source.
6. Power up the server (**Powering up the server** on page 38).

Removing the PCIe riser cages

⚠️ **CAUTION:**

To prevent damage to the server or expansion boards, power down the server and remove all AC power cords before removing or installing the PCIe riser cage.

Procedure

1. Power down the server (**Power down the server** on page 38).
2. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.
3. Do one of the following:
   - Extend the server from the rack (**Extend the server from the rack** on page 38).
   - Remove the server from the rack (**Removing the server from the rack** on page 39).
4. Remove the access panel (**Removing the access panel** on page 40).
5. Disconnect all cables attached to the expansion boards in the PCIe riser cage.
6. Remove the riser cage:
   - Primary or secondary riser cage (the primary riser cage is shown)
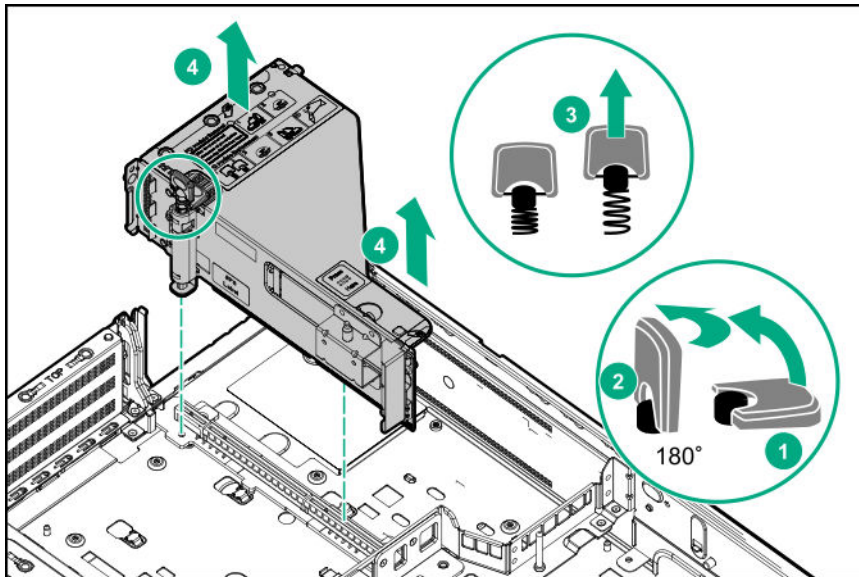
   - Tertiary riser cage
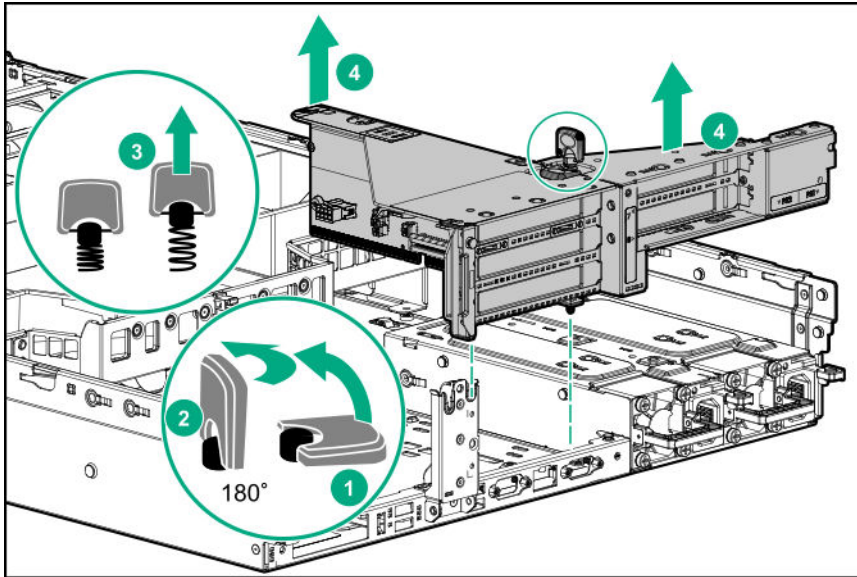
Installing the primary PCIe riser cage

⚠ **CAUTION:**

To prevent damage to the server or expansion boards, power down the server and remove all AC power cords before removing or installing the PCIe riser cage.

Procedure

1. Install the primary PCIe riser cage.
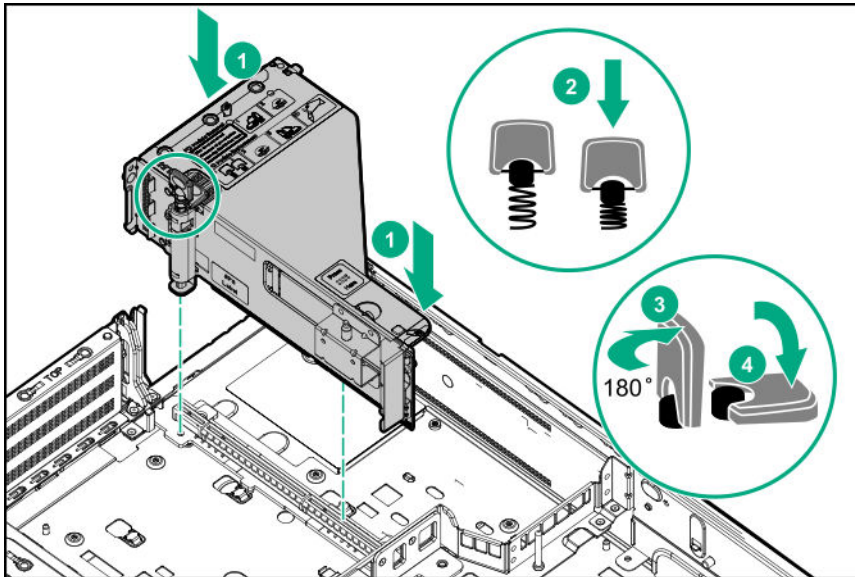
2. Install the access panel (**Installing the access panel** on page 41).
3. Install the server into the rack (**Installing the server into the rack** on page 34).
4. Connect each power cord to the server.
5. Connect each power cord to the power source.
6. Power up the server (**Powering up the server** on page 38).

Removing the fan cage

Procedure

1. Power down the server (**Power down the server** on page 38).
2. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.
3. Do one of the following:

   • Extend the server from the rack (**Extend the server from the rack** on page 38).
   • Remove the server from the rack (**Removing the server from the rack** on page 39).
4. Remove the access panel (**Removing the access panel** on page 40).
5. Remove the fan cage.

Installing the fan cage

Procedure

1. Install the fan cage.

2. Install the access panel (**Installing the access panel** on page 41).
3. Install the server into the rack (**Installing the server into the rack** on page 34).
4. Connect each power cord to the server.
5. Connect each power cord to the power source.
6. Power up the server (**Powering up the server** on page 38).

Removing the processor mezzanine tray

Procedure

1. Power down the server (**Power down the server** on page 38).
2. Remove all power:
    a. Disconnect each power cord from the power source.
    b. Disconnect each power cord from the server.
3. Do one of the following:

    • Extend the server from the rack (**Extend the server from the rack** on page 38).
    • Remove the server from the rack (**Removing the server from the rack** on page 39).
4. Remove the access panel (**Removing the access panel** on page 40).
5. Remove the processor mezzanine tray.
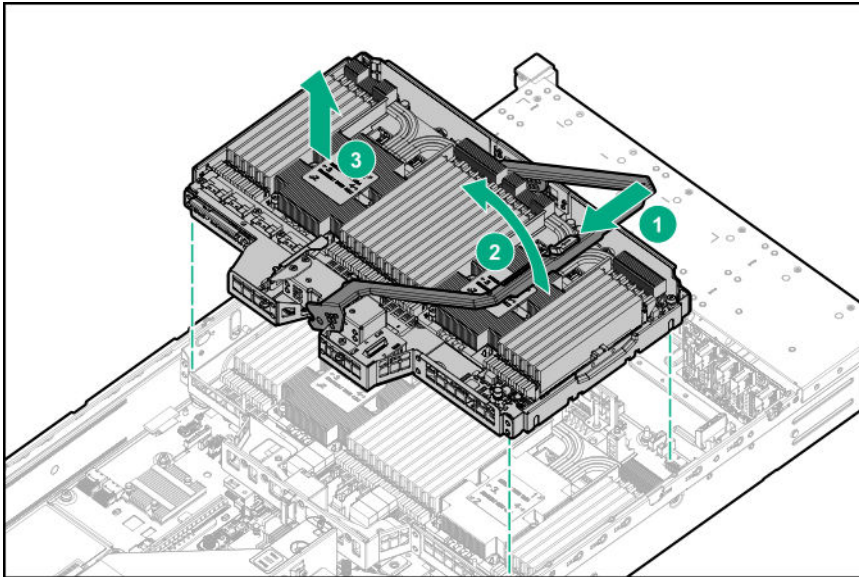
Removing the 2P pass-through performance board

Procedure

1. Power down the server (**Power down the server** on page 38).
2. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.
3. Do one of the following:

   • Extend the server from the rack (**Extend the server from the rack** on page 38).
   • Remove the server from the rack (**Removing the server from the rack** on page 39).
4. Remove the access panel (**Removing the access panel** on page 40).
5. Remove the pass-through board.
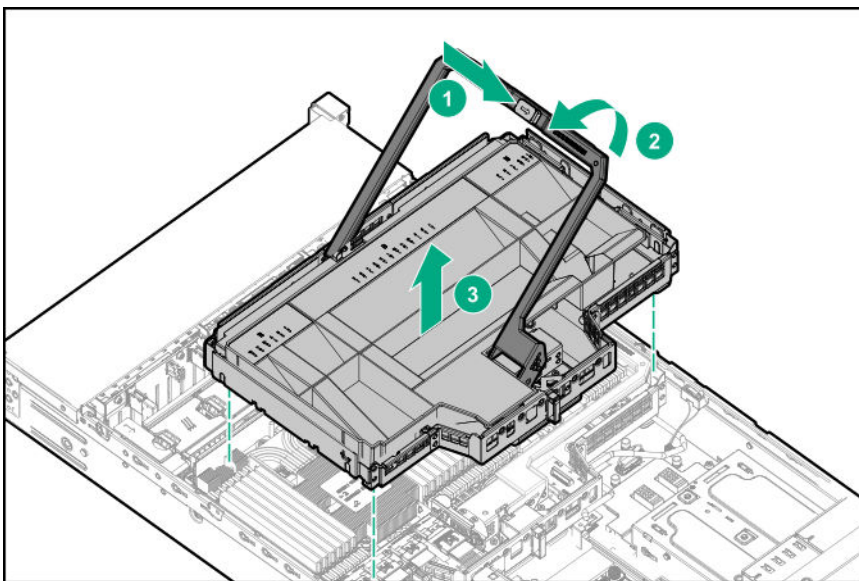
Installing hardware options

Before powering on the server for the first time, install all hardware options.

Hewlett Packard Enterprise 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**).

Installing a Systems Insight Display

Prerequisites

Before installing this option, be sure that you have the following:

- The components included with the hardware option kit
- T-10 Torx screwdriver

Procedure

1. Power down the server (**Power down the server** on page 38).
2. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.
3. Do one of the following:
   - Extend the server from the rack (**Extend the server from the rack** on page 38).
   - Remove the server from the rack (**Removing the server from the rack** on page 39).
4. Remove the access panel (**Removing the access panel** on page 40).
5. If installed, do the following:
   a. Remove the air baffle (**Removing the air baffle** on page 42).
   b. Remove the processor mezzanine tray (**Removing the processor mezzanine tray** on page 47).
   c. Remove the 2P pass-through performance board (**Removing the 2P pass-through performance board** on page 48).
6. Remove the fan cage (**Removing the fan cage** on page 46).

   △ **CAUTION:**

   When routing cables, always be sure that the cables are not in a position where they can be pinched or crimped.

7. Remove the cabled power switch module. Retain the T-10 screw for later use.
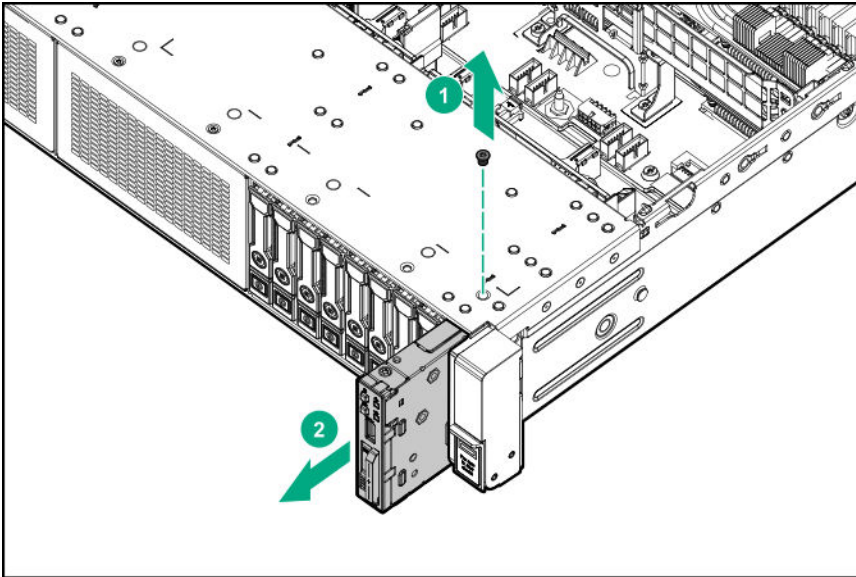
8. Route the cable through the opening in the front of the server, and then install the SID power switch module. Secure the module using the existing screw.
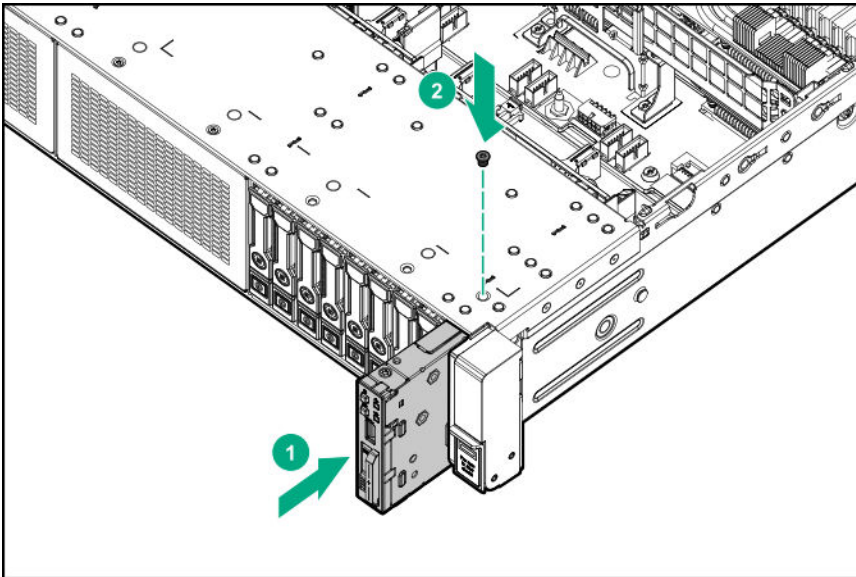
9. Cable the SID module to the system board.

10. If removed, do the following:

   a. Install the air baffle (**Installing the air baffle** on page 43).

   b. Install the processor mezzanine tray (**Installing a processor mezzanine tray** on page 87).

   c. Install the 2P pass-through performance board (**Installing a 2P pass-through performance board** on page 88).
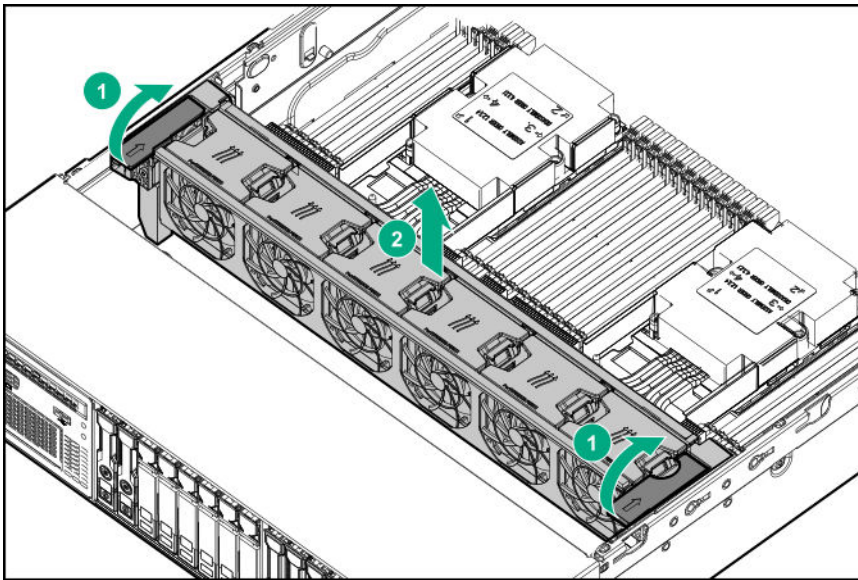
11. Install the fan cage.

12. Install the access panel (**Installing the access panel** on page 41).

13. Install the server into the rack (**Installing the server into the rack** on page 34).

14. Connect each power cord to the server.

15. Connect each power cord to the power source.

16. Power up the server (**Powering up the server** on page 38).

Installing an eight-bay SFF HDD drive cage

The eight-bay SFF HDD drive cage can be installed in the following drive boxes in the front of the server. See "**Front panel components** on page 7."

- Drive box 1
- Drive box 2
- Drive box 3

Prerequisites

Before installing this option, be sure that you have the following:

- T-10 Torx screwdriver
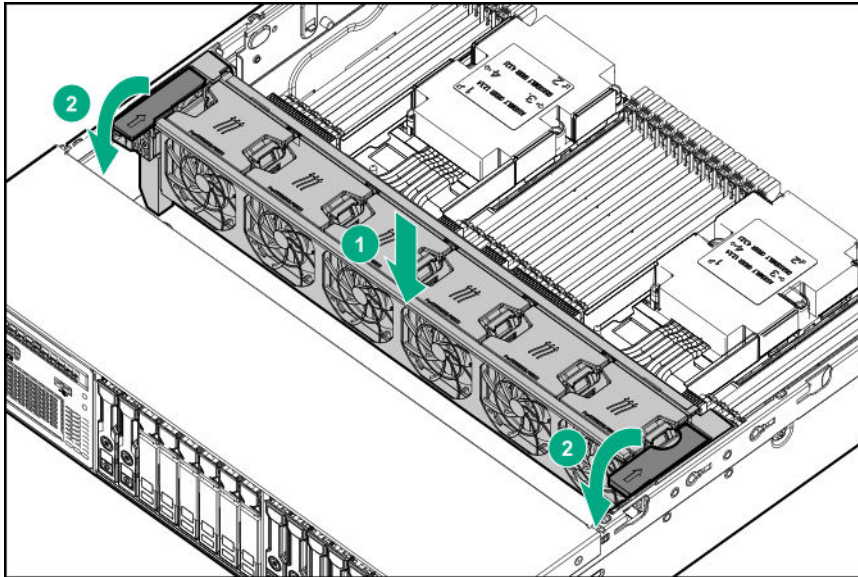- The components included with the hardware option kit

Procedure

1. Power down the server (**Power down the server** on page 38).

2. Remove all power:

   a. Disconnect each power cord from the power source.

   b. Disconnect each power cord from the server.

3. Do one of the following:

- Extend the server from the rack (**Extend the server from the rack** on page 38).
- Remove the server from the rack (**Removing the server from the rack** on page 39).

4. Remove the access panel (**Removing the access panel** on page 40).

5. If installed, do the following:

   a. Remove the air baffle (**Removing the air baffle** on page 42).

   b. Remove the processor mezzanine tray (**Removing the processor mezzanine tray** on page 47).

   c. Remove the 2P pass-through performance board (**Removing the 2P pass-through performance board** on page 48).

6. Remove the fan cage (**Removing the fan cage** on page 46).

7. Remove the screws, and then remove the drive bay blank.

8. Install the drive cage.

9. Route and connect the cables depending on the server configuration. For more information, see "**Cabling** on page 109."

   To cable the drive cage to the HPE 12G SAS Expander, see "**Installing the HPE 12G SAS Expander Card** on page 96."

10. Install the fan cage.

11. If removed, do the following:

a. Install the air baffle (**Installing the air baffle** on page 43).

b. Install the processor mezzanine tray (**Installing a processor mezzanine tray** on page 87).

c. Install the 2P pass-through performance board (**Installing a 2P pass-through performance board** on page 88).

12. Install the access panel (**Installing the access panel** on page 41).

13. Install the server into the rack (**Installing the server into the rack** on page 34).

14. Connect each power cord to the server.

15. Connect each power cord to the power source.

16. Power up the server (**Powering up the server** on page 38).

Installing an eight-bay NVME SSD drive cage

The eight-bay NVME SSD drive cage can only be installed in drive box 2 in the front of the server. See "**Front panel components** on page 7."

Prerequisites

Before installing this option, be sure that you have the following:

- T-10 Torx screwdriver
- The components included with the hardware option kit

Procedure

1. Power down the server (**Power down the server** on page 38).

2. Remove all power:

   a. Disconnect each power cord from the power source.

   b. Disconnect each power cord from the server.

3. Do one of the following:

   - Extend the server from the rack (**Extend the server from the rack** on page 38).
   - Remove the server from the rack (**Removing the server from the rack** on page 39).

4. Power down the server (**Power down the server** on page 38).

5. Remove the access panel (**Removing the access panel** on page 40).

6. If installed, do the following:

   a. Remove the air baffle (**Removing the air baffle** on page 42).

   b. Remove the processor mezzanine tray (**Removing the processor mezzanine tray** on page 47).

   c. Remove the 2P pass-through performance board (**Removing the 2P pass-through performance board** on page 48).

7. Remove the fan cage (**Removing the fan cage** on page 46).

8. Remove the screws, and then remove the drive bay blank.
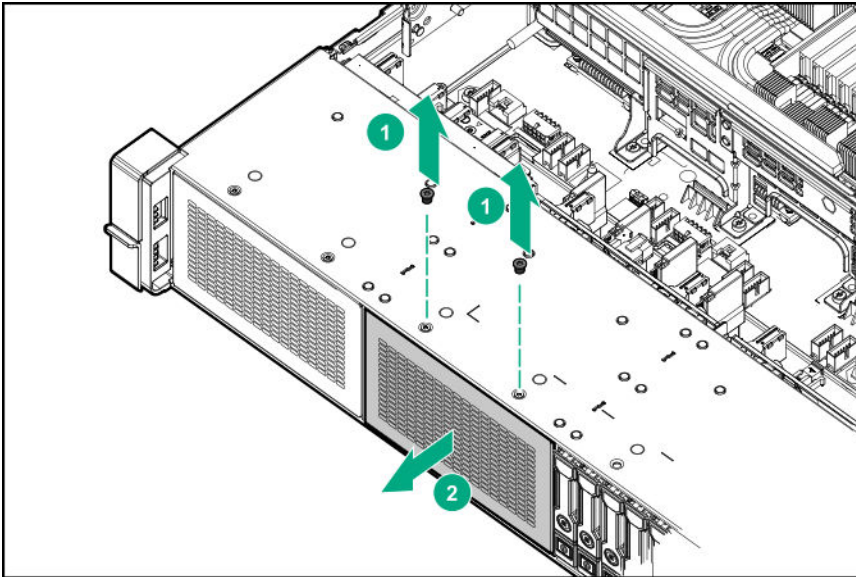
9. If drive blanks are installed in the drive cage assembly, remove the drive blanks. Retain the drive blanks for use in empty drive bays.

10. Install the drive cage.
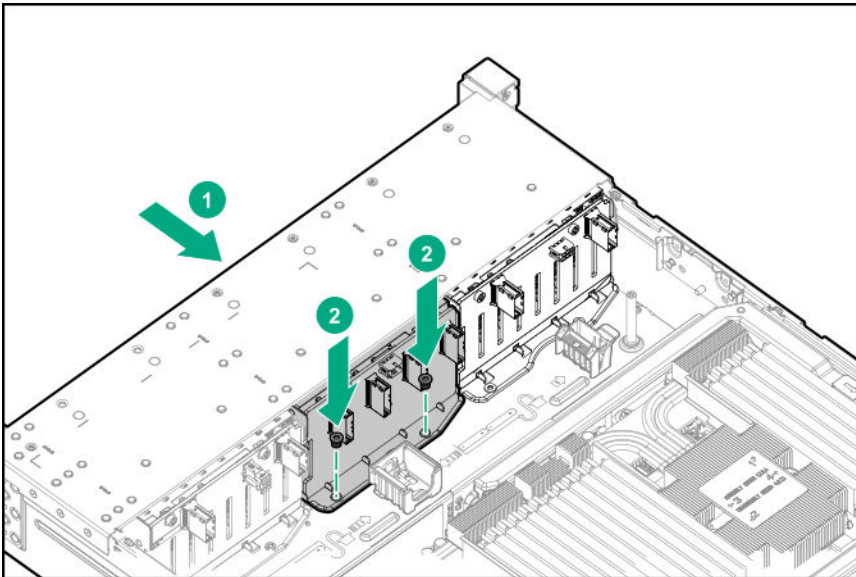
11. Route and connect the cables depending on the server configuration. For more information, see "**Cabling** on page 109."

    To cable the drive cage to the HPE 12G SAS Expander, see "**Installing the HPE 12G SAS Expander Card** on page 96."

12. If removed, do the following:

    a. Install the air baffle (**Installing the air baffle** on page 43).

    b. Install the processor mezzanine tray (**Installing a processor mezzanine tray** on page 87).

    c. Install the 2P pass-through performance board (**Installing a 2P pass-through performance board** on page 88).

13. Install the fan cage.

14. Install the access panel (**Installing the access panel** on page 41).

15. Install the server into the rack (**Installing the server into the rack** on page 34).

16. Connect each power cord to the server.

17. Connect each power cord to the power source.

18. Power up the server (**Powering up the server** on page 38).

Installing a two-bay NVMe SSD/six-bay SFF HDD cage

The two-bay NVME SSD/six-bay SFF HDD drive cage can be installed in the following drive box locations in the front of the server. For more information, see "**Front panel components** on page 7."

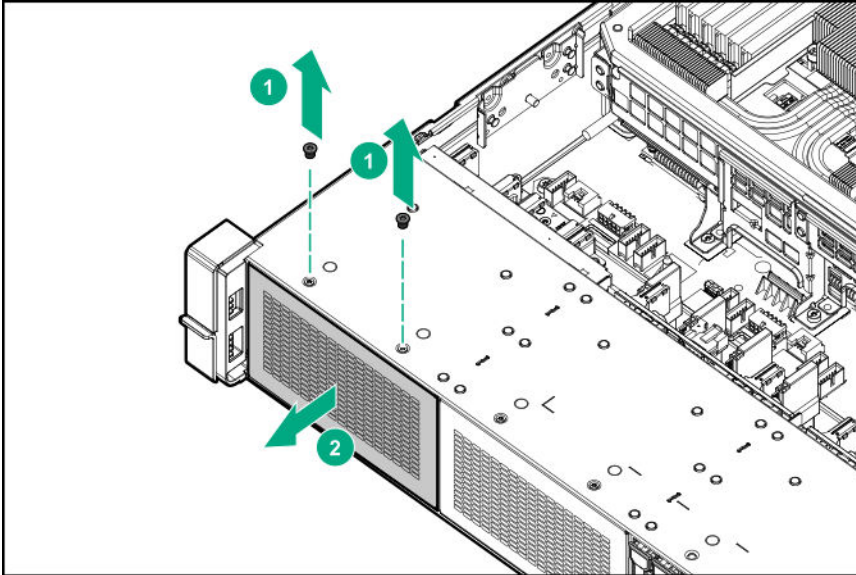- Drive box 1
- Drive box 2
- Drive box 3

Prerequisites

Before installing this option, be sure that you have the following:

- T-10 Torx screwdriver
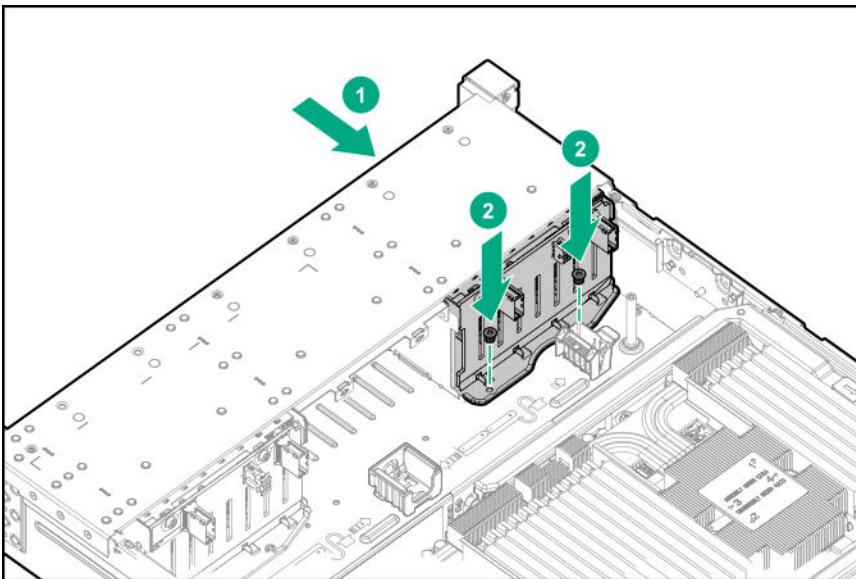- The components included with the hardware option kit

Procedure

1. Power down the server (**Power down the server** on page 38).

2. Remove all power:

   a. Disconnect each power cord from the power source.

   b. Disconnect each power cord from the server.

3. Do one of the following:

   - Extend the server from the rack (**Extend the server from the rack** on page 38).
   - Remove the server from the rack (**Removing the server from the rack** on page 39).

4. Remove the access panel (**Removing the access panel** on page 40).

5. If installed, do the following:

   a. Remove the air baffle (**Removing the air baffle** on page 42).

   b. Remove the processor mezzanine tray (**Removing the processor mezzanine tray** on page 47).

   c. Remove the 2P pass-through performance board (**Removing the 2P pass-through performance board** on page 48).

6. Remove the fan cage (**Removing the fan cage** on page 46).

7. Remove the screws, and then remove the drive bay blank.

8. Install the drive cage.

9. Route and connect the cables depending on the server configuration. For more information, see "**Cabling** on page 109."

   To cable the drive cage to the HPE 12G SAS Expander, see "**Installing the HPE 12G SAS Expander Card** on page 96."

10. If removed, do the following:

    a. Install the air baffle (**Installing the air baffle** on page 43).

    b. Install the processor mezzanine tray (**Installing a processor mezzanine tray** on page 87).

    c. Install the 2P pass-through performance board (**Installing a 2P pass-through performance board** on page 88).

11. Install the fan cage.

12. Install the access panel (**Installing the access panel** on page 41).

13. Install the server into the rack (**Installing the server into the rack** on page 34).

14. Connect each power cord to the server.

15. Connect each power cord to the power source.

16. Power up the server (**Powering up the server** on page 38).

Installing a universal media bay

Prerequisites

Before installing this option, be sure that you have the following:

- The components included with the hardware option kit
- T-10 Torx screwdriver

Procedure

1. Power down the server (**Power down the server** on page 38).

2. Remove all power:

   a. Disconnect each power cord from the power source.

   b. Disconnect each power cord from the server.

3. Do one of the following:

- Extend the server from the rack (**Extend the server from the rack** on page 38).
- Remove the server from the rack (**Removing the server from the rack** on page 39).

4. Remove the access panel (**Removing the access panel** on page 40).
5. If installed, do the following:
   a. Remove the air baffle (**Removing the air baffle** on page 42).
   b. Remove the processor mezzanine tray (**Removing the processor mezzanine tray** on page 47).
   c. Remove the 2P pass-through performance board (**Removing the 2P pass-through performance board** on page 48).
6. Remove the fan cage (**Removing the fan cage** on page 46).
7. Remove the screws, and then remove the drive bay blank.

8. Route the cables through the opening, and then install the universal media bay.
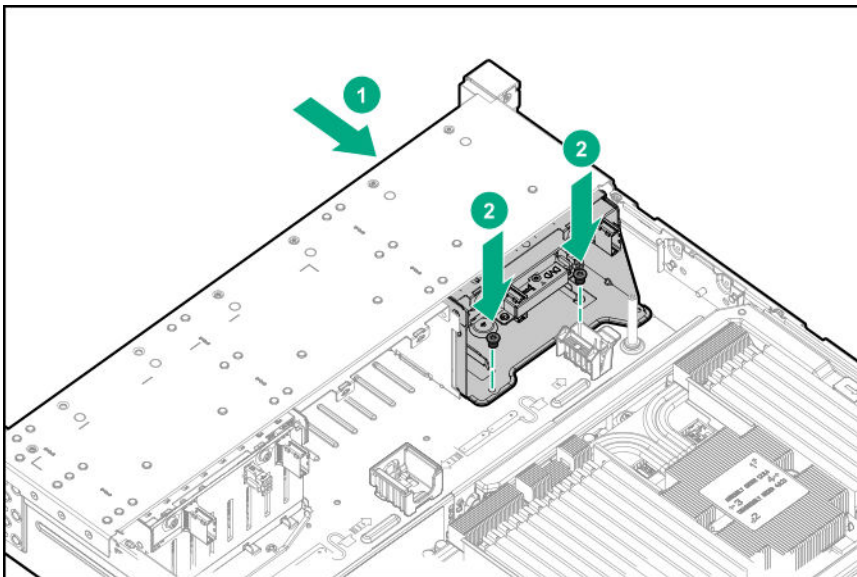
9. (Optional) Install the optical disk drive.
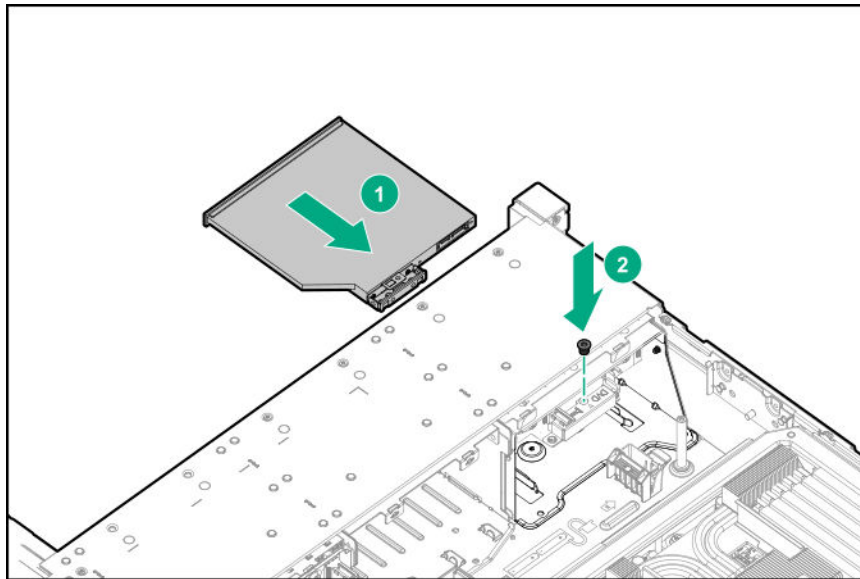
10. Connect the universal media bay USB and display port cables (orange) and the optional optical drive cable (blue).
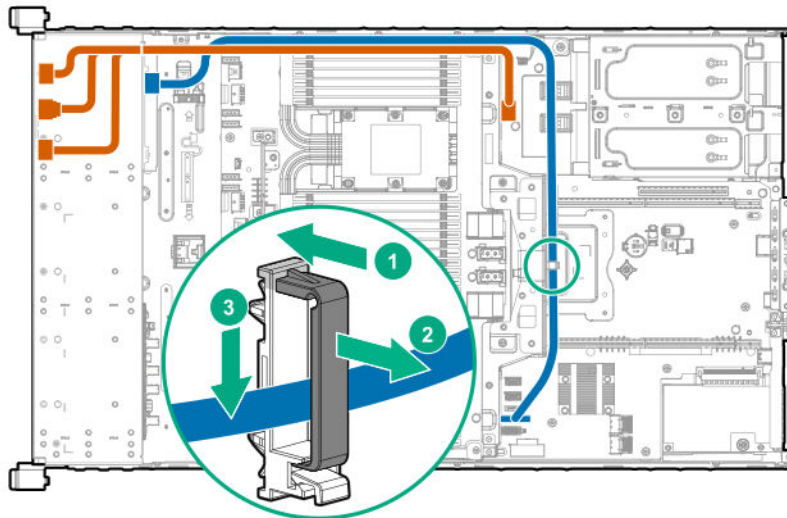
11. If removed, do the following:
    a. Install the air baffle (**Installing the air baffle** on page 43).
    b. Install the processor mezzanine tray (**Installing a processor mezzanine tray** on page 87).
    c. Install the 2P pass-through performance board (**Installing a 2P pass-through performance board** on page 88).
12. Install the fan cage.
13. Install the access panel (**Installing the access panel** on page 41).
14. Install the server into the rack (**Installing the server into the rack** on page 34).
15. Connect each power cord to the server.
16. Connect each power cord to the power source.
17. Power up the server (**Powering up the server** on page 38).

Installing a two-bay SFF drive cage

The front bay installation requires a universal media bay to be installed.
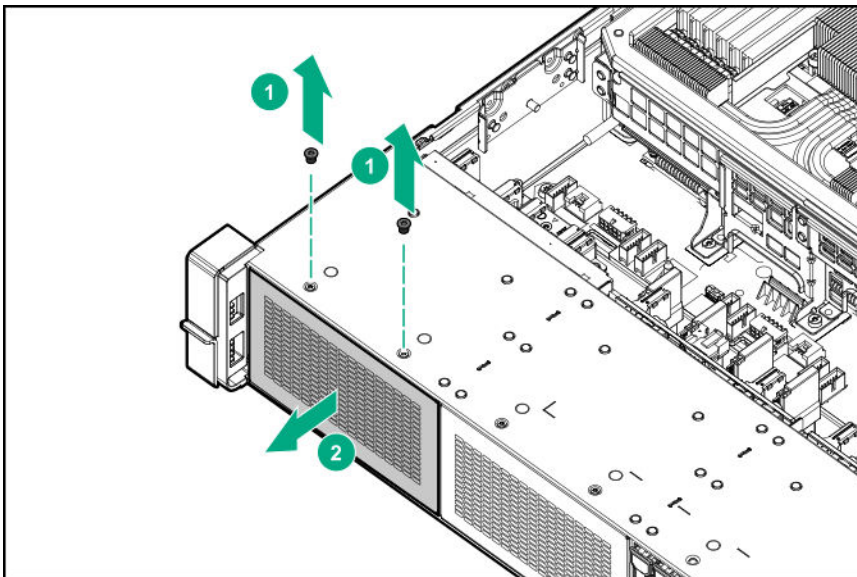
To install the component:

Prerequisites

Before installing this option, be sure that you have the following:
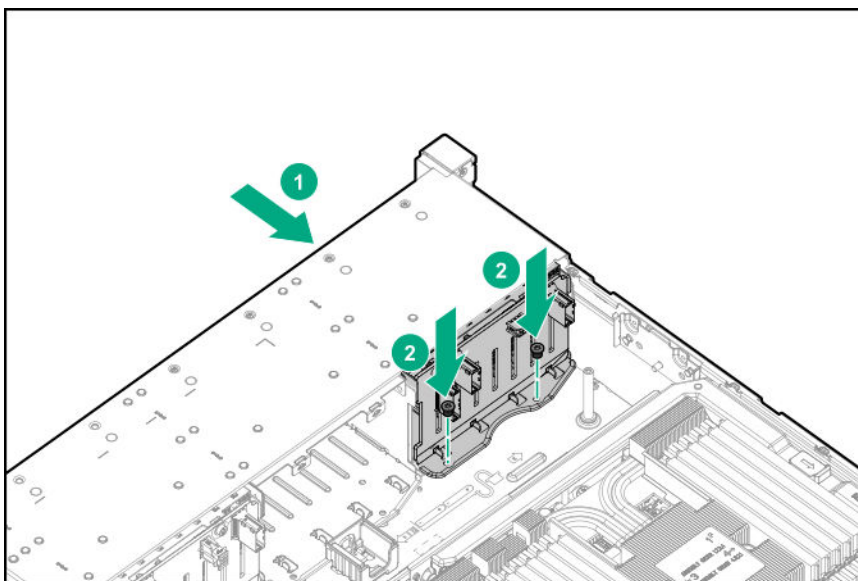
- T-10 Torx screwdriver
- The components included with the hardware option kit

Procedure

1. Power down the server (**Power down the server** on page 38).
2. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.
3. Do one of the following:

   - Extend the server from the rack (**Extend the server from the rack** on page 38).
   - Remove the server from the rack (**Removing the server from the rack** on page 39).
4. Remove the access panel (**Removing the access panel** on page 40).
5. If installed, do the following:
   a. Remove the air baffle (**Removing the air baffle** on page 42).
   b. Remove the processor mezzanine tray (**Removing the processor mezzanine tray** on page 47).
   c. Remove the 2P pass-through performance board (**Removing the 2P pass-through performance board** on page 48).
6. Remove the fan cage (**Removing the fan cage** on page 46).
7. Remove the screws, and then remove the drive bay blank.

8. Remove the optical disk drive tray from the universal media bay.
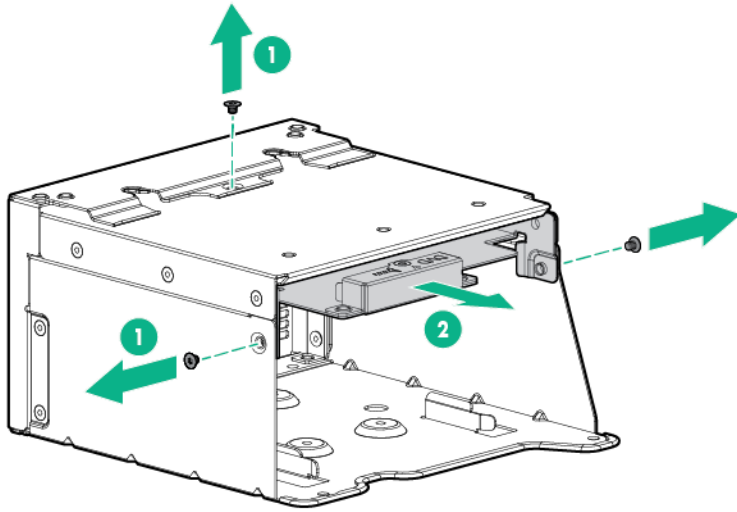
9. Remove the SFF drive blank from the universal media bay.
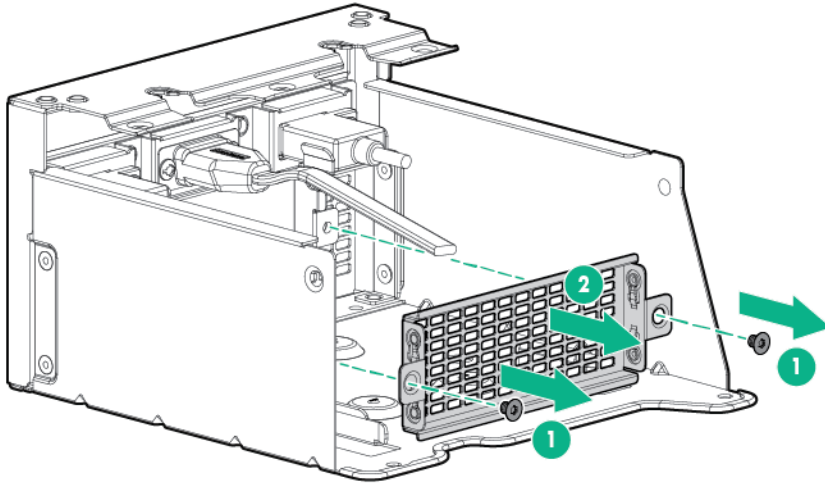
10. Install the grommets onto the underside of the drive cage.
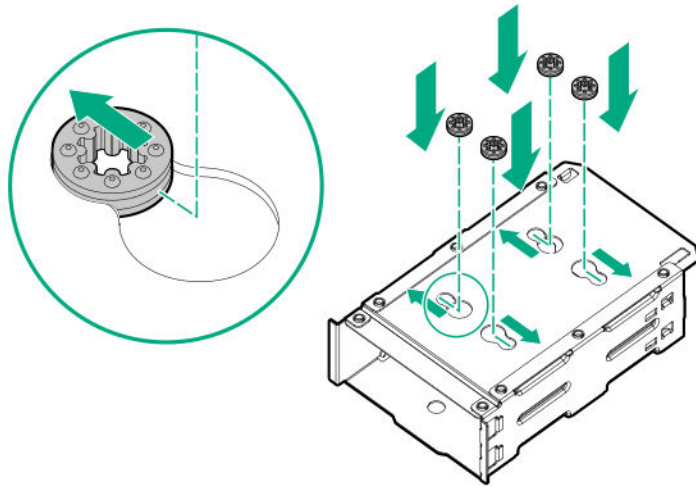
11. Install the drive cage into the universal media bay.
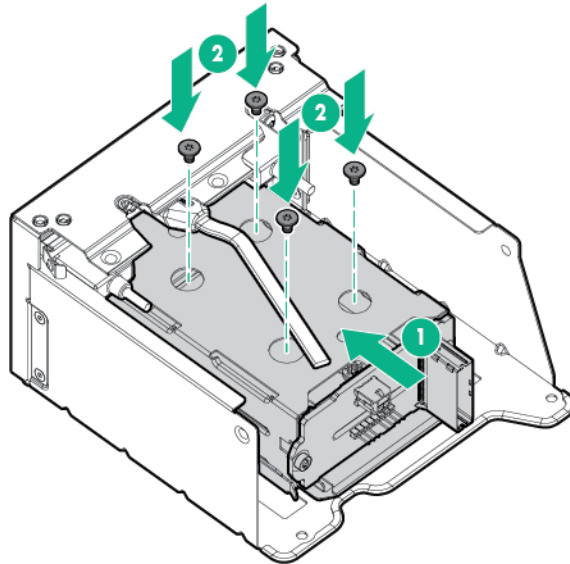
12. Install the universal media bay.
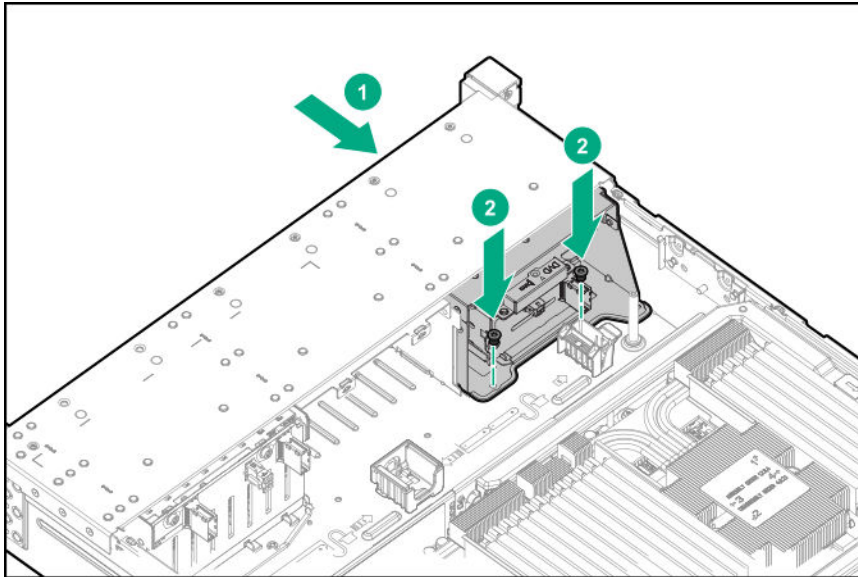
13. Connect the universal media bay USB and display port cables (orange) and the optional optical drive cable (blue).
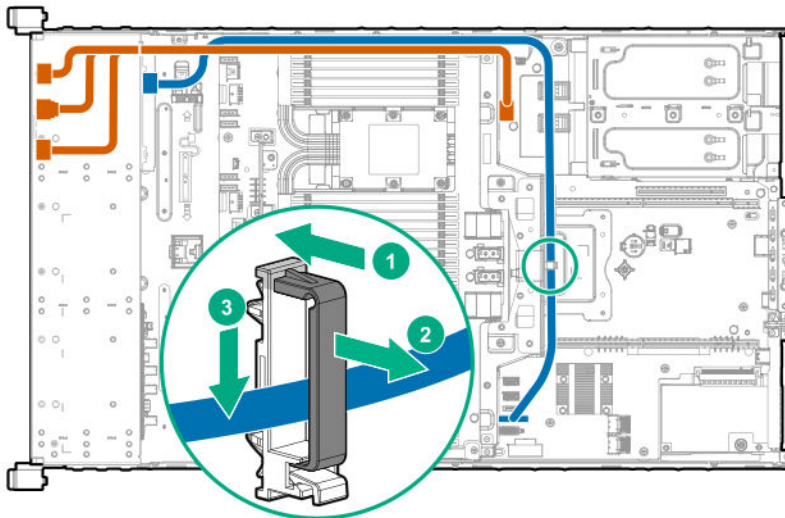
14. Route and connect the drive backplane power cable.
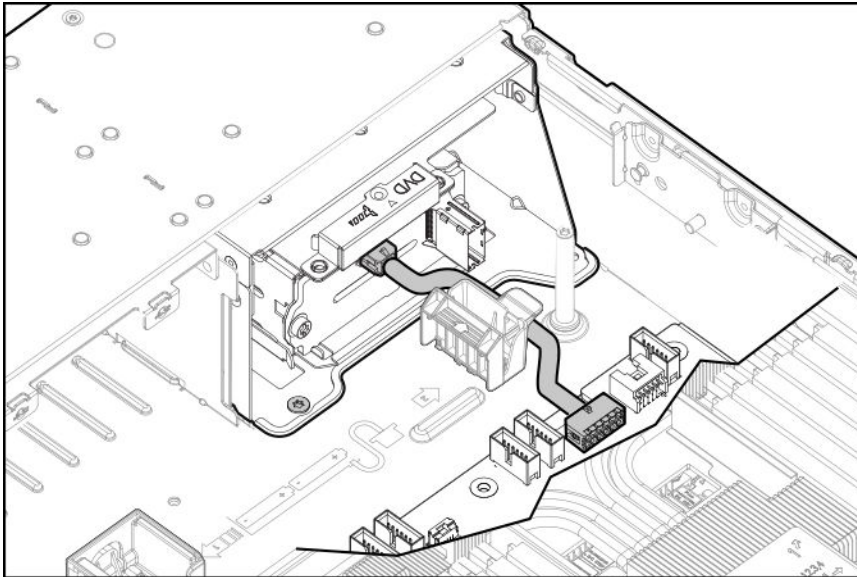
15. Route and connect the cables depending on the types of drives installed and the server configuration. For more information, see "**Cabling** on page 109."

    To cable the drive cage to the HPE 12G SAS Expander, see "**Installing the HPE 12G SAS Expander Card** on page 96."

16. If removed, do the following:
    a. Install the air baffle (**Installing the air baffle** on page 43).
    b. Install the processor mezzanine tray (**Installing a processor mezzanine tray** on page 87).
    c. Install the 2P pass-through performance board (**Installing a 2P pass-through performance board** on page 88).

17. Install the fan cage.
18. Install the access panel (**Installing the access panel** on page 41).
19. Install the server into the rack (**Installing the server into the rack** on page 34).
20. Connect each power cord to the server.
21. Connect each power cord to the power source.
22. Power up the server (**Powering up the server** on page 38).

Installing a hot-plug SAS or SATA drive

△ **CAUTION:**

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

Procedure

1. Remove the drive blank.
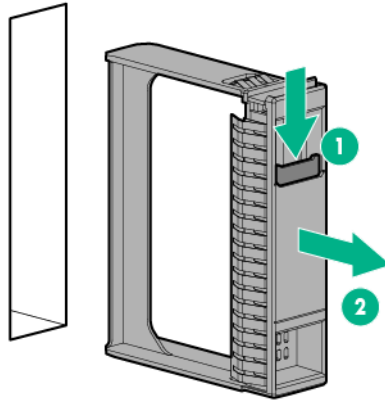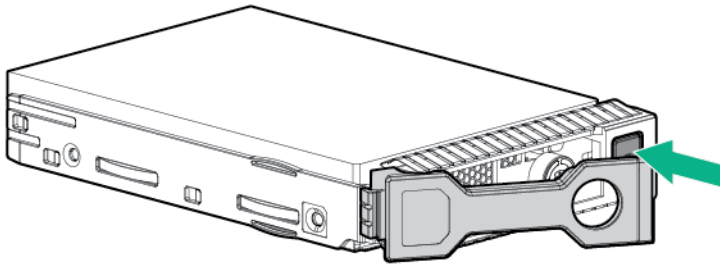
2. Prepare the drive.
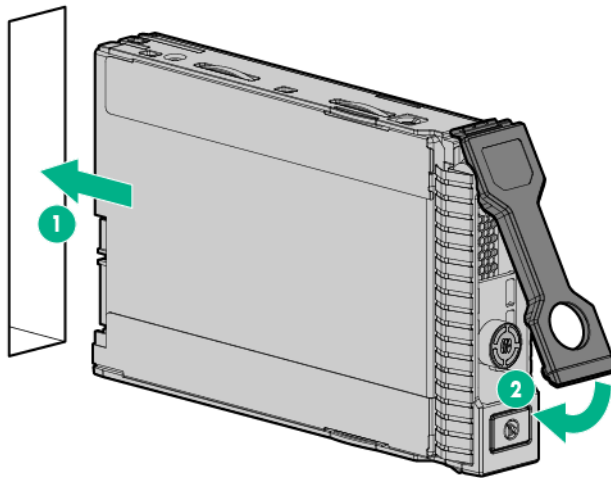
3. Install the drive.

Installing an NVMe drive

⚠ **CAUTION:**

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

Procedure

1. Remove the drive blank.
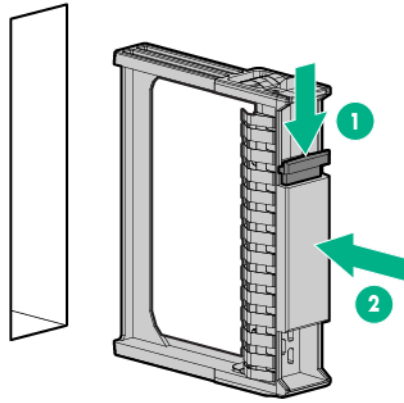
2. Prepare the drive.
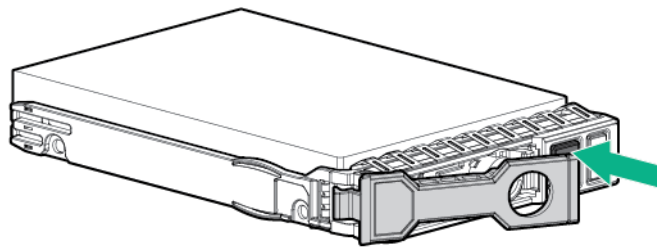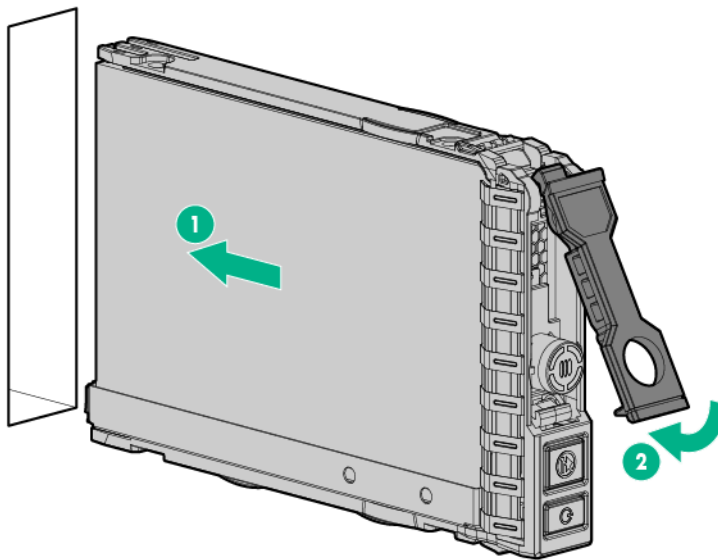
3. Install the drive.

4. Observe the LED status of the drive.

Installing an internal USB drive

Prerequisites

Before installing this option, be sure that you have the following:

- T-10 Torx screwdriver

Procedure

1. Power down the server (**Power down the server** on page 38).
2. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.
3. Do one of the following:
   - Extend the server from the rack (**Extend the server from the rack** on page 38).
   - Remove the server from the rack (**Removing the server from the rack** on page 39).
4. Remove the access panel (**Removing the access panel** on page 40).
5. Locate the internal USB connectors on the system board (**System board components** on page 19).
6. Install the USB drive.
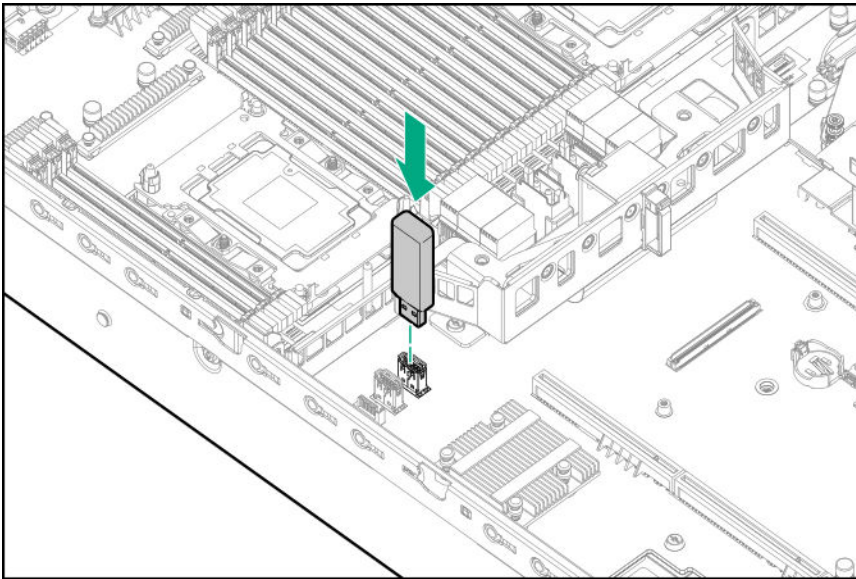
7. Install the access panel (**Installing the access panel** on page 41).
8. Install the server into the rack (**Installing the server into the rack** on page 34).
9. Connect each power cord to the server.
10. Connect each power cord to the power source.
11. Power up the server (**Powering up the server** on page 38).
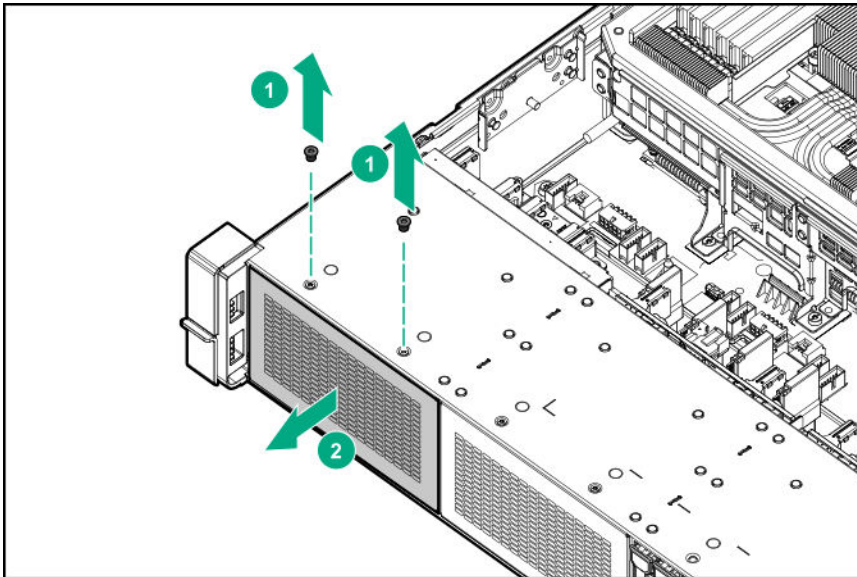
Installing a 4-port NVMe mezzanine card

Prerequisites

Before installing this option, be sure that you have the following:

- T-10 Torx screwdriver
- The components included with the hardware option kit

Procedure

1. Power down the server (**Power down the server** on page 38).
2. Remove all power:
    a. Disconnect each power cord from the power source.
    b. Disconnect each power cord from the server.
3. Do one of the following:

    •   Extend the server from the rack (**Extend the server from the rack** on page 38).
    •   Remove the server from the rack (**Removing the server from the rack** on page 39).
4. Remove the access panel (**Removing the access panel** on page 40).
5. Install the bracket.
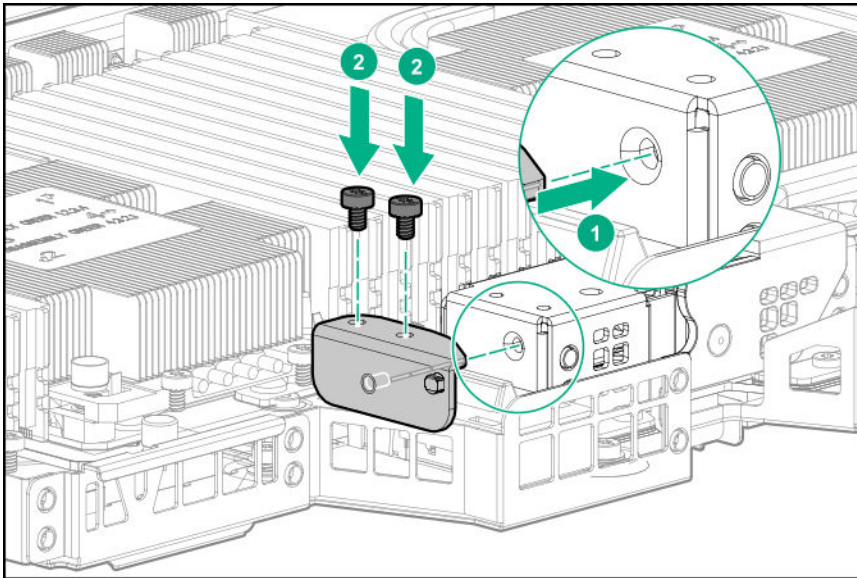
6. Install the mezzanine card.
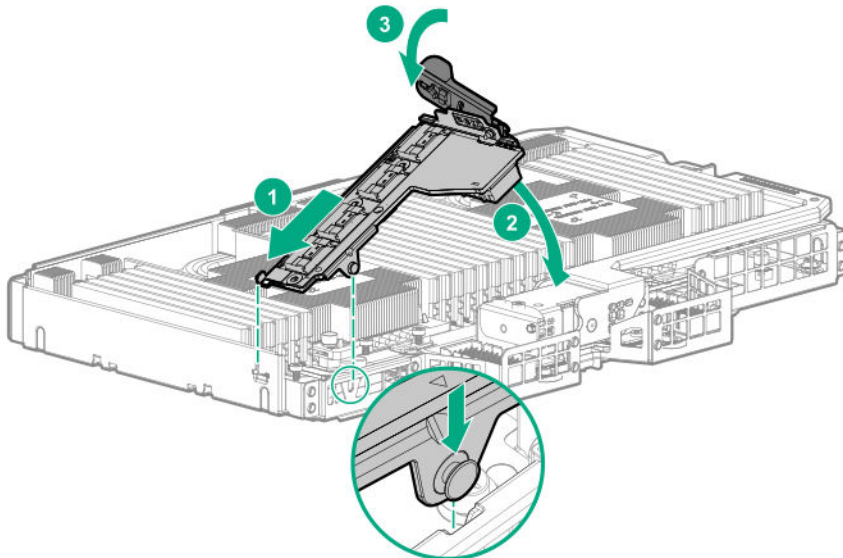
7. Connect the cables to the mezzanine card depending on the server configuration:

    •   Eight-bay NVMe SSD drive cage installed in box 2

- Two-bay NVMe/Six-bay SFF HDD drive cages installed in boxes 1–3
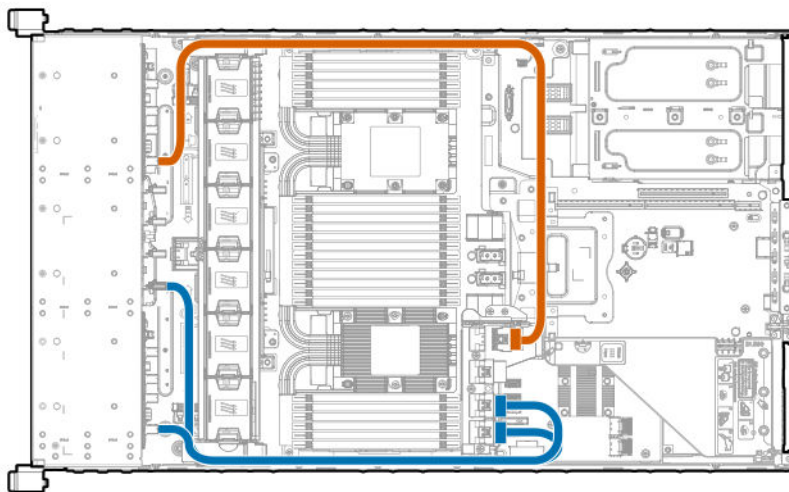
8. Install the access panel (**Installing the access panel** on page 41).
9. Install the server into the rack (**Installing the server into the rack** on page 34).
10. Connect each power cord to the server.
11. Connect each power cord to the power source.
12. Power up the server (**Powering up the server** on page 38).

Riser and riser cage options

Installing the secondary PCIe riser cage

Prerequisites

Before installing this option, be sure that you have the following:

- T-10 Torx screwdriver
- The components included with the hardware option kit

Procedure

1. Power down the server (**Power down the server** on page 38).
2. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.
3. Do one of the following:

   • Extend the server from the rack (**Extend the server from the rack** on page 38).
   • Remove the server from the rack (**Removing the server from the rack** on page 39).
4. Remove the access panel (**Removing the access panel** on page 40).
5. Remove the secondary riser cage blank.

6. When installing the secondary PCIe riser cage for the first time, remove the fastener from the riser cage.
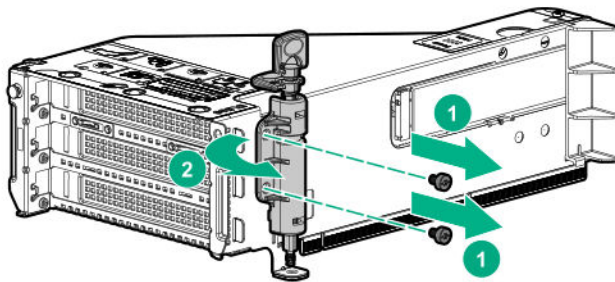
7. Install the additional fastener supplied with the option kit onto the riser cage.
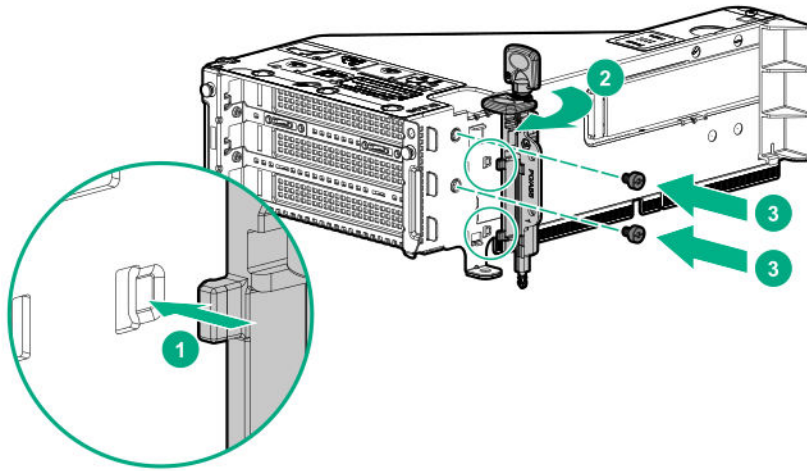
8. Install an expansion board into the secondary PCIe riser cage (**Installing an expansion board** on page 77).

9. Install the secondary PCIe riser cage.
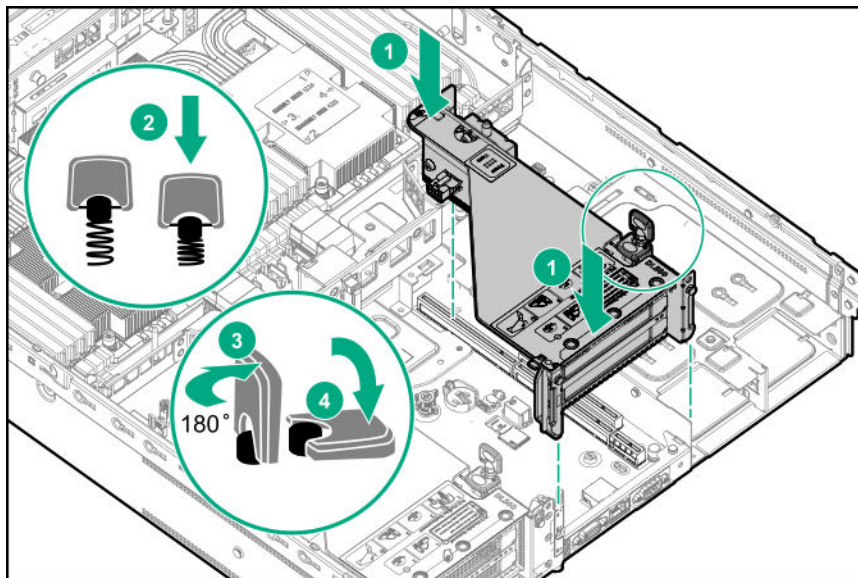
10. Connect any required cables to the expansion board, if necessary.
11. Install the access panel (**Installing the access panel** on page 41).
12. Install the server into the rack (**Installing the server into the rack** on page 34).
13. Connect each power cord to the server.
14. Connect each power cord to the power source.
15. Power up the server (**Powering up the server** on page 38).

Installing a tertiary PCIe cage

△ **CAUTION:**
To prevent damage to the server or expansion boards, power down the server and remove all AC power cords before removing or installing the PCI riser cage.

Prerequisites

Before installing this option, be sure that you have the following:

- T-10 Torx screwdriver
- The components included with the hardware option kit

Procedure

1. Power down the server (**Power down the server** on page 38).
2. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.
3. Do one of the following:

   - Extend the server from the rack (**Extend the server from the rack** on page 38).
   - Remove the server from the rack (**Removing the server from the rack** on page 39).
4. Remove the access panel (**Removing the access panel** on page 40).
5. Remove the secondary riser cage blank.

6. Remove the power cage blank.
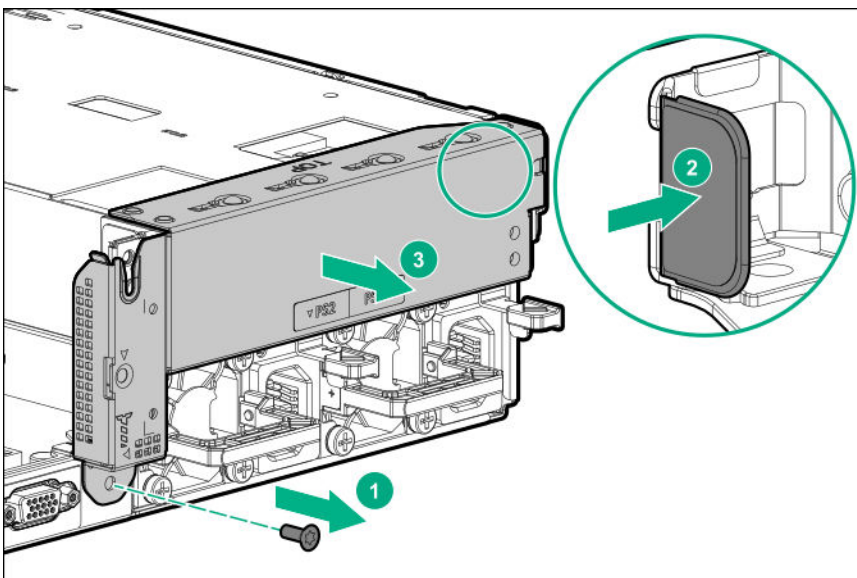
7. Install the tertiary riser cage.
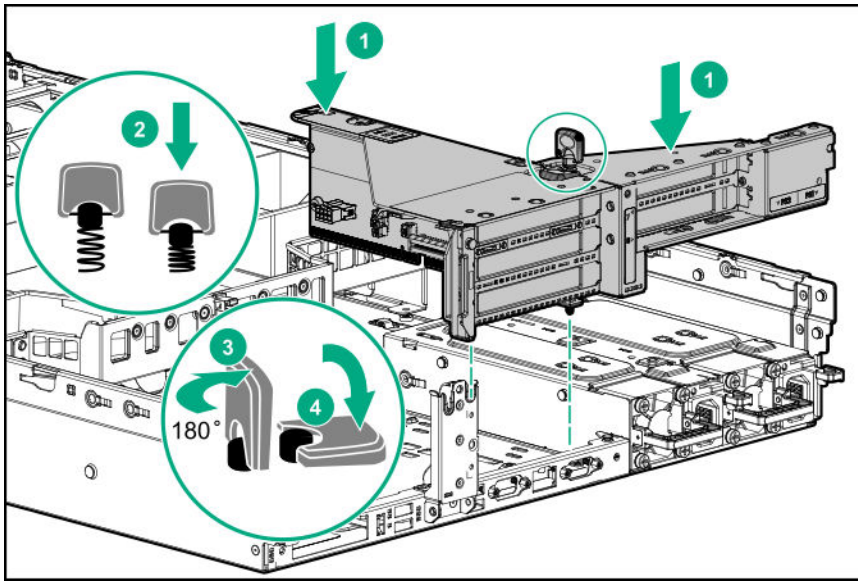
8. Install the access panel (**Installing the access panel** on page 41).
9. Install the server into the rack (**Installing the server into the rack** on page 34).
10. Connect each power cord to the server.
11. Connect each power cord to the power source.
12. Power up the server (**Powering up the server** on page 38).

Installing riser board options

The server supports three PCIe riser cages that can be configured with different riser boards.

Primary PCIe Riser Board

The primary PCIe riser cage supports installation of the following riser boards:

- Quad Slimline riser board with 4 x8 Slimline NVMe ports.
- 3-slot riser board with 3 x8 connections and 1 x8 Slimline NVMe connection.
- 3-slot riser board with 2 x8, 1 x16, and 2 M.2 SATA connections.
- 3-slot riser board with 2 x8 and 1 x16 connections.
- 2-slot riser board with 2 x16 connections.

Secondary PCIe Riser Board

The secondary PCIe riser cage supports installation of the following riser boards:

- Quad Slimline riser board with 4 x8 Slimline NVMe connections.
- 3-slot riser board with 3 x8 connections and 1 x8 Slimline NVMe port.
- 3-slot riser board with 2 x8 and 1 x16 connections.
- 2-slot riser board with 2 x16 connections.

Tertiary PCIe Riser Board

The tertiary PCIe riser cage supports installation of the following riser boards:

- 2-slot riser with 2 x8 connections.
- 2-slot riser with 1 x8 connection and 1 x8 Slimline NVMe port.
- 2-port riser with 2 x8 Slimline NVMe connections.

# Installing a riser board into the primary and secondary PCIe riser cages

Prerequisites

Before installing this option, be sure that you have the following:

- T-10 Torx screwdriver
- The components included with the hardware option kit

Procedure

1. Power down the server (**Power down the server** on page 38).
2. Remove all power:

    a. Disconnect each power cord from the power source.

    b. Disconnect each power cord from the server.
3. Do one of the following:

    - Extend the server from the rack (**Extend the server from the rack** on page 38).
    - Remove the server from the rack (**Removing the server from the rack** on page 39).
4. Remove the access panel (**Removing the access panel** on page 40).
5. Disconnect all cables attached to the expansion boards in the PCIe riser cage.
6. Remove the riser cage (**Removing the PCIe riser cages** on page 44).
7. If installed, remove any expansion boards installed on the riser board.
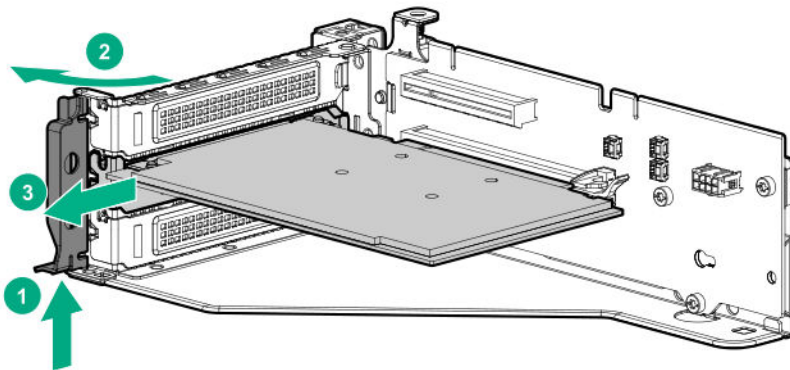
8. If installed, remove the riser board installed in the riser cage.
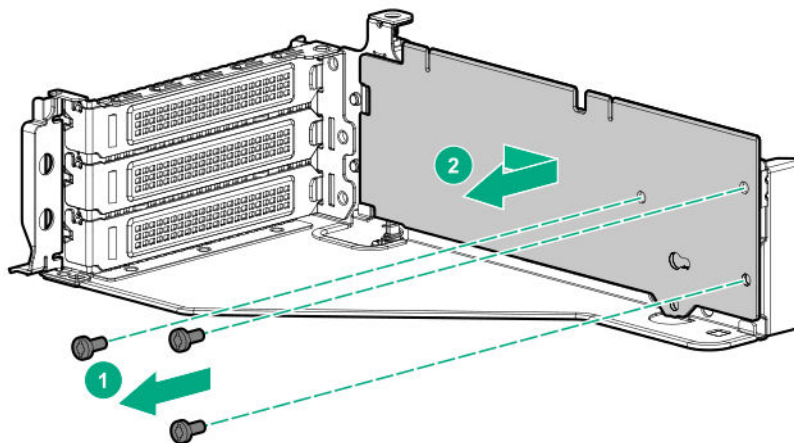
9. Align the screw holes on the riser board with the holes on the riser cage, and then install the riser board.
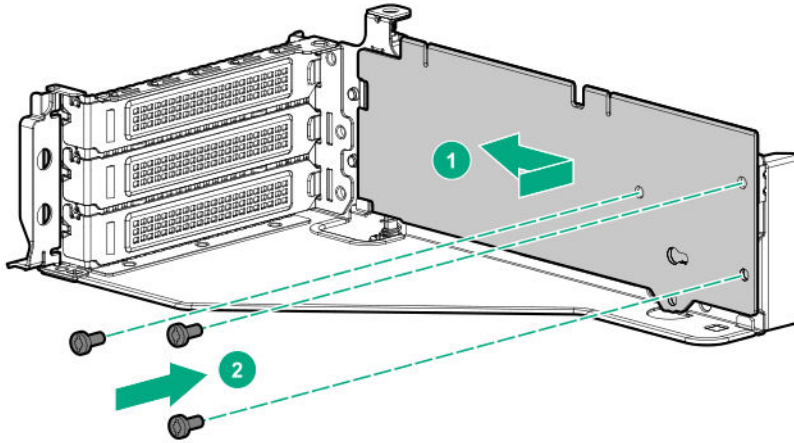
10. Do one of the following:

    • Install the primary PCIe riser cage (**Installing the primary PCIe riser cage** on page 45).
    • Install the secondary PCIe riser cage (**Installing the secondary PCIe riser cage** on page 68).
11. Install the access panel (**Installing the access panel** on page 41).
12. Install the server into the rack (**Installing the server into the rack** on page 34).
13. Connect each power cord to the server.
14. Connect each power cord to the power source.
15. Power up the server (**Powering up the server** on page 38).

Installing a riser board into the tertiary PCIe riser cage

Prerequisites

Before installing this option, be sure that you have the following:

• T-10 Torx screwdriver
• The components included with the hardware option kit

Procedure

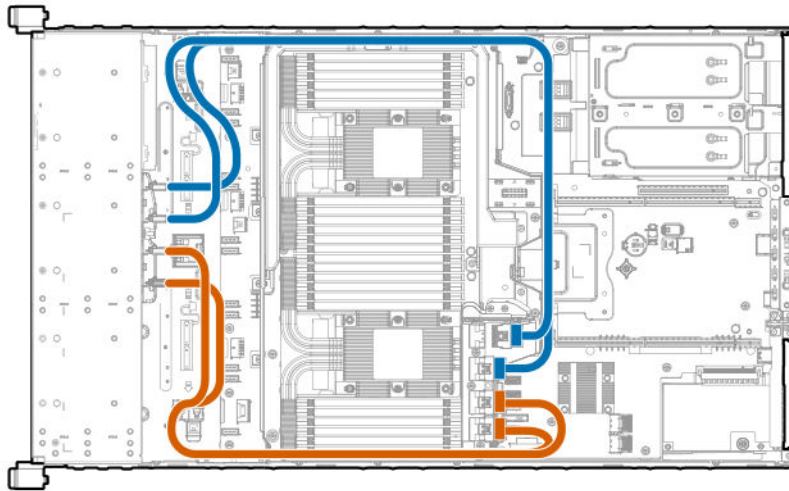1. Power down the server (**Power down the server** on page 38).
2. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.
3. Do one of the following:

    • Extend the server from the rack (**Extend the server from the rack** on page 38).
    • Remove the server from the rack (**Removing the server from the rack** on page 39).
4. Remove the access panel (**Removing the access panel** on page 40).
5. Remove the riser cage (**Removing the PCIe riser cages** on page 44).
6. Install the riser board.

7. Install the tertiary riser cage (**Installing a tertiary PCIe cage** on page 70).
8. Install the access panel (**Installing the access panel** on page 41).
9. Install the server into the rack (**Installing the server into the rack** on page 34).
10. Connect each power cord to the server.
11. Connect each power cord to the power source.
12. Power up the server (**Powering up the server** on page 38).

Installing expansion board options

PCIe riser board slot definitions

Installing a riser cage in the primary, secondary, or tertiary PCIe connectors determines which PCIe form factor can be supported.

	PCIe slot riser 1	PCIe slot riser 2	PCIe slot riser 3
Primary Riser Connector with M.2 (Connected to Processor 1)			
1 - ¾L/FH	PCIe - x8		
2 - ¾L/FH	PCIe - x16		
3 - ¾L/FH	PCIe - x8		
Secondary Riser Connector M.2 (Connected to Processor 2)			
4 - HL/FH		PCIe - x8	
5 - HL/FH		PCIe - x16	
6 - HL/FH		PCIe - x8	
Optional Primary Riser Connector (Connected to Processor 1)			
1 - ¾L/FH	PCIe - x8		
2 - ¾L/FH	PCIe - x8		
3 - ¾L/FH	PCIe - x8		

Table Continued

	PCIe slot riser 1	PCIe slot riser 2	PCIe slot riser 3
1 - Slimline	-		
Optional Secondary Riser Connector (Connected to Processor 2)			
4 - HL/FH		PCIe - x8	
5 - HL/FH		PCIe - x8	
6 - HL/FH		PCIe - x8	
1 - Slimline		-	
Optional Primary Riser - Slots 2 and 3 (Connected to Processor 1)			
1 - ¾L/FH	-		
2 - ¾L/FH	PCIe - x16		
3 - ¾L/FH	PCIe - x16		
Optional Secondary Riser - Slots 5 and 6 (Connected to Processor 2)			
4 - HL/FH		-	
5 - HL/FH		PCIe - x16	
6 - HL/FH		PCIe - x16	
Optional Tertiary Riser - Slots 7 and 8 (Connected to Processor 2)			
7 - HL/FH			PCIe - x8
8 - HL/FH			PCIe - x8
Optional Tertiary Riser - Slots 7 and 8 (Connected to Processor 2)			
7 - HL/FH			PCIe - x8
1 - Slimline			-

NVMe slot definitions

Installing a riser cage in the primary, secondary, or tertiary PCIe connectors determines which PCIe form factor can be supported.

	NVMe slot riser 1	NVMe slot riser 2	NVMe slot riser 3
Optional Primary Riser Connector (Connected to Processor 1)			
1 - Slimline	NVMe x8	–	–
2 - Slimline	NVMe x8	–	–
3 - Slimline	NVMe x8	–	–
4 - Slimline	NVMe x8	–	–
Optional Secondary Riser Connector (Connected to Processor 2)			
1 - Slimline	–	NVMe x8	–
2 - Slimline	–	NVMe x8	–
3 - Slimline	–	NVMe x8	–

Table Continued

	NVMe slot riser 1	NVMe slot riser 2	NVMe slot riser 3
4 - Slimline	–	NVMe x8	–
Optional Primary Riser Connector (Connected to Processor 1)			
1 - ¾L/FH	–	–	–
2 - ¾L/FH	–	–	–
3 - ¾L/FH	–	–	–
1 - Slimline	NVMe x8	–	–
Optional Secondary Riser Connector (Connected to Processor 2)			
4 - HL/FH	–	–	–
5 - HL/FH	–	–	–
6 - HL/FH	–	–	–
1 - Slimline	–	NVMe x8	–
Optional Tertiary Riser - Slots 7 and 8 (Connected to Processor 2)			
1 - Slimline	–	–	NVMe x8
2 - Slimline	–	–	NVMe x8
Optional Tertiary Riser - Slots 7 and 8 (Connected to Processor 2)			
7 - HL/FH	–	–	–
1 - Slimline	–	–	NVMe x8

4-port NVMe mezzanine card slot descriptions

Optional 4-port NVMe mezzanine card (Connected to Processor 3)	
1 - Slimline	NVMe x8
2 - Slimline	NVMe x8
3 - Slimline	NVMe x8
4 - Slimline	NVMe x8

Installing an expansion board

⚠ **WARNING:**

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

△ **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.

Prerequisites

Before installing this option, be sure that you have the following:

- T-10 Torx screwdriver
- The components included with the hardware option kit

Procedure

1. Power down the server (**Power down the server** on page 38).
2. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.
3. Do one of the following:
   - Extend the server from the rack (**Extend the server from the rack** on page 38).
   - Remove the server from the rack (**Removing the server from the rack** on page 39).
4. Remove the access panel (**Removing the access panel** on page 40).
5. Remove the riser cage (**Removing the PCIe riser cages** on page 44).
6. Remove the blank from the riser cage.

   The primary PCIe riser cage is shown.

7. Install the expansion board into the PCI riser cage.
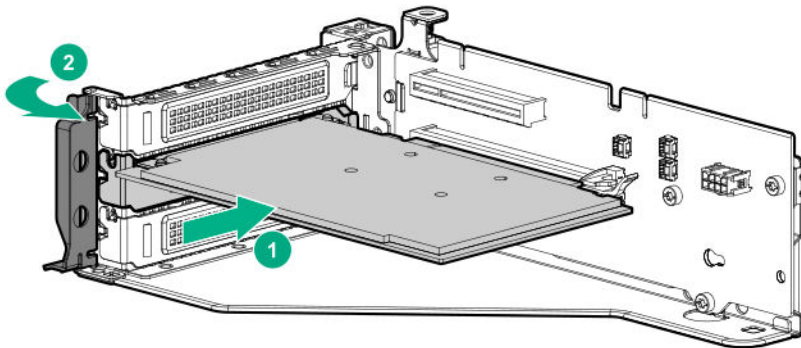
8. Install the riser cage.
9. Connect any required internal or external cables to the expansion board. See the documentation that ships with the expansion board.
10. Install the access panel (**Installing the access panel** on page 41).
11. Install the server into the rack (**Installing the server into the rack** on page 34).
12. Connect each power cord to the server.
13. Connect each power cord to the power source.
14. Power up the server (**Powering up the server** on page 38).

Installing a FlexibleLOM adapter

Prerequisites

Before installing this option, be sure that you have the following:

- T-10 Torx screwdriver
- The components included with the hardware option kit

Procedure

1. Power down the server (**Power down the server** on page 38).
2. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.
3. Do one of the following:

   - Extend the server from the rack (**Extend the server from the rack** on page 38).
   - Remove the server from the rack (**Removing the server from the rack** on page 39).
4. Remove the access panel (**Removing the access panel** on page 40).
5. Remove the primary PCIe riser cage (**Removing the PCIe riser cages** on page 44).
6. Remove the existing FlexibleLOM adapter.
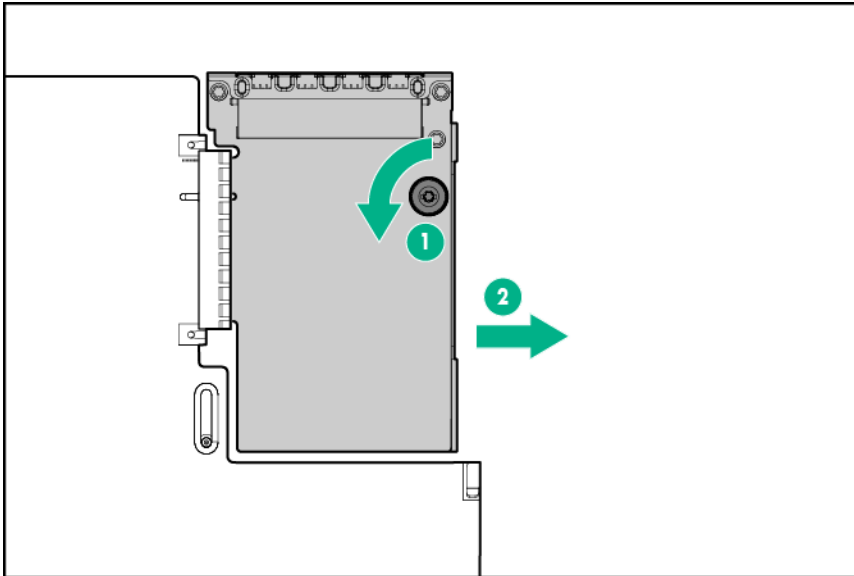
7. Install the FlexibleLOM adapter.
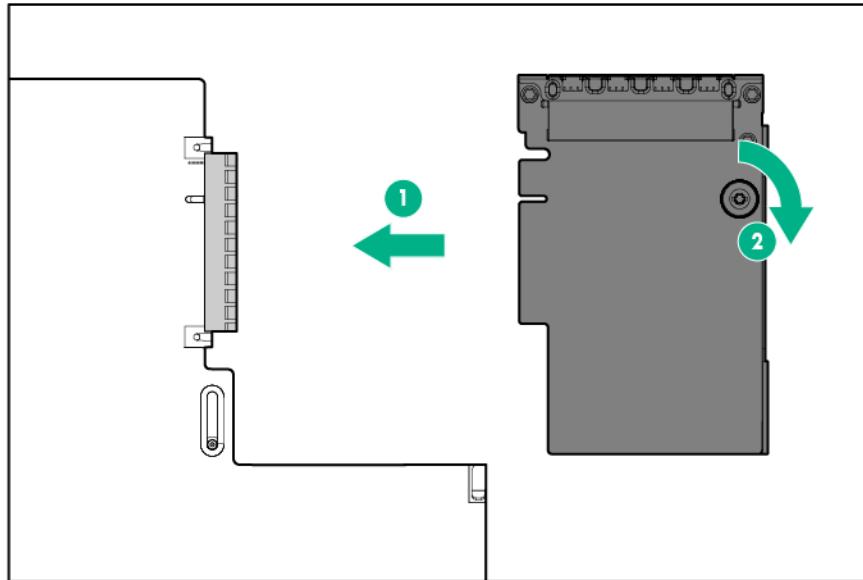
8. Install the primary PCIe riser cage (**Installing the primary PCIe riser cage** on page 45).
9. Install the access panel (**Installing the access panel** on page 41).
10. Install the server into the rack (**Installing the server into the rack** on page 34).
11. Connect each power cord to the server.
12. Connect each power cord to the power source.
13. Power up the server (**Powering up the server** on page 38).

Processor options

Identifying the processor type

The processor type installed in the server is briefly displayed during POST. To view this information and additional processor specifications, do the following:

Procedure

1. Reboot the server.

   The server restarts and the POST screen appears.
2. Press **F9**.

   The System Utilities screen appears.
3. Select **System Information** | **Processor Information**.

   The Processor Information screen shows detailed information about the processors installed in the server.
4. Press **Esc** until the main menu is displayed.
5. Select **Reboot the System** to exit the utility and resume the boot process.

Installing a processor heatsink module

Hewlett Packard Enterprise recommends identifying the processor heatsink module components before performing this procedure. For more information, see "**Processor, heatsink, and socket components** on page 20."

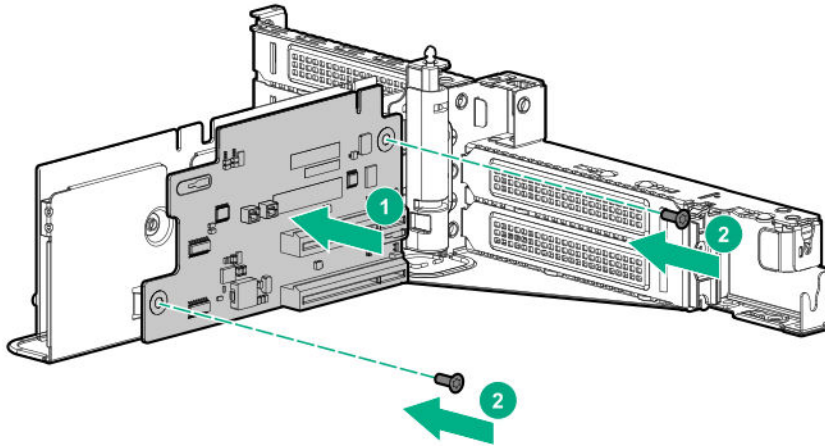**Prerequisites**

Before installing this option, be sure that you have the following:

• The components included with the hardware option kit
• T-30 Torx screwdriver
• T-10 Torx screwdriver

Procedure

1. Observe the following alerts:

   ⚠ **CAUTION:**
   When handling the heatsink, always hold it along the top and bottom of the fins. Holding it from the sides can damage the fins.

   ⚠ **CAUTION:**
   To avoid damage to the processor or system board, only authorized personnel should attempt to replace or install the processor in this server.

   ⚠ **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.

2. Power down the server (**Power down the server** on page 38).
3. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.
4. Do one of the following:

   • Extend the server from the rack (**Extend the server from the rack** on page 38).
   • Remove the server from the rack (**Removing the server from the rack** on page 39).
5. Remove the access panel (**Removing the access panel** on page 40).
6. If installed, do the following:
   a. Remove the air baffle (**Removing the air baffle** on page 42).
   b. Remove the processor mezzanine tray (**Removing the processor mezzanine tray** on page 47).
   c. Remove the 2P pass-through performance board (**Removing the 2P pass-through performance board** on page 48).

NOTE:

Depending on the server configuration, your heatsink might appear different.

7. Install the processor heatsink assembly:

   a. Remove the dust cover.

   b. Locate the Pin 1 indicator on the processor frame and the socket.

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

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

   A standard heatsink is shown. Your heatsink might look different.
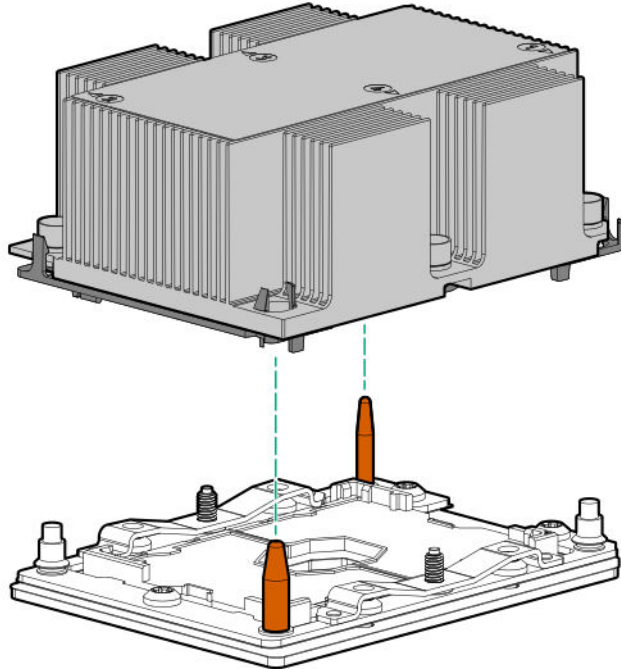
   d. Using a T-30 Torx screwdriver, tighten the nuts until they stop.

8. If removed, do the following:
   a. Install the air baffle (**Installing the air baffle** on page 43).
   b. Install the processor mezzanine tray (**Installing a processor mezzanine tray** on page 87).
   c. Install the 2P pass-through performance board (**Installing a 2P pass-through performance board** on page 88).
9. Install the access panel (**Installing the access panel** on page 41).
10. Install the server into the rack (**Installing the server into the rack** on page 34).
11. Connect each power cord to the server.
12. Connect each power cord to the power source.
13. Power up the server (**Powering up the server** on page 38).

The installation is complete.

Upgrading a processor

Hewlett Packard Enterprise recommends identifying the processor heatsink module components before performing this procedure. For more information, see "**Processor, heatsink, and socket components** on page 20."
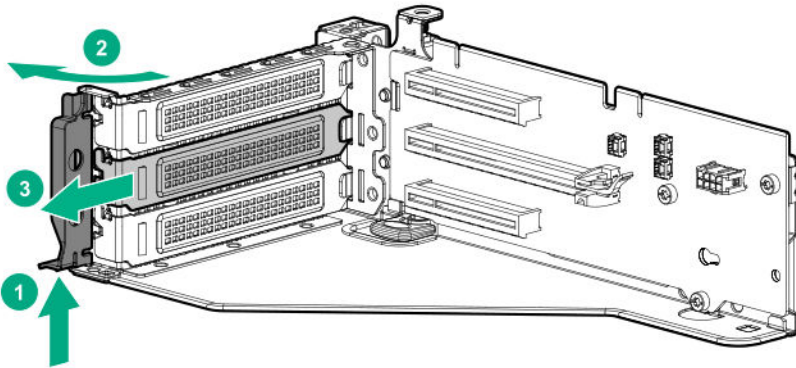
Prerequisites

Before installing this option, be sure that you have the following items:

- The components included with the hardware option kit
- T-30 Torx screwdriver
- T-10 Torx screwdriver

Procedure

1. Observe the following alerts:

   ⚠ **CAUTION:**
   When handling the heatsink, always hold it along the top and bottom of the fins. Holding it from the sides can damage the fins.

   ⚠ **CAUTION:**
   To avoid damage to the processor or system board, only authorized personnel should attempt to replace or install the processor in this server.

   ⚠ **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.

2. Power down the server (**Power down the server** on page 38).
3. Remove all power:

a. Disconnect each power cord from the power source.

b. Disconnect each power cord from the server.

4. Do one of the following:

   • Extend the server from the rack (**Extend the server from the rack** on page 38).

   • Remove the server from the rack (**Removing the server from the rack** on page 39).

5. Remove the access panel (**Removing the access panel** on page 40).

6. If installed, do the following:

   a. Remove the air baffle (**Removing the air baffle** on page 42).

   b. Remove the processor mezzanine tray (**Removing the processor mezzanine tray** on page 47).

   c. Remove the 2P pass-through performance board (**Removing the 2P pass-through performance board** on page 48).

   NOTE:

   Depending on the server configuration, your heatsink might appear different.

   ---

7. Identify the processor to remove.

8. Remove the processor heatsink assembly:

   a. Allow the heatsink to cool.

   b. Loosen the heatsink nuts in the order specified by the label on the heatsink.
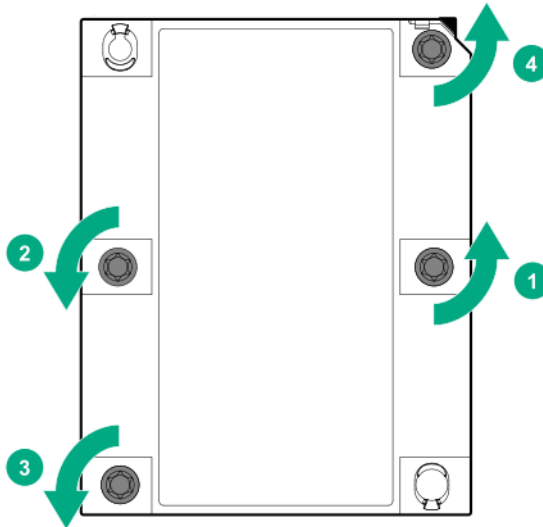
   c. Lift the processor heatsink assembly and move it away from the system board.

   d. Turn the assembly over and place it on a work surface with the processor facing up.

   e. Install the dust cover.

9. Release the thermal grease tension between the processor and heatsink:

   a. Locate the tension release slot between the frame and heatsink.

      The slot is across from the Pin 1 indicator, near the corner.

   b. Insert a 1/4" flathead screwdriver into the slot.

      Be sure that the screwdriver is between the frame and the heatsink.

   c. Gently rotate the screwdriver to release the tension of the thermal grease.
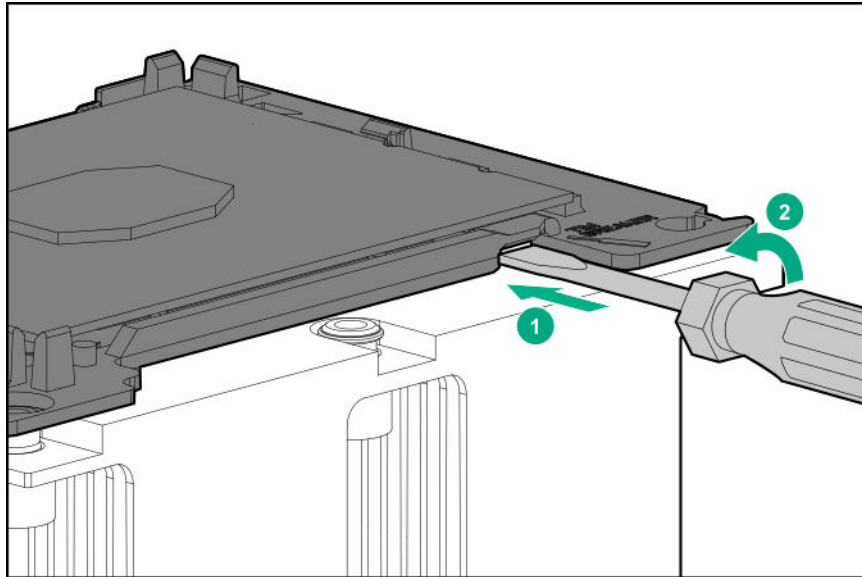
d. Unlatch the remaining corners of the frame.

e. Separate the frame from the heatsink.

   The processor remains attached to the frame.

10. Using a cleaning solvent, remove the existing thermal grease from the processor and heatsink.

11. Apply thermal grease or a thermal pad to the new processor.

12. Install the processor on the heatsink.

Align the Pin 1 indicator on the frame to the Pin 1 indicator on the heatsink, and then latch the processor frame to the heatsink.
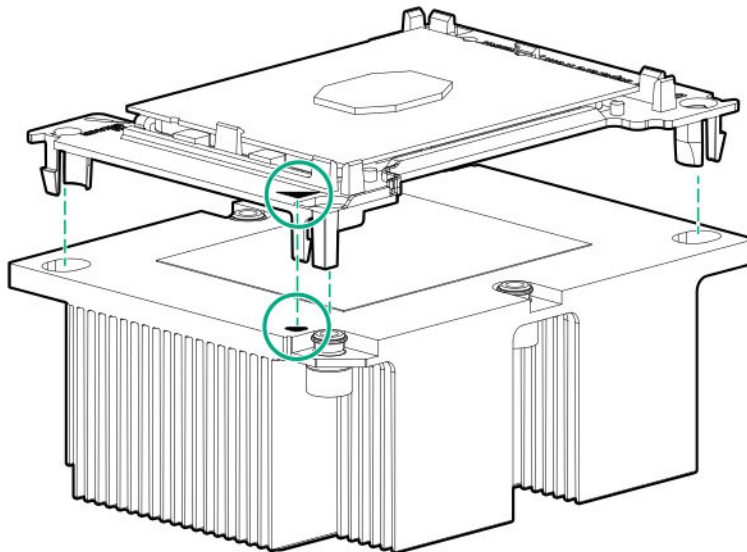
13. Install the processor heatsink assembly:

a. Remove the dust cover.

b. Locate the Pin 1 indicator on the processor frame and the socket.

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

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

   A standard heatsink is shown. Your heatsink might look different.
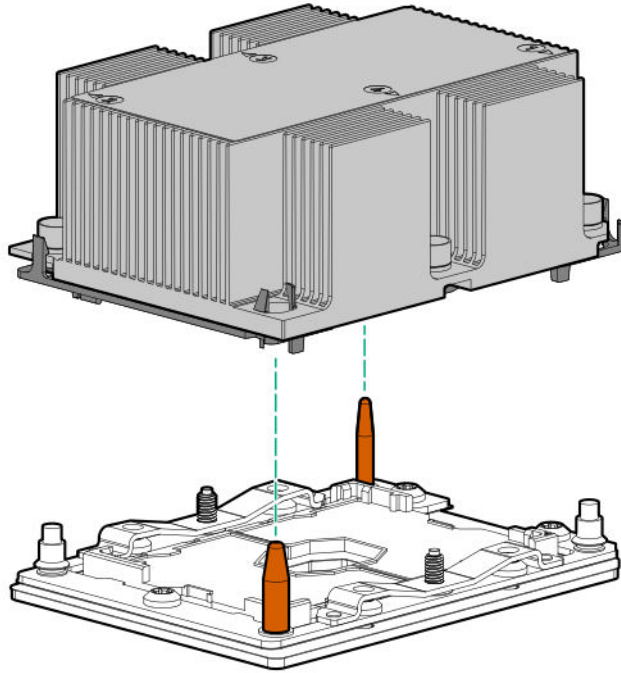
d. Using a T-30 Torx screwdriver, tighten the nuts until they stop.
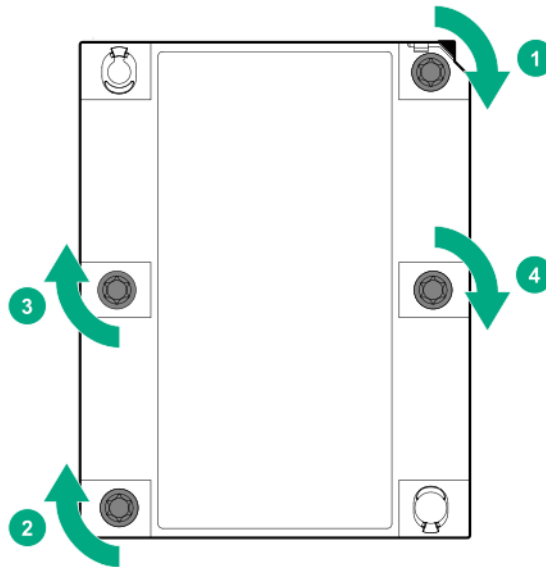
14. If removed, do the following:
    a. Install the air baffle (**Installing the air baffle** on page 43).
    b. Install the processor mezzanine tray (**Installing a processor mezzanine tray** on page 87).
    c. Install the 2P pass-through performance board (**Installing a 2P pass-through performance board** on page 88).
15. Install the access panel (**Installing the access panel** on page 41).
16. Install the server into the rack (**Installing the server into the rack** on page 34).
17. Connect each power cord to the server.
18. Connect each power cord to the power source.
19. Power up the server (**Powering up the server** on page 38).

Installing a processor mezzanine tray

Prerequisites

Install the processor mezzanine tray to support four processors in the server.

Before installing this option, be sure that you have the following:

- T-10 Torx screwdriver
- The components included with the hardware option kit

Procedure

1. Power down the server (**Power down the server** on page 38).
2. Remove all power:
    a. Disconnect each power cord from the power source.
    b. Disconnect each power cord from the server.
3. Do one of the following:

    - Extend the server from the rack (**Extend the server from the rack** on page 38).
    - Remove the server from the rack (**Removing the server from the rack** on page 39).
4. Remove the access panel (**Removing the access panel** on page 40).
5. Remove the air baffle (**Removing the air baffle** on page 42).
6. Install the processors onto the processor mezzanine tray sockets (**Installing a processor heatsink module** on page 81).
7. Install the DIMMs onto the processor mezzanine tray DIMM slots (**Installing a DIMM** on page 90).
8. Install the processor mezzanine tray.
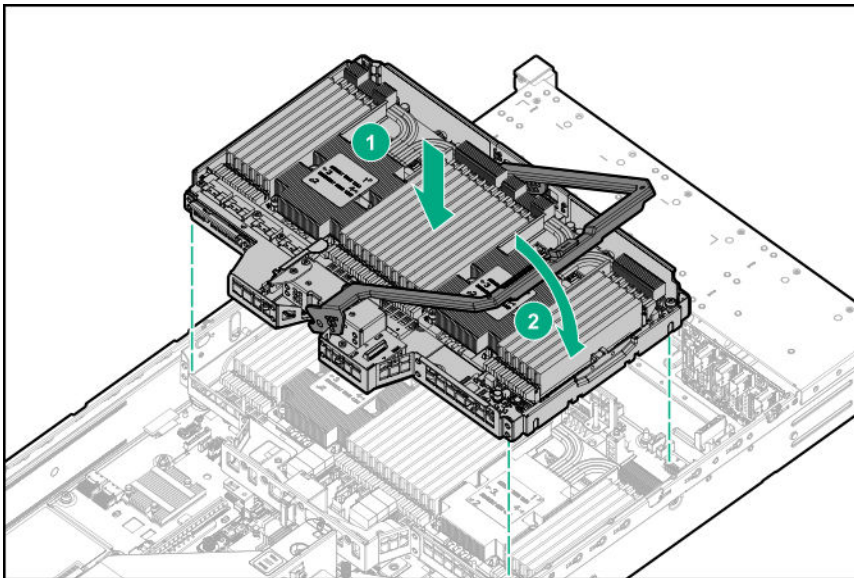
9. Install the air baffle (**Installing the air baffle** on page 43).
10. Install the access panel (**Installing the access panel** on page 41).
11. Install the server into the rack (**Installing the server into the rack** on page 34).
12. Connect each power cord to the server.
13. Connect each power cord to the power source.
14. Power up the server (**Powering up the server** on page 38).

Installing a 2P pass-through performance board

Prerequisites

Before installing this option, be sure that you have the following:

- T-10 Torx screwdriver
- The components included with the hardware option kit

Procedure

1. Power down the server (**Power down the server** on page 38).
2. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.
3. Do one of the following:

   - Extend the server from the rack (**Extend the server from the rack** on page 38).
   - Remove the server from the rack (**Removing the server from the rack** on page 39).
4. Remove the access panel (**Removing the access panel** on page 40).
5. Remove the air baffle (**Removing the air baffle** on page 42).
6. Install the pass-through board.
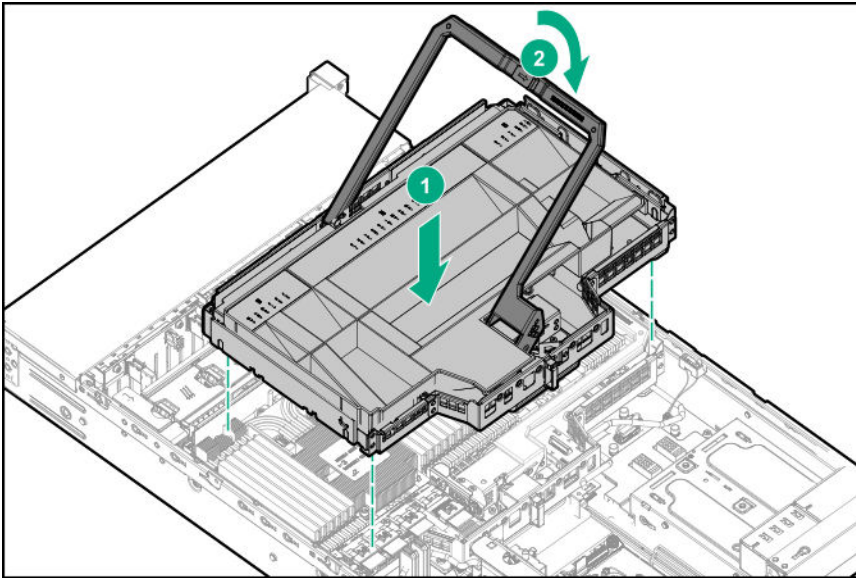
7. Install the access panel (**Installing the access panel** on page 41).
8. Install the server into the rack (**Installing the server into the rack** on page 34).
9. Connect each power cord to the server.
10. Connect each power cord to the power source.
11. Power up the server (**Powering up the server** on page 38).

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 Smart Memory speed information

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

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.
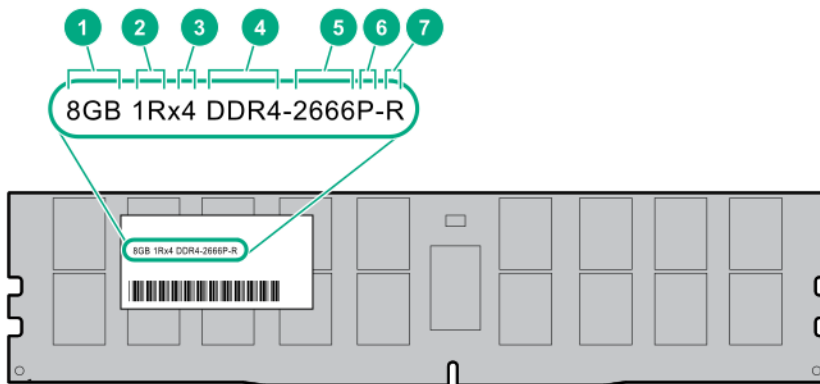
Item	Description	Definition
1	Capacity	8 GB
		16 GB
		32 GB
		64 GB
		128 GB
2	Rank	1R = Single rank
		2R = Dual rank
		4R = Quad rank
		8R = Octal rank
3	Data width on DRAM	x4 = 4-bit
		x8 = 8-bit
		x16 = 16-bit
4	Memory generation	PC4 = DDR4

Table Continued

Item	Description	Definition
5	Maximum memory speed	2133 MT/s 2400 MT/s 2666 MT/s
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 TSVLRDIMM)
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**).

Installing a DIMM

For information about memory support, configurations, or population guidelines, see "**DIMM population information** on page 89."

Prerequisites

Before installing this option, be sure that you have the following:

- T-10 Torx screwdriver
- The components included with the hardware option kit

Procedure

1. Power down the server (**Power down the server** on page 38).
2. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.
3. Do one of the following:

   - Extend the server from the rack (**Extend the server from the rack** on page 38).
   - Remove the server from the rack (**Removing the server from the rack** on page 39).
4. Remove the access panel (**Removing the access panel** on page 40).
5. If installed, do the following:
   a. Remove the air baffle (**Removing the air baffle** on page 42).
   b. Remove the processor mezzanine tray (**Removing the processor mezzanine tray** on page 47).
   c. Remove the 2P pass-through performance board (**Removing the 2P pass-through performance board** on page 48).
6. Open the DIMM slot latches.
7. Install the DIMM.
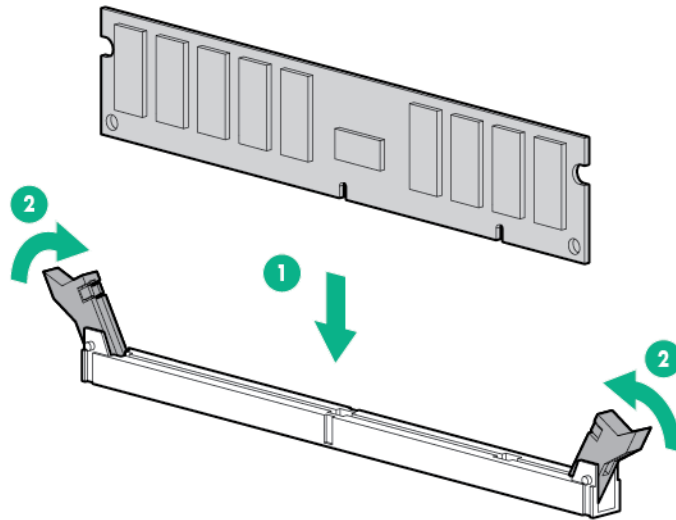
8. If removed, do the following:

    a. Install the air baffle (**Installing the air baffle** on page 43).

    b. Install the processor mezzanine tray (**Installing a processor mezzanine tray** on page 87).

    c. Install the 2P pass-through performance board (**Installing a 2P pass-through performance board** on page 88).

9. Install the access panel (**Installing the access panel** on page 41).

10. Install the server into the rack (**Installing the server into the rack** on page 34).

11. Connect each power cord to the server.

12. Connect each power cord to the power source.

13. Power up the server (**Powering up the server** on page 38).

To configure the memory mode, use the BIOS/Platform Configuration (RBSU) in the System Utilities.

If a DIMM failure has occurred, see "**Systems Insight Display combined LED descriptions** on page 12."

Power supply options

The server supports installation of two or four of the following Flex Slot power supplies:

- HPE 800W Flex Slot Platinum Hot-plug Power Supply
- HPE 800W Flex Slot Titanium Plus Hot-plug Power Supply
- HPE 800W Flex Slot Universal Hot-plug Power Supply
- HPE 800W Flex Slot Hot-plug Battery Backup Power Supply
- HPE 1600W Flex Slot Platinum Plus Hot-plug Power Supply

Population rules

The power supplies are supported horizontally for redundancy. Observe the following when installing power supplies:

Two power supply configuration

- Install the power supplies into power supply bays 1 and 2.
- Connect the power supplies to separate AC circuits for redundancy.

Four power supply configuration

- Install the power cage into the server.
- Install power supplies into power supply bays 1—4.
- Connect AC power to power supplies 1 and 2, and then connect power supplies 3 and 4 to a separate AC circuit for redundancy.

For power supply bay identification, see "**Rear panel components** on page 16."

> **NOTE:**
>
> HPE ProLiant Gen9 power supplies are **not** supported in HPE ProLiant Gen10 servers.

Installing a hot-plug power supply (two power supply configuration)

> △ **CAUTION:**
> All power supplies installed in the server must have the same output power capacity. Verify that all power supplies have the same part number and label color. The system becomes unstable and may shut down when it detects mismatched power supplies.

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

Procedure

1. Release the cable management arm to access the rear panel (**Releasing the cable management arm** on page 39).
2. Remove the blank.

> ⚠ **WARNING:**
> To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.
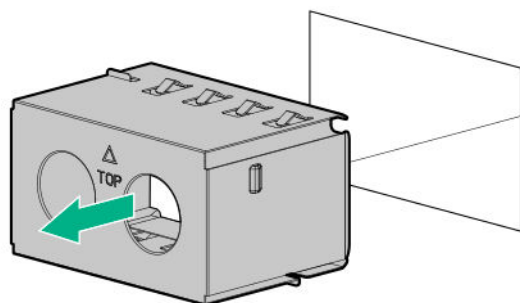
3. Install the power supplies into power supply bays 1 and 2 until each click into place.

   To install power supplies in a four power supply configuration, see "**Installing additional redundant hot-plug power supplies (four power supply configuration)** on page 93."
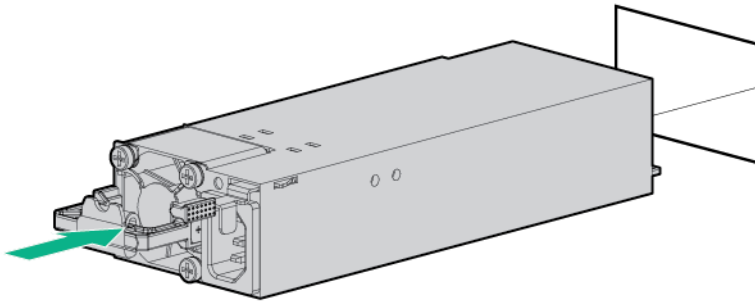
4. Connect the power cord to the power supply.

   For redundancy, connect the power supplies in bays 1 and 2 to separate AC circuits.
5. Route the power cord.

   Use the cable management arm when routing cords and cables.
6. Connect the power cord to the power source.
7. Observe the power supply LED.

Installing additional redundant hot-plug power supplies (four power supply configuration)

⚠ **CAUTION:**

All power supplies installed in the server must have the same output power capacity. Verify that all power supplies have the same part number and label color. The system becomes unstable and may shut down when it detects mismatched power supplies.

⚠ **CAUTION:**

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

Prerequisites

Before installing this option, be sure that you have the following:

- T-10 Torx screwdriver
- The components included with the hardware option kit

Procedure

1. Power down the server (**Power down the server** on page 38).
2. Remove all power:

   a. Disconnect each power cord from the power source.

   b. Disconnect each power cord from the server.
3. Remove the server from the rack (**Removing the server from the rack** on page 39).
4. Remove the access panel (**Removing the access panel** on page 40).
5. Do one of the following:

   - Remove the secondary PCIe riser cage blank.
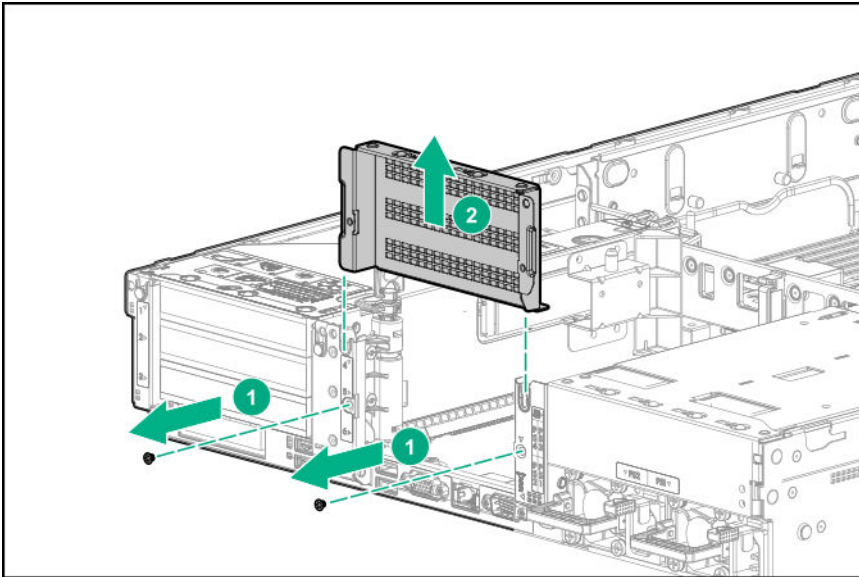
- Remove the secondary PCIe riser cage (**Removing the PCIe riser cages** on page 44).
- Remove the tertiary PCIe riser cage (**Removing the PCIe riser cages** on page 44).

6. Remove the power supply cage blank.
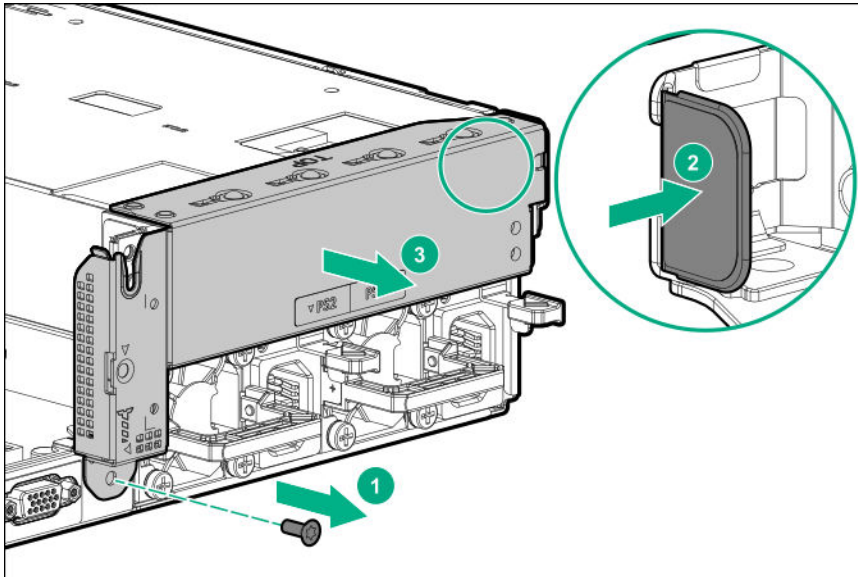
7. Install the power supply cage.
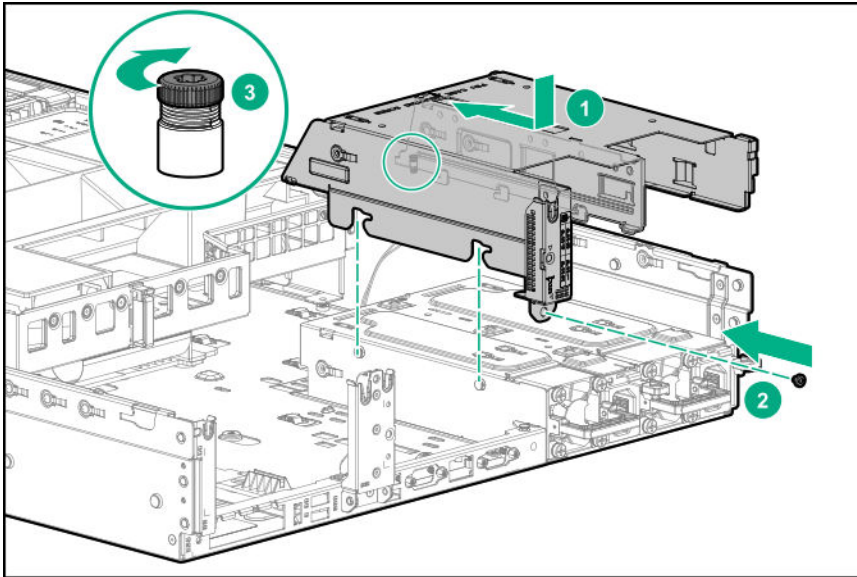
8. Install the power supply backplane.
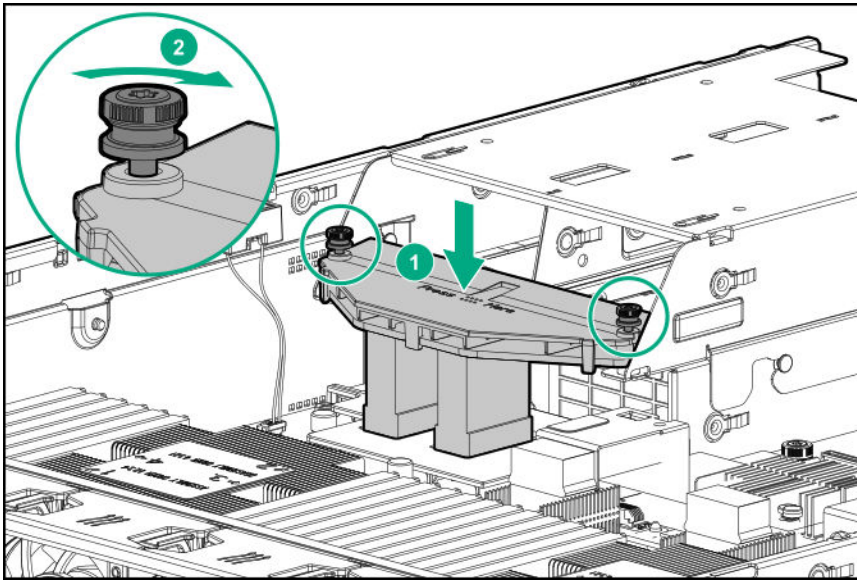
9. Install the power supplies into power supply bays 1—4 until each click into place.
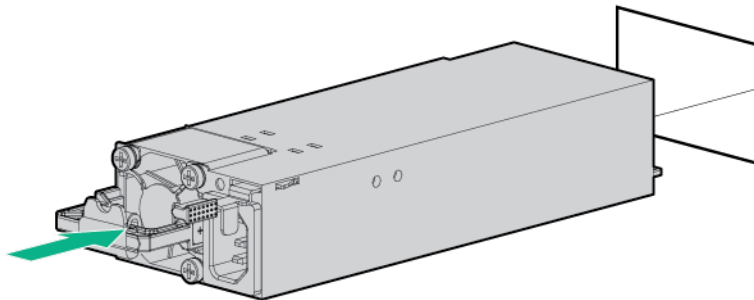
10. Do one of the following:

- Install the PCIe riser cage blank.
- Install the secondary PCIe riser cage.

11. Install the access panel (**Installing the access panel** on page 41).
12. Install the server into the rack (**Installing the server into the rack** on page 34).
13. Connect AC power to the power supplies:

    a. Connect AC power to the power supplies in bays 1 and 2.
    b. For redundancy, connect the power supplies in bays 3 and 4 to a separate AC circuit.

14. Route the power cord.

    Use best practices when routing power cords and other cables. A cable management arm is available to help with routing. To obtain a cable management arm, contact a Hewlett Packard Enterprise authorized reseller.

15. Connect each power cord to the power source.
16. Power up the server (**Powering up the server** on page 38).

Installing the HPE 12G SAS Expander Card

Hewlett Packard Enterprise recommends installing the SAS expander card in slot 2 of the primary PCIe riser cage.

To ensure that cables are connected correctly, observe the labels on the cable and component connectors.

Be sure that you have the latest firmware for the controllers, HBAs, and the HPE 12G SAS Expander. To download the latest firmware, see the Hewlett Packard Enterprise website (**http://www.hpe.com/support/hpesc**).

Group A cables—Controller to SAS expander card

Cable	Description	Connection to SAS expander	Connection to controller
874067-001	Mini-SAS cable, Smart Array Controller to expander	Port 1, Port 2	Riser 1, Smart Array controller

Group B cables—SAS expander card to Smart Array controller

Cable	Description	Connection to SAS expander	Connection to controller
880028-001	2x4 SAS cable, expander to H240	Port 1, Port 2	Riser 2
880029-001	2x4 SAS cable, expander to Smart Array controller	Port 1, Port 2	Riser 3

Group C cables—SAS expander card to SFF drive cage

Cable	Description	Connection to SAS expander	Connection to drive box
874066-001	Mini-SAS cable, expander to 2SFF	Port 3, Port 4	Box 1
874064-001	Mini-SAS cable, expander to 2SFF	Port 5, Port 6	Box 2
874065-001	Mini-SAS cable, expander to 2SFF	Port 7, Port 8	Box 3
874063-001	Mini-SAS cable, expander to 2SFF	Port 3	Box 1

Prerequisites

The 12G SAS Expander Card supports up to 24 SFF drives, depending on which options are also installed in the server.

The following components must be installed:

- Storage controller
- Drive cages
  - 24SFF drive configuration—Bay 1, bay 2, and bay 3 installed with 8SFF front drive cages
  - 18SFF drive configuration—Bay 1 Universal Media Bay installed with 2SFF drive cage option, and bay 2 and bay 3 installed with 8SFF front drive cages.
  - 16SFF drive configuration—Bay 2 and bay 3 installed with 8SFF drive cages

Procedure

1. Power down the server (**Power down the server** on page 38).
2. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.
3. Do one of the following:
   - Extend the server from the rack (**Extend the server from the rack** on page 38).
   - Remove the server from the rack (**Removing the server from the rack** on page 39).
4. Remove the access panel (**Removing the access panel** on page 40).
5. If installed, do the following:
   a. Remove the air baffle (**Removing the air baffle** on page 42).
   b. Remove the processor mezzanine tray (**Removing the processor mezzanine tray** on page 47).
   c. Remove the joint board (**Removing the 2P pass-through performance board** on page 48).
   d. Remove the 2P pass-through performance board (**Removing the 2P pass-through performance board** on page 48).
6. Remove the fan cage (**Removing the fan cage** on page 46).
7. Remove the primary PCIe riser cage (**Removing the PCIe riser cages** on page 44).
8. Remove the expansion slot blank from slot 2.
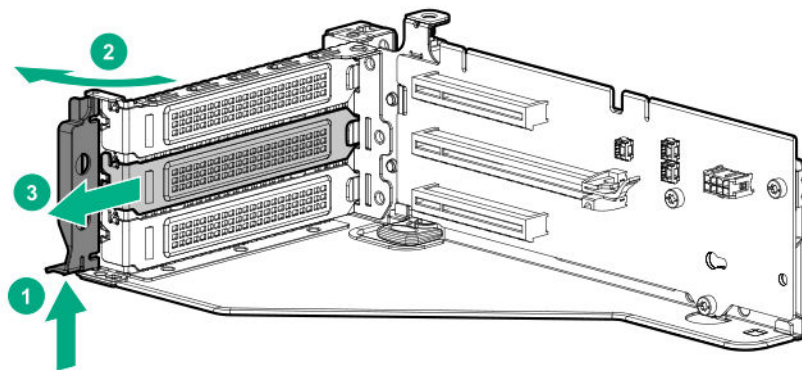
9. Using the labels on the cables to determine the correct connections, connect the cables to the SAS expander card.
   a. Depending on the ports on the controller, connect the appropriate controller cables to the SAS expander card.
   b. Depending on the drive configuration, connect the appropriate drive cage cables to the SAS expander card.

Drive configuration	Part number	Cable	SAS expander ports
24 SFF	874064-001 874065-001 874066-001	2x4 mini-SAS cable	Ports 3–8
18 SFF	874063-001 874064-001 874065-001	1x4 mini-SAS cable 2x4 mini-SAS cable	Ports 3, 5–8
16 SFF	874064-001 874065-001	2x4 mini-SAS cable	Ports 5–8

10. Install the SAS expander card.
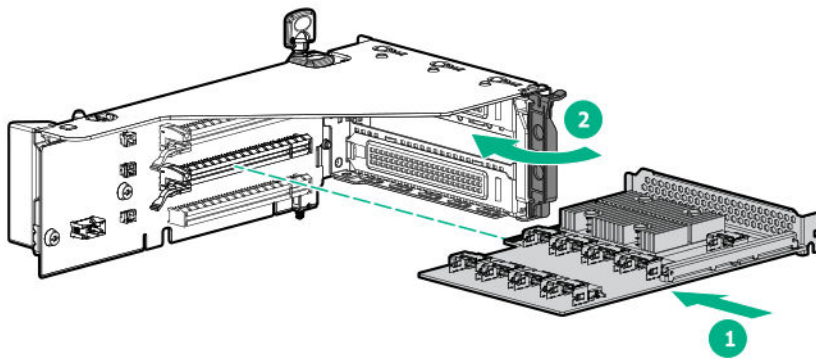
11. Install the primary PCIe riser cage (**Installing the primary PCIe riser cage** on page 45).
12. Using the labels on the cables to determine the correct connections, connect the cables from the SAS expander card to the controller.

   • Flexible Smart Array Controller with two x4 connectors (Group B SAS cables)
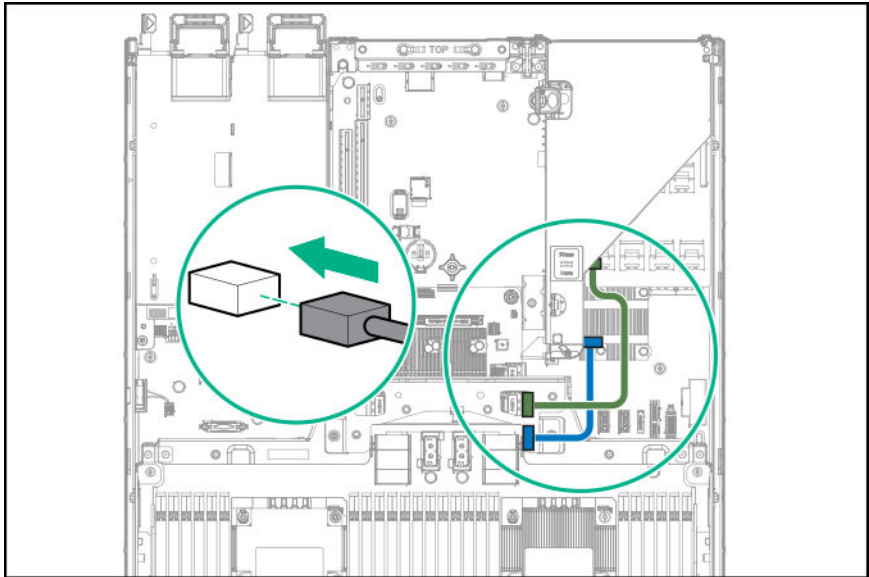
- PCI slot-based Smart Array controller with x8 connector (Group A SAS cables)
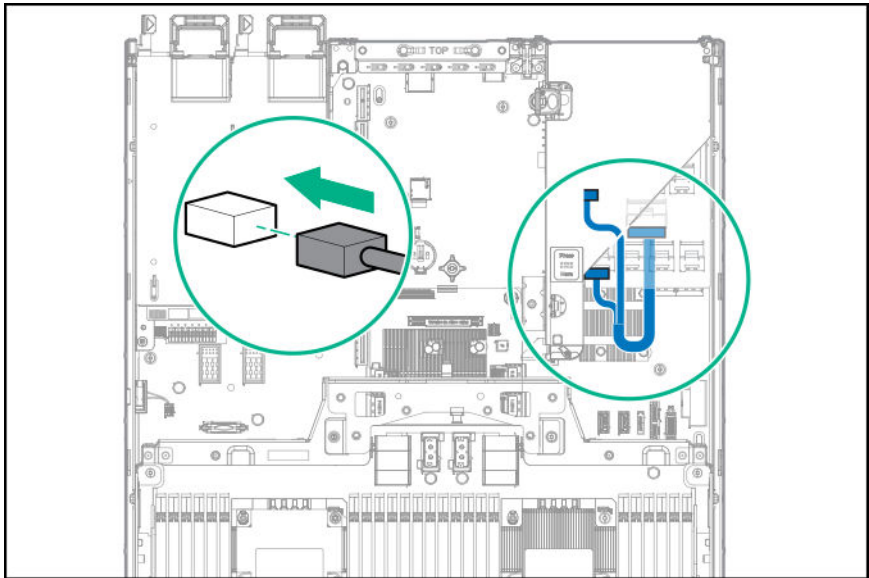
13. Connect the cables to the drive cage backplanes:

- 24 SFF backplanes (Group C SAS cables)
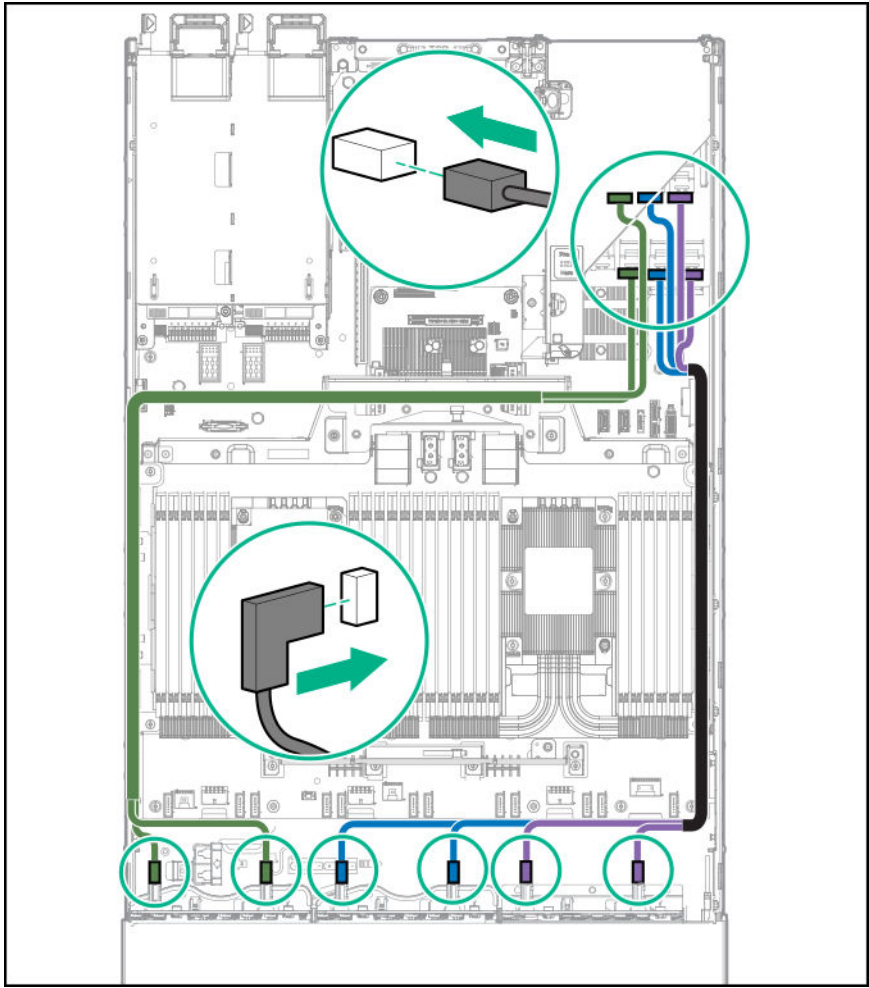
- 18 SFF backplanes (Group C SAS cables)
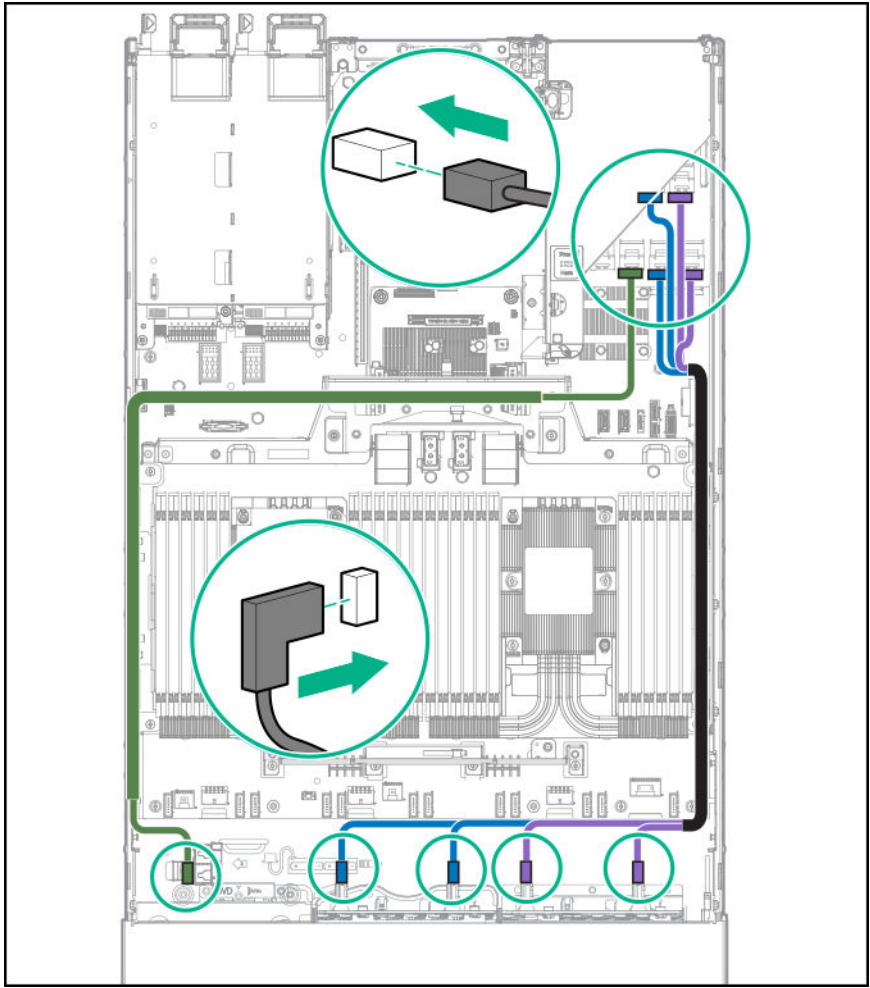
- 16 SFF backplanes (Group C SAS cables)
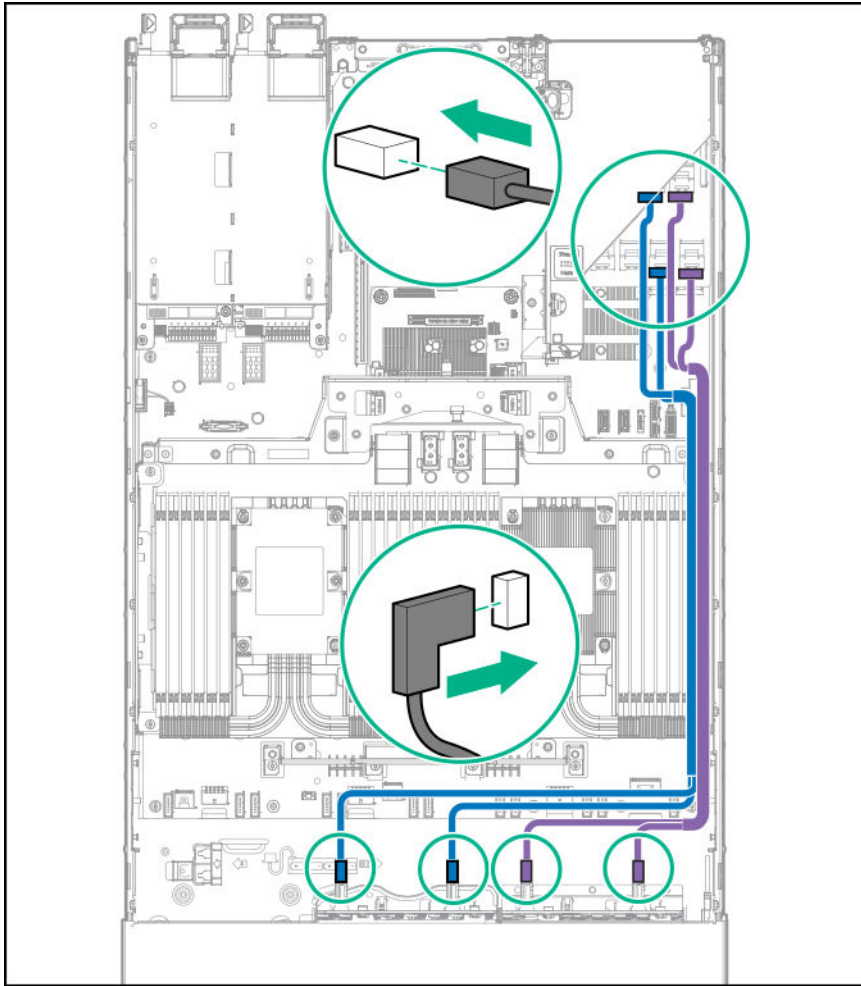
14. Install the fan cage.
15. If removed, do the following:
    a. Install the air baffle (**Installing the air baffle** on page 43).
    b. Install the processor mezzanine tray (**Installing a processor mezzanine tray** on page 87).
    c. Install the 2P pass-through performance board (**Installing a 2P pass-through performance board** on page 88).
16. Install the access panel (**Installing the access panel** on page 41).
17. Install the server into the rack (**Installing the server into the rack** on page 34).
18. Connect each power cord to the server.
19. Connect each power cord to the power source.
20. Power up the server (**Powering up the server** on page 38).

Installing the Mini-SAS cable

Cabling configurations and requirements vary depending on the product and installed options. For more information on cable installation, see the following:

• "**Cabling** on page 109" in this guide.
• The documentation included with the hardware option kit.

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**).

Installing a Smart Storage Battery

The server supports two Smart Storage Batteries, one each for the processor mezzanine board and the system board.

Prerequisites

Before installing this option, be sure that you have the following:

- T-10 Torx screwdriver
- The components included with the hardware option kit

Procedure

1. Power down the server (**Power down the server** on page 38).
2. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.
3. Do one of the following:

   - Extend the server from the rack (**Extend the server from the rack** on page 38).
   - Remove the server from the rack (**Removing the server from the rack** on page 39).
4. Remove the access panel (**Removing the access panel** on page 40).
5. If installed, do the following:
   a. Remove the air baffle (**Removing the air baffle** on page 42).
   b. Remove the processor mezzanine tray (**Removing the processor mezzanine tray** on page 47).
   c. Remove the 2P pass-through performance board (**Removing the 2P pass-through performance board** on page 48).
6. Remove the fan cage (**Removing the fan cage** on page 46).
7. Install the HPE Smart Storage Battery.
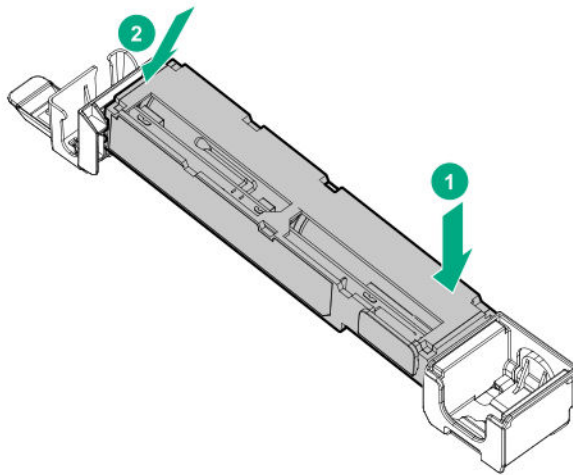
8. Route and connect the cable.
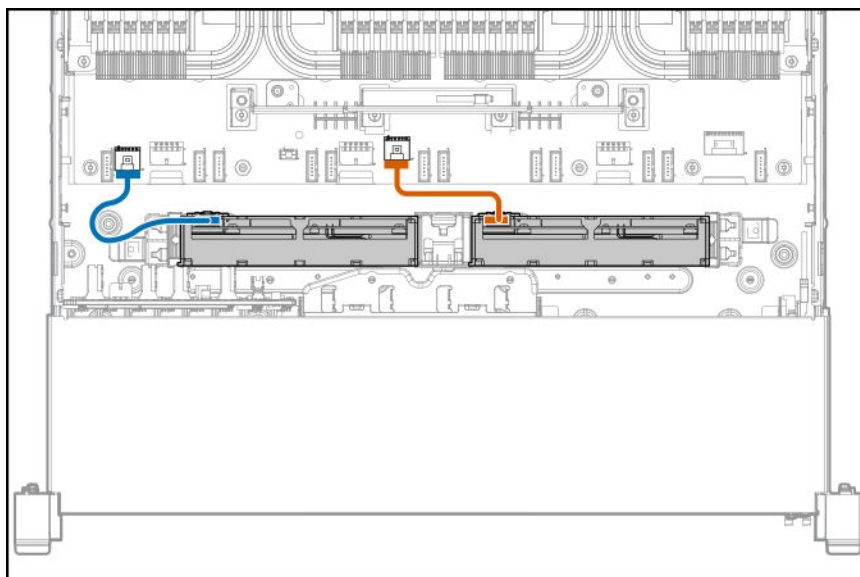
- System board HPE Smart Storage battery (orange)
- Processor mezzanine tray HPE Smart Storage battery (blue)

9. Install the fan cage.
10. If removed, do the following:

    a. Install the air baffle (**Installing the air baffle** on page 43).
    b. Install the processor mezzanine tray (**Installing a processor mezzanine tray** on page 87).
    c. Install the 2P pass-through performance board (**Installing a 2P pass-through performance board** on page 88).

11. Install the access panel (**Installing the access panel** on page 41).
12. Install the server into the rack (**Installing the server into the rack** on page 34).
13. Connect each power cord to the server.
14. Connect each power cord to the power source.
15. Power up the server (**Powering up the server** on page 38).

Installing a Smart Array controller

⚠ **CAUTION:**

Hewlett Packard Enterprise recommends performing a complete backup of all server data before installing or removing a controller or adapter.

Prerequisites

Before installing this option, be sure that you have the following:

- The components included with the hardware option kit

Before installing this option, you must observe the following requirements:

- To ensure that cables are connected correctly, observe the labels on the cable and component connectors.
- Be sure that you have the latest firmware for the controllers, HBAs, and the expander card. To download the latest firmware, see the **Hewlett Packard Enterprise website**.

Procedure

1. Back up all server data.
2. Power down the server (**Power down the server** on page 38).

3. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.
4. Do one of the following:

   • Extend the server from the rack (**Extend the server from the rack** on page 38).
   • Remove the server from the rack (**Removing the server from the rack** on page 39).
5. Remove the access panel (**Removing the access panel** on page 40).
6. If installed, do the following:
   a. Remove the air baffle (**Removing the air baffle** on page 42).
   b. Remove the processor mezzanine tray (**Removing the processor mezzanine tray** on page 47).
   c. Remove the 2P pass-through performance board (**Removing the 2P pass-through performance board** on page 48).
7. Install the controller.
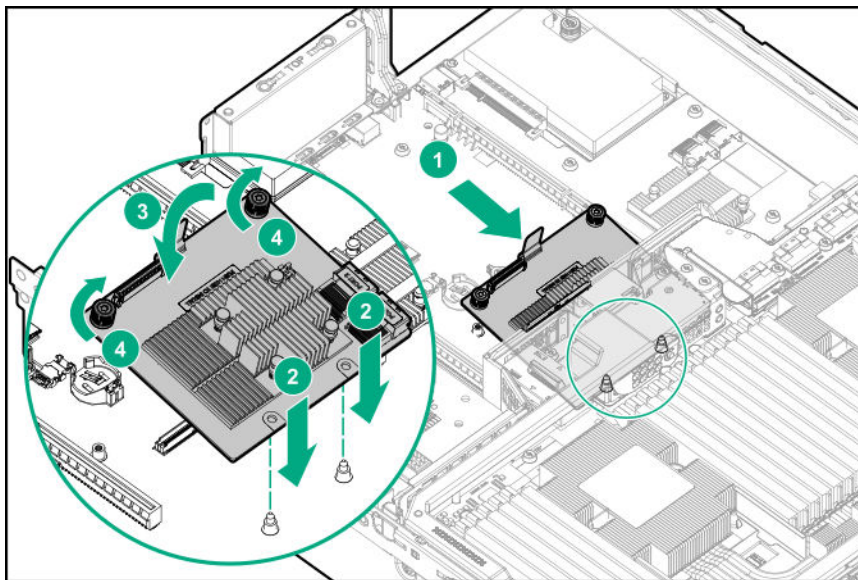
8. Route and connect the cables depending on the server configuration. See "**Cabling** on page 109."
9. If removed, do the following:
   a. Install the air baffle (**Installing the air baffle** on page 43).
   b. Install the processor mezzanine tray (**Installing a processor mezzanine tray** on page 87).
   c. Install the 2P pass-through performance board (**Installing a 2P pass-through performance board** on page 88).
10. Install the access panel (**Installing the access panel** on page 41).
11. Install the server into the rack (**Installing the server into the rack** on page 34).
12. Connect each power cord to the server.
13. Connect each power cord to the power source.
14. Before powering on the system, be sure that the HPE Smart Storage Battery is installed. See "**Installing a Smart Storage Battery** on page 103."
15. Power up the server (**Powering up the server** on page 38).

Installing a Smart Array controller into a PCI expansion slot

△ **CAUTION:**

Hewlett Packard Enterprise recommends performing a complete backup of all server data before performing a controller or adapter installation or removal.

Before installing the controller, you must observe the following requirements:

- To ensure that cables are connected correctly, observe the labels on the cable and component connectors.
- Be sure that you have the latest firmware for the controllers, HBAs, and the expander card. To download the latest firmware, see the **Hewlett Packard Enterprise website**.

Prerequisites

Before installing this option, be sure that you have the following:

- The components included with the hardware option kit

Procedure

1. Power down the server (**Power down the server** on page 38).
2. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.
3. Do one of the following:

   - Extend the server from the rack (**Extend the server from the rack** on page 38).
   - Remove the server from the rack (**Removing the server from the rack** on page 39).
4. Remove the access panel (**Removing the access panel** on page 40).
5. Remove the PCIe riser cage (**Removing the PCIe riser cages** on page 44).
6. Install the controller.
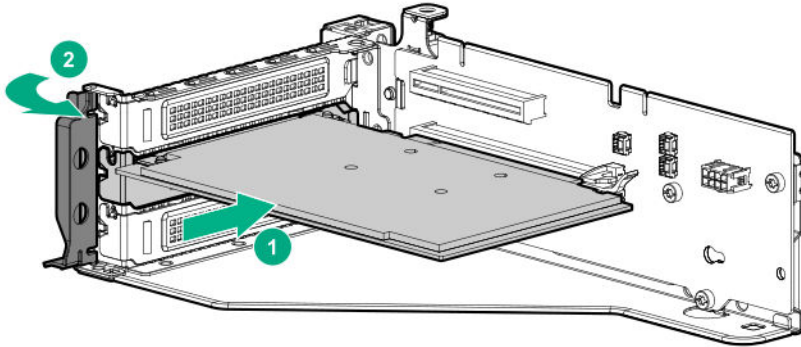
7. Install the primary PCIe riser cage (**Installing the primary PCIe riser cage** on page 45).
8. Connect the appropriate SAS cables. For more information, see "**Cabling** on page 109."
9. Install the access panel (**Installing the access panel** on page 41).
10. Install the server into the rack (**Installing the server into the rack** on page 34).
11. Connect each power cord to the server.
12. Connect each power cord to the power source.
13. Before powering on the system, be sure that the HPE Smart Storage Battery is installed. See "**Installing a Smart Storage Battery** on page 103."
14. Power up the server (**Powering up the server** on page 38).

Installing an internal microSD card

Procedure

1. Power down the server (**Power down the server** on page 38).
2. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.

3. Remove the server from the rack (**Removing the server from the rack** on page 39).
4. Remove the access panel (**Removing the access panel** on page 40).
5. Do one of the following:

   - Remove the secondary PCIe riser cage (**Removing the PCIe riser cages** on page 44).
   - Remove the tertiary PCIe riser cage (**Removing the PCIe riser cages** on page 44).
6. Install the microSD card.
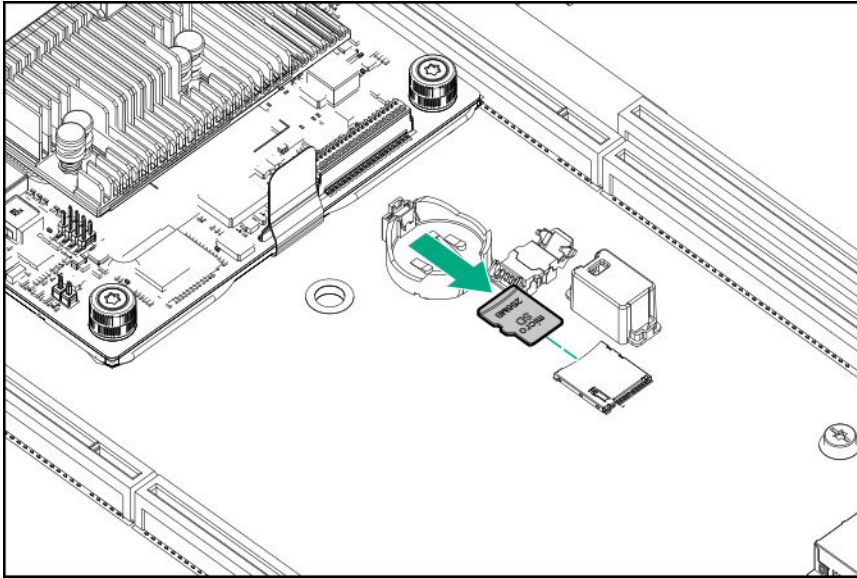
7. Do one of the following:

   - Install the secondary PCIe riser cage (**Installing the secondary PCIe riser cage** on page 68).
   - Install the tertiary PCIe riser cage (**Installing a tertiary PCIe cage** on page 70).
8. Install the access panel (**Installing the access panel** on page 41).
9. Install the server into the rack (**Installing the server into the rack** on page 34).
10. Connect each power cord to the server.
11. Connect each power cord to the power source.
12. Power up the server (**Powering up the server** on page 38).

Installing an intrusion detection switch

Prerequisites

Before installing this option, be sure that you have the following:

- The components included with the hardware option kit

Procedure

1. Power down the server (**Power down the server** on page 38).
2. Remove all power:
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.
3. Do one of the following:

   - Extend the server from the rack (**Extend the server from the rack** on page 38).
   - Remove the server from the rack (**Removing the server from the rack** on page 39).
4. Remove the access panel (**Removing the access panel** on page 40).
5. Install the intrusion detection switch.
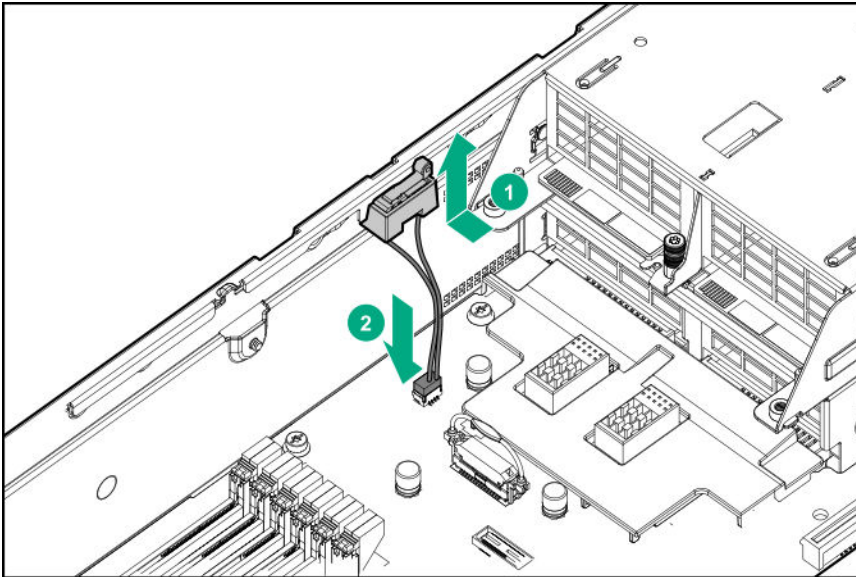
6. Install the access panel (**Installing the access panel** on page 41).
7. Install the server into the rack (**Installing the server into the rack** on page 34).
8. Connect each power cord to the server.
9. Connect each power cord to the power source.
10. Power up the server (**Powering up the server** on page 38).

Installing the bezel
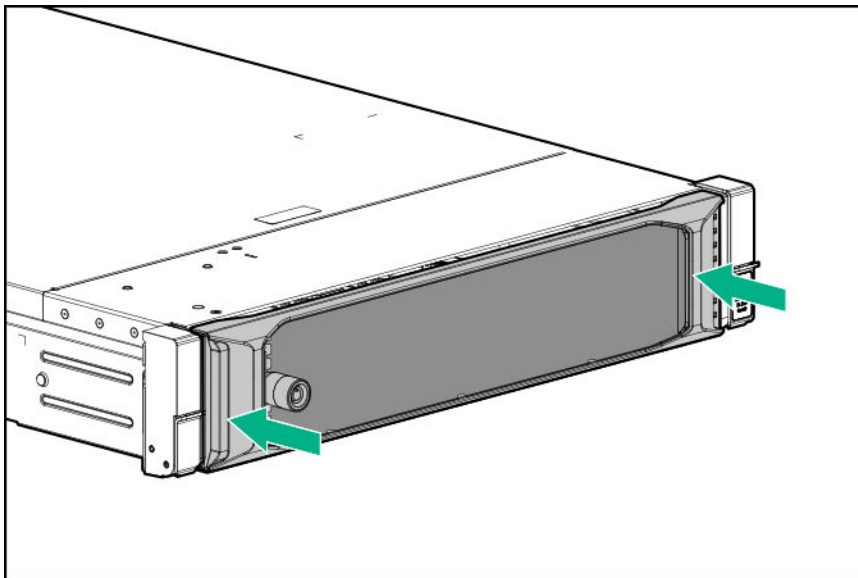
Cabling

Cabling overview

This section provides guidelines that help you make informed decisions about cabling the serverand hardware options to optimize performance.

> **⚠ CAUTION:**
> When routing cables, always be sure that the cables are not in a position where they can be pinched or crimped.

Power switch and Systems Insight Display module cabling
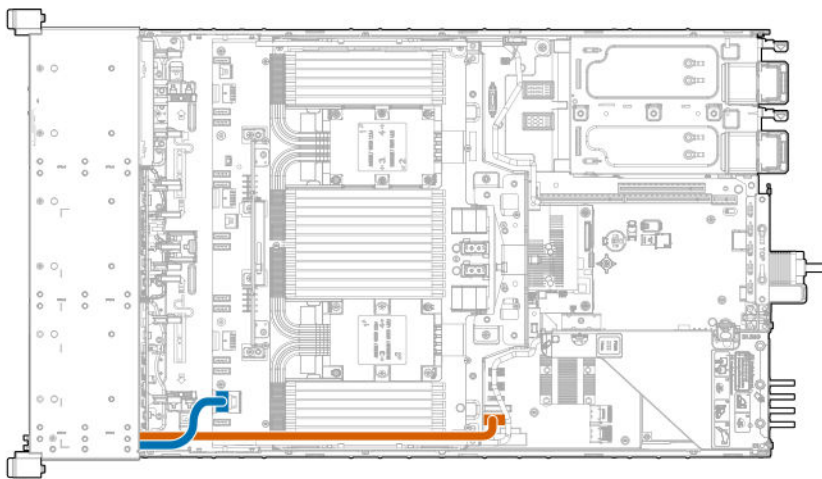
HPE Smart Storage Battery cabling
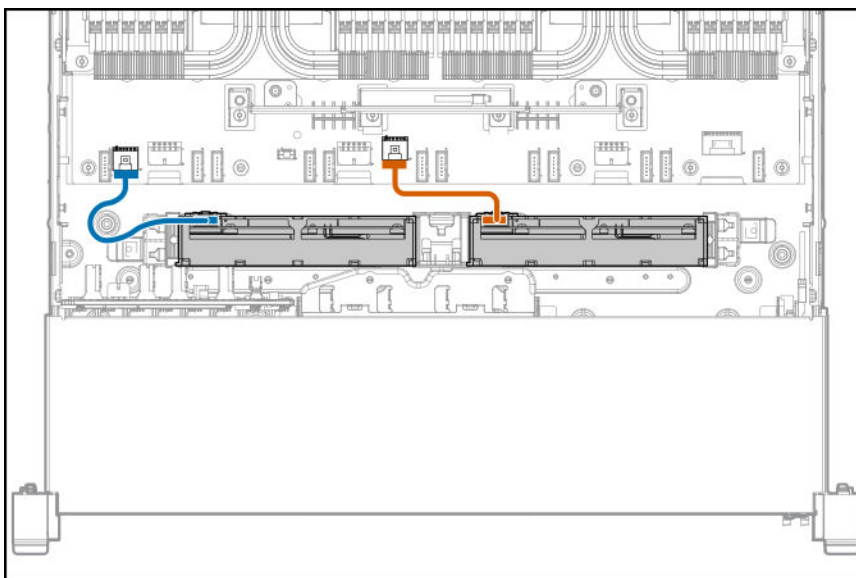
Cable	Description
System board HPE Smart Storage battery	Orange
Processor mezzanine tray HPE Smart Storage battery	Blue

Eight-bay SFF HDD drive cage cabling

To cable the drive cage to the HPE 12G SAS Expander, see "**Installing the HPE 12G SAS Expander Card** on page 96."

Drive box 1 cabling

Connected to the Primary PCIe riser board
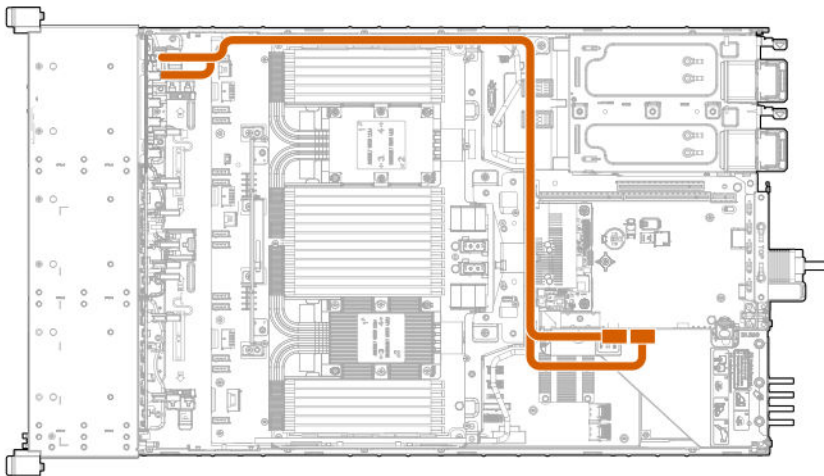
Connected to the secondary PCIe riser board
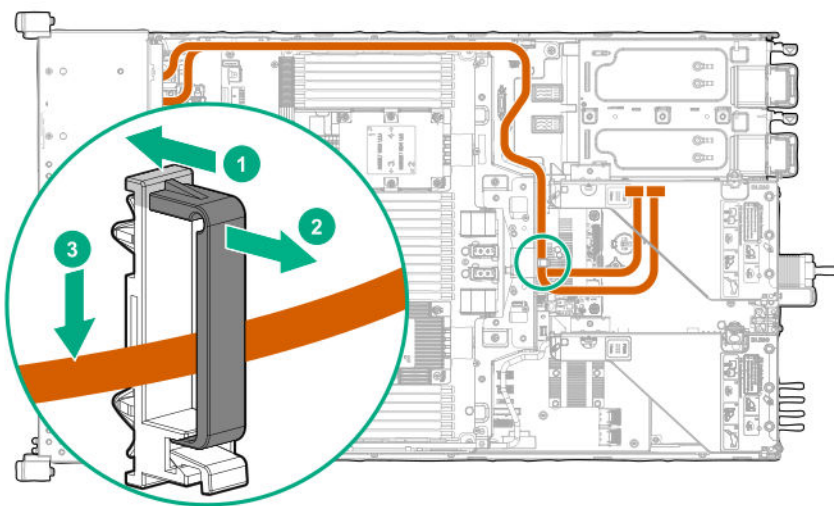
Connected to the tertiary PCIe riser board
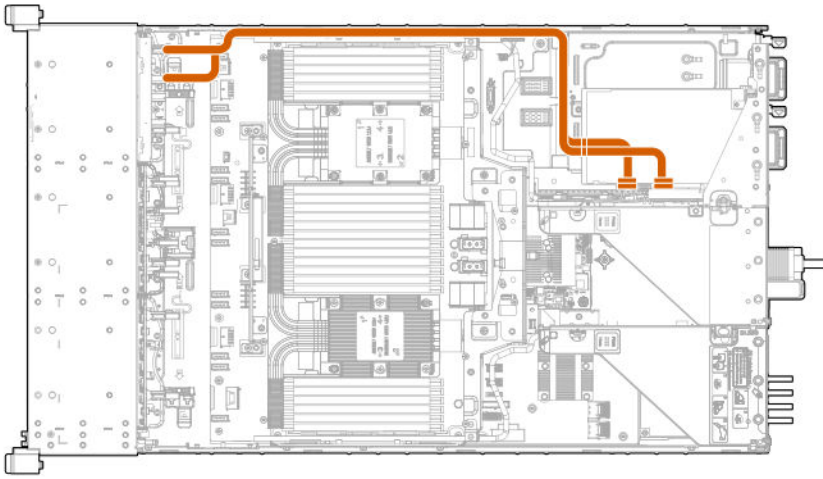
Connected to the system board (SATA ports 1 and 2)
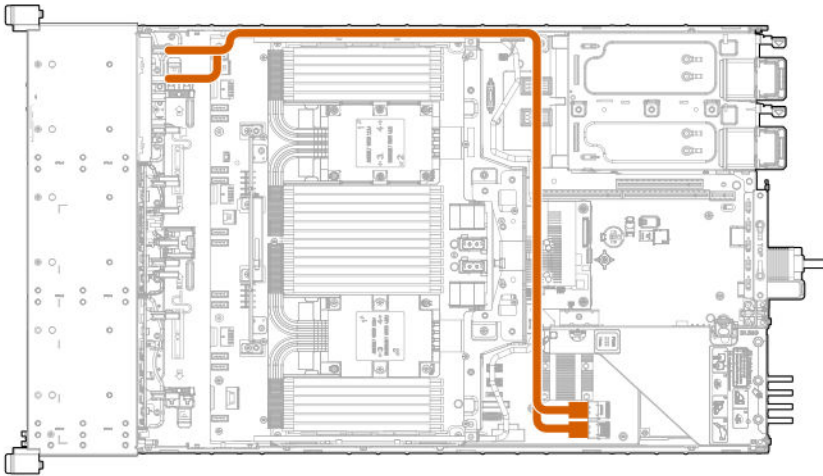
Connected to the HPE P816i-a Smart Array controller
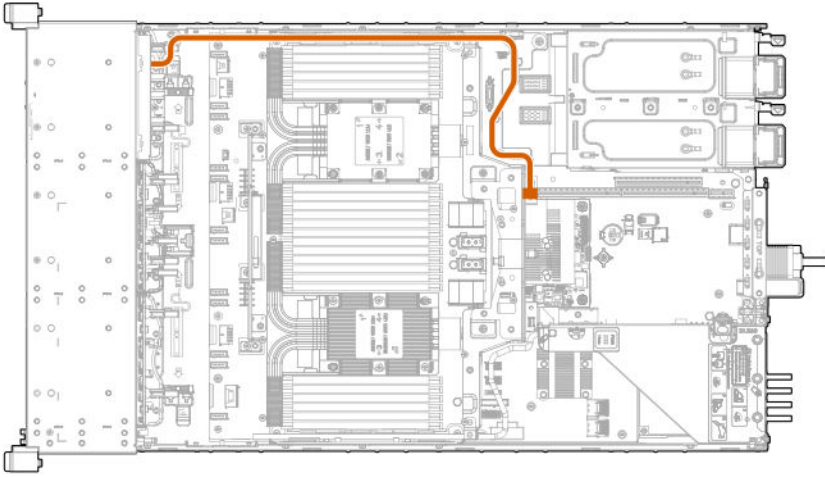
Connected to the HPE P408i-a Smart Array controller
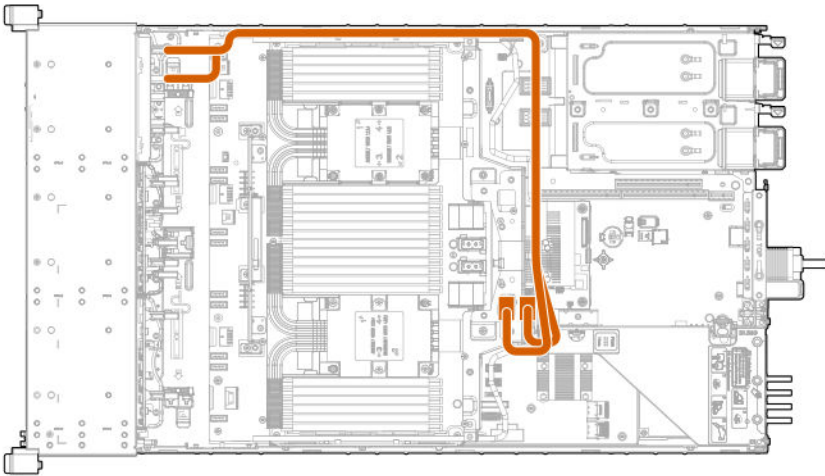
Drive box 2 cabling

Connected to the primary PCIe riser board
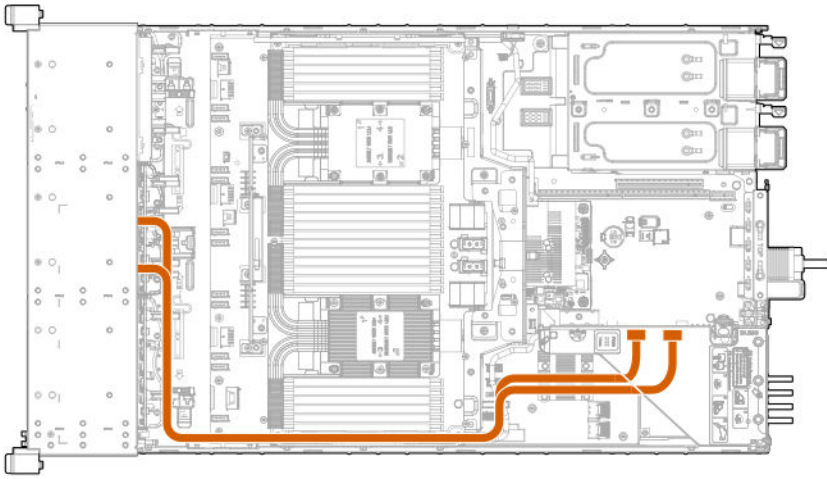
Connected to the secondary PCIe riser board
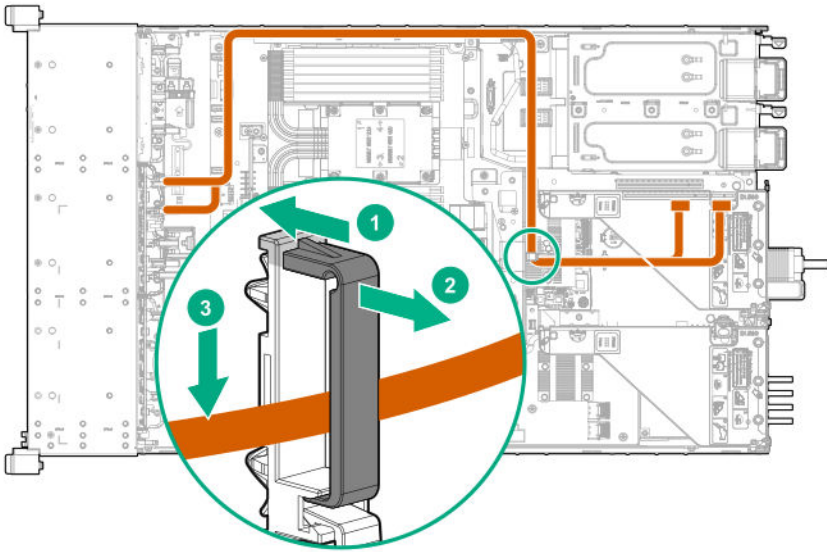
Connected to the tertiary PCIe riser board
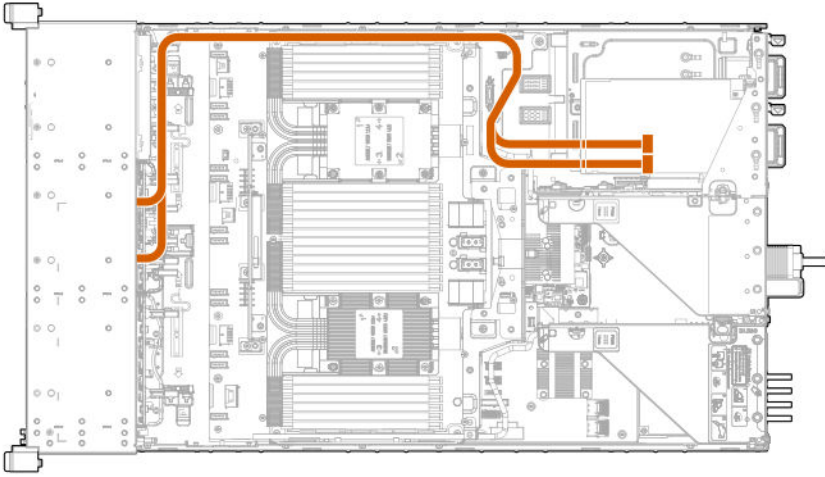
Connected to the system board (SATA ports 1 and 2)
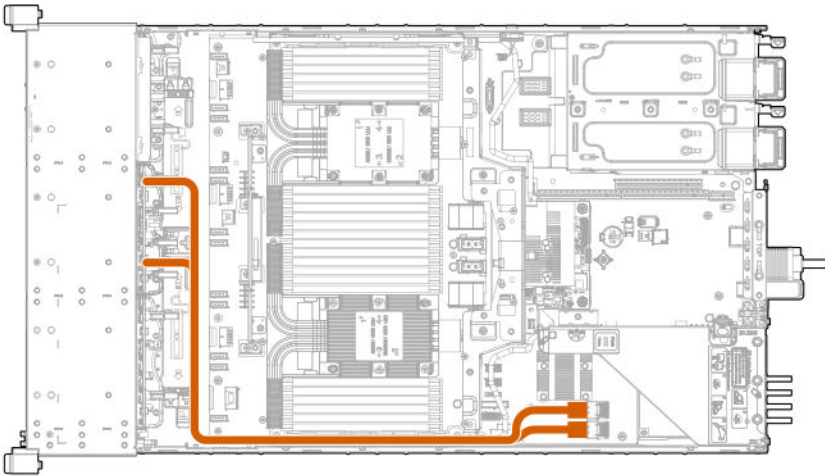
Connected to the Smart Array controller
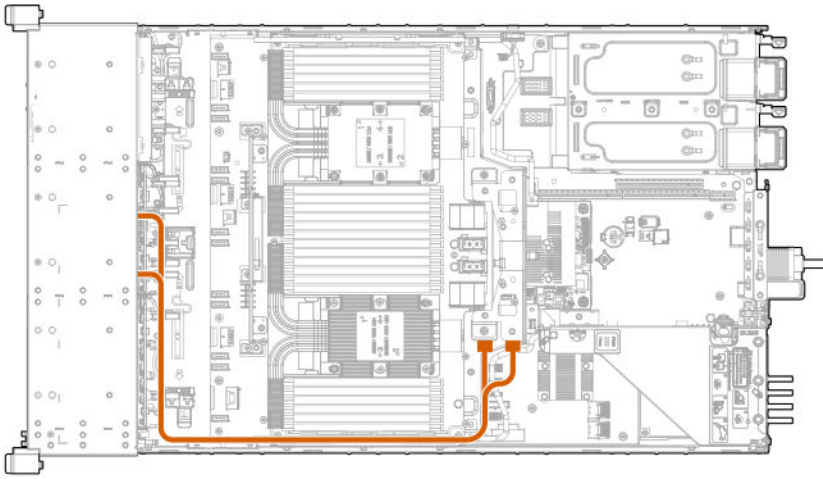
Drive box 3 cabling

Connected to the Primary PCIe riser board
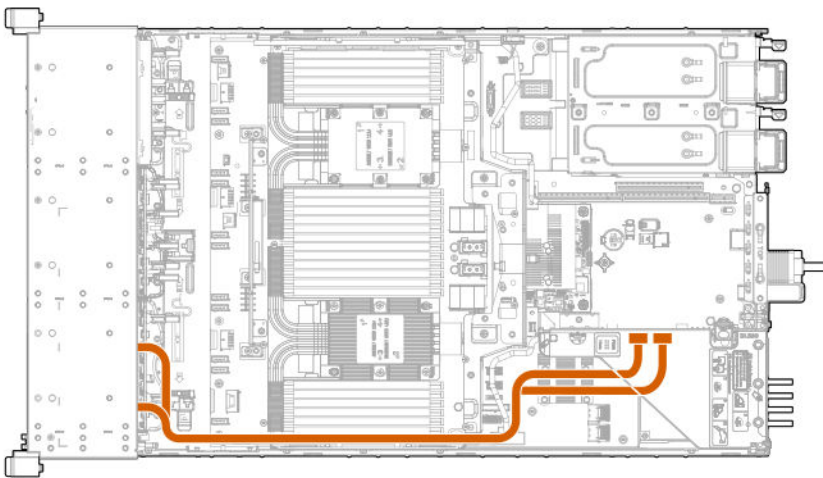
Connected to the secondary PCIe riser board
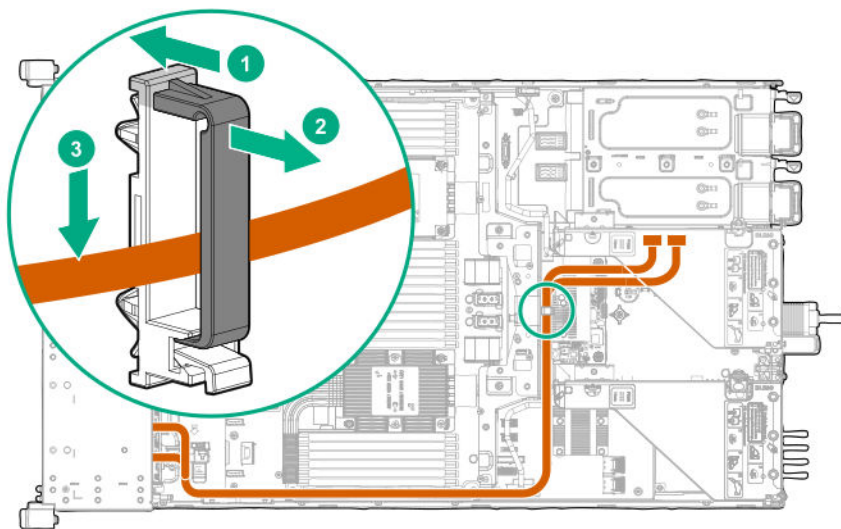
Connected to the system board (SATA ports 1 and 2)
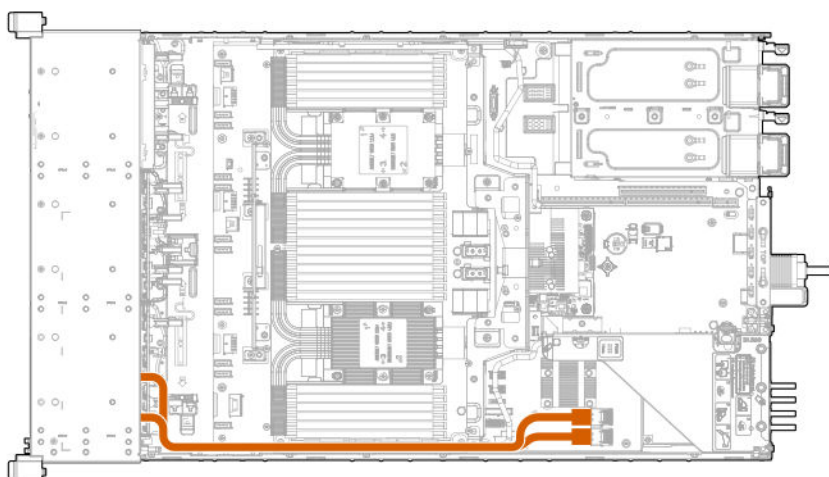
Connected to an HPE Smart Array controller
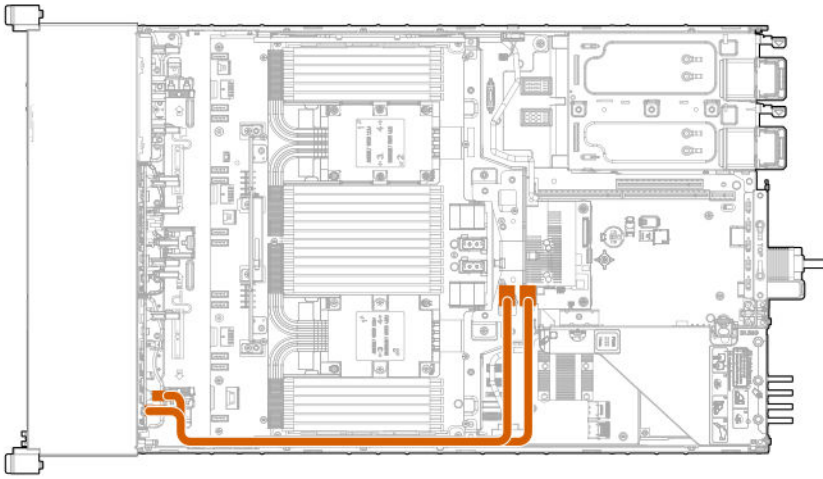
Eight-bay NVMe SSD drive cage cabling

Drive box 2 connected to the quad slimline riser installed in the primary PCIe riser cage
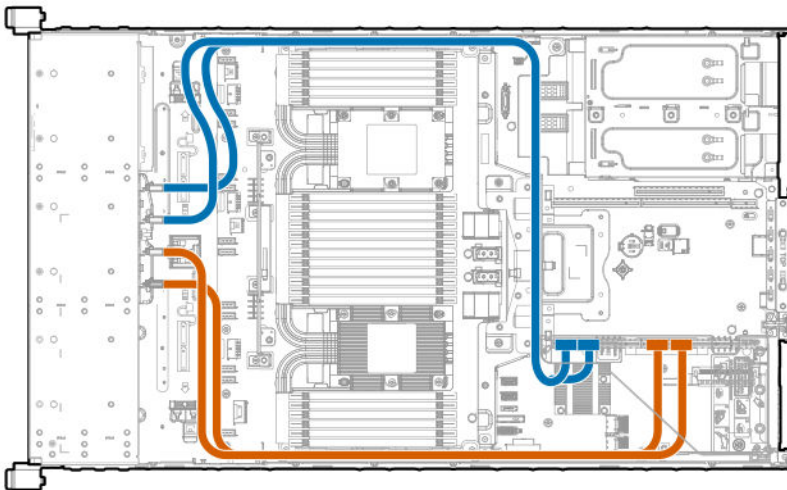
Drive box 2 connected to the quad slimline riser installed in the secondary PCIe riser cage
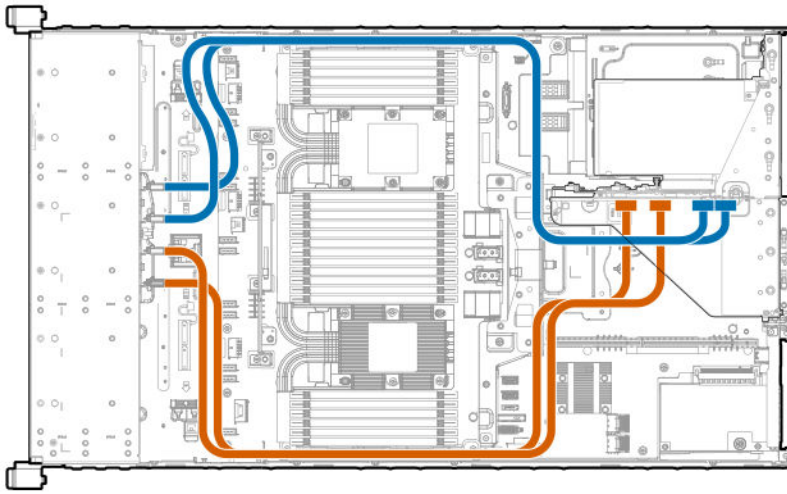
Drive box 2 connected to the 4-port NVMe mezzanine card
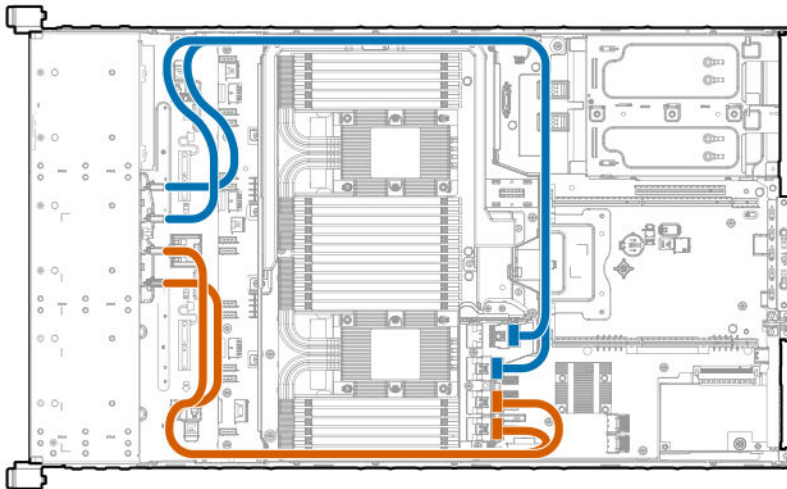
Two-bay NVMe/Six-bay SFF HDD drive cage cabling

To cable the drive cage to the HPE 12G SAS Expander, see "**Installing the HPE 12G SAS Expander Card** on page 96."

Quad slimline riser installed in the primary PCIe riser cage
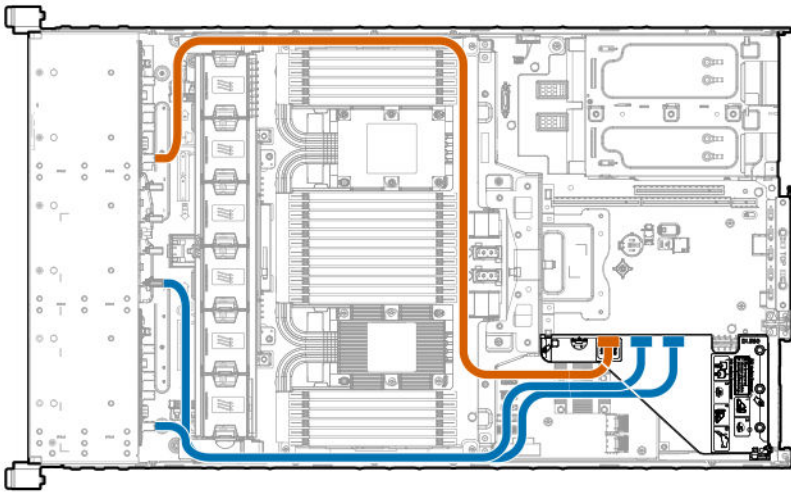
Quad slimline riser installed in the secondary PCIe riser cage
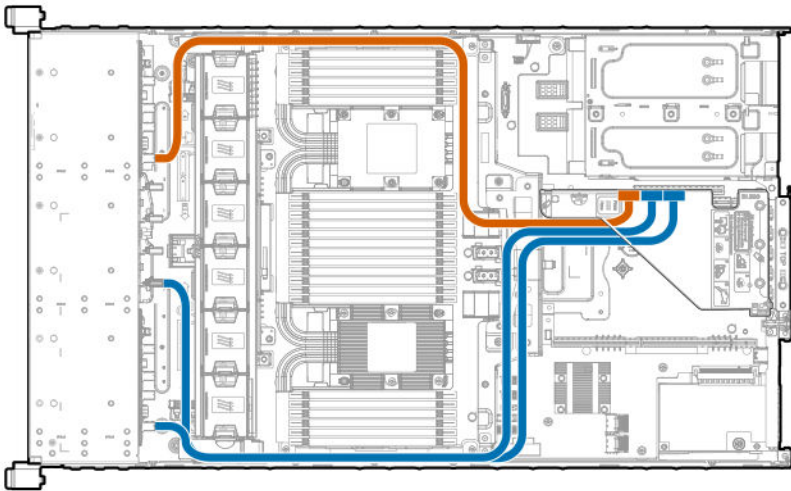
Tertiary riser
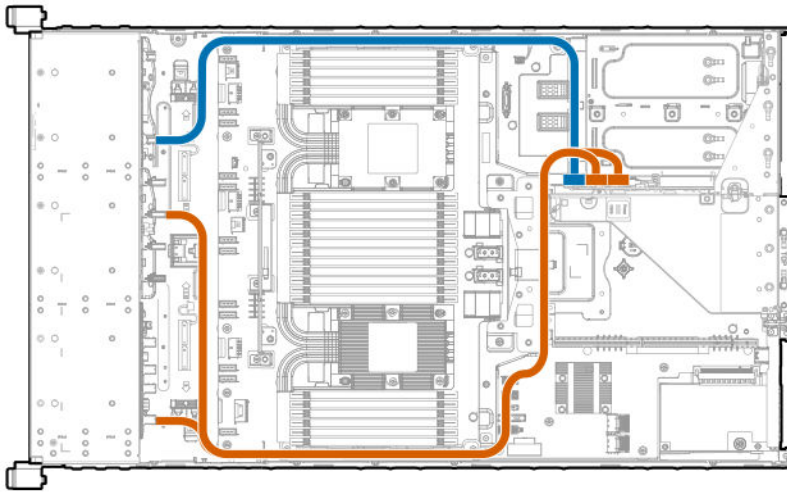
Drive boxes 1–3 connected to the 4-port NVMe mezzanine card
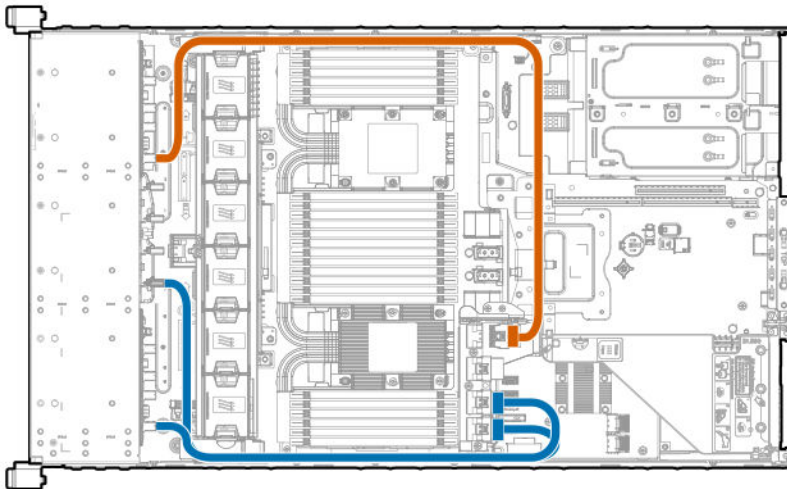
Universal media bay cabling

Box 1 Universal media bay with optional optical drive cable (blue)
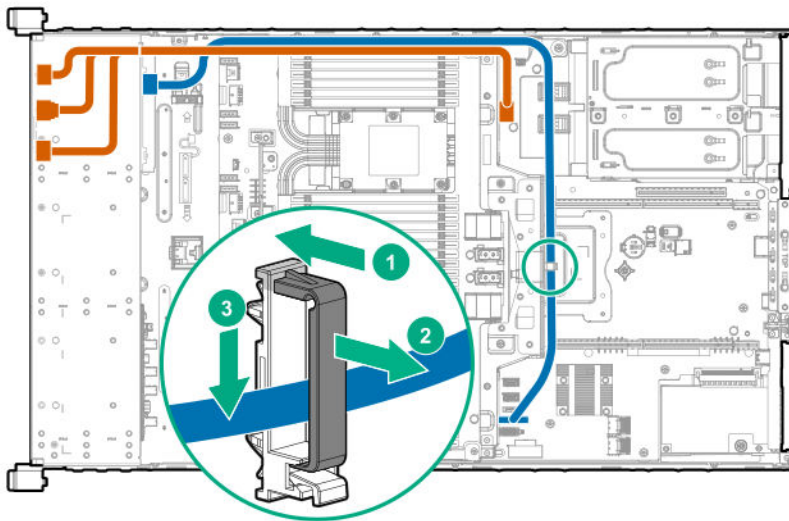
Two-bay SFF HDD drive cage cabling

To cable the drive cage to the HPE 12G SAS Expander, see "**Installing the HPE 12G SAS Expander Card** on page 96."
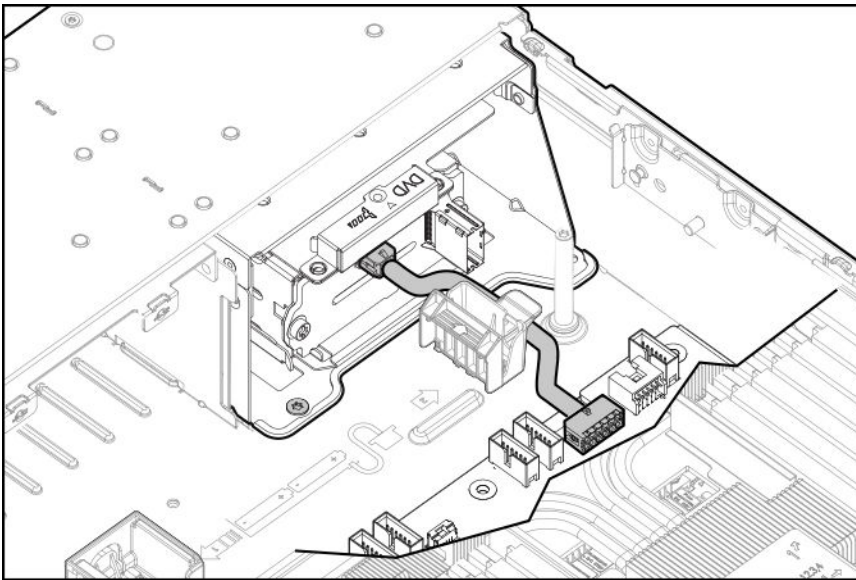
Software and configuration utilities

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 122	Online and Offline
HPE iLO 5 on page 123	Online and Offline
HPE Smart Storage Administrator on page 128	Online and Offline
iLO RESTful API on page 124	Online and Offline
Intelligent Provisioning on page 125	Offline
Scripting Toolkit for Windows and Linux on page 126	Online
Service Pack for ProLiant on page 129	Online and Offline
Smart Update Manager on page 130	Online and Offline
UEFI System Utilities on page 126	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 on the Hewlett Packard Enterprise website.

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 on the Hewlett Packard Enterprise website.

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 5 supports the following features:

- Group health status—View server health and model information.
- Group Virtual Media—Connect scripted 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, see the following website: **http://www.hpe.com/info/ilo/licensing**.

For more information about iLO Federation, see the iLO user guide on the Hewlett Packard Enterprise website.

iLO Service Port

The Service Port is a USB port with the label **iLO** on the front of 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 blinks to indicate the Service Port status.

    You can also retrieve the 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 on the Hewlett Packard Enterprise website.

iLO RESTful API

iLO 5 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 and firmware and driver update solution that enables rapid discovery, detailed inventory reporting, and 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/servers/iloamplifierpack**.

Intelligent Provisioning

Intelligent Provisioning is a single-server deployment tool embedded in ProLiant servers, Apollo systems, 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.

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.

In addition to accessing Intelligent Provisioning by pressing F10 from the POST screen, you can also access Intelligent Provisioning from the iLO web browser user interface using Always On. You can access Always On without having to reboot 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.

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/info/EIL**.

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 the *UEFI System Utilities and Shell Release Notes for Gen10 and HPE Synergy* on the Hewlett Packard Enterprise website (**http://www.hpe.com/info/ProLiantUEFI/docs.**).

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 `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 pre-boot 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.

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**.

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. See **Updating firmware from the System Utilities**.
- The `fwupdate` command in the **Embedded UEFI Shell**.
- Service Pack for ProLiant (SPP)
- HPE online flash components

Service Pack for ProLiant

SPP is a systems software and firmware solution delivered as a single download. This solution uses SUM as the deployment tool and is tested on supported ProLiant servers.

SPP, along with SUM and iSUT, provides Smart Update system maintenance tools that systematically update ProLiant servers and BladeSystem infrastructure.

SPP can be used in an online mode on a Windows or Linux hosted operating system, or in an offline mode where the server is booted to an operating system included in the ISO file.

To download the SPP, see the SPP download page at **https://www.hpe.com/servers/spp/download**.

Smart Update Manager

SUM is a tool for firmware and driver maintenance on ProLiant servers, BladeSystem enclosures, Moonshot systems, and other nodes. It provides a browser-based GUI or a command-line scripting interface for flexibility and adaptability.

SUMidentifies 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.
- Simultaneous firmware and software deployment for multiple remote nodes.
- Local offline firmware deployments with SPP deliverables.
- Remote offline deployment when used with the RESTful Interface Tool (Gen10), iLO Virtual Media, or PXE booted media.
- Extensive logging in all modes.

> **NOTE:**
>
> SUM does not support third-party controllers, including flashing hard drives behind the controllers.

Integrated Smart Update Tools

Integrated Smart Update Tools is a software utility used with iLO 5, 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 and iLO Amplifier Pack manage the iLO while iSUT runs on each server and deploys the updates. The same administrator might not manage both applications. Create a process that notifies the administrators when updates are available.

- **Integrated Smart Update Tools**: Polls an iLO 5, 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 5 with integrated Smart Update**: Loads Install Sets to the iLO Repository on iLO 5 nodes. iSUT deploys OS-based updates from the iLO Repository.
- **iLO Amplifier Pack**: Displays available updates for servers. Communicates with iSUT to initiate updates, reports the status to iLO Amplifier Pack.
- **HPE OneView:** Displays available updates for servers. Communicates with iSUT 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 one node with iLO Amplifier Pack and HPE OneView.

Updating firmware from the System Utilities

Use the **Firmware Updates** option to update firmware components in the system, including the system BIOS, NICs, and storage cards.

Procedure

1. Access the System ROM Flash Binary component for your server from the Hewlett Packard Enterprise Support Center.
2. Copy the binary file to a USB media or iLO virtual media.
3. Attach the media to the server.
4. Launch the **System Utilities**, and select **Embedded Applications** > **Firmware Update**.
5. Select a device.

   The **Firmware Updates** screen lists details about your selected device, including the current firmware version in use.
6. Select **Select Firmware File**.
7. Select the flash file in the **File Explorer** list.

   The firmware file is loaded and the **Firmware Updates** screen lists details of the file in the **Selected firmware file** field.
8. Select **Image Description**, 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. Enter `fwupdate -d BIOS -f `*`filename`* to flash the system ROM.
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.

The server includes new hardware that may not have driver support on all OS installation media.

If you are installing an Intelligent Provisioning-supported OS, use **Intelligent Provisioning** on page 125 and its Configure and Install feature to install the OS and latest supported drivers.

If you do not use Intelligent Provisioning to install an OS, drivers for some of the new hardware are required. These drivers, as well as other option drivers, ROM images, and value-add software can be downloaded as part of an SPP.

If you are installing drivers from SPP, be sure that you are using the latest SPP version that your server supports. To verify that your server is using the latest supported version and for more information about SPP, see the **Hewlett Packard Enterprise website**.

To locate the drivers for a particular server, go to the **Hewlett Packard Enterprise Support Center website**. Under **Select your HPE product**, enter the product name or number and click **Go**.

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**.
- Download individual drivers, firmware, or other systems software components from the server product page in the **Hewlett Packard Enterprise Support Center website**.

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

Change control and proactive notification

Hewlett Packard Enterprise offers Change Control and Proactive Notification to notify customers 30 to 60 days in advance of the following:

- Upcoming hardware and software changes
- Bulletins
- Patches

Let Hewlett Packard Enterprise know what Hewlett Packard Enterprise commercial products you own and they will send you the latest updates to keep your business running smoothly.

For more information, see the Hewlett Packard Enterprise website:

http://www.hpe.com/info/pcn

Troubleshooting

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 Gen 10 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**).

Replacing the system battery

The system battery provides power to the real-time clock. If the server no longer automatically displays the correct date and time, you might need to replace the system battery.

> ⚠ **WARNING:**
> The computer contains an internal lithium manganese dioxide, a vanadium pentoxide, or an alkaline battery pack. A risk of fire and burns exists if the battery pack is not properly handled. To reduce the risk of personal injury:
>
> - Do not attempt to recharge the battery.
> - Do not expose the battery to temperatures higher than 60°C (140°F).
> - Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.
> - Replace only with the spare designated for this product.

Procedure

1. Power down the server (**Power down the server** on page 38).
2. Remove all power.
   a. Disconnect each power cord from the power source.
   b. Disconnect each power cord from the server.
3. Do one of the following:

   - Extend the server from the rack (**Extend the server from the rack** on page 38).
   - Remove the server from the rack (**Removing the server from the rack** on page 39).
4. Remove the access panel (**Removing the access panel** on page 40).
5. If installed, remove the secondary PCIe riser cage (**Removing the PCIe riser cages** on page 44).
6. Locate the battery (**System board components** on page 19).
7. Remove the battery.
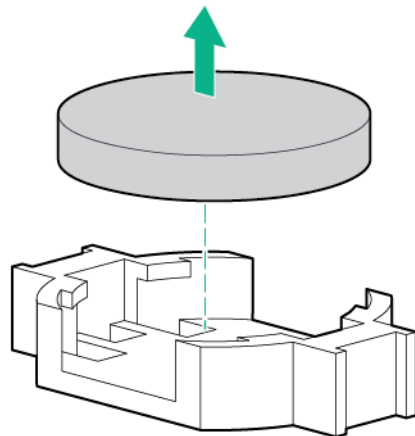
8. To replace the component, reverse the removal procedure.
9. Properly dispose of the old battery.

   For more information about battery replacement or proper disposal, contact an authorized reseller or an authorized service provider.

Specifications

Environmental specifications

Specification	Value
System Inlet Temperature, Standard Operating Support [1]	—
Operating	10°C to 35°C (50°F to 95°F)
Non-operating	-30°C to 60°C (-22°F to 140°F)
Relative humidity (non-condensing)	—
Operating	Minimum to be the higher (more moisture) of -12°C (10.4°F) dew point or 8% relative humidity Maximum to be 24°C (75.2°F) dew point or 90% relative humidity
Non-operating	5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing.
Altitude	—
Operating	3050 m (10,000 ft) This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 457 m/min (1500 ft/min).
Non-operating	9144 m (30,000 ft) Maximum allowable altitude change rate is 457 m/min (1500 ft/min).

[1] *All temperature ratings shown are for sea level. An altitude derating of 1.0°C per 305.0 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. System performance during standard operating support may be reduced if operating with a fan fault or above 30°C (86°F).*

The approved hardware configurations for this system are listed on the **Hewlett Packard Enterprise website**.

Environmental specifications

Specification	Value
System Inlet Temperature, Extended Ambient Operating Support	—
—	For approved hardware configurations, the supported system inlet range is extended to be:
	5°C to 10°C (41°F to 50°F) and 35°C to 40°C (95°F to 104°F)
	All temperature ratings shown are for 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). [1]
—	For approved hardware configurations, the supported system inlet range is extended to be:
	40°C to 45°C (104°F to 113°F)
	All temperature ratings shown are for 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). [1]

[1] System performance may be reduced if operating in the extended ambient operating range or with a fan fault.

The approved hardware configurations for this system are listed on the **Hewlett Packard Enterprise website**.

Mechanical specifications

Specification	Value
Height	8.75 cm (3.44 in)
Depth	75.47 cm (29.71 in)
Width	44.54 cm (17.54 in)
Weight (maximum)	34.12 kg (75.23 lbs)
Weight (minimum)	18.45kg (40.67 lbs)

Power supply specifications

Depending on installed options, the server is configured with one of the following power supplies:

• HPE 800W Flex Slot -48VDC Hot-plug Power Supply
• HPE 1600W Flex Slot Platinum Plus Hot-plug Power Supply

For detailed power supply specifications, see the QuickSpecs on the Hewlett Packard Enterprise website **http://www.hpe.com/info/proliant/powersupply**.

HPE 800W Flex Slot Platinum Hot-plug Power Supply

Specification	Value
Input requirements	
Rated input voltage	100 to 127 VAC
	200 to 240 VAC
	240 VDC for China only
Rated input frequency	50 Hz to 60 Hz
	Not applicable to 240VDC
Rated input current	9.4 A at 100 VAC
	4.5 A at 200 VAC
	3.8 A at 240 VDC for China only
Maximum rated input power	940 W at 100 VAC
	900 W at 200 VAC
	912 W at 240 VDC for China only
BTUs per hour	3207 at 100 VAC
	3071 at 200 VAC
	3112 at 240 for China only
Power supply output	
Rated steady-state power	800 W at 100 VAC to 127 VAC input
	800 W at 200 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 200 VAC to 240 VAC input
	800 W at 240 VDC input for China only

HPE 800W Flex Slot Titanium Plus Hot-plug Power Supply

Specification	Value
Input requirements	

Table Continued

Rated input voltage	200 to 240 V AC
	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	870 W at 200 VAC
	870 W at 240 VAC
	870 W at 240 VDC for China only
BTUs per hour	2969 at 200 VAC
	2969 at 240 VAC
	2969 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 Power Supply

Specification	Value
Input requirements	
Rated input voltage	200 V to 277 V AC
	380 VDC
Rated input frequency	50 Hz–60 Hz
Rated input current	4.5 A at 200 V AC
	3.2 A at 277 V AC
	2.3 A at 380 VDC

Table Continued

Maximum rated input power	900 W at 200 VAC
	887 W at 277 VAC
	874 W at 380 VDC
BTUs per hour	3071 at 200 VAC
	3026 at 277 VAC
	2982 at 380 VDC
Power supply output	
Rated steady-state power	800 W at 200 VAC to 277 VAC input
	800 W at 380 VDC input
Maximum peak power	800 W at 200 VAC to 277 VAC input
	800 W at 380 VDC input

HPE 800W Flex Slot -48VDC Hot-plug Power Supply

Specification	Value
Input requirements	
Rated input voltage	-40 VDC to -72 VDC
	-48 VDC nominal input
Rated input current	26 A at -40 VDC input
	19 A at -48 VDC input, nominal input
	12.4 A at -72 VDC input
Rated input power (W)	936 W at -40 VDC input
	912 W at -48 VDC input, nominal input
	900 W at -72 VDC input
Rated input power (BTUs per hour)	3194 at -40 VDC input
	3112 at -48 VDC input, nominal input
	3071 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

WARNING:

To reduce the risk of electric shock or energy hazards:

- This equipment must be installed by trained service personnel, as defined by the NEC and IEC 60950-1, Second Edition, the standard for Safety of Information Technology Equipment.
- 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 Power Supply

Specification	Value
Input requirements	
Rated input voltage	200 to 240 VAC 240 VDC (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 1720 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 1ms (turbo mode) at 200 VAC to 240 VAC input

Websites

General websites

    Hewlett Packard Enterprise Information Library

        www.hpe.com/info/EIL

    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 websites, see **Support and other resources**.

Support and other resources

Accessing Hewlett Packard Enterprise Support

- For live assistance, go to the Contact Hewlett Packard Enterprise Worldwide website:

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

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

Information to collect

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

Accessing updates

- Some software products provide a mechanism for accessing software updates through the product interface. Review your product documentation to identify the recommended software update method.
- To download product updates:

  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

Warranty information

To view the warranty for your product or to view the *Safety and Compliance Information for Server, Storage, Power, Networking, and Rack Products* reference document, go to the Enterprise Safety and Compliance website:

www.hpe.com/support/Safety-Compliance-EnterpriseProducts

Additional warranty information

    HPE ProLiant and x86 Servers and Options

        www.hpe.com/support/ProLiantServers-Warranties

    HPE Enterprise Servers

        www.hpe.com/support/EnterpriseServers-Warranties

    HPE Storage Products

        www.hpe.com/support/Storage-Warranties

    HPE Networking Products

        www.hpe.com/support/Networking-Warranties

Regulatory information

To view the regulatory information for your product, view the *Safety and Compliance Information for Server, Storage, Power, Networking, and Rack Products*, available at the Hewlett Packard Enterprise Support Center:

www.hpe.com/support/Safety-Compliance-EnterpriseProducts

Additional regulatory information

Hewlett Packard Enterprise is committed to providing our customers with information about the chemical substances in our products as needed to comply with legal requirements such as REACH (Regulation EC No 1907/2006 of the European Parliament and the Council). A chemical information report for this product can be found at:

www.hpe.com/info/reach

For Hewlett Packard Enterprise product environmental and safety information and compliance data, including RoHS and REACH, see:

www.hpe.com/info/ecodata

For Hewlett Packard Enterprise environmental information, including company programs, product recycling, and energy efficiency, see:

www.hpe.com/info/environment

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.