Hewlett Packard Enterprise

HPE ProLiant DL580 Gen10 Server User Guide

Abstract

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

Contents

Component identification

Front panel components

Server with power module

Item	Description
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2	Box 2 — Supported options: • **Eight-bay SFF HDD/SSD drive cage** • **Eight-bay SFF NVMe SSD drive cage** • **Six-bay SFF HDD/Two-bay NVMe SSD (Premium) drive cage**
3	Box 3 — Supported options: • **Eight-bay SFF HDD/SSD drive cage** • **Eight-bay SFF NVMe SSD drive cage** • **Six-bay SFF HDD/Two-bay NVMe SSD (Premium) drive cage**
4	Front USB 3.0 port

Table Continued

Item	Description
5	Serial number and iLO information pull tab
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10	Box 4 — Supported options: • **Universal media bay components** • **Eight-bay SFF HDD/SSD drive cage**

Server with optional Systems Insight Display Module

Item	Description
1	Box 1 — Supported options: • **Eight-bay SFF HDD/SSD drive cage** • **Six-bay SFF HDD/Two-bay NVMe SSD (Premium) drive cage** • **Eight-bay SFF NVMe SSD drive cage** (with only four NVMe drives installed)
2	Box 2 — Supported options: • **Eight-bay SFF HDD/SSD drive cage** • **Eight-bay SFF NVMe SSD drive cage** • **Six-bay SFF HDD/Two-bay NVMe SSD (Premium) drive cage**
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4	Front USB 3.0 ports (2)
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9	Box 4 — Supported options: • **Universal media bay components** • **Eight-bay SFF HDD/SSD drive cage**

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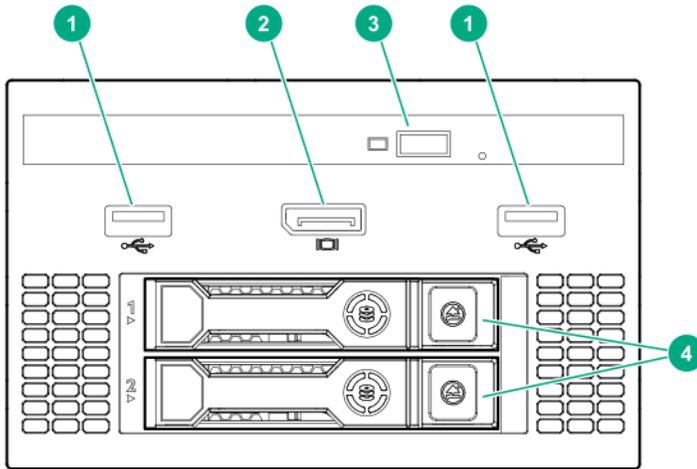
Item	Description
1	USB 2.0 port
2	Video display port
3	Optical disk drive (optional)
4	Drives (optional) *

* Requires the two-bay SFF (Premium) drive cage.

Drive bay numbering

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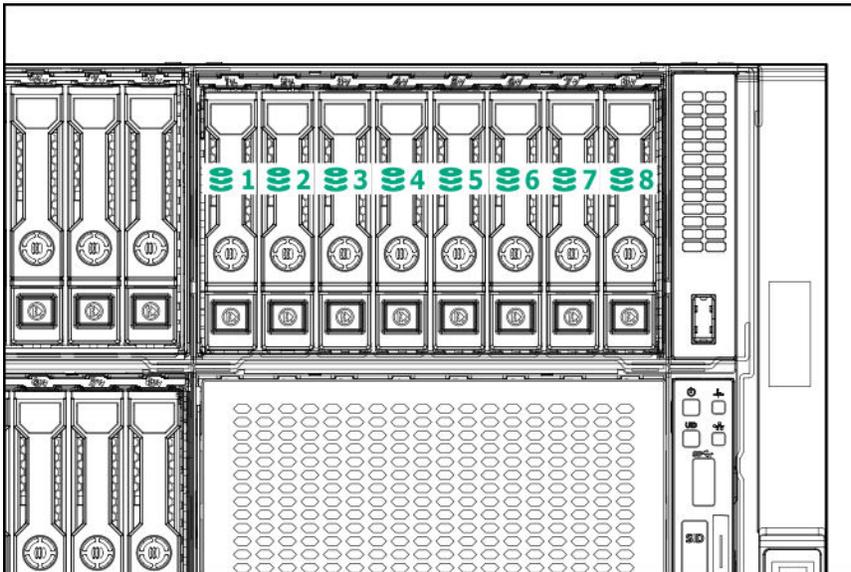
Eight-bay SFF NVMe drive cage
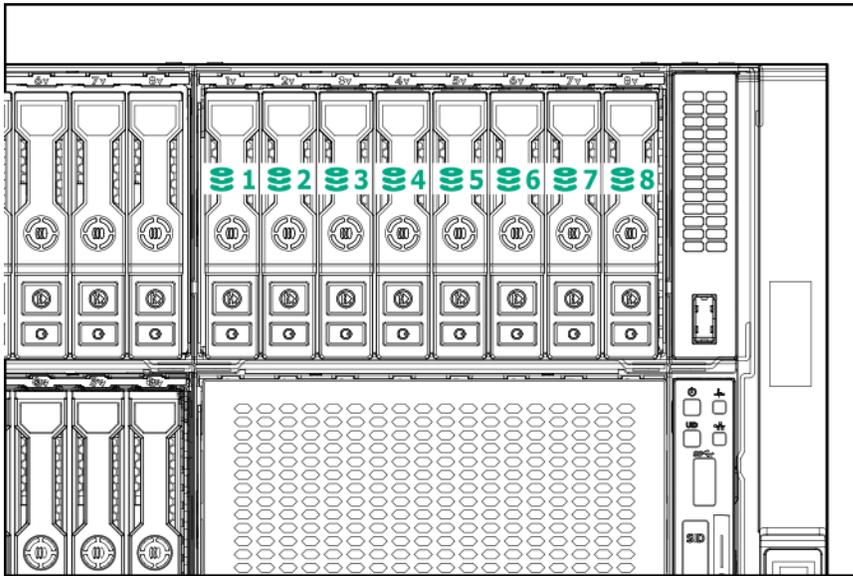
Six-bay SFF HDD/Two-bay NVMe SSD (Premium) drive cage
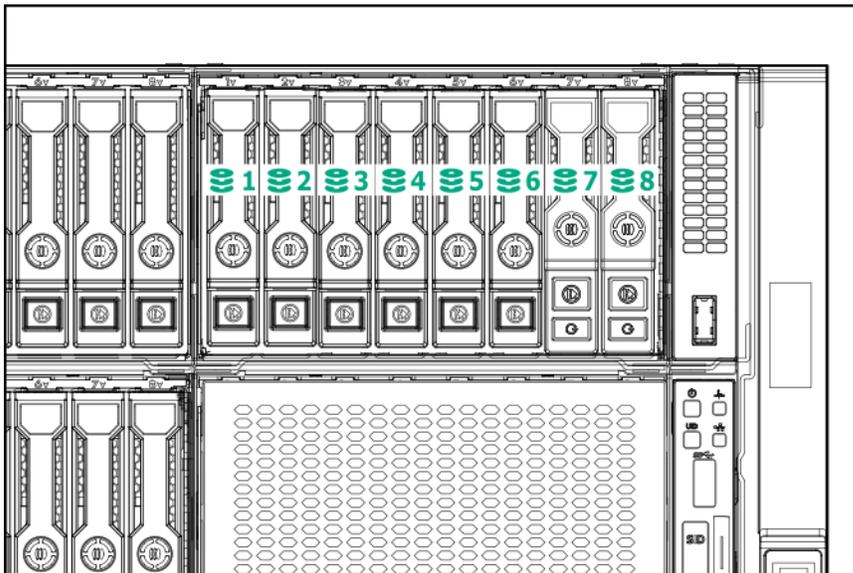
Two-bay SFF (Premium) drive cage
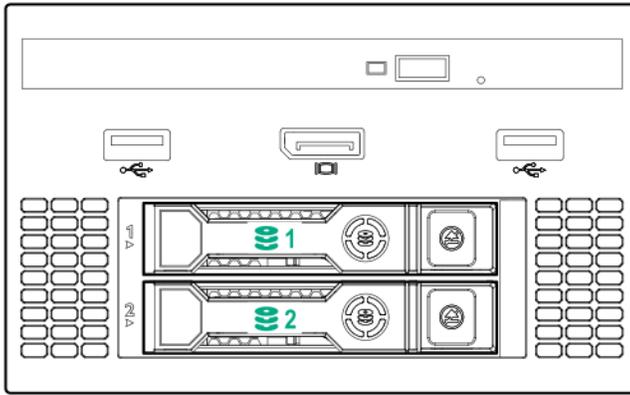
Front panel LEDs and buttons

Power switch module
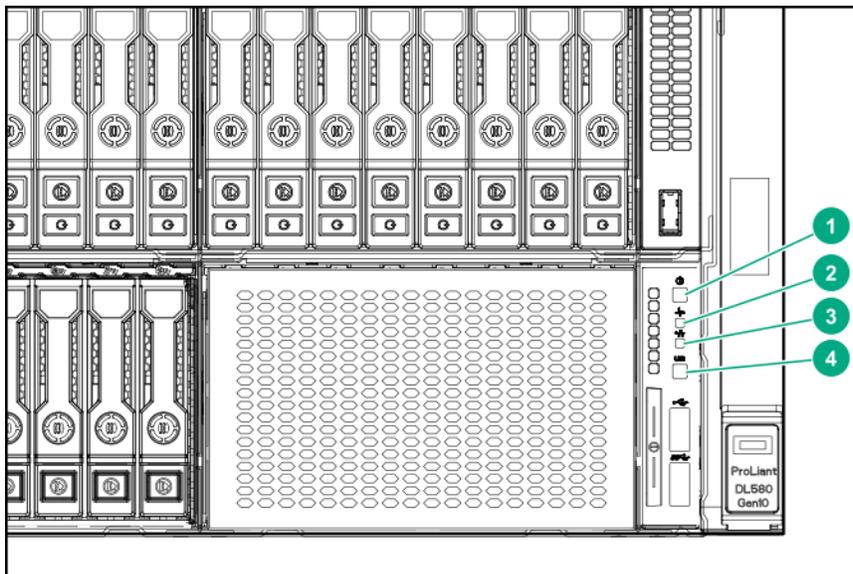
Systems Insight Display module (optional)
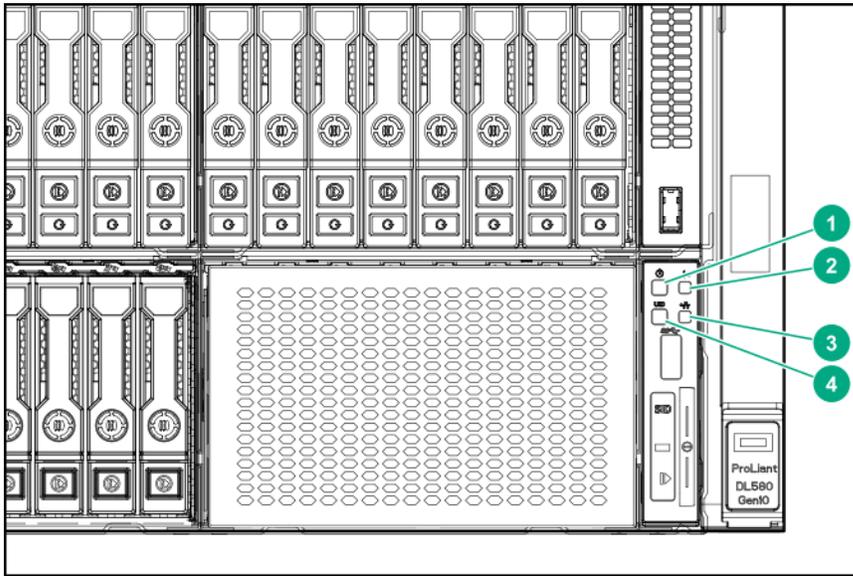
Item	Description	Status
1	Power On/Standby button and system power LED[1]	Solid green = System on
		Flashing green (1 Hz/cycle per sec) = Performing power on sequence
		Solid amber = System in standby
		Off = No power present[2]
2	Health LED[1]	Solid green = Normal
		Flashing green (1 Hz/cycle per sec) = 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 • 1 fast flash and then off for 3 seconds = iLO Service Port status is Complete • 4 medium flashes and then off for 1 second = iLO Service Port status is Busy • 8 fast flashes and then off for 1 second = iLO Service Port status is Error 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.

UID button functionality

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

Front panel LED power fault codes

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

Subsystem	LED behavior
System board	1 flash
Processor	2 flashes
Memory	3 flashes
Riser board PCIe slots	4 flashes
FlexibleLOM	5 flashes

Table Continued

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

Systems Insight Display LEDs

The Systems Insight Display LEDs represent the system board layout. The display enables diagnosis with the access panel installed.
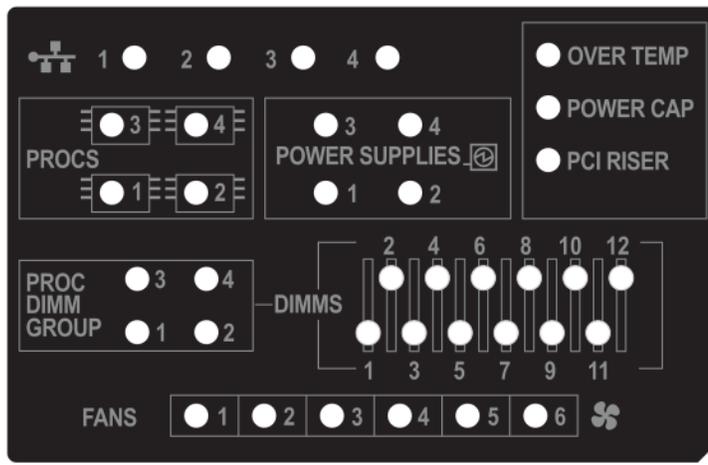
Description	Status
Processor LEDs	Off = Normal Amber = Failed processor
DIMM LEDs	Off = Normal Amber = Failed DIMM or configuration issue
Fan LEDs	Off = Normal Amber = Failed fan or missing fan
NIC LEDs	Off = No link to network Solid green = Network link Flashing green = Network link with activity If power is off, the front panel LED is not active. For status, see **Rear panel LEDs** on page 22.

Table Continued

Description	Status
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 16.

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.

Table Continued

Systems Insight Display LED and color	Health LED	System power LED	Status
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
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
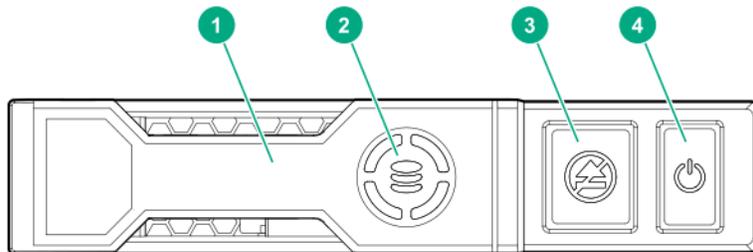
Item	Description
1	Release lever
2	Activity ring
3	Do Not Remove LED[1]
4	Power On/Off button

[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 that the device is still in use. Removal of the NVMe SSD before the device has completed and ceased signal/traffic flow can cause loss of data.

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 10.

• The NVMe SSD is a PCIe bus device. Do not remove a device attached to a PCIe bus without allowing it to first 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 must 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 (standard)
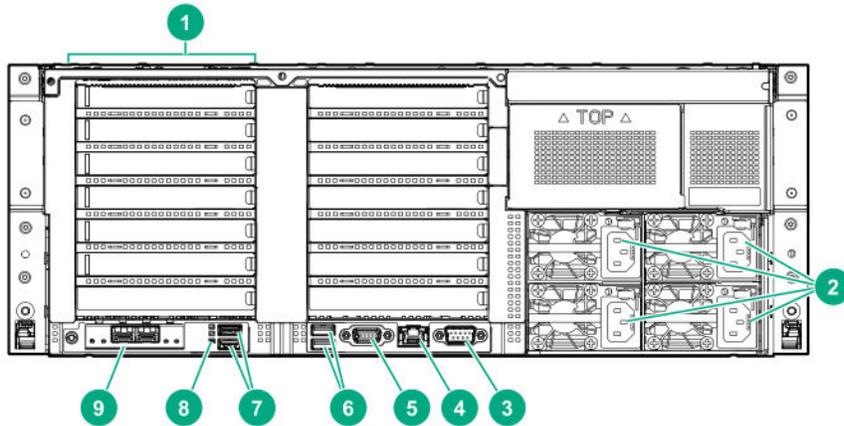
Item	Description
1	Primary PCIe riser slots 1-7
2	Power supplies (4)
3	Serial port
4	iLO Management Port
5	Video port
6	Rear USB 2.0 ports (2)
7	Rear USB 3.0 ports (2)
8	UID LED
9	FlexibleLOM (optional)

Rear panel with optional butterfly riser cage
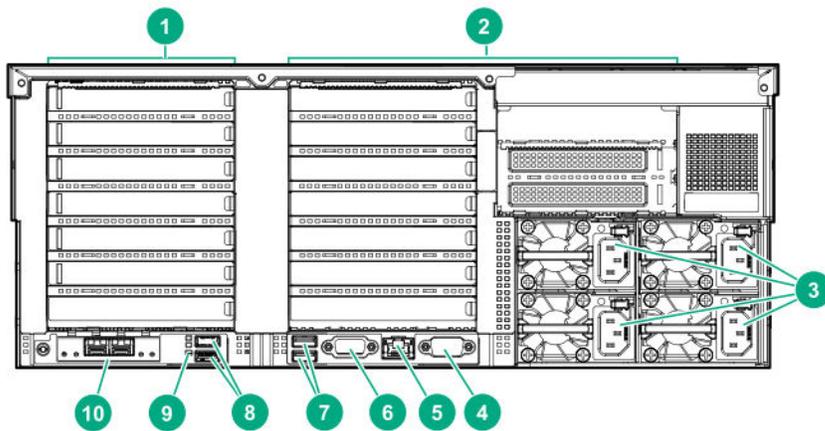
Item	Description
1	Primary PCIe riser slots 1-7
2	Butterfly PCIe riser slots 8-16 (Optional)
3	Power supplies (4)
4	Serial port
5	iLO Management Port
6	Video port
7	Rear USB 2.0 ports (2)
8	Rear USB 3.0 ports (2)
9	UID LED
10	FlexibleLOM (optional)

Rear panel LEDs

Item	Description	Status
1	Activity LED	Off = No network activity Solid green = Link to network Flashing green = Network activity
2	Link LED	Off = No network link Green = Network link
3	UID LED	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 • 1 fast flash and then off for 3 seconds = iLO Service Port status is Complete • 4 medium flashes and then off for 1 second = iLO Service Port status is Busy • 8 fast flashes and then off for 1 second = iLO Service Port status is Error Off = Deactivated

Power supply LEDs

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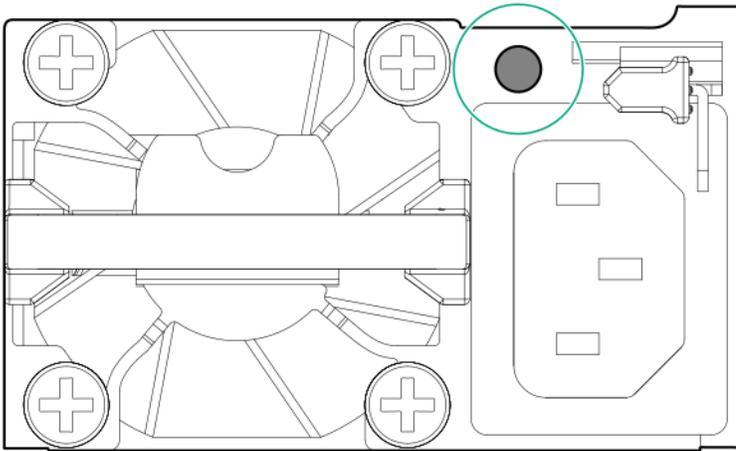
LED Status	Description
Off	System is off or power supply has failed.
Solid Green	Normal

Fan bay numbering

The server requires 12 fans, with two fans per bay.
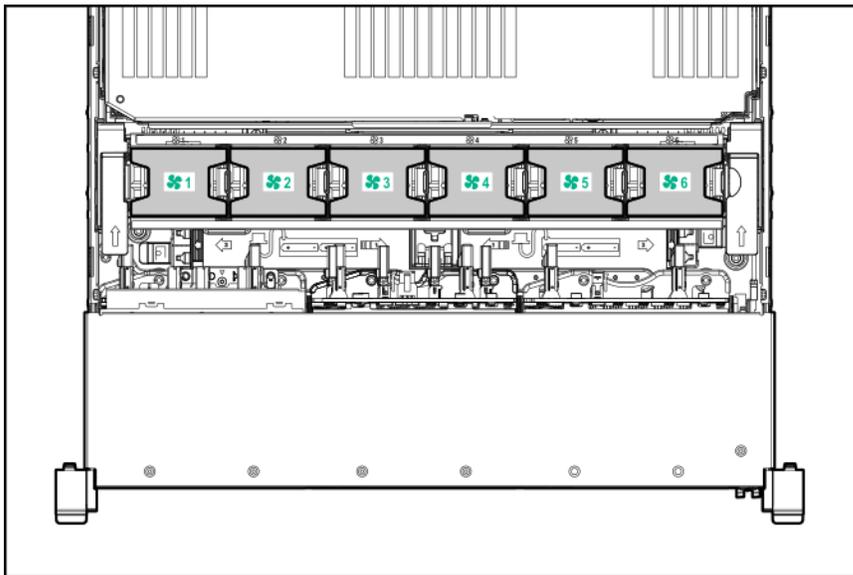
System board components
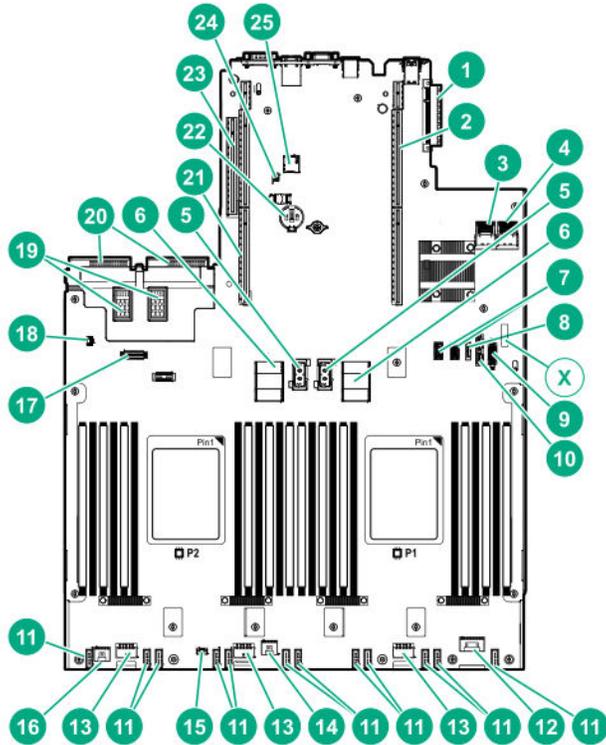
Item	Description
1	FlexibleLOM connector
2	Primary PCIe riser connector (processor 1 required)
3	x4 SATA port 1
4	x4 SATA port 2
5	Upper processor mezzanine connector — Power (2)
6	Upper processor mezzanine connector — Signals (2)
7	USB 3.0 (2)
8	x1 SATA port
X	System maintenance switch
9	Front USB 3.0 and iLO Service Port connector
10	x1 SATA port / Optical Drive port
11	Fan connectors (12)
12	Front power switch connector
13	Drive backplane power connectors (3)
14	HPE Smart Storage Battery connector 1 (system board)
15	Optional 2SFF HDD x1 SATA board sideband connector

Table Continued

Item	Description
16	HPE Smart Storage Battery connector 2 (processor mezzanine board)
17	Universal media bay USB/Display port connector
18	Intrusion detection switch connector
19	Power supply connectors (PS3, PS4)
20	Power supply connectors (PS1, PS2)
21	Secondary PCIe riser connector (processor 2 required)
22	System battery
23	Tertiary PCIe riser connector (processor 2 required)
24	TPM connector
25	microSD connector

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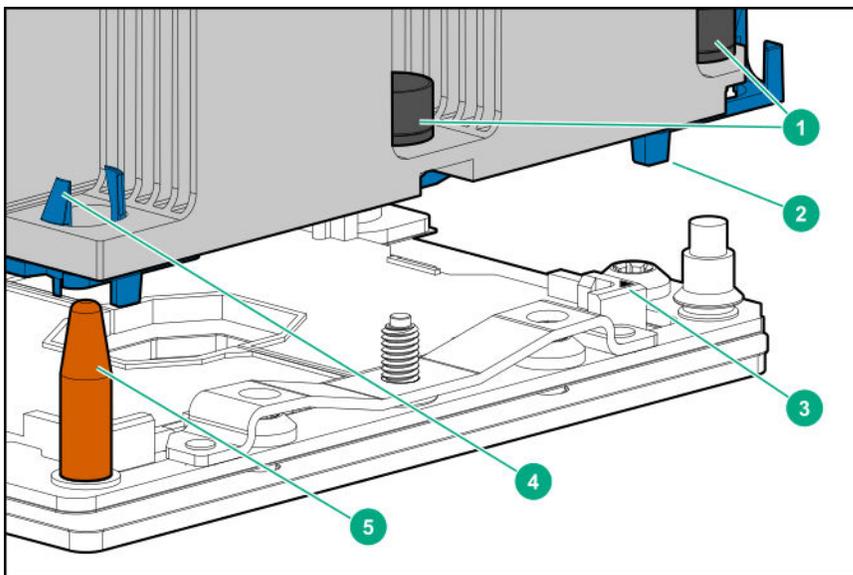
Item	Description
1	Heatsink nuts
2	Processor carrier
3	Pin 1 indicator[1]
4	Heatsink latch
5	Alignment post

[1] Symbol also on the processor and frame.

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
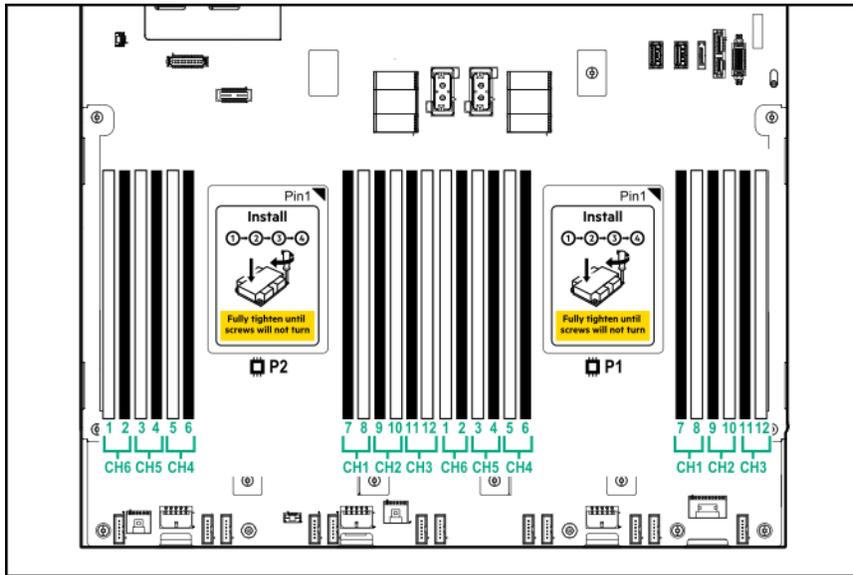
Processor mezzanine board DIMM slots
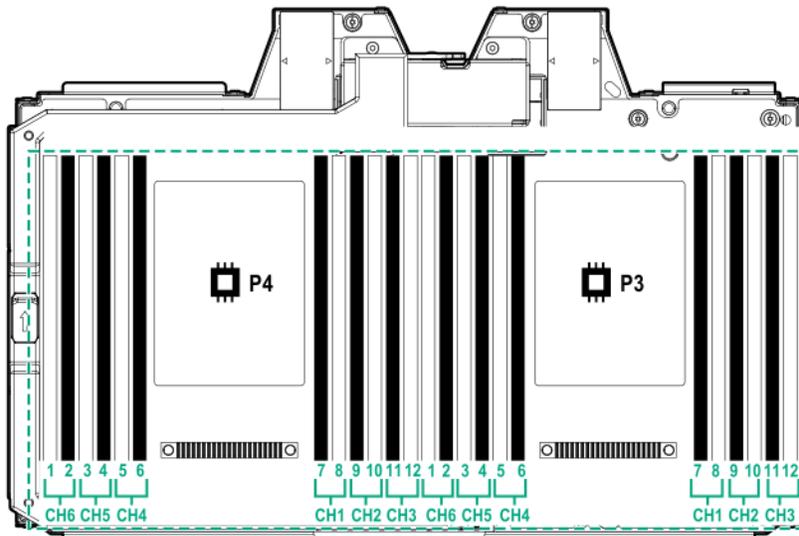
Drive cage backplane identification

Eight-bay SFF HDD/SSD drive cage backplane
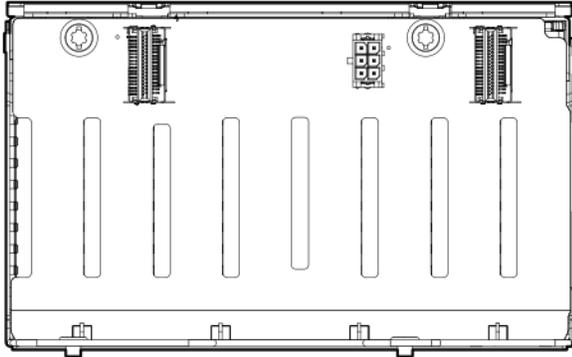
Eight-bay SFF NVMe SSD drive cage backplane
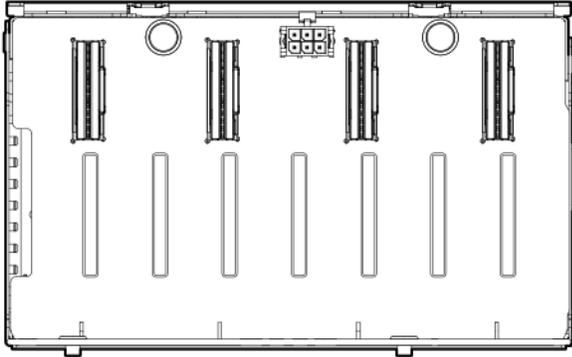
Two-bay NVMe/Six-bay SFF HDD (Premium) drive cage backplane
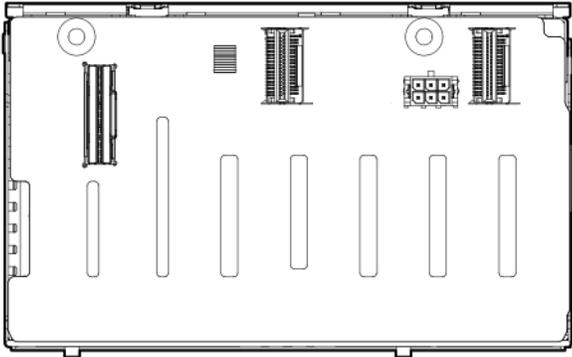
Two-bay SFF (Premium) drive cage backplane
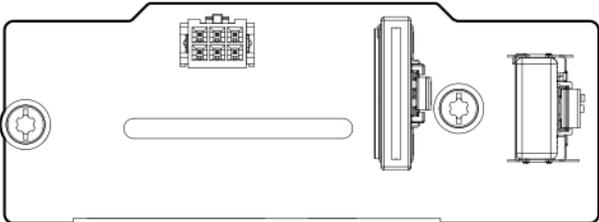
HPE 12G SAS Expander Card port numbering
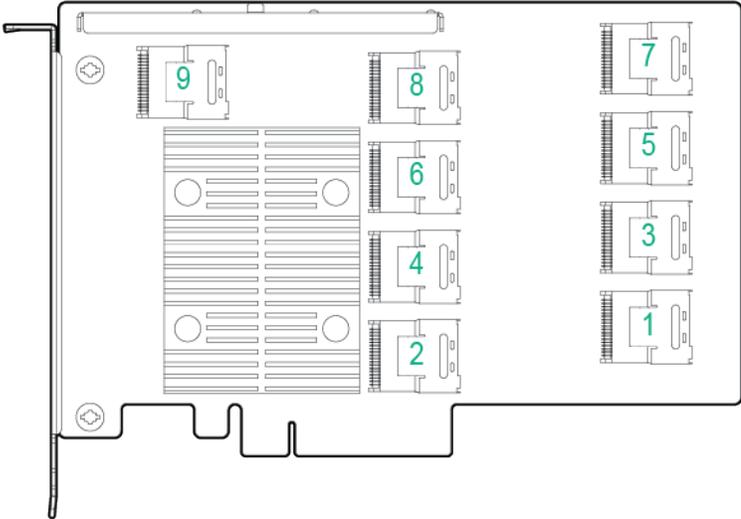
Riser board components

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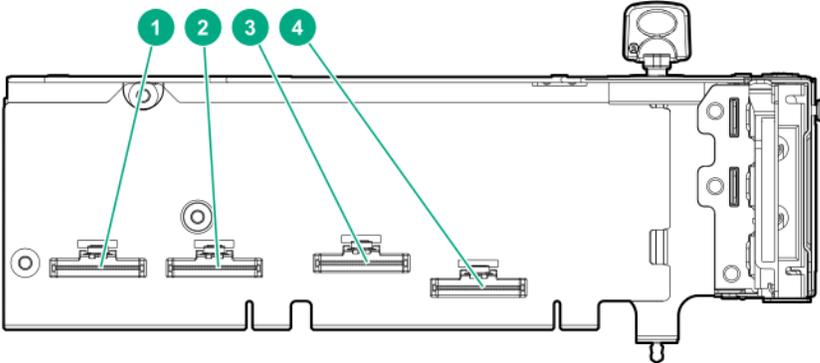
Item	Description
1–4	x8 Slimline NVMe connectors

6-slot riser board
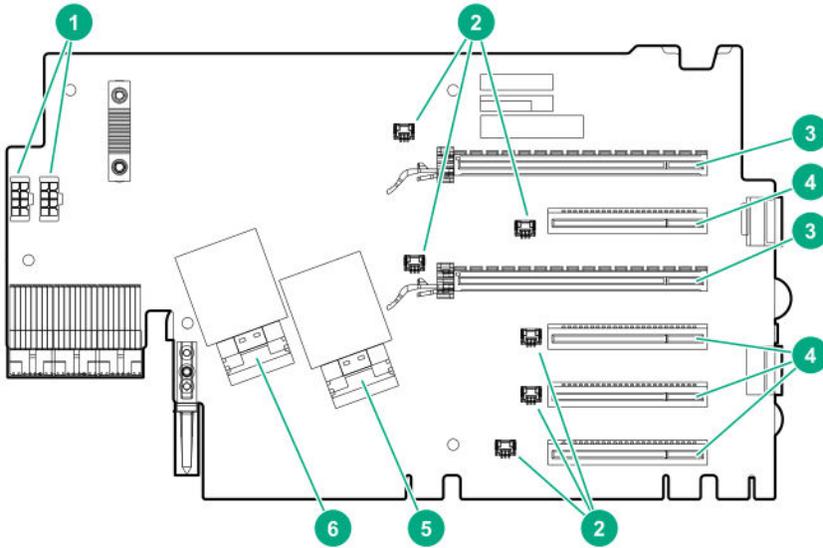
Item	Description
1	GPU power connectors (2)
2	Smart Array cache backup power connectors (6)
3	x16 connectors (2)
4	x8 connectors (4)
5	NVMe slimline connector J4
6	NVMe slimline connector J3

7-slot riser board
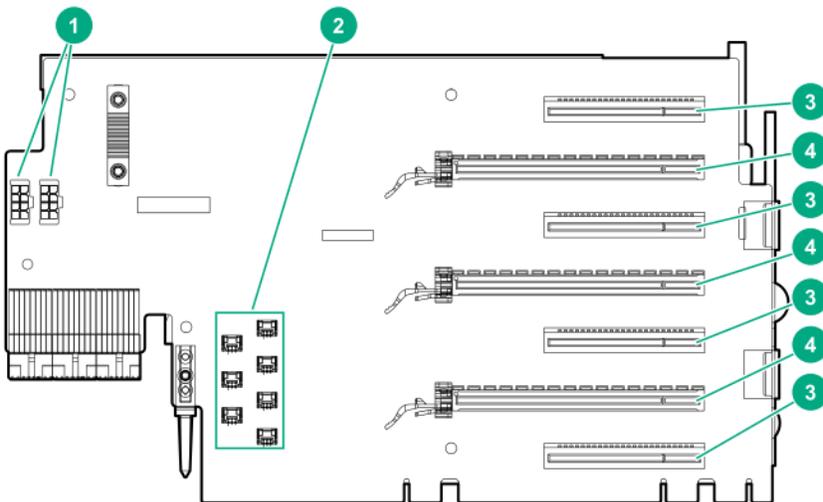
Item	Description
1	GPU power connectors (2)
2	Smart Array cache backup power connectors (7)
3	x8 connectors (4)
4	x16 connectors (3)

Tertiary riser board
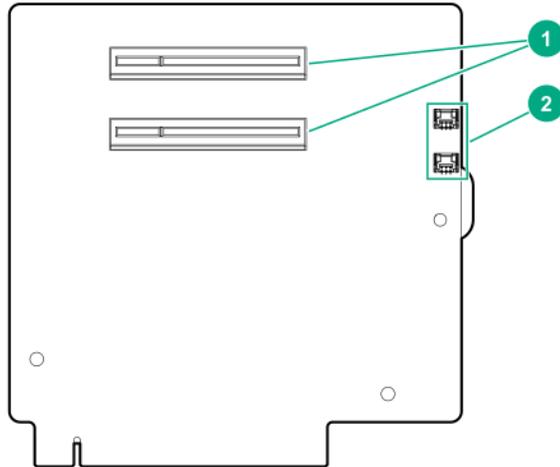
Item	Description
1	x8 connectors (2)
2	Smart Array cache backup power connectors

Operations

Power up the server

Procedure

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.

Extending 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 anything from the rack.

Procedure

Pull down the quick release levers on each side of the server, and then extend the server from the rack.
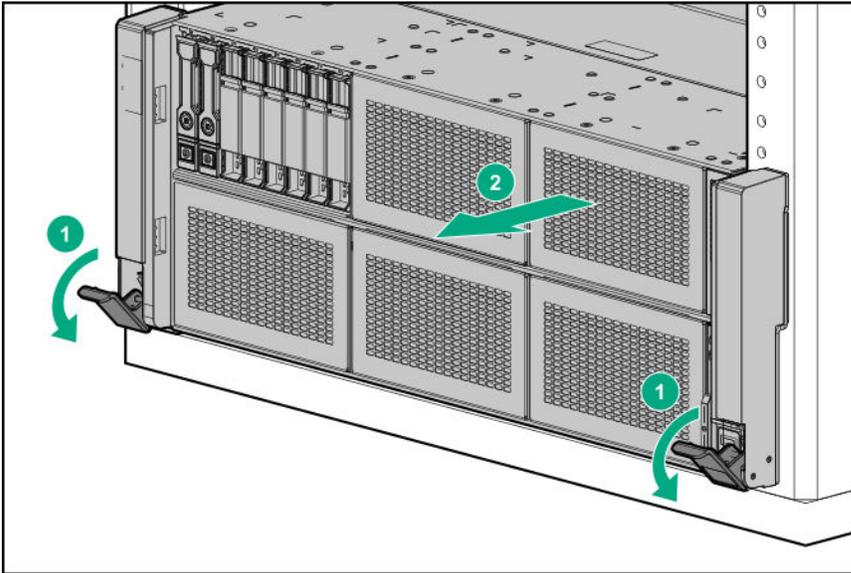
Removing the server from the rack

Procedure

1. **Power down the server** on page 32.

2. Extend the server from the rack (**Extending the server from the rack** on page 32).

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.

Removing the bezel
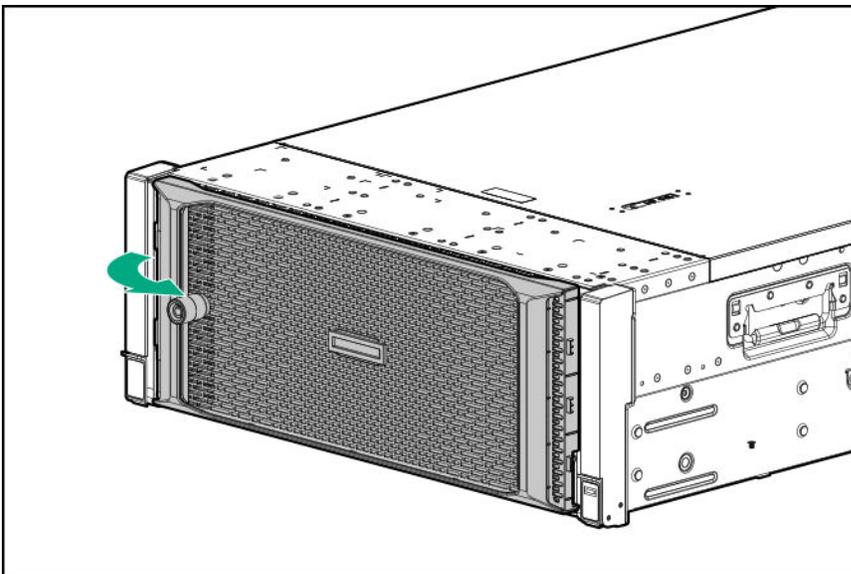
Accessing the Systems Insight Display

Procedure

1. Press and release the panel.

2. Pull out the display to fully extend it, and then rotate the display to view the LEDs.
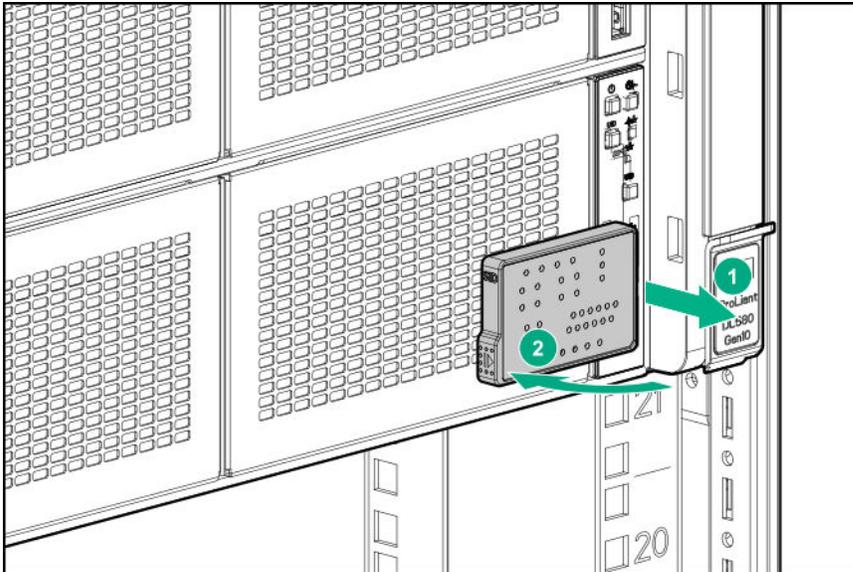
Removing a hot-plug SAS or SATA drive

Procedure

1. Determine the status of the drive from the drive LED definitions (**SAS/SATA drive components and LEDs** on page 18).

2. Back up all data on the drive.

3. Remove the drive.
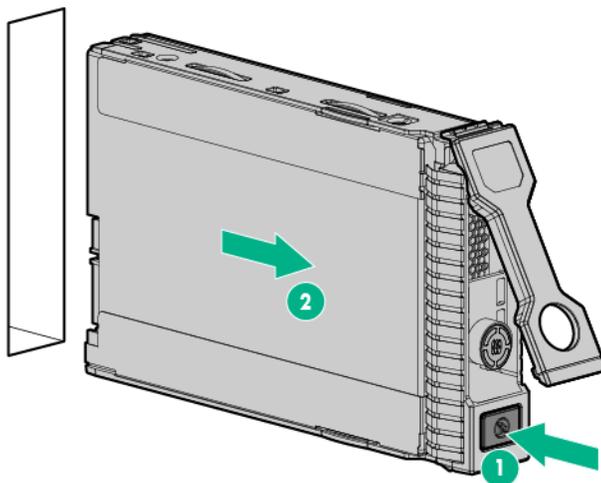
Removing an NVMe drive

Procedure

1. Determine the status of the drive from the drive LED definitions (**NVMe drive components and LEDs** on page 18).

2. Back up all server data.

3. Remove the drive:

   a. Push the Power button.

      The Do Not Remove button will illuminate and flash. Do not press the button while it is illuminated.

   b. When the flashing stops and the icon on the button is no longer illuminated or flashing, press the Do Not Remove button to release the release lever.

   c. Pull the release lever to disengage the drive from the backplane, and slide the drive out of the drive bay.
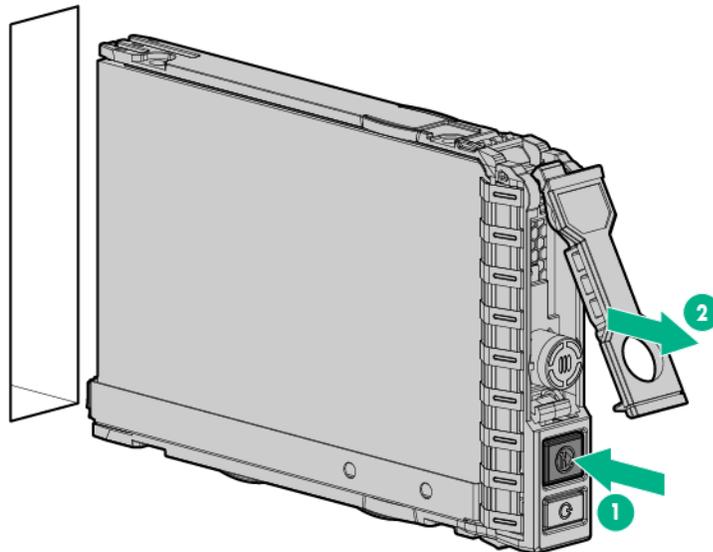
4. Prepare the replacement drive.
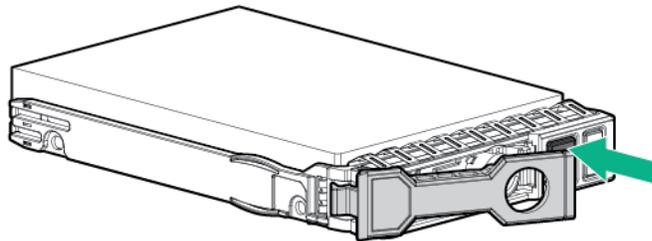
5. Install the drive.
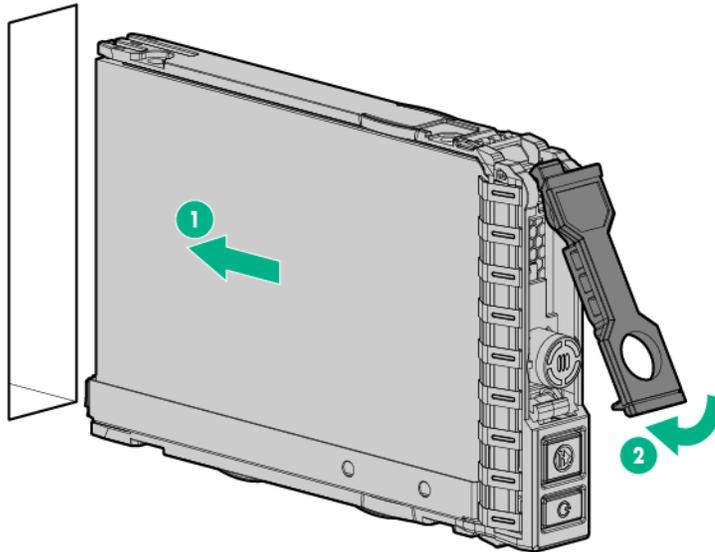
6. Observe the LED status of the drive.

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.

Procedure

1. **Power down the server** on page 32.

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 (**Extending the server from the rack** on page 32).

- Remove the server from the rack (**Removing the server from the rack** on page 33).

4. If the locking latch is locked, use a T-15 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.
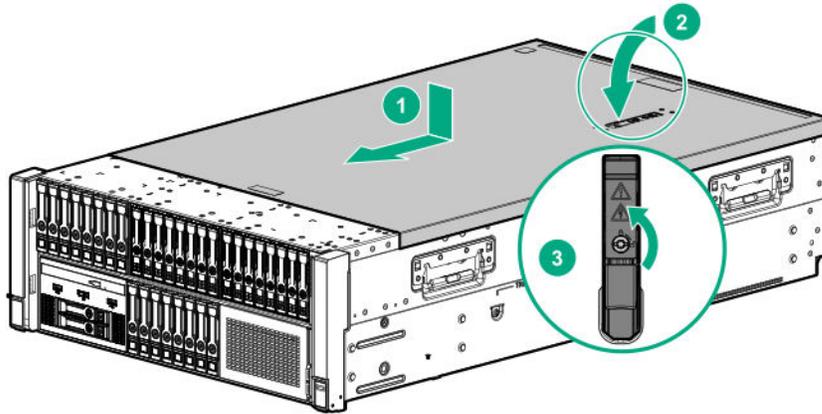
Installing the primary PCIe riser cage

△ 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.

   △ CAUTION:

   To avoid damaging the connectors, always install the air baffle into the server before installing the riser cages.
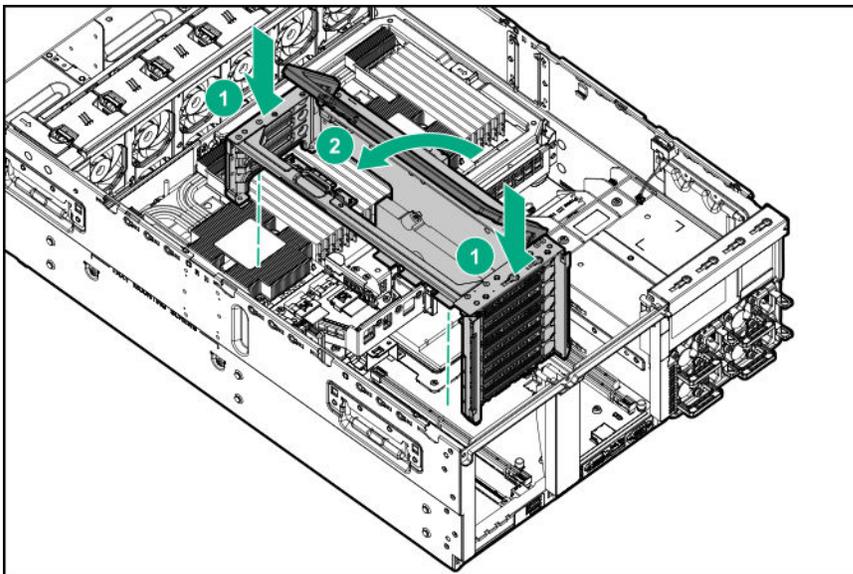
2. Install the access panel (**Installing the access panel** on page 37).

3. Install the server into the rack (**Installing the server into the rack** on page 53).

4. Connect each power cord to the server.

5. Connect each power cord to the power source.

6. **Power up the server** on page 32.

Removing a 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.

⚠ **CAUTION:**

To avoid damaging the connectors, always install the air baffle into the server before installing the riser cages.

Procedure

1. **Power down the server** on page 32.

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 (**Extending the server from the rack** on page 32).

   • Remove the server from the rack (**Removing the server from the rack** on page 33).

4. Remove the access panel (**Removing the access panel** on page 36).

   ⚠ **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.

5. Disconnect all cables attached to the expansion boards in the PCIe riser cage.

6. Remove the riser cage:

   • Primary riser cage
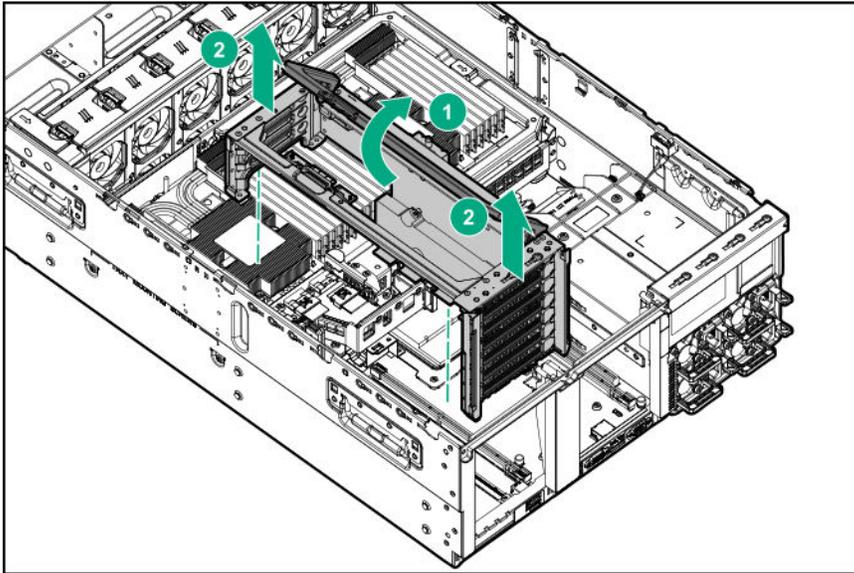
- Butterfly riser cage
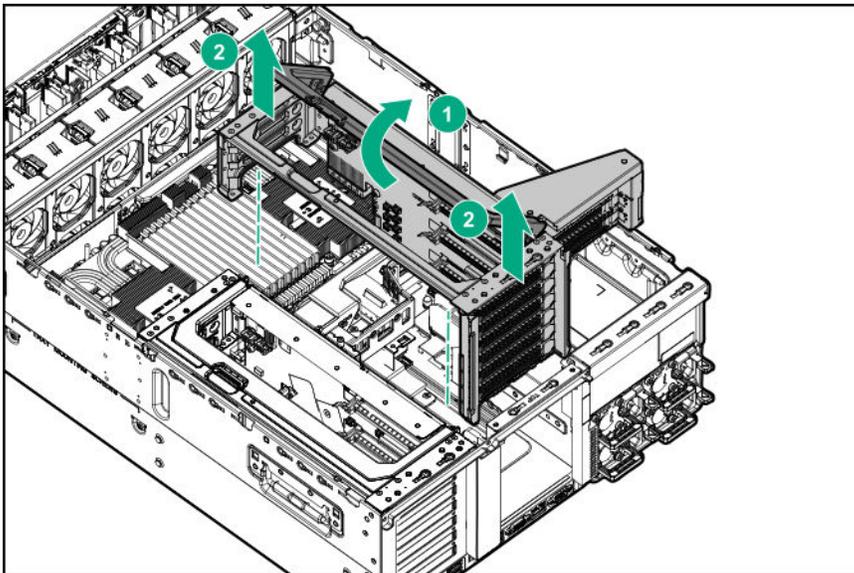
Removing the air baffle

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

Procedure

1. **Power down the server** on page 32.

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 (**Extending the server from the rack** on page 32).

- Remove the server from the rack (**Removing the server from the rack** on page 33).

4. Remove the access panel (**Removing the access panel** on page 36).

> △ **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.

5. Remove the primary PCIe riser cage (**Removing a PCIe riser cage** on page 39).

6. If installed, remove the butterfly riser cage (**Removing a PCIe riser cage** on page 39).

7. Remove the air baffle.

Installing the air baffle

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

> △ **CAUTION:**
> To avoid damaging the connectors, always install the air baffle into the server before installing the riser cages.

Procedure

1. Install the air baffle.
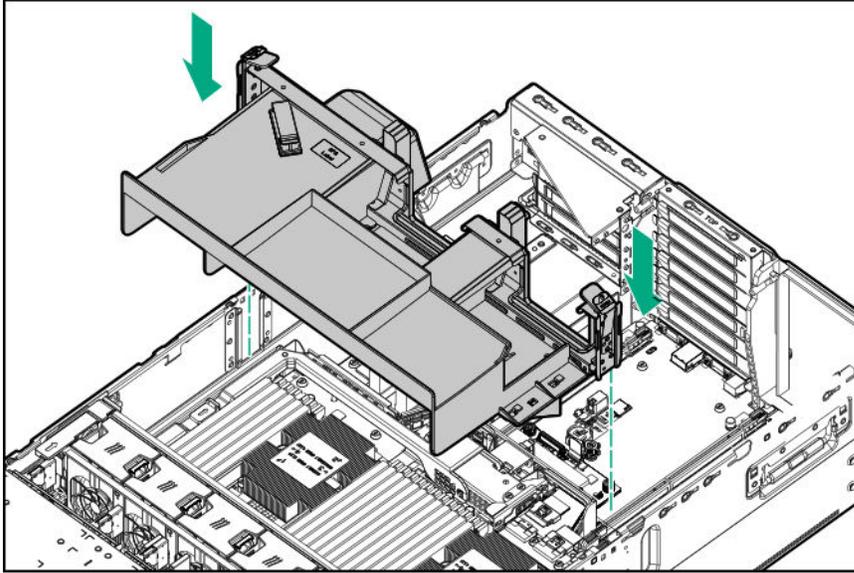
2. Install the primary PCIe riser cage (**Installing the primary PCIe riser cage** on page 38).

3. Install the butterfly PCIe riser cage (**Installing a butterfly PCIe riser cage** on page 80).

4. Install the access panel (**Installing the access panel** on page 37).

5. Install the server into the rack (**Installing the server into the rack** on page 53).

6. Connect each power cord to the server.

7. Connect each power cord to the power source.

8. **Power up the server** on page 32.

Removing the fan cage

Procedure

1. **Power down the server** on page 32.

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 (**Extending the server from the rack** on page 32).

   • Remove the server from the rack (**Removing the server from the rack** on page 33).

4. Remove the access panel (**Removing the access panel** on page 36).

△ **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.

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 37).

3. Install the server into the rack (**Installing the server into the rack** on page 53).

4. Connect each power cord to the server.

5. Connect each power cord to the power source.

6. **Power up the server** on page 32.

Removing the fan cage holders

Procedure

1. **Power down the server** on page 32.

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 (**Extending the server from the rack** on page 32).

   • Remove the server from the rack (**Removing the server from the rack** on page 33).

4. Remove the access panel (**Removing the access panel** on page 36).

   ⚠ **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.

5. Remove the fan cage (**Removing the fan cage** on page 42).

6. Remove the fan cage holders.
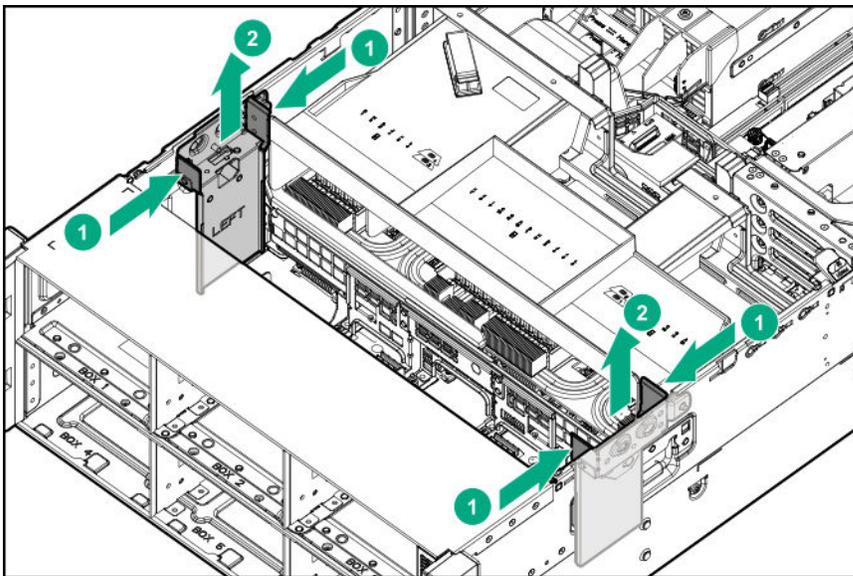
Installing fan cage holders

Procedure

1. Install the fan cage holders.
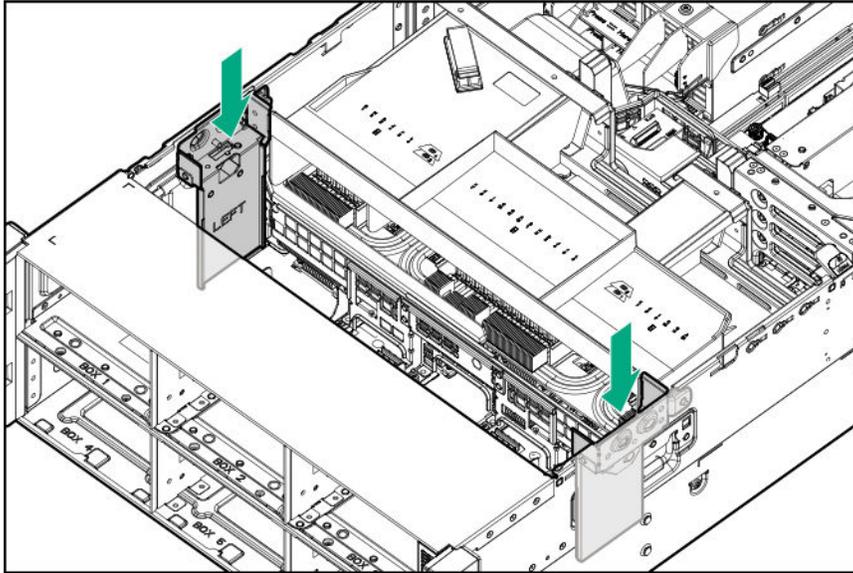
2. Install the fan cage (**Installing the fan cage** on page 43).

3. If removed, do the following:

   • Install the processor mezzanine tray (**Installing a processor mezzanine tray** on page 102).

   • Install the 2P pass-through performance board (**Installing the 2P pass-through performance board** on page 107).

4. Install the access panel (**Installing the access panel** on page 37).

5. Install the server into the rack (**Installing the server into the rack** on page 53).

6. Connect each power cord to the server.

7. Connect each power cord to the power source.

8. **Power up the server** on page 32.

Removing the processor mezzanine tray

Procedure

1. **Power down the server** on page 32.

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 (**Extending the server from the rack** on page 32).

- Remove the server from the rack (**Removing the server from the rack** on page 33).

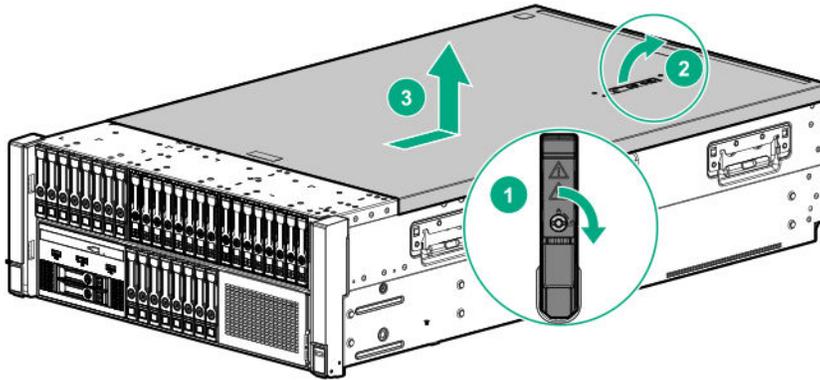4. Remove the access panel (**Removing the access panel** on page 36).

⚠ **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.

5. Remove the primary PCIe riser cage (**Removing a PCIe riser cage** on page 39).

6. If installed, remove the butterfly riser cage (**Removing a PCIe riser cage** on page 39).

7. Remove the air baffle (**Removing the air baffle** on page 40).

8. Remove the processor mezzanine tray.

Removing the 2P pass-through performance board

Procedure

1. **Power down the server** on page 32.

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 (**Extending the server from the rack** on page 32).

- Remove the server from the rack (**Removing the server from the rack** on page 33).

4. Remove the access panel (**Removing the access panel** on page 36).

⚠ **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.

5. Remove the primary PCIe riser cage (**Removing a PCIe riser cage** on page 39).

6. If installed, remove the butterfly riser cage (**Removing a PCIe riser cage** on page 39).

7. Remove the air baffle (**Removing the air baffle** on page 40).

8. Remove the pass-through board.
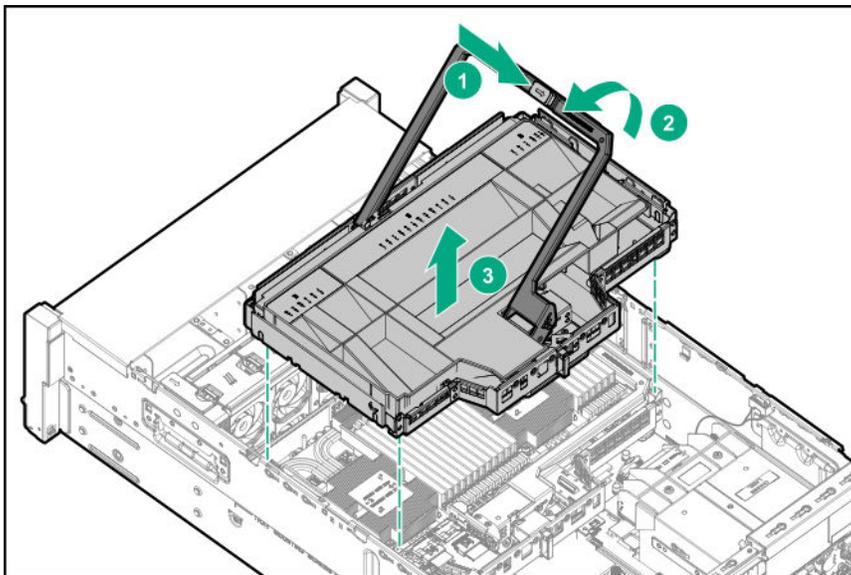
Setup

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 49).

2. Read the following safety notices, warnings, and cautions:

    - Server warnings and cautions (**Server warnings and cautions** on page 51)

    - Rack warnings (**Rack warnings** on page 51)

    - Electrostatic discharge (**Electrostatic discharge** on page 52)

3. Verify the contents in the server box (**Server box contents** on page 53).

4. Install hardware options (**Installing hardware options** on page 56).

5. Install the server into a rack (**Installing the server into the rack** on page 53).

6. Configure the server (**Configuring the server** on page 54).

7. Install or deploy an operating system (**Operating system** on page 54).

8. Register your server (**Registering the server** on page 55).

Operational requirements

Space and airflow requirements

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

• Leave a minimum clearance of 63.5 cm (25 in) in front of the rack.

• Leave a minimum clearance of 76.2 cm (30 in) behind the rack.

• Leave a minimum clearance of 121.9 cm (48 in) from the back of the rack to the back of another rack or row of racks.

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

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

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

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

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

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

⚠ **CAUTION:**
If a third-party rack is used, observe the following additional requirements to ensure adequate airflow and to prevent damage to the equipment:

• Front and rear doors—If the 42U rack includes closing front and rear doors, you must allow 5,350 sq cm (830 sq in) of holes evenly distributed from top to bottom to permit adequate airflow (equivalent to the required 64 percent open area for ventilation).

• Side—The clearance between the installed rack component and the side panels of the rack must be a minimum of 7 cm (2.75 in).

Temperature requirements

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

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

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

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

- Do not exceed the manufacturer's TMRA.

Power requirements

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

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

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

Electrical grounding requirements

The server must be grounded properly for proper operation and safety. In the United States, you must install the equipment in accordance with NFPA 70, 1999 Edition (National Electric Code), Article 250, as well as any local and regional building codes. In Canada, you must install the equipment in accordance with Canadian Standards Association, CSA C22.1, Canadian Electrical Code. In all other countries, you must install the equipment in accordance with any regional or national electrical wiring codes, such as the International Electrotechnical Commission (IEC) Code 364, parts 1 through 7. Furthermore, you must be sure that all power distribution devices used in the installation, such as branch wiring and receptacles, are listed or certified grounding-type devices.

Because of the high ground-leakage currents associated with multiple servers connected to the same power source, 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.

⚠️ **WARNING:**
To reduce the risk of personal injury or damage to the equipment, adequately stabilize the rack before extending a component outside the rack. Extend only one component at a time. A rack may become unstable if more than one component is extended.

⚠️ **WARNING:**
When installing a server in a telco rack, be sure that the rack frame is adequately secured at the top and bottom to the building structure.

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 56.

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 rack.
2. Connect peripheral devices to the server.

   ⚠ **WARNING:**

   To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into RJ-45 connectors.

3. Connect the power cord to the rear of the server.
4. 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.

5. 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 55.

- 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 143.

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.

Installing or deploying an operating system

Before installing an operating system, observe the following:

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

- Update firmware before using the server for the first time, unless software or components require an older version. For more information, see "**Keeping the system current** on page 143."

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

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

Registering the server

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

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** on page 32.

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 (**Extending the server from the rack** on page 32).

   - Remove the server from the rack (**Removing the server from the rack** on page 33).

4. Remove the access panel (**Removing the access panel** on page 36).

   > △ **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.

5. Remove the primary PCIe riser cage (**Removing a PCIe riser cage** on page 39).

6. If installed, remove the butterfly riser cage (**Removing a PCIe riser cage** on page 39).

7. Remove the air baffle (**Removing the air baffle** on page 40).

8. Remove the fan cage (**Removing the fan cage** on page 42).

9. If installed, remove the processor mezzanine tray (**Removing the processor mezzanine tray** on page 45).

10. Remove the cabled power switch module. Retain the T-10 screw for later use.
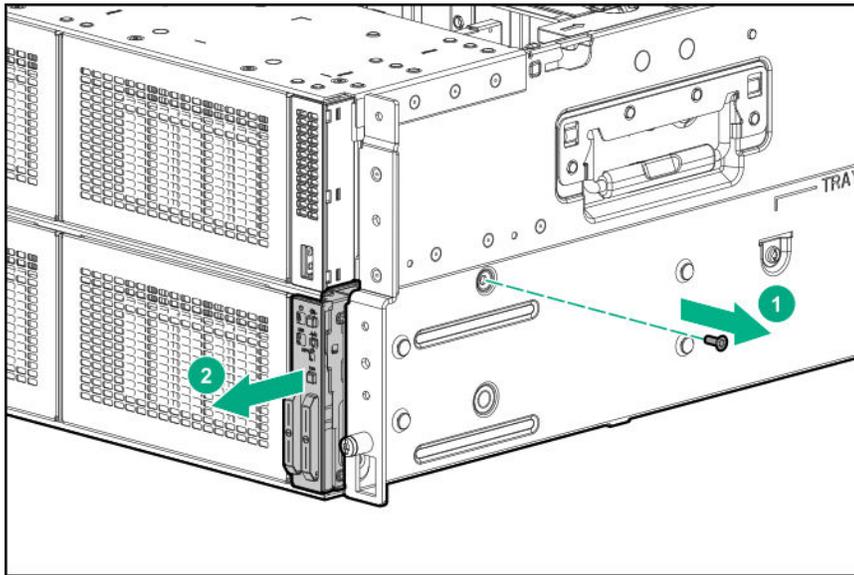
11. Route the cable through the opening in the front of the server, and then install the SID power switch module. Secure the module using the existing screw.

⚠ **CAUTION:**

When routing cables, always be sure that the cables are not in a position where they can be pinched or crimped.
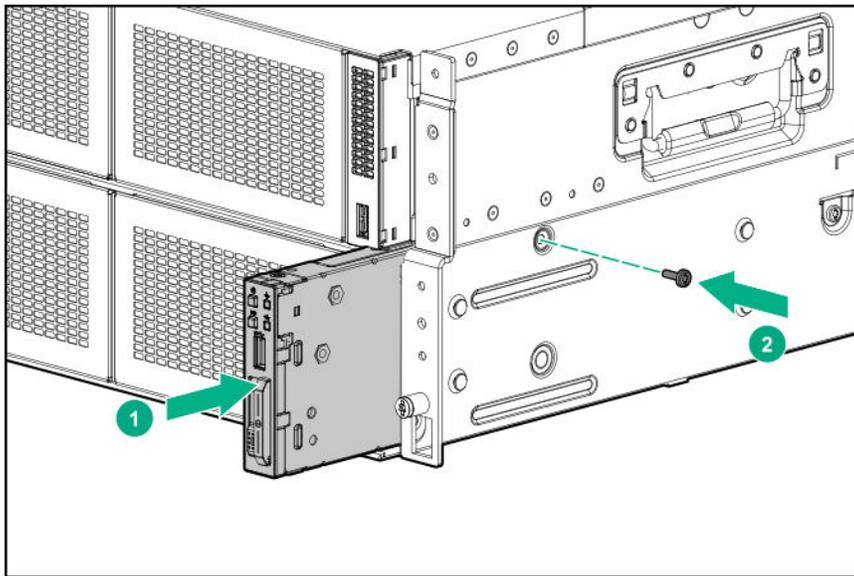
12. Cable the SID module to the system board.

13. Install the processor mezzanine tray (**Installing a processor mezzanine tray** on page 102).

14. Install the air baffle (**Installing the air baffle** on page 41).

> ⚠ **CAUTION:**
>
> To avoid damaging the connectors, always install the air baffle into the server before installing the riser cages.

15. Install the primary PCIe riser cage (**Installing the primary PCIe riser cage** on page 38).

16. Install the butterfly PCIe riser cage (**Installing a butterfly PCIe riser cage** on page 80).

17. Install the fan cage (**Installing the fan cage** on page 43).

18. Install the access panel (**Installing the access panel** on page 37).

19. Install the server into the rack (**Installing the server into the rack** on page 53).

20. Connect each power cord to the server.

21. Connect each power cord to the power source.

22. **Power up the server** on page 32.

Installing an eight-bay SFF HDD/SSD drive cage

The eight-bay SFF HDD/SSD drive cage can be installed in any drive box in the server. For more information, 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** on page 32.

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 (**Extending the server from the rack** on page 32).

   • Remove the server from the rack (**Removing the server from the rack** on page 33).

4. Remove the access panel (**Removing the access panel** on page 36).

   ⚠ **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.

5. Remove the primary PCIe riser cage (**Removing a PCIe riser cage** on page 39).

6. If installed, remove the butterfly riser cage (**Removing a PCIe riser cage** on page 39).

7. Remove the air baffle (**Removing the air baffle** on page 40).

8. If installed, do one of the following:

   • Remove the processor mezzanine tray (**Removing the processor mezzanine tray** on page 45).

   • Remove the 2P pass-through performance board (**Removing the 2P pass-through performance board** on page 46).

9. Remove the fan cage (**Removing the fan cage** on page 42).

10. Remove the fan cage holders (**Removing the fan cage holders** on page 44).

11. Remove the drive bay blank.

12. If drive blanks are installed in the drive cage assembly, remove the drive blanks. Retain the drive blanks for use in empty drive bays.

13. Install the drive cage.

- Drive boxes 1–3 (box 1 shown)
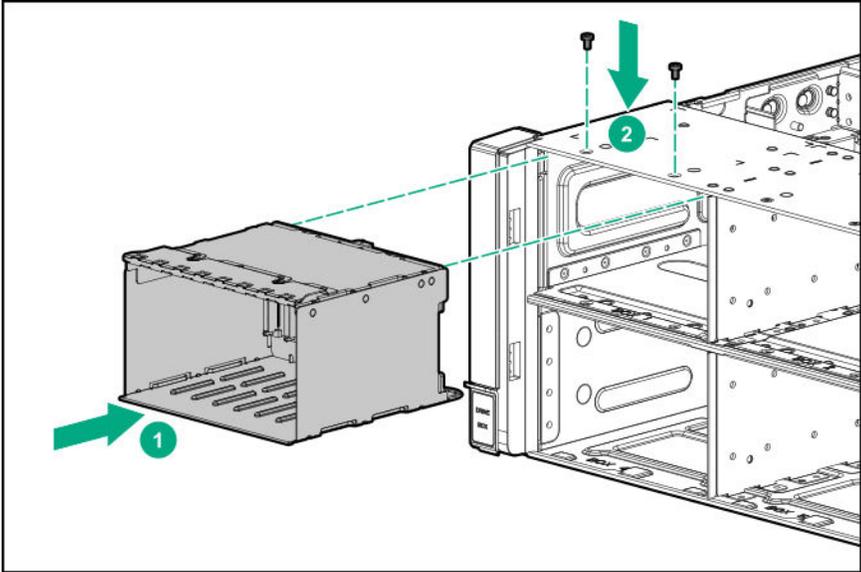
- Drive boxes 4–6 (box 4 shown)

14. Route and connect the cables depending on the server configuration. For more information, see **Cabling** on page 118.

    ⚠ **CAUTION:**

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

15. Install the fan cage holders (**Installing fan cage holders** on page 45).

16. Install the fan cage (**Installing the fan cage** on page 43).

17. If removed, do one of the following:

    • Install the processor mezzanine tray (**Installing a processor mezzanine tray** on page 102).

    • Install the 2P pass-through performance board (**Installing the 2P pass-through performance board** on page 107).

18. Install the air baffle (**Installing the air baffle** on page 41).

    ⚠ **CAUTION:**

    To avoid damaging the connectors, always install the air baffle into the server before installing the riser cages.

19. Install the primary PCIe riser cage (**Installing the primary PCIe riser cage** on page 38).

20. Install the butterfly PCIe riser cage (**Installing a butterfly PCIe riser cage** on page 80).

21. Install the access panel (**Installing the access panel** on page 37).

22. Install the server into the rack (**Installing the server into the rack** on page 53).

23. Connect each power cord to the server.

24. Connect each power cord to the power source.

25. **Power up the server** on page 32.

Installing an eight-bay NVMe SSD drive cage

The eight-bay NVMe SSD drive cage can be installed in drive boxes 1–3.

- A minimum of four NVMe drives can be installed in the drive cage.

- When installed in drive box 1, only four NVMe drives can be installed in the drive cage.

For more information on valid NVMe drive configurations and cabling, see **NVMe drive cable matrix** on page 120.

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** on page 32.

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 (**Extending the server from the rack** on page 32).

   - Remove the server from the rack (**Removing the server from the rack** on page 33).

4. Remove the access panel (**Removing the access panel** on page 36).

   > ⚠ **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.

5. Remove the primary PCIe riser cage (**Removing a PCIe riser cage** on page 39).

6. If installed, remove the butterfly riser cage (**Removing a PCIe riser cage** on page 39).

7. Remove the air baffle (**Removing the air baffle** on page 40).

8. If installed, do one of the following:

   - Remove the processor mezzanine tray (**Removing the processor mezzanine tray** on page 45).

   - Remove the 2P pass-through performance board (**Removing the 2P pass-through performance board** on page 46).

9. Remove the fan cage (**Removing the fan cage** on page 42).

10. Remove the fan cage holders (**Removing the fan cage holders** on page 44).

11. Remove the drive bay blank.

12. If drive blanks are installed in the drive cage assembly, remove the drive blanks. Retain the drive blanks for use in empty drive bays.

13. Install the drive cage.

14. Route and connect the cables depending on the server configuration. For more information, see **Cable matrix** on page 118 and **NVMe SSD drive cage cabling** on page 130.

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

15. Install the fan cage holders (**Installing fan cage holders** on page 45).

16. Install the fan cage (**Installing the fan cage** on page 43).

17. If removed, do one of the following:

- Install the processor mezzanine tray (**Installing a processor mezzanine tray** on page 102).

- Install the 2P pass-through performance board (**Installing the 2P pass-through performance board** on page 107).
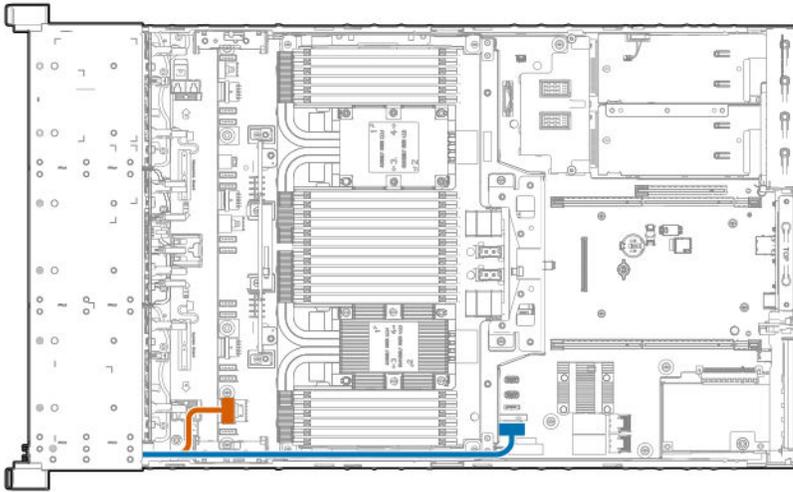
18. Install the air baffle (**Installing the air baffle** on page 41).

⚠ **CAUTION:**

To avoid damaging the connectors, always install the air baffle into the server before installing the riser cages.

19. Install the primary PCIe riser cage (**Installing the primary PCIe riser cage** on page 38).

20. Install the butterfly PCIe riser cage (**Installing a butterfly PCIe riser cage** on page 80).

21. Install the access panel (**Installing the access panel** on page 37).

22. Install the server into the rack (**Installing the server into the rack** on page 53).

23. Connect each power cord to the server.

24. Connect each power cord to the power source.

25. **Power up the server** on page 32.

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

The two-bay NVMe SSD/six-bay SFF HDD (Premium) drive cage can be installed in the following drive boxes in 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

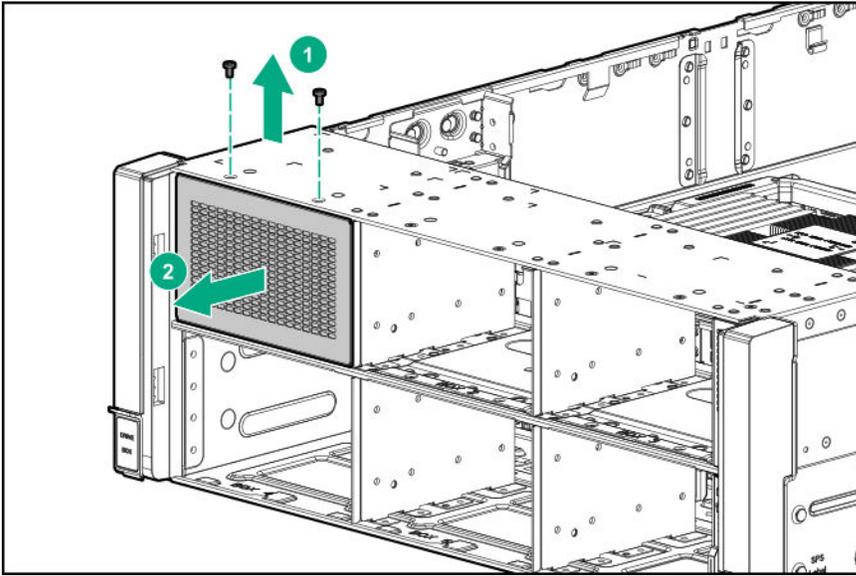- The components included with the hardware option kit

Procedure

1. **Power down the server** on page 32.

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 (**Extending the server from the rack** on page 32).

- Remove the server from the rack (**Removing the server from the rack** on page 33).

4. Remove the access panel (**Removing the access panel** on page 36).

   ⚠ **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.

5. Remove the primary PCIe riser cage (**Removing a PCIe riser cage** on page 39).

6. If installed, remove the butterfly riser cage (**Removing a PCIe riser cage** on page 39).

7. Remove the air baffle (**Removing the air baffle** on page 40).

8. If installed, do one of the following:

   - Remove the processor mezzanine tray (**Removing the processor mezzanine tray** on page 45).

   - Remove the 2P pass-through performance board (**Removing the 2P pass-through performance board** on page 46).

9. Remove the fan cage (**Removing the fan cage** on page 42).

10. Remove the fan cage holders (**Removing the fan cage holders** on page 44).
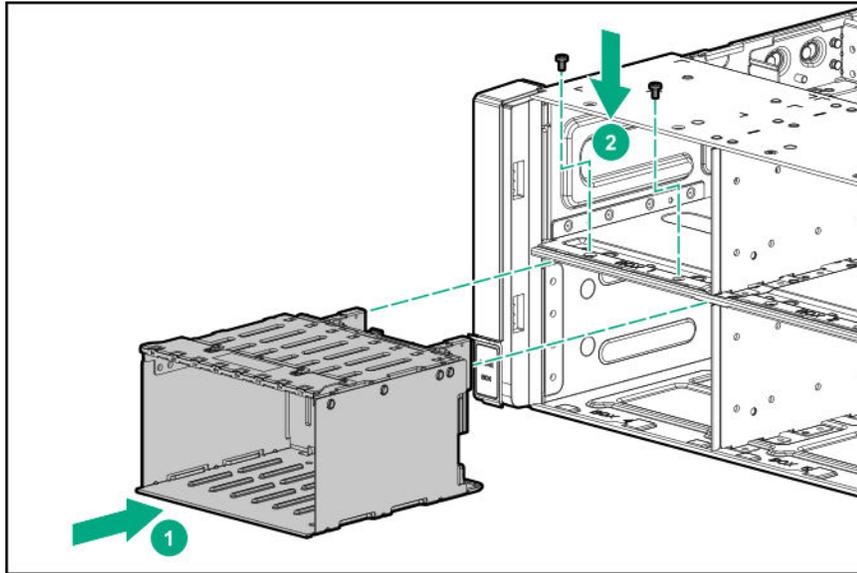
11. Remove the drive bay blank.

12. If drive blanks are installed in the drive cage assembly, remove the drive blanks. Retain the drive blanks for use in empty drive bays.

13. Install the drive cage.

14. Route and connect the cables depending on the server configuration. For more information, see **Cabling** on page 118.

    ⚠ **CAUTION:**

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

15. Install the fan cage holders (**Installing fan cage holders** on page 45).

16. Install the fan cage (**Installing the fan cage** on page 43).

17. If removed, do one of the following:

    • Install the processor mezzanine tray (**Installing a processor mezzanine tray** on page 102).

    • Install the 2P pass-through performance board (**Installing the 2P pass-through performance board** on page 107).

18. Install the air baffle (**Installing the air baffle** on page 41).

    ⚠ **CAUTION:**

    To avoid damaging the connectors, always install the air baffle into the server before installing the riser cages.

19. Install the primary PCIe riser cage (**Installing the primary PCIe riser cage** on page 38).

20. Install the butterfly PCIe riser cage (**Installing a butterfly PCIe riser cage** on page 80).

21. Install the access panel (**Installing the access panel** on page 37).

22. Install the server into the rack (**Installing the server into the rack** on page 53).

23. Connect each power cord to the server.

24. Connect each power cord to the power source.

25. **Power up the server** on page 32.

Installing a universal media bay

The universal media bay can only be installed in drive box 4. For more information, see **Front panel components** on page 7.

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** on page 32.

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 (**Extending the server from the rack** on page 32).

   • Remove the server from the rack (**Removing the server from the rack** on page 33).

4. Remove the access panel (**Removing the access panel** on page 36).
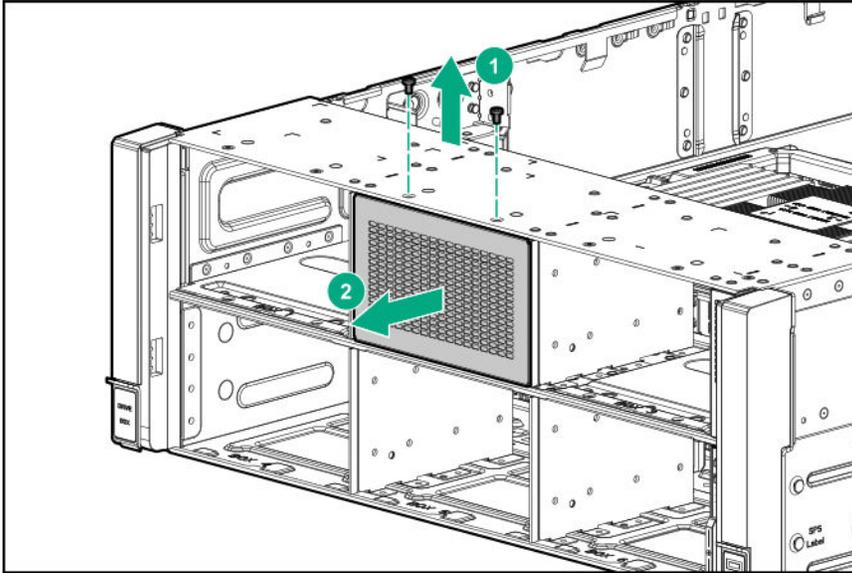
   ⚠ **CAUTION:**
   Do not operate the server for long periods with the access panel open or removed. Operating the server in this manner results in improper airflow and improper cooling that can lead to thermal damage.

5. Remove the primary PCIe riser cage (**Removing a PCIe riser cage** on page 39).

6. If installed, remove the butterfly riser cage (**Removing a PCIe riser cage** on page 39).

7. Remove the air baffle (**Removing the air baffle** on page 40).

8. If installed, do one of the following:

   • Remove the processor mezzanine tray (**Removing the processor mezzanine tray** on page 45).

   • Remove the 2P pass-through performance board (**Removing the 2P pass-through performance board** on page 46).

9. Remove the fan cage (**Removing the fan cage** on page 42).

10. Remove the fan cage holders (**Removing the fan cage holders** on page 44).

11. Remove the drive bay blank from box 1.

12. If drive blanks are installed in the drive cage assembly, remove the drive blanks. Retain the drive blanks for use in empty drive bays.

13. Route the cables through the opening, and then install the universal media bay.

    △ **CAUTION:**

    When routing cables, always be sure that the cables are not in a position where they can be pinched or crimped.
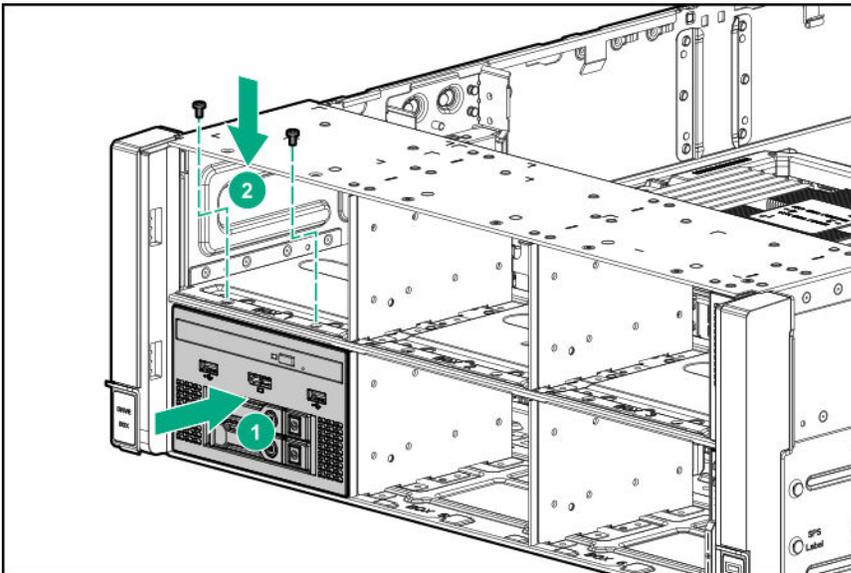
14. Connect the cables depending on the server configuration. For more information, see **Cabling** on page 118.

    △ **CAUTION:**

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

15. Install the drive bay blank into box 1.

16. Install the fan cage holders (**Installing fan cage holders** on page 45).

17. Install the fan cage (**Installing the fan cage** on page 43).

18. If removed, do one of the following:

- Install the processor mezzanine tray (**Installing a processor mezzanine tray** on page 102).

- Install the 2P pass-through performance board (**Installing the 2P pass-through performance board** on page 107).

19. Install the air baffle (**Installing the air baffle** on page 41).

> ⚠ **CAUTION:**
>
> To avoid damaging the connectors, always install the air baffle into the server before installing the riser cages.

20. Install the primary PCIe riser cage (**Installing the primary PCIe riser cage** on page 38).

21. Install the butterfly PCIe riser cage (**Installing a butterfly PCIe riser cage** on page 80).

22. Install the access panel (**Installing the access panel** on page 37).

23. Install the server into the rack (**Installing the server into the rack** on page 53).

24. Connect each power cord to the server.

25. Connect each power cord to the power source.

26. **Power up the server** on page 32.

Installing a two-bay SFF (Premium) drive 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

The front bay installation requires a universal media bay to be installed (**Installing a universal media bay** on page 67).

Procedure

1. **Power down the server** on page 32.

2. Remove all power:

   a. Disconnect each power cord from the power source.

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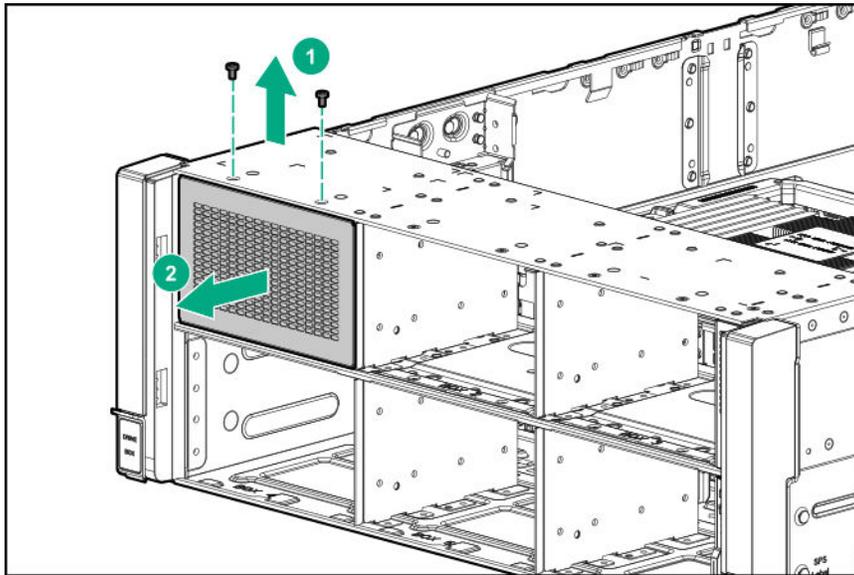
3. Do one of the following:

- Extend the server from the rack (**Extending the server from the rack** on page 32).

- Remove the server from the rack (**Removing the server from the rack** on page 33).

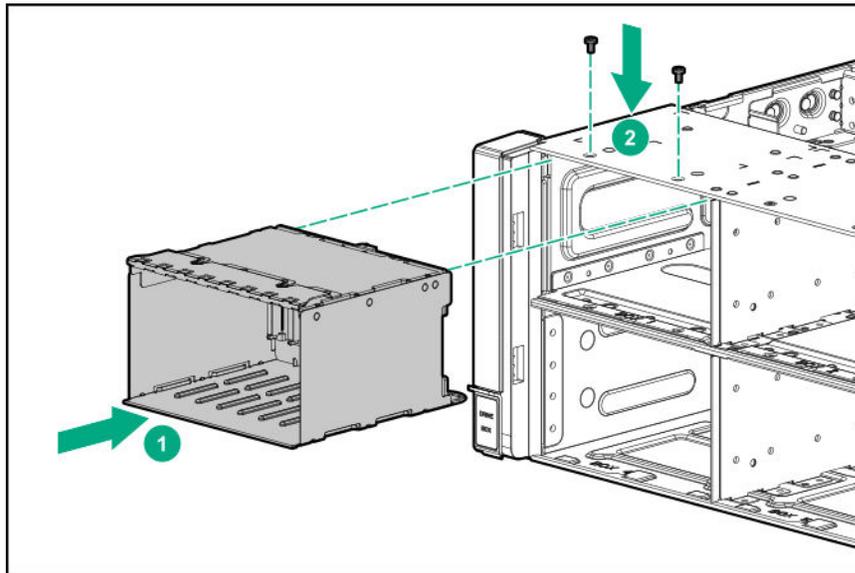4. Remove the access panel (**Removing the access panel** on page 36).

⚠ **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.

5. Remove the primary PCIe riser cage (**Removing a PCIe riser cage** on page 39).

6. If installed, remove the butterfly riser cage (**Removing a PCIe riser cage** on page 39).

7. Remove the air baffle (**Removing the air baffle** on page 40).

8. If installed, do one of the following:

- Remove the processor mezzanine tray (**Removing the processor mezzanine tray** on page 45).

- Remove the 2P pass-through performance board (**Removing the 2P pass-through performance board** on page 46).

9. Remove the fan cage (**Removing the fan cage** on page 42).

10. Remove the fan cage holders (**Removing the fan cage holders** on page 44).

11. Remove the drive bay blank from box 1.

12. If installed in the server, remove the universal media bay.
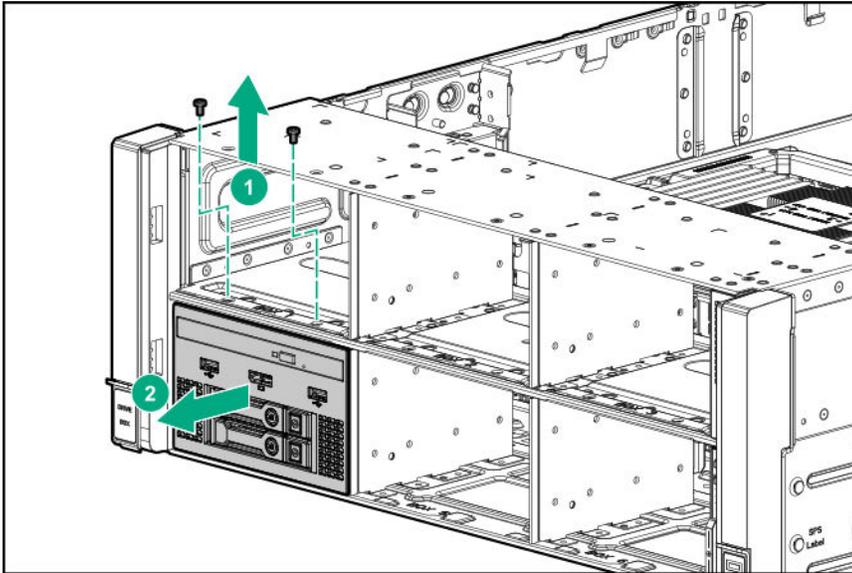
13. Remove the optical disk drive tray from the universal media bay.
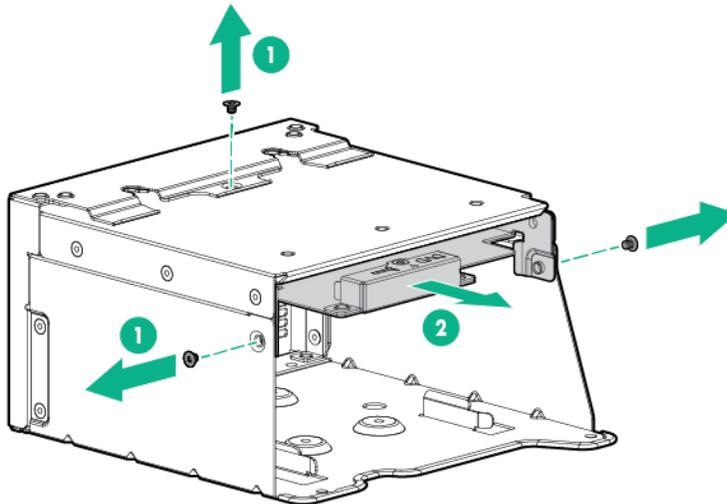
14. Remove the SFF drive blank from the universal media bay.
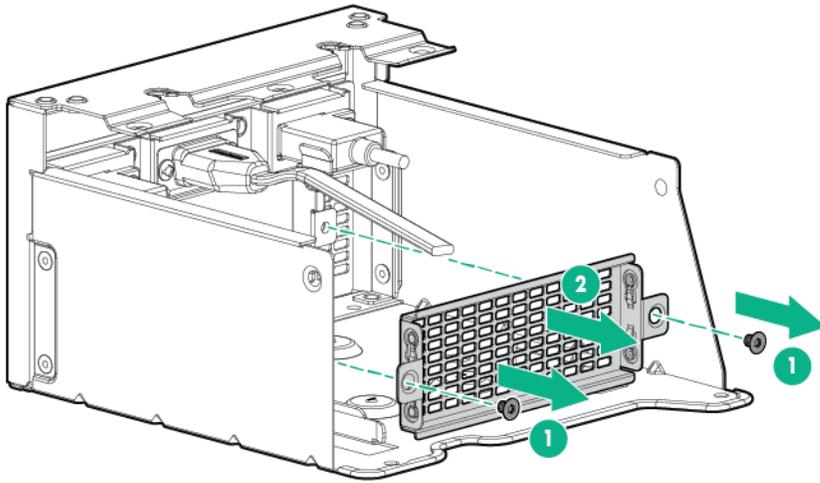
15. Install the grommets onto the underside of the drive cage.
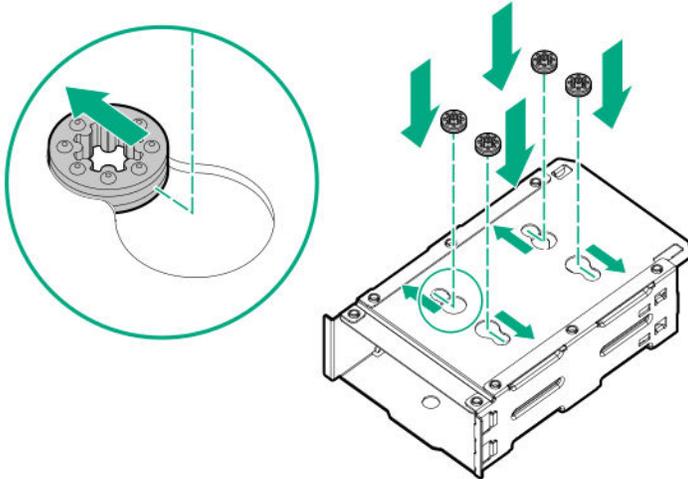
16. Install the drive cage into the universal media bay.
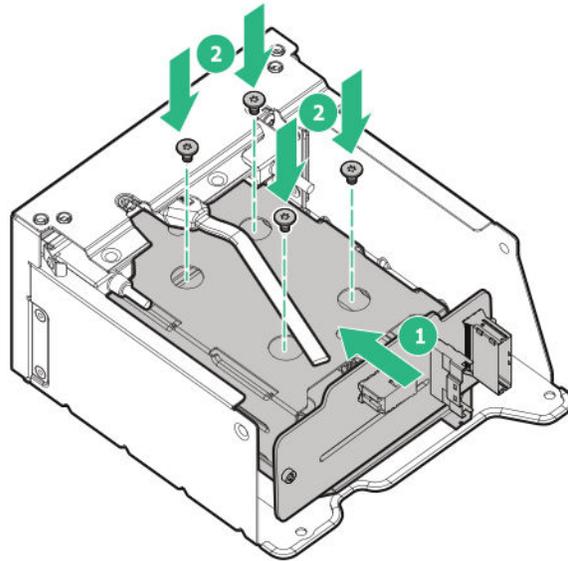
17. Route the cables through the opening, and then install the universal media bay.

> ⚠ **CAUTION:**
>
> When routing cables, always be sure that the cables are not in a position where they can be pinched or crimped.
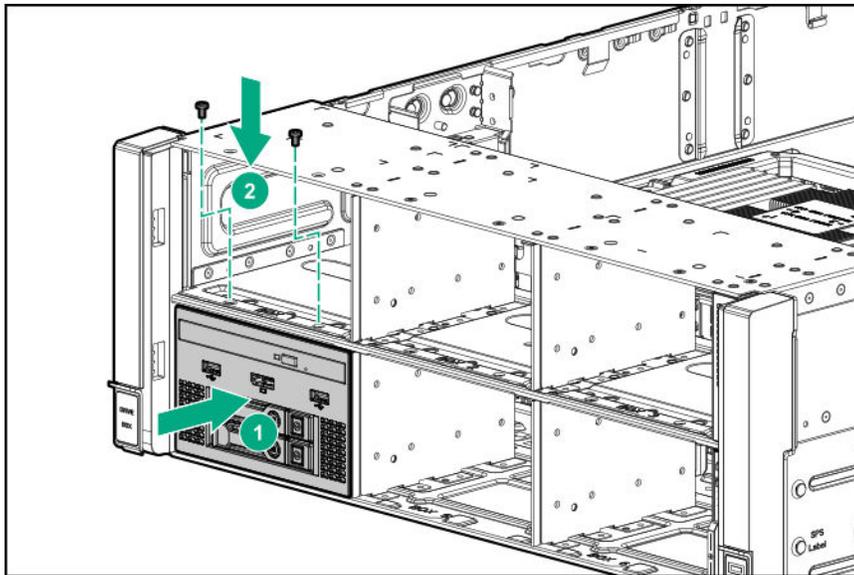
18. Connect the cables depending on the server configuration. For more information, see **Cabling** on page 118.

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

19. Install the drive bay blank into box 1.

20. Install the fan cage holders (**Installing fan cage holders** on page 45).

21. Install the fan cage (**Installing the fan cage** on page 43).

22. If removed, do one of the following:

    - Install the processor mezzanine tray (**Installing a processor mezzanine tray** on page 102).

    - Install the 2P pass-through performance board (**Installing the 2P pass-through performance board** on page 107).

23. Install the air baffle (**Installing the air baffle** on page 41).

    △ **CAUTION:**

    To avoid damaging the connectors, always install the air baffle into the server before installing the riser cages.

24. Install the primary PCIe riser cage (**Installing the primary PCIe riser cage** on page 38).

25. Install the butterfly PCIe riser cage (**Installing a butterfly PCIe riser cage** on page 80).

26. Install the access panel (**Installing the access panel** on page 37).

27. Install the server into the rack (**Installing the server into the rack** on page 53).

28. Connect each power cord to the server.

29. Connect each power cord to the power source.

30. **Power up the server** on page 32.

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.
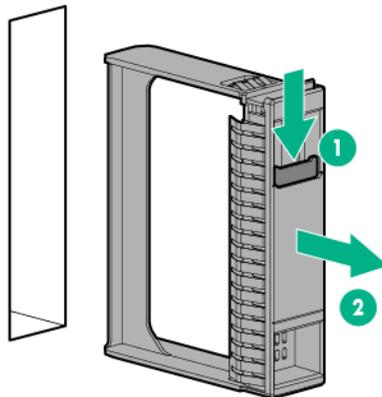
2. Prepare the drive.
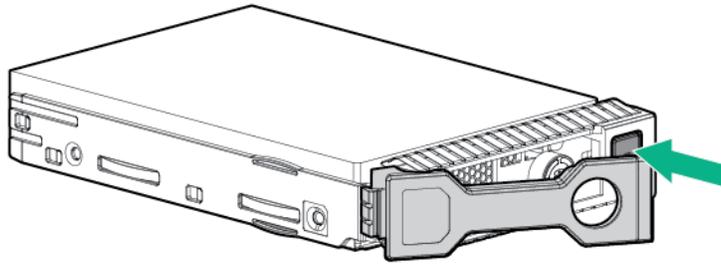
3. Install the drive.
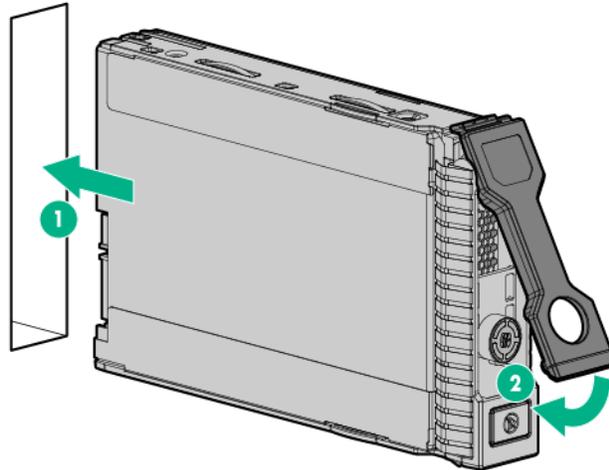
Installing an NVMe drive

⚠ **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.

The server supports installation of up to 20 NVMe drives, depending on the drive cage configuration. Observe the following population guidelines:

- Install a minimum of four NVMe drives in the eight-bay NVMe drive cage.

- Two-drive configurations are supported in the following drive cages:

  ◦ Six-bay HDD/two-bay NVMe (Premium) drive cage

  ◦ Two-bay SFF (Premium) drive cage in the universal media bay

For more information on valid NVMe drive configurations and cabling, see **NVMe drive cable matrix** on page 120.

Procedure

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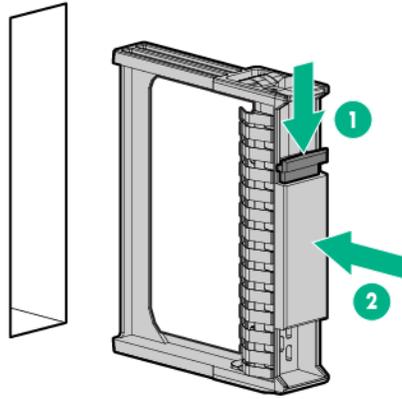
2. Prepare the drive.
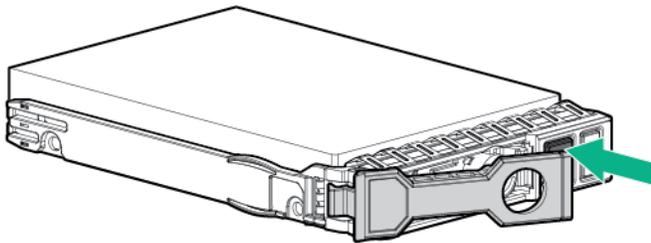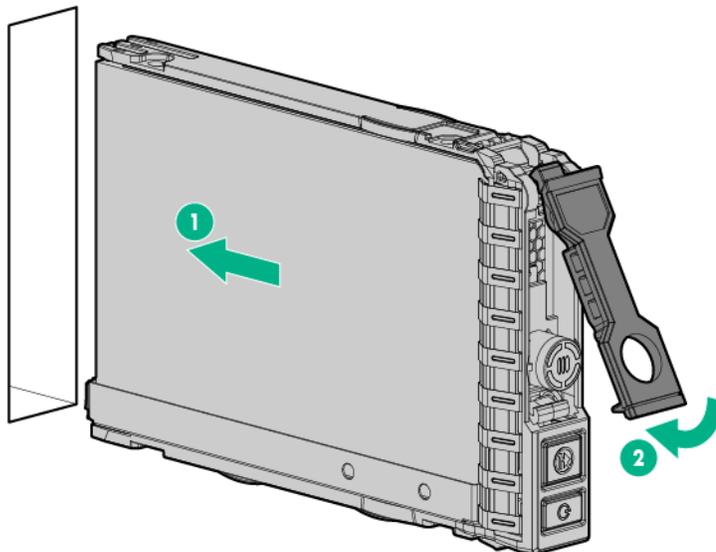
3. Install the drive.

4. Observe the LED status of the drive.
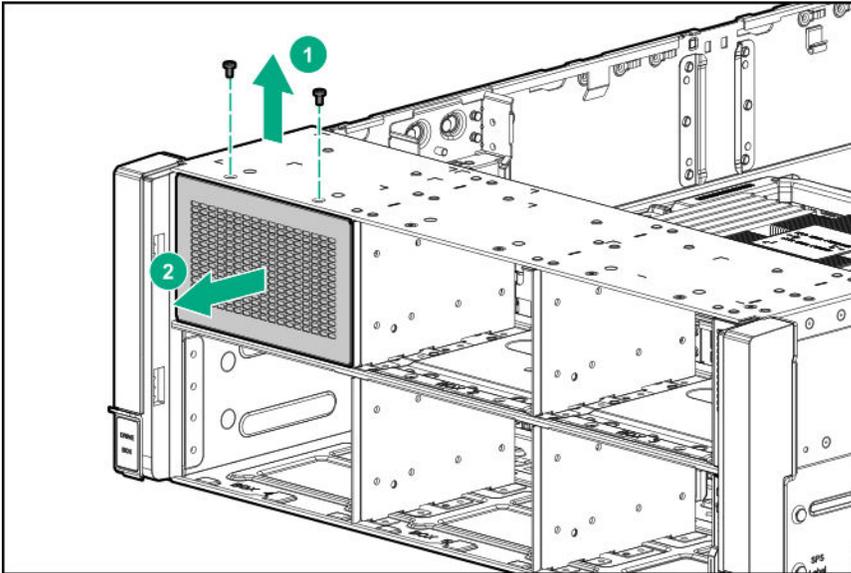
Installing an internal USB drive

Procedure

1. **Power down the server** on page 32.

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 (**Extending the server from the rack** on page 32).

    • Remove the server from the rack (**Removing the server from the rack** on page 33).

4. Remove the access panel (**Removing the access panel** on page 36).

    ⚠ **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.

    ---

5. Locate the internal USB connectors on the system board (**System board components** on page 24).

6. Install the USB drive.

7. Install the access panel (**Installing the access panel** on page 37).

8. Install the server into the rack (**Installing the server into the rack** on page 53).

9. Connect each power cord to the server.

10. Connect each power cord to the power source.

11. **Power up the server** on page 32.

Installing a 4-port NVMe mezzanine card

Prerequisites

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

- The components included with the hardware option kit
- A T-10 Torx screwdriver might be needed to unlock the access panel.
- A primary riser PCIe riser cage with a 4-port NVMe riser card installed.

Procedure

1. **Power down the server** on page 32.

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 (**Extending the server from the rack** on page 32).
   - Remove the server from the rack (**Removing the server from the rack** on page 33).

4. Remove the access panel (**Removing the access panel** on page 36).

   ⚠ **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.

5. Remove the primary PCIe riser cage (**Removing a PCIe riser cage** on page 39).

   NOTE:

   If you are not installing a new primary PCIe riser cage that has a 4-port NVMe riser card installed, be sure to remove the riser card from the existing primary PCIe riser cage, and replace it with a 4-port NVMe riser card.

6. If installed, remove the butterfly riser cage (**Removing a PCIe riser cage** on page 39).

7. Remove the air baffle (**Removing the air baffle** on page 40).
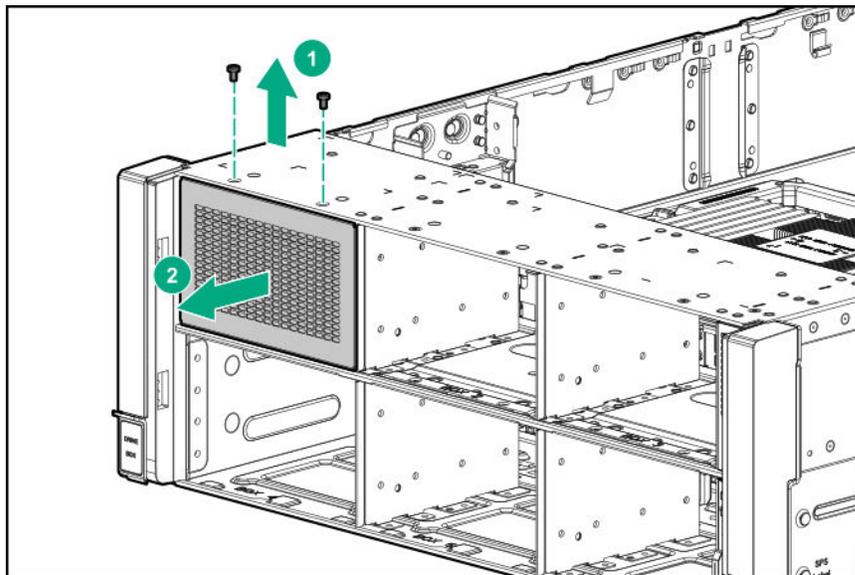
8. If installed, remove the processor mezzanine tray (**Removing the processor mezzanine tray** on page 45).

9. Remove the fan cage (**Removing the fan cage** on page 42).

10. Remove the fan cage holders (**Removing the fan cage holders** on page 44).

11. Install the bracket.
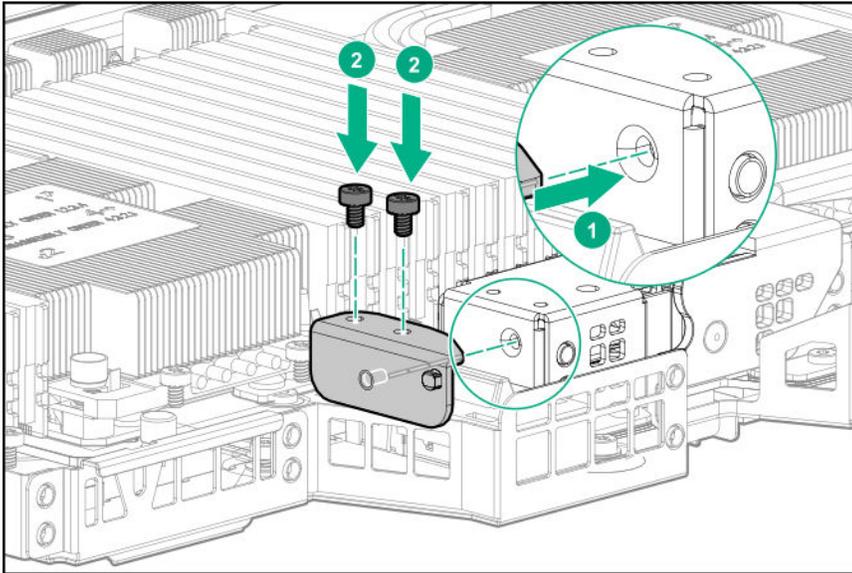
12. Install the mezzanine card. Listen for a click to indicate that the card is fully installed when the handle is closed.
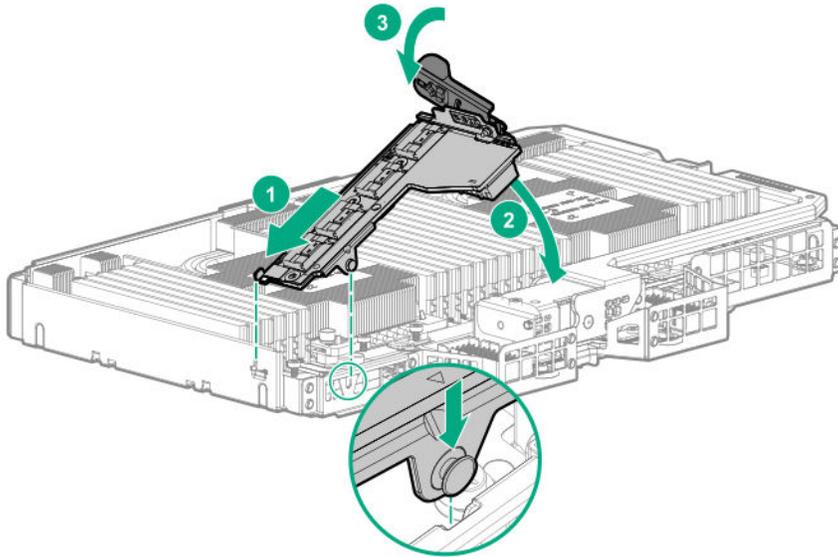
13. Route the cables depending on the server configuration. For more information, see **Cabling** on page 118.

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

14. Install the fan cage holders (**Installing fan cage holders** on page 45).

15. Install the fan cage (**Installing the fan cage** on page 43).

16. Install the processor mezzanine tray (**Installing a processor mezzanine tray** on page 102).

17. Connect the cables to the mezzanine card. For more information, see **Cabling** on page 118.

18. Install the air baffle (**Installing the air baffle** on page 41).

⚠ **CAUTION:**

   To avoid damaging the connectors, always install the air baffle into the server before installing the riser cages.

19. Install a primary PCIe riser cage with a 4-port NVMe riser card installed (**Installing the primary PCIe riser cage** on page 38).

20. Install the butterfly PCIe riser cage (**Installing a butterfly PCIe riser cage** on page 80).

21. Install the access panel (**Installing the access panel** on page 37).

22. Install the server into the rack (**Installing the server into the rack** on page 53).

23. Connect each power cord to the server.

24. Connect each power cord to the power source.

25. **Power up the server** on page 32.

Installing a butterfly 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 PCI riser cage.

Prerequisites

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

• The components included with the hardware option kit

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

Procedure

1. **Power down the server** on page 32.

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 (**Extending the server from the rack** on page 32).

   • Remove the server from the rack (**Removing the server from the rack** on page 33).

4. Remove the access panel (**Removing the access panel** on page 36).

⚠ 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.

5. Remove the butterfly riser cage blanks.

   a. Remove the secondary slot blank.
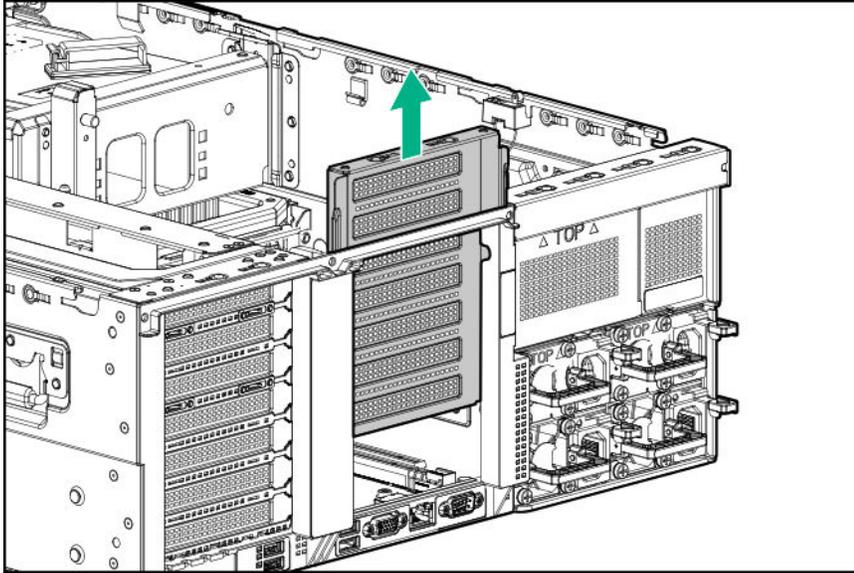
   b. Remove the tertiary slot blank.

6. Install the riser cage.

   ⚠ CAUTION:

   To avoid damaging the connectors, always install the air baffle into the server before installing the riser cages.
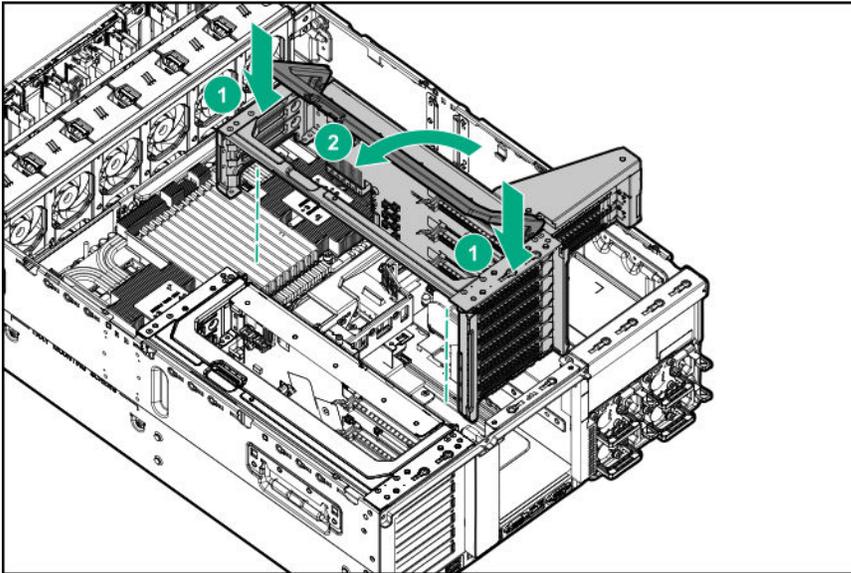
7.   Install the access panel (**Installing the access panel** on page 37).

8.   Install the server into the rack (**Installing the server into the rack** on page 53).

9.   Connect each power cord to the server.

10. Connect each power cord to the power source.

11. **Power up the server** on page 32.

Riser board options

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

Primary PCIe riser cage

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

• Six-slot riser board with four x8, two x16, and two x8 Slimline NVMe connections.

• Seven-slot riser board with four x8 and three x16 connections.

• Four-port riser board with four x8 Slimline NVMe connections.

Butterfly PCIe riser cage (Secondary PCIe slot)

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

• Six-slot riser board with four x8, two x16, and two x8 Slimline NVMe connections.

• Seven-slot riser board with four x8 and three x16 connections.

Butterfly PCIe riser cage (Tertiary PCIe slot)

The butterfly PCIe riser cage supports installation of a two-slot riser board with two x8 connections in the tertiary PCIe slot.

Installing a riser board into the primary 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** on page 32.

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 (**Extending the server from the rack** on page 32).
   - Remove the server from the rack (**Removing the server from the rack** on page 33).

4. Remove the access panel (**Removing the access panel** on page 36).

   ⚠ **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.

5. Disconnect all cables attached to the expansion boards in the PCIe riser cage.

6. Remove the riser cage (**Removing a PCIe riser cage** on page 39).

7. If installed, remove any expansion boards installed on the riser board.
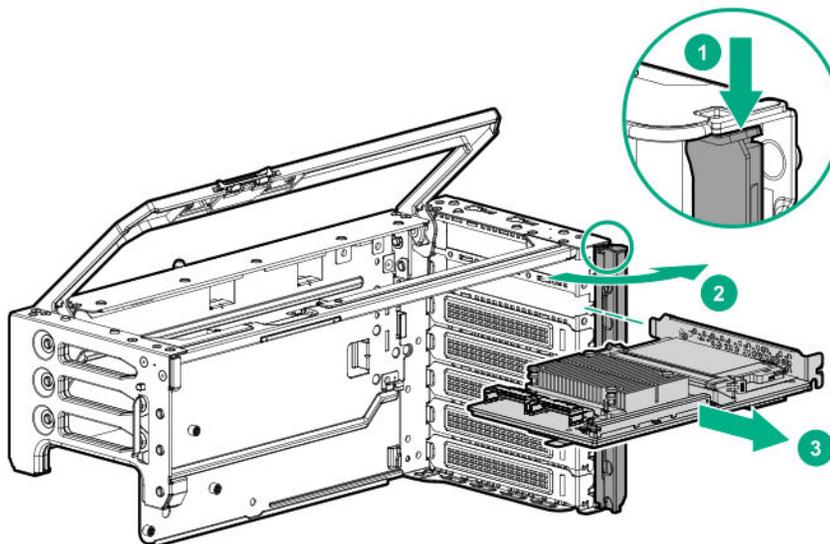
8. Remove the riser board installed in the riser cage.
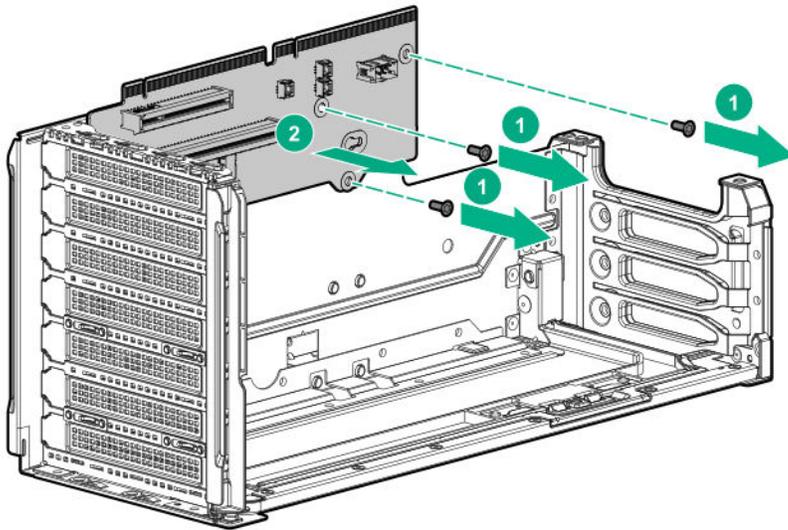
9. Align the screw holes on the riser board with the holes on the riser cage, and then install the riser board.

   NOTE:

   Your riser board might appear different.
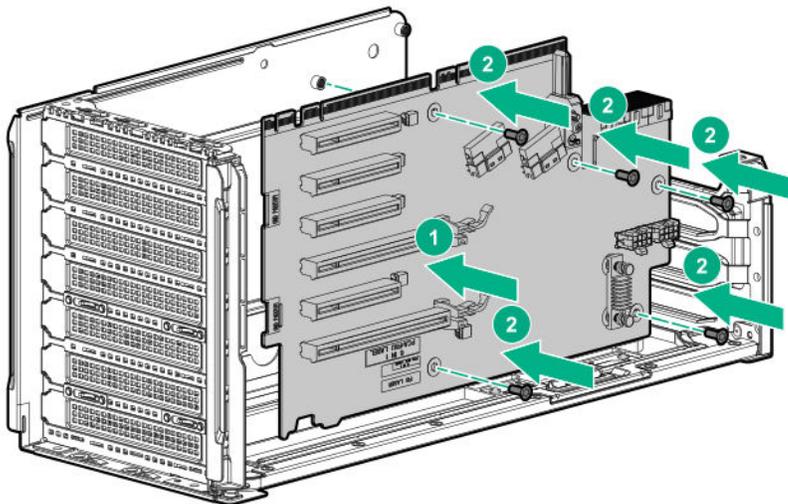
10. Install the riser cage (**Installing the primary PCIe riser cage** on page 38).

11. Install the access panel (**Installing the access panel** on page 37).

12. Install the server into the rack (**Installing the server into the rack** on page 53).

13. Connect each power cord to the server.

14. Connect each power cord to the power source.

15. **Power up the server** on page 32.

Installing a riser board into the butterfly PCIe riser cage

Prerequisites

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

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

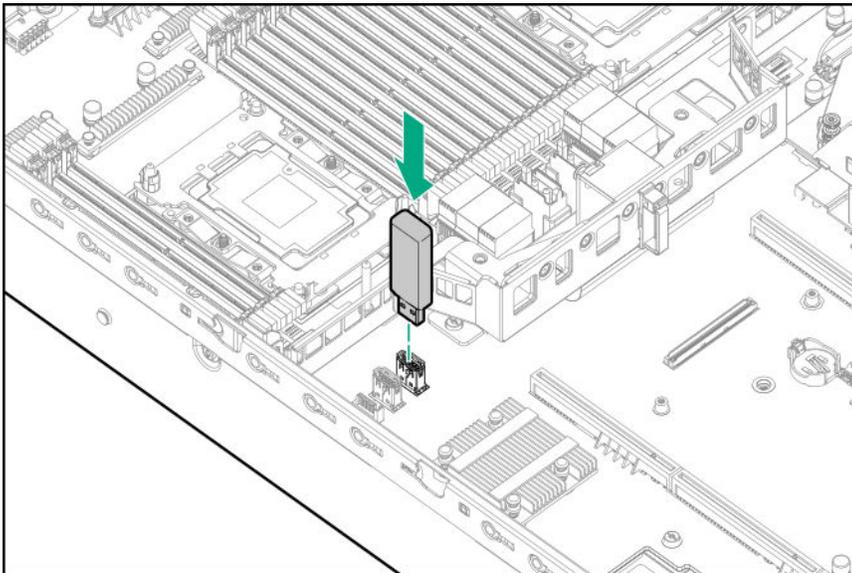- The components included with the hardware option kit

Procedure

1. **Power down the server** on page 32.

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 (**Extending the server from the rack** on page 32).

   - Remove the server from the rack (**Removing the server from the rack** on page 33).

4. Remove the access panel (**Removing the access panel** on page 36).

   ⚠ **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.

5. Remove the riser cage (**Removing a PCIe riser cage** on page 39).

6. Install the riser board.

7. Install the riser cage (**Installing a butterfly PCIe riser cage** on page 80).

8. Install the access panel (**Installing the access panel** on page 37).

9. Install the server into the rack (**Installing the server into the rack** on page 53).

10. Connect each power cord to the server.

11. Connect each power cord to the power source.

12. **Power up the server** on page 32.

Expansion slot options

Processor-to-PCIe slot assignment

The PCIe slots are mapped to specific processors, as described in the following table.

Proc	Primary riser		Secondary riser		Tertiary riser	Primary 8x2 NVMe riser	
	7-slot PCIe	6-slot + NVMe	7-slot PCIe	6-slot + NVMe	2-slot PCIe	NVMe slim	NVMe Mezz
1	Slots 5, 6, 7	Slots 5, 6, 7 + 2 NVMe (J4)*	—	—	—	8 NVMe	—
2	—	—	Slots 12, 13, 14	Slots 12, 13, 14 + 2 NVMe (J3)*	Slots 15, 16	—	—
3	Slots 1, 2, 3, 4	Slots 2, 3, 4 + 2 NVMe (J3)*	—	—	—	—	8 NVMe
4	—	—	Slots 8, 9, 10, 11	Slots 9, 10, 11 + 2 NVMe (J4)*	—	—	—

* To locate the J3 and J4 ports, see **6-slot riser board** on page 30.

For example, PCIe slot 8 is operational when:

• The 7-slot PCIe riser board is installed in the butterfly riser cage.

• Processor 4 is installed.

Installing an expansion board

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

⚠ 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:

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

Procedure

1. **Power down the server** on page 32.

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 (**Extending the server from the rack** on page 32).

    *   Remove the server from the rack (**Removing the server from the rack** on page 33).

4. Remove the access panel (**Removing the access panel** on page 36).

    ⚠ 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.

5. Remove the riser cage (**Removing a PCIe riser cage** on page 39).

6. Remove the expansion slot 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 37).

11. Install the server into the rack (**Installing the server into the rack** on page 53).

12. Connect each power cord to the server.

13. Connect each power cord to the power source.

14. **Power up the server** on page 32.

Installing the HPE 12G SAS Expander Card

Hewlett Packard Enterprise recommends installing the SAS expander card in the following locations:

- 24-drive configuration—Install the expander card into slot 5 of the primary riser cage. A SAS controller must be installed in slot 6.

- 48-drive configuration—Install the expander cards into slot 5 of the primary riser cage, and into slot 15 of the butterfly riser cage. SAS controllers must be installed in slots 6 and 16.

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 and the expander card. To download the latest firmware, see the Hewlett Packard Enterprise website (**http://www.hpe.com/support/hpesc**).

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

⚠ **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

- The components included with the hardware option kit

- Cables for each drive box

- A SAS controller for each expander

Procedure

1. **Power down the server** on page 32.

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 (**Extending the server from the rack** on page 32).

   - Remove the server from the rack (**Removing the server from the rack** on page 33).

4. Remove the access panel (**Removing the access panel** on page 36).
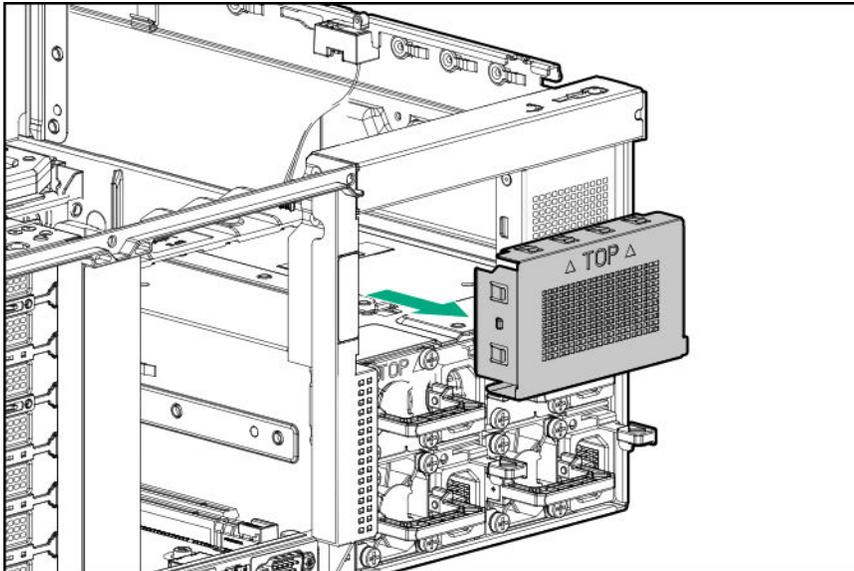
   ⚠ **CAUTION:**
   Do not operate the server for long periods with the access panel open or removed. Operating the server in this manner results in improper airflow and improper cooling that can lead to thermal damage.

5. Remove the riser cage (**Removing a PCIe riser cage** on page 39).

6. Remove the expansion slot blank from slot 5 (primary riser cage) or slot 15 (butterfly riser cage).

The primary PCIe riser cage is shown.
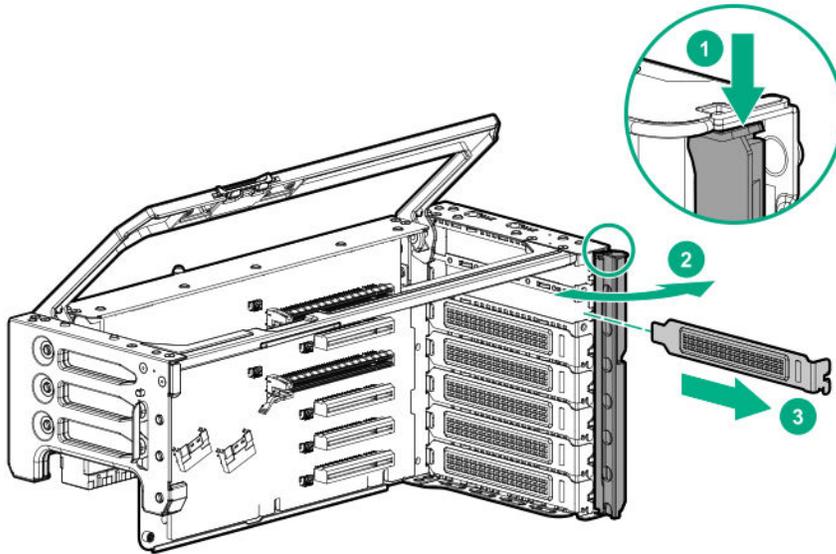
7. Using the labels on each cable, connect the cables to the SAS expander.

8. Install the 12G SAS expander card into expansion slot 5 or slot 15.
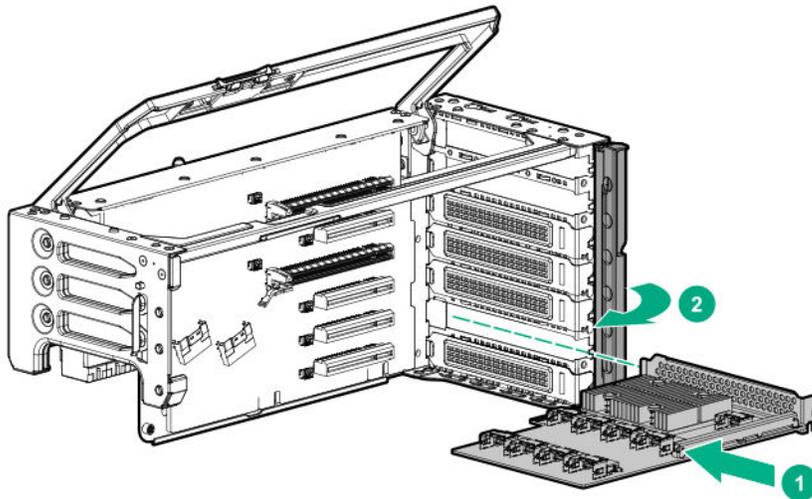
9. Install the riser cage.

10. Using the labels on the cables to determine the correct connections, connect the cables from ports 3 and 4 of the SAS expander card to the corresponding SAS controller in slot 6 or 16.

11. Connect the cables from the SAS expander card to the drive backplanes.

    a. Route the cables from the upper drive box backplanes (boxes 1–3) to the SAS expander card in the butterfly riser cage.
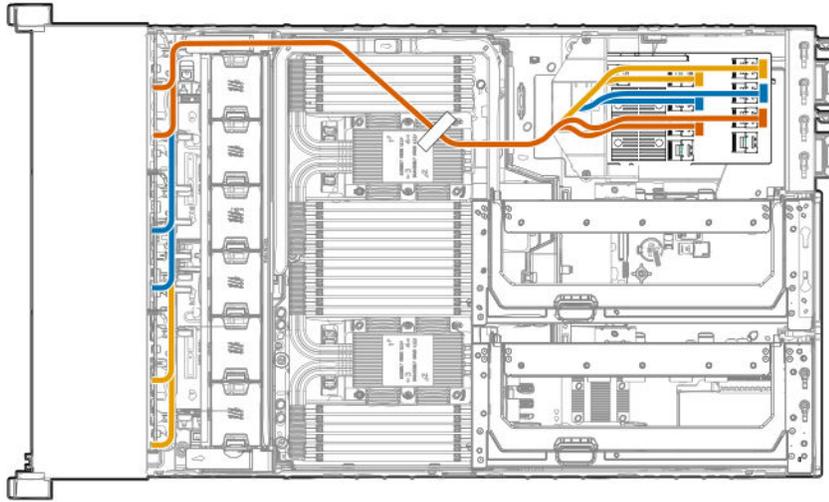
b. Route the cables from the lower drive box backplanes (boxes 4–6) to the SAS expander card in the primary riser cage.
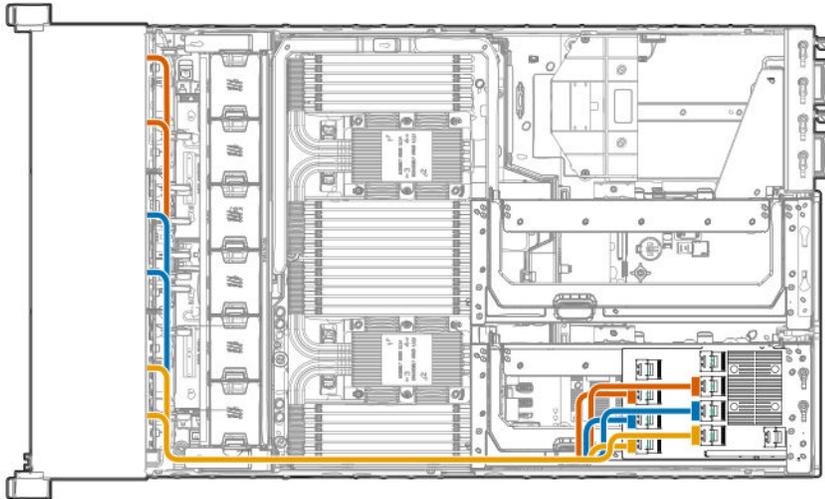
12. Install the access panel (**Installing the access panel** on page 37).

13. Install the server into the rack (**Installing the server into the rack** on page 53).

14. Connect each power cord to the server.

15. Connect each power cord to the power source.

16. **Power up the server** on page 32.

Installing a GPU card

Up to four double wide GPU cards can be installed in the following locations:

- Primary riser cage, slots 2 and 4.

- Butterfly riser cage, slots 9 and 11.

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

△ **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:

- The components included with the hardware option kit

- T-30 Torx screwdriver

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

- One cable kit supports up to three GPU cards. Install a second GPU cable kit if installing more than three GPU cards in the server.

Procedure

1. **Power down the server** on page 32.

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 (**Extending the server from the rack** on page 32).

    - Remove the server from the rack (**Removing the server from the rack** on page 33).

4. Remove the access panel (**Removing the access panel** on page 36).

    △ **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.

5. Remove the riser cage (**Removing a PCIe riser cage** on page 39).
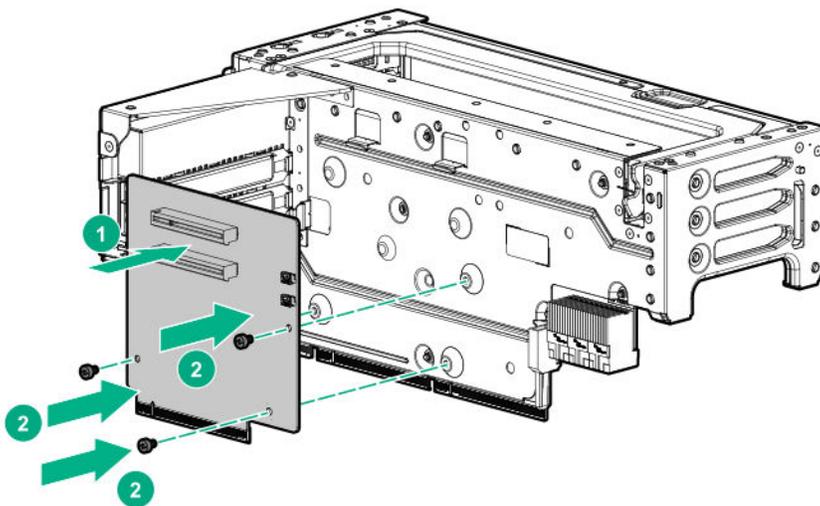
6. Install the extender bracket onto the GPU card.
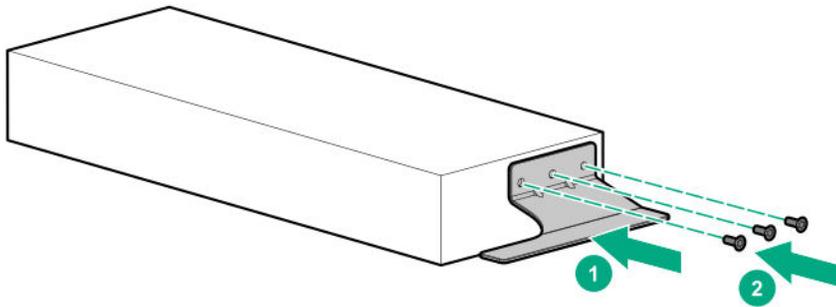
7. Install the GPU card into the riser cage.

8. Connect the GPU power cables to the riser board, and loop the excess cable.
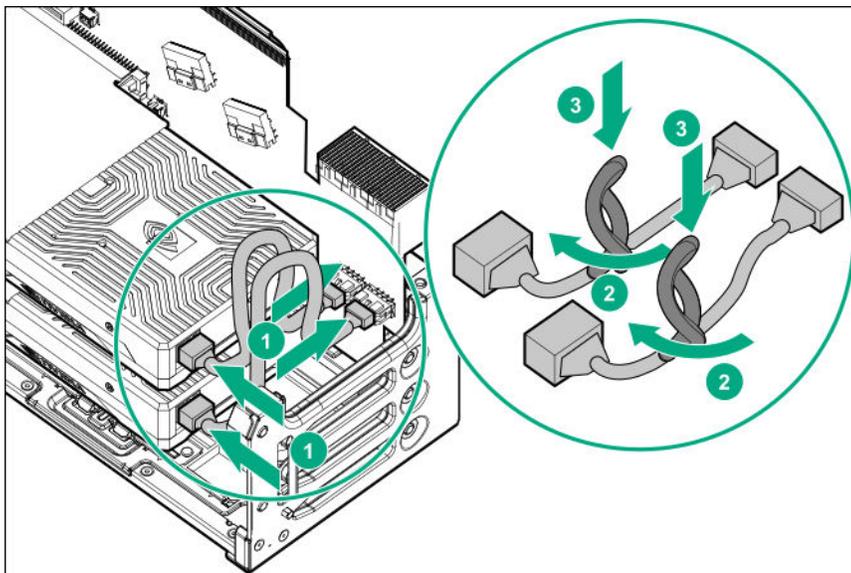
9. Tuck the looped cables between the GPU cards and the riser cage.

⚠ CAUTION:

Before installing the riser cage into the server, be sure that the power cables are routed and secured between the GPU card and the riser cage. Improper routing can result in damage to the cables and connectors.
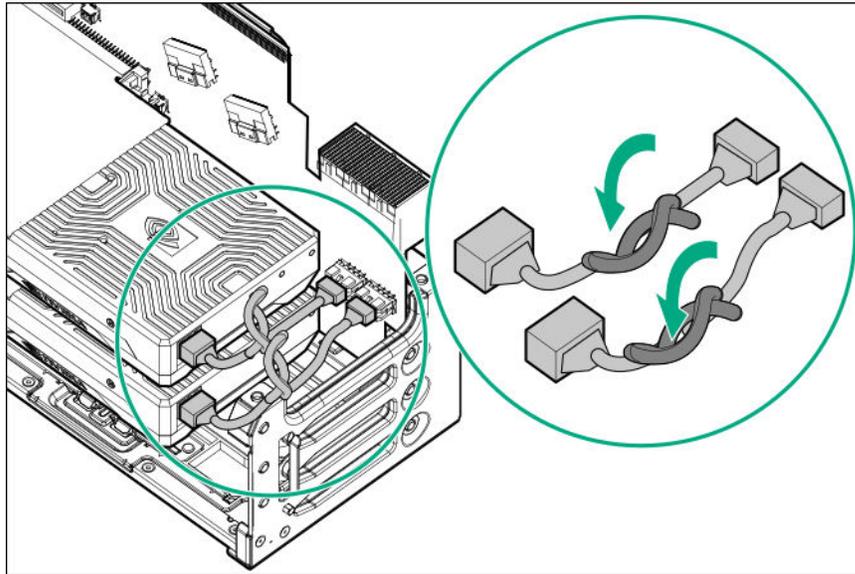
10. Install the riser cage.

11. Install the access panel (**Installing the access panel** on page 37).

12. Install the server into the rack (**Installing the server into the rack** on page 53).

13. Connect each power cord to the server.

14. Connect each power cord to the power source.

15. **Power up the server** on page 32.

The installation is complete.

Installing a controller

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

⚠ 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.

⚠ CAUTION:

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

Before installing the controller, 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 (**http://www.hpe.com/support/hpesc**).

Prerequisites

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

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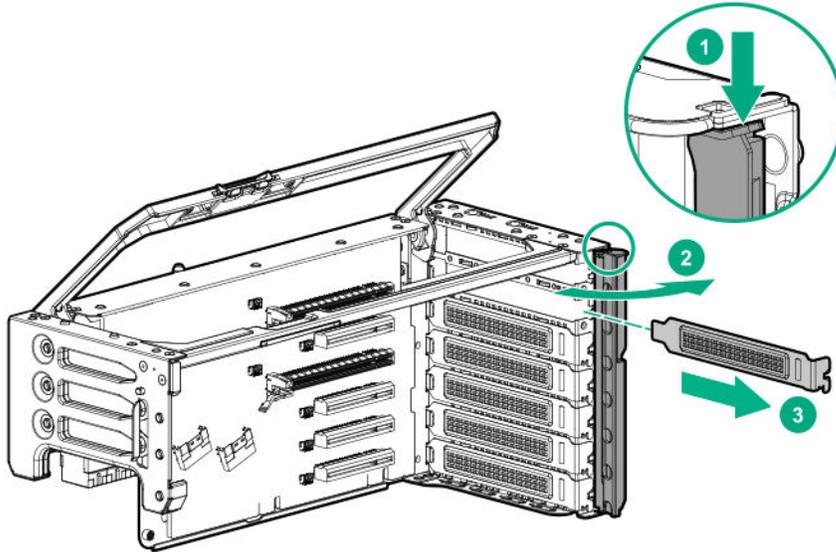
- T-10 Torx screwdriver

Procedure

1. Back up all server data.

2. **Power down the server** on page 32.

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 (**Extending the server from the rack** on page 32).

    - Remove the server from the rack (**Removing the server from the rack** on page 33).

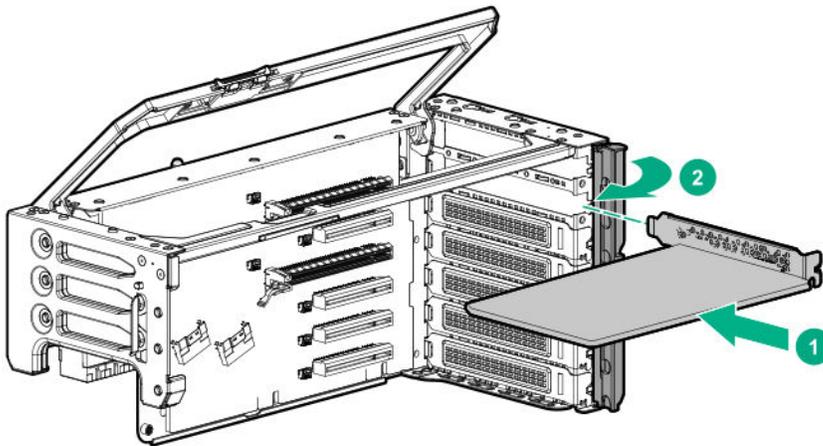5. Remove the access panel (**Removing the access panel** on page 36).

   ⚠ **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.

6. Remove the riser cage (**Removing a PCIe riser cage** on page 39).

7. Remove the expansion slot blank from the riser cage.

   The primary PCIe riser cage is shown.
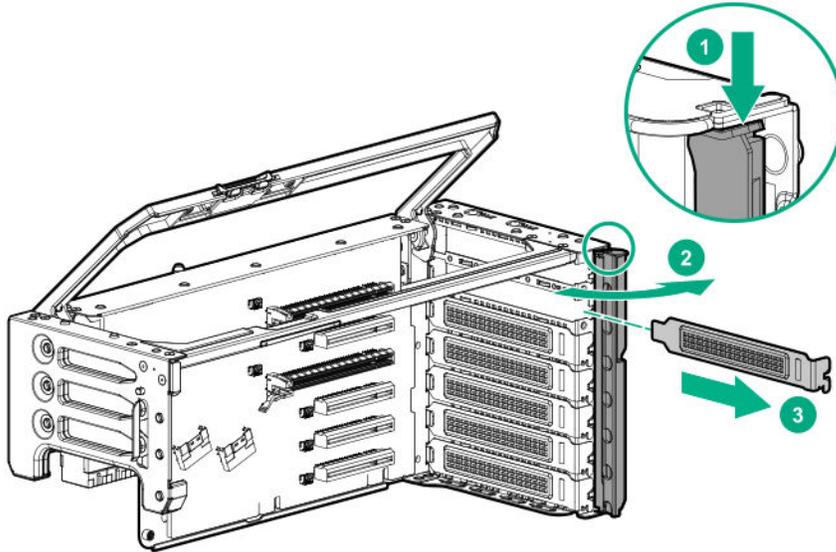
8. Install the controller into the PCI riser cage.

   Your controller might appear different.

   • 24-drive configuration—Install the SAS controller in slot 6. The SAS expander card must be installed into slot 5 of the primary riser cage.

   • 48-drive configuration—Install the SAS controllers in slots 6 and 16. Install SAS expander cards into slot 5 of the primary riser cage, and into slot 15 of the butterfly riser cage.
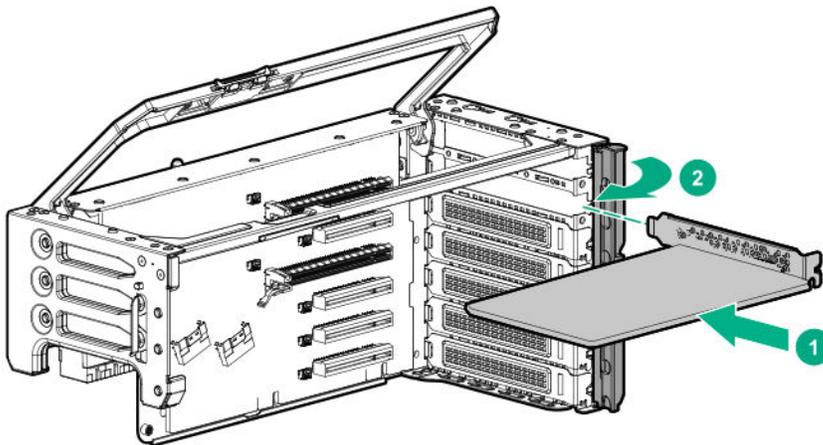
9. If present, connect the Smart Array cache backup power cable to the Smart Array cache backup power connector on the riser board (**Riser board components** on page 29).

10. Install the riser cage.

11. Connect storage devices to the controller.

12. Install the access panel (**Installing the access panel** on page 37).

13. Install the server into the rack (**Installing the server into the rack** on page 53).

14. Connect each power cord to the server.

15. Connect each power cord to the power source.

16. **Power up the server** on page 32.

Installing a FlexibleLOM adapter

Prerequisites

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

- The components included with the hardware option kit

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

Procedure

1. **Power down the server** on page 32.

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 (**Extending the server from the rack** on page 32).

- Remove the server from the rack (**Removing the server from the rack** on page 33).

**4.** Remove the access panel (**Removing the access panel** on page 36).

    ⚠ **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.

5. Remove the primary PCIe riser cage (**Removing a PCIe riser cage** on page 39).

6. Install the FlexibleLOM adapter.
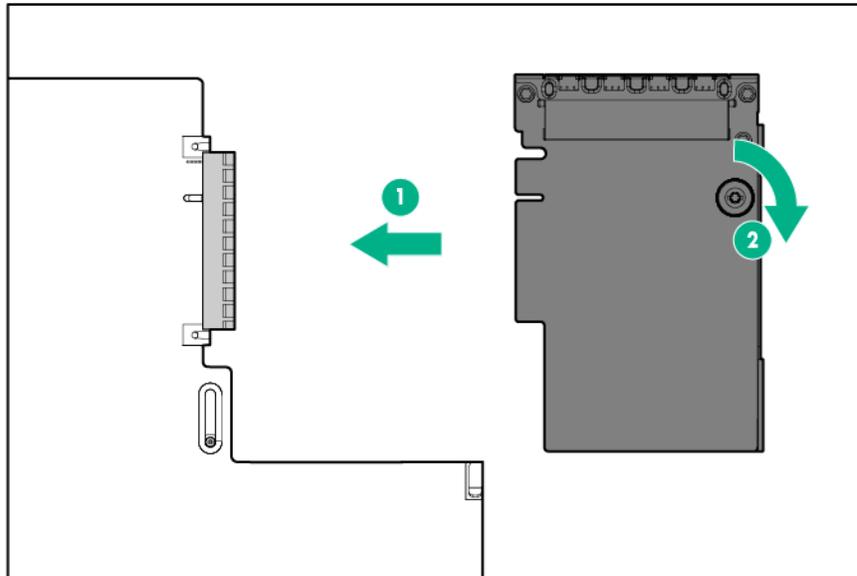
7. Install the primary PCIe riser cage (**Installing the primary PCIe riser cage** on page 38).

8. Install the access panel (**Installing the access panel** on page 37).

9. Install the server into the rack (**Installing the server into the rack** on page 53).

10. Connect each power cord to the server.

11. Connect each power cord to the power source.

12. **Power up the server** on page 32.

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

The server supports installation of 1–4 processors.

NOTE:

Single-processor configurations are supported in servers with only a six-slot riser installed in the primary riser cage.

Hewlett Packard Enterprise recommends identifying the processor heatsink module components (**Processor, heatsink, and socket components** on page 25) before performing this procedure.

Prerequisites

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

- The components included with the hardware option kit
- T-30 Torx screwdriver
- A T-10 Torx screwdriver might be needed to unlock the access panel.

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** on page 32.

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 (**Extending the server from the rack** on page 32).

   • Remove the server from the rack (**Removing the server from the rack** on page 33).

5. Remove the access panel (**Removing the access panel** on page 36).
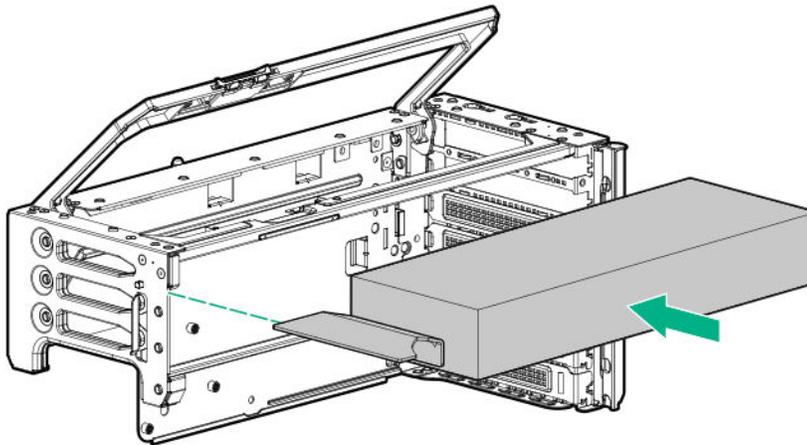
   △ **CAUTION:**
   Do not operate the server for long periods with the access panel open or removed. Operating the server in this manner results in improper airflow and improper cooling that can lead to thermal damage.

6. Remove the primary PCIe riser cage (**Removing a PCIe riser cage** on page 39).

7. If installed, remove the butterfly riser cage (**Removing a PCIe riser cage** on page 39).

8. Remove the air baffle (**Removing the air baffle** on page 40).

9. If installed, remove the processor mezzanine tray (**Removing the processor mezzanine tray** on page 45).

10. Install the processor heatsink assembly:

    a. Locate the Pin 1 indicator on the processor carrier and the socket.

    b. Align the processor heatsink assembly with the heatsink alignment pins and gently lower it down until it sits evenly on the socket.
    The heatsink alignment pins are keyed. The processor heatsink assembly will only install one way.

    Your heatsink may look different than the one shown.
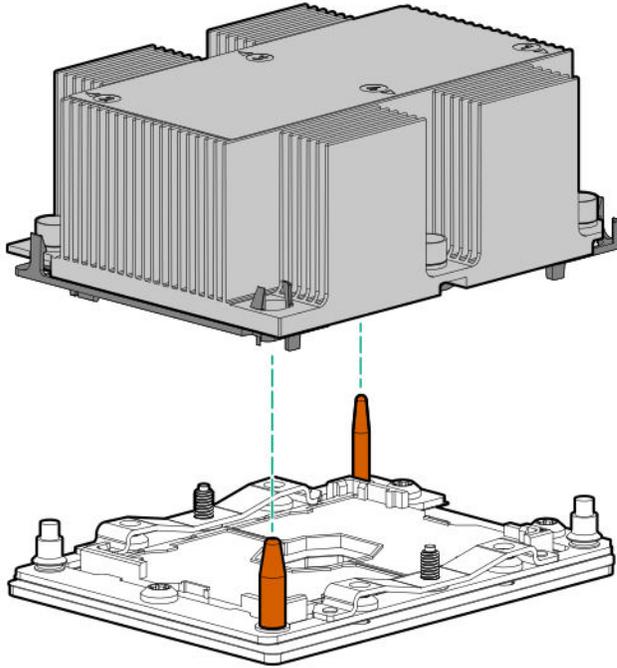
⚠ CAUTION:
Be sure to tighten each heatsink nut fully in the order indicated. Otherwise, boot failure or intermittent shutdowns might occur.

c. Using a T-30 Torx screwdriver, fully tighten each heatsink nuts in the order indicated on the heatsink label (1 -2 -3 -4) until it no longer turns.
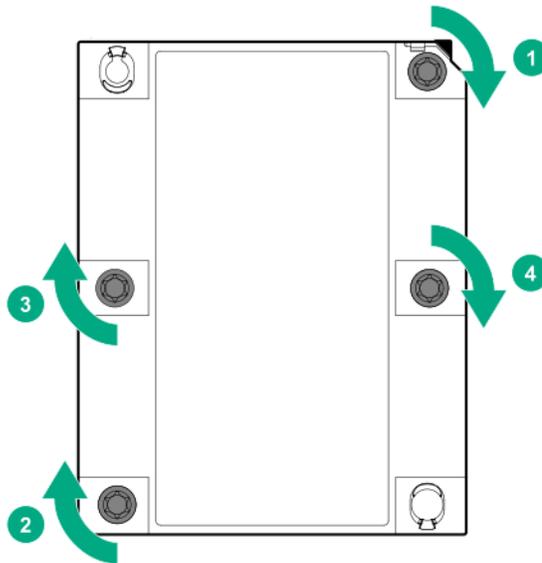
11. Install the processor mezzanine tray (**Installing a processor mezzanine tray** on page 102).

12. Install the air baffle (**Installing the air baffle** on page 41).

⚠ **CAUTION:**

To avoid damaging the connectors, always install the air baffle into the server before installing the riser cages.

13. Install the fan cage (**Installing the fan cage** on page 43).

14. Install the primary PCIe riser cage (**Installing the primary PCIe riser cage** on page 38).

15. Install the butterfly PCIe riser cage (**Installing a butterfly PCIe riser cage** on page 80).

16. Install the access panel (**Installing the access panel** on page 37).

17. Install the server into the rack (**Installing the server into the rack** on page 53).

18. Connect each power cord to the server.

19. Connect each power cord to the power source.

20. **Power up the server** on page 32.

Installing a processor mezzanine tray

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

Procedure

1. **Power down the server** on page 32.

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 (**Extending the server from the rack** on page 32).

    • Remove the server from the rack (**Removing the server from the rack** on page 33).

4. Remove the access panel (**Removing the access panel** on page 36).

⚠ **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.

5. Remove the primary PCIe riser cage (**Removing a PCIe riser cage** on page 39).

6. If installed, remove the butterfly riser cage (**Removing a PCIe riser cage** on page 39).

7. Remove the air baffle (**Removing the air baffle** on page 40).

8. Install the processors onto the processor mezzanine tray sockets (**Installing a processor** on page 99).

9. Install the DIMMs onto the processor mezzanine tray DIMM slots (**Installing a DIMM** on page 105).

10. Install the processor mezzanine tray.
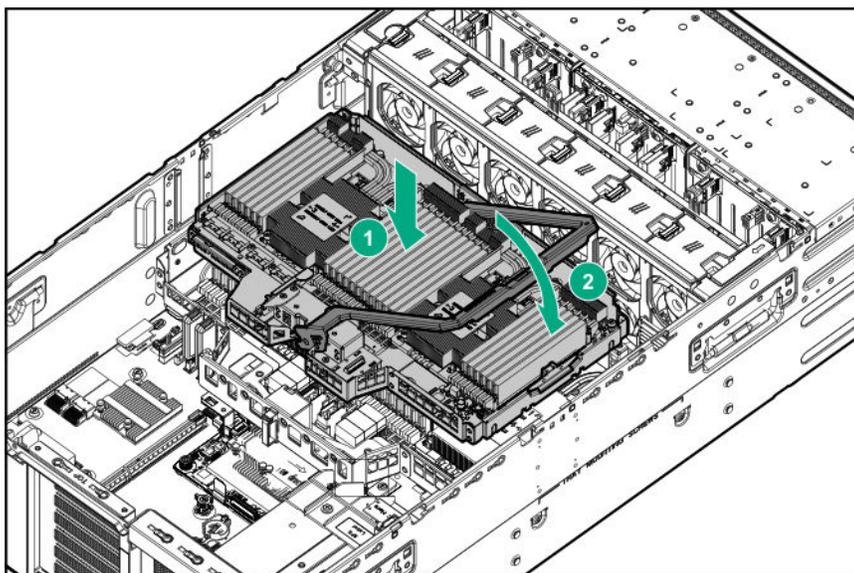
11. Install the air baffle (**Installing the air baffle** on page 41).

> ⚠ **CAUTION:**
>
> To avoid damaging the connectors, always install the air baffle into the server before installing the riser cages.

12. Install the primary PCIe riser cage (**Installing the primary PCIe riser cage** on page 38).

13. Install the butterfly PCIe riser cage (**Installing a butterfly PCIe riser cage** on page 80).

14. Install the access panel (**Installing the access panel** on page 37).

15. Install the server into the rack (**Installing the server into the rack** on page 53).

16. Connect each power cord to the server.

17. Connect each power cord to the power source.

18. **Power up the server** on page 32.

Memory options

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

DIMM population information

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

HPE SmartMemory speed information

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

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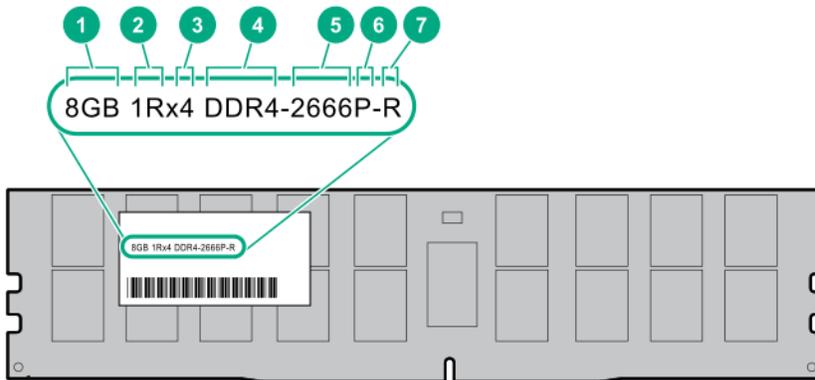
Item	Description	Definition
1	Capacity	8 GB
		16 GB
		32 GB
		64 GB
		128 GB
2	Rank	1R = Single rank
		2R = Dual rank
		4R = Quad rank
		8R = Octal rank
3	Data width on DRAM	x4 = 4-bit
		x8 = 8-bit
		x16 = 16-bit
4	Memory generation	PC4 = DDR4
5	Maximum memory speed	2133 MT/s
		2400 MT/s
		2666 MT/s

Table Continued

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

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

Installing a DIMM

For information about memory support, configurations, or population guidelines, see **Memory options** on page 103.

Prerequisites

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

- The components included with the hardware option kit
- A T-10 Torx screwdriver might be needed to unlock the access panel.

Procedure

1. **Power down the server** on page 32.

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 (**Extending the server from the rack** on page 32).

    - Remove the server from the rack (**Removing the server from the rack** on page 33).

4. Remove the access panel (**Removing the access panel** on page 36).

    ⚠ **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.

5. Remove the primary PCIe riser cage (**Removing a PCIe riser cage** on page 39).

6. If installed, remove the butterfly riser cage (**Removing a PCIe riser cage** on page 39).

7. Remove the air baffle (**Removing the air baffle** on page 40).

8. To access the DIMM slots for processors 1 and 2, remove the processor mezzanine tray (**Removing the processor mezzanine tray** on page 45).

9. Open the DIMM slot latches.

10. Install the DIMM.

11. Install the processor mezzanine tray (**Installing a processor mezzanine tray** on page 102).

12. Install the air baffle (**Installing the air baffle** on page 41).

⚠ **CAUTION:**

To avoid damaging the connectors, always install the air baffle into the server before installing the riser cages.

13. Install the primary PCIe riser cage (**Installing the primary PCIe riser cage** on page 38).

14. Install the butterfly PCIe riser cage (**Installing a butterfly PCIe riser cage** on page 80).

15. Install the access panel (**Installing the access panel** on page 37).

16. Install the server into the rack (**Installing the server into the rack** on page 53).

17. Connect each power cord to the server.

18. Connect each power cord to the power source.

19. **Power up the server** on page 32.

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 16.

Installing the 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** on page 32.

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 (**Extending the server from the rack** on page 32).

   • Remove the server from the rack (**Removing the server from the rack** on page 33).

4. Remove the access panel (**Removing the access panel** on page 36).

   ⚠ **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.

5. Remove the primary PCIe riser cage (**Removing a PCIe riser cage** on page 39).

6. If installed, remove the butterfly riser cage (**Removing a PCIe riser cage** on page 39).

7. Remove the air baffle (**Removing the air baffle** on page 40).

8. Remove the covers protecting the upper processor mezzanine power and signal connectors. To locate these connectors, see **System board components** on page 24.

9. Install the pass-through board.
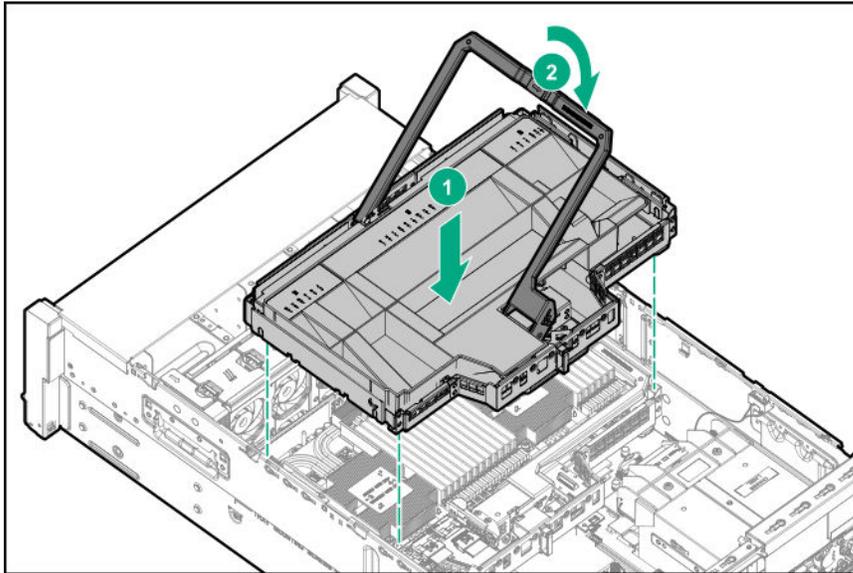
10. Install the air baffle (**Installing the air baffle** on page 41).

⚠ **CAUTION:**

To avoid damaging the connectors, always install the air baffle into the server before installing the riser cages.

11. Install the primary PCIe riser cage (**Installing the primary PCIe riser cage** on page 38).

12. Install the butterfly PCIe riser cage (**Installing a butterfly PCIe riser cage** on page 80).

13. Install the access panel (**Installing the access panel** on page 37).

14. Install the server into the rack (**Installing the server into the rack** on page 53).

15. Connect each power cord to the server.

16. Connect each power cord to the power source.

17. **Power up the server** on page 32.

Installing a Smart Storage Battery

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** on page 32.

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 (**Extending the server from the rack** on page 32).

   • Remove the server from the rack (**Removing the server from the rack** on page 33).

4. Remove the access panel (**Removing the access panel** on page 36).

   △ **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.

5. Remove the primary PCIe riser cage (**Removing a PCIe riser cage** on page 39).

6. If installed, remove the butterfly riser cage (**Removing a PCIe riser cage** on page 39).

7. Remove the air baffle (**Removing the air baffle** on page 40).

8. Remove the fan cage (**Removing the fan cage** on page 42).

9. Install the HPE Smart Storage Battery.
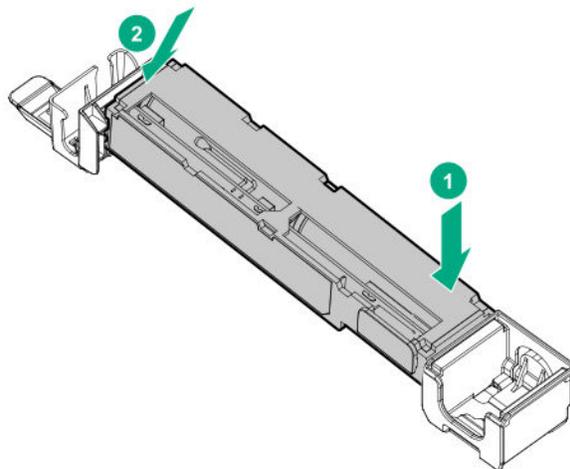
10. Route and connect the cable.
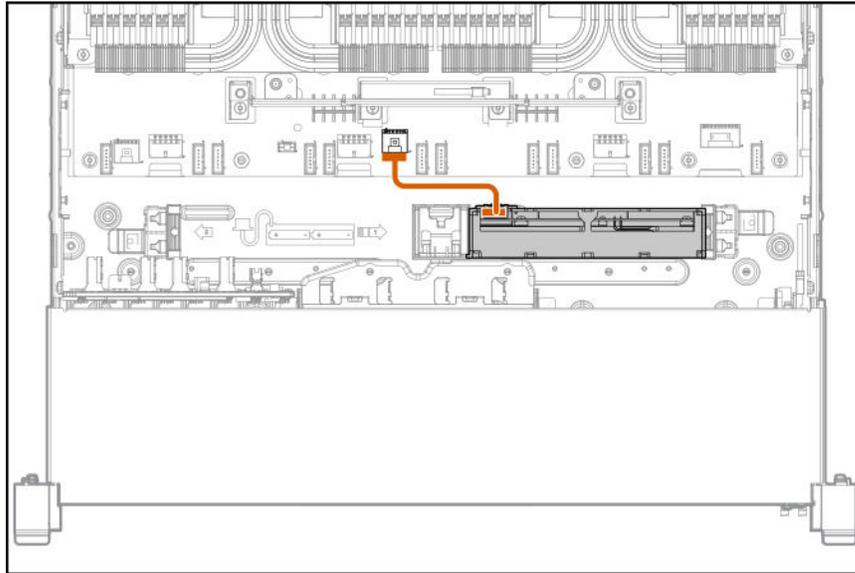
11. Install the air baffle (**Installing the air baffle** on page 41).

> ⚠ **CAUTION:**
>
> To avoid damaging the connectors, always install the air baffle into the server before installing the riser cages.

12. Install the fan cage (**Installing the fan cage** on page 43).

13. Install the primary PCIe riser cage (**Installing the primary PCIe riser cage** on page 38).

14. Install the butterfly PCIe riser cage (**Installing a butterfly PCIe riser cage** on page 80).

15. Install the access panel (**Installing the access panel** on page 37).

16. Install the server into the rack (**Installing the server into the rack** on page 53).

17. Connect each power cord to the server.

18. Connect each power cord to the power source.

19. **Power up the server** on page 32.

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** on page 32.

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 (**Extending the server from the rack** on page 32).

   • Remove the server from the rack (**Removing the server from the rack** on page 33).

4. Remove the access panel (**Removing the access panel** on page 36).

   △ **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.

5. Install the intrusion detection switch.
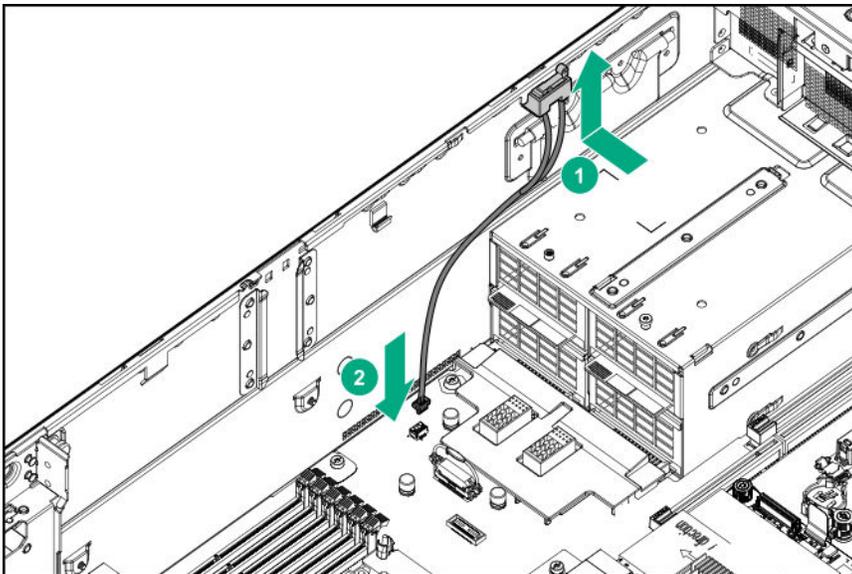
6. Install the access panel (**Installing the access panel** on page 37).

7. Install the server into the rack (**Installing the server into the rack** on page 53).

8. Connect each power cord to the server.

9. Connect each power cord to the power source.

10. **Power up the server** on page 32.

HPE Trusted Platform Module 2.0 Gen10 option

Overview

Use these instructions to install and enable an HPE TPM 2.0 Gen10 Kit in a supported server. This option is not supported on Gen9 and earlier servers.

This procedure includes three sections:

1. Installing the Trusted Platform Module board.

2. Enabling the Trusted Platform Module.

3. Retaining the recovery key/password.

HPE TPM 2.0 installation is supported with specific operating system support such as Microsoft® Windows Server® 2012 R2 and later. For more information about operating system support, see the product QuickSpecs on the Hewlett Packard Enterprise website (**http://www.hpe.com/info/qs**). For more information about Microsoft® Windows® BitLocker Drive Encryption feature, see the Microsoft website (**http://www.microsoft.com**).

> △ **CAUTION:**
> If the TPM is removed from the original server and powered up on a different server, data stored in the TPM including keys will be erased.

> ⓘ **IMPORTANT:**
> In UEFI Boot Mode, the HPE TPM 2.0 Gen10 Kit can be configured to operate as TPM 2.0 (default) or TPM 1.2 on a supported server. In Legacy Boot Mode, the configuration can be changed between TPM 1.2 and TPM 2.0, but only TPM 1.2 operation is supported.

HPE Trusted Platform Module 2.0 Guidelines

> △ **CAUTION:**
> Always observe the guidelines in this document. Failure to follow these guidelines can cause hardware damage or halt data access.

Hewlett Packard Enterprise SPECIAL REMINDER: Before enabling TPM functionality on this system, you must ensure that your intended use of TPM complies with relevant local laws, regulations and policies, and approvals or licenses must be obtained if applicable.

For any compliance issues arising from your operation/usage of TPM which violates the above mentioned requirement, you shall bear all the liabilities wholly and solely. Hewlett Packard Enterprise will not be responsible for any related liabilities.

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

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

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

When installing or replacing a TPM, observe the following guidelines:

- Do not remove an installed TPM. Once installed, the TPM becomes a permanent part of the system board.

- When installing or replacing hardware, Hewlett Packard Enterprise service providers cannot enable the TPM or the encryption technology. For security reasons, only the customer can enable these features.

- When returning a system board for service replacement, do not remove the TPM from the system board. When requested, Hewlett Packard Enterprise Service provides a TPM with the spare system board.

- Any attempt to remove the cover of an installed TPM from the system board can damage the TPM cover, the TPM, and the system board.

- If the TPM is removed from the original server and powered up on a different server, data stored in the TPM including keys will be erased.

- When using BitLocker, always retain the recovery key/password. The recovery key/password is required to complete Recovery Mode after BitLocker detects a possible compromise of system integrity.

- Hewlett Packard Enterprise is not liable for blocked data access caused by improper TPM use. For operating instructions, see the TPM documentation or the encryption technology feature documentation provided by the operating system.

Installing and enabling the HPE TPM 2.0 Gen10 Kit

Installing the Trusted Platform Module board

Preparing the server for installation

Procedure

1. Observe the following warnings:

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

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

2. Update the system ROM.

   Locate and download the latest ROM version from the **Hewlett Packard Enterprise Support Center website**. Follow the instructions on the website to update the system ROM.

3. Update the system ROM.

   Locate and download the latest ROM version from the Hewlett Packard Enterprise Support Center website (**http://www.hpe.com/support/hpesc**). To update the system ROM, follow the instructions on the website.

4. Power down the server.

   a. Shut down the OS as directed by the OS documentation.

   b. To place the server in standby mode, press the Power On/Standby button. When the server enters standby power mode, the system power LED changes to amber.

   c. Disconnect the power cords (rack and tower servers).

5. Do one of the following:

   - Remove the server from the rack, if necessary.

   - Remove the server or server blade from the server.

6. Place the server on a flat, level work surface.

7. Remove the access panel.

8. Remove the butterfly riser cage (**Removing a PCIe riser cage** on page 39).

9. Proceed to **Installing the TPM board and cover** on page 114.

Installing the TPM board and cover

Procedure

1. Observe the following alerts:

⚠ **CAUTION:**
If the TPM is removed from the original server and powered up on a different server, data stored in the TPM including keys will be erased.

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

2. Align the TPM board with the key on the connector, and then install the TPM board. To seat the board, press the TPM board firmly into the connector. To locate the TPM connector on the system board, see the server label on the access panel.
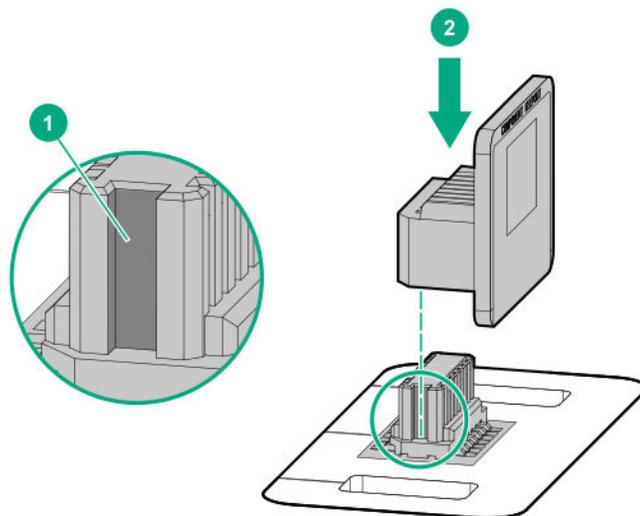
3. Install the TPM cover:

   a. Line up the tabs on the cover with the openings on either side of the TPM connector.

   b. To snap the cover into place, firmly press straight down on the middle of the cover.
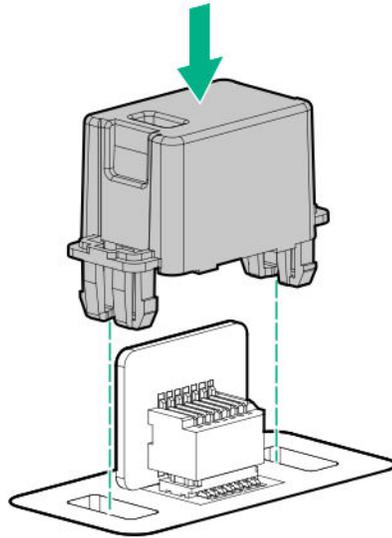
4. Proceed to **Preparing the server for operation** on page 115.

Preparing the server for operation

Procedure

1. Install any options or cables previously removed to access the TPM connector.

2. Install the access panel.

3. Do one of the following:

   a. Install the server in the rack, if necessary.

   b. Install the server in the enclosure.

4. Power up the server.

   a. Connect the power cords (rack and tower servers).

   b. Press the Power On/Standby button.

Enabling the Trusted Platform Module

When enabling the Trusted Platform module, observe the following guidelines:

- By default, the Trusted Platform Module is enabled as TPM 2.0 when the server is powered on after installing it.

- In UEFI Boot Mode, the Trusted Platform Module can be configured to operate as TPM 2.0 or TPM 1.2.

- In Legacy Boot Mode, the Trusted Platform Module configuration can be changed between TPM 1.2 and TPM 2.0, but only TPM 1.2 operation is supported.

Enabling the Trusted Platform Module as TPM 2.0

Procedure

1. During the server startup sequence, press the **F9** key to access **System Utilities**.

2. From the System Utilities screen, select **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Server Security** > **Trusted Platform Module options**.

3. Verify the following:

   - "Current TPM Type" is set to **TPM 2.0**.

   - "Current TPM State" is set to **Present and Enabled**.

   - "TPM Visibility" is set to **Visible**.

4. If changes were made in the previous step, press the **F10** key to save your selection.

5. If F10 was pressed in the previous step, do one of the following:

   - If in graphical mode, click **Yes**.

   - If in text mode, press the **Y** key.

6. Press the **ESC** key to exit System Utilities.

7. If changes were made and saved, the server prompts for reboot request. Press the **Enter** key to confirm reboot.

   If the following actions were performed, the server reboots a second time without user input. During this reboot, the TPM setting becomes effective.

   - Changing from TPM 1.2 and TPM 2.0

   - Changing TPM bus from FIFO to CRB

   - Enabling or disabling TPM

   - Clearing the TPM

8. Enable TPM functionality in the OS, such as Microsoft Windows BitLocker or measured boot.

   For more information, see the **Microsoft website**.

Enabling the Trusted Platform Module as TPM 1.2

Procedure

1. During the server startup sequence, press the **F9** key to access **System Utilities**.

2. From the System Utilities screen select **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Server Security** > **Trusted Platform Module options**.

3. Change the "TPM Mode Switch Operation" to **TPM 1.2**.

4. Verify "TPM Visibility" is **Visible**.

5. Press the **F10** key to save your selection.

6. When prompted to save the change in System Utilities, do one of the following:

- If in graphical mode, click **Yes**.

- If in text mode, press the **Y** key.

7. Press the **ESC** key to exit System Utilities.

   The server reboots a second time without user input. During this reboot, the TPM setting becomes effective.

8. Enable TPM functionality in the OS, such as Microsoft Windows BitLocker or measured boot.

   For more information, see the **Microsoft website**.

Retaining the recovery key/password

The recovery key/password is generated during BitLocker setup, and can be saved and printed after BitLocker is enabled. When using BitLocker, always retain the recovery key/password. The recovery key/password is required to enter Recovery Mode after BitLocker detects a possible compromise of system integrity.

To help ensure maximum security, observe the following guidelines when retaining the recovery key/password:

- Always store the recovery key/password in multiple locations.

- Always store copies of the recovery key/password away from the server.

- Do not save the recovery key/password on the encrypted hard drive.

Cabling

HPE ProLiant Gen10 DL Servers Storage Cabling Guidelines

When installing cables, observe the following:

- All ports are labeled:

  - System board ports
  - Controller ports
  - 12G SAS Expander ports

- Most data cables have labels near each connector with destination port information.
- Some data cables are pre-bent. Do not unbend or manipulate the cables.
- Before connecting a cable to a port, lay the cable in place to verify the length of the cable.
- When routing cables from the front to the rear of the server, use the cable channels on either side of the chassis.

Cable matrix

Use the following tables to find cabling information and part numbers.

SAS/SATA kits

Option kit	Cable part number*	From	To	Power cable part number
2SFF SAS/SATA drive cage	869952-001 [1]	Drive backplane	System board	870479-001 [2]
8SFF SAS/SATA drive cage	870480-001 [3]	Drive backplane (drive boxes 1, 3, 4, and 6)	Primary riser cage / Tertiary riser cage	870479-001 [2]
8SFF SAS/SATA drive cage	870483-001 [3]	Drive backplane (drive boxes 1–6)	Primary riser cage / Tertiary riser cage	870479-001 [2]
8SFF SAS/SATA drive cage (mini SAS)	870492-001 [4]	Drive backplane (drive boxes 1, 3, 4, and 6)	Primary riser cage / Tertiary riser cage	870479-001 [2]

Table Continued

Option kit	Cable part number*	From	To	Power cable part number
8SFF SAS/SATA drive cage (mini SAS)	870489-001 [4]	Drive backplane (drive boxes 1–6)	Primary riser cage / Tertiary riser cage	870479-001 [2]
12G SAS Expander	870499-001 [5]	2SFF SAS port	12G SAS Expander	—
6SFF/2 NVMe drive cage	870483-001 [3]	Drive backplane (drive boxes 1–3)	Primary riser cage / Tertiary riser cage	870479-001 [2]

* To order spare cables, use the following kits and spare part numbers.

[1] 2SFF cable kit (877963-001)

[2] USB 3.0 Ext. 600mm+SASPWR BP cable kit (881699-001)

[3] M.SAS/SATA 1041mm+900mm cable kit (881700-001)

[4] M.SAS 970mm+820mm cable kit (881701-001)

[5] M.SAS/SATA 1x4-1x4 cable kit (881702-001)

Data kits

Option kit	Cable part number*	From	To
Front USB/display port (universal media bay)	Included with component	Component	System board
Front USB 3.0 port	870476-001 [1]	Component	System board
Optical disk drive	869949-001 [2]	Component	System board
Systems Insight Display	Included with component	Component	System board

* To order spare cables, use the following kits and spare part numbers.

[1] USB 3.0 Ext. 600mm+SASPWR BP cable kit (881699-001)

[2] Optical drive cable (784623-001)

GPU kits

Option kit	Cable part number*	From	To
HPE GPU 8p Keyed GPU Cable Kit	869820-001 [1]	GPU	Riser
HPE GPU 8p Cable Kit	869821-001 [1]	GPU	Riser

* To order spare cables, use the following kits and spare part numbers.

NVMe drive cable matrix

Use the following tables to find supported NVMe drive configurations, cabling information, and part numbers.

NVMe drives are supported in servers with the following riser configurations:

- **6-slot primary**
- **6-slot primary + 8-slot butterfly** *
- **6-slot primary + 9-slot butterfly** **
- **7-slot primary + 8-slot butterfly**
- **4-port slimline primary + 8-slot butterfly + 4-port mezzanine card**
- **4-port slimline primary + 9-slot butterfly + 4-port mezzanine card**

* The 8-slot butterfly riser contains a 6-slot riser in the secondary PCIe slot, and a 2-slot riser in the tertiary PCIe slot.

** The 9-slot butterfly riser contains a 7-slot riser in the secondary PCIe slot, and a 2-slot riser in the tertiary PCIe slot.

Server riser configuration: 6-slot riser installed in the primary riser cage

# of NVMe drives supported	Processor quantity	Cable part number *	From	To	Power cable part number *
2	1	869957-001 [1]	Drive box 2, 8SFF (6+2) Premium drive cage	Primary 6-slot riser	870479-001 [3]
2	1	869957-001 [1]	Drive box 4, 2SFF Premium drive cage	Primary 6-slot riser	870479-001 [3]
2	2	869957-001 [1]	Drive box 2, 8SFF (6+2) Premium drive cage	Primary 6-slot riser	870479-001 [3]
2	2	869957-001 [1]	Drive box 4, 2SFF Premium drive cage	Primary 6-slot riser	870479-001 [3]
2	3	869957-001 [1]	Drive box 4, 2SFF Premium drive cage	Primary 6-slot riser	870479-001 [3]
4	3	869957-001 [1]	Drive box 2, 8SFF (6+2) Premium drive cage	Primary 6-slot riser	870479-001 [3]
			Drive box 3, 8SFF (6+2) Premium drive cage	Primary 6-slot riser	
4	3	869957-001 [1]	Drive box 2, 8SFF (6+2) Premium drive cage	Primary 6-slot riser	870479-001 [3]

Table Continued

# of NVMe drives supported	Processor quantity	Cable part number *	From	To	Power cable part number *
			Drive box 4, 2SFF Premium drive cage	Primary 6-slot riser	
4 **	3	870508-001 [2]	Drive box 2, 8-NVMe drive cage	Primary 6-slot riser	870479-001 [3]
2	4	869957-001 [1]	Drive box 4, 2SFF Premium drive cage	Primary 6-slot riser	870479-001 [3]
4	4	869957-001 [1]	Drive box 2, 8SFF (6+2) Premium drive cage	Primary 6-slot riser	870479-001 [3]
			Drive box 3, 8SFF (6+2) Premium drive cage	Primary 6-slot riser	
4	4	869957-001 [1]	Drive box 2, 8SFF (6+2) Premium drive cage	Primary 6-slot riser	870479-001 [3]
			Drive box 4, 2SFF Premium drive cage	Primary 6-slot riser	

* To order spare cables, use the following kits and spare part numbers.

- [1] NVMe cable kit (877983-001)
- [2] NVMe cable kit (881703-001)
- [3] USB 3.0 Ext. 600mm+SASPWR BP cable kit (881699-001)

** Partial configuration, see **6-drive (or fewer) configuration** on page 130.

Server riser configuration:

- **Primary riser cage—6-slot riser installed**
- **Butterfly riser cage—6-slot and 2-slot risers installed**

# of NVMe drives supported	Processor quantity	Cable part number	From	To	Power cable part number
4	2	869957-001 [1]	Drive box 2, 8SFF (6+2) Premium drive cage	Primary 6-slot riser	870479-001 [3]
			Drive box 4, 2SFF Premium drive cage	Butterfly 6-slot riser	

Table Continued

# of NVMe drives supported	Processor quantity	Cable part number	From	To	Power cable part number
4	2	869957-001 [1]	Drive box 2, 8SFF (6+2) Premium drive cage	Butterfly 6-slot riser	870479-001 [3]
			Drive box 3, 8SFF (6+2) Premium drive cage	Primary 6-slot riser	
6	3	869957-001 [1]	Drive box 2, 8SFF (6+2) Premium drive cage	Primary 6-slot riser	870479-001 [3]
			Drive box 3, 8SFF (6+2) Premium drive cage	Primary 6-slot riser	
			Drive box 4, 2SFF Premium drive cage	Butterfly 6-slot riser	
6	3	869957-001 [1]	Drive box 1, 8SFF (6+2) Premium drive cage	Butterfly 6-slot riser	870479-001 [3]
			Drive box 2, 8SFF (6+2) Premium drive cage	Primary 6-slot riser	
			Drive box 3, 8SFF (6+2) Premium drive cage	Primary 6-slot riser	
6 **	3	870508-001 [2]	Drive box 2, 8-NVMe drive cage	Primary 6-slot riser Butterfly 6-slot riser	870479-001 [3]
6	4	869957-001 [1]	Drive box 1, 8SFF (6+2) Premium drive cage	Butterfly 6-slot riser	870479-001 [3]
			Drive box 2, 8SFF (6+2) Premium drive cage	Primary 6-slot riser	
			Drive box 3, 8SFF (6+2) Premium drive cage	Primary 6-slot riser	
8	4	870508-001 [2]	Drive box 2, 8-NVMe drive cage	Primary 6-slot riser Butterfly 6-slot riser	870479-001 [3]
8	4	869957-001 [1]	Drive box 1, 8SFF (6+2) Premium drive cage	Primary 6-slot riser	870479-001 [3]
			Drive box 2, 8SFF (6+2) Premium drive cage	Butterfly 6-slot riser	

Table Continued

# of NVMe drives supported	Processor quantity	Cable part number	From	To	Power cable part number
			Drive box 3, 8SFF (6+2) Premium drive cage	Primary 6-slot riser	
			Drive box 4, 2SFF Premium drive cage	Butterfly 6-slot riser	

* To order spare cables, use the following kits and spare part numbers.

- [1] NVMe cable kit (877983-001)

- [2] NVMe cable kit (881703-001)

- [3] USB 3.0 Ext. 600mm+SASPWR BP cable kit (881699-001)

** Partial configuration, see

Server riser configuration:

- **Primary riser cage—6-slot riser installed**

- **Butterfly riser cage—7-slot and 2-slot risers installed**

# of NVMe drives supported	Processor quantity	Cable part number	From	To	Power cable part number
2	2	869957-001 [1]	Drive box 2, 8SFF (6+2) Premium drive cage	Primary 6-slot riser	870479-001 [3]
2	2	869957-001 [1]	Drive box 4, 2SFF Premium drive cage	Primary 6-slot riser	870479-001 [3]
4	3	869957-001 [1]	Drive box 2, 8SFF (6+2) Premium drive cage	Primary 6-slot riser	870479-001 [3]
			Drive box 3, 8SFF (6+2) Premium drive cage	Primary 6-slot riser	
4	3	869957-001 [1]	Drive box 2, 8SFF (6+2) Premium drive cage	Primary 6-slot riser	870479-001 [3]
			Drive box 4, 2SFF Premium drive cage	Primary 6-slot riser	
4	4	869957-001 [1]	Drive box 2, 8SFF (6+2) Premium drive cage	Primary 6-slot riser	870479-001 [3]
			Drive box 3, 8SFF (6+2) Premium drive cage	Primary 6-slot riser	

Table Continued

# of NVMe drives supported	Processor quantity	Cable part number	From	To	Power cable part number
4	4	869957-001 [1]	Drive box 2, 8SFF (6+2) Premium drive cage	Primary 6-slot riser	870479-001 [3]
			Drive box 4, 2SFF Premium drive cage	Primary 6-slot riser	

* To order spare cables, use the following kits and spare part numbers.

- [1] NVMe cable kit (877983-001)

- [2] NVMe cable kit (881703-001)

- [3] USB 3.0 Ext. 600mm+SASPWR BP cable kit (881699-001)

Server riser configuration:

- **Primary riser cage—7-slot riser installed**

- **Butterfly riser cage—6-slot and 2-slot risers installed**

# of NVMe drives supported	Processor quantity	Cable part number	From	To	Power cable part number
2	2	869957-001 [1]	Drive box 2, 8SFF (6+2) Premium drive cage	Butterfly 6-slot riser	870479-001 [3]
2	2	869957-001[1]	Drive box 4, 2SFF Premium drive cage	Butterfly 6-slot riser	870479-001 [3]
2	3	869957-001 [1]	Drive box 2, 8SFF (6+2) Premium drive cage	Butterfly 6-slot riser	870479-001 [3]
2	3	869957-001 [1]	Drive box 4, 2SFF Premium drive cage	Butterfly 6-slot riser	870479-001 [3]
2	4	869957-001 [1]	Drive box 2, 8SFF (6+2) Premium drive cage	Butterfly 6-slot riser	870479-001 [3]
2	4	869957-001 [1]	Drive box 4, 2SFF Premium drive cage	Butterfly 6-slot riser	870479-001 [3]
4	4	869957-001 [1]	Drive box 2, 8SFF (6+2) Premium drive cage	Butterfly 6-slot riser	870479-001 [3]
			Drive box 4, 2SFF Premium drive cage	Butterfly 6-slot riser	

Table Continued

# of NVMe drives supported	Processor quantity	Cable part number	From	To	Power cable part number
4	4	869957-001 [1]	Drive box 1, 8SFF (6+2) Premium drive cage	Butterfly 6-slot riser	870479-001 [3]
			Drive box 2, 8SFF (6+2) Premium drive cage	Butterfly 6-slot riser	

* To order spare cables, use the following kits and spare part numbers.

- [1] NVMe cable kit (877983-001)

- [2] NVMe cable kit (881703-001)

- [3] USB 3.0 Ext. 600mm+SASPWR BP cable kit (881699-001)

Server riser configuration:

- **Primary riser cage—4-port slimline riser installed**

- **Butterfly riser cage—6-slot and 2-slot risers installed**

- **4-port NVMe mezzanine card installed**

# of NVMe drives supported	Processor quantity	Cable part number	From	To	Power cable part number
16	3	870508-001 [2]	Drive box 2, 8-NVMe drive cage	4-port mezzanine card	870479-001 [3]
			Drive box 3, 8-NVMe drive cage	Primary 4-port riser	
18	3	870508-001 [2]	Drive box 2, 8-NVMe drive cage	4-port mezzanine card	870479-001 [3]
			Drive box 3, 8-NVMe drive cage	Primary 4-port riser	
		869957-001 [1]	Drive box 4, 2SFF Premium drive cage	Butterfly 6-slot riser	
18	3	870508-001 [2]	Drive box 2, 8-NVMe drive cage	4-port mezzanine card	870479-001 [3]
			Drive box 3, 8-NVMe drive cage	Primary 4-port riser	
		869957-001 [1]	Drive box 4, 2SFF Premium drive cage	Butterfly 6-slot riser	

Table Continued

# of NVMe drives supported	Processor quantity	Cable part number	From	To	Power cable part number
18	4	870508-001 [2]	Drive box 1, 8-NVMe drive cage	4-port mezzanine card	870479-001 [3]
			Drive box 2, 8-NVMe drive cage	4-port mezzanine card	
			Drive box 3, 8-NVMe drive cage	Primary 4-port riser	
		869957-001 [1]	Drive box 4, 2SFF Premium drive cage	Butterfly 6-slot riser	
18	3	870508-001 [2]	Drive box 1, 8SFF (6+2) Premium drive cage	Butterfly 6-slot riser	870479-001 [3]
			Drive box 2, 8-NVMe drive cage	4-port mezzanine card	
		869957-001 [1]	Drive box 3, 8-NVMe drive cage	Primary 4-port riser	
18	4	870508-001 [2]	Drive box 2, 8-NVMe drive cage	4-port mezzanine card	870479-001 [3]
			Drive box 3, 8-NVMe drive cage	Primary 4-port riser	
		869957-001 [1]	Drive box 4, 2SFF Premium drive cage	Butterfly 6-slot riser	
18	4	870508-001 [2]	Drive box 1, 8SFF (6+2) Premium drive cage	Butterfly 6-slot riser	870479-001 [3]
			Drive box 2, 8-NVMe drive cage	4-port mezzanine card	
		869957-001 [1]	Drive box 3, 8-NVMe drive cage	Primary 4-port riser	
20 **	4	870508-001 [2]	Drive box 1, 8SFF (6+2) Premium drive cage	Butterfly 6-slot riser	870479-001 [3]
			Drive box 2, 8-NVMe drive cage	4-port mezzanine card	
		869957-001 [1]	Drive box 3, 8-NVMe drive cage	Primary 4-port riser	
			Drive box 4, 2SFF Premium drive cage	Butterfly 6-slot riser	

* To order spare cables, use the following kits and spare part numbers.

- [1] NVMe cable kit (877983-001)
- [2] NVMe cable kit (881703-001)
- [3] USB 3.0 Ext. 600mm+SASPWR BP cable kit (881699-001)

** Partial configuration, see **20-drive configuration** on page 132.

Server riser configuration:

- **Primary riser cage—4-port slimline riser installed**
- **Butterfly riser cage—7-slot and 2-slot risers installed**
- **4-port NVMe mezzanine card installed**

# of NVMe drives supported	Processor quantity	Cable part number	From	To	Power cable part number
16	3	870508-001 [2]	Drive box 2, 8-NVMe drive cage	4-port mezzanine card	870479-001 [3]
			Drive box 3, 8-NVMe drive cage	Primary 4-port riser	
16	4	870508-001 [2]	Drive box 2, 8-NVMe drive cage	4-port mezzanine card	870479-001 [3]
			Drive box 3, 8-NVMe drive cage	Primary 4-port riser	

* To order spare cables, use the following kits and spare part numbers.

- [1] NVMe cable kit (877983-001)
- [2] NVMe cable kit (881703-001)
- [3] USB 3.0 Ext. 600mm+SASPWR BP cable kit (881699-001)

Universal media bay cabling

With optional optical disk drive
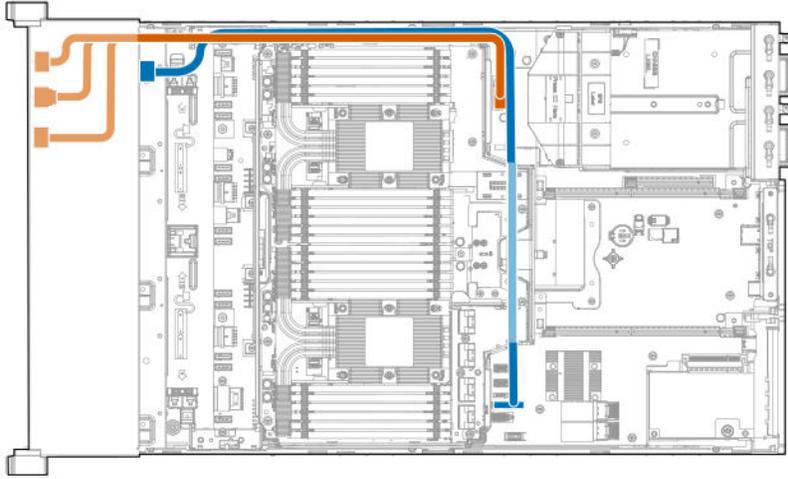
With optional 2SFF drive cage
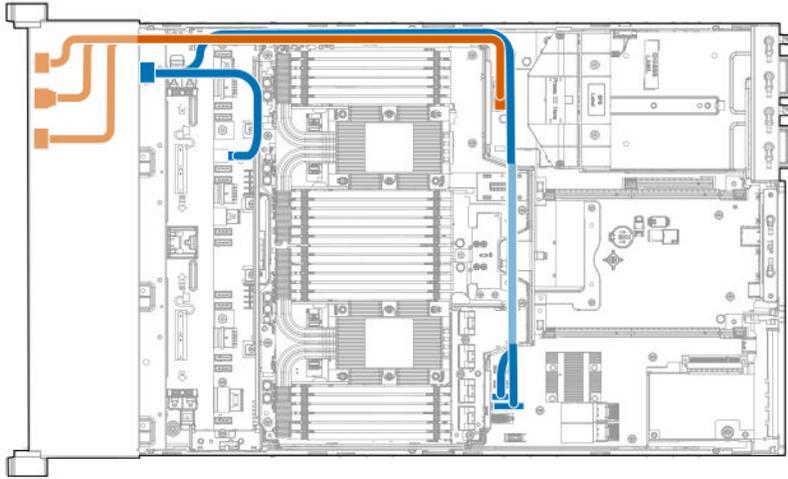
Front panel USB port cabling
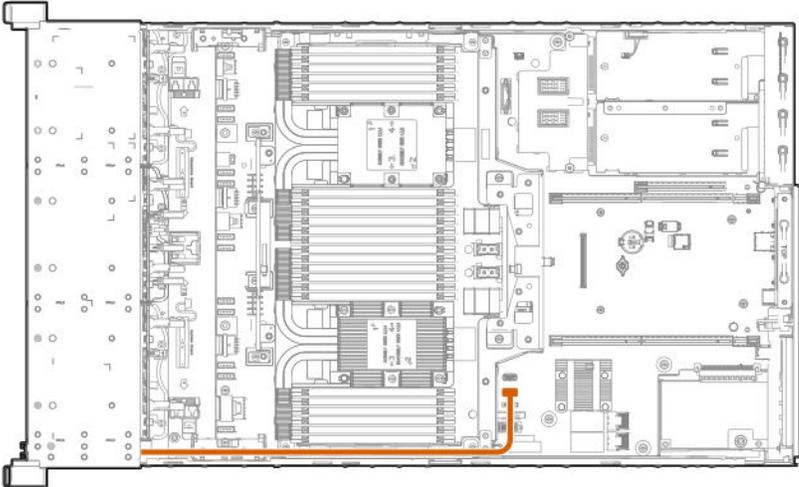
Power switch module/Systems Insight Display module cabling
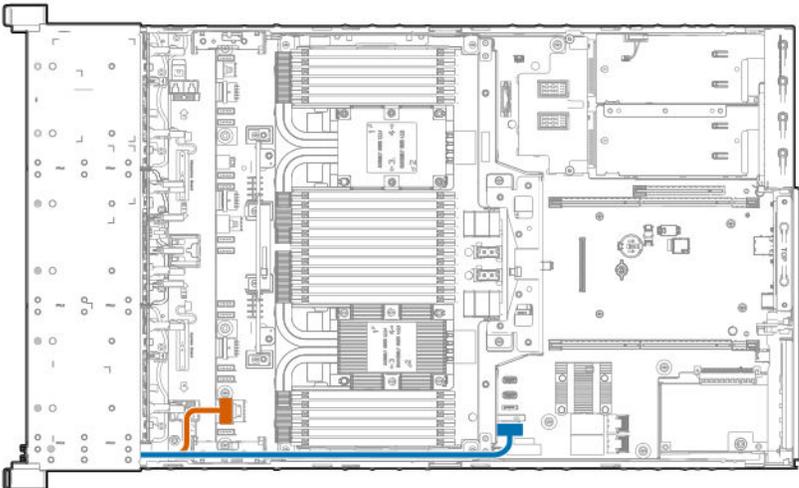
SFF HDD drive cage cabling

Drive cages to primary PCIe riser
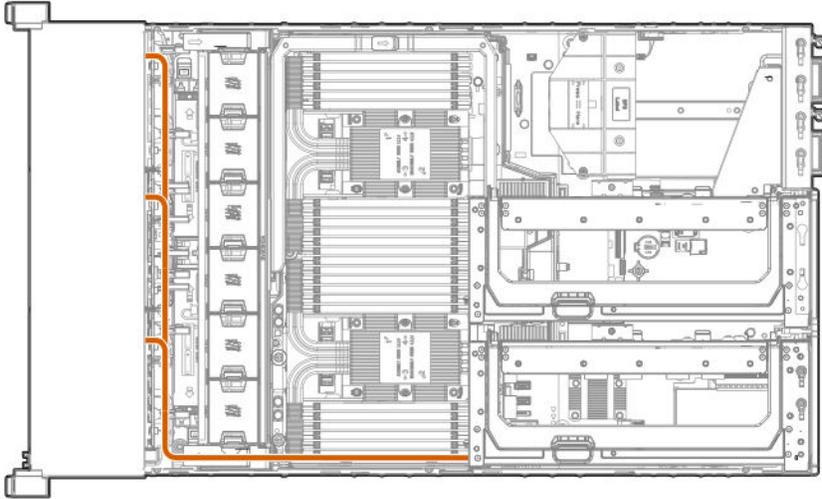
Drive cages to tertiary riser slot
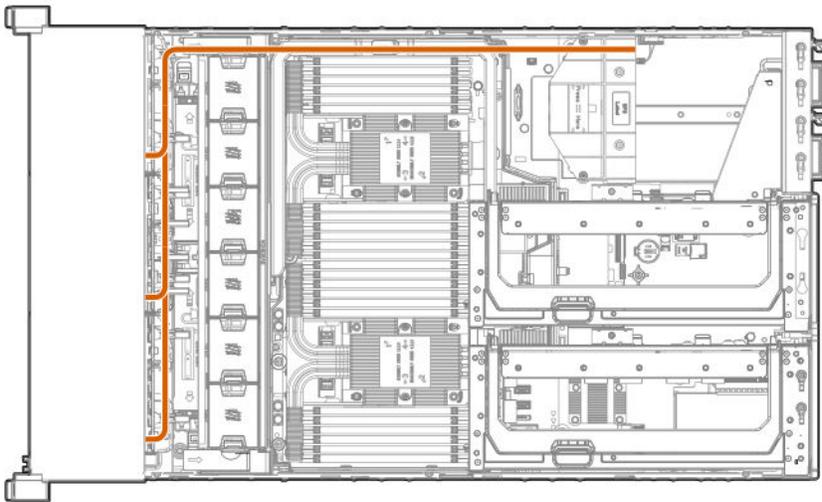
NVMe SSD drive cage cabling

6-drive (or fewer) configuration

Drive box 2, connected to the 6-slot risers installed in the primary and butterfly riser cages.
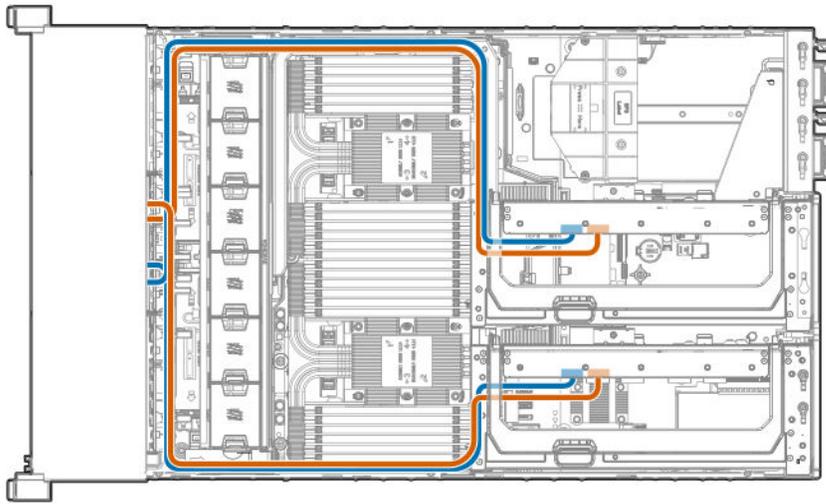
8-drive configuration

Drive box 2, connected to the 6-slot risers installed in the primary and butterfly riser cages.
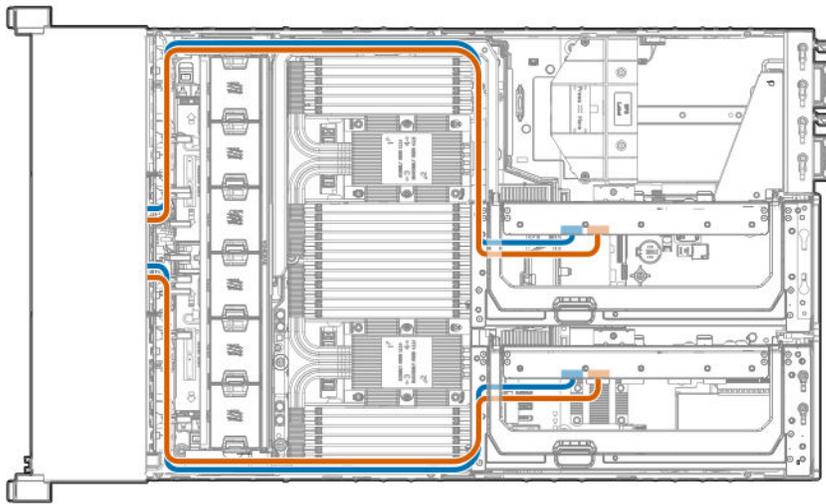
16-drive configuration

- Drive box 2, connected to the 4-port NVMe mezzanine card.
- Drive box 3, connected to the 4-port slimline riser installed in the primary riser cage.
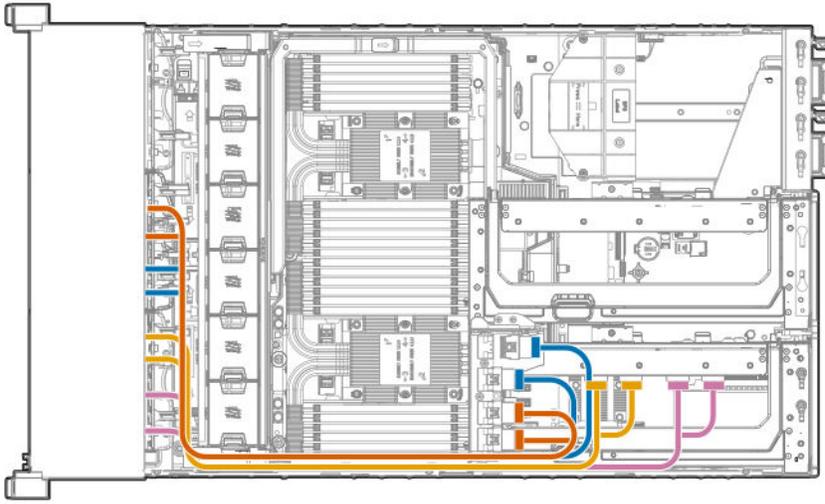
20-drive configuration

16-drive configuration, plus the following:

- Drive box 1 (six-bay HDD/two-bay NVMe Premium drive cage), connected to the 6-slot riser installed in the butterfly riser cage.

- Drive box 4 (universal media bay with two-bay SFF Premium drive cage), connected to the 6-slot riser installed in the butterfly riser cage.

Or:

Drive box 1 (eight-bay NVMe SSD drive cage, with four NVMe drives installed), connected to the 6-slot riser installed in the butterfly riser cage.
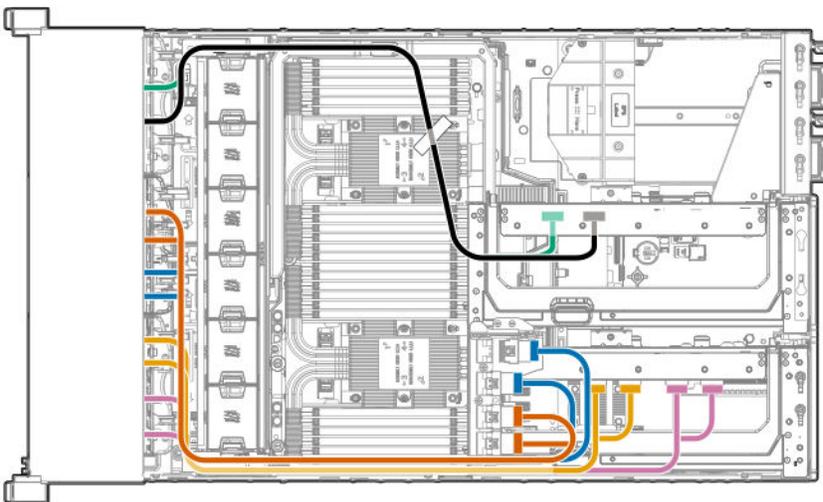
12G SAS expander cabling

24-drive configuration

Cables from the lower drive box backplanes (boxes 4–6) are routed to the SAS expander card installed in the primary riser cage.
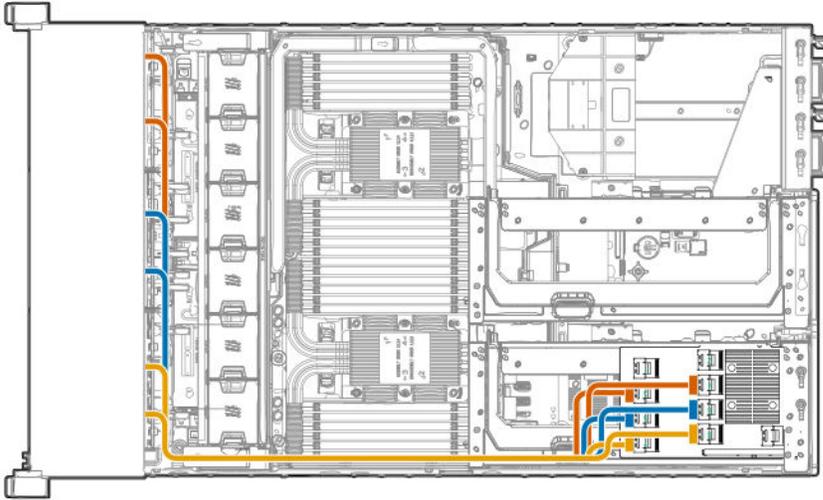
48-drive configuration

Cables from the lower drive box backplanes are routed as shown in the 24-drive configuration.

Cables from the upper drive box backplanes (boxes 1–3) are routed to the SAS expander card installed in the butterfly riser cage.
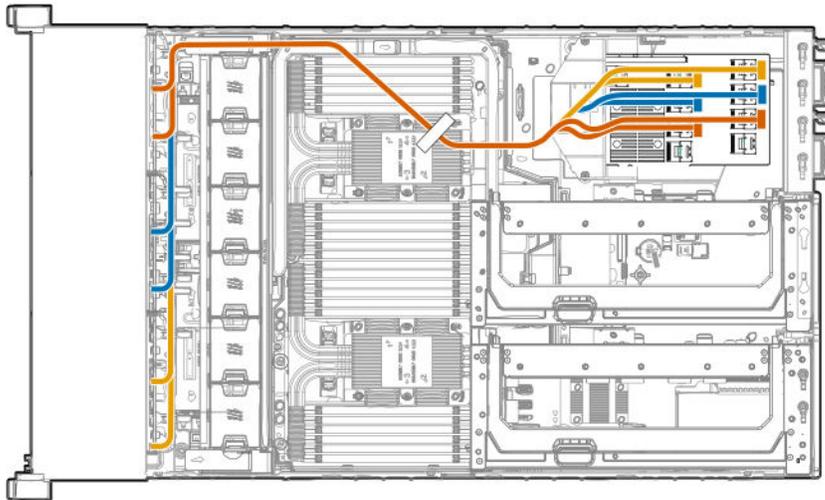
HPE Smart Storage Battery cabling
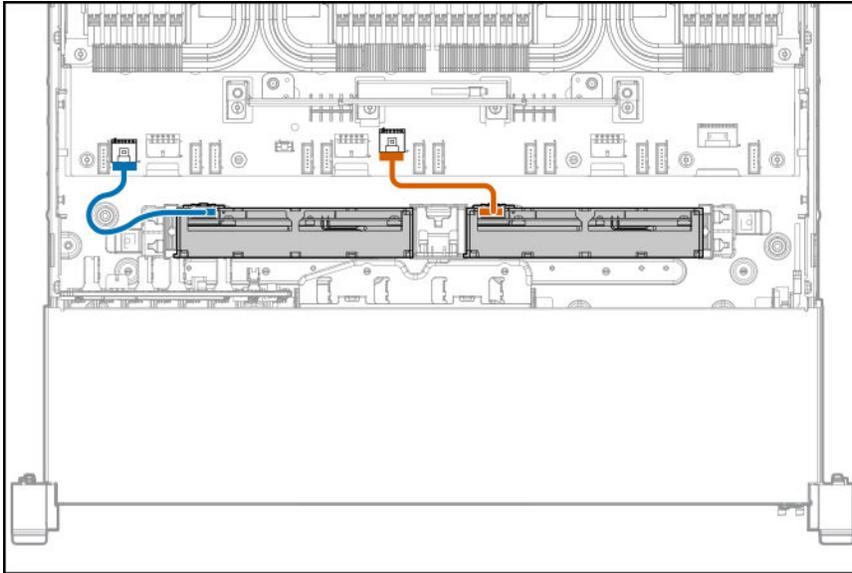
Cable	Description
System board HPE Smart Storage battery	Orange
Processor mezzanine tray HPE Smart Storage battery	Blue

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 135	Online and Offline
HPE iLO 5 on page 136	Online and Offline
HPE Smart Storage Administrator on page 142	Online and Offline
iLO RESTful API on page 138	Online and Offline
Intelligent Provisioning on page 138	Offline
Scripting Toolkit for Windows and Linux on page 140	Online
Service Pack for ProLiant on page 144	Online and Offline
Smart Update Manager on page 144	Online and Offline
UEFI System Utilities on page 140	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 supports the following features:

- Group health status—View server health and model information.

- Group Virtual Media—Connect URL-based media for access by the servers in an iLO Federation group.

- Group power control—Manage the power status of the servers in an iLO Federation group.

- Group power capping—Set dynamic power caps for the servers in an iLO Federation group.

- Group firmware update—Update the firmware of the servers in an iLO Federation group.

- Group license installation—Enter a license key to activate iLO licensed features on the servers in an iLO Federation group.

- Group configuration—Add iLO Federation group memberships for multiple iLO systems.

Any user can view information on iLO Federation pages, but a license is required for using the following features: Group Virtual Media, Group power control, Group power capping, Group configuration, and Group firmware update.

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

iLO Service Port

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

When you have physical access to a server, you can use the Service Port to do the following:

- Download the Active Health System Log to a supported USB flash drive.

  When you use this feature, the connected USB flash drive is not accessible by the host operating system.

- Connect a client (such as a laptop) with a supported USB to Ethernet adapter to access the iLO web interface, remote console, CLI, iLO RESTful API, or scripts.

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

When you use the iLO Service Port:

- Actions are logged in the iLO Event Log.

- The server UID blinks to indicate the Service Port status.

  You can also retrieve the Service Port status by using a REST client and the iLO RESTful API.

- You cannot use the Service Port to boot any device within the server, or the server itself.

- You cannot access the server by connecting to the Service Port.

- You cannot access the connected device from the server.

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

iLO RESTful API

iLO includes the iLO RESTful API, which is Redfish API conformant. The iLO RESTful API is a management interface that server management tools can use to perform configuration, inventory, and monitoring tasks by sending basic HTTPS operations (GET, PUT, POST, DELETE, and PATCH) to the iLO web server.

To learn more about the iLO RESTful API, see the Hewlett Packard Enterprise website (**http://www.hpe.com/info/restfulinterface/docs**).

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

RESTful Interface Tool

The RESTful Interface Tool (iLOREST) is a scripting tool that allows you to automate HPE server management tasks. It provides a set of simplified commands that take advantage of the iLO RESTful API. You can install the tool on your computer for remote use or install it locally on a server with a Windows or Linux Operating System. The RESTful Interface Tool offers an interactive mode, a scriptable mode, and a file-based mode similar to CONREP to help decrease automation times.

For more information, see the following website: **http://www.hpe.com/info/resttool**.

iLO Amplifier Pack

The iLO Amplifier Pack is an advanced server inventory 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/support/ilo-ap-ug-en**.

Intelligent Provisioning

Intelligent Provisioning is a single-server deployment tool embedded in ProLiant servers and HPE Synergy compute modules. Intelligent Provisioning simplifies server setup, providing a reliable and consistent way to deploy servers.

Intelligent Provisioning prepares the system for installing original, licensed vendor media and Hewlett Packard Enterprise-branded versions of OS software. Intelligent Provisioning also prepares the system to integrate optimized server support software from the Service Pack for ProLiant (SPP). SPP is a comprehensive systems software and firmware solution for ProLiant servers, server blades, their enclosures, and HPE Synergy compute modules. These components are preloaded with a basic set of firmware and OS components that are installed along with Intelligent Provisioning.

ⓘ **IMPORTANT:**

HPE ProLiant XL servers do not support operating system installation with Intelligent Provisioning, but they do support the maintenance features. For more information, see "Performing Maintenance" in the *Intelligent Provisioning User Guide* and online help.

After the server is running, you can update the firmware to install additional components. You can also update any components that have been outdated since the server was manufactured.

To access Intelligent Provisioning:

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

- From the iLO web browser user interface using **Always On**. **Always On** allows you to access Intelligent Provisioning without rebooting your server.

Intelligent Provisioning operation

Intelligent Provisioning includes the following components:

- Critical boot drivers

- Active Health System (AHS)

- Erase Utility

- Deployment Settings

> **IMPORTANT:**
>
> - Although your server is pre-loaded with firmware and drivers, you should update the firmware upon initial setup to ensure you have the latest versions. Also, downloading and updating the latest version of Intelligent Provisioning ensures the latest supported features are available.
>
> - For ProLiant servers, firmware is updated using the Intelligent Provisioning Firmware Update utility.
>
> - Do not update firmware if the version you are currently running is required for compatibility.

NOTE:

Intelligent Provisioning does not function within multihomed configurations. A multihomed host is one that is connected to two or more networks or has two or more IP addresses.

Intelligent Provisioning provides installation help for the following operating systems:

- Microsoft Windows Server

- Red Hat Enterprise Linux

- SUSE Linux Enterprise Server

- VMware ESXi/vSphere Custom Image

Not all versions of an OS are supported. For information about specific versions of a supported operating system, see the OS Support Matrix on the Hewlett Packard Enterprise website (**http://www.hpe.com/info/ossupport**).

Management Security

HPE ProLiant Gen10 servers are built with some of the industry's most advanced security capabilities, out of the box, with a foundation of secure embedded management applications and firmware. The management security provided by HPE embedded management products enables secure support of modern workloads, protecting your components from unauthorized access and unapproved use. The range of embedded management and optional software and firmware available with the iLO Advanced and iLO Advanced

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

You can customize the certificates embedded in the UEFI BIOS by adding or removing your own certificates, either from a management console directly attached to the server, or by remotely connecting to the server using the iLO Remote Console.

You can configure Secure Boot:

- Using the **System Utilities** options described in the following sections.

- Using the iLO RESTful API to clear and restore certificates. For more information, see the Hewlett Packard Enterprise website (**http://www.hpe.com/info/redfish**).

- Using the `secboot` command in the Embedded UEFI Shell to display Secure Boot databases, keys, and security reports.

Launching the Embedded UEFI Shell

Use the **Embedded UEFI Shell** option to launch the Embedded UEFI Shell. The Embedded UEFI Shell is a preboot command-line environment for scripting and running UEFI applications, including UEFI boot loaders. The Shell also provides CLI-based commands you can use to obtain system information, and to configure and update the system BIOS.

Prerequisites

Embedded UEFI Shell is set to **Enabled**.

Procedure

1. From the **System Utilities** screen, select **Embedded Applications** > **Embedded UEFI Shell**.

   The **Embedded UEFI Shell** screen appears.

2. Press any key to acknowledge that you are physically present.

   This step ensures that certain features, such as disabling **Secure Boot** or managing the **Secure Boot** certificates using third-party UEFI tools, are not restricted.

3. If an administrator password is set, enter it at the prompt and press **Enter**.

   The `Shell>` prompt appears.

4. Enter the commands required to complete your task.

5. Enter the `exit` command to exit the Shell.

HPE Smart Storage Administrator

HPE SSA is the main tool for configuring arrays on HPE Smart Array SR controllers. It exists in three interface formats: the HPE SSA GUI, the HPE SSA CLI, and HPE SSA Scripting. All formats provide support for configuration tasks. Some of the advanced tasks are available in only one format.

The diagnostic features in HPE SSA are also available in the standalone software HPE Smart Storage Administrator Diagnostics Utility CLI.

During the initial provisioning of the server or compute module, an array is required to be configured before the operating system can be installed. You can configure the array using SSA.

HPE SSA is accessible both offline (either through HPE Intelligent Provisioning or as a standalone bootable ISO image) and online:

- Accessing HPE SSA in the offline environment

   ⓘ **IMPORTANT:**
   If you are updating an existing server in an offline environment, obtain the latest version of HPE SSA through Service Pack for ProLiant before performing configuration procedures.

Using one of multiple methods, you can run HPE SSA before launching the host operating system. In offline mode, users can configure or maintain detected and supported devices, such as optional Smart Array controllers and integrated Smart Array controllers. Some HPE SSA features are only available in the offline environment, such as setting the boot controller and boot volume.

- Accessing HPE SSA in the online environment

  This method requires an administrator to download the HPE SSA executables and install them. You can run HPE SSA online after launching the host operating system.

For more information, see *HPE Smart Array SR Gen10 Configuration Guide* at the **Hewlett Packard Enterprise website**.

USB support

Hewlett Packard Enterprise Gen10 servers support all USB operating speeds depending on the device that is connected to the server.

External USB functionality

Hewlett Packard Enterprise provides external USB support to enable local connection of USB devices for server administration, configuration, and diagnostic procedures.

For additional security, external USB functionality can be disabled through USB options in UEFI System Utilities.

Redundant ROM support

The server enables you to upgrade or configure the ROM safely with redundant ROM support. The server has a single ROM that acts as two separate ROM images. In the standard implementation, one side of the ROM contains the current ROM program version, while the other side of the ROM contains a backup version.

NOTE: The server ships with the same version programmed on each side of the ROM.

Safety and security benefits

When you flash the system ROM, the flashing mechanism writes over the backup ROM and saves the current ROM as a backup, enabling you to switch easily to the alternate ROM version if the new ROM becomes corrupted for any reason. This feature protects the existing ROM version, even if you experience a power failure while flashing the ROM.

Keeping the system current

Updating firmware or system ROM

To update firmware or system ROM, use one of the following methods:

- The **Firmware Update** option in the System Utilities.
- The `fwupdate` command in the **Embedded UEFI Shell**.
- Service Pack for ProLiant (SPP)
- HPE online flash components
- Moonshot Component Pack

Service Pack for ProLiant

SPP is a systems software and firmware solution delivered as a single ISO file download. This solution uses SUM as the deployment tool and is tested and supports HPE ProLiant, HPE BladeSystem, HPE Synergy, and HPE Apollo servers and infrastructure.

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

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

The preferred method for downloading an SPP is using the SPP Custom Download at **www.hpe.com/servers/custom**.

The SPP is also available for download from the SPP download page at **https://www.hpe.com/servers/spp/download**.

Smart Update Manager

SUM is an innovative tool for maintaining and updating the firmware, drivers, and system software of HPE ProLiant, HPE BladeSystem, HPE Synergy, HPE Apollo, and HPE Moonshot servers, infrastructure, and associated options.

SUM identifies associated nodes you can update at the same time to avoid interdependency issues.

Key features of SUM include:

- Discovery engine that finds installed versions of hardware, firmware, and software on nodes.
- SUM deploys updates in the correct order and ensures that all dependencies are met before deploying an update.
- Interdependency checking.
- Automatic and step-by-step Localhost Guided Update process.
- Web browser-based mode.
- Ability to create custom baselines and ISOs.
- Support for iLO Repository (Gen10 iLO 5 nodes only).
- Simultaneous firmware and software deployment for multiple remote nodes.
- Local offline firmware deployments with SPP deliverables.
- Extensive logging in all modes.

NOTE:

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

Smart Update Tools

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

NOTE:

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

- **Smart Update Tools**: Polls iLO to check for requests from HPE OneView or iLO Amplifier Pack for updates through the management network and orchestrates staging, deploying, and activating updates. You can adjust the polling interval by issuing the appropriate command-line option provided by iSUT. Performs inventory on target servers, stages deployment, deploys updates, and then reboots the servers.

- **iLO Amplifier Pack**: Displays available updates for servers. Communicates with iSUT (or SUT 1.x) through iLO to perform updates.

- **HPE OneView:** Displays available updates for servers. Communicates with iSUT (or SUT 1.x) to initiate updates, reports the status on the **Firmware** section of the **Server Profile** page of HPE OneView. HPE OneView provides automated compliance reporting in the dashboard.

- **SPP**: A comprehensive systems software and firmware update solution, which is delivered as a single ISO image.

- **SUM**: A tool for firmware and driver maintenance for HPE ProLiant servers and associated options.

NOTE:

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

Updating firmware from the System Utilities

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

Procedure

1. Access the System ROM Flash Binary component for your server from the Hewlett Packard Enterprise Support Center.

2. Copy the binary file to a USB media or iLO virtual media.

3. Attach the media to the server.

4. Launch the **System Utilities**, and select **Embedded Applications** > **Firmware Update**.

5. Select a device.

   The **Firmware Updates** screen lists details about your selected device, including the current firmware version in use.

6. Select **Select Firmware File**.

7. Select the flash file in the **File Explorer** list.

   The firmware file is loaded and the **Firmware Updates** screen lists details of the file in the **Selected firmware file** field.

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

   A device can have multiple firmware images.

9. Select **Start firmware update**.

Updating the firmware from the UEFI Embedded Shell

Procedure

1. Access the System ROM Flash Binary component for your server from the Hewlett Packard Enterprise Support Center (**http://www.hpe.com/support/hpesc**).

2. Copy the binary file to a USB media or iLO virtual media.

3. Attach the media to the server.

4. Boot to the UEFI Embedded Shell.

5. To obtain the assigned file system volume for the USB key, enter `map -r`.

6. Change to the file system that contains the System ROM Flash Binary component for your server. Enter one of the `fsx` file systems available, such as `fs0:` or `fs1:`, and press **Enter**.

7. Use the `cd` command to change from the current directory to the directory that contains the binary file.

8. Flash the system ROM by entering `fwupdate -d BIOS -f `*`filename`*.

9. Reboot the server. A reboot is required after the firmware update in order for the updates to take effect and for hardware stability to be maintained.

Online Flash components

This component provides updated system firmware that can be installed directly on supported operating systems. Additionally, when used in conjunction with SUM, this Smart Component allows the user to update firmware on remote servers from a central location. This remote deployment capability eliminates the need for the user to be physically present at the server to perform a firmware update.

Drivers

> (!) **IMPORTANT:**
> Always perform a backup before installing or updating device drivers.

Update drivers using any of the following **Smart Update Solutions**:

- Download the latest Service Pack for ProLiant (includes Smart Update Manager)

- Create a custom SPP download

- Download Smart Update Manager for Linux

- Download specific drivers

  To locate the drivers for a server, go to the **Hewlett Packard Enterprise Support Center website**, and then search for the product name/number.

Software and firmware

Update software and firmware before using the server for the first time, unless any installed software or components require an older version.

For system software and firmware updates, use one of the following sources:

- Download the SPP from the Hewlett Packard Enterprise website (**http://www.hpe.com/servers/spp/download**).

- Download individual drivers, firmware, or other systems software components from the server product page in the Hewlett Packard Enterprise Support Center website (**http://www.hpe.com/support/hpesc**).

Operating system version support

For information about specific versions of a supported operating system, refer to the **operating system support matrix**.

HPE Pointnext Portfolio

HPE Pointnext delivers confidence, reduces risk, and helps customers realize agility and stability. Hewlett Packard Enterprise helps customers succeed through Hybrid IT by simplifying and enriching the on-premise experience, informed by public cloud qualities and attributes.

Operational Support Services enable you to choose the right service level, length of coverage, and response time to fit your business needs. For more information, see the Hewlett Packard Enterprise website:

https://www.hpe.com/us/en/services/operational.html

Utilize the Advisory and Transformation Services in the following areas:

- Private or hybrid cloud computing

- Big data and mobility requirements

- Improving data center infrastructure

- Better use of server, storage, and networking technology

For more information, see the Hewlett Packard Enterprise website:

http://www.hpe.com/services/consulting

Proactive notifications

30 to 60 days in advance, Hewlett Packard Enterprise sends notifications to subscribed customers on upcoming:

- Hardware, firmware, and software changes

- Bulletins

- Patches

- Security alerts

You can subscribe to proactive notifications on the **Hewlett Packard Enterprise website**.

Troubleshooting

Troubleshooting resources

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

- *Troubleshooting Guide for HPE ProLiant Gen10 servers* provides procedures for resolving common problems and comprehensive courses of action for fault isolation and identification, issue resolution, and software maintenance.

- *Error Message Guide for HPE ProLiant Gen10 servers and HPE Synergy* provides a list of error messages and information to assist with interpreting and resolving error messages.

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

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

NMI functionality

An NMI crash dump enables administrators to create crash dump files when a system is hung and not responding to traditional debugging methods.

An analysis of the crash dump log is an essential part of diagnosing reliability problems, such as hanging operating systems, device drivers, and applications. Many crashes freeze a system, and the only available action for administrators is to cycle the system power. Resetting the system erases any information that could support problem analysis, but the NMI feature preserves that information by performing a memory dump before a hard reset.

To force the OS to invoke the NMI handler and generate a crash dump log, the administrator can use the iLO Virtual NMI feature.

Replacing the system battery

The system battery provides power to the internal 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** on page 32.

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 (**Extending the server from the rack** on page 32).

   • Remove the server from the rack (**Removing the server from the rack** on page 33).

4. Remove the access panel (**Removing the access panel** on page 36).

   > ⚠️ **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.

5. If installed, remove the butterfly riser cage (**Removing a PCIe riser cage** on page 39).

6. Locate the battery (**System board components** on page 24).

7. Remove the battery.
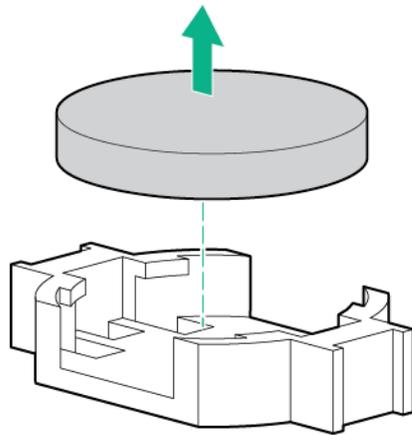
To replace the component, reverse the removal procedure.

8. 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**.

System Inlet Temperature, Extended Ambient Operating Support

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	17.48 cm (6.88 in)
Depth	75.18 cm (29.60 in)
Width	44.55 cm (17.54 in)
Weight (maximum)	51.71 kg (114 lbs)
Weight (minimum)	28.12 kg (62 lbs)

Power supply specifications

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

- **HPE 800W Flex Slot Platinum Hot Plug Low Halogen Power Supply** on page 153

- **HPE 1600W Flex Slot Platinum Hot Plug Low Halogen Power Supply** on page 153

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 Low Halogen Power Supply

Specification	Value
Input requirements	
Rated input voltage	100 VAC to 127 VAC
	100 VAC to 240 VAC
	240 VDC for China only
Rated input frequency	50 Hz to 60 Hz
	Not applicable to 240 VDC
Rated input current	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	899 W at 100 VAC
	867 W at 200 VAC
	864 W at 240 VDC for China only
BTUs per hour	3,067 at 100 VAC
	2,958 at 200 VAC
	2,949 at 240 VAC for China only
Power supply output	
Rated steady-state power	800 W at 100 VAC to 127 VAC input
	800 W at 100 VAC to 240 VAC input
	800 W at 240 VDC input for China only
Maximum peak power	800 W at 100 VAC to 127 VAC input
	800 W at 100 VAC to 240 VAC input
	800 W at 240 VDC input for China only

HPE 1600W Flex Slot Platinum Hot Plug Low Halogen Power Supply

Specification	Value
Input requirements	
Rated input voltage	200 VAC to 240 VAC
	240 VDC for China only
Rated input frequency	50 Hz to 60 Hz

Table Continued

Specification	Value
Rated input current	8.7 A at 200 VAC
	7.2 A at 240 VAC
Maximum rated input power	1,734 W at 200 VAC
	1,725 W at 240 VAC
BTUs per hour	5,918 at 200 VAC
	5,884 at 240 VAC
Power supply output	
Rated steady-state power	1,600 W at 200 VAC to 240 VAC input
	1,600 W at 240 VDC input
Maximum peak power	2,200 W for 1 ms (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.